Carrier

ComfortLink™

AQUAFORCE SERVICE MANUAL

30XA Air-Cooled Chillers
Series A

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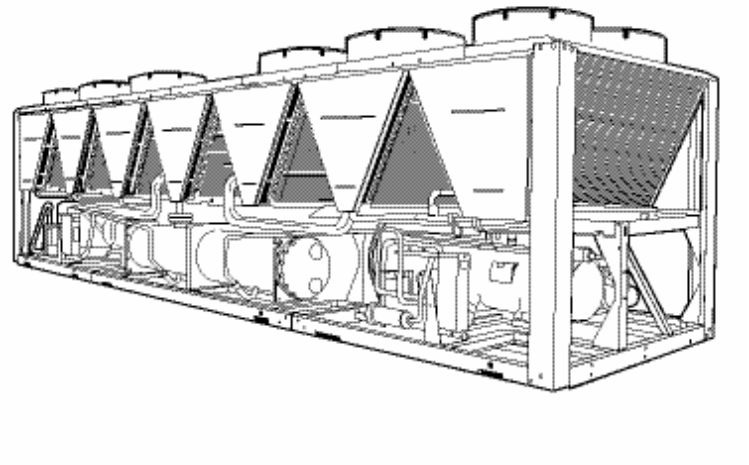

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SAFETY CONSIDERATIONS

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.

CAUTION

This system uses R-410a, which has higher pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gage set, hoses and recovery systems must be designed to handle R-410a refrigerant. If unsure about equipment, consult the equipment manufacturer.

INTRODUCTION

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

This chiller is a ASHRAE 90.1 compliant machine, utilizing a flooded cooler, screw compression technology and R-134a.

Production of this family of the machines started with serial numbers beginning with ??05Q.

Model Number Significance

The following chart is a model number breakdown for the 30XA AquaForce Chiller.

Position	1-4	5	6-8	9	10	11	12	13	14	15	16
Description	**30XA**	**A**	**220**	**6**	**-**	**-**	**0**	**-**	**-**	**-**	**3**

Air-Cooled AquaSnap Chiller

Design Series

Nominal Capacity

080	120	200	280	400
090	140	220	300	450
100	160	240	325	500
110	180	260	350	

Position	1-4	5	6-8	9	10	11	12	13	14	15	16
Description	**30XA**	**A**	**220**	**6**	**-**	**-**	**0**	**-**	**-**	**-**	**3**

Voltage Options
1 = 575-3-60
2 = 380-3-60
4 = 230-3-60
6 = 460-3-60
7 = 208-3-60

Condenser Coil, Sound and Ambient Options
- = Al/Cu Coil, High Ambient
0 = Cu/Cu Coil, High Ambient
1 = Pre-Coat Al//Cu Coil, High Ambient
2 = E-Coat Al/Cu Coil, High Ambient
3 = E-Coat Cu/Cu Coil, High Ambient
4 = MicroChannel, High Ambient
5 = E-Coat MicroChannel, High Ambient
6 = Al/Cu Coil, High Ambient, Low Sound
7 = Cu/Cu Coil, High Ambient, Low Sound
8 = Pre-Coat Al//Cu Coil, High Ambient, Low Sound
9 = E-Coat Al/Cu Coil, High Ambient, Low Sound
B = E-Coat Cu/Cu Coil, High Ambient, Low Sound
C = MicroChannel, High Ambient, Low Sound
D = E-Coat MicroChannel, High Ambient, Low Sound
F = Al/Cu Coil, Low Sound
G = Cu/Cu Coil, Low Sound
H = Pre-Coat Al//Cu Coil, Low Sound
J = E-Coat Al/Cu Coil, Low Sound
K = E-Coat Cu/Cu Coil, Low Sound
L = MicroChannel, Low Sound
M = E-Coat MicroChannel, Low Sound
N = Al/Cu Coil
P = Cu/Cu Coil
Q = Pre-Coat Al//Cu Coil
R = E-Coat Al/Cu Coil
S = E-Coat Cu/Cu Coil
T = MicroChannel
V = E-Coat MicroChannel

Hydronic Pump Package Options
- = None
0 = Single 3 Hp
1 = Single 5 Hp
2 = Single 7.5 Hp
3 = Single 10 Hp
4 = Single 15 Hp
5 = Single 20 Hp
6 = Dual 3 Hp
7 = Dual 5 Hp
8 = Dual 7.5 Hp (Lo Hd)
9 = Dual 7.5 Hp (Hi Hd)
B = Dual 10 Hp
C = Dual 15 Hp
D = Dual 20 Hp

Z = Special Order Machine

Cooler and Brine Options
0 = Cooler Heater
3 = Cooler Heater, -1 Pass
5 = Cooler Heater, +1 Pass
B = Cooler Heater, Brine
F = Cooler Heater, Brine, -1 Pass
H = Cooler Heater, Brine +1 Pass

Refrigeration Circuit Options
- = None
1 = Suction Service Valve (SSV)
2 = Low Ambient Temperature Head Pressure Control (LATHPC)
5 = SSV, LATHPC

Electrical Options

Position	1-4	5	6-8	9	10	11	12	13	14	15	16
Description	30XA	A	220	6	-	-	0	-	-	-	3

- = Single Point Power, XL Start
0 = Single Point Power, Wye-Delta Start

Controls and Communication Options

Packaging and Security Options
0 = Skid
1 = Skid, Top Crate
2 = Full Crate
3 =

APPLICATION

Compressors

Condenser Coils

Condenser Coil Material Options
Several options for condenser coils materials are offered. They are listed below. The choice of material depends on the environment for the machine. See “Selection Guide: Environmental Corrosion Protection”, Catalog Number 811-20062, for information on which material is correct for the installation.

Aluminum Fin/Copper Tube
Aluminum Fin/Copper Tube is the standard condenser coil material.

E-coat Aluminum Fin/Copper Tube
This option was released with the introduction of the product.

Pre-coat Aluminum Fin/Copper Tube
This option was released with the introduction of the product, with one change. The material color of the compound changed from black to gold. There is no difference in performance, efficiency or corrosion for the color change. It is the same compound originally used for earlier chiller families.

Bulletins pertaining to this option:
- 111-05-09 – 30RB Pre-Coat Coil Option Color Change
  This bulletin described the color change for the Pre-coat option to domestic distributors.
- 111-05-02-E – 30RB Pre-Coat Coil Option Color Change
  This bulletin described the color change for the Pre-coat option to export distributors.

Copper Fin/Copper Tube
This option was not released for production at the initial launch of the product. It was released for production orders in January 2006.

Bulletins pertaining to this option:
- 111-06-01 – 30RB/XA Cu/Cu Condenser Coil Options Release
  This bulletin advised of the copper fin/cooper tube condenser coil release with Packaged Chiller Builder Version 3.17

E-coat Copper Fin/Copper Tube
This option was not released for production at the initial launch of the product. It was released for production orders January 2006.

Bulletins pertaining to this option:
- 111-06-01 – 30RB/XA Cu/Cu Condenser Coil Options Release
  This bulletin advised of the copper fin/cooper tube condenser coil release with Packaged Chiller Builder Version 3.17

MicroChannel Condenser Coil
This option was not released for production at the initial launch of the product. It was released for production orders April 2006. It is an all aluminum condenser coil.

It is recommended that with this option, the suction service valves be included to allow for charge storage in the cooler.

Bulletins pertaining to this option:
- 111-06-17 – 30XA MicroChannel Condenser Coil Release
  This bulletin advised of the MicroChannel condenser coil release with Packaged Chiller Builder Version 3.19a.
- 111-06-21 – Refrigerant Storage with MCHX Coils
  This bulletin recommended the Suction Service Valve Option with the of the MicroChannel condenser coils for refrigerant storage options.

Condenser Fan System

Condenser Fan Motor
Two special fan motors are used with this fan system, due to mounting requirements.

Fan Motor Information

Frame Size	
Type	
Insulation Class	F
Speed, RPM (r/s)	1140 (19)
NEC Rated Horsepower	3.4
Bearings	Permanently Lubricated

Control Transformer
A separate 115 volt control circuit is required for this family of machines. A factory installed option is available to supply control power for the machine.

A field-installed accessory is also available. For usage, see the table below.

30XA Model	*Voltage*	*Part Number*	*Description*	*Quantity*
	208-3-60	*30GX-900---057*		*1*
	230-3-60	*30GX-900---055*		*1*
All	*380-3-60*		*5 kVA*	
	460-3-60	*30GX-900---055*		*1*
	575-3-60	*30GX-900---056*		*1*

Early production

Cooler Freeze Protection
Freeze protection for the cooler 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.

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.

Coolers
The 30XA machines utilize a flooded vessel. Different pass arrangements are available.

Cooler Head Swap
Some machines cannot be modified for cooler head swaps without increasing the risk of liquid refrigerant carry-over and incurring a loss of capacity. As a result, this modification is not recommended on the following units: 30XA260, 30XA280, 30XA300, 30XA325, 30XA350, 30XA450 and 30XA500.

Energy Management Module
This module, offered as both a factory-installed option and as an accessory, allows for many Energy Management Functions to be incorporated into the controls of the unit. These controls include:

Ground Fault Interrupter Convenience Outlet
Offered on this product family is a Ground Fault Interrupter Convenience Outlet both from the factory as a Factory Installed Option included with the “Service Option” and as an Accessory. It is only available in 115 volt, 60 Hz. It is not compatible with 380-3-60 units.

Voltage 3-Ph, 60 Hz	Quantity	Ground Fault Interrupter – Convenience Outlet Part Number

Head Pressure Control
AquaSnap offers both factory-installed as well as field installed accessory head pressure control. The controller is a Variable Frequency Drive for the lead condenser fans in the circuit. Below is the accessory usage table.

Unit	Size	Voltage	No. of Circuits	Accessory Kit No.	Qty Req'd
30XA	080,090,100,110, 120,140,160,180, 200,220,240,260, 280,300,325,350	200-3-60	2	00EFN900000700A	2
		230-3-60	2	00EFN900000700A	2
		380-3-60	2	00EFN900000500A	2
		460-3-60	2	00EFN900000500A	2
		575-3-60	2	00EFN900001900A	2
	400,450,500	380-3-60	3	00EFN900000500A	3
		460-3-60	3	00EFN900000500A	3
		575-3-60	3	00EFN900001900A	3

Hydronic Package
The hydronic package has not been released yet.

Rigging Information
The 30XA400, 450 and 500 machines can be broken into two pieces for easier rigging. The interconnecting piping between the two coolers must be removed and the communication cable between the 2 sections must be disconnected before rigging.

