4.3 - Cooler Interlock contact

A contact to check the status of a safety loop is provided (cooler flow switch and customer interlock are wired internally in series). Its function is to prevent the unit from starting if the contact is open while the delay at startup has expired. The contact must also stay closed as long as the unit is not stopped through Local, Remote or CCN control.

If the cooler pump is controlled by the pro-dialog and if the cooler contact is closed after 2 minutes the cooler pump is turned OFF provided that the contact is failed CLOSED, the alarm 75 shall be active and the unit can't no more start until manual reset.

4.4 - Cooler heater control

This function is applied only for air cooled units and is related to the cooler pump function when the unit state is OFF or when unit operates as a lag chiller in master/slave operation and in standby mode. This is provided on outdoor unit as a safeguard against the cooler freezing. The cooler heater is associated with refrigerant isolation solenoids, one output per circuit whose goal is to prevent the refrigerant from migrating into the condenser when chiller is stopped.

The following logic shall be used:

- If the outdoor air temperature is below the cooler heater trip point and if either the saturated suction temperature of circuit A or saturated suction temperature of circuit B are lower than the cooler heater trip point plus 3.3 ^C, the cooler heater shall be activated.
- Normally the isolation valves shall prevent refrigerant in the cooler from migrating into the condenser. For this case, cooler heater can ensure cooler protection efficiently without the need of using cooler pump.
- If it is not the case (SST remain low), the pump shall be turned on every 7 minutes to check freezing conditions and additional heat to the cooler : cooler fluid temp (< 3° - [SSTa + SSTb]/2). Pump shall be turned of if cooler fluid temp > (8°C - [SSTa + SSTb]/2).
- If both saturated suction temperatures of circuit A and circuit B are greater than the cooler heater trip point plus 5.5 ^C, the cooler heater shall be turned off. The pump shall be allowed to stop.

heater trip point = freeze + heat_spt (heat_sp from SERVICE2 table)
freeze = 1.1 for water, coldest setpoint - 4.4^C for brine

4.5 - Oil heater control

Each circuit has its own oil separator fitted with an oil heater. Both circuit oil heater are controlled independently . Since there is no oil temperature sensor, the oil heater will be controlled based on the saturated condensing temperature as follows :

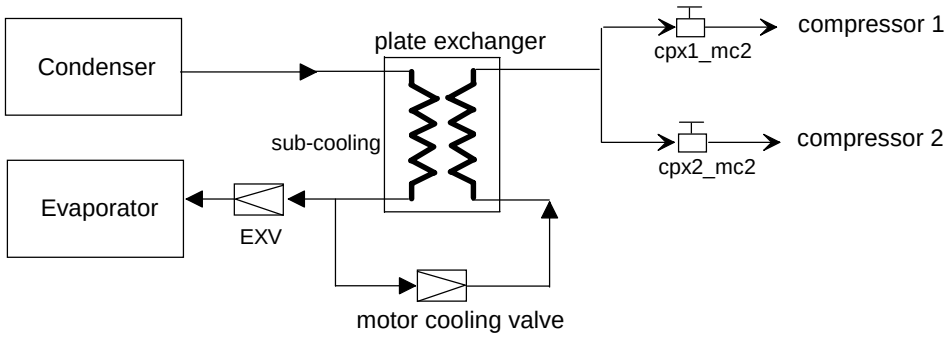
- Oil heater ON when outside temperature is below 17°C.
- Oil heater OFF when outside temperature is above 25°C
- Oil heater OFF when circuit is in operation or oil level is low (oil_sw is OPEN).

4.6 - Motor Cooling Control without plate exchanger economizer

The screw compressor motors used in the Global Chiller control are refrigerant cooled. The control strategy for motor cooling relies on vapor at light loads, and supplementary liquid refrigerant at high loads. Each compressor will have its own cooling solenoid. An additional motor cooling solenoid is required when operating in high condensing temperature. It is automatically controlled by pro-dialog even if it is not mounted in the units. The motor cooling solenoids shall be cycled to allow liquid to cool the motor. The main motor cooling solenoid control is based on the motor temperature and its setpoint (83°C) using a quasi-fuzzy logic. The additional motor cooling solenoid control is just based on the discharge gas temperature.

4.7 - Motor Cooling Control with sub cooling plate exchanger

The sub cooling plate exchanger replaces the old economizer for simple maintenance and cost reduction. Thus the screw compressor motors are cooled by refrigerant from the plate exchanger, located between condenser and exv (see scheme below). The refrigerant flow through this exchanger for motor cooling purpose is controlled by a thermal expansion valve. The opening of this valve is done by heating its internal resistor via 24 vac ouput signal from the screw compressor board, channel 13. For circuit which has 2 compressors, an additional solenoid (see scheme below, x=a for circuit A, x=b for circuit B) shall be controlled to balance motor temperatures. These solenoid output are located at channel 14 of the screw compressor board.



4.7.1 Motor Cooling Control with TQ feedback Signal Control

(refer to factory configuration and wiring for retrofit, pages, 21, 23 and 24)

Tq valve opening position depends on the heat (resistor is the image) on the TQ valve and also the equalisation pressure located at plate exchanger (in our application, quite the same than economiser pressure).

With the same economiser pressure, the higher heating signal is commanded (CPA1_PUL, or CPB1_PUL), the lower is the resistor and the more the valve is opened.

With same heating signal value, if the economiser pressure increases, the valve will tend to close. And vice versa

Based on this relation, if the feedback signal is enabled, the control will check all the time the relation TQ position = F (economiser pressure/TQ resistor) and shall make a kind of override (absolutely required at the start-up, resistor is very high)
When a value of 200 is sent on CPA1_PUL or CPB1_PUL (hardware SIO variable) some time, that means resistor value is a little above the minimum position, preheat is sent.
This value is sent also when loading capacity.

When the economiser pressure is steady, and TQ resistor is near to the pre-opening position, regular control (PID) is used.

TQ resistor sensor is connected to the EXV board. The value read is in K Ohms MTQ_RESA (for circuit A), MTQ_RESB (for circuit B). During regular operation, value read shall be from 0.7 k Ohm to 4 k Ohms.

4.8 - CAPACITY CONTROL

This function adjusts the number of active compressors and loaders to keep the leaving water temperature at the setpoint. The **precision** with which this is achieved depends upon the **capacity of the water loop, the water flow rate, the load and the number of capacity control steps available**. The control continuously takes account of the temperature error with respect to the control point, the rate of change of the leaving fluid temperature and the delta of temperatures between the entering and leaving fluid in order to determine the optimum time to add or subtract steps of capacity.

Note: a too important number of starts of a particular compressor will automatically cause a limitation of the compressors starts. This will affect the precision of the water loop temperature control.

4.8.1 - Logic description

4.8.1.1 - Basic logic

To operate the capacity control task uses the following inputs:

- EWT — Entering water temperature
- LWT — Leaving water temperature
- CTRL_PNT — Control point
- Cooling z_multiplier — Z Multiplier (range: 1.0 to 6.0)
- Heating z_multiplier — Z Multiplier (range: 1.0 to 6.0)

The control calculates the SMZ: load/unload factor. It is compared to the z_multiplier to determine when to add or remove stage:

- If (sum/z) > +z_multiplier -> stage = +1 (add a compressor)
- If (sum/z) $\geq$ +0.6 and if a loader is available (loader is OFF) -> stage = +1 (add a loader)
- If (sum/z) < - z_multiplier -> stage = -1 (remove one compressor)
- If sum/z) < -0.6 and loader is avaialble (loader is ON) -> stage = -1 (turn off one loader)

Note: z_multiplier doesn't apply to loaders.

4.8.1.2 - Z Multiplier calculation

The z_multiplier factor allows to indirectly increase the compressor on/off time delay. In consequence, it can be adjusted (increased) to avoid compressors short cycling. This function requires the following Service configuration:

- Auto Z Multiplier sepoint (zm_spt). Default to 6.
- Cooling and heating Z Multiplier max value (hc_zm). default to 6.0.

This function adapts the z_multiplier to the unit compressor cycles number (the cycle number shall be based on the compressor which has been the most started during an hour). The significant period for compressors cycling shall be of one hour.

If the cycle counter exceeds the setpoint (zm_spt), then the z_multiplier value shall be increased based on the cycle number (PID loop). The function shall not take care of the loaders cycling.

The calculated value of the z_multiplier shall not exceed the configured hc_zm.
If the unit returns to normal operating condition with a cycles counter going down then the calculated z_multiplier shall progressively return to its normal value (zm = 1.0). The rate at which the calculated z_multiplier returns to normal shall be lower than the rate at which it is increased.

The setpoint value shall allow to adapt the auto z multiplier calculation to the installation. The setpoint ranges from 4 to 6.

During normal operation, each modification of the unit capacity is followed by a dead time when no capacity modification is possible. The duration of this dead time is 90 seconds.

4.8.1.3 - Overrides

sum/z ratio will be overridden if any one of the following conditions is satisfied.

1	Cooler freeze protection
2,3	Very Low saturated suction temperature
4	Low source temperature protection
5,6	Low discharge superheat temperature
7, 8	Low temperature Cooling/High temperature heating
9	Demand limit
10	Cooler Lock
11	Slow change override
12	Ramp loading
13	Minimum ON/OFF delay
14	High temperature cooling and low temperature heating
15	System Manager control
16, 17	High pressure
18,19	High current
20, 21	Low saturated suction temperature
22,23,24,25	High condensing temperature
28	Compressor startup with loader 1 on due to low condensing temperature
26, 27	Low Oil Level when circuit is OFF
29,30	Stopping circuit due to low oil level (allowed thrice within 2 hours) before going to alarm
31,32	High motor temperature on economizer units (T° > 93°C)
33,34	Stopping compressor due high motor temperature (T° > 110°C, allowed thrice within 2 hours) before going to alarm
35	Chiller current limit

Note : When overrides 2,3 , 5, 6, 16, 17, 18, 19, 20, 21 are active, the variable close control (cls_ctrl) shall be enabled whatever the configuration to allow unloading the last loader in the circuit.

Chiller Current Override (override #35)

This function allows customer to limit the total current (it does not include current of fans, valves, heaters, oil pumps ...) of all the compressors during operation. The chiller current limit can be modified through USER configuration (USER table or User configuration by main interface). This function is similar to demand limit function.

- If the chiller current is greater than the chiller current limit , then a stage of capacity will be removed.
- If chiller current plus the added current of selected compressor is greater than the chiller current limit, the increase of capacity will not be allowed. If the compressors is OFF, its added current is 80% of its MTA. If the selected compressor is on but deos not reach 100% capacity, an added stage on the same compressor will add 40% of its current.

4.9 - COMPRESSORS & LOADERS LOADING SEQUENCE

4.9.1 - General Description

The Global chillers uses compressors which have better performance at full load than at part load. Therefore, the loading sequence strategy will be different than for the flotronic II or for the Pro-dialog 30 G & H. The following list applies only to capacity control. For High Ambient Unloading, it can be overridden.

1. A compressor will not be started until all other running compressors are 100% loaded.

2. On units with 3 compressors, both circuits cannot have their loaders off at the same time once 3 or more of the compressors in the unit are on. Where possible, the circuit which is starting a compressor will be the one which is to be unloaded.

3. Any time a lag compressor in a circuit is starting, the loaders in the circuit shall be turned off (unloading all compressors in the circuit). This shall be done 15 seconds prior to starting the new compressor. 15 seconds after the new compressor has started, the loaders shall be set to their desired state. When a lead compressor is starting, all loaders shall be turned off when the compressor relay is turned on (+/- 2 seconds), and shall be set to their desired state 15 seconds after the compressor has been started.

4. There shall be a configuration decision for "close control", which (when selected) will cause the control to utilize all of the loading devices to achieve better leaving water temperature control.

5. Whenever any compressor in a circuit is going to be stopped normally, the circuit shall be fully unloaded for 15 seconds prior to shutting down the compressor. This shall not apply when the reason for a shutdown is due to an alarm condition.

7. For any shutdown, all compressors and loaders will be shut down at the same time.

For more than 2 compressors, two types of sequencing are available and configurable by the user through either the Main Interface or through the CCN network:

- Equal circuit loading: The control shall attempt to maintain equal capacity between the circuits as the machine loads and unloads.
- Staged circuit loading: The control shall load the lead circuit completely before the lag circuit is started. When the load is decreasing the lag circuit shall be unloaded first.

Circuit compressors sequence select shall try to equalize the compressor starts number. That means any compressor in the circuit can become the lead compressor if it has the lowest starts number, however, this shall be balanced with the operating hours.

Loaders in the same circuit are commanded simultaneously. Thus one loader variable is displayed.

When a circuit is overridden (compressor status are blinking in the synopsis) because of low suction temperature, low or high discharge temperature or high condensing temperature (high pressure), or high current then no capacity increase shall be allowed on the affected circuit. This circuit is selected to unload capacity first when unloading capacity condition is required.

4.9.2- Compressor capacity determination

Each compressor has three stages capacity. Simulation had been done to determine the average capacity corresponding to those stages as following :

No loader ON -> 40%
Only loader_1 -> 70%
Both loaders ON -> = 100%

4.9.3- Staged Loading Increasing Capacity Logic

LEAD CIRCUIT			LAG CIRCUIT		
NUMBER OF COMPRESSORS	LOADER 1	LOADER 2	NUMBER OF COMPRESSORS	LOADER 1	LOADER 2
0	OFF	OFF	0	OFF	OFF
1	OFF	OFF	0	OFF	OFF
1	ON	OFF	0	OFF	OFF
1	ON	ON	0	OFF	OFF
2	ON	OFF	0	OFF	OFF
2	ON	ON	0	OFF	OFF
2	ON	ON	1	ON	OFF
2	ON	ON	1	ON	ON
2	ON	ON	2	ON	OFF
2	ON	ON	2	ON	ON

4.9.4- Equal Loading Increasing Capacity Logic with close_control = NO

LEAD CIRCUIT			LAG CIRCUIT		
NUMBER OF COMPRESSORS	LOADER 1	LOADER 2	NUMBER OF COMPRESSORS	LOADER 1	LOADER 2
0	OFF	OFF	0	OFF	OFF
1	OFF	OFF	0	OFF	OFF
1	ON	OFF	0	OFF	OFF
1	ON	ON	0	OFF	OFF
1	ON	OFF	1	ON	OFF
1	ON	ON	1	ON	OFF
1	ON	ON	1	ON	ON
2	ON	OFF	1	ON	ON
2	ON	ON	1	ON	ON
2	ON	ON	2	ON	OFF
2	ON	ON	2	ON	ON

4.9.5- Equal Loading Increasing Capacity Logic with close_control = YES

LEAD CIRCUIT			LAG CIRCUIT		
NUMBER OF COMPRESSORS	LOADER 1	LOADER 2	NUMBER OF COMPRESSORS	LOADER 1	LOADER 2
0	OFF	OFF	0	OFF	OFF
1	OFF	OFF	0	OFF	OFF
1	ON	OFF	0	OFF	OFF
1	ON	ON	0	OFF	OFF
1	ON	OFF	1	OFF	OFF
1	ON	ON	1	OFF	OFF
1	ON	ON	1	ON	OFF
1	ON	ON	1	ON	ON
2	ON	OFF	1	ON	ON
2	ON	ON	1	ON	ON
2	ON	ON	2	ON	OFF
2	ON	ON	2	ON	ON

4.9.6- Equal Loading Decreasing Capacity Logic with close_control = YES

LEAD CIRCUIT			LAG CIRCUIT		
NUMBER OF COMPRESSORS	LOADER 1	LOADER 2	NUMBER OF COMPRESSORS	LOADER 1	LOADER 2
2	ON	ON	2	ON	ON
2	ON	ON	2	ON	OFF
2	ON	OFF	2	ON	OFF
2	ON	ON	1	ON	OFF
2	ON	OFF	1	ON	OFF
2	ON	OFF	1	OFF	OFF
1	ON	ON	1	ON	OFF
1	ON	OFF	1	ON	OFF
1	ON	OFF	1	OFF	OFF
1	ON	ON	0	OFF	OFF
1	ON	OFF	0	OFF	OFF
1	OFF	OFF	0	OFF	OFF

4.9.7 - Equal Loading Decreasing Capacity Logic with close_control = NO

LEAD CIRCUIT			LAG CIRCUIT		
NUMBER OF COMPRESSORS	LOADER 1	LOADER 2	NUMBER OF COMPRESSORS	LOADER 1	LOADER 2
2	ON	ON	2	ON	ON
2	ON	ON	2	ON	OFF
2	ON	ON	1	ON	ON
2	ON	ON	1	ON	OFF
1	ON	ON	1	ON	ON
1	ON	ON	1	ON	OFF
1	ON	OFF	1	ON	OFF
1	ON	ON	0	OFF	OFF
1	ON	OFF	0	OFF	OFF
1	OFF	OFF	0	OFF	OFF
0	OFF	OFF	0	OFF	OFF

4.9.8 - Staged Loading Decreasing Capacity Logic with close_control = NO

LEAD CIRCUIT			LAG CIRCUIT		
NUMBER OF COMPRESSORS	LOADER 1	LOADER 2	NUMBER OF COMPRESSORS	LOADER 1	LOADER 2
2	ON	ON	2	ON	ON
2	ON	ON	2	ON	OFF
2	ON	ON	1	ON	ON
2	ON	ON	1	ON	OFF
2	ON	ON	0	OFF	OFF
2	ON	OFF	0	OFF	OFF
1	ON	ON	0	OFF	OFF
1	ON	OFF	0	OFF	OFF
1	OFF	OFF	0	OFF	OFF
0	OFF	OFF	0	OFF	OFF

4.9.9 - Staged Loading Decreasing Capacity Logic with close_control = YES

LEAD CIRCUIT			LAG CIRCUIT		
NUMBER OF COMPRESSORS	LOADER 1	LOADER 2	NUMBER OF COMPRESSORS	LOADER 1	LOADER 2
2	ON	ON	2	ON	ON
2	ON	ON	2	ON	OFF
2	ON	ON	1	ON	ON
2	ON	ON	1	ON	OFF
2	ON	ON	1	OFF	OFF
2	ON	OFF	1	OFF	OFF
2	ON	OFF	0	OFF	OFF
1	ON	ON	0	OFF	OFF
1	ON	OFF	0	OFF	OFF
1	OFF	OFF	0	OFF	OFF
0	OFF	OFF	0	OFF	OFF

4.10 - EXV CONTROL

4.10.1 - General

The EXV is controlled to maintain minimum pinch for insuring the cooler exchange performance through the delta temperature between the cooler fluid and the saturated suction temperature. EXV opening movement will normally decrease the cooler pinch and thus increase the cooler exchange performance. But it shall not open too much provided a drop in discharge superheat , low oil pressure and refrigerant flow.

