TRANE®

Cooling and Heating Systems and Services

User Guide

Tracer CH530™ Control System for Chillers RTWD/RTUD 060-250

RLC-SVU05A-E4

General information

Foreword

These instructions are given as a guide to good practice in the installation, start-up, operation, and maintenance by the user, of Trane CH530 chiller control system on chillers. They do not contain full service procedures necessary for the continued successful operation of this equipment. The services of a qualified technician should be employed through the medium of a maintenance contract with a reputable service company. Read this manual thoroughly before unit start-up.

Warnings and cautions

Warnings and Cautions appear at appropriate sections throughout this manual. Your personal safety and the proper operation of this machine require that you follow them carefully. The constructor assumes no liability for installations or servicing performed by unqualified personnel.

WARNING! : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION! : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or for equipment or property-damage-only accidents.

Safety recommendations

To avoid death, injury, equipment or property damage, the following recommendations should be observed during maintenance and service visits:

1. Disconnect the main power supply before any servicing on the unit.
2. Service work should be carried out only by qualified and experienced personnel.

Reception

On arrival, inspect the unit before signing the delivery note.

Reception in France only:

In case of visible damage: The consignee (or the site representative) must specify any damage on the delivery note, legibly sign and date the delivery note, and the truck driver must countersign it. The consignee (or the site representative) must notify Trane Epinal Operations - Claims team and send a copy of the delivery note. The customer (or the site representative) should send a registered letter to the last carrier within 3 days of delivery.

Reception in all countries except France:

In case of concealed damage: The consignee (or the site representative) must send a registered letter to the last carrier within 7 days of delivery, claiming for the described damage. A copy of this letter must be sent to Trane Epinal Operations - Claims team.

Note: for deliveries in France, even concealed damage must be looked for at delivery and immediately treated as visible damage.

General information

Warranty

Warranty is based on the general terms and conditions of the manufacturer. The warranty is void if the equipment is repaired or modified without the written approval of the manufacturer, if the operating limits are exceeded or if the control system or the electrical wiring is modified. Damage due to misuse, lack of maintenance or failure to comply with the manufacturer's instructions or recommendations is not covered by the warranty obligation. If the user does not conform to the rules of this manual, it may entail cancellation of warranty and liabilities by the manufacturer.

Maintenance contract

It is strongly recommended that you sign a maintenance contract with your local Service Agency. This contract provides regular maintenance of your installation by a specialist in our equipment. Regular maintenance ensures that any malfunction is detected and corrected in good time and minimizes the possibility that serious damage will occur. Finally, regular maintenance ensures the maximum operating life of your equipment. We would remind you that failure to respect these installation and maintenance instructions may result in immediate cancellation of the warranty.

Training

To assist you in obtaining the best use of it and maintaining it in perfect operating condition over a long period of time, the manufacturer has at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and technicians a better knowledge of the equipment they are using, or that is under their charge. Emphasis is particularly given to the importance of periodic checks on the unit operating parameters as well as on preventive maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

Contents

Overview

The Trane CH530 control system that runs the chiller consists of several elements:

- The main processor collects data, status, and diagnostic information and communicates commands to the ***LLID (for Low Level Intelligent Device)*** bus. The main processor has an integral display (DynaView).
- ***LLID bus***. The main processor communicates to each input and output device (e.g. temperature and pressure sensors, low voltage binary inputs, analog input/output) all connected to a four-wire bus, rather than the conventional control architecture of signal wires for each device.
- The ***communication interface*** to a building automation system (BAS).
- A ***service tool*** to provide all service/maintenance capabilities. Main processor and service tool (TechView) software is downloadable from ***www.Trane.com***. The process is discussed later in this section under TechView Interface. DynaView provides bus management. It has the task of restarting the link, or filling in for what it sees as "missing" devices when normal communications has been degraded. Use of TechView may be required.

The CH530 uses the IPC3 protocol based on RS485 signal technology and communicating at 19.2 Kbaud to allow 3 rounds of data per second on a 64-device network. Most diagnostics are handled by the DynaView. If a temperature or pressure is reported out of range by a LLID, the DynaView processes this information and calls out the diagnostic. The individual LLIDs are not responsible for any diagnostic functions.

Note: *It is imperative that the CH530 Service Tool (TechView) be used to facilitate the replacement of any LLID or reconfigure any chiller component*.

Controls Interface

DynaView (picture on cover)

Each chiller is equipped with the DynaView interface. DynaView has the capability to display additional information to the advanced operator including the ability to adjust settings. Multiple screens are available and text is presented in multiple languages as factory-ordered or can be easily downloaded online.

TechView

TechView can be connected to the DynaView module and provides further data, adjustment capabilities, diagnostics information, downloadable software, and downloadable languages.

DynaView Interface

Power Up

On power-up, Dynaview will progress through 3 screens.

The first screen (Figure 1) will display for 3-10 seconds. This screen will give the status of the Application software, the Boot Software P/N, selftest results and the application part number. The contrast is adjustable from this screen. The message "Selftest passed" may be replaced with "Err2: RAM Error" or "Err3: CRC Failure"

Note that the Application and Boot software numbers will vary according to the unit type.

If no application is found, the screen (Figure 2) will display instead of Figure 1.