The section weights are as follows:

Unit	Condenser Coil	Section Weight (lbs) Compressor Circuits		Section Weight (kg) Compressor Circuits	
		A & B	C	A & B	C
30XA-400	Al Fin/Cu Tube	15,290	9,288	6,950	4,222
30XA-450		17,254	9,346	7,843	4,248
30XA-500		17,511	9,383	7,960	4,265
30XA-400	Cu Fin/Cu Tube				
30XA-450					
30XA-500					

CONTROLS

Capacity Control
The control system cycles compressors and positions the slide valve of each compressor to maintain the user-configured leaving chilled fluid temperature set point. The Main Base Board (MBB) uses entering fluid temperature to determine the

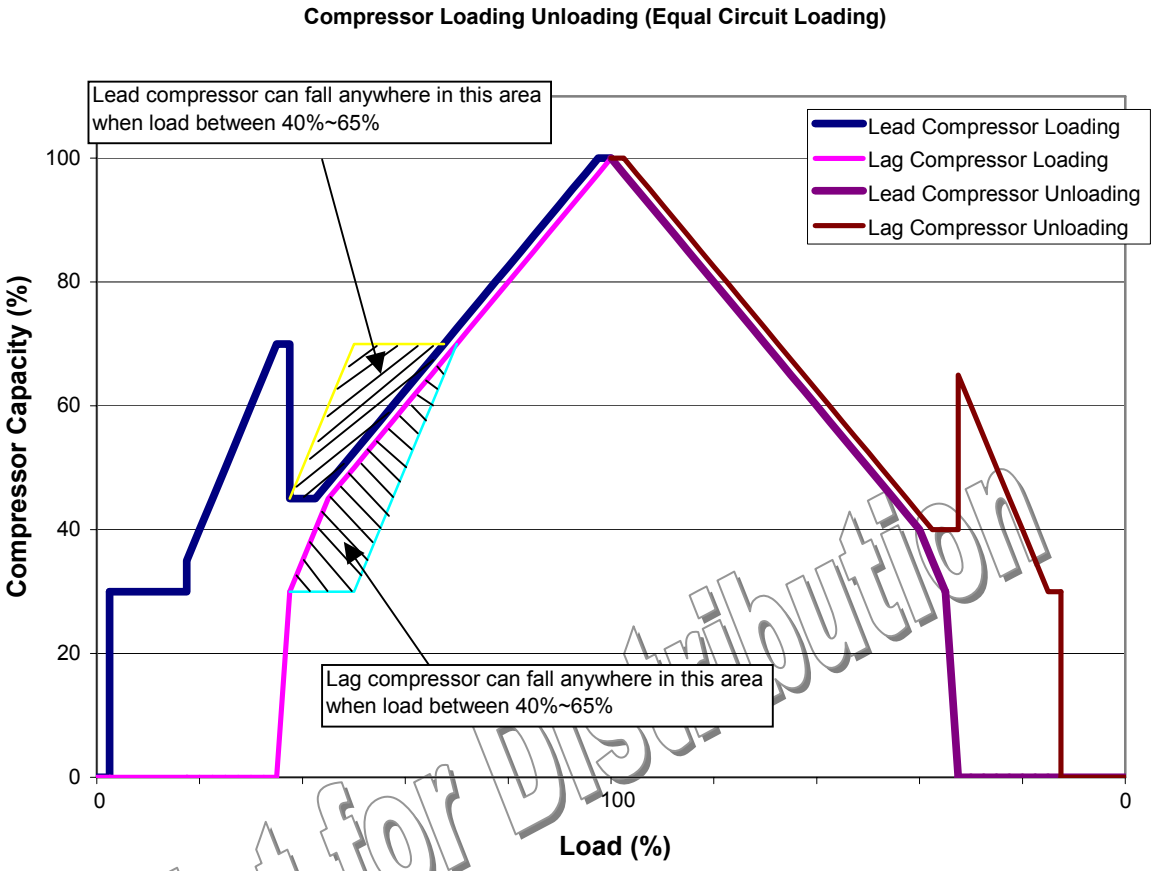
temperature drop across the cooler and is used in determining the optimum time to add or subtract capacity. Return fluid temperature, space temperature (requires additional sensor), or outdoor-air temperature reset features can automatically reset the leaving chilled fluid temperature set point. It can also be reset from an external 4 to 20-mA signal (requires Energy Management Module). Temperature reset requires a temperature sensor and the Energy Management Module. The control has an automatic lead-lag feature built in for circuit and compressor starts. If enabled, the control will determine which circuit (***Configuration→OPTN→LLCS*=0**) and compressor to start to even the wear. The compressor wear factor (combination of starts and run hours) is used to determine which compressor starts.

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

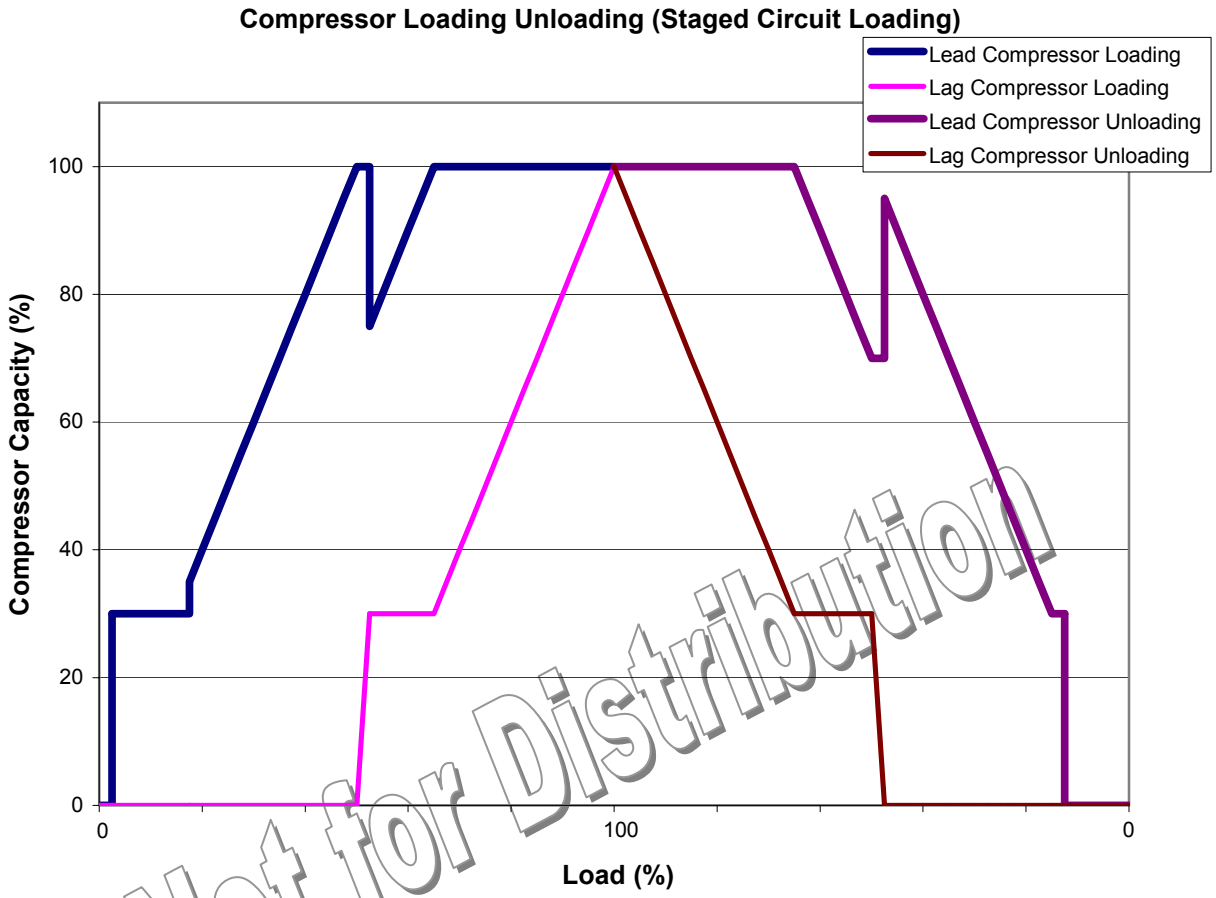
In this case, the circuit with the lowest compressor wear factor is the circuit that starts first. The following settings will determine what circuit starts first:
***Configuration→OPTN→LLCS*=1, Circuit A starts**
***Configuration→OPTN→LLCS*=2, Circuit B starts**
***Configuration→OPTN→LLCS*=2, Circuit C starts**

If Minimum Load Control is enabled (***Configuration→UNIT→HGBP*=1**), the valve will be operational only during the first stage of cooling.

EQUAL LOADING (***Configuration→OPTN→LOAD*=0**) — The circuit which has started will maintain minimum stage of capacity and slide valve fully unloaded; when additional capacity is required the next circuit with the lowest compressor wear factor is started with the slide valve at minimum position. As additional capacity is required the slide valve for a circuit will be adjusted in approximately 5% increments to match capacity requirements. The control will alternate between circuits to maintain the same percentage of capacity on each circuit.



STAGE LOADING — If stage-loading is selected (***Configuration→OPTN→LOAD*=1**), the circuit which has started will gradually load the slide valve to match capacity requirements until the circuit is fully loaded. Once the circuit is fully loaded and additional capacity is required, the control will start an additional circuit fully unloaded and gradually unload the circuit which was fully loaded to match capacity requirements.



The capacity control algorithm runs every 30 seconds. The algorithm attempts to maintain the Control Point at the desired set point. Each time the capacity control algorithm runs, the control reads the entering and leaving fluid temperatures. The control determines the rate at which conditions are changing and calculates 2 variables based on these conditions. Next, a capacity ratio is calculated using the 2 variables to determine whether or not to make any changes to the current stages of capacity. This ratio value ranges from –100 to +100%. If the next change of capacity is a compressor, the control starts (stops) a compressor when the ratio reaches +100% (–100%). If the next change of capacity is to reposition the slide valve, the control energizes slide valve when ratio is +60% and energizes slide valve 1 when ratio is –60%. If installed, the minimum load valve solenoid will be energized with the first stage of capacity.

Minimum load valve value is fixed at 10 tons in the total capacity calculation. The control will also use the minimum load valve solenoid as the last stage of capacity before turning off the last compressor. A delay of 90 seconds occurs after each capacity step change. A delay of 3 minutes occurs after each compressor capacity step change.

Cooler Pump Control
Original production machines, produced prior to serial number ??05Q did not have an output channel for cooler pump control. There is a solution to this and it is described below:

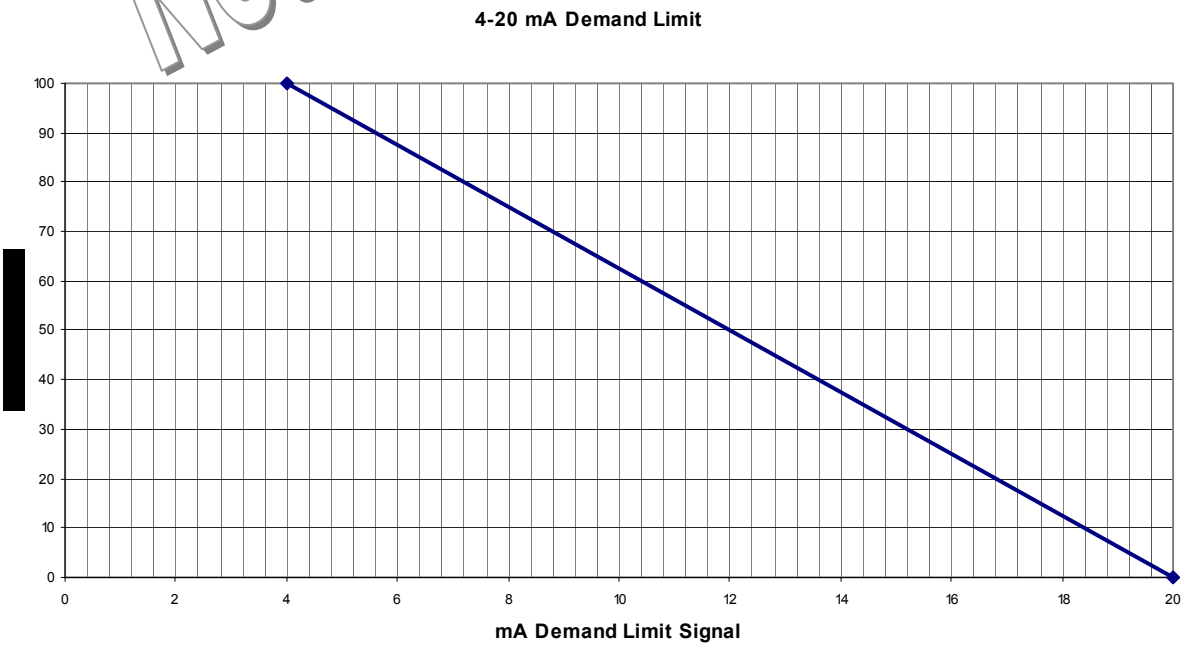
Demand Limit
There are three methods of Demand Limit for the machine. This algorithm is based on capacity, not power consumption.