The EXV control shall deal with two goals : Smaller Cooler Pinch and Discharge Superheat Protection.

Additional protection against excessive EXV opening is applied to ensure the condenser heat transfer (sub cooling). It may happen when operating in high condensing temperature and indirectly high discharge superheat, exv would tend to open continuously to get the lower pinch due to the setpoint and unfortunately in certain conditions, this value has reached the limit, though it is higher than the setpoint. Therefore, EXV position limit shall be set when there is no more variation in cooler pinch for a variation of EXV position of 4 percent.

EXV position shall also be limited to avoid hunting problem due to low discharge superheat protection. It may occur when operating in a low condensing temperature, the discharge superheat protection can switch from enable to disable in few scans and so on.

This control uses a kind of auto adaptive method whose goal is to find out the optimal position of EXV for insuring an optimal pinch with a correct discharge superheat and sub cooling.

4.10.2 - Overrides

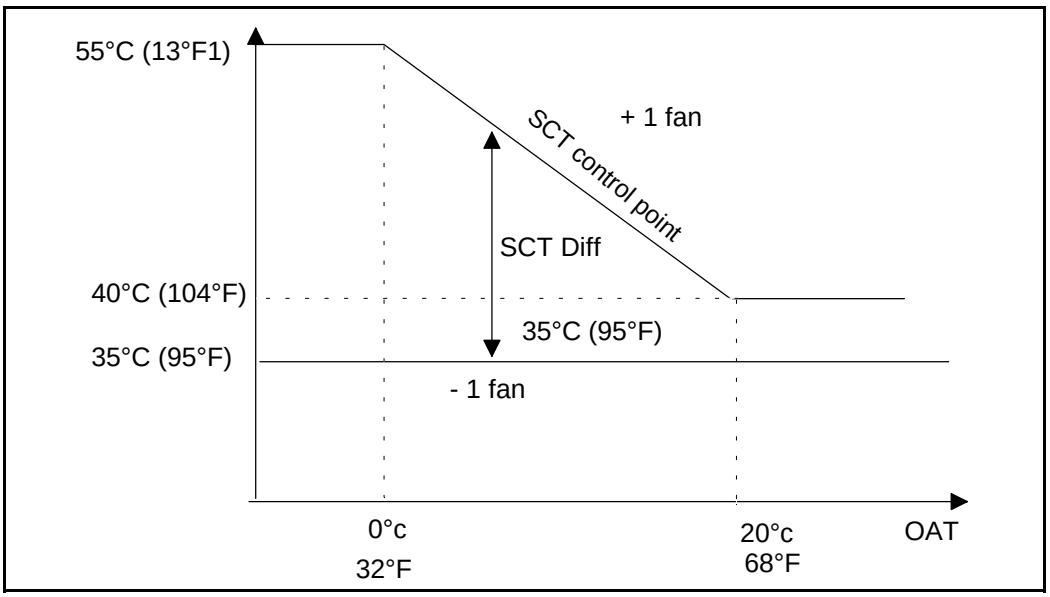
over_exv	**Override Description with and priority precedence**.
1	Low ambient startup
2	Low Saturated Suction Temperature
3	Very Low Saturated Suction Temperature
4	Very Low Discharge Superheat
5	Mop control (Closing EXV)
6	Cooler pinch regular control
7	Reclaim injection override
8	High Saturated Suction Temperature (no movement)
9	Low Saturated Suction with High Saturated Condensing Temperature
10,11	Capacity increase
12,13, 14	Capacity decrease
15	Reclaim pumpdown session
16,17	Discharge Superheat lower than control point
18, 20	Safeguard Discharge Superheat
19	Exv position limitation active
21,26	Safeguard optimal cooler pinch due high Discharge Superheat or lower exv position
22	Closing EXV due to good pinch and high motor temperature for economizer unit
23	Exv position limitation active, and go back to previous position
24, 25	EXV limitation is reinitialized

4.11 - Air Cooled Condensing Pressure Control

Head pressure differential value and head pressure differential timer can be adjusted in the Service menu. Decreasing these values will increase fan cycling. This differential value and timer can be reduced since the unit is fitted with an important number of fan stages, as to increase the condensing control accuracy. But in certain cases, notably on units with few fan stages, at too small value can causes superheat hunting problems.
Varifan PID gains can be modified in the Service menu (not recommended). See section 4.2.3.

SCT control point without varifan

To avoid fan cycles and also to ensure a minimum expected SCT for oil pressure, SCT control shall be adjusted based on OAT, the same for SCT differential as



4.12.1 - Air Cooled Condensing Pressure Control - Fan staging with Aux board

Each DO shall support only one fan. **The first DO is not used if varifan is present to standardize the way of making connection and to avoid wiring mistake**.

4.12.2 - Air Cooled Condensing Pressure Control - Fan staging

The combination described here below is for 4 fans configured maximum, each DO commands 1 fan

stage	DO_1	DO_2	DO_3	DO_4	fans controlled	total fans
0	off	off	off	off	0	0
1	on	off	off	off	fan_1	1
2	on	on	off	off	fan_1 + fan_2	2
3	on	on	on	off	fan_1 + fan_2+ fan_3	3
4	on	on	on	on	fan_1 + fan_2 + fan_3 + fan_4	4

The following combinations are used for a circuit with more than 4 fans configured

stage	DO_1	DO_2	DO_3	DO_4	fans controlled	total fans
0	off	off	off	off	0	0
1	on	off	off	off	fan_1	1
2	on	on	off	off	fan_1 + fan_2	2
3	on	off	on	off	fan_1 + - + fan_3 + fan_4	3
4	on	on	on	off	fan_1 + fan_2 + fan_3 + fan_4	4
5	on	on	on	on	fan_1 + fan_2 + fan_3 + fan_4 + fan_5	5

stage	DO_1	DO_2	DO_3	DO_4	fans controlled	total fans
0	off	off	off	off	-	0
1	on	off	off	off	fan_1	1
2	on	on	off	off	fan_1+ fan_2	2
3	on	off	on	off	fan_1+ - + fan_3 + fan_4	3
4	on	on	on	off	fan_1+ fan_2 + fan_3 + fan_4	4
5	on	off	on	on	fan_1+ - + fan_3 + fan_4+ fan_5 + fan_6	5
6	on	on	on	on	fan_1+ fan_2 + fan_3 + fan_4 + fan_5 + fan_6	6

stage	DO_1	DO_2	DO_3	DO_4	fans controlled	total fans
0	off	off	off	off	-	0
1	on	off	off	off	fan_1	1
2	on	on	off	off	fan_1 + fan_2	2
3	on	off	on	off	fan_1 + - + fan_3 + fan_4	3
4	on	on	on	off	fan_1 + fan_2 + fan_3 + fan_4	4
5	on	on	off	on	fan_1 + fan_2 + - + - + fan_5 + fan_6 + fan_7	5
6	on	off	on	on	fan_1 + - + fan_3 + fan_4 + fan_5 + fan_6 + fan_7	6
7	on	on	on	on	fan_1 + fan_2 + fan_3 + fan_4 + fan_5 + fan_6 + fan_7	7

stage	DO_1	DO_2	DO_3	DO_4	fans controlled	total fans
0	off	off	off	off	-	0
1	on	off	off	off	fan_1	1
2	on	on	off	off	fan_1 + fan_2	2
3	on	off	on	off	fan_1 + - + fan_3 + fan_4	3
4	on	on	on	off	fan_1 + fan_2 + fan_3 + fan_4	4
5	on	off	off	on	fan_1 + - + - + - + fan_5 + fan_6 + fan_7 + fan_8	5
6	on	on	off	on	fan_1 + fan_2 + - + - + fan_5 + fan_6 + fan_7 + fan_8	6
7	on	off	on	on	fan_1 + - + fan_3 + fan_4 + fan_5 + fan_6 + fan_7 + fan_8	7
8	on	on	on	on	fan_1 + fan_2 + fan_3 + fan_4 + fan_5 + fan_6 + fan_7 + fan_8	8

4.13 - Water Cooled Condensing Pressure Control

The control of a common water valve for both circuits is required. The water valve control will be based on the highest saturated condensing temperature of both circuit or based on the operating circuit if the other is OFF.

Water valve PID gains can be modified in the Service menu (when unit is OFF). See section 4.2.3. They are accessible though the table SERVICE1 and can be modified during operation.

4.14 - High Pressure (Maximum Condensing Temperature) Override

This function shall be used to avoid circuit high pressure trip while the condensing pressure reaches a configurable override threshold (Service 1 Configuration).

- If the saturated condensing temperature is greater than the maximum condensing temperature (mct_sp) minus the maximum condensing temperature override differential (mct_diff) but less than the maximum condensing temperature (mct_sp) then the circuit capacity increase shall be inhibited.
- If the saturated condensing temperature is greater than the maximum condensing temperature (mct_sp) then the circuit capacity shall be reduced. The first capacity stage shall never be turned off even if that causes a circuit high pressure trip.
- If the circuit capacity has been reduced due to high condensing temperature override then the circuit capacity increase will not be allowed for 5 minutes even if the saturated condensing temperature is below the maximum condensing temperature (mct_sp) minus the maximum condensing temperature override differential. This shall avoid compressor cycling.

4.15 - High Current Override

This function shall be used to avoid circuit high current trip while the motor current reaches a configurable override threshold (Service 1 Configuration).

- If the current is greater than the maximum current threshold (curr_max) minus the maximum current override differential (curr_diff) but less than the maximum current threshold (curr_max) then the circuit capacity increase shall be inhibited.
- If the current is greater than the maximum current threshold (curr_max) then the circuit capacity shall be reduced by removing a loader or the affected compressor.
- If the circuit capacity has been reduced due to current override then the circuit capacity increase will not be allowed for 5 minutes what ever current measured. This shall avoid compressor cycling.

4.16 - Stopping Function

4.16.1- Stopping a compressor by capacity unloading

If the selected compressor is operating with at least one loader ON, then all the loaders in the same circuit shall be de-energized for 15 seconds before stopping the compressor.

4.16.2- Stopping the unit by manual command (OFF)

Both circuit shall decrease its capacity progressively every 15 seconds. One loader is immediately de-energized. The last loader will be de-energized in 15 seconds later. Then all compressors, oil solenoids and oil pump will be de-energized in 15 seconds after the last loader is turned OFF.
Here is an example of the stopping function with time indicator for a circuit with both loaders ON before receiving a STOP command.

$t = t_0$ loader_2 = OFF

$t = t_{0+15s}$ loader_1 = OFF,

$t = t_{0+30s}$ All the compressors, oil solenoids and oil pumps shall be de-energized

The exv shall be closed in one minute after the last compressor is de-energized or after the difference between discharge and suction pressure is lower than 58 psi

note : Both circuits can be stopped in different timing depending on the status of their loaders when the STOP command is received. Maximum duration for stopping the unit is 30 seconds. A circuit can be stopped immediately if no loader is ON before going to stopping procedure.

4.16.3- Stopping a circuit by failure

If the circuit or the hole unit are failed by alarms freeze, low sst, cooler flow, all the compressors are shut off immediately. Otherwise, it shall respect procedure above.

4.17- Oil pressure control

4.17.1- Oil pressure Setpoint determination

The following algorithm applies to all unit types:

Suction pressure (kpa)	< 240	240 ≤ AND ≤350	> 350
Oil setpoint 1(kpa)	70	86	104

Oil Setpoint2 is calculated as follows:

DP - SP (kpa)	< 861	861 ≤ AND ≤ 1137	> 1137
Oil setpoint 2(kpa)	0.235* (DP - SP) + 4	2* (DP - SP) - 1516	0.63645* (DP - SP) + 35

* DP = Discharge Pressure
* SP = Suction pressure

4.17.2- Oil pump control

The oil pump is generally used to provide pre-lubrification of the compressor. Moreover, it is controlled to insure a correct oil pressure during capacity transition or during operation with low condensing temperature that cause a drop of oil pressure to avoid tripping in alarm.

Thus the oil pump is turned ON when the Differential Oil Pressure is lower than Oil Setpoint 1 plus 13 kpa.
and remained ON until Differential Oil Pressure is greater than Oil Setpoint 1 plus 35 kpa AND difference between discharge and economizer pressure is greater than Oil Setpoint 1 plus 150 kpa to avoid oil pump cycles.

4.17.3- Low Oil pressure alarm determination

ALARM 68 for Compressor A1, ALARM 69 for Compressor A2, ALARM 70 for Compressor B1, ALARM 71 for Compressor B2.

Criteria For Trip Tested only when the compressor is ON.

DOP: Differential Oil Pressure for the appropriate compressor. DOP = Oil pressure - Economizer pressure.

Economizer pressure is the common (econ_sel = YES) Economizer Pressure transducer reading for the circuit involved or the appropriate economizer pressure transducer (econ_sel = NO) associated to the compressor.

A. Compressor has started with Normal Ambient (oat > 10 °C) or or condenser temperature (temp > 18°C)

1. If the compressor has been running for less than 5 seconds then ignore the alarm.

2. If the compressor has been running for more than 5 seconds but less than 30 seconds and DOP < (Oil Setpoint1/30)*(Comp. Running Time [in seconds]) for 3 continuous readings, then the alarm shall be tripped.

3. If the compressor has been running for 30 seconds or more, then if:
   a). DOP < Oil pressure setpoint1 for 15 continuous seconds,

OR

   b). (Poil - Psuction) < Oil pressure setpoint2 for 15 continuous seconds,
   then the alarm shall be tripped

B. Compressor has started with Low Ambient (oat < 10 °C) or low condenser temperature (temp < 18°C)

1. If the compressor has been running for less than 90 seconds then ignore the alarm.

2. If the compressor has been running for more than 90 seconds but less than 180 seconds and DOP < (Oil Setpoint1/90)*(Comp. Running Time [in seconds] - 90) for 3 continuous readings, then the alarm shall be tripped.

3. If the compressor has been running for 180 seconds or more, then if:
a). DOP < Oil pressure setpoint1 for 15 continuous seconds,

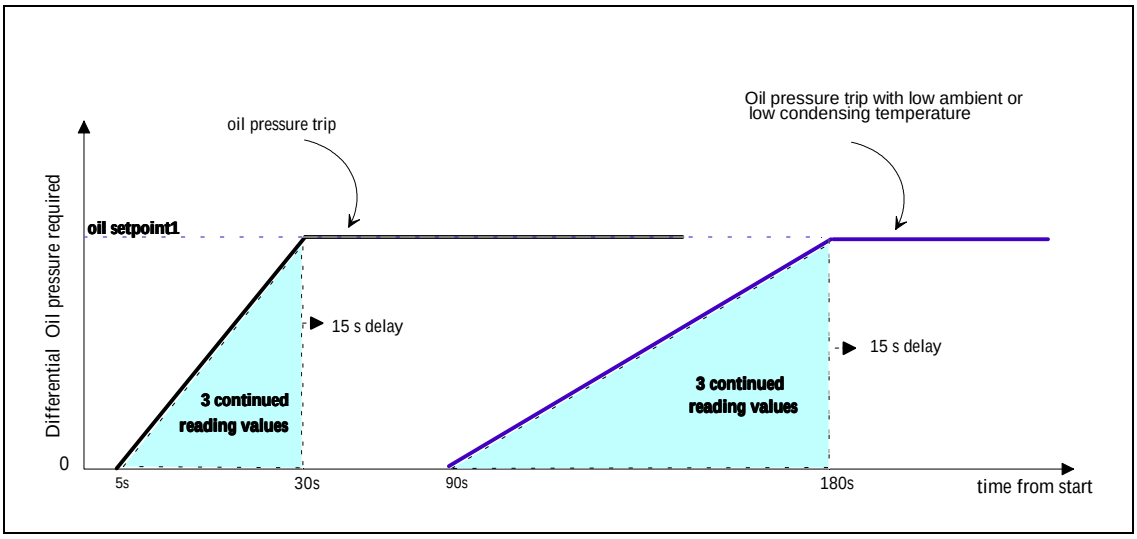
OR

b). (Poil - Psuction) < Oil pressure setpoint2 for 15 continuous seconds, then the alarm shall be tripped.

Action To Be Taken

1. If the alarm is tripped then the affected compressor shall be stopped. The other compressors shall continue to run.

4.17.4- Differential Oil Pressure Setpoint 1 alarm condition summary.



4.18 - Reclaim Operation

4.18.1 - General Description

This function shall control the air cooled to reclaim or the reclaim to air cooled changeover process.

Reclaim changeover shall be caused either by:

- A manual reclaim select change due to a local, remote or CCN command on the unit
- A heat reclaim temperature change while reclaim has been selected. This algorithm monitors the entering reclaim sensor temperature and compares it with the reclaim setpoint to determine if the reclaim can be active or not.

If the reclaim function has been selected, the reclaim shall become active when the entering reclaim temperature comes below the reclaim setpoint minus the reclaim deadband and delay between the last air cooled to reclaim session is elapsed. It shall become inactive when the entering reclaim temperature comes over the reclaim setpoint plus the reclaim deadband.

Non-reclaim to reclaim Changeover shall follow this procedure:

- Turn on the reclaim condenser pump
- Verify the condenser flow is established, if not after 1 minute delay has elapsed, reclaim operation shall be aborted and an alarm shall be displayed.
- Wait for 3 minutes after condenser pump is ON and until the saturated condensing temperature reaches (30 deg C) and superheat is greater than 8.6 ^C
- If saturated condensing temperature is greater than reclaim setpoint + 3.3^F, go to reclaim operation directly (it is not necessary to make an pumpdown) otherwise, go through pumpdown (see below)
- Start the pumpdown sequence : reclaim discharge valve shall be closed and reclaim pumpdown injection valve shall be open.
- Close EXV 6.67 or 3.33% upon the number of compressors on circuit every 10 seconds while pumpdown pressure is greater than 300 kpa (44 psi), during first minute if EXV is less than 15 % opened.
- After a 10 minutes duration or as soon as pumpdown pressure is lower than 300 kpa (44 psi), reclaim injection valve shall be closed, reclaim operation is effective. Open EXV 13.33% as avoid low saturated suction alarm.
- When reclaim operation is active, each circuit fan staging has its own saturated condensing control point determined as follows:
  sct_ctrl_x = (hr_ewt + hr_lwt)/ 2 + rsp_x_a * capacity_x + rsp_x_b (x for circuit), rsp_x_a and rsp_x_b are service parameters in table SERVICE2.
- Pumpdown shall not be necessary if saturated condensing temperature is greater than reclaim setpoint + 6 ^C

Reclaim to non-reclaim Changeover shall follow this procedure:

- Turn off the condenser pump.
- Close the reclaim pumpdown valve.
- Open the reclaim discharge valve if at least a compressor is ON. Otherwise, Close it.