Figure 1

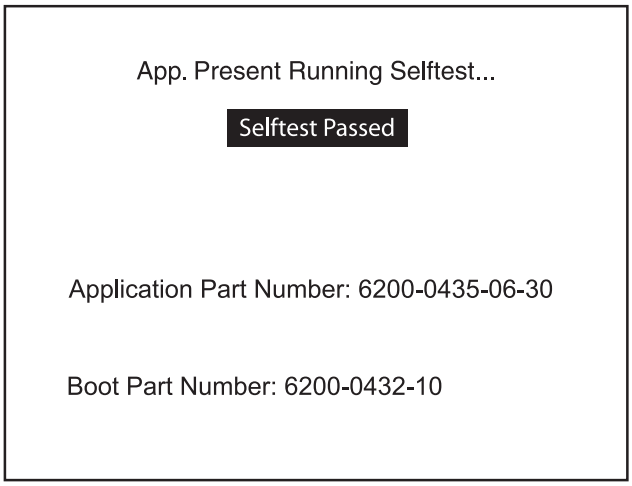
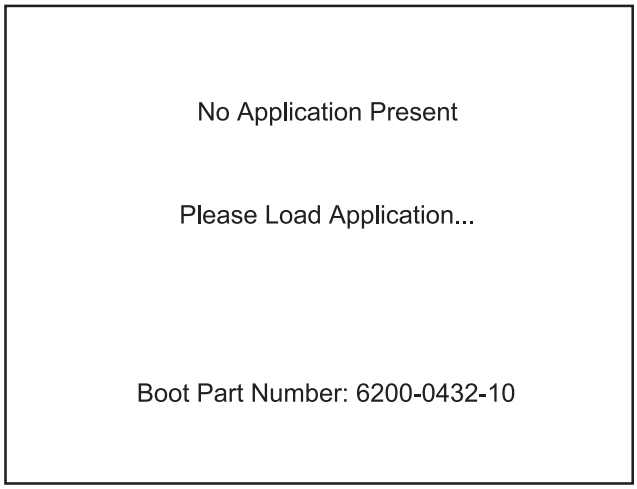


Figure 2



DynaView Interface

The second screen (Figure 3) will display for 15-25 seconds. If a valid configuration is present, "Tracer CH530" will also be displayed. If the MP configuration is found to be invalid, "MP: Invalid Configuration" is displayed indefinitely. Contact your local Trane service technician.

The third screen is the first screen of the application.

Figure 3

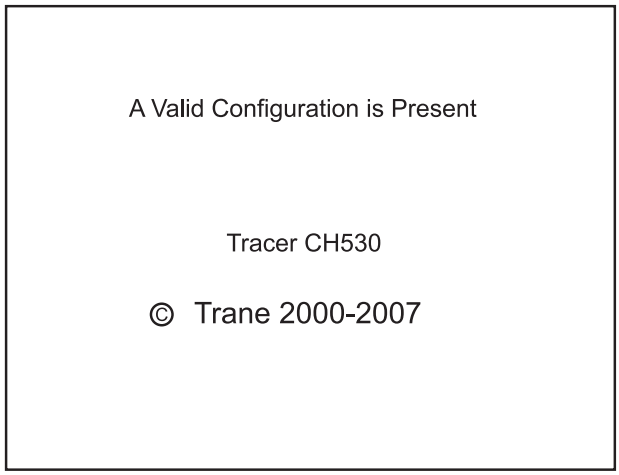
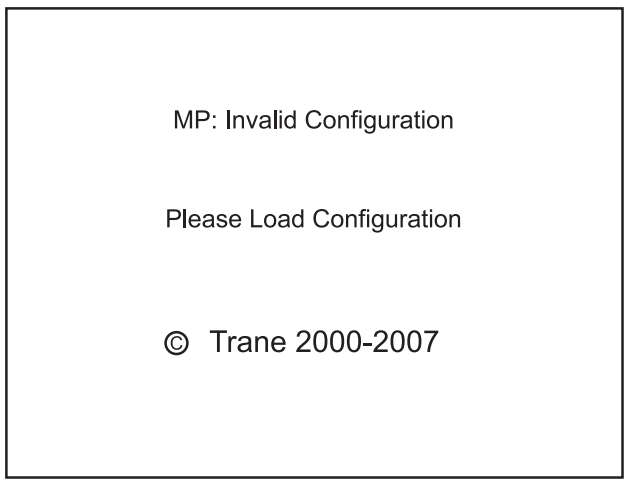


Figure 4



DynaView Interface

The display on DynaView is a 1/4 VGA display with a resistive touch screen and an LED backlight. The display area is approximately 4 inches wide by 3 inches high (102mm x 60mm).

CAUTION!

Equipment Damage! Putting excessive pressure on the touch screen could cause damage. It takes less than 7 kg of force to break the screen.

In this touch screen application, key functions are determined completely by software and change depending upon the subject matter currently being displayed. The basic touch screen functions are outlined below.

Radio Buttons

Radio buttons show 1 menu choice among 2 or more alternatives, all visible. The possible selections are each associated with a button. The selected button is darkened, presented in reverse video to indicate it is the selected choice. The full range of possible choices as well as the current choice is always in view.

Spin Value Buttons

Spin values are used to allow a variable setpoint to be changed, such as leaving water setpoint. The value increases or decreases by touching the (+) or (-) arrows.

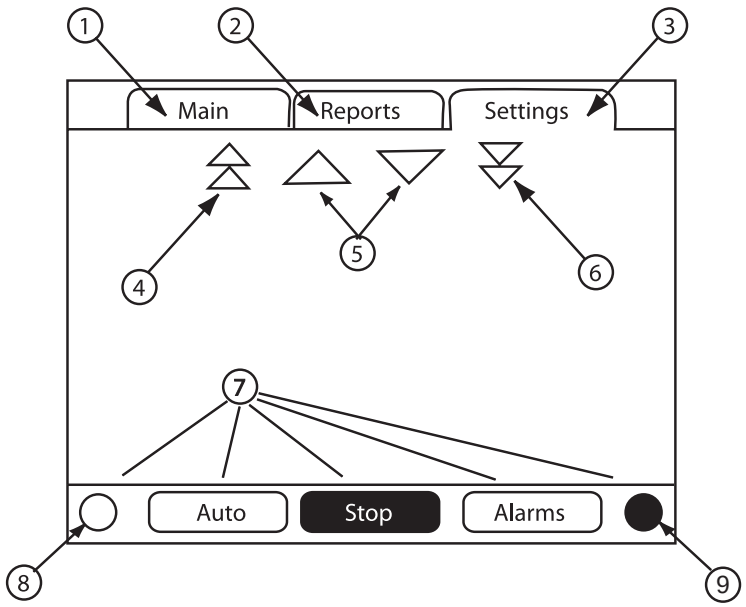
Action Buttons

Action buttons appear temporarily and provide the user with a choice such as **Enter** or **Cancel**.