Externally powered 4-20 mA
The Energy Management Module is required for 4 to 20 mA demand limit control. To configure demand limit for 4 to 20 mA control three parameters must be configured. They are: Demand Limit Select (***Configuration→RSET→DMDC***), mA for 100% Demand Limit (***Configuration→RSET→DMMX***) and mA for 0% Demand Limit (***Configuration →RSET→DMZE***). In the following example, a 4 mA signal is Demand Limit 100% and a 20 mA Demand Limit signal is 0%. The 4 to 20 mA signal is connected to TB6-1 and TB6-2. The demand limit is a linear interpolation between the two values entered.

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

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

Mode	Keypad Entry	Display	Item Expansion	Comment
Configuration	[Enter]	DISP		
	[↓]	UNIT		
	[↓]	SERV		
	[↓]	OPTN		
	[↓]	RSET	Reset Cool and Heat Tmp	
	[Enter]	CRST		
	[↓]	HRST		
	[↓]	DMDC	Demand Limit Select	
	[Enter]	0	None	
	[Enter]	0	None	Flashing to indicate Edit mode. May require Password
	[↑]	2	4-20 mA Input	Use up arrows to change value to 2.
	[Enter]	2		Accepts the change.
	[Escape]	DMDC		
	[↓]	DMMX	mA for 100% Demand Limit	
	[Enter]	0		
	[Enter]	0		Flashing to indicate Edit mode.
	[↑]	4		Use up arrows to change value to 4.
	[Escape]	DMMX		
	[↓]	DMZE	mA for 0% Demand Limit	
	[Enter]	0		
	[Enter]	0		Flashing to indicate Edit mode.
	[↑]	20		Use up arrows to change value to 20.
	[Escape]	DMZE		



Troubleshooting:

- The Energy Management Module is developed for a 1-5 vdc signal. A field supplied 250 ohm, ½ watt resistor is required. Starting with ??06Q, the 250 ohm resistors were added.

Machine Control Methods — Three variables control how the machine operates. One variable controls the machine On-Off function. The second controls the set point operation. The third variable controls the Heat-Cool operation. Table 19 illustrates how the control method and cooling set point select variables direct the operation of the chiller and the set point to which it controls. Table ? also provides the On/Off state of the machine for the given combinations.

Machine On/Off Control
Machine On/Off control depends on the interface display, Touch Pilot or Navigator.

Touch Pilot Machine Control
Machine On/Off control is determined by field input by pushing the Start/Stop button on the Touch Pilot Display. Pressing this button will cause the Equipment Start Screen to be displayed.

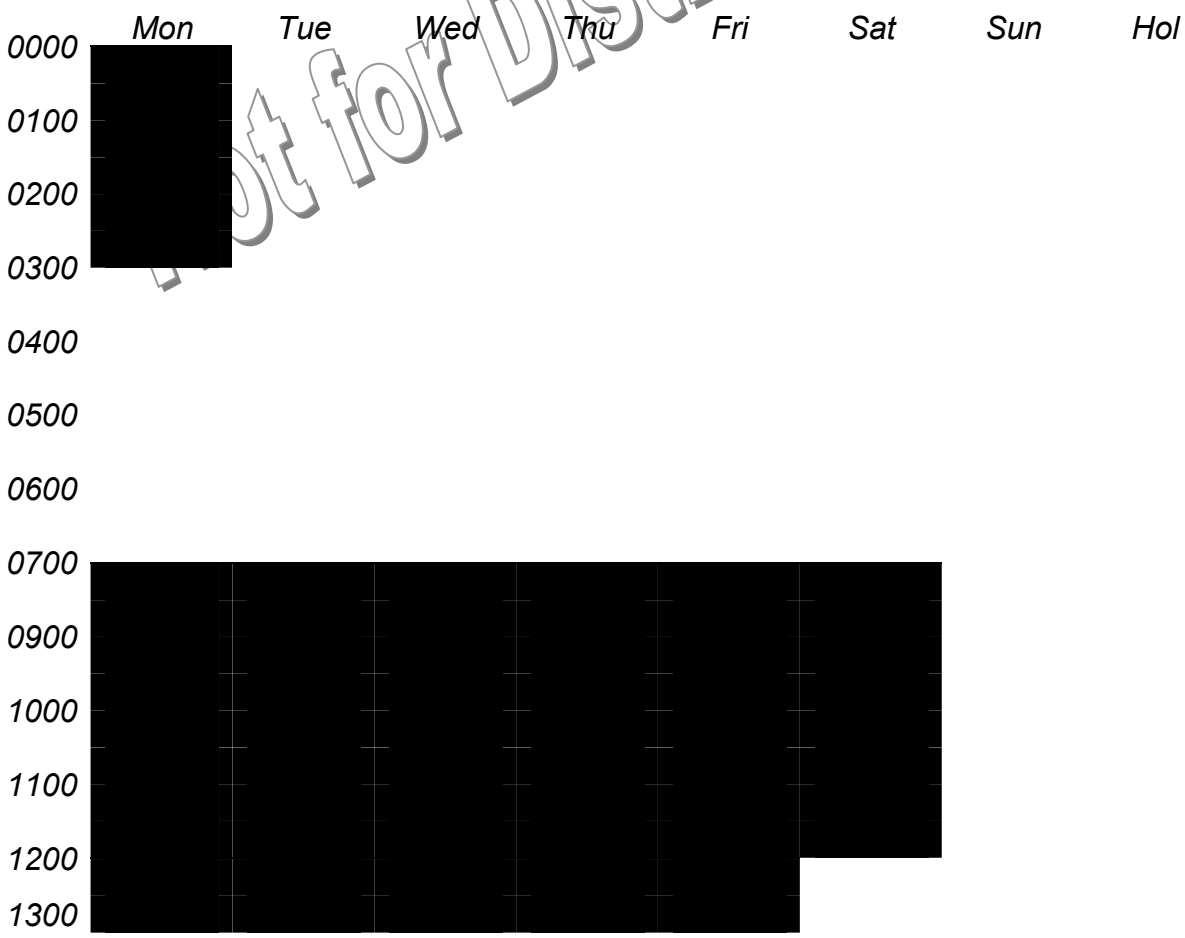
LOCAL ON – To start the machine in local mode, press the Start/Stop button (0/1) on the Touch Pilot Display. An Equipment Start Screen will be displayed. Select Local on. The control will ignore the position of Enable/Off/Remote Contact switch and all CCN network force commands, except an Emergency Stop Command. The Run Status (Status→GENUNIT→STATUS) indicating the current status of the machine, will change to RUNNING, DELAY or READY. The Chiller Occupied? (Status→GENUNIT→CHILL_OCC) will change to YES. The Control Type (Status→GENUNIT→ctr_type) will indicate the type of control and show Local. The Operating Type (Status→GENUNIT→OPER_TYP) will change to L-On (Local On).

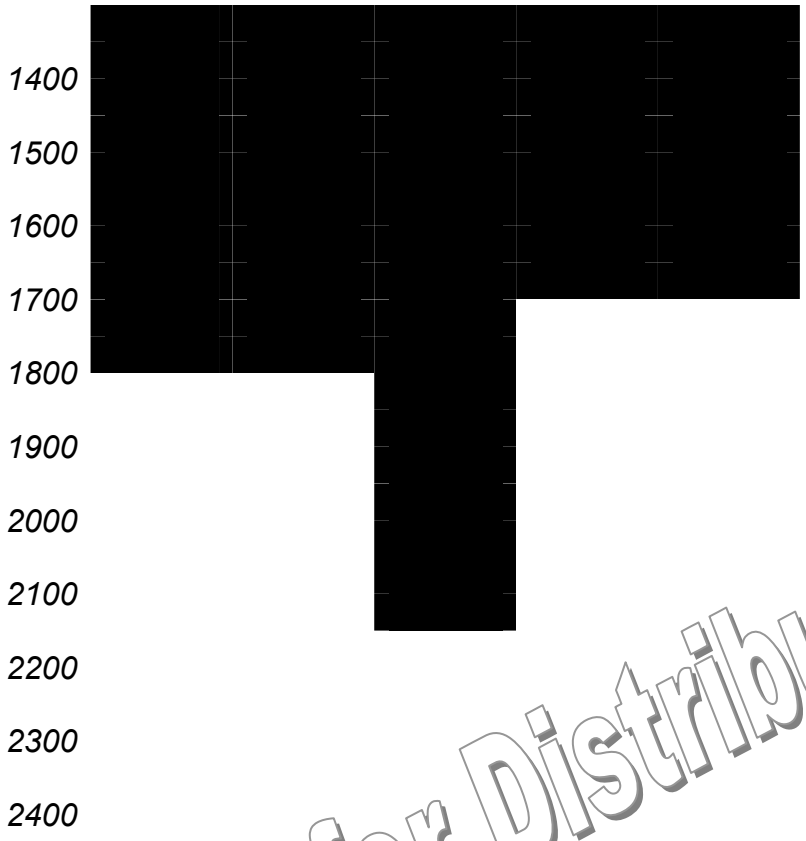
LOCAL SCHEDULE - To start the machine with a local schedule, press the Start/Stop button (0/1) on the Touch Pilot Display. An Equipment Start Screen will be displayed. Select Local Schedule. The unit will start and stop according to the schedule defined in the Time Schedule menu. Two Internal Time Schedules are available and must be field programmed. Time Schedule 1 is used for single set point On-Off control. Time Schedule 2 is used for Dual Set Point/Occupied-Unoccupied set point control. The control will ignore the position of Enable/Off/Remote Contact switch and all CCN network force commands, except the Emergency Stop Command. The Run Status (Status→GENUNIT→STATUS) will indicate the current status of the machine, OFF, RUNNING, DELAY, or READY. The Chiller Occupied? (Status→GENUNIT→CHILL_OCC) will indicate the occupied state of the machine according to Time Schedule 1, either YES or NO. The Control Type (Status→GENUNIT→ctr_type) will indicate the type of control and will show Local. The Operating Type (Status→GENUNIT→OPER_TYP) will change to L-Sched (Local Schedule).

The schedules consist of 8 user-configurable occupied time periods. The control supports time schedules for local control, remote control and ice building. These time periods can be flagged to be in effect or not in effect on each day of the week. The day begins at 00.00 and ends at 24.00. The machine is in unoccupied mode unless a scheduled time period is in effect. If an occupied period is to extend past midnight, it must be programmed in the following manner: occupied period must end at 24:00 hours (midnight); a new occupied period must be programmed to begin at 00:00 hours.