During reclaim operation, if the pumpdown pressure is greater than 400 kpa (59 psi), the pumpdown procedure in non_reclaim to reclaim session shall be initiated. When the number of these abnormal sessions exceeds 2 times, the reclaim operation shall be aborted, the circuit shall return to air cooled mode and an alarm shall be displayed.

At power up or after reset or after the unit capacity goes down to 0%, the function shall return to air cooled mode.

4.18.2 - Reclaim To Air Cooled Changeover Initiation

This shall determine whether the unit shall return to air cooled mode. This can be caused by the following:

Cause #1: Reclaim operation active and reclaim select is no more active

Cause #2: Reclaim mode is active and the entering reclaim temperature is above the range of the reclaim setpoint + the reclaim dead band divided by 2 : HR_EWT >rsp + hr_deadb/2

Cause #3: Number of consecutive reclaim pumpdown sessions exceeds 2 times

Cause #4: entering reclaim temperature sensor failure

4.18.3 - Air Cooled To Reclaim Changeover Initiation

A non-reclaim to reclaim injection session has been required and at least one compressor is on and the unit is not failed and the entering reclaim temperature is not failed and this one is below the reclaim setpoint - half of configured reclaim deadband and delay between the last reclaim injection has elapsed.

4.18.4 - Reclaim Operation status hr_status Description

Information on reclaim operation is available on table RECLAIM (hrstatus) or on INFORMATION menu (hr_status). hr_status parameter shall contain reclaim operation indicator of both circuit in two digits, one digit per circuit (left digit for circuit A, the other for circuit B) with the following description :

reclaim operation indicator	Status description
0	Air cooled operation
1	Reclaim mode request
2	Reclaim pumpdown mode
3	Reclaim operation active
4	Reclaim pumpdown failed
5	Reclaim failed due to flow switch

*note : in case of reclaim operation failure (alarm # 83 for circuit A, alarm # 84 for circuit B), hr_status will not be initialized until the manual reset on main interface is done.

4.18.5 - Reclaim Operation Using Air Cooled Exchanger

To avoid high pressure problem, the remained condenser (hr_val_x) can be turned ON if SCT is above reclaim setpoint + 8.3 deg C and all fans are ON provided that fans staging is not enough to avoid the risk of exceeding high pressure override threshold. When turning ON, the remained condenser (hr_val_a) is kept to ON for at least 3 minutes to let fans staging to be stabilized. This condenser can be turned OFF if it has been ON for more than 3 minutes and if saturated condensing temperature is below the reclaim setpoint (rsp) to ensure the reclaim operation performance.

4.18.6 - Reclaim Condenser Water Valve Control

if unit is not in reclaim operation, then the reclaim condenser water valve remains in minimum position.

In reclaim operation :

- If reclaim entering temperature is below 20 deg C, then reclaim condenser valve is at minimum position.
- If reclaim entering temperature is above 40 deg C, then reclaim condenser valve is at maximum position.
- If entering temperature is within the range 20 degC and 40 deg C, then reclaim condenser water valve position will be an interpolation between minimum and maximum position.

4.18.7 - Reclaim Condenser Heater Control

Reclaim condenser heater is ON when entering or leaving fluid are lower than 3.0 deg C(37.4 degF). It is turned OFF when both temperatures are above 4.4 deg C (40.0 deg F).

4.19 - Two Units Master/Slave Control

4.19.1 - General

This function allows to perform master/slave plant control between two chillers linked by the CCN network. Master and slave chiller need to operate on the same bus. Master/slave operations shall operate in cooling or heating mode.

To operate properly, the master and the slave chillers must have an additional CHWS sensor located on the common chilled leaving piping when the water control is done on the outlet side. This CHWS sensor shall be connected on each chiller basic board. When the water system control is done on the inlet side no additional CHWS sensor is required.

Parallel chiller control with dedicated pumps is recommended. Chiller must start and stop its own water pump located on its own piping. If pumps are not dedicated for each chiller pimping, chiller isolation valves are required: each chiller must open and close its own isolation valve through the control (valve shall be connected to the pump outputs).

Water system control with no individual chiller pump control is feasible. It is not recommended when the system load is low or if the control point is close from the freeze water tripping point (because of system instability that can be caused by the freeze protection override). System flow is constant even if the master or the slave chiller is stopped. In that case, the system pump shall be controlled by the master chiller.

Series chillers with dedicated primary pumping and constant flow shall be feasible but not recommended. Pump start/stop must be controlled externally. Each series chiller must control its own isolation and bypass valves: stopped chiller must be isolated from water flow (chiller pump command shall be used for valves control. Each chiller must open and close its own chilled isolation valve).

The master chiller shall monitor all external commands as start/stop, demand limiting or setpoint select. It needs to be started in *Master* operating type. The slave chiller must operate in CCN mode. If the master chiller is turned off while the master/slave function is active then, the slave chiller shall be stopped.

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

The control of the slave chiller shall be done through commands emitted by the master chiller. The slave chiller has no action in the master/slave operations: it shall only verify that CCN communication with its master is correct.

The master function shall provide the ability to select a lead chiller among the master and the slave. Selection shall be based on the delta between the master and the slave run hours and shall try to optimize the runtime hours. If this function is unused then, the lead chiller shall always the master. Lead/lag changeover between the master and the slave due to hour balance shall occur during chiller operations odd days at 12:00 a.m. or at startup.

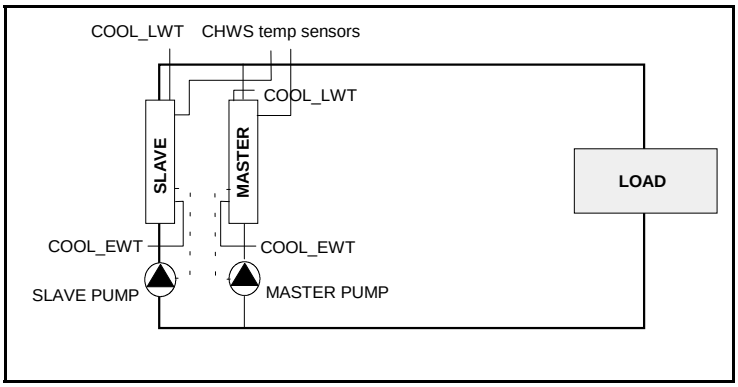
The lead chiller shall always be started first and the lag chiller shall be maintained at zero percent capacity through master forcing the lag demand limit value (LAG_LIM) to 0%. The lag water pump shall be maintained off. When the lead chiller cannot be loaded anymore (because it is loaded at its full available capacity or at the master demand limit value) then the lag start timer is started. When the lag start timer is elapsed, if the error on the master controlled setpoint is greater than 3^F and if the pulldown time is elapsed then, the lag chiller water pump shall be turned on (if required by configuration) and the lag chiller shall be allowed to start through master forcing the lag chiller demand limit value (LAG_LIM) to its own demand limit value. To ensure that the lag chiller will be unloaded first in case of water load decrease then, the lead chiller setpoint error shall be reset of upwards 4^F provided that the lag capacity is not zero.

The lead pulldown time tells how long after starting the lead chiller (one time after the master chiller status has been manually started) before checking whether to start an additional chiller. This time delay gives the lead chiller a chance to pull down the loop temperature before starting another chiller.

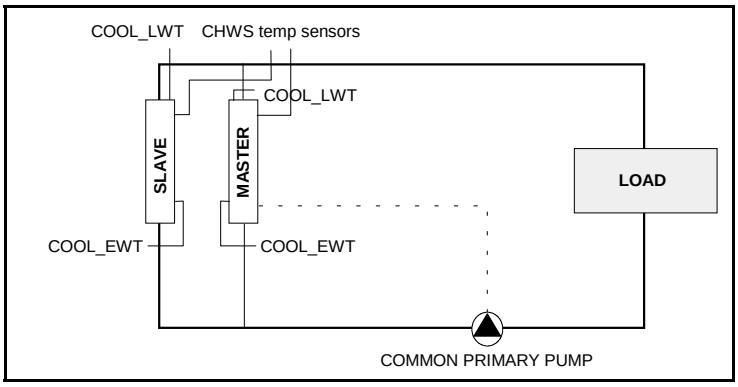
If a communication failure is detected between the master and the slave then, all master/slave functions shall be disabled and chillers shall return to standalone operations until communication is reestablished.

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

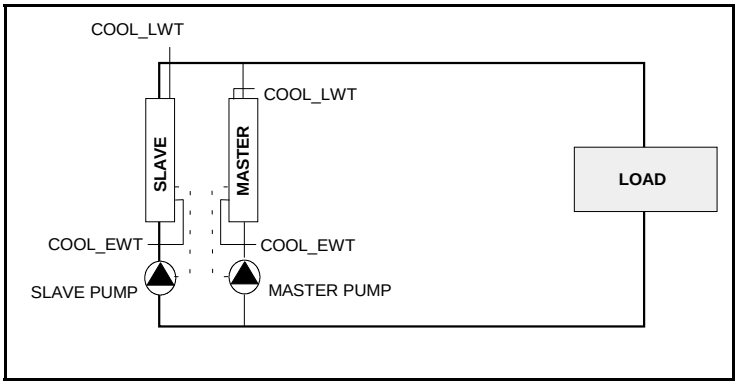
The figures below illustrate master/slave application for the most common plant layouts. Those figures are not exhaustive.



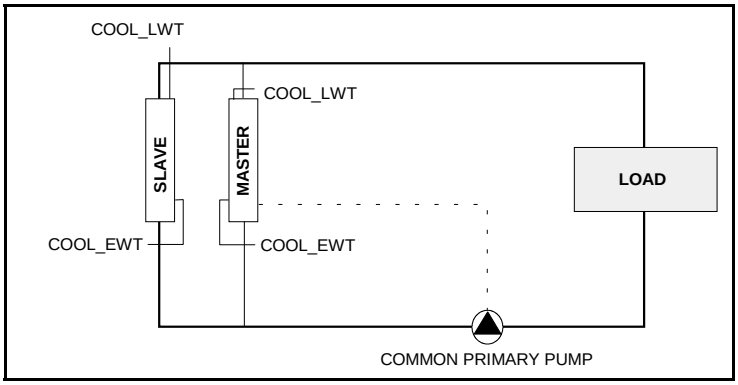
Typical parallel Master/slave chillers, dedicated primary pumping, variable flow Leaving water control



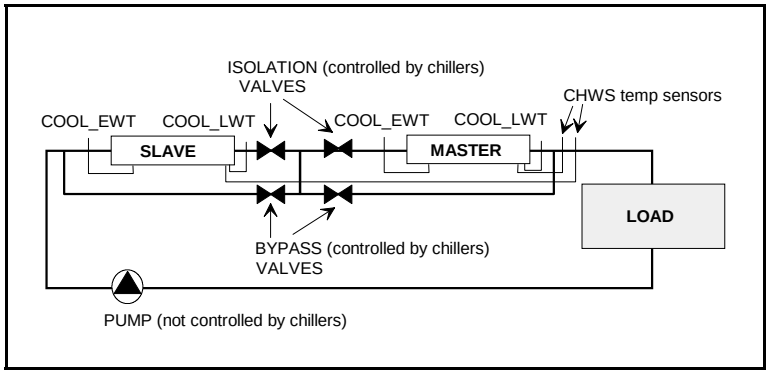
Typical parallel Master/slave chillers, common primary pumping, constant flow Leaving water control



Typical parallel Master/slave chillers, dedicated primary pumping, variable flow Entering water control



Typical parallel Master/slave chillers, common primary pumping, variable flow Entering water control



Typical series Master/slave chillers, dedicated primary pumping, constant flow Leaving water control option

4.19.2 - Abnormal conditions

If a communication failure is detected between the master and the slave then all master/slave functions shall be disabled and chillers shall return to standalone operations until communication is reestablished.

If any chiller is stopped due to failure then the other chiller will be allowed to start with no delay.

If master/slave configuration error occurs, master/slave shall be disable.

Master/Slave Error

The following error shall be updated in the M_MSTSLV Maintenance table (priority order):

Master/Slave alarm code			
Error code	**Master**	**Slave**	**Description**
0	x	x	Normal
1	x	x	The master or slave water pump is not configured while the control of the lag unit pump is required (lag_pump = 1)
2	x		Master and slave units have the same network address.
3	x		There is no slave configured at the slave address
4	x		Slave pump_seq incorrect configuration
5	x		There is a conflict between the master and the slave lwt option: the master is configured for ewt control while the slave is configured for lwt control.
6	x		There is a conflict between the master and the slave lwt option: the master is configured for lwt control while the slave is configured for ewt control.
7	x		There is a conflict between the master and the slave pump option: the master is configured for lag pump control while the slave is not configured for lag pump control.
8	x		There is a conflict between the master and the slave pump option: the master is not configured for lag pump control while the slave is configured for lag pump control.
9	x	x	The slave chiller is in local or remote control (chilstat = 3)
10	x	x	The slave chiller is down due to fault (chilstat = 5)
11	x		The master chiller operating type is not Master: master_oper_typ ≠ master
12	x	x	No communication with slave.
13	x		master and slave heatcool status are not the same.

Note

Master/slave sequence can be controlled through the Network Service Tool or PCDCT tools (see appendix, M_MSTSLV Maintenance Table)

5 - CCN ALARM MESSAGES

The Building Supervisor displays current alarms messages and their return to normal provided that the CCN table ALARMDEF has been correctly configured.

The Network Service Tool Diagnostic Menu allows to display 5 current alarms messages (even if the ALARDEF table is not configured).

The following gives the messages that shall be displayed by the Building Supervisor or from main interface.

Alarm 1	Cooler Entering Thermistor
Alarm 2	Cooler Leaving Thermistor
Alarm 3	Condenser Entering Thermistor
Alarm 4	Condenser Leaving Thermistor
Alarm 5	Reclaim Condenser Entering Thermistor
Alarm 6	Reclaim Condenser Leaving Thermistor
Alarm 7	OAT Thermistor
Alarm 8	MASTER/Slave Common Fluid Thermistor
Alarm 9	Compressor A1 Discharge Gas Temperature Thermistor
Alarm 10	Compressor A2 Discharge Gas Temperature Thermistor
Alarm 11	Compressor B1 Discharge Gas Temperature Thermistor
Alarm 12	Compressor B2 Discharge Gas Temperature Thermistor
Alarm 13	0-10V Reset/Limit Input
Alarm 14	Circuit A Discharge Transducer
Alarm 15	Circuit B Discharge Transducer
Alarm 16	Circuit A Suction Transducer
Alarm 17	Circuit B Suction Transducer
Alarm 18	Compressor A1 Oil Transducer
Alarm 19	Compressor A2 Oil Transducer
Alarm 20	Compressor B1 Oil Transducer
Alarm 21	Compressor B2 Oil Transducer
Alarm 22	Compressor A1 Economizer Transducer
Alarm 23	Compressor A2 Economizer Transducer
Alarm 24	Compressor B1 Economizer Transducer
Alarm 25	Compressor B2 Economizer Transducer
Alarm 26	Circuit A Remote Discharge Pressure Transducer
Alarm 26	Circuit A Reclaim Pumpdown Pressure Transducer
Alarm 27	Circuit B Reclaim Pumpdown Pressure Transducer
Alarm 28	Circuit A Motor Cooling TQ feedback Sensor Failure
Alarm 29	Circuit B Motor Cooling TQ feedback Sensor Failure
Alarm 30	Loss of communication with Screw Compressor Board 1
Alarm 31	Loss of communication with Screw Compressor Board 2
Alarm 32	Loss of communication with Screw Compressor Board 3
Alarm 33	Loss of communication with Screw Compressor Board 4
Alarm 34	Loss of communication with EXV Board 1
Alarm 35	Loss of communication with Fans Board 1
Alarm 36	Loss of communication with Fans Board 2
Alarm 37	Loss of communication with 4xAI_2xAO or Aux Type 1 Board
Alarm 38	Loss of communication with Reclaim or Cooler Heater Board
Alarm 39	Loss of communication with CCN / Clock Board
Alarm 40	Electrical Box Thermostat or reverse phase detection Failure
Alarm 41	Unit is in CCN emergency stop
Alarm 42	Initial factory configuration required
Alarm 43	Illegal configuration
Alarm 44	Circuit A High Pressure
Alarm 45	Circuit B High Pressure
Alarm 46	Compressor A1 Oil Solenoid Failure

Alarm 47	Compressor A2 Oil Solenoid Failure
Alarm 48	Compressor B1 Oil Solenoid Failure
Alarm 49	Compressor B2 Oil Solenoid Failure
Alarm 50	Compressor A1 Prestart Low Oil Pressure
Alarm 51	Compressor A2 Prestart Low Oil Pressure
Alarm 52	Compressor B1 Prestart Low Oil Pressure
Alarm 53	Compressor B2 Prestart Low Oil Pressure
Alarm 54	Circuit A Low Oil Level
Alarm 55	Circuit B Low Oil Level
Alarm 56	Circuit A Low Suction Temperature
Alarm 57	Circuit B Low Suction Temperature
Alarm 58	Circuit A High Suction Temperature
Alarm 59	Circuit B High Suction Temperature
Alarm 60	Circuit A Low Discharge Superheat
Alarm 61	Circuit B Low Discharge Superheat
Alarm 62	Compressor A1 Maximum Delta Pressure Check Oil Line
Alarm 63	Compressor A2 Maximum Delta Pressure Check Oil Line
Alarm 64	Compressor B1 Maximum Delta Pressure Check Oil Line
Alarm 65	Compressor B2 Maximum Delta Pressure Check Oil Line
Alarm 66	Loss of communication with System Manager
Alarm 67	Master/Slave communication Failure
Alarm 68	Compressor A1 Low Oil Pressure
Alarm 69	Compressor A2 Low Oil Pressure
Alarm 70	Compressor B1 Low Oil Pressure
Alarm 71	Compressor B2 Low Oil Pressure
Alarm 72	Cooler Freeze Protection
Alarm 73	Circuit A Condenser Freeze
Alarm 74	Circuit B Condenser Freeze
Alarm 75	Cooler Interlock Failure
Alarm 76	Condenser Lock Failure
Alarm 77	Compressor A1 High Current
Alarm 78	Compressor A2 High Current
Alarm 79	Compressor B1 High Current
Alarm 80	Compressor B2 High Current
Alarm 81	Cooler Pump 1 Default
Alarm 82	Cooler Pump 2 Default
Alarm 83	Circuit A Reclaim Pumpdown Failure
Alarm 84	Circuit B Reclaim Pumpdown Failure
Alarm 85	Reclaim Operation Failed by Condenser Flow Switch
Alarm 86	Master chiller configuration error
Alarm 87	Service maintenance alert