File Folder Tabs

File folder tabs are used to select a screen of data. The tabs are in 1 row across the top of the display. The user selects a screen of information by touching the appropriate tab.

Figure 5 - Basic Screen Format



Display Screens

The main body of the screen is used for description text, data, setpoints, or keys (touch sensitive areas). The Chiller Mode is displayed here. A double arrow pointing to the right indicates more information is available about the specific item on that same line. Pressing it will bring you to a sub-screen that will present the information or allow changes to settings.

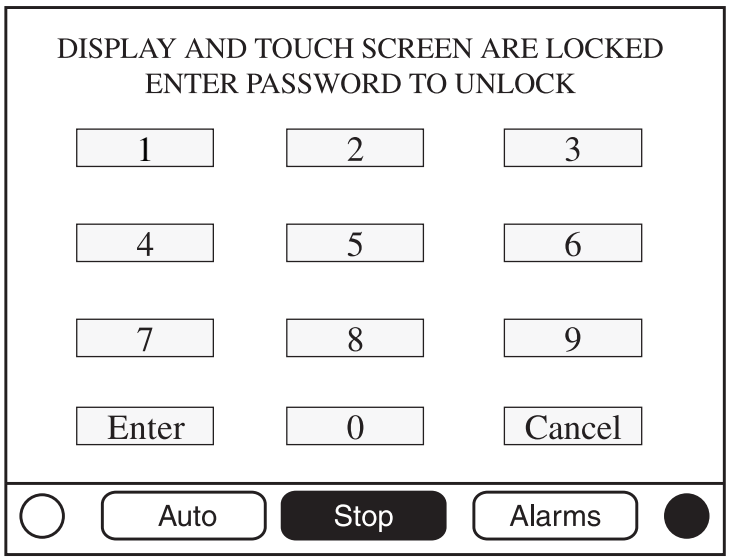
DynaView Interface

The bottom of the screen (7) is present in all screens and contains the following functions. The contrast (8,9) may require re-adjustment at ambient temperatures significantly different from those present at last adjustment. The other functions are critical to machine operation. The AUTO and STOP keys are used to enable or disable the chiller. The key selected is in black (reverse video). The chiller will stop when the STOP key is touched and after completing the Run Unload mode.

Touching the AUTO key will enable the chiller if no diagnostic is present. (A separate action must be taken to clear active diagnostics.) The AUTO and STOP keys take precedence over the Enter and Cancel keys. (While a setting is being changed, AUTO and STOP keys are recognized even if Enter or Cancel has not been pressed.) The ALARMS button appears only when an alarm is present, and blinks (by alternating between normal and reverse video) to draw attention to a diagnostic condition. Pressing the ALARMS button takes you to the corresponding tab for additional information.

Note: screens may differ according to unit type or configuration. They should be considered as examples.

Figure 6 - Keypad



Keypad/Display Lockout Feature

Note: *The DynaView display and Touch Screen Lock screen is shown above. This screen is used if the Display and touch screen and lock feature is enabled. Thirty minutes after the last keystroke, this screen is displayed and the Display and Touch Screen is locked out until the sequence "159 <ENTER>" is pressed.* Until the proper password is entered, there will be no access to the DynaView screens including all reports, setpoints, and Auto/Stop/Alarms/Interlocks. The password "159" can not be changed from either DynaView or TechView.

For setting changes, use the password "314 <ENTER>".

System/Circuit Selection Buttons

On some report and setting screens, radio buttons on the top of the screen shall be presented to allow the user to select subscreens based on system-level data and per-circuit data.

For single-circuit units with system/circuit selection buttons, the buttons shall be labeled (in English) “System” and “Ckt”. For two-circuit units with system/circuit selection buttons, the buttons shall be labeled “System”, “Ckt1”, and “Ckt2”.

DynaView Interface

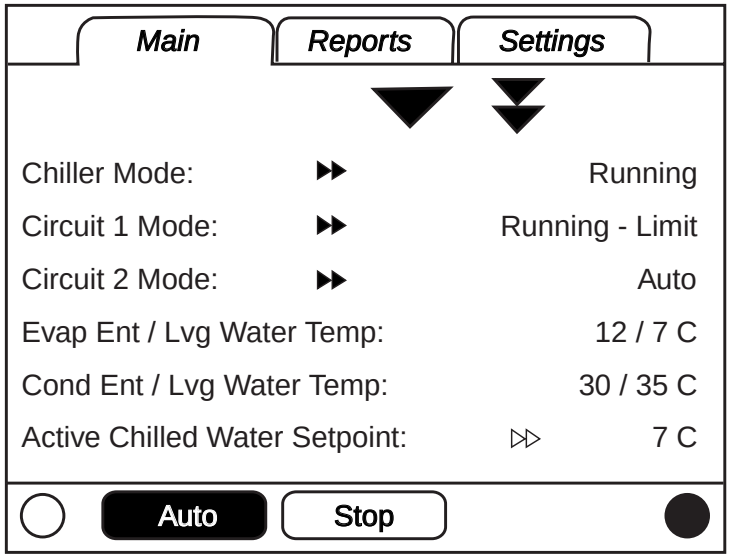
Main Screens

The Main screen is a “dashboard” of the chiller. High level status information is presented so that a user can quickly understand the mode of operation of the chiller.

The Chiller Operating Mode will present a top level indication of the chiller mode (i.e. Auto, Running, Inhibit, Run Inhibit, etc.) The “additional info” icon will present a subscreen that lists in further detail the subsystem modes.

The Main screen shall be the default screen. After an idle time of 30 minutes the CH530 shall display the Main screen with the first data fields. The remaining items (listed in the following table) will be viewed by selecting the up/down arrow icons.