NOTE: This is true only if the occupied period starts at 00:00 (midnight). If the occupied period starts at a time other than midnight, then the occupied period must end at 24:00 hours (midnight) and new occupied period must be programmed to start at 00:00 in order for the chiller to stay in the occupied mode past midnight.

In the following example, a early morning pulldown time period is scheduled for Monday morning from 12:00 AM to 3:00 AM. The occupied period starts at 7:00 AM, Monday through Saturday. The occupied time ends at 6:00 PM on Monday and Tuesday, 9:30 PM on Wednesday, 5:00 PM on Thursday and Friday, and 12:00 PM on Saturday. Note: This schedule was designed to illustrate the programming of the schedule function and is not intended as a recommended schedule for chiller operation.





If the chiller is to be controlled to a single set point, use Schedule 1 (OCCPC01S). This will start and stop the machine. During the unoccupied times, the chiller will be off. If the chiller is to be controlled to 2 set points, occupied and unoccupied, use Schedule 2 (OCCPC02S). This will cause the chiller to control to an occupied set point and an unoccupied set point. The machine will be able to provide cooling at any time.

To configure this option:
Touch Pilot:

Display Name	***Path***	***Line No.***	***Value***
Period 1 DOW (MTWTFSSH)	*Config\OCCDEFCS\OCC1P01S or OCC1P02S*	*2*	*10000000*
Occupied from		*3*	*00:00*
Occupied to		*4*	*03:00*
Period 2 DOW (MTWTFSSH)		*5*	*11000000*
Occupied from		*6*	*07:00*
Occupied to		*7*	*18:00*
Period 3 DOW (MTWTFSSH)		*8*	*00100000*
Occupied from		*9*	*07:00*
Occupied to		*10*	*21:30*

Period 4 DOW (MTWTFSSH)	*11*	*00011000*
Occupied from	*12*	*07:00*
Occupied to	*13*	*17:00*
Period 5 DOW (MTWTFSSH)	*14*	*00000100*
Occupied from	*15*	*07:00*
Occupied to	*16*	*12:00*

Holiday Schedule – The ComfortLink Control allows up to 16 holiday periods. All holidays are entered with numerical values. First the month (HOL-MON), then the day (HOL-DAY), then the duration (HOL-LEN) of the holiday period in days. If a holiday in included in one of the Occupied Time Periods of the schedule, the machine will follow that operating condition for the holiday. In the following examples, the holidays, July 4 and December 25-26 are programmed for Holiday 1 and Holiday 2 respectively.

To configure this option:
Touch Pilot:

Display Name	***Path***	***Line No.***	***Value***
Holiday Start Month	*Config\HOLIDAY\HOLDY_01*	*1*	*7*
Start Day		*2*	*4*
Duration (days)		*3*	*1*
Holiday Start Month	*Config\HOLIDAY\HOLDY_02*	*1*	*12*
Start Day		*2*	*25*
Duration (days)		*3*	*2*

Timed Override - With the Touch Pilot Display only, each time schedule can be overridden to keep the chiller in an Occupied mode (Timed Override Hours) for 1, 2, 3 or 4 hours on a one-time basis. (Does the timed override need to be in the current schedule or does it matter?)

To configure this option:
Touch Pilot:

Display Name	***Path***	***Line No.***	***Value***
Timed Override Hours	*Config\OCCDEFCS\OCC1P01S or OCC1P02S*	*1*	*Range: 0 to 4* *Default: 0*

If configured for a timed override, the override can be cancelled by changing the Timed Override Hours to 0.

CCN Global Time Schedule — A CCN Global Schedule can be utilized. The schedule number can be set anywhere from 65 to 99 for operation under a CCN global schedule.

The 30XA chillers can be configured to follow a CCN Global Time Schedule broadcast by another system element. ComfortVIEW™ Network Manager's Configure and Modify commands or the Service Tool's Modify/Names function must be used to change the number of the Occupancy Equipment Part Table Name (OCC1P01E) to the Global Schedule Number. The Schedule Number can be set from 65 to 99 (OCC1P65E to OCC1P99E).

The Occupancy Supervisory Part table name (OCC1P01S) number must be changed to configure the unit to broadcast a Global Time Schedule. The Schedule Number can be set from 65 to 99 (OCC1P65S to OCC1P99S). When OCC1PxxS is set to a value greater than 64, an occupancy flag is broadcast over the CCN every time it transitions from occupied to unoccupied or vice-versa. By configuring their appropriate Time Schedule decisions to the same number, other devices on the network can follow this same schedule.

CCN MODE - To allow machine control by CCN commands, press the Start/Stop button (0/1) on the Touch Pilot Display. An Equipment Start Screen will be displayed. Select CCN Mode. The unit will be controlled by a CCN command to the CCN Chiller Start/Stop (Status→GENUNIT→CHIL_S_S). An external CCN device such as Chillervisor controls the On/Off state of the machine. When controlled by a Chillervisor, it is recommended, the Auto Start When SM Lost (Service→SERVICE1→auto_sm) be set to Yes. In the event of a loss of communication with the network, the machine will start and be controlled locally. Careful evaluation of Chilled Water Plant control should be reviewed. In the event Local Control is established, be sure that all pumps, valves and other devices are capable of operating properly. The control will ignore the position of Enable/Off/Remote Contact switch. The Run Status (Status→GENUNIT→STATUS) will indicate the current status of the machine, OFF, RUNNING, DELAY, or READY. The Control Type (Status→GENUNIT→ctr_type) will indicate the type of control and will show CCN. The Operating Type (Status→GENUNIT→OPER_TYP) will change to CCN.

For Dual Chiller Control applications, the Slave Chiller must be enabled using the CCN Mode button.

REMOTE MODE – To allow machine to start and stop via a Remote Contact closure, press the Start/Stop button (1/0) on the Touch Pilot Display. An Equipment Start Screen will be displayed. Select Remote Mode. The unit will be controlled by the Enable/Off/Remote Contact switch. Switching the Enable/Off/ Remote Contact switch to the Enable or Remote Contact position (external contacts closed) will force the unit into an occupied state. In this mode, all CCN network force commands, except the Emergency Stop Command will be ignored. The Run Status (Status→GENUNIT→STATUS) will indicate the current status of the machine, OFF, RUNNING, DELAY, or READY, depending on the position of the Remote/Off/Enable Switch closure. The Chiller Occupied? (Status→GENUNIT→CHILL_OCC) will change to YES. The Control Type (Status→GENUNIT→ctr_type) will indicate the type of control

and will show Remote. The Operating Type (Status→GENUNIT→OPER_TYP) will change to Remote.

MASTER MODE – To activate the Dual Chiller Control, the machines must be individually configured for Dual Chiller Control. To operate the machines in Dual Chiller Mode, on the Master unit press the Start/Stop button (0/1) on the Touch Pilot Display. An Equipment Start Screen will be displayed. Select Master Mode. Failure to start the Master unit in this manner will cause both machines to operate in local mode. The Master Unit Control can be done locally, remotely or through CCN commands per the master/slave configuration (Configuration→MST_SLT→Master Control Type). The control will ignore the position of Enable/Off/Remote Contact switch, if the Master Control Type is configured for Local Control or CCN Control. The Run Status (Status→GENUNIT→STATUS), Chiller Occupied? (Status→GENUNIT→CHILL_OCC), and Control Type (Status→GENUNIT→ctr_type) will change based on the Master Control Type configured above and the Machine On/Off Control defined above. Operating Type (Status→GENUNIT→OPER_TYP) will change to Master.

TO TURN MACHINE OFF – To turn the machine off, press the Start/Stop button (1/0) on the Touch Pilot Display. The machine will shutdown. While the unit is in Local Off, it will remain shutdown and ignore all CCN network commands as well as the position of Enable/Off/Remote Contact switch. The Run Status (Status→GENUNIT→STATUS) indicating the current status of the machine, will change to OFF. The Chiller Occupied? (Status→GENUNIT→CHILL_OCC) will change to NO. The Control Type (Status→GENUNIT→ctr_type) will indicate the type of control and will indicate Local. The Operating Type (Status→GENUNIT→OPER_TYP) will change to L-OFF (Local Off).

Navigator Machine Control

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

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

Navigator:

Item	*Item Expansion*	*Path*	*Value*
OPER	*Operating Control Type*	*Operating Modes→SLCT→OPER*	*SWITCH CTRL*

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

Navigator:

Item	*Item Expansion*	*Path*	*Value*
OPER	*Operating Control Type*	*Operating Modes→SLCT→OPER*	*TIME SCHED*

The schedules consist of 8 user-configurable occupied time periods. The control supports time schedules for local control, remote control and ice building. These time periods can be flagged to be in effect or not in effect on each day of the week. The day begins at 00.00 and ends at 24.00. The machine is in unoccupied mode unless a scheduled time period is in effect. If an occupied period is to extend past midnight, it must be programmed in the following manner: occupied period must end at 24:00 hours (midnight); a new occupied period must be programmed to begin at 00:00 hours.

NOTE: This is true only if the occupied period starts at 00:00 (midnight). If the occupied period starts at a time other than midnight, then the occupied period must end at 24:00 hours (midnight) and new occupied period must be programmed to start at 00:00 in order for the chiller to stay in the occupied mode past midnight.

In the following example, a early morning pulldown time period is scheduled for Monday morning from 12:00 AM to 3:00 AM. The occupied period starts at 7:00 AM, Monday through Saturday. The occupied time ends at 6:00 PM on Monday and Tuesday, 9:30 PM on Wednesday, 5:00 PM on Thursday and Friday, and 12:00 PM on Saturday. Note: This schedule was designed to illustrate the programming of the schedule function and is not intended as a recommended schedule for chiller operation. (See Touch Pilot Figure ?)

If the chiller is to be controlled to a single set point, use Schedule 1 (SCH1). This will start and stop the machine. During the unoccupied times, the chiller will be off. If the chiller is to be controlled to 2 set points, occupied and unoccupied, use Schedule 2 (SCH2). This will cause the chiller to control to an occupied set point and an unoccupied set point. The machine will be able to provide cooling at any time.