Alarms compressor

Alarm 101	Compressor A1 Motor Temperature Too High
Alarm 102	Compressor A1 Motor Temperaure Out of Range
Alarm 103	Compressor A1 High Pressure Switch
Alarm 104	Compressor A1 Over Current
Alarm 105	Compressor A1 Lock Rotor
Alarm 106	Compressor A1 Ground Fault
Alarm 107	Compressor A1 Phase Loss L1
Alarm 108	Compressor A1 Phase Loss L2
Alarm 109	Compressor A1 Phase Loss L3
Alarm 110	Compressor A1 Unbalance > 14 %
Alarm 111	Compressor A1 Unbalance > 18 %
Alarm 112	Compressor A1 No Motor Current
Alarm 113	Compressor A1 Star Delta Starter Failure
Alarm 114	Compressor A1 Contactor Failure
Alarm 115	Compressor A1 Unable To Stop
Alarm 116	Compressor A1 Phase Reversal
Alarm 117	Compressor A1 MTA Configuration Header Fault

Alarm 201	Compressor A2 Motor Temperature Too High
Alarm 202	Compressor A2 Motor Temperature Out of Range
Alarm 203	Compressor A2 High Pressure Switch
Alarm 204	Compressor A2 Over Current
Alarm 205	Compressor A2 Lock Rotor
Alarm 206	Compressor A2 Ground Fault
Alarm 207	Compressor A2 Phase Loss L1
Alarm 208	Compressor A2 Phase Loss L2
Alarm 209	Compressor A2 Phase Loss L3
Alarm 210	Compressor A2 Unbalance > 14 %
Alarm 211	Compressor A2 Unbalance > 18 %
Alarm 212	Compressor A2 No Motor Current
Alarm 213	Compressor A2 Star Delta Starter Failure
Alarm 214	Compressor A2 Contactor Failure
Alarm 215	Compressor A2 Unable To Stop
Alarm 216	Compressor A2 Phase Reversal
Alarm 217	Compressor A2 MTA Configuration Header Fault

Alarm 301	Compressor B1 Motor Temperature Too High
Alarm 302	Compressor B1 Motor Temperature Out of Range
Alarm 303	Compressor B1 High Pressure Switch
Alarm 304	Compressor B1 Over Current
Alarm 305	Compressor B1 Lock Rotor
Alarm 306	Compressor B1 Ground Fault
Alarm 307	Compressor B1 Phase Loss L1
Alarm 308	Compressor B1 Phase Loss L2
Alarm 309	Compressor B1 Phase Loss L3
Alarm 310	Compressor B1 Unbalance > 14 %
Alarm 311	Compressor B1 Unbalance > 18 %
Alarm 312	Compressor B1 No Motor Current
Alarm 313	Compressor B1 Star Delta Starter Failure
Alarm 314	Compressor B1 Contactor Failure
Alarm 315	Compressor B1 Unable To Stop
Alarm 316	Compressor B1 Phase Reversal
Alarm 317	Compressor B1 MTA Configuration Header Fault

Alarm 401	Compressor B2 Motor Temperature Too High
Alarm 402	Compressor B2 Motor Temperature Out of Range
Alarm 403	Compressor B2 High Pressure Switch
Alarm 404	Compressor B2 Over Current
Alarm 405	Compressor B2 Lock Rotor
Alarm 406	Compressor B2 Ground Fault
Alarm 407	Compressor B2 Phase Loss L1
Alarm 408	Compressor B2 Phase Loss L2
Alarm 409	Compressor B2 Phase Loss L3
Alarm 410	Compressor B2 Unbalance > 14 %
Alarm 411	Compressor B2 Unbalance > 18 %
Alarm 412	Compressor B2 No Motor Current
Alarm 413	Compressor B2 Star Delta Starter Failure
Alarm 414	Compressor B2 Contactor Failure
Alarm 415	Compressor B2 Unable To Stop
Alarm 416	Compressor B2 Phase Reversal
Alarm 417	Compressor B2 MTA Configuration Header Fault

6 - CCN COMPATIBILITY

30GX&HX Pro-Dialog *4* Control is compatible with:
- The Building Supervisor
- The Network Service Tool

30GX&HX Pro-Dialog *4* Control is compatible with the following POCs:
- Alarm POC II
- Autodial Gateway II
- Data Transfer/Collection History
- Dataport 1
- Dataport 2
- SAM
- NDS
- CCN/JBUS Gateway
- Flotronic System Manager
- Chiller SYstem Manager III

7 - PRO_DIALOG 4 DOWNLOADER ADDENDUM INFORMATION

The pro_dialog 4 control software shall be downloaded using the downloader version 3.0 or later. Here is the example of the downloader list (download.lis) which contains only pro_dialog 4 controls :

CESR208410-22	PD4 Global chiller GX & HXC SR 2.2	(1)
CESR208400-22	PD4 Recip chiller 30 GK & 30HZ V2 SR 2.2	(1)
CESRNRCP53-10	NRCP PD4 SLAVE ADDRESS 53 version 1.0	(2)
CESRSCPM10-60	PD4 SCPM board download SR 1.06	(2)

1. Software can be downloaded through CCN bus or through SIO bus
2. Software shall only be downloaded through SIO bus.
   Before downloading the software, use the reset command to erase the old software. Once F2 key is pressed, turn off and on quickly the power supply of the board, the message «Hard restart command successful !».
   Then go to the downloader , Select download, software and then press F2 to download the software as usual.

The «CESRNRCP53-10» shal be used for Aquasnap basic board download when cooler heater and reclaim option are selected.

APPENDIX A - CCN DISPLAY, SETPOINT, MAINTENANCE TABLE SCREENS ...

DISPLAY SCREEN

TABLE NAME: GENUNIT PIC TABLE TYPE : 11H, instance 1

	DESCRIPTION	STATUS	UNITS	POINTS	FORCEABLE
1	GENERAL PARAMETERS				
2					
3	Control Type	Local/CCN/Remote[1]	-	ctr_type	N
4	Run Status	running/Off/Stopping/Delay[2]	-	status	N
5	CCN Chiller Start/Stop	Enable/Dsable[3]	-	CHIL_S_S	Y
6	Chiller Occupied?	Yes/No[4]	-	CHIL_OCC	Y
7	Minutes Left for Start	0-15	min	MIN_LEFT	N
8	Heat/Cool Select	Heat/Cool[5]	-	HC_SEL	Y
9	Heat Reclaim Select	Yes/No[10]	-	RECL_SEL	Y
10					
11	Alarm State	Normal[6]	-	ALM	N
12	Current Alarm 1	nnn	-	alarm_1	N
13	Current Alarm 2	nnn	-	alarm_2	N
14	Current Alarm 3	nnn	-	alarm_3	N
15	Current Alarm 4	nnn	-	alarm_4	N
16	Current Alarm 5	nnn	-	alarm_5	N
17					
18	Percent Total Capacity	nnn	%	CAP_T	N
19	Active Demand Limit Val	nnn[7]	%	DEM_LIM	Y
20	Lag Capacity Limit Value	nnn	%	LAG_LIM	N
21	Current Setpoint	±nnn.n	°F	SP	N
22	Setpoint Occupied?	Yes/No[4]	-	SP_OCC	Y
23	Control Point	±nnn.n[8]	°F	CTRL_PNT	Y
24	Controlled Water Temp	±nnn.n	°F	CTRL_WT	N
25	External Temperature	±nnn.n	°F	OAT	N
26					
27	Emergency Stop	Enable/Emstop[9]	-	EMSTOP	Y

1 : Unit control type in effect as described in section 4.4.1.

2 : Unit current status as described in section 4.5.

- Running means that the unit is started or allowed to start
- Off means that the unit is stopped with all its outputs off
- Stopping means that the unit is required to stop but all its outputs (compressors) are not yet stopped.
- Delay means that the unit is allowed to start but the delay at startup is not yet elapsed.

3 : Allows to Start/Stop the chiller only when unit under CCN control type. Forced value is displayed but unused when the unit is not under CCN control.

4 : Occupied state. This item can be forced. If the unit is in CCN mode, the forced value shall be used instead of the real occupancy state. If the unit is not in CCN mode the forced value shall be unused and the regular time schedule shall be used. Forced value and force code shall appear in the GENUNIT Points Display table only if the unit is under CCN control.

5: Heat/cool select. This item can be forced. If the unit is in CCN mode, the forced value shall be used whatever the status of the remote heat/cool contacts. If the unit is not in CCN mode the forced value shall be unused. Forced value and force code shall appear in the GENUNIT Points Display table only if the unit is under CCN control.

6 : Alarm status
- Normal (no alarm)
- Partial (alarm but unit is not down)
- Shutdown (unit is down)

7: Active Demand Limit Value. This item can be forced. If the unit is in CCN mode, the forced value shall be used whatever the status of the external limit switch contact and whatever the value of the demand limit switch setpoint. If the unit is not in CCN mode the forced value shall be unused. Forced value and force code shall appear in the GENUNIT Points Display table only if the unit is under CCN control.

8: Control Point. This item can be forced. If the unit is in CCN mode, the forced value shall be used instead of the real control point calculation. If the unit is not in CCN mode the forced value shall be unused. Forced value and force code shall appear in the GENUNIT Points Display table only if the unit is under CCN control.

9 : Active all the time even if the unit is not in CCN control type.

10: Heat Reclaim Select. This item can be forced. If the unit is in CCN mode, the forced value shall be used whatever the status of the remote reclaim switch. Forced value and force code shall appear in the GENUNIT Points Display table only if the unit is under CCN control.

DISPLAY SCREEN

TABLE NAME: CIRCA_AN PIC TABLE TYPE : 11H, instance 2

	DESCRIPTION	STATUS	UNITS	POINTS	FORCEABLE
1	CIRCUIT A ANALOG VALUES				
2.					
3	Percent Total Capacity	0 - 100	%	CAPA_T	N
4	Discharge Pressure	nnn.n	psi	DP_A	N
5	Suction Pressure	nnn.n	psi	SP_A	N
6	Oil Pressure Cp1	nnn.n	psi	CPA1_OP	N
7	Oil Pressure Cp2	nnn.n	psi	CPA2_OP	N
8	Oil Press Difference Cp1	nnn.n	psi	DOP_A1	N
9	Oil Press Difference Cp2	nnn.n	psi	DOP_A2	N
10	Economizer Pressure Cp1	nnn.n	psi	CPA1_ECP	N
11	Economizer Pressure Cp2	nnn.n	psi	CPA2_ECP	N
12	Saturated Condensing Tmp	±nnn.n	°F	SCT_A	N
13	Saturated Suction Temp	±nnn.n	°F	SST_A	N
14	Discharge Gas Temp Cp 1	±nnn.n	°F	CPA1_DGT	N
15	Discharge Gas Temp Cp 2	±nnn.n	°F	CPA2_DGT	N
16	Average Discharge Gas Tp	±nnn.n	°F	dt_a	N
17	Motor Temperature Comp 1	±nnn.n	°F	CPA1_TMP	N
18	Motor Temperature Comp 2	±nnn.n	°F	CPA2_TMP	N
19	Motor Current Comp 1	nnn.n	AMPS	CPA1_CUR	N
20	Motor Current Comp 2	nnn.n	AMPS	CPA2_CUR	N
21	EXV Position	0 - 100	%	EXV_A	N
22	Head Press Actuator Pos	0 - 100	%	hd_pos_a	N
23	Cooler Exchange Delta T	n.n	^F	PINCH_A	N
24	Motor Cool TQ in Kohms	nn.n		MTQ_RESA	N
25	Motor Cooling Puls Cycle	nnn		CPA1_PUL	N

DISPLAY SCREEN

TABLE NAME: CIRCA_D PIC TABLE TYPE : 11H, instance 3

	DESCRIPTION	STATUS	UNITS	POINTS	FORCIBLE
1	CIRCUIT A DISCRETE				
2					
3	Compressor 1 Output	On/Off	-	CP_A1	N
4	Cp1 Mtr Cool Solenoid 1	On/Off	-	cpa1_mc1	N
5	Cp1 Mtr Cool Solenoid 2	On/Off	-	cpa1_mc2	N
6	Cp1, Oil Solenoid Out	On/Off	-	cpa1_ols	N
7	Compressor 2 Output	On/Off	-	CP_A2	N
8	Cp2 Mtr Cool Solenoid 1	On/Off	-	cpa2_mc1	N
9	Cp2 Mtr Cool Solenoid 2	On/Off	-	cpa2_mc2	N
10	Cp2, Oil Solenoid Out	On/Off	-	cpa2_ols	N
11	Cir A, Loader 1 Output	On/Off	-	ldr_1_a	N
12	Cir A, Loader 2 Output	On/Off	-	ldr_2_a	N
13	Cir A, Oil Heater Output	On/Off	-	oil_h_a	N
14	Cir A, Oil Level Input	Low/High	-	oil_l_a	N
15	Cir A, Oil Pump Output	On/Off	-	oilpmp_a	N
16	Cir A Refrig Isolate Out	On/Off	-	refa_iso	N
17					
18	FANS OUTPUT				
19	Fan Output DO # 1	On/Off	-	fan_a1	N
20	Fan Output DO # 2	On/Off	-	fan_a2	N
21	Fan Output DO # 3	On/Off	-	fan_a3	N
22	Fan Output DO # 4	On/Off	-	fan_a4	N
23	Fan Output DO # 5	On/Off	-	fan_a5	N
24	Fan Output DO # 6	On/Off	-	fan_a6	N
25	Fan Output DO # 7	On/Off	-	fan_a7	N
26	Fan Output DO # 8	On/Off	-	fan_a8	N
27	Fan Staging Number	0 - 8	-	FAN_ST_A	N

DISPLAY SCREEN

TABLE NAME: CIRCB_AN PIC TABLE TYPE : 11H, instance 4

	DESCRIPTION	STATUS	UNITS	POINTS	FORCEABLE
1	CIRCUIT B ANALOG VALUES				
2.					
3	Percent Total Capacity	0 - 100	%	CAPB_T	N
4	Discharge Pressure	nnn.n	psi	DP_B	N
5	Suction Pressure	nnn.n	psi	SP_B	N
6	Oil Pressure Cp1	nnn.n	psi	CPB1_OP	N
7	Oil Pressure Cp2	nnn.n	psi	CPB2_OP	N
8	Oil Press Difference Cp1	nnn.n	psi	DOP_B1	N
9	Oil Press Difference Cp2	nnn.n	psi	DOP_B2	N
10	Economizer Pressure Cp1	nnn.n	psi	CPB1_ECP	N
11	Economizer Pressure Cp2	nnn.n	psi	CPB2_ECP	N
12	Saturated Condensing Tmp	±nnn.n	°F	SCT_B	N
13	Saturated Suction Temp	±nnn.n	°F	SST_B	N

14	Discharge Gas Temp Cp 1	±nnn.n	°F	CPB1_DGT	N
15	Discharge Gas Temp Cp 2	±nnn.n	°F	CPB2_DGT	N
16	Average Discharge Gas Tp	±nnn.n	°F	dt_b	N
17	Motor Temperature Comp 1	±nnn.n	°F	CPB1_TMP	N
18	Motor Temperature Comp 2	±nnn.n	°F	CPB2_TMP	N
19	Motor Current Comp 1	nnn.n	AMPS	CPB1_CUR	N
20	Motor Current Comp 2	nnn.n	AMPS	CPB2_CUR	N
21	EXV Position	0 - 100	%	EXV_B	N
22	Head Press Actuator Pos	0 - 100	%	hd_pos_b	N
23	Cooler Exchange Delta T	n.n	^F	PINCH_B	N
24	Motor Cool TQ in Kohms	nn.n		MTQ_RESB	N
25	Motor Cooling Puls Cycle	nnn		CPB1_PUL	N

DISPLAY SCREEN

TABLE NAME: CIRCB_D PIC TABLE TYPE : 11H, instance 5

	DESCRIPTION	STATUS	UNITS	POINTS	FORCEABLE
1	CIRCUIT B DISCRETE				
2					
3	Compressor 1 Output	On/Off	-	CP_B1	N
4	Cp1 Mtr Cool Solenoid 1	On/Off	-	cpb1_mc1	N
5	Cp1 Mtr Cool Solenoid 2	On/Off	-	cpb1_mc2	N
6	Cp1, Oil Solenoid Out	On/Off	-	cpb1_ols	N
7	Compressor 2 Output	On/Off	-	CP_B2	N
8	Cp2 Mtr Cool Solenoid 1	On/Off	-	cpb2_mc1	N
9	Cp2 Mtr Cool Solenoid 2	On/Off	-	cpb2_mc2	N
10	Cp2, Oil Solenoid Out	On/Off	-	cpb2_ols	N
11	Cir B, Loader 1 Output	On/Off	-	ldr_1_b	N
12	Cir B, Loader 2 Output	On/Off	-	ldr_2_b	N
13	Cir B, Oil Heater Output	On/Off	-	oil_h_b	N
14	Cir B, Oil Level Input	Low/High	-	oil_l_b	N
15	Cir B, Oil Pump Output	On/Off	-	oilpmp_b	N
16	Cir B Refrig Isolate Out	On/Off	-	refb_iso	N
17					
18	FANS OUTPUT				
19	Fan Output DO # 1	On/Off	-	fan_b1	N
20	Fan Output DO # 2	On/Off	-	fan_b2	N
21	Fan Output DO # 3	On/Off	-	fan_b3	N
22	Fan Output DO # 4	On/Off	-	fan_b4	N
23	Fan Output DO # 5	On/Off	-	fan_b5	N
24	Fan Output DO # 6	On/Off	-	fan_b6	N
25	Fan Output DO # 7	On/Off	-	fan_b7	N
26	Fan Output DO # 8	On/Off	-	fan_b8	N
27	Fan Staging Number	0 - 8	-	FAN_ST_B	N

DISPLAY SCREEN

TABLE NAME: OPTIONS PIC TABLE TYPE : 11H, instance 6

	DESCRIPTION	STATUS	UNITS	POINTS	FORCEABLE
1	UNIT DISCRETE IN				
2	Remote On/Off Switch	Open/Close	-	onoff_sw	N
3	Remote Heat/Cool Switch	Open/Close	-	hc_sw	N
4	Remote Reclaim Switch	Open/Close	-	recl_sw	N
5	Remote Setpoint Switch	Open/Close	-	setp_sw	N
6	Limit Switch Status	Open/Close	-	limit_sw	N
7	Interlock Status	Open/Close	-	lock_1	N
8	Pump Run status	On/Off	-	pump_def	N
9	Condenser Flow Status	Open/Close	-	condflow	N
10	Electrical Box Thermostat	Open/Close[4]	-	elec_box	N
11					
12	UNIT DISCRETE OUT				
13	Cooler Pump #1 Command	On/Off[1]	-	CLPUMP_1	Y
14	Cooler Pump #2 Command	On/Off[1]	-	CLPUMP_2	Y
15	Rotate Pumps Now?	Yes/No[1]	-	ROT_PUMP	Y
16	Condenser Pump Command	On/Off[3]	-	COND_PMP	Y
17	Cooler Heater Command	On/Off	-	coolheat	N
18	Critical Alarm Signal	On/Off[5]	-	SAFE_ALM	N
19					
20	UNIT ANALOG				
21	Cooler Entering Fluid	±nnn.n	°F	COOL_EWT	N
22	Cooler Leaving Fluid	±nnn.n	°F	COOL_LWT	N
23	Condenser Entering Fluid	±nnn.n	°F	COND_EWT	N
24	Condenser Leaving Fluid	±nnn.n	°F	COND_LWT	N
25	CHWS Temperature	±nnn.n	°F	CHWSTEMP	N
26	External 0-10Vdc Signal	±nn.n	Volts	EXT_VDC	N
27	Current Cond Setpoint	nnn.n[2]	°F	COND_SP	Y
28	Chiller Total Current	nnn.n	amps	tot_curr	N

1: Cooler pump control. This item can be forced On or Off if the unit is in CCN mode and if the CHIL_S_S is disabled. If the unit is not in CCN mode the forced value shall be unused and the regular calculation shall be used. Forced value and force code shall appear in the OPTIONS Points Display table only if the unit is under CCN control and if CHIL_S_S is disabled.
If PUMP#1 is forced, **no** force shall be allowed on PUMP_2 and vice versa.