Figure 7 - Main screen



DynaView Interface

Table 1 - Main Screen Data Fields Table

Description		Units	Resolution	Dependencies
1.	Chiller Mode (>> submodes)	enumeration		
2.	Circuit 1 Mode (>> submodes)	enumeration		
3.	Circuit 2 Mode (>> submodes)	enumeration		
4.	Evap Ent/Lvg Water Temp	F / C	0.1	
5.	Cond Ent/Lvg Water Temp	F / C	0.1	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
6.	Active Chilled Water Setpoint (>>source) (>> front panel setpoint) - from arbitration setpoint screen	F / C	0.1	
7.	Active Hot Water Setpoint (>>source) (>> front panel setpoint) - from arbitration setpoint screen	F / C	0.1	Hot Water Option installed only
8.	Average Line Current	%RLA	1	
9.	Active Current Limit Setpoint (>> source) (>> front panel setpoint) - from arbitration setpoint screen	% RLA	1	
10. 11.	Active Ice Termination Setpoint (>>front panel setpoint)	F / C	0.1	If Ice Building Option is installed
12.	Outdoor Air Temperature	F / C	0.1	Only if OA sensor is installed
13.	Software Type	enumeration	RTWD / RTUD	
14.	Software Version		X.XX	

Chiller Mode

The machine-operating mode indicates the operational status of the chiller. A subscreen with additional mode summary information will be provided by selection of an additional information icon (>>). The operating mode line will remain stationary while the remaining status items scroll with the up/down arrow keys.

Active Chilled Water Setpoint and Active Hot Water Setpoint

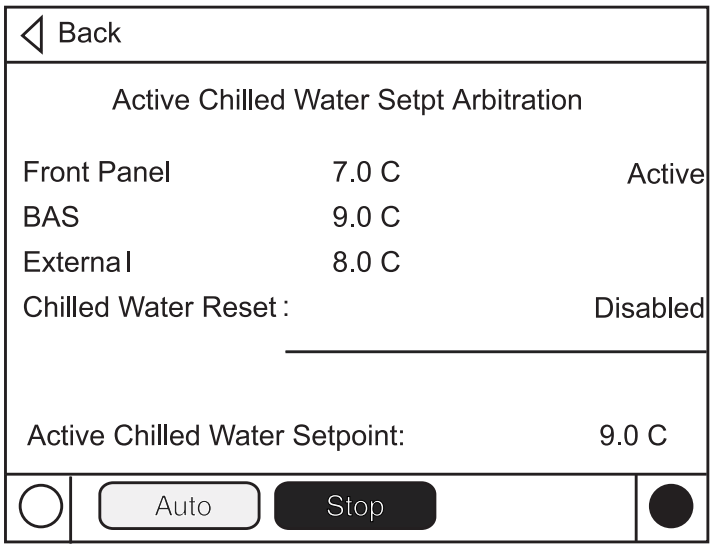
The active chilled water setpoint is the setpoint that is used in cool mode. The active hot water setpoint is the setpoint that is used in heat mode. Both setpoints result from the logical hierarchy of setpoint arbitration by the main processor. The water setpoint will be displayed to 0.1 degrees Fahrenheit or Celsius.

Touching the double arrow to the left of the Active Chilled Water Setpoint or to the left of the Active Hot Water Setpoint will take the user to the respective active water setpoint arbitration sub-screen.

Active Water Setpoint Arbitration Subscreen

The active water setpoint is that setpoint to which the unit is currently controlling. It is the result of arbitration between the front panel, BAS, and external setpoints. The active chilled water water setpoint may also be subjected to a form of chilled water reset.

Figure 8 - Active Chilled Water Subscreen



DynaView Interface

Other Active Setpoints

The Active Current Limit Setpoint will behave the same way as the Active Chilled Water Setpoint, with the exception that Active Current Limit Setpoint does not have an external source.

DynaView Interface

Chiller Operating Mode

The machine-operating mode indicates the operational status of the chiller. A subscreen with additional mode summary information will be provided by selection of an additional information icon (>>). The operating mode line will remain stationary while the remaining status items scroll with the up/down arrow keys.

Table 2 - Main screen menu, Chiller Operating Modes - Top Level

Chiller Level Mode	
Top Level Mode	**Description**
Stopped	The chiller is not running either circuit, and cannot run without intervention.
Stopped Sub Modes	**Description**
Local Stop	Chiller is stopped by the DynaView Stop button command- cannot be remotely overridden.
Immediate Stop	Chiller is stopped by the DynaView Immediate Stop (by pressing the Stop then Immediate Stop buttons in succession) - previous shutdown was manually commanded to shutdown immediately.
No Circuits Available	The entire chiller is stopped by circuit diagnostics or lockouts that may automatically clear.
Diagnostic Shutdown - Manual Reset	The chiller is stopped by a diagnostic that requires manual intervention to reset.
Cond Pmp Strt Dly (Head Pres Ctrl) min:sec	Only possible when Condenser Head Pressure Control option is enabled and the condenser pump is being manually commanded to run - this wait may be necessary due to the Head Pressure control device's stroke time.

Chiller Level Mode	
Top Level Mode	**Description**
Run Inhibit	The chiller is currently being inhibited from starting (and running), but may be allowed to start if the inhibiting or diagnostic condition is cleared.
Run Inhibit Sub Modes	**Description**
No Circuits Available	The entire chiller is stopped by circuit diagnostics or lockouts that may automatically clear.
Ice Building Is Complete	The chiller is inhibited from running as the Ice Building process has been normally terminated on the evaporator entering temperature. The chiller will not start unless the ice building command (hardwired input or Building Automation System command) is removed or cycled.
Ice to Normal Transition	The chiller is inhibited from running for a brief period of time if it is commanded from active ice building mode into normal cooling mode via the ice building hardwired input or Tracer. This allows time for the external system load to "switchover" from an ice bank to the chilled water loop, and provides for a controlled pull down of the loop's warmer temperature. This mode is not seen if the ice making is automatically terminated on return brine temperature per the mode below.
Start(ing is)* Inhibited by BAS (Building Automation System)*	Chiller is stopped by Tracer or other BAS system.
Start(ing is)* Inhibited by External Source	The chiller is inhibited from starting or running by the "external stop" hardwired input.
Diagnostic Shutdown - Auto Reset	The entire chiller is stopped by a diagnostic that may automatically clear.
Waiting for BAS Communications (to Establish Operating Status)*	The chiller is inhibited because of lack of communication with the BAS. This is only valid 15 minutes after power up.
Start(ing is)* Inhibited by Low Ambient Temp(erature)*	The chiller is inhibited based on the outdoor air temperature.
Start(ing is)* Inhibited by Local Schedule	The chiller is inhibited from starting based on the local time of day scheduling (option)