To configure this option:
Navigator:

Item	*Item Expansion*	*Path*	*Value*
OCC.1	*Occupied Time*		*00:00*
UNO.1	*Unoccupied Time*		*03:00*
MON.1	*Monday Select*		*Yes*
TUE.1	*Tuesday Select*	*Time*	*No*
WED.1	*Wednesday Select*	*Clock→SCH1→PER.1*	*No*
THU.1	*Thursday Select*	*or Time*	*No*
FRI.1	*Friday Select*	*Clock→SCH2→PER.1*	*No*
SAT.1	*Saturday Select*		*No*
SUN.1	*Sunday Select*		*No*
HOL.1	*Holiday Select*		*No*
OCC.2	*Occupied Time*		*07:00*
UNO.2	*Unoccupied Time*		*18:00*
MON.2	*Monday Select*		*Yes*
TUE.2	*Tuesday Select*	*Time*	*Yes*
WED.2	*Wednesday Select*	*Clock→SCH1→PER.2*	*No*
THU.2	*Thursday Select*	*or Time*	*No*
FRI.2	*Friday Select*	*Clock→SCH2→PER.2*	*No*
SAT.2	*Saturday Select*		*No*
SUN.2	*Sunday Select*		*No*
HOL.2	*Holiday Select*		*No*
OCC.3	*Occupied Time*		*07:00*
UNO.3	*Unoccupied Time*		*21:30*
MON.3	*Monday Select*		*No*
TUE.3	*Tuesday Select*	*Time*	*No*
WED.3	*Wednesday Select*	*Clock→SCH1→PER.3*	*Yes*
THU.3	*Thursday Select*	*or Time*	*No*
FRI.3	*Friday Select*	*Clock→SCH2→PER.3*	*No*
SAT.3	*Saturday Select*		*No*
SUN.3	*Sunday Select*		*No*
HOL.3	*Holiday Select*		*No*
OCC.4	*Occupied Time*		*07:00*
UNO.4	*Unoccupied Time*		*17:00*
MON.4	*Monday Select*		*No*
TUE.4	*Tuesday Select*	*Time*	*No*
WED.4	*Wednesday Select*	*Clock→SCH1→PER.4*	*No*
THU.4	*Thursday Select*	*or Time*	*Yes*
FRI.4	*Friday Select*	*Clock→SCH2→PER.4*	*Yes*
SAT.4	*Saturday Select*		*No*
SUN.4	*Sunday Select*		*No*
HOL.4	*Holiday Select*		*No*
OCC.5	*Occupied Time*	*Time*	*07:00*
UNO.5	*Unoccupied Time*	*Clock→SCH1→PER.5*	*12:00*

MON.5	*Monday Select*	*or Time*	*No*
TUE.5	*Tuesday Select*	*Clock→SCH2→PER.5*	*No*
WED.5	*Wednesday Select*		*No*
THU.5	*Thursday Select*		*No*
FRI.5	*Friday Select*		*No*
SAT.5	*Saturday Select*		*Yes*
SUN.5	*Sunday Select*		*No*
HOL.5	*Holiday Select*		*No*

Holiday Schedule – The ComfortLink Control allows up to 16 holiday periods. All holidays are entered with numerical values. First the month (MON.x), then the day (DAY.x), then the duration (DUR.x) of the holiday period in days. If a holiday in included in one of the Occupied Time Periods of the schedule, the machine will follow that operating condition for the holiday. In the following examples, the holidays, July 4 and December 25-26 are programmed for Holiday 1 and Holiday 2 respectively.

To configure this option:
Navigator:

Item	***Item Expansion***	***Path***	***Value***
MON.1	*Holiday Start Month*	*Time Clock→HOLI→HOL.1*	*7*
DAY.1	*Holiday Start Day*		*4*
DUR.1	*Holiday Duration in Day*		*1*
MON.2	*Holiday Start Month*	*Time Clock→HOLI→HOL.2*	*12*
DAY.2	*Holiday Start Day*		*25*
DUR.2	*Holiday Duration in Day*		*2*

CCN Global Time Schedule — A CCN Global Schedule can be utilized. The schedule number can be set anywhere from 65 to 99 for operation under a CCN global schedule. The 30XA chillers can be configured to follow a CCN Global Time Schedule broadcast by another system element. ComfortVIEW™ Network Manager's Configure and Modify commands or the Service Tool's Modify/Names function must be used to change the number of the Occupancy Equipment Part Table Name (OCC1P01E) to the Global Schedule Number. The Schedule Number can be set from 65 to 99 (OCC1P65E to OCC1P99E).

The Occupancy Supervisory Part table name (OCC1P01S) number must be changed to configure the unit to broadcast a Global Time Schedule. The Schedule Number can be set from 65 to 99 (OCC1P65S to OCC1P99S). When OCC1PxxS is set to a value greater than 64, an occupancy flag is broadcast over the CCN every time it transitions from occupied to unoccupied or vice-versa. By configuring their appropriate Time Schedule decisions to the same number, other devices on the network can follow this same schedule. The Enable/Off/Remote Contact must be in the Enable position or Remote Contact position with the contacts closed for the unit to operate. The Unit Run

Status (Run Status→VIEW→STAT) will indicate the current status of the machine, OFF, RUNNING, STOPPING or DELAY, depending on the schedule. The unit Occupied status (Run Status→VIEW→OCC) will indicate the current occupied schedule according to the schedule, either NO or YES. The Status Unit Control Type (Run Status→VIEW→CTRL) will be LOCAL OFF when the switch is Off. The Status Unit Control Type will be CCN when the Enable/Off/Remote Contact switch input is On.

CCN CONTROL — In this Operating Type Control, the machine operates under CCN control as long as the Enable/Off/Remote Contact Switch is in the Enable or Remote Contact position (external contacts closed.) To operate under this Operating Control, OPER must be set to CCN CONTROL. An external CCN device such as Chillervisor controls the On/Off state of the machine. When controlled by a Chillervisor, it is recommended, the Auto Start When SM Lost (AU.SM) be set to Yes. Careful evaluation of Chilled Water Plant control should be reviewed. In the event Local Control is established, be sure that all pumps, valves and other devices are capable of operating properly. In the event of a loss of communication with the network, the machine will start and be controlled locally. This CCN device forces the variable CHIL_S_S between Start/Stop to control the chiller. The Unit Run Status (Run Status→VIEW→STAT) will indicate the current status of the machine, OFF, RUNNING, STOPPING or DELAY, depending on the CCN command. The unit Occupied status (Run Status→VIEW→OCC) will indicate the current occupied state according to the CCN command, either NO or YES. The Status Unit Control Type (Run Status→VIEW→CTRL) will be LOCAL OFF when the Enable/Off/Remote Contact switch is Off. The Status Unit Control Type will be CCN when the Enable/Off/Remote Contact switch input is Closed and the CHIL_S_S variable is Stop or Start.

For Dual Chiller Control applications, the Slave Chiller must be enabled using the CCN CONTROL option.

Navigator:

Item	*Item Expansion*	*Path*	*Value*
OPER	*Operating Control Type*	*Operating Modes→SLCT→OPER*	*CCN CONTROL*
AU.SM	*Auto Start when SM Lost*	*Configuration→SERV*	*YES*

Software Revisions

There have been a number of updates to the 30XA software. Outlined below is a summary of the changes with the implementation date.

Version 2.01 (CSA-SR-20C470201)

Serial Number Start: 2406Q

- Added Touch Pilot Display control algorithms
- Added Minimum Load Control access for Navigator.

- Improved run time balance algorithm
- Modify EXV control algorithm to disable the discharge superheat move adjustments if the discharge gas temperature is less that 180 °F (82.2 °C).
- Improved Suction Pressure Transducer Failure alert (Pr.06, Pr.07, and Pr.08) logic. The new algorithm does not compare the suction pressure to the entering water temperature if the EXV for the circuit is less than 50% open.
- Improved EXV response time in brine applications.
- For brine applications, added a 10 second time delay for the Low Suction Temperature Alerts (P.05, P.06, P.07).
- Added Reverse Water Flow Protection Algorithm to the controls.
- Corrected several point names in the tables.
- Added Discharge Gas Temperature to the “Black Box” software collection tool.
- Added Cooler Flow Switch Management for 50 Hz units. (Not part of the Charlotte software.

Version 1.05 (CSA-SR-20C470105)
Serial Number Start: 0906Q

- Added MicroChannel Heat Exchanger Option control algorithms.
- Corrected Circuit C superheat readout. Originally, it was reading the value of Circuit B.

Version 1.04 (CSA-SR-20C470104)
Serial Number Start: 3805Q

Original Software Release

LITERATURE

Below is a list of literature for the 30XA AquaForce machines. Shaded literature is obsolete literature.

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
Product Data					
30XA-1PD	523-079	AquaForce 30XA080-500, Air-cooled Liquid Chillers, 80-500 Nominal Tons	3/05		
30XA-2PD	04-52300001-01	AquaForce 30XA080-500 Air-Cooled Chillers, 80 to 500 Nominal Tons	5/05	0605A, 0605B	
	11-808-364-01	Touch Pilot, 33CNTPILOT	03/06		
Selection Software					
		Packaged Chiller Builder, Version 3.10	05/23/05		Version 3.11
		Packaged Chiller Builder, Version 3.11	06/08/05		Version 3.12
		Packaged Chiller Builder, Version 3.12	07/29/05		Version 3.13
		Packaged Chiller Builder, Version 3.13	08/26/05		Version 3.14
		Packaged Chiller Builder, Version 3.14	09/30/05		Version 3.15
		Packaged Chiller Builder, Version 3.15	10/28/05		Version 3.16

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
		Packaged Chiller Builder, Version 3.16	12/02/05		Version 3.17
		Packaged Chiller Builder, Version 3.17	01/06/06		Version 3.18
		Packaged Chiller Builder, Version 3.18	01/27/06		Version 3.19
		Packaged Chiller Builder, Version 3.19	02/24/06		Version 3.19a
		Packaged Chiller Builder, Version 3.19a	04/03/06		Version 3.19b
		Packaged Chiller Builder, Version 3.19b	06/30/06		
Application Information					
	811-20062	Selection Guide: Environmental Corrosion Protection.	10/2004		04-581-006-01
	04-581006-01	Selection Guide: Environmental Corrosion Protection	04/2006		
	TIP133	30RB/XA Base Rail Dimensions	06/10/05		
White Papers					
	04-581005-01	MicroChannel Technology	04/2006		
Product Bulletin					
111-05-22		30GX Phase-Out	04/07/05		
111-05-24		30XA AquaForce Introduction	05/27/05		
111-05-25		Air-Cooled Chiller Product Offering	04/29/05		111-05-39
111-05-05-E		Air-Cooled Chiller Product Offering	04/29/05		
111-05-27		30GX Transition Guide	04/26/05		
111-05-28		30XA AquaForce Options & Accessories	04/29/05		111-05-30
111-05-30		30XA AquaForce Options & Accessories	05/06/05		111-05-34
111-05-34		30XA Selection Software & NPI	05/24/05		111-05-40
111-05-37		AquaForce Air-Cooled Chillers New Product Introduction Binder Pre-Order Announcement	05/27/05		
111-05-38		30XA AquaForce Air-Cooled Chiller Introduction	05/27/05		
111-05-39		Air-Cooled Product Offering	05/27/05		
111-05-40		30XA Selection Software & Options/Accessories Availability	05/27/05		
111-05-52		30XA Suction Service Valve Availability	07/22/05		111-05-68
111-05-53		30XA260-350 Standard Pass Cooler Nozzle Size Error	07/22/05		
111-05-57		30RB/XA Condenser Coil Trim Panels	07/27/05		
111-05-60		NACO Chiller Builder Report Error	08/12/05		
111-05-68		30XA Suction Service Valve Release	09/30/05		
111-06-01		30RB/XA Cu/Cu Condenser Coil Options Release	01/06/06		
111-06-05		Packaged Chiller Builder “What’s This” Feature	02/03/06		
111-06-07		Competitive Alert – YCAV	02/24/06		
111-06-09		30XA Model Number Changes	02/24/06		
111-06-15		30XA Hail Guard and Security Grilles Release	03/31/06		
111-06-16		30XA Low Sound Option Release	03/31/06		
111-06-17		30XA MicroChannel Condenser Coil Release	03/31/06		
111-06-18		30XA Single & Dual Point Power Release	03/31/06		
111-06-19		30XA Touch Pilot™ Display Release	03/31/06		
111-06-20		30RB/XA Model Number Descriptions	04/05/06		
111-06-21		Refrigerant Storage with MCHX Coils	04/13/06		
111-06-22		Touch Pilot™ Display Samples	04/21/06		
111-06-26		DataLink & DataPort Obsolescence	05/05/06		
111-06-28		Competitive Alert – McQuay AGS –D Series Release	05/19/06		