2: Condensing Setpoint. This item can be forced. If the unit is in CCN mode, the forced value shall be used instead of the real control point calculation. If the unit is not in CCN mode the forced value shall be unused and the regular calculation shall be used. Forced value and force code shall appear in the OPTIONS Points Display table only if the unit is under CCN control.

3: Condenser pumpcontrol. This item can be forced On but not Off. If the unit is in CCN mode, the forced value shall be used instead of regular pump control point. If the unit is not in CCN mode the forced value shall be unused and the regular calculation shall be used. Forced value and force code shall appear in the OPTIONS Points Display table only if the unit is under CCN control.

4: Electrical box Thermostat. This item indicates the electrical box thermostat and network power reverse phase detection status (wired internally in series 16a and 16b on PD4-BASIC BOARD). These contacts, when opened will prevent the unit from starting.

5: This output is energized when a contact failure is reported by any SCPM board

DISPLAY SCREEN

TABLE NAME: RECLAIM PIC TABLE TYPE : 11H, instance 7

	DESCRIPTION	STATUS	UNITS	POINTS	FORCEABLE
1	RECLAIM ANALOG PARAM				
2	Reclaim Entering Fluid	±nnn.n	°F	HR_EWT	N
3	Reclaim Leaving Fluid	±nnn.n	°F	HR_LWT	N
4	Reclaim Fluid Setpoint	±nnn.n	°F	hr_sp	N
5	Cir A SCT Control Point	±nnn.n	°F	sct_a_sp	N
6	Cir B SCT Control Point	±nnn.n	°F	sct_b_sp	N
7	Cir A Pumpdown Pressure	±nnn.n	psi	pmpd_p_a	N
8	Cir B Pumpdown Pressure	±nnn.n	psi	pmpd_p_b	N
9	A Saturated Pumpdown Tmp	±nnn.n	°F	pd_sat_a	N
10	B Saturated Pumpdown Tmp	±nnn.n	°F	pd_sat_b	N
11	HR Cond Valve Position	±nnn.n	%	hr_v_pos	N
12					
13	RECLAIM DISCRETE PARAM		-		N
14	Heat Reclaim Select	Yes/No	No	RECL_SEL	N
15	Condenser Flow Status	Open/Close	-	condflow	N
16	Cir A Reclaim Valve Stat	On/Off	-	hr_val_a	N
17	Cir B Reclaim Valve Stat	On/Off	-	hr_val_b	N
18	A Pumpdown Valve Status	On/Off	-	pd_val_a	N
19	B Pumpdown Valve Status	On/Off	-	pd_val_b	N
20	Circuit A Reclaim Status	n		hrstat_a	N
21	Circuit B Reclaim Status	n		hrstat_b	N
22	Reclaim Condenser Heater	On/Off	-	cond_htr	N

TABLE NAME: MODES PIC TABLE TYPE : 11H, instance 8

	DESCRIPTION	STATUS	UNITS	POINTS	FORCEABLE
1	OPERATING MODES				
2	Startup Delay in Effect	Yes/No	-	Mode[07]	N
3	Second Setpoint in Use	Yes/No	-	Mode[08]	N
4	Reset in Effect	Yes/No	-	Mode[09]	N
5	Demand Limit Active	Yes/No	-	Mode[10]	N
6	Ramp Loading Active	Yes/No	-	Mode[11]	N
7	Low Source Protection	Yes/No	-	Mode[12]	N
8	Low Cooler Suction Cir A	Yes/No	-	Mode[13]	N
9	Low Cooler Suction Cir B	Yes/No	-	Mode[14]	N
10	Low Dis Superheat Cir A	Yes/No	-	Mode[15]	N
11	Low Dis Superheat Cir B	Yes/No	-	Mode[16]	N
12	High Pres Override Cir A	Yes/No	-	Mode[17]	N
13	High Pres Override Cir B	Yes/No	-	Mode[18]	N
14	High Current Over Cir A	Yes/No	-	Mode[19]	N
15	High Current Over Cir B	Yes/No	-	Mode[20]	N
16	Reclaim Active?	Yes/No	-	Mode[21]	N
17	Cooler Heater Active?	Yes/No	-	Mode[22]	N
18	Cooler Pumps Rotation?	Yes/No	-	Mode[23]	N
19	Pump Periodic Start?	Yes/No	-	Mode[24]	N
20	Night Capacity Active?	Yes/No	-	Mode[25]	N
21	System Manager Active?	Yes/No	-	Mode[26]	N
22	Master Slave Active?	Yes/No	-	Mode[27]	N

CONFIGURATION SCREEN

TABLE NAME: USER PIC TABLE TYPE : 10H, instance 2

	DESCRIPTION	STATUS	DEFAULT	UNITS	POINT
1	USER CONFIGURATION				
2					
3	Circuit Loading Sequence	0/1/2	0	-	lead_cir
4	0 = Auto				
5	1 = Circuit A First				
6	2 = Circuit B First				
7	Loading Sequence	0/1	0	-	seq_typ
8					
9	Ramp Loading Select	Yes/No	No	-	ramp_sel
10					
11	Unit Off to On Delay	1 to 15	1	min	off_on_d
12					
13	Cooler Pumps Sequence	0/1/2/3/4	0	-	pump_seq
14	0 = No Pump				
15	1 = One Pump Only				
16	2 = Two Pumps Auto				
17	3 = Pump#1 Manual				
18	4 = Pump#2 Manual				
19	Pump Auto Rotation Delay	24 to 3000	48	hours	pump_del
20	Periodic Pumps Start	Yes/No	No	-	pump_per
21					
22	Reset Type Select	0 to 3	0	-	res_sel
23	0 = None				
24	1 = Voltage Control				
25	2 = Delta T Control				
26	3 = OAT Control				
27					
28	Demand Limit Type Select	0 to 2	0	-	lim_sel
29	0 = None				
30	1 = Switch Control				
31	2 = 0-10vdc Control				
32	Vdc For 100% Demand Lim	0 to 10	0	volts	lim_mx
33	Vdc For 0% Demand Limit	0 to 10	10	volts	lim_ze
34					
35	Night Control				
36	Start Hour	00:00 to 24:00	00:00	-	nh_start
37	End Hour	00:00 to 24:00	00:00	-	nh_end
38	Capacity Limit	0 to 100	100	%	nh_limit
39	Capacity Limit	0 to 100	100	%	nh_limit
40					
41	Chiller Comp Current Limit	90 to 1500[1]	1500	amps	curr_lim
42	Menu Description Select	Yes/No	Yes	-	menu_des
43	Pass For All User Config	Yes/No	No	-	all_pass

1. Refer to control capacity override #35, chiller current limit description

TABLE NAME: BRODEFS PIC TABLE TYPE : 14H, instance 1

	DESCRIPTION	STATUS	DEFAULT	UNITS	POINT
1	Activate	Yes/No	No	-	ccnbroad
2					
3	OAT Broadcast				
4	Bus #	0 to 239	0	-	oatbusnm
5	Element #	0 to 239	0	-	oatlocad
6					
7	DAYLIGHT SAVINGS START				
8	Month	1 to 12	4	-	startmon
9	Day	1 to 31	15	-	startday
10	Time	00:00 to 24:00	02:00	-	starttim
11	Minutes to Add	0 to 1440	60	-	min_add
12					
13	DAYLIGHT SAVINGS STOP				
14	Month	1 to 12	10	-	stopmon
15	Day	1 to 31	15	-	stopday
16	Time	00:00 to 24:00	02:00	-	stoptim
17	Minutes to Subtract	0 to 1440	60	-	min_sub

CONFIGURATION SCREEN

TABLE NAME: OCCDEFCS / OCCPC01S and OCCPC02S PIC TABLE TYPE : 14H, instance 2

	DESCRIPTION	STATUS	DEFAULT	UNITS	POINT
1	Timed Override Hours	0-4	0	-	ovr_ext
2	Period 1 DOW (MTWTFSSH)	0/1	11111111	-	dow1
3	Occupied From	0:00-24:00	0:00	-	occtod1
4	Occupied To	0:00-24:00	24:00	-	unoctod1
5	Period 2 DOW (MTWTFSSH)	0/1	00000000	-	dow2
6	Occupied From	0:00-24:00	0:00	-	occtod2
7	Occupied To	0:00-24:00	24:00	-	unoctod2
8	Period 3 DOW (MTWTFSSH)	0/1	00000000	-	dow3
9	Occupied From	0:00-24:00	0:00	-	occtod3
10	Occupied To	0:00-24:00	24:00	-	unoctod3
11	Period 4 DOW (MTWTFSSH)	0/1	00000000	-	dow4
12	Occupied From	0:00-24:00	0:00	-	occtod4
13	Occupied To	0:00-24:00	24:00	-	unoctod4
14	Period 5 DOW (MTWTFSSH)	0/1	00000000	-	dow5
15	Occupied From	0:00-24:00	0:00	-	occtod5
16	Occupied To	0:00-24:00	24:00	-	unoctod5
17	Period 6 DOW (MTWTFSSH)	0/1	00000000	-	dow6
18	Occupied From	0:00-24:00	0:00	-	occtod6
19	Occupied To	0:00-24:00	24:00	-	unoctod6
20	Period 7 DOW (MTWTFSSH)	0/1	00000000	-	dow7
21	Occupied From	0:00-24:00	0:00	-	occtod7
22	Occupied To	0:00-24:00	24:00	-	unoctod7
23	Period 8 DOW (MTWTFSSH)	0/1	00000000	-	dow8
24	Occupied From	0:00-24:00	0:00	-	occtod8
25	Occupied To	0:00-24:00	24:00	-	unoctod8

TABLE NAME: HOLIDAY / HOLDY01S to HOLDY016S PIC TABLE TYPE : 14H, instance 3

DESCRIPTION		STATUS	DEFAULT	UNITS	POINT
Holiday	Start Month	0-12	0	-	HOL_MON
	Start Day	0-31	0	-	HOL_DAY
	Duration (days)	0-99	0	-	HOL_LEN

SETPOINT SCREEN

TABLE NAME: SETPOINT PIC TABLE TYPE : 17H, instance 1

	DESCRIPTION	STATUS	DEFAULT	UNITS	POINT
1	COOLING				
2	Cooling Setpoint 1	- 20 to 101	44.0	°F	csp1
3	Cooling Setpoint 2	- 20 to 101	44.0	°F	csp2
4	Voltage No Reset Value	0 to 10	0.0	volts	v_cr_no
5	Voltage Full Reset Value	0 to 10	0.0	volts	v_cr_fu
6	Delta T No Reset Value	0 to 25	0.0	^F	dt_cr_no
7	Delta T Full Reset Value	0 to 25	0.0	^F	dt_cr_fu
8	OAT No Reset Value	14 to 125	0.0	°F	oatcr_no
9	OAT Full Reset Value	14 to 125	0.0	°F	oatcr_fu
10	Cooling Reset Deg. Value	-30 to 30	0.0	^F	cr_deg
11	Cooling Ramp Loading	0.2 to 2.0	1.0	^F	cramp_sp
12					
13	HEATING				
14	Heating Setpoint	80 to 153	100.0	°F	hsp
15	Voltage No Reset Value	0 to 10	0.0	volts	v_hr_no
16	Voltage Full Reset Value	0 to 10	0.0	volts	v_hr_fu
17	Delta T No Reset Value	0 to 25	0.0	^F	dt_hr_no
18	Delta T Full Reset Value	0 to 25	0.0	^F	dt_hr_fu
19	Heating Reset Deg. Value	-30 to 30	0.0	^F	hr_deg
20	Heating Ramp Loading	0.2 to 2.0	1.0	^F	hramp_sp
21					
22	HEAD PRESSURE				
23	Sat Cond Temp Setpoint	95 to 140[1]	104.0	°F	headsp
24	Reclaim Setpoint	95 to 140	122.0	°F	rsp
25					
26	DEMAND LIMIT				
27	Switch Demand Limit Setp	0 to 100	100	%	lim_sp

1 : For water cooled, headsp low limit is 80°F (26.7 degC)

MAINTENANCE SCREEN

TABLE NAME: LOADFACT PIC TABLE TYPE : 12H, instance 1

	DESCRIPTION	STATUS	UNITS	POINT
1	CAPACITY CONTROL			
2	Average Ctrl Water Temp	±nnn.n	°F	ctrl_avg
3	Differential Water Temp	±nnn.n	°F	diff_wt
4	Water Delta T	±nnn.n	^F	delta_t
5	Control Point	±nnn.n	°F	CTRL_PNT
6	Reset Amount	±nnn.n	^F	reset
7	Controlled Temp Error	±nnn.n	^F	tp_error
8	Actual Capacity	nnn	%	cap_t
9	Actual Capacity Limit	nnn	%	cap_lim
10	Current Z Multiplier Val	±n.n	-	zm
11	Load/Unload Factor	±nnn.n	-	smz
12	Active Capacity Override	nn	-	over_cap
13				
14	CIRCUIT A EXV CONTROL			
15	EXV Position	nnn.n	%	EXV_A
16	EXV Position Limit	nnn.n	%	exvlim_a
17	Cooler Exchange Delta T	n.n	^F	PINCH_A
18	Discharge Superheat	n.n	°F	DSH_A
19	Economizer pinch offset	n.n	^F	offset_a
20	EXV Override	nn	-	ov_exv_a
21				
22	CIRCUIT B EXV CONTROL			
23	EXV Position	nnn.n	%	EXV_B
24	EXV Position Limit	nnn.n	%	exvlim_b
25	Cooler Exchange Delta T	n.n	^F	PINCH_B
26	Discharge Superheat	n.n	°F	DSH_B
27	Economizer pinch offset	n.n	^F	offset_b
28	EXV Override	nn	-	ov_exv_b

TABLE NAME: LAST_POR PIC TABLE TYPE : 12H, instance 6

1	PowerDown 1:day-mon-year	nnnnnn	ddmmyy	date_of1
2	PowerDown 1:hour-minute	nnnn	hhmm	time_of1
3	Power On 2: day-mon-year	nnnnnn	ddmmyy	date_on1
4	Power On 2: hour-minute	nnnn	hhmm	time_on1
5	PowerDown 2:day-mon-year	nnnnnn	ddmmyy	date_of2
6	PowerDown 2:hour-minute	nnnn	hhmm	time_of2
7	Power On 2: day-mon-year	nnnnnn	ddmmyy	date_on2
8	Power On 2: hour-minute	nnnn	hhmm	time_on2
9	PowerDown 3:day-mon-year	nnnnnn	ddmmyy	date_of3
10	PowerDown 3:hour-minute	nnnn	hhmm	time_of3
11	Power On 3: day-mon-year	nnnnnn	ddmmyy	date_on3
12	Power On 3: hour-minute	nnnn	hhmm	time_on3
13	PowerDown 4:day-mon-year	nnnnnn	ddmmyy	date_of4
14	PowerDown 4:hour-minute	nnnn	hhmm	time_of4
15	Power On 4: day-mon-year	nnnnnn	ddmmyy	date_on4
16	Power On 4: hour-minute	nnnn	hhmm	time_on4
17	PowerDown 5:day-mon-year	nnnnnn	ddmmyy	date_of5
18	PowerDown 5:hour-minute	nnnn	hhmm	time_of5
19	Power On 5: day-mon-year	nnnnnn	ddmmyy	date_on5
20	Power On 5: hour-minute	nnnn	hhmm	time_on5

MAINTENANCE SCREEN

TABLE NAME: M_MSTSLV PIC TABLE TYPE : 12H, instance 3

	DESCRIPTION	STATUS	UNITS	POINT
1	MASTER/SLAVE CONTROL			
2	Unit is Master or Slave	Disable/Master/Slave	-	mstslv
3	Master Control Type	Local/Remote/CCN[3]	-	ms_ctrl
4	Master/Slave Ctrl Active	True/False	-	ms_activ
5	Lead Unit is the:	Master/Slave	-	lead_sel
6	Slave Chiller State	0/1/2/3/4/5[1]	-	slv_stat
7	Slave Chiller Total Cap	0-100	%	slv_capt
8	Lag Start Delay	1 to 30[2]	minutes	l_strt_d
9	Lead/Lag Hours Delta	±nnnnn[3]	hours	ll_hr_d
10	Lead/Lag Changeover?	Yes/No[4]	-	ll_chang
11	Lead Pulldown?	Yes/No[4]	-	ll_pull
12	Master/Slave Error	nn	-	ms_error
13	Max Available Capacity ?	True/False[5]	-	cap_max

1: Slave chiller chilstat value
2: This decision is consistent for Master chiller only. It shall be set by default to 0 for the slave chiller.
3: Always CCN for the slave chiller.
4: This decision is consistent for Master chiller only. It shall be set by default to 'No' for the slave chiller.
5: This item is true when chiller has loaded its total unbroken capacity tonnage.