DynaView Interface

Chiller Level Mode	
Top Level Mode	**Description**
Auto	The chiller is not currently running but can be expected to start at any moment given that the proper conditions and interlocks are satisfied.
Auto Sub Modes	**Description**
Waiting For Evap(orator)* Water Flow	The unit will wait up to 20 minutes in this mode for water flow to be established per the flow switch hardwired input.
Waiting For A Need To Cool	The chiller will wait indefinitely in this mode, for a leaving water temperature higher than the Chilled Water Setpoint plus some control dead-band.
Waiting For A Need To Heat	The chiller will wait indefinitely in this mode, for a leaving water temperature lower than the Hot Water Setpoint plus some control dead-band.
Power Up Delay Inhibit: min:sec	On Power up, the chiller will wait for the Power Up Delay Timer to expire.

Chiller Level Mode	
Top Level Mode	**Description**
Waiting to Start	The chiller is not currently running and there is a call for cooling but the lead circuit start is delayed by certain interlocks or proofs. Further information is provided by the sub-mode:
Waiting to Start Sub Modes	**Description**
Waiting For Condenser Water Flow	The chiller will wait up to 4 minutes in this mode for condenser water flow to be established per the flow switch hardwired input.
Cond Water Pump PreRun Time min:sec	The chiller will wait up to 30 minutes (user adjustable) in this mode for to allow the condenser water loop to equalize in temperature
Cond Pmp Strt Dly (Head Pres Ctrl) min:sec	Only possible when Condenser Head Pressure Control option is enabled, this wait may be necessary due to the Head Pressure control device's stroke time.
Cprsr Strt Delay (Head Pres Ctrl) min:sec	Only possible when Condenser Head Pressure Control option is enabled, this wait may be necessary due to the Head Pressure control device's stroke time

Chiller Level Mode	
Top Level Mode	**Description**
Running	At least one circuit on the chiller is currently running.
Running Sub Modes	**Description**
Maximum Capacity	The chiller is operating at its maximum capacity.
Capacity Control Softloading	The control is limiting the chiller loading due to capacity based softloading setpoints.
Current Control Softloading	The chiller is running, and loading of individual compressors may be limited by a gradual filter of the chiller's softloading current limit setpoint. The starting current limit and the settling time of this filter is user adjustable as part of the current control softload feature. The mode will be displayed as long as the Current Control Softloading limit is ramping or "settling".

Chiller Level Mode	
Top Level Mode	**Description**
Running - Limit	At least one circuit on the chiller is currently running, but the operation of any of the circuits on the chiller is being actively limited by a chiller level limit. Other sub modes that apply to the Chiller Running top level modes may also be displayed here. Refer to the list of circuit limit modes for circuit limits that will cause display of this Chiller Level Running Limit mode.
Running - Limit Sub Modes	**Description**
<none applicable>	Design Note: Hot Start Limit is applied and annunciated at a circuit level, even though it is based on the chiller's leaving water temperature.

DynaView Interface

Chiller Level Mode	
Top Level Mode	**Description**
Shutting Down	The chiller is still running but shutdown is imminent. The chiller is going through a compressor run-unload or extended operational pumpdown of the lag circuit/compressor (or all circuits simultaneously).
Shutting Down Sub Modes	**Description**
Operational Pumpdown	The lag circuit (or all circuits) is in the process shutting down by performing an operational pumpdown just prior to stopping the circuit's compressor. The EXV is commanded closed. Pumpdown will terminate when both the liquid level and the evap pressure are low (below specific criteria) or after a specific time has expired.
Evaporator Water Pump Off Delay: MIN:SEC	The Evaporator water pump is continuing to run past the shutdown of the compressors, executing the pump off delay timer.
Cond Water Pump Off Delay: MIN:SEC	The Condenser water pump is continuing to run past the shutdown of the compressors, executing the pump off delay timer.

Chiller Level Mode	
Top Level Mode	**Description**
Misc.	These sub modes may be displayed in most of the top level chiller modes
Misc. Sub Modes	**Description**
Manual Evap(orator)* Water Pump Override	The Evaporator water pump relay is on due to a manual command.
Diagnostic Evap Water Pump Override	The Evaporator water pump relay is on due to a diagnostic.
Diagnostic Cond Water Pump Override	The Condenser water pump relay is on due to a diagnostic.
Local Schedule Active	The local time of day scheduler (option) is operational and could automatically change modes or setpoints as scheduled
Manual Condenser Water Pump Override	The condenser water pump relay is on due to a manual command.
Manual Compressor Control Signal	Chiller capacity control is being controlled by DynaView or TechView.
Night Noise Setback	The Night Noise Setback feature has been activated. If the unit is running, fans will be running at low speed.
Hot Water Control	These modes are mutually exclusive and they indicate that the chiller is controlling to the active hot water setpoint, the active chilled water setpoint, or the active ice termination setpoint respectively.
Chilled Water Control	
Ice Building	