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
111-06-40		30XA Hydronic Package Release	06/30/06		
111-06-42		Packaged Chiller Builder Version 3.19b Pump Data Report Error	07/14/06		
Promotional Information					
	04-830090-25	Aqua Series Air-Cooled Chillers	05/2005		
	04-811-90007	AquaForce – The Force is Within Product Display			
	570-606	Fluid Analysis – TotalSense Fluid Analysis Services	05/2006		
Product Presentation					
		30XA AquaForce and 30RB AquaSnap Lunch & Learn	05/27/05		
		30XA AquaForce and the Microchannel (MCHX) Condenser Coil Lunch and Learn	06/12/06		
		Touch Pilot Display Demonstration	06/12/06		
Submittal Bulletin					
33CN-1SB	513-359	33CNTRANLON LonWorks Carrier Translator	08/2003		
33CN-2SB	513-360				
Installation Instructions					
30XA-1SI	533-00068	AquaForce 30XA080-500 Air-Cooled Liquid Chillers	06/2005		
Controls, Start-Up, Operation, Service and Troubleshooting					
30XA-1T	533-00069	30XA080-500 Air-Cooled Liquid Chillers, 60 Hz.	12/05		
	808-335	LonWorks Carrier Translator, Overview and Configuration Manual	12/03		
	808-356	BACnet/MODBUS Carrier Translator, Overview and Configuration Manual			
Accessory Installation Instructions					
30-2SI	533-00071	30RB060-390, 30XA080-500 Low Ambient Temperature Head Pressure Control Accessory, 60 Hz	1/06		
30-3SI	04-53300002-01	30RB060-390, 30XA080-500 Condenser Coil Trim Panel Accessory	7/05		
30-4SI	533-0075	30RB060-390, 30XA080-500 Hail Guard Doors Accessory	04/06		
30-6SI	04-53300006-01	30RB060-390, 30XA080-500 Accessory Security Grille Package	04/06		
	11-808-363-01	Touch Pilot, 33CNTPILOT	03/06		
	997-030010-1	LONWorks Carrier Translator Installation Instructions	02/04		
	997-050010-1	BACnet/Modbus Carrier Translator Installation Instructions	01/05		
Wiring Diagrams					
Technical Training					
TDP-622C	796-054	Technical Development Program – Air-Cooled Chillers	10/04		
	797-054	Technical Development Program – Air-Cooled Chillers, Instructor CD			

SERVICE

Troubleshooting

The following is an abbreviated list of symptoms, probable causes and potential remedies:

Symptom	Possible Cause	Possible Remedy
Unit does not run	Check for power to unit	• Check Overcurrent Protection Device • Check Non-Fused Disconnect (if equipped) • Restore Power to unit
	Wrong/Incorrect unit configuration	• Check Unit Configuration
	Active Alarm	• Check Alarm status. See separate Alarm and follow troubleshooting instructions
	Active Operating Mode	• Check for Operating Modes. See Operating Modes and follow troubleshooting instructions
Unit operates too long or continuously	Low refrigerant charge	• Check for leak and add refrigerant.
	Compressor or control contacts welded	• Replace contactor or relay.
	Air in Chilled Water Loop	• Purge water loop
	Non-condensibles in Refrigerant circuit.	• Remove refrigerant and recharge.
	Inoperative EXV	• Check EXV, clean or replace. • Check EXV Cable, replace if necessary. • Check EXV Board for output signal.
Circuit does not run	No Active Alams or Operating Modes	• Check to be sure the compressor is enabled. • Check the status of the oil level switch for software versions prior to 2.1.
	Active Alarm	• Check Alarm status. See separate Alarm and follow troubleshooting instructions
	Active Operating Mode	• Check for Operating Modes. See Operating Modes and follow troubleshooting instructions
Circuit does not load	Active Alarm	• Check Alarm status. See separate Alarm and follow troubleshooting instructions
	Active Operating Mode	• Check for Operating Modes. See Operating Modes and follow troubleshooting instructions

Symptom	Possible Cause	Possible Remedy
	Low Saturated Suction Temperature	• See Operating Modes 21, 22 and 23.
	High Circuit Suction Superheat	• The circuit capacity is not allowed increase if circuit superheat is greater than 36 F (20 C). See Alarms P.08, P.09 and P.10 for potential causes.
	Low Suction Superheat	• The circuit capacity is not allowed to increase if the circuit superheat is less than 5 F (2.8 C). See Alarms P.11, P.12 and P.13 for potential causes.
Compressor does not run	Active Alarm	• Check Alarm status. See separate Alarm and follow troubleshooting instructions
	Active Operating Mode	• Check for Operating Modes. See Operating Modes and follow troubleshooting instructions
	Inoperative Compressor Contactor	• Check control wiring • Check Scroll Protection Module • Check Contactor Operation, replace if necessary.
Chilled Water Pump is ON, but the machine is OFF	Cooler Freeze Protection	•

Alarms

These are warnings of abnormal or fault conditions, and may cause either one circuit (Alert) or the whole unit (Alarm) to shut down. They are assigned codes as described in Table ? (Alarm Mode Table). The alarm/alert indicator LED on the Scrolling Marquee or Navigator is illuminated when any alarm or alert condition is present. If an Alert is active, the Alarm Indicator LED will blink. If an Alarm is active, the Alarm Indicator LED will remain on constant. Currently active Alerts and Alarms can be found ***Alarms→ALRM→ALM1*** to ***ALM5***.

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

An alarm example is shown below:

	ALARM	
Alarm Descriptor	**th**	**.01**

Alarm Prefix
A1 – Compressor A1 Failure
B1 – Compressor B1 Failure
C1 – Compressor C1 Failure
Co – Communication Failure
FC – Factory Configuration Error
MC – Master Chiller Configuration Error
P – Process Failure
Pr – Pressure Transducer Failure
Sr – Service Notification
th – Thermistor Failure

Alarm Suffix
Code Number to identify source

Resetting Alarms
The controller generates two types of alarms. Automatic reset alarms will reset without any intervention if the condition that caused the alarm corrects itself. Manual reset alarms require the service technician to check for the alarm cause and reset the alarm.

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

Alarm History
Alarm History buffer ***Alarms→H.ALM*** holds up to 30 alarms. Each alarm is time and date stamped. Pressing [ENTER] and [ESCAPE] will expand each alarm code display.

Prefix Code	Suffix Code	Description	Reason for Alarm	Action Taken by Control	Reset Type	Probable Cause
A1 A2 A3 A4 B1 B2 B3 B4 C1 C2 C3 C4	.01	Compressor nn Motor Temperature Too High	Compressor Motor Sensor PTC resistance is greater than 4.5 kΩ	Circuit shutdown or not allowed to start-up	Manual	Compressor failure, wiring error, operation outside of limits, improper refrigerant charge
	.02	Compressor nn Crankcase Heater Failure	Crankcase heater current not detected when required or detected when not required.	Circuit shutdown or not allowed to start-up	Manual	Wiring error, failed Crankcase heater, failed SPM.
	.03	Compressor nn High Pressure Switch	High Pressure Switch open.	Circuit shutdown or not allowed to start-up	Manual	Wiring error, closed/restricted discharge valve, improper refrigerant charge, dirty condenser coils, failed outdoor fan motor, discharge pressure transducer inaccuracy
	.04	Compressor nn Motor Sensor PTC Out of Range	Compressor Motor Sensor PTC resistance is less than 50 Ω or greater than 17k Ω.	Circuit shutdown or not allowed to start-up	Manual	Wiring error, operation outside of limits, compressor failure, improper refrigerant charge
Co	.A1	Loss of Communication with Compressor Board A1	No communication with SPM	Affected compressor is shutdown	Automatic	Wrong SPM address, wrong unit configuration, wiring error, power loss to SPM.
	.A2	Loss of Communication with Compressor Board A2				
	.A3	Loss of Communication with Compressor Board A3				
	.A4	Loss of Communication with Compressor Board A4				
	.B1	Loss of Communication with Compressor Board B1				
	.B2	Loss of Communication with Compressor Board B2				
	.B3	Loss of Communication with Compressor Board B3				
	.B4	Loss of Communication with Compressor Board B4				
	.C1	Loss of Communication with Compressor Board C1				
	.C2	Loss of Communication with Compressor Board C2				
	.C3	Loss of Communication with Compressor Board C3				
	.C4	Loss of Communication with Compressor Board C4				

Prefix Code	Suffix Code	Description	Reason for Alarm	Action Taken by Control	Reset Type	Probable Cause
Co	.E1	Loss of Communication with EXV Board Number 1	No communication with EXV1	Circuit A & B shutdown or not allowed to start	Automatic	Wrong module address, wrong unit configuration, wiring error, power loss to module
	.E2	Loss of Communication with EXV Board Number 2	No communication with EXV2	Circuit C shutdown or not allowed to start		
Co	.F1	Loss of Communication with Fan Board Number 1	No communication with Fan Board 1	Circuit A & B shutdown or not allowed to start (060-150, 210-250) Circuit A shutdown or not allowed to start (160-190, 275-300)	Automatic	Wrong module address, wrong unit configuration, wiring error, power loss to module
	.F2	Loss of Communication with Fan Board Number 2	No communication with Fan Board 2	Circuit B shutdown or not allowed to start (160-190,275-300)		
	.F3	Loss of Communication with Fan Board Number 3	No communication with Fan Board 3	Circuit C shutdown or not allowed to start (210-300)		
Co	.O1	Loss of Communication with Free Cooling Board	No communication with Free Cooling Board	None	Automatic	Wrong configuration
Co	.O2	Loss of Communication with Electrical Heaters Board	No communication with Electrical Heaters Board			
Co	.O3	Loss of Communication with Energy Management Board	No communication with Energy Management Board	Disable or not allow EMM Functions (3-Step and 4-20 mA Demand Limit, 4-20 mA and Space Temperature Reset, Occupancy Override, and Ice Build)	Automatic	Wrong module address, wrong unit configuration, wiring error, power loss to module
Co	.O4	Loss of Communication with Heat Reclaim Board	No communication with Heat Reclaim Board	None	Automatic	Wrong configuration
FC	.n0	Initial Factory Configuration Required	No configuration	Unit not allowed to start	Automatic	Missing configuration
	.nn	Illegal Configuration	Wrong or incompatible configuration data	Unit not allowed to start	Automatic	Incorrect configuration
MC	.nn	Master Chiller Configuration Error	Wrong or incompatible configuration data	Unit not allowed to start in Master-Slave Control	Automatic	Incorrect configuration