TABLE NAME: SERMAINT PIC TABLE TYPE : 12H, instance 5

	DESCRIPTION	STATUS	UNITS	POINT	FORCEABLE
1	Reset Maintenance Alert	nn	-	S_RESET	Y
2	1 - 11: reset individually				
3	12 : reset all				
4					
5	OPERATION WARNINGS				
6	1 - Refrigerant Charge	Normal/Low	-	charge_m	N
7	2 - Water Loop Size	Normal/Low	-	wloop_m	N
8	3 - Air Exchanger	Normal/Dirty	-	aexch_m	N
10					
11	GENERAL SERVICING DELAYS				
12	4 - CPump 1 (days)	0 to 1000/Alert	-	cpump1_m	N
13	5 - CPump 2 (days)	0 to 1000/Alert	-	cpump2_m	N
14	6 - HPump (days)	0 to 1000/Alert	-	hpump_m	N
15	7 - Water Filter (days)	0 to 1000/Alert	-	wfilte_m	N
16	8 - A1 Oil Filter (days)	0 to 1000/Alert		ofila1_m	N
17	9 - A2 Oil Filter (days)	0 to 1000/Alert		ofila2_m	N
18	10- B1 Oil Filter (day)	0 to 1000/Alert		ofilb1_m	N
19	11- B2 Oil Filter (days)	0 to 1000/Alert		ofilb2_m	N

MAINTENANCE SCREEN

TABLE NAME: STRTHOUR PIC TABLE TYPE : 12, instance 3

	DESCRIPTION	STATUS	UNITS	POINT
1	MACHINE			
2	Total Operating Hours	nnnnn	hours	HR_MACH
3	Starts Number	nnnnn	-	st_mach
4	Compressor A1 Hours	nnnnn	hours	HR_CP_A1
5	Compressor A2 Hours	nnnnn	hours	HR_CP_A2
6	Compressor A1 Starts	nnnnn	-	st_cp_a1
7	Compressor A2 Starts	nnnnn	-	st_cp_a2
8	Compressor B1 Hours	nnnnn	hours	HR_CP_B1
9	Compressor B2 Hours	nnnnn	hours	HR_CP_B2
10	Compressor B1 Starts	nnnnn	-	st_cp_b1
11	Compressor B2 Starts	nnnnn	-	st_cp_b2
12	Starts Max During 1 Hour	nn	-	st_cp_mx
13	Starts/hr From Last 24 h	nn	-	st_cp_av
14	Cooler Pump #1 Hours	nnnnn	hours	hr_cpum1
15	Cooler Pump #2 Hours	nnnnn	hours	hr_cpum2
16	Condenser Pump Hours	nnnnn	hours	hr_hpump

Note: Table for display only.

TABLE NAME: MTA_SCHM PIC TABLE TYPE : 12H, instance 4

	DESCRIPTION	STATUS	DEFAULT	UNITS	POINT
1	SCPM A1 MTA Header Read	0 to 560	0	Amps	cpa1_mta
2	SCPM A2 MTA Header Read	0 to 560	0	Amps	cpa2_mta
3	SCPM B1 MTA Header Read	0 to 560	0	Amps	cpb1_mta
4	SCPM B2 MTA Header Read	0 to 560	0	Amps	cpb2_mta
5					
6	Scheme Number	0 to 5	3	-	scheme
7	SCPM A1 Software Version	nnn.nn	0		cpa1_ver
8	SCPM A2 Software Version	nnn.nn	0		cpa2_ver
9	SCPM B1 Software Version	nnn.nn	0		cpb1_ver
10	SCPM B2 Software Version	nnn.nn	0		cpb2_ver

TABLE NAME: OCCMAINT PIC TABLE TYPE : 15,

	DESCRIPTION	STATUS	UNITS	POINT
1	Current Mode (1=occup.)	0/1	-	MODE
2	Current Occup Period #	1 to 8	-	PER_NO
3	Timed -Override in Effect	Yes/No	-	OVERLAST
4	Timed-Override Duration	0 to 4	hours	OVR_HRS
5	Current Occupied Time	00:00 to 23:59	-	STRTTIME
6	Current Unoccupied Time	00:00 to 23:59	-	ENDTIME
7	Next Occupied Day	Mon to Sun	-	NXTOCDAY
8	Next Occupied Time	00:00 to 23:59	-	NXTOCTIM
9	Next Unocupied Day	Mon to Sun	-	NXTUNDAY
10	Next Unoccupied Time	00:00 to 23:59	-	NXTUNTIM
11	Prev Unocupied Day	Mon to Sun	-	PRVUNDAY
12	Prev Unoccupied Time	00:00 to 23:59	-	PRVUNTIM

APPENDIX B

CCN Variables

The following variables can be used for trace functions (Network Service Tool-Trace, Data Collection).

CCN Variables: Hardware SIO Points

POINT NAMES	DESCRIPTIONS	UNITS	TYPE	CONFIGURATION
ALARM_A	Circuit A Alarm Relay, Command		H-DO	all
ALARM_B	Circuit B Alarm Relay, Command		H-DO	cpb1_mta > 0
CHWSTEMP	Chiller Water System for Master / Slave Control	°F	H-AI	All
COND_EWT	Condenser entering water temperature	°F	H-AI	unit_typ = 2 or 3
COND_LWT	Condenser leaving water temperature	°F	H-AI	unit_typ = 2 or 3
COOL_EWT	Cooler entering water temperature	°F	H-AI	all
COOL_LWT	Cooler leaving water temperature	°F	H-AI	all
CPUMP_1	Cooler Water Pump # 1, Command		H-DO	pump_seq > 0
CPUMP_2	Cooler Water Pump # 2, Command		H-DO	pump_seq > 1
CONDPUMP	Condenser Water Pump , Command		H-DO	All
CP_A1	Compressor A1, Command	-	H-DO	all
CPA1_MUX	Compressor A1, multiplexed DO's $b_5b_4b_3b_2b_1b_0$ b_0: cpa1_mc1 Motor cooling 1 b_1: cpa1_mc2 Motor cooling 2 or economizer valve b_2: cpa1_ols Oil solenoid b_3: cpa1_ld1 Loader 1 output b_4: cpa1_ld2 Loader 2 output b_5: oilpmp_a Oil pump output circuit A	-	H-DO	All
CPA1_PUL	Circuit A Motor cooling thermal valve output	-	H-AO	econ_sel = 1
CPA1_CUR	Compressor A1, Current	Amps	H-AI	all
CPA1_OP	Compressor A1, Oil Pressure	psi	H-AI	all
CPA1_ECP	Compressor A1, Economizer Pressure	psi	H-AI	all
CPA1_DGT	Compressor A1, Discharge Gas Temperature	°F	H-AI	all
CPA1_TMP	Compressor A1, Motor Temperature	°F	H-AI	all
CPA1_STA	Compressor A1, status and MTA reading	-	H-AI	all
CP_A2	Compressor A2, Command	-	H-DO	cpa2 _mta> 0

POINT NAMES	DESCRIPTIONS	UNITS	TYPE	CONFIGURATION
CPA2_MUX	Compressor A2, multiplexed DO's $b_5b_4b_3b_2b_1b_0$ b_0: cpa2_mc1 Motor cooling 1 b_1: cpa2_mc2 Motor cooling 2 or economizer valve b_2: cpa2_ols Oil solenoid b_3: cpa2_ld1 Loader 1 output b_4: cpa2_ld2 Loader 2 output b_5: not used	-	H-DO	cpa2_mta > 0
CPA2_CUR	Compressor A2, Current	Amps	H-AI	cpa2_mta > 0
CPA2_OP	Compressor A2, Oil Pressure	psi	H-AI	cpa2_mta> 0
CPA2_ECP	Compressor A2, Economizer Pressure	psi	H-AI	cpa2_mta > 0 and econ_sel = 0
CPA2_DGT	Compressor A2, Discharge Gas Temperature	°F	H-AI	cpa2_mta> 0
CPA2_TMP	Compressor A2, Motor Temperature	°F	H-AI	cpa2_mta> 0
CPA2_STA	Compressor A2, status and MTA reading	-	H-AI	cpa2_mta> 0
CP_B1	Compressor B1, Command	-	H-DO	cpb1_mta> 0
CPB1_MUX	Compressor B1, multiplexed DO's $b_5b_4b_3b_2b_1b_0$ b_0: cpb1_mc1 Motor cooling 1 b_1: cpb1_mc2 Motor cooling 2 or economizer valve b_2: cpb1_ols Oil solenoid b_3: cpb1_ld1 Loader 1 output b_4: cpb1_ld2 Loader 2 output b_5: oilpmp_b Oil pump output circuit B	-	H-DO	cpb1_mta > 0
CPB1_PUL	Circuit B Motor cooling thermal valve output	-	H-AO	cpb1_mta> 0 and econ_sel = 1
CPB1_CUR	Compressor B1, Current	Amps	H-AI	cpb1_mta > 0
CPB1_OP	Compressor B1, Oil Pressure	psi	H-AI	cpb1_mta > 0
CPB1_ECP	Compressor B1, Economizer Pressure	psi	H-AI	cpb1_mta > 0
CPB1_DGT	Compressor B1, Discharge Gas Temperature	°F	H-AI	cpb1_mta> 0
CPB1_TMP	Compressor B1, Motor Temperature	°F	H-AI	cpb1_mta > 0
CPB1_STAT	Compressor B1, status and MTA reading	-	H-AI	cpb1_mta> 0
CP_B2	Compressor B2, Command	-	H-DO	cpb2_mta> 0
CPB2_MUX	Compressor B2, multiplexed DO's $b_5b_4b_3b_2b_1b_0$ b_0: cpb2_mc1 Motor cooling 1 b_1: cpb2_mc2 Motor cooling 2 or economizer valve b_2: cpb2_ols Oil solenoid b_3: cpb2_ld1 Loader 1 output b_4: cpb2_ld2 Loader 2 output b_5: not used	-	H-DO	cb2_mta > 0
CPB2_CUR	Compressor B2, Current	Amps	H-AI	cb2_mta> 0
CPB2_OP	Compressor B2, Oil Pressure	psi	H-AI	cb2_mta> 0

POINT NAMES	DESCRIPTIONS	UNITS	TYPE	CONFIGURATION
CPB2_ECP	Compressor B2, Economizer Pressure	psi	H-AI	cb2_mta > 0 and econ_sel = 0
CPB2_DGT	Compressor B2, Discharge Gas Temperature	°F	H-AI	cb2_mta> 0
CPB2_TMP	Compressor B2, Motor Temperature	°F	H-AI	cb2_mta> 0
CPB2_STA	Compressor B2, status and MTA reading	-	H-AI	cb2_mta> 0
EXV_ST_A	EXV Movement Circuit A	%	H-AO	all
EXV_ST_B	EXV Movement Circuit B	%	H-AO	cb2_mta > 0
EXT_VDC	External 0 - 10 Vdc input sensor	volts	H-AI	all
DP_A	Discharge Pressure Circuit A	psi	H-AI	all
DP_B	Discharge Pressure Circuit B	psi	H-AI	cb2_mta> 0
HD_A	Varifan or Water Valve Circuit A	4 - 20 mA 0 - 10Vdc	H-AO	hd_selec > 0
HD_B	Varifan or Water Valve Circuit B	4 - 20 mA 0 - 10Vdc	H-AO	hd_selec > 0
HR_EWT	Reclaim Entering Water Temperature	°F	H-AI	hr_tmp = 1
HR_LWT	Reclaim Entering Water Temperature	°F	H-AI	hr_tmp = 1
HR_WTRVL	Reclaim Condenser Water Valve	0 - 10Vdc	H-AO	recl_opt = 1
MTQ_RESA	Motor Cooling Feedback Signal circuit A	-	H-AI	econ_sel and tq_r_fbk= YES
MTQ_RESB	Motor Cooling Feedback Signal circuit B	-	H-AI	econ_sel and tq_r_fbk= YES
MUX_DI	Basic board multilexed DI's: $b_7b_6b_5b_4b_3b_2b_1b_0$ b_0: onoff_sw Remote on/off switch b_1: spt_sw Remote dual setpoint sw b_2: hc_sw Remote heat/cool switch b_2: recl_sw Remote reclaim swutch b_3: limit_sw demand limit switch b_4: lock_1 Cooler interlock b_5: elec_box Electrical Box Thermostat b_6: condflow Condenser flow switch b_7: pump_def Pump default	-	H-DIM	all (all) (all) (unit_typ = 3) (unit_typ = 1 or 4) (all) (all) (all) (all) (uni_typ = 1 or 4)

POINT NAMES	DESCRIPTIONS	UNITS	TYPE	CONFIGURATION
MUX_FAN1	Fan 4xDO board #1, multiplexed DO's $b_4b_3b_2b_1b_0$ b_0: fan_a1 Fan output 1, circuit A b_1: fan_a2 Fan output 2, circuit A b_2: fan_b1 Fan output 1, circuit B b_3: fan_b2 Fan output 2, circuit B b_0: fan_a1 Fan output 1, circuit A b_1: fan_a2 Fan output 2, circuit A b_2: fan_a3 Fan output 3, circuit A b_3: fan_a4 Fan output 4, circuit A	-	H-DO	unit_typ = 1 nbfan_a < 3 and nbfan_b > 3 nbfan_a > 2 and nbfan_b > 2
	Fan Aux board , multiplexed DO's $b_7b_6b_5b_4b_3b_2b_1b_0$ b_0: fan_a1 Fan output 1, circuit A b_1: fan_a2 Fan output 2, circuit A b_2: fan_a3 Fan output 3, circuit A b_3: fan_a4 Fan output 4, circuit A b_4: fan_a5 Fan output 5, circuit A b_5: fan_a6 Fan output 6, circuit A b_6: fan_a7 Fan output 7, circuit A b_7: fan_a8 Fan output 8, circuit A b_4 fan_b1 Fan output 1, circuit B b_5 fan_b2 Fan output 2, circuit B b_6 fan_b3 Fan output 3, circuit B b_7 fan_b4 Fan output 4, circuit B		H-DO	unit_typ = 1 nb_fan_a> 0 nb_fan_a > 0 and nb_fantotal comp > 6 Total comp < 7
MUX_FAN2	Fan 4xDO board #2, multiplexed DO's $b_4b_3b_2b_1b_0$ b_0: fan_b1 Fan output 1, circuit B b_1: fan_b2 Fan output 2, circuit B b_2: fan_b3 Fan output 3, circuit B b_3: fan_b4 Fan output 4, circuit B	-	H-DO	nbfan_a > 2 and nbfan_b> 2
	Fan Aux board , multiplexed DO's $b_7b_6b_5b_4b_3b_2b_1b_0$ b_0: fan_b1 Fan output 1, circuit B b_1: fan_b2 Fan output 2, circuit B b_2: fan_b3 Fan output 3, circuit B b_3: fan_b4 Fan output 4, circuit B b_4: fan_b5 Fan output 5, circuit B b_5: fan_b6 Fan output 6, circuit B b_6: fan_b7 Fan output 7, circuit B b_7: fan_b8 Fan output 8, circuit B		H-DO	unit_typ = 1 nb_fan_b> 0 total comp > 6

POINT NAMES	DESCRIPTIONS	UNITS	TYPE	CONFIGURATION
MUX_HRDO	NRCP (AQUASNAP) Basic board multilexed DO's, or AUX 1 Basic board multilexed DO's: $b_9b_8b_7b_6b_5b_4b_3b_2b_1b_0$ b_0: hr_val_a reclaim valve circuit A b_1: hr_val_b reclaim valve circuit B b_2: unused b_3: cond_htr reclaim condenser heater b_4: pd_val_a pumpdown valve circuit A b_5: pd_val_b pumpdown valve circuit B b_6: unused b_7: cool_htr cooler heater b_8: refa_iso refriegerant solenoid A b_9: refb_iso refriegerant solenoid B	-	H-DOM	heat_sel = yes or recl_opt = yes recl_opt = yes recl_opt = yes recl_opt = yes recl_opt = yes recl_opt = yes (heat_sel = yes) (heat_sel = yes) (heat_sel = yes)
OAT	Outside Air Temperature	°F	H-AI	unit_typ = 1 or 4
OIL_HTRA	Oil Heater Circuit A		H-DO	unit_typ = 1 or 4
OIL_HTRB	Oil Heater Circuit B		H-DO	unit_typ = 1 or 4 and cpb1_mta > 0
PD_P_A	Reclaim Pumpdown Pressure circuit A	PSI	H-AI	recl_opt = yes
PD_P_B	Reclaim Pumpdown Pressure circuit B	PSI	H-AI	recl_opt = yes and cpb1_mta > 0
SP_A	Suction pressure, circuit A	PSI	H-AI	all
SP_B	Suction pressure, circuit B	PSI	H-AI	all
SAFE_ALM	Critical Alarm Signal, Command	-	H-DO	alll

CCN Variables: Software SIO Points

POINT NAMES	DESCRIPTIONS	UNITS	TYPE
ALM	Alarm Status (0=no alarm 1=partial alarm 2=total alarm)	-	S-AI
CAPA_T	Circuit A Percent Capacity	Percent	S-A
CAPB_T	Circuit B Percent Capacity	Percent	S-A
CAP_T	Machine Percent Capacity	Percent	S-A
CAP_T_AV	Chiller Available Percent Capacity (running or not)	Percent	S-A
CHILSTAT	CCN Chiller status (for SM & Master/Slave operation)	-	S-D
CHIL_OCC	CCN Chiller Occupancy Flag	-	S-D
CHIL_S_S	CCN Enable/Disable the start/Stop Chiller Flag	-	S-D
CL_PUMP1	Cooler pump # 1 status	-	S-D
CL_PUMP2	Cooler pump # 2 status	-	S-D
COND_PMP	Condenser pump status	-	S-D
COND_SP	Consensing Setpoint	°F	S-A
COOLHEAT	Cooler heater output	-	S-D
CTRL_PNT	Chille Control Point	°F	S-A
CTRL_WT	Chiller Control Water	°F	S-A
DEM_LIM	Active Demand Limit Value	Percent	S-A
DSH_A	Discharge Superheat Circuit A	^F	S-A
DSH_B	Discharge Superheat Circuit B	^F	S-A
DOP_A1	Compressor A1, Oil Differential Pressure	psi	S-A
DOP_A2	Compressor A2, Oil Differential Pressure	psi	S-A
DOP_B1	Compressor B1, Oil Differential Pressure	psi	S-A
DOP_B2	Compressor B2, Oil Differential Pressure	psi	S-A
EMSTOP	Emergency Stop Enable/Disable via CCN flag	-	S-D
EWT	Entering Water Temperature	°F	S-A
EXV_A	EXV Position Circuit A	%	S-A
EXV_B	EXV Position Circuit B	%	S-A
FAN_ST_A	Fan stages Circuit A		S-A
FAN_ST_B	Fan stages Circuit B		S-A
HC_SEL	Heat/Cool Select (0=Cool 1= Heat)	-	S-A
HR_MACH	Chiller Run time Operation	Hours	S-A
HR_CP_A1	Compressor A1 Run time Operation	Hours	S-A
HR_CP_A2	Compressor A2 Run time Operation	Hours	S-A
HR_CP_B1	Compressor B1 Run time Operation	Hours	S-A
HR_CP_B2	Compressor B2 Run time Operation	Hours	S-A
LAG_LIM	Master Slave Lag limit	%	S-A
LCW_STPT	CCN Leaving Chiller Water Setpoint	°F	S-A
LWT	Leaving Water Temperature	°F	S-A