DynaView Interface

Table 2 - Circuit Level Operating Modes

Circuit Level Mode	
Top Level Mode	**Description**
Stopped	The circuit is not running, and cannot run without intervention.
Stopped Sub Modes	**Description**
Diagnostic Shutdown - Manual Reset	The circuit has been shutdown on a latching diagnostic.
Front Panel Circuit Lockout	The circuit is manually locked out by the circuit lockout setting - the nonvolatile lockout setting is accessible through either the DynaView or TechView.
External Circuit Lockout	The respective circuit is locked out by the external circuit lockout binary input.
Circuit Level Mode	
Top Level Mode	**Description**
Run Inhibit	The given circuit is currently being inhibited from starting (and running), but may be allowed to start if the inhibiting or diagnostic condition is cleared.
Run Inhibit Sub Modes	**Description**
Diagnostic Shutdown - Auto Reset	The circuit has been shutdown on a diagnostic that may clear automatically.
Low Oil Flow Cool Down Time mn:sc	The cool-down period is necessary to allow the compressor rotors to cool after starts.
Restart Inhibit min:sec	The compressor (and therefore, its circuit) is currently unable to start due to its restart inhibit timer. A given compressor is not allowed to start until 5 minutes (adj) has expired since its last start, once a number of "free starts" have been used up.
Circuit Level Mode	
Top Level Mode	**Description**
Auto	The circuit is not currently running but can be expected to start at any moment given that the proper conditions are satisfied.
Auto Sub Modes	**Description**
Calibrating EXV	This submode is displayed when the EXV is performing a calibration. A calibration is only performed when the chiller is not running and never more frequently than once every 24 hours
Circuit Level Mode	
Top Level Mode	**Description**
Waiting to Start	The chiller is going through the necessary steps to allow the lead circuit to start.
Waiting to Start Sub Modes	**Description**
Start Inhibited Waiting For Oil	The compressor (and thus its circuit) will wait up to 2 minutes in this mode for oil level to appear in the oil tank.
Waiting For EXV Preposition	The Chiller will wait for the time it takes the EXV to get to its commanded pre-position prior to starting the compressor. This is typically a relatively short delay and no countdown timer is necessary (less than 15 seconds)

DynaView Interface

Circuit Level Mode	
Top Level Mode	**Description**
Running	The compressor on the given circuit is currently running.
Running Sub Modes	**Description**
Establishing Min(imum)* Cap(acity)* - Low Diff(errential)* Pressure	The circuit is experiencing low system differential pressure and its compressor is being force loaded, irregardless Chilled Water Temperature Control, to develop pressure sooner.
Establishing Min Cap - High Disch Temp	The circuit is running with high discharge temperatures and its compressor is being forced loaded to its step load point, without regard to the leaving water temperature control, to prevent tripping on high compressor discharge temperature.
The following modes annunciations have not been implemented as a display but are actually operational in the EXV liquid level control algorithm. The modes included here as possible future annunciated modes	
EXV Controlling Differential Pressure	Liquid level control of the Electronic Expansion Valve has temporarily been suspended. The EXV is being modulated to control for a minimum differential pressure. This control implies low liquid levels and higher approach temperatures, but only as is necessary to provide minimum oil flow for the compressor until the condenser water loop can warm up to approx 50F. (Future mode display - display of mode not implemented in Phase 1 or 2 although present in algorithms.)
EXV Controlling for Low Evaporator Pressure	Liquid level control of the Electronic Expansion Valve has temporarily been suspended. The EXV is being modulated to control for a minimum evaporator pressure that is based of the pressure of the Low Refrigerant Temperature Cutout. This control will tend to increase the liquid level above the setpoint or to open the valve more quickly than liquid level control can, in order to avoid an LRTC trip. It is most often invoked transiently to help open the EXV in the event of rapidly falling liquid level and rapidly declining evaporator pressures. (Future Mode display, - display of mode not implemented in Phase 1 or 2 although present in algorithms.)
Circuit Level Mode	
Top Level Mode	**Description**
Running - Limit	The circuit, and compressor are currently running, but the operation of the chiller/compressor is being actively limited by the controls. Further information is provided by the sub-mode.* See the section below regarding criteria for annunciation of limit modes
Running - Limit Sub Modes	**Description**
Current Limit	The compressor is running and its capacity is being limited by high currents. The current limit setting is 120% RLA (to avoid overcurrent trips) or lower as set by the compressor's "share" of the active current limit (demand limit) setting for the entire chiller.*
High Condenser Pressure Limit	The circuit is experiencing condenser pressures at or near the condenser limit setting. Compressors on the circuit will be unloaded to prevent exceeding the limits.*
Low Evaporator Rfgt Temperature Limit	The circuit is experiencing saturated evaporator temperatures at or near the Low Refrigerant Temperature Cutout setting. Compressors on the circuit will be unloaded to prevent tripping. *
Hot Start Limit	This mode will occur if the leaving evaporator water temperature exceeds 75F (for SW version 6.30 and earlier) or 90 F (for software 7.01 and later) at the point at which the step load for the respective circuit would be desired. This is often the case in a high water temperature pulldown. While in this mode, no compressor on the circuit will be allowed to load past its minimum load capacity step, but it will not inhibit other compressors from staging on. This mode is necessary to prevent nuisance trips due to Compressor Overcurrent or High Pressure Cutout. Reasonable pulldown rates can still be expected despite this limit, since the compressor's capacity even at partial load is much greater at high suction temperatures.

DynaView Interface

Circuit Level Mode	
Top Level Mode	**Description**
Shutting Down	The circuit is preparing to de-energize the compressor.
Preparing Shutdown Sub Modes	**Description**
Operational Pumpdown	The circuit is in the process shutting down by performing an operational pumpdown just prior to stopping the last running compressor. The EXV is commanded closed. Pumpdown will terminate when both the liquid level and the evap pressure are low (below specific criteria) or after a specific time has expired.
Compressor Unloading: MIN:SEC	The compressor is in its run unload time. The number of seconds remaining in run unload is shown in the submode. The run unload time must expire before the compressor will shut down.
Circuit Level Mode	
Top Level Mode	**Description**
Misc.	These sub modes may be displayed in most of the top level circuit modes
Misc. Sub Modes	**Description**
Service Pumpdown	The circuit is currently performing a service pumpdown.
Restart Time Inhibit: MIN:SEC	If there is accumulated Restart Inhibit Time, it must expire before a compressor is allowed to start.

* Mode text strings in parenthesis for TechView display only - available space for DynaView text strings is limited.