Prefix Code	Suffix Code	Description	Reason for Alarm	Action Taken by Control	Reset Type	Probable Cause
P	.01	Water Exchanger Freeze Protection	Entering or Leaving Thermistor sensed a temperature at or below freeze point.	Unit shutdown or not allowed to start. Chilled Water Pump will be started	Automatic, first occurrence in 24 hours, Manual, if multiple alarms within 24 hours	Faulty thermistor, faulty wiring, low water flow rate, low loop volume, or freeze conditions.
P	.05	Circuit A Low Suction Temperature	Low Saturated Suction Temperatures sensed for a period of time.	Circuit shutdown	Automatic, first occurrence in 24 hours, Manual, if multiple alarms within 24 hours	Faulty transducer, faulty wiring, low water flow rate, low loop volume, fouled cooler, or freeze conditions.
	.06	Circuit B Low Suction Temperature				
	.07	Circuit C Low Suction Temperature				
P	.08	Circuit A High Superheat	EXV>98%, Suction Superheat >54 F (30.0 C) and SST<MOP for more than 5 minutes	Circuit shutdown	Manual	Faulty transducer, faulty thermistor, faulty wiring, faulty EXV, low refrigerant charge, plugged or restricted liquid line.
	.09	Circuit B High Superheat				
	.10	Circuit C High Superheat				
P	.11	Circuit A Low Superheat	EXV≤5% and Suction Superheat is less than the superheat setting by at least 5 F (2.8 C) or SST>Maximum Operating Pressure for more than 5 minutes	Circuit shutdown	Automatic, first occurrence in 24 hours, Manual, if multiple alarms within 24 hours	Faulty transducer, faulty thermistor, faulty wiring, faulty EXV, or incorrect configuration.
	.12	Circuit B Low Superheat				
	.13	Circuit C Low Superheat				
P	.14	Cooler Interlock Failure	Cooler Pump Interlock circuit opens	Unit shutdown or not allowed to start	Automatic if stage=0, Manual if stage>0.	Low Water Flow, faulty wiring or contacts, faulty water flow switch, or chilled water pump problem.
P	.15	Condenser Flow Switch Failure		None	Manual	Wrong configuration

Prefix Code	Suffix Code	Description	Reason for Alarm	Action Taken by Control	Reset Type	Probable Cause
P	.16	Compressor A1 Not Started or Pressure not Established	Compressor differential (Discharge-Suction) did not increase by 10 psig (69 kPa) in 2 minutes	Circuit shutdown	Manual	No power to the compressor, faulty compressor contactor, low control voltage, faulty discharge or suction pressure transducers, wiring error, improper electrical phasing.
	.17	Compressor A2 Not Started or Pressure not Established				
	.18	Compressor A3 Not Started or Pressure not Established				
	.19	Compressor A4 Not Started or Pressure not Established				
	.20	Compressor B1 Not Started or Pressure not Established				
	.21	Compressor B2 Not Started or Pressure not Established				
	.22	Compressor B3 Not Started or Pressure not Established				
	.23	Compressor B4 Not Started or Pressure not Established				
	.24	Compressor C1 Not Started or Pressure not Established				
	.25	Compressor C2 Not Started or Pressure not Established				
	.26	Compressor C3 Not Started or Pressure not Established				
	.27	Compressor C4 Not Started or Pressure not Established				
P	.28	Electrical Box Thermostat / Power Reversal Phase Detection	Open signal input to MBB Channel 15A or 15B	Unit not allowed to start	Automatic	Check wiring, or faulty Chilled Water Pump Interlock relay.
P	.29	Loss of Communication with System Manager	Loss of communication with an external control device for more than 2 minutes	Unit changes to stand alone operation	Automatic	Faulty communication wiring, no power supply to the external controller.
P	.30	Master/Slave Communication Failure	Communication between the master and slave machines has been lost.	Units operate as stand alone machines	Automatic	Faulty communication wiring, no power or control power to the main base board to either module.
P	.31	Unit is in Emergency Stop	Emergency Stop command has been received.	Unit shuts down or not allowed to start.	Automatic	Carrier Comfort Network Emergency Stop Command received.
P	.32	Cooler Pump 1 Fault	Pump Interlock status does not match pump status.	Unit shuts down. If available, another pump will start.	Manual	Faulty contacts, wiring error, or low control voltage.
	.33	Cooler Pump 2 Fault				
P	.34	Circuit A Reclaim Operation Failure		None	Manual	Wrong configuration
	.35	Circuit B Reclaim Operation Failure				

Prefix Code	Suffix Code	Description	Reason for Alarm	Action Taken by Control	Reset Type	Probable Cause
P	.37	Circuit A Repeated High Discharge Gas Overrides	Multiple capacity overrides due to high saturated discharge temperatures	Circuit shut down	Automatic	Condenser air recirculation, dirty or plugged condenser coils, inaccurate discharge transducer, faulty condenser fan,
	.38	Circuit B Repeated High Discharge Gas Overrides				
	.39	Circuit C Repeated High Discharge Gas Overrides				
P	.40	Circuit A Repeated Low Suction Temperature Override in Heating(?)				
	.41	Circuit B Repeated Low Suction Temperature Override in Heating(?)				
	.42	Circuit C Repeated Low Suction Temperature Override in Heating(?)				
Pr	.01	Circuit A Discharge Transducer	Measured voltage is 0 vdc	Circuit shutdown or not allowed to start.	Automatic	Faulty transducer, wiring error, failed Main Base Board or Fan Board 3.
	.02	Circuit B Discharge Transducer				
	.03	Circuit C Discharge Transducer				
	.04	Circuit A Suction Transducer				
	.05	Circuit B Suction Transducer				
	.06	Circuit C Suction Transducer				
Pr	.07	Circuit A Reclaim Pumpdown Pressure Transducer		None		Wrong configuration
	.08	Circuit B Reclaim Pumpdown Pressure Transducer				
Sr	nn	Service Maintenance Alert	Field programmed elapsed time has expired for maintenance item	None	Manual	Maintenance required
th	.01	Water Exchanger Entering Fluid Thermistor Failure	Temperature measured by the controller is less than -40 F (-40 C) or greater than 240 F (115.6 C)	Unit will be shutdown or not allowed to start.	Automatic	Faulty thermistor, wiring error, failed Main Base Board or EXV Board
	.02	Water exchanger entering fluid thermistor failure				
th	.03	Circuit A Defrost Thermistor Failure		None		Wrong configuration
	.04	Circuit B Defrost Thermistor Failure				
	.08	Reclaim Condenser Entering Thermistor				
	.09	Reclaim Condenser Leaving Thermistor				
th	.10	OAT Thermistor Failure		Unit is shutdown or not allowed to start. Cooler/Pump heaters are energized		Faulty thermistor, wiring error, failed Main Base Board or EXV Board

Prefix Code	Suffix Code	Description	Reason for Alarm	Action Taken by Control	Reset Type	Probable Cause
th	.11	Master/Slave Common Fluid Thermistor		Dual Chiller deactivated. Master and Slave machines operate in stand alone mode		
th	.12	Circuit A Suction Gas Thermistor		Circuit shutdown		
	.13	Circuit B Suction Gas Thermistor		Circuit shutdown		
	.14	Circuit C Suction Gas Thermistor		Circuit shutdown		
th	.17	Circuit A Condenser Subcooling Liquid Thermistor		None		Wrong configuration
	.18	Circuit B Condenser Subcooling Liquid Thermistor				
th	.21	Space Temperature Sensor Failure		Temperature Reset based on Space Temperature disabled		Faulty thermistor, wiring error, failed Main Base Board or EXV Board

The following is a detailed description of each alarm code and possible cause.

Alarm Code – Alarm Description
A1.03 – Compressor High Pressure Switch Protection
B1.03 – Compressor High Pressure Switch Protection
C1.03 – Compressor High Pressure Switch Protection

Criteria for Trip: This alarm is generated when the High Pressure Switch for the compressor opens.

Action to be taken: Compressor is shut down, or not allowed to start

Reset Method: Manual (MBB)
Manual (MBB and Switch, Starting with Serial Number 2206Q)

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

- Check the condenser fan operation.
- Check the coils for debris or air recirculation.
- Confirm that the machine charge is correct.
- Check the calibration of the High Pressure Switch. Consider replacing the switch.
- Check for proper connection of the High Pressure Switch to the Compressor Protection Module.
- Check for non-condensables in the circuit.

Alarm Code – Alarm Description
A1.09 – Compressor Low Current Alarm
B1.09 – Compressor Low Current Alarm
C1.09 – Compressor Low Current Alarm

Criteria for Trip: This alarm is generated when the Compressor Protection module detects motor current less than 15% of the MTA setting on all three phases for more than 450 ms on Wye-Delta machines or more than 1 second on Across-the-Line machines.

Action to be taken: Compressor is shut down, or not allowed to start

Reset Method: Manual

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

- Check the operation of the contactors. If the contactors do not pull in, the alarm can be generated.
- Check for proper control voltage.
- Check the toroid harness connections. Be sure that the correct toroid is connected to the appropriate CCP connection. A connection problem at the CCP or toroid could cause the alarm.
- Check the toroid resistance. It should be ? Ω.
- Check for proper connection of the High Pressure Switch to the Compressor Protection Module.
- Check the operation of the High Pressure Switch. An open High Pressure Switch or chattering switch at the start can generate this alarm.

Alarm Code – Alarm Description
P.28 – Electrical Box Thermostat / Power Reversal Phase Detection

Criteria for Trip: The criterion is tested when the unit is ON. This alarm originally was not supported. This alarm is generated if one of the Main Base Board (MBB) inputs to Channel 15A or 15B is open.

The Phase Reversal Protection is part of the Compressor Protection Module.

Action to be taken: The unit is not allowed to start.

Reset Method: Automatic.

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

- Check the wiring to MBB Channel 15A and 15B for proper connections.

- Check the jumper or field installed Chilled Water Pump Relay Contacts across TB5-1 and TB5-2. An open contact will cause this alarm.

Alarm Code – Alarm Description
P.75 – Circuit A Low Oil Level
P.76 – Circuit B Low Oil Level
P.77 – Circuit C Low Oil Level

Criteria for Trip: The criterion is tested when the unit is OFF or ON. This alarm is generated if the Oil Level Switch is open.

Action to be taken: The circuit is shut down or not allowed to start.

Reset Method: Automatic, first occurrence in 24 hours. Manual if multiple alarms occur within 24 hours.

Possible Causes: If this condition is encountered, check the following items:
- Check the circuit for rapid cycling. The system will recover the oil in the circuit more efficiently under full load.
- Check the oil level switch for proper operation.
- Check for a wiring error.
- Check the MBB for a bad monitoring channel.
- Software versions including and prior to Version 2.1 failed to register this alarm in the alarm section, but would still trip the unit.

To recover the oil, use the oil recovery procedure outlined in the Service section. Add additional oil to the circuit to close the oil level switch. The added oil may need to be removed from the system later.

If the alert condition continues, consider adding ½ gallon of oil to the circuit. Continue adding oil in ½ gallon increments to a maximum of 1-½ gallons. Do not overcharge the oil system. The extra oil will accumulate in the cooler, fouling the cooler.

Compressors

Compressor Model Number Significance

Position	1 0	2 6	3 T	4 T	5 A	6 2	7 6	8 6	9 S	10 T	11 2	12 A

Compressor Type
- Semi-hermetic

Model Code
- TS – 133 mm
- TT – 166 mm
- TU – 192 mm

Duty
- A – Air-Cooled
- W – Water-Cooled

Displacement (60 Hz)
- 137 – 45 tons
- 155 – 50 tons
- 186 – 60 tons
- 266 – 90 tons
- 301 – 100 tons
- 356 – 120 tons
- 483 – 165 tons
- 554 – 185 tons

Voltage
- S – 460-3-60 & 400-3-50
- T – 575-3-60
- W – 380-3-60
- X – 230-3-60 & 200-3-50
- Z – 200-3-60

Motor Size (60 Hz)

A	30	K	80	U	180
B	35	L	85	V	200
C	40	M	90	W	225
D	45	N	100	X	250
E	50	O	110	Y	275
F	55	P	120		
G	60	Q	130		
H	65	R	140		
I	70	S	150		
J	75	T	160		

Design Series
- 1 – Phase 1
- 2 – Phase 2
- 9 – Remanufactured Service Compressor

Packaging/Accessories
- A – Compressor Module
- B – Service Compressor
- C – Bare Compressor

Compressor Usage

Unit	Compressors		
	Circuit A	Circuit B	Circuit C

30XAA110	06TSA186*J**	06TSA155*J**	-
30XAA160	06TTA301*S**	06TSA186*J**	-
30XAA200	06TTA301*S**	06TTA301*S**	-
30XAA220	06TTA356*S**	06TTA301*S**	-
30XAA240	06TTA356*S**	06TTA356*S**	-
30XAA260	06TUA483*W**	06TTA301*S**	-
30XAA280	06TUA483*W**	06TTA356*S**	-
30XAA300			
30XAA350	06TUA554*W**	06TUA483*W**	-
30XAA400	06TTA356*S**	06TTA356*S**	06TUA483*W**

Compressor Weights
The table below lists individual compressor weights.