POINT NAMES	DESCRIPTIONS	UNITS	TYPE
MIN_LEFT	Minutes left for start	min	S-A
PINCH_A	Cooler Exchange Deltat T circuit A	^F	S-A
PINCH_B	Cooler Exchange Deltat T circuit B	^F	S-A
RECL_SEL	Reclaim Select	-	S-D
ROT_PUMP	Rotate pumps now	-	S-D
S_RESET	Servicing alert Reset	-	S-D
SCT_A	Saturated Condensing Temperature, Circuit A	°F	S-A
SCT_B	Saturated Condensing Temperature, Circuit B	°F	S-A
SMZ	Sum/Z Value for capacity PID Loop Control	-	S-A
SP_OCC	Setpoint occupancy status		S-D
SST_A	Saturated Suction Temperature, Circuit A	°F	S-A
SST_B	Saturated Suction Temperature, Circuit B	°F	S-A
STATE	Unit state information (int value): 1 = local operating type, off mode 2 = local operating type, on mode 3 = remote operating type, off mode 4 = remote operating type, on mode 5 = ccn operating type, off mode 6 = ccn operating type, on mode 7 = ccn operating type, off mode, system manager control 8 = ccn operating type, on mode, system manager control 9 = Master operating type, off mode 10 = Master operating type, on mode 11 = Master operating type, Master Slave Control, off mode 12 = Master operating type, Master Slave Control, on mode off mode = unit is commended to OFF or totally failed on mode = unit is commended to ON (status could also be delay)	-	S-A
TOT_OIL	Circuit A & B Oil level indicator : 3 = Circuit A & Circuit B oil level are both high 2 = Circuit A oil level is high, circuit B oil level is low 1 = Circuit A oil level is low, circuit B oil level is high 0 = Circuit A & Circuit B oil level are both low	-	S-A

SCHEME 1 : Water Cooled Chillers 1 compressor, Aux Board

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	COND_LWT
Channel 05	AI	COND_EWT
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	
Channel 09	AI	
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	hc_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	CONDPUMP
Channel 22	DO	-
Channel 23	DO	-
Channel 24	DO	ALARM_A
Channel 25	DO	
Channel 26	DO	SAFE_ALM

EXV BOARD #1 Address = 29		
Channel 29		EXV_ST_A
Channel 33		-
Channel 37	AI	-MTQ_RESA
Channel 38	AI	-

SCPM BOARD #1 Address =84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

AUXILIARY BOARD # 1 Address = 49		
Channel 49		-
Ch 49 bit-0	DO	-
Ch 49 bit-1	DO	-
Ch 49 bit-2	DO	-
Ch 49 bit-3	DO	-
Ch 49 bit-4	DO	-
Ch 49 bit-5	DO	-
Ch 49 bit-6	DO	-
Ch 49 bit-7	DO	-
Channel 50	AO	HD_A
Channel 51	AO	
Channel 52	AI	-
Channel 53	AI	-
Channel 54	AI	-
Channel 55	AI	-

Channel 27-28: virtual

SCHEME 3 : Water Cooled Chillers 2 to 4 compressors, Aux board

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	COND_LWT
Channel 05	AI	COND_EWT
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	hc_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	CONDPUMP
Channel 22	DO	-
Channel 23	DO	-
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Channel 26	DO	SAFE_ALM

EXV BOARD # 1 Address = 29		
Channel 29		EXV_ST_A
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA
Channel 38	AI	MTQ_RESB

SCPM BOARD #1 Address =84		
Channel 84	DO	CP_A1
Channel 85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel 86	DO	CPA1_PUL
Channel 87	AI	CPA1_CUR
Channel 88	AI	CPA1_OP
Channel 89	AI	CPA1_ECP
Channel 90	AI	CPA1_DGT
Channel 91	AI	CPA1_TMP
Channel 92	AI	CPA1_STA
Channel 93	AI	-
Channel 94	AI	-

SCPM BOARD #2 Address = 95		
Channel 95	DO	CP_A2
Channel 96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel 97	DO	-
Channel 98	AI	CPA2_CUR
Channel 99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

SCPM BOARD #3 Address =106		
Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel 108	DO	CPB1_PUL
Channel 109	AI	CPB1_CUR
Channel 110	AI	CPB1_OP
Channel 111	AI	CPB1_ECP
Channel 112	AI	CPB1_DGT
Channel 113	AI	CPB1_TMP
Channel 114	AI	CPB1_STA
Channel 115	AI	-
Channel 116	AI	-

SCPM BOARD #4 Address = 117		
Channel 117	DO	CP_B2
Channel 118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel 119	DO	-
Channel 120	AI	CPB2_CUR
Channel 121	AI	CPB2_OP
Channel 122	AI	CPB2_ECP
Channel 123	AI	CPB2_DGT
Channel 124	AI	CPB2_TMP
Channel 125	AI	CPB2_STA
Channel 126	AI	-
Channel 127	AI	-

AUXILIARY BOARD # 1 Address = 49		
Channel 49		-
Ch 49 bit-0	DO	-
Ch 49 bit-1	DO	-
Ch 49 bit-2	DO	-
Ch 49 bit-3	DO	-
Ch 49 bit-4	DO	-
Ch 49 bit-5	DO	-
Ch 49 bit-6	DO	-
Ch 49 bit-7	DO	-
Channel 50	AO	HD_A
Channel 51	AO	HD_B
Channel 52	AI	-
Channel 53	AI	-
Channel 54	AI	-
Channel 55	AI	-

Channel 27-28: virtual

SCHEME 4 : Water Cooled Chillers 2 to 4 Compressors, no Aux Board

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	COND_LWT
Channel 05	AI	COND_EWT
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	hc_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	CONDPUMP
Channel 22	DO	-
Channel 23	DO	-
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Channel 26	DO	SAFE_ALM

EXV BOARD # 1 Address = 29		
Channel 29		EXV_ST_A
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA
Channel 38	AI	MTQ_RESB

4xAI - 2xAO BOARD Address = 47		
Channel_47	AI	-
Channel_48	AI	-
Channel_49	AI	-
Channel_50	AI	-
Channel_51	AO	HD_A
Channel_52	AO	HD_B

SCPM BOARD Address = 84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Chan_93-94	AI	-
		-

SCPM BOARD Address = 40		
Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Chan104-105	AI	-

Channel 27-28: virtual

SCPM BOARD Address = 106		
Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Chan 115-16	AI	-
		-

SCPM BOARD Address = 117		
Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Chan126-127	AI	-
		-

-
-

SCHEME 5 : Air Cooled Chillers 1 compressor, Aux Board, Varifan

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	
Channel 09	AI	
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	hc_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	
Channel 22	DO	OIL_HTRA
Channel 23	DO	COOL_HTR
Channel 24	DO	ALARM_A
Channel 25	DO	REFA_ISO
Channel 26	DO	SAFE_ALM

EXV BOARD Address = 29		
Channel 29		EXV_ST_A
Channel 33		
Channel 37	AI	MTQ_RESA
Channel 38	AI	-

SCPM BOARD #1 Address =84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

AUXILIARY BOARD # 1 Address = 49		
Channel 49		MUX_FAN1
Ch 49 bit-0	DO	
Ch 49 bit-1	DO	fan_a1
Ch 49 bit-2	DO	fan_a2
Ch 49 bit-3	DO	fan_a3
Ch 49 bit-4	DO	fan_a4
Ch 49 bit-5	DO	-
Ch 49 bit-6	DO	-
Ch 49 bit-7	DO	-
Channel 50	AO	HD_A
Channel 51	AO	
Channel 52	AI	-
Channel 53	AI	-
Channel 54	AI	-
Channel 55	AI	-

Channel 27-28: virtual

SCHEME 6 : Air Cooled Chillers 1 compressor, Aux Board, No Varifan

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	
Channel 09	AI	
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	hc_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	
Channel 22	DO	OIL_HTRA
Channel 23	DO	COOL_HTR
Channel 24	DO	ALARM_A
Channel 25	DO	REFA_ISO
Channel 26	DO	SAFE_ALM

EXV BOARD Address = 29		
Channel 29		EXV_ST_A
Channel 33		
Channel 37	AI	MTQ_RESA
Channel 38	AI	-

SCPM BOARD #1 Address =84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

AUXILIARY BOARD # 1 Address = 49		
Channel 49		MUX_FAN1
Ch 49 bit-0	DO	fan_a1
Ch 49 bit-1	DO	fan_a2
Ch 49 bit-2	DO	fan_a3
Ch 49 bit-3	DO	fan_a4
Ch 49 bit-4	DO	-
Ch 49 bit-5	DO	-
Ch 49 bit-6	DO	-
Ch 49 bit-7	DO	-

Channel 27-28: virtual

SCHEME 8 : Air Cooled Chillers < 3 separate fan stages 2 to 4 compressors, Cooler heater = NO, Reclaim option = no No Aux Board

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	-
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	recl_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	-
Channel 22	DO	OIL_HTRA
Channel 23	DO	OIL_HTRB
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Channel 26	DO	SAFE_ALM

EXV BOARD Address = 29		
Channel 29		EXV_ST_A
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA
Channel 38	AI	MTQ_RESB

4xAI - 2xAO BOARD Address = 47		
Channel_47	AI	
Channel_48	AI	
Channel_49	AI	HR_LWT
Channel_50	AI	HR_EWT
Channel_51	AO	HD_A
Channel_52	AO	HD_B

SCPM BOARD #1 Address =84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

SCPM BOARD #2 Address = 95		
Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

SCPM BOARD #3 Address =106		
Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Channel_115	AI	-
Channel_116	AI	-

SCPM BOARD #4 Address = 117		
Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Channel_126	AI	-
Channel_127	AI	-

4xDO BOARD #1 Address = 39		
Channel_39		MUX_FAN1
39 - bit 0		fan_a1
39 - bit 1		fan_a2
39 - bit 2		fan_b1
39 - bit 3		fan_b2

Channel 27-28: virtual

SCHEME 9 : Air Cooled < 5 separate fan stages 2 to 4 compressors, Aux Board, no varifan

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	-
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	recl_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	CONDPUMP
Channel 22	DO	OIL_HTRA
Channel 23	DO	OIL_HTRB
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Channel 26	DO	SAFE_ALM

EXV BOARD Address = 29		
Channel 29		EXV_ST_A
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA
Channel 38	AI	MTQ_RESB

SCPM BOARD #1 Address =84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

SCPM BOARD #2 Address = 95		
Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

SCPM BOARD #3 Address =106		
Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Channel_115	AI	-
Channel_116	AI	-

SCPM BOARD #4 Address = 117		
Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Channel_126	AI	-
Channel_127	AI	-

AUXILIARY BOARD # 1 Address = 49		
Channel 49		MUX_FAN1
Ch 49 bit-0	DO	fan_a1
Ch 49 bit-1	DO	fan_a2
Ch 49 bit-2	DO	fan_a3
Ch 49 bit-3	DO	fan_a4
Ch 49 bit-4	DO	fan_b1
Ch 49 bit-5	DO	fan_b2
Ch 49 bit-6	DO	fan_b3
Ch 49 bit-7	DO	fan_b4

AUXILIARY BOARD # 3 Address = 63		
Channel 63		MUX_HRDO
Ch 63 bit-0	DO	pd_val_a
Ch 63 bit-1	DO	hr_val_a
Ch 63 bit-2	DO	refa_iso
Ch 63 bit-3	DO	pd_val_b
Ch 63 bit-4	DO	hr_val_b
Ch 63 bit-5	DO	refb_iso
Ch 63 bit-6	DO	cond_htr
Ch 63 bit-7	DO	cool_htr
Channel 64	AO	
Channel 65	AO	-
Channel 66	AI	HR_LWT
Channel 67	AI	HR_EWT
Channel 68	AI	
Channel 69	AI	

Channel 27-28: virtual

SCHEME 10 : Air Cooled > 4 separate fan stages 2 to 4 compressors, Aux Board, no varifan

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	-
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	recl_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	CONDPUMP
Channel 22	DO	OIL_HTRA
Channel 23	DO	OIL_HTRB
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Channel 26	DO	SAFE_ALM

EXV BOARD Address = 29		
Channel 29		EXV_ST_A
Channel 33		EXV_ST_B
Channel 37	AI	-
Channel 38	AI	-

SCPM BOARD #1 Address =84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

SCPM BOARD #2 Address = 95		
Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

SCPM BOARD #3 Address =106		
Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Channel_115	AI	-
Channel_116	AI	-

SCPM BOARD #4 Address = 117		
Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Channel_126	AI	-
Channel_127	AI	-

AUXILIARY BOARD # 1 Address = 49		
Channel 49		MUX_FAN1
Ch 49 bit-0	DO	fan_a1
Ch 49 bit-1	DO	fan_a2
Ch 49 bit-2	DO	fan_a3
Ch 49 bit-3	DO	fan_a4
Ch 49 bit-4	DO	fan_a5
Ch 49 bit-5	DO	fan_a6
Ch 49 bit-6	DO	fan_a7
Ch 49 bit-7	DO	fan_a8

AUXILIARY BOARD # 2 Address = 56		
Channel 56		MUX_FAN2
Ch 56 bit-0	DO	fan_b1
Ch 56 bit-1	DO	fan_b2
Ch 56 bit-2	DO	fan_b3
Ch 56 bit-3	DO	fan_b4
Ch 56 bit-4	DO	fan_b5
Ch 56 bit-5	DO	fan_b6
Ch 56 bit-6	DO	fan_b7
Ch 56 bit-7	DO	fan_b8

AUXILIARY BOARD # 3 Address = 63		
Channel 63		MUX_HRDO
Ch 63 bit-0	DO	pd_val_a
Ch 63 bit-1	DO	hr_val_a
Ch 63 bit-2	DO	refa_iso
Ch 63 bit-3	DO	pd_val_b
Ch 63 bit-4	DO	hr_val_b
Ch 63 bit-5	DO	refb_iso
Ch 63 bit-6	DO	cond_htr
Ch 63 bit-7	DO	cool_htr
Channel 64	AO	
Channel 65	AO	-
Channel 66	AI	HR_LWT
Channel 67	AI	HR_EWT
Channel 68	AI	
Channel 69	AI	

Channel 27-28: virtual

SCHEME 11: Air Cooled < 5 separate fan stages 2 to 4 compressors Aux Board, varifan

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	-
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	recl_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	CONDPUMP
Channel 22	DO	OIL_HTRA
Channel 23	DO	OIL_HTRB
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Channel 26	DO	SAFE_ALM

EXV BOARD Address = 29		
Channel 29		EXV_ST_B
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA-
Channel 38	AI	MTQ_RESB

SCPM BOARD #1 Address =84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

SCPM BOARD #2 Address = 95		
Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

SCPM BOARD #3 Address =106		
Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Channel_115	AI	-
Channel_116	AI	-

SCPM BOARD #4 Address = 117		
Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Channel_126	AI	-
Channel_127	AI	-

AUXILIARY BOARD # 1 Address = 49		
Channel 49		MUX_FAN1
Ch 49 bit-0	DO	-
Ch 49 bit-1	DO	fan_a1
Ch 49 bit-2	DO	fan_a2
Ch 49 bit-3	DO	fan_a3
Ch 49 bit-4	DO	-
Ch 49 bit-5	DO	fan_b1
Ch 49 bit-6	DO	fan_b2
Ch 49 bit-7	DO	fan_b3
Channel 50	AO	HD_A
Channel 51	AO	HD_B
Chan 52-54	AI	-

AUXILIARY BOARD # 3 Address = 63		
Channel 63		MUX_HRDO
Ch 63 bit-0	DO	pd_val_a
Ch 63 bit-1	DO	hr_val_a
Ch 63 bit-2	DO	refa_iso
Ch 63 bit-3	DO	pd_val_b
Ch 63 bit-4	DO	hr_val_b
Ch 63 bit-5	DO	refb_iso
Ch 63 bit-6	DO	cond_htr
Ch 63 bit-7	DO	cool_htr
Channel 64	AO	HR_WTRVL
Channel 65	AO	-
Channel 66	AI	HR_LWT
Channel 67	AI	HR_EWT
Channel 68	AI	PD_P_A
Channel 69	AI	PD_P_B

Channel 27-28: virtual

SCHEME 12 : Air Cooled > 4 separate fan stages 2 to 4 Compressors Aux Board, varifan

BASIC BOARD Address = 1		
Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	-
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	recl_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	CONDPUMP
Channel 22	DO	OIL_HTRA
Channel 23	DO	OIL_HTRB
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Channel 26	DO	SAFE_ALM

EXV BOARD#1 Address = 29		
Channel 29		EXV_ST_B
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA
Channel 38	AI	MTQ_RESB

SCPM BOARD #1 Address =84		
Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

SCPM BOARD #2 Address = 95		
Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

SCPM BOARD #3 Address =106		
Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Channel_115	AI	-
Channel_116	AI	-

SCPM BOARD #4 Address = 117		
Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Channel_126	AI	-
Channel_127	AI	-

AUXILIARY BOARD # 1 Address = 49		
Channel 49		MUX_FAN1
Ch 49 bit-0	DO	f-
Ch 49 bit-1	DO	fan_a1
Ch 49 bit-2	DO	fan_a2
Ch 49 bit-3	DO	fan_a3
Ch 49 bit-4	DO	fan_a4
Ch 49 bit-5	DO	fan_a5
Ch 49 bit-6	DO	fan_a6
Ch 49 bit-7	DO	fan_a7
Channel 50	AO	HD_A
Channel 51	AO	
Chan 52-54	AI	-