DynaView Interface

Reports Screen

The Reports tab will allow a user to select from a list of possible reports headings (i.e. Custom, ASHRAE Guideline 3, Refrigerant, etc.).

Each report will generate a list of status items as defined in the following tables.

Figure 9 - Reports screen

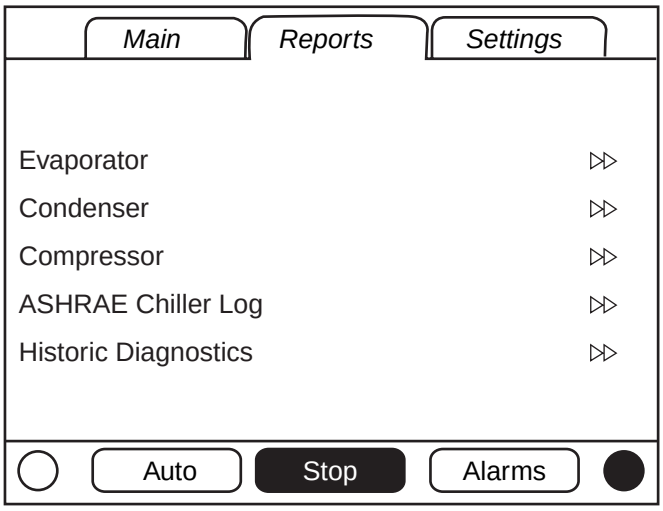


Table 3- Reports Screen

Report Menu
Description
1. Evaporator
2. Condenser
3. Compressor
4. ASHRAE Chiller Log
5. Historic Diagnostics

Report name: System Evaporator			
<| Back System Ckt1 Ckt2			
<scroll up/down buttons>			
Description	**Resolution**	**Units**	**Dependencies**
1. Evap Entering Water Temperature	+ XXX.X	Temperature	
2. Evap Leaving Water Temperature	+ XXX.X	Temperature	
3. Evap Water Flow Switch Status	(Flow, No Flow)	Enum	

Report name: Circuit Evaporator			
<| Back System Ckt1 Ckt2			
<scroll up/down buttons>			
Description	**Resolution**	**Units**	**Dependencies**
1. Evap Entering Water Temperature	+ XXX.X	Temperature	
2. Evap Leaving Water Temperature	+ XXX.X	Temperature	
3. Evap Sat Rfgt Temp	+ XXX.X	Temperature	
4. Suction Pressure	XXX.X	Pressure	
5. Evap Approach Temp	+ XXX.X	Temperature	
6. Evap Water Flow Switch Status	(Flow, No Flow)	Enum	
7. Expansion Valve Position	XXX.X	Percent	
8. Expansion Valve Position Steps	XXXX	Steps	
9. Evaporator Liquid Level	XX.X	Height	

DynaView Interface

Report name: System Condenser			
<| Back System Ckt1 Ckt2			
<scroll up/down buttons>			
Description	**Resolution**	**Units**	**Dependencies**
1. Cond Entering Water Temp	+ XXX.X	Temperature	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
2. Cond Leaving Water Temp	+ XXX.X	Temperature	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
3. Cond Water Flow Switch Status	(Flow, No Flow)	Enum	Water Cooled only (i.e. RTWD or RTUD with ACFC=None))
4. Outdoor Air Temperature	+ XXX.X	Temperature	Only if OA sensor is installed
5. Cond Head Pressure Ctrl Command	XXX	%	Only if Cond Head pressure control option is installed
Report name: Circuit Condenser			
<| Back System Ckt1 Ckt2			
<scroll up/down buttons>			
Description	**Resolution**	**Units**	**Dependencies**
1. Cond Entering Water Temp	+ XXX.X	Temperature	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
2. Cond Leaving Water Temp	+ XXX.X	Temperature	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
3. Condenser Air Flow	XXX	%	Air Cooled (i.e RTUD with ACFC=INT)
4. Cond Inverter Speed	XXX	%	Air Cooled with Low Ambient Var Spd fan (i.e RTUD with ACFC<>None and with LAFC = VARA or VARP)
5. Outdoor Air Temperature	+ XXX.X	Temperature	Only if OA sensor is installed
6. Cond Water Flow Switch Status	(Flow, No Flow)	Enum	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
7. Cond Sat Rfgt Temp	+ XXX.X	Temperature	
8. Cond Rfgt Pressure	XXX.X	Pressure	
9. Differential Pressure	XXX.X	Pressure	
10. Cond Approach Temp	+ XXX.X	Temperature	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
Report name: System Compressor			
<| Back System Ckt1 Ckt2			
<scroll up/down buttons>			
Description	**Resolution**	**Units**	**Dependencies**
1. Average Line Current	XXX	%RLA	
2. Unit Volts	XXX	Volts	
3. Unit Running Time	XXXX:XX	hr:min	
4. Power Demand		kW	Only if pwr meter option installed
5. Power Demand Time Period		min	Only if pwr meter option installed
6. Energy Consump-Resettable		kWh	Only if pwr meter option installed
7. Time of Last Reset		time-date	Only if pwr meter option installed
8. Energy Consump-NonReset		Kwh	Only if pwr meter option installed