Compressor	*Weight, lbs (kg)*
06TSA137	*809 (368)*
06TSA155	*825 (375)*
06TSA186	*876 (398)*
06TTA266	*1,527 (694)*
06TTA301	*1,538 (699)*
06TTA356	*1,558 (708)*
06TUA483	*1,982 (901)*
06TUA554	*2,066 (939)*

Compressor Changeout Sequence

Condenser Coils
Several condenser coil options are offered for corrosion protection. Position 10 in the model number indicates the coil option. The following coils are offered: Standard Aluminum Fin/Copper Tube Coil, Copper Fin/Copper Tube Coil, Aluminum Fin/Copper Tube Coil with E-Coat, Copper Fin/Copper Tube Coil with E-Coat, Aluminum Pre-coast Fin/Copper Tube.

Bulletins pertaining to this issue:

- 111-06-01 – 30RB/XA Cu/Cu Condenser Coil Option Release
  This bulletin announced the release of the Copper Fin/Copper Tube Condenser Coil Option.

Condenser Coil Physical Data

Condenser Coil Material	Fins/Inch	Approximate Weight, lbs (kg)

Standard Aluminum Fin/Copper Tube Coil	19	140 (64)
Copper Fin/Copper Tube Coil	17	260 (118)
Aluminum Fin/Copper Tube Coil with E-Coat	17	140 (64)
Copper Fin/Copper Tube Coil with E-Coat	17	260 (118)
Aluminum Pre-coast Fin/Copper Tube	19	140 (64)

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
The 30XA uses the next generation Aeroacoustic Fan with a specially designed motor mount.

Cooler Physical Data

30XA Cooler									
30XA	Cooler Pass Option	No. of Passes	Cooler Part No. (00PSN8000) w/o Heater / w/ Heater	Water Nozzle Size (Victaulic)	Weight, approximate lbs. (kg) Empty	Weight, approximate lbs. (kg) Filled †	Shell OD… Wall Thick. (In.)	Tube P/N (00PSG000) OD…Tube Length (in.)	No. of Tubes
120							14 … 0.25	177701A 0.750 … 105.9	92
	Std	2	12510A	5”					
300	-1							177701A 0.750 … 105.9	225
	Std	2	129803A / 129806A	8”					
	+1								
400	-1	N/A							
	Std	1		8”			18 … 0.25	177701A 0.750 … 105.9	176
		1		8”			18 … 0.25	177702A 0.750 … 74.7	165
	+1	N/A							
450 500	-1	N/A							
	Std	1		8”			20 … 0.25	177701A 0.750 … 105.9	225
		1		8”			18 … 0.25	177702A 0.750 … 74.7	165
	+1	N/A							

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

High Pressure Switch
Each circuit has its own high pressure switch. The switch is located on the top of the oil separator, near the compressor discharge connection.

Original production machines used an automatic reset high pressure switch. The controls required a manual reset for operation to resume. Beginning with units with serial number 2206Q (May 23, 2006), the high pressure switch was changed from an automatic reset pressure switch to a manual reset pressure switch. A high pressure switch alarm still requires a manual reset of the controls.

Starting Serial Number	*Part Number*	*High Pressure Switch*			
		Open Pressure, psig (kPa)	*Reset Pressure, psig (kPa)*	*Reset Type*	*Port Size*
		304.5 +0/-14.5 (2099 +0/-100)		*Automatic*	*1.5 mm*
2206Q				*Manual*	*0.5 mm*

Hydronic Package

Strainer

Refrigerant Relief Devices

Fusible Plugs

Pressure Relief Valves
Pressure relief valves are located on the cooler of each circuit on every machine. 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.

Location	Part Number	Relief Pressure, psi (kPa) +/- 3%	Flow Capacity, lb. of dry air/min	Connection Size
Cooler	EB51LZ221	220 (1517)	31.7	3/4” NPTF

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.

Refrigerant
The 30XA machines use R-134a as the operating refrigerant. The refrigerant charge amount depends on the condenser coil option chosen.

	Condenser Coil Option / Circuit Refrigerant Amount, lbs (kg)					
	Al or Cu Fin/Cu Tube			*Microchannel*		
	Circuit A	*Circuit B*	*Circuit C*	*Circuit A*	*Circuit B*	*Circuit C*
080	*86 (39)*	*86 (39)*	*-*			*-*
090	*97 (44)*	*97 (44)*	*-*			*-*
100	*108 (49)*	*108 (49)*	*-*			*-*
110						
120						
140						
160						
180						
200						
220						
240	*270 (122.5)*	*270 (122.5)*	*-*	*192.5 (87.5)*	*192.5 (87.5)*	*-*

Refrigerant Moisture Limit
The upper limit for moisture in a system is based on the water saturation limit at 35 °F (1.6 °C). This was carried through for HFC/POE systems as well. 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	Specification Requirement*	Acceptable Limit
Moisture	10 ppm	≤100 ppm

Note: * - The specification requirement refers to the acceptability criteria for new oil based on Carrier Material Specification PS10-34.

If higher moisture content is found, check the following:
- Check for a cooler leak

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

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

Thermistors
Thermistors that are monitoring the chiller's operation include: Cooler Entering Water, Cooler Leaving Water, Dual Chiller Leaving Water, Compressor Suction Gas

Temperature, and Outside Air Thermistors. These thermistors are 5 kΩ at 77 F (25 C) and are identical in temperature versus resistance and voltage drop performance. The Space Temperature Thermistor is 10 kΩ at 77 F (25 C) and has a different temperature vs. resistance and voltage drop performance.

COOLER LEAVING FLUID SENSOR — On all sizes, this thermistor is installed in a friction fit well in the leaving water nozzle of the cooler.
COOLER ENTERING FLUID SENSOR — On all sizes, this thermistor is factory-installed in a friction fit well in the entering water nozzle of the cooler.
DUAL CHILLER LWT – On duplex chillers, 30RB315-390, a factory-supplied, field-installed friction fit well and thermistor in the common supply water header of the two modules.
COMPRESSOR RETURN GAS TEMPERATURE — This thermistor is factory-installed in a friction fit well located in the common suction line for the circuit. There is one thermistor for each circuit.
OUTDOOR AIR TEMPERATURE — This sensor is factory-installed.
REMOTE SPACE TEMPERATURE – This sensor (part no. 33ZCT55SPT) is a field-installed accessory mounted in the indoor space and is used for water temperature reset. The sensor should be installed as a wall-mounted thermostat (in the conditioned space where it will not be subjected to either a cooling or heating source or direct exposure to sunlight, and 4 to 5 ft above the floor).

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

To connect the space temperature sensor:
1. Using a 20 AWG twisted pair conductor cable rated for the application, connect 1 wire of the twisted pair to one SEN terminal and connect the other wire to the other SEN terminal located under the cover of the space temperature sensor.
2. Connect the other ends of the wires to terminals 5 and 6 on TB5 located in the unit control box.

Units on the CCN can be monitored from the space at the sensor through the RJ11 connector, if desired. To wire the RJ11 connector into the CCN (Fig. 10):
1. Cut the CCN wire and strip ends of the red (+), white (ground), and black (–) conductors. (If another wire color scheme is used, strip ends of appropriate wires.)
2. Insert and secure the red (+) wire to terminal 5 of the space temperature sensor terminal block.
3. Insert and secure the white (ground) wire to terminal 4 of the space temperature sensor.
4. Insert and secure the black (–) wire to terminal 2 of the space temperature sensor.

IMPORTANT: The cable selected for the RJ11 connector wiring MUST be identical to the CCN communication bus wire used for the entire network. Refer to Table 5 for

acceptable wiring.

5. Connect the other end of the communication bus cable to the remainder of the CCN communication bus.

Thermistor ID	Description	Resistance at 77 F (25 C)	Connection Point
EWT	Entering Water Thermistor	5k Ω	MBB-J6-CH2
LWT	Leaving Water Thermistor	5k Ω	MBB-J6-CH1
OAT	Outdoor Air Thermistor	5k Ω	MBB-J6-CH4
SGTA	Circuit A Suction Gas Thermistor	5k Ω	EXV1-J3-A, -TH
SGTB	Circuit B Suction Gas Thermistor	5k Ω	EXV1-J3-B, -TH
DUAL	Dual Chiller LWT Thermistor	5k Ω	MBB-J6-CH3
SGTC	Circuit C Suction Gas Thermistor	5k Ω	EXV2-J3-A, -TH
SPT	Space Temperature Thermistor	10k Ω	EMM-J6-CH2

MAINTENANCE

Recommended Maintenance Schedule

The following are only recommended guidelines. Jobsite conditions may dictate that maintenance schedule is performed more often than recommended.

Routine:
For machines with E-coat Condenser Coils:

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

Every month:

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

Every 3 months (for all machines):

- Check refrigerant charge.
- Check all refrigerant joints and valves for refrigerant leaks, repair as necessary.
- Check chilled water flow switch operation.
- Check condenser coils for debris, clean as necessary with Carrier approved coil cleaner.
- Check Sightglass Dry-eye for moisture.
- Check all condenser fans for proper operation.
- Check compressor oil level.

- Check crankcase heater operation.
- Inspect pump seal, if equipped with a pump package.

Every 12 months (for all machines):
- Check all electrical connections, tighten as necessary.
- Inspect all contactors and relays, replace as necessary.
- Check accuracy of thermistors, replace if greater than ± 2° F (1.2° C) variance from calibrated thermometer.
- Check accuracy of transducers, replace if greater than ± psi (kPa) variance.
- Obtain and test an oil sample. Change oil only if necessary.
- Check to be sure that the proper concentration of antifreeze is present in the chilled water loop, if applicable.
- Verify that the chilled water loop is properly treated.
- Check refrigerant filter driers for excessive pressure drop, replace as necessary.
- Check chilled water strainers, clean as necessary.
- Check cooler heater operation, if equipped.
- Check condition of condenser fan blades and that they are securely fastened to the motor shaft.
- Perform Service Test to confirm operation of all components.
- Check for excessive cooler approach (Leaving Chilled Water Temperature - Saturated Suction Temperature), which may indicate fouling. Clean cooler vessel if necessary.

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

30XA Series A Spare Parts List
Serial Number Range: Q

30XA Series A - Critical Parts		
Part Number	**Description**	**Comments**

30XA Series A - Recommended Parts		
Part Number	**Description**	**Comments**

30XA Series A - 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.

Bulletins pertaining to this item:

- PMB06-013 – Critical/Recommended Spare Parts List for 30XA
  This bulletin listed a critical and recommended spare parts list for the 30XA.