AUXILIARY BOARD # 2 Address = 56		
Channel 56		MUX_FAN1
Ch 56 bit-0	DO	-
Ch 56 bit-1	DO	fan_b1
Ch 56 bit-2	DO	fan_b2
Ch 56 bit-3	DO	fan_b3
Ch 56 bit-4	DO	fan_b4
Ch 56 bit-5	DO	fan_b5
Ch 56 bit-6	DO	fan_b6
Ch 56 bit-7	DO	fan_b7
Channel 57	AO	HD_B
Channel 58	AO	
Chan 59-62	AI	-

AUXILIARY BOARD # 3 Address = 63		
Channel 63		MUX_HRDO
Ch 63 bit-0	DO	pd_val_a
Ch 63 bit-1	DO	hr_val_a
Ch 63 bit-2	DO	refa_iso
Ch 63 bit-3	DO	pd_val_b
Ch 63 bit-4	DO	hr_val_b
Ch 63 bit-5	DO	refb_iso
Ch 63 bit-6	DO	cond_htr
Ch 63 bit-7	DO	cool_htr
Channel 64	AO	HR_WTRVL
Channel 65	AO	-
Channel 66	AI	HR_LWT
Channel 67	AI	HR_EWT
Channel 68	AI	PD_P_A
Channel 69	AI	PD_P_B

Channel 27-28: virtual

SCHEME 13 : Air Cooled Chillers >2 separate fan stages, 2 to 4 Compressors, Cooler heater = NO, Reclaim option = no, No Aux Board

BASIC BOARD Address = 1

Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	-
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	recl_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	
Channel 22	DO	OIL_HTRA
Channel 23	DO	OIL_HTRB
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Ch 26-28	DO	unused

EXV BOARD Address = 29

Channel 29		EXV_ST_A
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA
Channel 38	AI	MTQ_RESB

4xAI - 2xAO BOARD Address = 47

Channel_47	AI	
Channel_48	AI	
Channel_49	AI	HR_LWT
Channel_50	AI	HR_EWT
Channel_51	AO	HD_A
Channel_52	AO	HD_B

SCPM BOARD #1 Address =84

Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

SCPM BOARD #2 Address = 95

Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

SCPM BOARD #3 Address =106

Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Channel_115	AI	-
Channel_116	AI	-

SCPM BOARD #4 Address = 117

Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Channel_126	AI	-
Channel_127	AI	-

4xDO BOARD #1 Address = 39

Channel_39		MUX_FAN1
39 - bit 0		fan_a1
39 - bit 1		fan_a2
39 - bit 2		fan_a3
39 - bit 3		fan_a4

4xDO BOARD #2 Address = 43

Channel_43		MUX_FAN2
43 - bit 0		fan_b1
43 - bit 1		fan_b2
43 - bit 2		fan_b3
43 - bit 3		fan_b4

Channel 26 : DO unused
Channel 27-28: virtual
Channel 80 - 83 : free

SCHEME 14 : Air Cooled Chillers < 3 separate fan stages 2 to 4 Compressors, Cooler heater = YES or Reclaim option = YES, No Aux Board

BASIC BOARD Address = 1

Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	-
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	recl_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	HPUMP
Channel 22	DO	OIL_HTRA
Channel 23	DO	OIL_HTRB
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Ch 26-28	DO	unused

EXV BOARD Address = 29

Channel 29		EXV_ST_A
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA
Channel 38	AI	MTQ_RESB

4xAI - 2xAO BOARD Address = 47

Channel_47	AI	
Channel_48	AI	
Channel_49	AI	-
Channel_50	AI	-
Channel_51	AO	HD_A
Channel_52	AO	HD_B

SCPM BOARD #1 Address =84

Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

SCPM BOARD #2 Address = 95

Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

SCPM BOARD #3 Address =106

Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Channel_115	AI	-
Channel_116	AI	-

SCPM BOARD #4 Address = 117

Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Channel_126	AI	-
Channel_127	AI	-

NRCP BASIC BOARD Address = 53

Channel_53	AI	HR_LWT
Channel_54	AI	HR_EWT
Channel_55	AI	-
Channel_56	AI	-
Channel_57	AI	PD_P_A
Channel_58	AI	PD_P_B
Channel_59	AO	HR_WTRVL
Channel_60	DI	-
Channel_61	DI	-
Channel_62	DI	-
Channel_63	DI	-
Channel_64	DI	-
Channel_65	DI	-
Channel_66	DI	-
Channel_67	DI	-
Channel_68	MUX	MUX_NRCP
68 bit 0	DO	hr_val_a
68 bit 1	DO	hr_val_b
68 bit 2	DO	-
68 bit 3	DO	cond_htr
68 bit 4	DO	pd_val_a
68 bit 5	DO	pd_val_b
68 bit 6	DO	-
68 bit 7	DO	cool_htr
68 bit 8	DO	refa_iso
68 bit 9	DO	refb_iso
Ch_78- 79	DO	virtual-unused

4xDO BOARD #1 Address = 39

Channel_39		MUX_FAN1
39 - bit 0		fan_a1
39 - bit 1		fan_a2
39 - bit 2		fan_b1
39 - bit 3		fan_b2

Channel 26 : DO unused
Channel 27-28: virtual
Channel 80 - 83 : free

SCHEME 15 : Air Cooled Chillers > 2 separate fan stages 2 to 4 Compressors, Cooler heater = YES or Reclaim option = YES, No Aux Board

BASIC BOARD
Address = 1

Channel 01	AI	COOL_LWT
Channel 02	AI	COOL_EWT
Channel 03	AI	CHWSTEMP
Channel 04	AI	OAT
Channel 05	AI	-
Channel 06	AI	DP_A
Channel 07	AI	SP_A
Channel 08	AI	DP_B
Channel 09	AI	SP_B
Channel 10	AI	EXT_VDC
Channel 11		MUX_DI [1]
11- bit 0	DI	onoff_sw
11 - bit 1	DI	spt_sw
11 - bit 2	DI	recl_sw
11 - bit 3	DI	lim_sw
11 - bit 4	DI	lock_1
11 - bit 5	DI	elec_box
11 - bit 6	DI	cond_flow
11 - bit 7	DI	pump_def
Channel 19	DO	CPUMP_1
Channel 20	DO	CPUMP_2
Channel 21	DO	CONDPUMP
Channel 22	DO	OIL_HTRA
Channel 23	DO	OIL_HTRB
Channel 24	DO	ALARM_A
Channel 25	DO	ALARM_B
Ch 26-28	DO	unused

EXV BOARD
Address = 29

Channel 29		EXV_ST_A
Channel 33		EXV_ST_B
Channel 37	AI	MTQ_RESA
Channel 38	AI	MTQ_RESB

4xAI - 2xAO BOARD
Address = 47

Channel_47	AI	
Channel_48	AI	
Channel_49	AI	-
Channel_50	AI	-
Channel_51	AO	HD_A
Channel_52	AO	HD_B

SCPM BOARD #1
Address =84

Channel_84	DO	CP_A1
Channel_85		CPA1_MUX
85 - bit 0	DO	cpa1_mc1
85 - bit 1	DO	cpa1_mc2
85 - bit 2	DO	cpa1_ols
85 - bit 3	DO	a1_ldr_1
85 - bit 4	DO	a1_ldr_2
85 - bit 5	DO	oilpmp_a
Channel_86	DO	CPA1_PUL
Channel_87	AI	CPA1_CUR
Channel_88	AI	CPA1_OP
Channel_89	AI	CPA1_ECP
Channel_90	AI	CPA1_DGT
Channel_91	AI	CPA1_TMP
Channel_92	AI	CPA1_STA
Channel_93	AI	-
Channel_94	AI	-

SCPM BOARD #2
Address = 95

Channel_95	DO	CP_A2
Channel_96		CPA2_MUX
96 - bit 0	DO	cpa2_mc1
96 - bit 1	DO	cpa2_mc2
96 - bit 2	DO	cpa2_ols
96 - bit 3	DO	a2_ldr_1
96 - bit 4	DO	a2_ldr_2
96 - bit 5	DO	-
Channel_97	DO	-
Channel_98	AI	CPA2_CUR
Channel_99	AI	CPA2_OP
Channel 100	AI	CPA2_ECP
Channel 101	AI	CPA2_DGT
Channel 102	AI	CPA2_TMP
Channel 103	AI	CPA2_STA
Channel 104	AI	-
Channel 105	AI	-

Channel 26 : DO unused
Channel 27-28: virtual
Channel 80 - 83 : free

SCPM BOARD #3
Address =106

Channel 106	DO	CP_B1
Channel 107		CPB1_MUX
107 - bit 0	DO	cpb1_mc1
107 - bit 1	DO	cpb1_mc2
107 - bit 2	DO	cpb1_ols
107 - bit 3	DO	b1_ldr_1
107 - bit 4	DO	b1_ldr_2
107 - bit 5	DO	oilpmp_b
Channel_108	DO	CPB1_PUL
Channel_109	AI	CPB1_CUR
Channel_110	AI	CPB1_OP
Channel_111	AI	CPB1_ECP
Channel_112	AI	CPB1_DGT
Channel_113	AI	CPB1_TMP
Channel_114	AI	CPB1_STA
Channel_115	AI	-
Channel_116	AI	-

SCPM BOARD #4
Address = 117

Channel_117	DO	CP_B2
Channel_118		CPB2_MUX
118 - bit 0	DO	cpb2_mc1
118 - bit 1	DO	cpb2_mc2
118 - bit 2	DO	cpb2_ols
118 - bit 3	DO	b2_ldr_1
118 - bit 4	DO	b2_ldr_2
118 - bit 5	DO	-
Channel_119	DO	-
Channel_120	AI	CPB2_CUR
Channel_121	AI	CPB2_OP
Channel_122	AI	CPB2_ECP
Channel_123	AI	CPB2_DGT
Channel_124	AI	CPB2_TMP
Channel_125	AI	CPB2_STA
Channel_126	AI	-
Channel_127	AI	-

NRCP BASIC BOARD
Address = 53

Channel_53	AI	HR_LWT
Channel_54	AI	HR_EWT
Channel_55	AI	-
Channel_56	AI	-
Channel_57	AI	PD_P_A
Channel_58	AI	PD_P_B
Channel_59	AO	HR_WTRVL
Channel_60	DI	-
Channel_61	DI	-
Channel_62	DI	-
Channel_63	DI	-
Channel_64	DI	-
Channel_65	DI	-
Channel_66	DI	-
Channel_67	DI	-
Channel_68	MUX	MUX_NRCP
68 bit 0	DO	hr_val_a
68 bit 1	DO	hr_val_b
68 bit 2	DO	-
68 bit 3	DO	cond_htr
68 bit 4	DO	pd_val_a
68 bit 5	DO	pd_val_b
68 bit 6	DO	-
68 bit 7	DO	cool_htr
68 bit 8	DO	refa_iso
68 bit 9	DO	refb_iso
Ch_78- 79	DO	virtual-unused

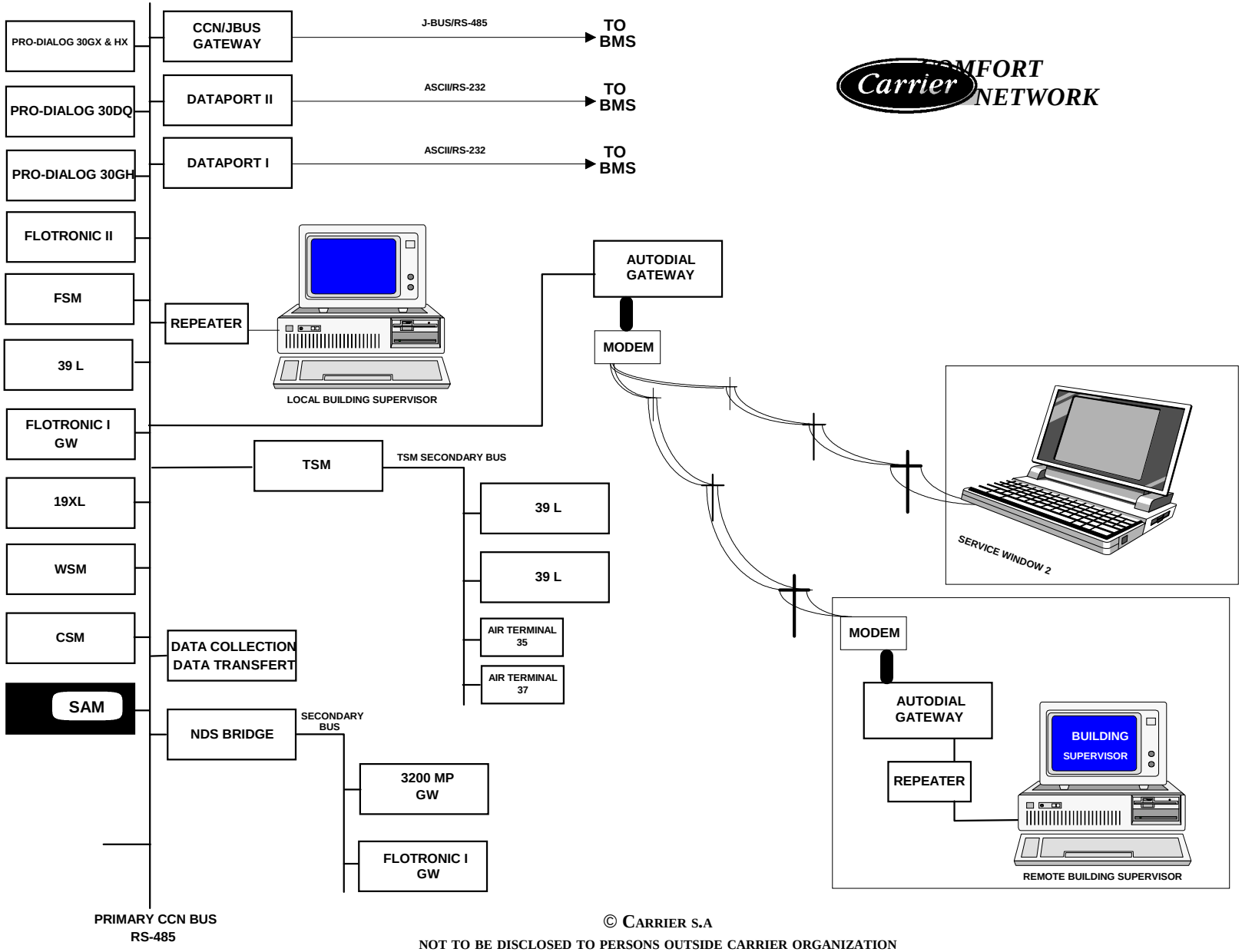
4xDO BOARD #1
Address = 39

Channel_39		MUX_FAN1
39 - bit 0		fan_a1
39 - bit 1		fan_a2
39 - bit 2		fan_a3
39 - bit 3		fan_a4

4xDO BOARD #2
Address = 43

Channel_43		MUX_FAN2
43 - bit 0		fan_b1
43 - bit 1		fan_b2
43 - bit 2		fan_b3
43 - bit 3		fan_b4

APPENDIX E- JBUS MEMORY MAPPING - 30GX&HX V2.X DEFAULT CONFIGURATION					
REGISTER ADDRESS	JBUS ACCESS	CONTENT	TYPE**		REMARK**
			INT	FLOAT	
0 [h00]	R	Entering Fluid Temperature		X	Read value must be divided by 10
1 [h01]	R	Leaving Fluid Temperature		X	Read value must be divided by 10
2 [h02]	R	Circuit A Discharge Pressure		X	Read value must be divided by 10
3 [h03]	R	Circuit B Discharge Pressure		X	Read value must be divided by 10
4 [h04]	R	Control Point		X	Read value must be divided by 10
5 [h05]	R	Unit Percent Active Capacity	X		
6 [h06]	R	Demand Limit	X		
7 [h07]	R	Chiller State	X		0 = Off, 1 = On, 6=delay, 24=running
8 [h08]	R	Alarm State	X		0 = Normal, 16 = Partial, 25 = Shutdown
9 [h09]	R	Heat Cool Select	X		0 = cool. 1 = heat
10 [h0A]	R	Cooler Pump # 1 status	X		
11 [h0B]	R	Condenser Pump status	X		
12 [h0C]	R	Machine Operating Hours	X		
13 [h0D]	R	Compressor A1 Hours	X		
14 [h0E]	R	Compressor A2 Hours	X		
15 [h0F]	R	Compressor B1 Hours	X		
16 [h10]	R	Compressor B2 Hours	X		
---	R		X		
40 [h28]	R	Total Number of active alarms	X		
41 [h29]	R	Active alarm 1*	X		Provide the code of up to 5 active alarms. These are stored in arrival order. Alarms read from CCN/JBUS are alarm index but not alarms codes as follows from iom, alarm codes 101 to 117 , index = 88 (code 101) to 104 (code 117) from iom, alarm codes 201 to 217 , index = 105 (code 201) to 121 (code 217) - - - - - - - - from iom, alarm codes 401 to 417 , index = 139 (code 401) to 155 (code 417)
42 [h2A]	R	Active alarm 2*	X		
43 [h2B]	R	Active alarm 3*	X		
44 [h2C]	R	Active alarm 4*	X		
45 [h2D]	R	Active alarm 5*	X		
61 [h3D]	R	Gateway current alarm code	X		2 = CCN communication failure
66 [h42]	R	JBUS alarm code	X		
97 [h61]	R/W	Cooling Setpoint 1		X	Write value must be multiplied by 10
98 [h62]	R/W	Cooling Setpoint 2		X	Write value must be multiplied by 10
99 [h62]	R/W	Heating Setpoint		X	Write value must be multiplied by 10
107 [6Bh]	R/W	Chiller Start/Stop ***	X		0 = Off 1 = On
108 [h6C]	R/W	Control Point		X	Write value must be multiplied by 10
109 [h6D]	R/W	Demand Limit Value	X		
112 [70h]	R/W	JBUS baud rate	X		Default = 9600
113 [71h]	R/W	JBUS address	X		Default = 1
114 [72h]	R/W	JBUS parity and stop bit	X		Default = 0, no parity and 1 stop bit



APPENDIX F SAM SCREEN FOR 30GX&HX PRO-DIALOG *PLUS*

OFF
OFF - COOLER HEATER ACTIVE
READY TO START IN XX MIN
ON - COOLING
ON - COOL-RECLAIM
ON - COOL-RESET ACTIVE
ON - COOL- RECL-RESET
ON - HEATING
ON - HEAT - RESET ACTIVE
ON - MASTER AND LEAD UNIT
ON - MASTER AND LAG UNIT
ON - SLAVE AND LEAD UNIT
ON - SLAVE AND LAG UNIT
ON - UNDER SM CONTROL

NORMAL
PARTIAL: ALARM XX
SHUTDOWN: ALARM XX