DynaView Interface

Report name: Circuit Compressor			
<| Back System Ckt1 Ckt2			
<scroll up/down buttons>			
Description	**Resolution**	**Units**	**Dependencies**
1. Oil Pressure	XXX.X	Pressure	
2. Compressor Rfgt Dschg Temp	+ XXX.X	Temperature	
3. Cond Sat Rfgt Temp	+ XXX.X	Temperature	
4. Average Line Current	XXX	%RLA	
5. % RLA L1 L2 L3	XXX.X	%RLA	
6. Amps L1 L2 L3	XXX.X	Amps	
7. Phase Voltages	XXX	Vac	Only if pwr meter option installed
8. Power Consumption	XXX	kW	Only if pwr meter option installed
9. Load Power Factor	X.XXX		Only if pwr meter option installed
10. Compressor Starts:	XXXX	Integer	
11. Compressor Running Time:	XXXX:XX	hr:min	
Report name: System ASHRAE Chiller Log			
<| Back System Ckt1 Ckt2			
<scroll up/down buttons>			
Description	**Resolution**	**Units**	**Dependencies**
1. Current Time/Date	XX:XX mmm dd, yyyy	Time / Date	
2. Chiller Mode		Enum	
3. Active Chilled Water Setpoint	XXX.X	Temperature	
4. Active Hot Water Setpoint	XXX.X	Temperature	Hot Water Option installed only
5. Evap Entering Water Temperature	XXX.X	Temperature	
6. Evap Leaving Water Temperature	XXX.X	Temperature	
7. Average Leaving Water Temp	XXX.X	Temperature	
8. Evap Water Flow Switch Status		Enum	
9. Outdoor Air Temperature	XXX.X	Temperature	Only if OA sensor is installed
Report name: Circuit ASHRAE Chiller Log			
<| Back System Ckt1 Ckt2			
<scroll up/down buttons>			
Description	**Resolution**	**Units**	**Dependencies**
1. Circuit Mode		Enum	
2. Evap Sat Rfgt Temp	XXX.X	Temperature	
3. Suction Pressure	XXX.X	Pressure	
4. Evap Approach Temp	XXX.X	Temperature	
5. Cond Sat Rfgt Temp	XXX.X	Temperature	
6. Cond Rfgt Pressure	XXX.X	Pressure	
7. Cond Approach Temp	XXX.X	Temperature	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
8. Compressor Starts	XXXX	Integer	
9. Compressor Running Time	XX:XX	Hours:Minute	

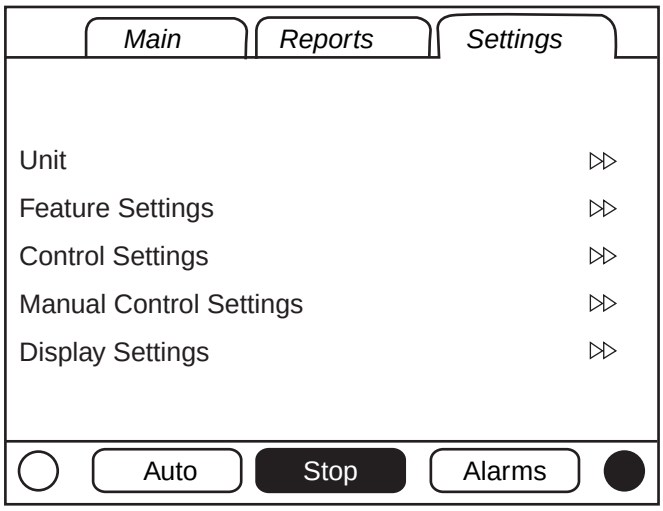
Items 1 - 9 will be unique for each circuit, ckt1, and ckt2.

DynaView Interface

Settings Screen

The Settings screen provides a user the ability to adjust settings justified to support daily tasks. The layout provides a list of sub-menus, organized by typical subsystem. This organization allows each subscreen to be shorter in length which should improve the users navigation.

Figure 10 - Settings screen



Settings Menu

Description
1. Chiller
2. Feature Settings
3. Manual Control Settings
4. Display Settings

DynaView Interface

Chiller		
Description	**Resolution or (Enumerations), Default**	**Units**
1. Front Panel Cool/Heat Command	(Cool, Heat), Cool	Enum
2. Front Panel Chilled Water Setpt	(2) + XXX.X	Temperature
3. Front Panel Hot Water Setpt	(2) + XXX.X	Temperature
4. Front Panel Current Limit Setpt	1	%RLA
5. Front Panel Ice Build Cmd	On/Auto	Enum
6. Front Panel Ice Termination Setpoint	XXX.X	Temperature
7. Setpoint Source	(BAS/Ext/FP, Ext/ Front Panel, Front Panel), BAS/Ext/FP	Enum
8. Leaving Water Temp Cutout	XX.X	Temperature
9. Low Refrigerant Temp Cutout	XX.X	Temperature
10. Staging Sequence	(Bal Starts/Hrs, Fixed), Bal Starts/Hrs	Enum
11. Condenser Pump Prestart Time	XX , 0	minutes
Feature Settings		
Note: Purple Box Designates Phase 2 Air Cooled RTUD items.		
Description	**Resolution or (Enumerations), Default**	**Units**
1. Cooling Low Ambient Lockout	(Enable, Disable), Enable	Enum
1a. Cooling Low Ambient Lockout	(Enable, Disable), Enable	Enum
1b. Cooling Low Amb Lockout Setpt	XXX.X	Temperature
2. Noise Setback Command	(Auto, On, Schedule), Auto	Enum
3. Ice Building	(Enable, Disable), Disable	Enum
4. Ext Chilled/Hot Water Setpt	(Enable, Disable), Disable	Enum
5. Ext Current Limit Setpoint	(Enable, Disable), Disable	Enum
6 Chilled Water Reset	(Const Return, Outdoor, Return, Disable), Disable	
6a. Chilled Water Reset	(Const Return, Outdoor, Return, Disable), Disable	Enum
6b. Return Reset Ratio	XXX	Percent
6c. Return Start Reset	XXX.X	Temperature
6d. Return Maximum Reset	XXX.X	Temperature
6e. Outdoor Reset Ratio	XXX	Percent
6f. Outdoor Start Reset	XXX.X	Temperature
6g. Outdoor Maximum Reset	XXX.X	Temperature
7. LCI-C Diag Language	(English, Selection 2, Selection 3) English (0)	Enum
8. LCI-C Diag Encoding	(Text, Code) Text	Enum

Items 1 and 6 are top level. If user presses this line another screen opens to allow user to change relevant setpoints.
Items 7 and 8 are present if comm5 LCI-C option is installed.

DynaView Interface

System Manual Control Settings				
<| Back System Ckt1 Ckt2				
<scroll up/down buttons>				
Description	**Resolution or (Enumerations), Default**	**Units**	**Monitor Value**	**Dependency**
1. Evap Water Pump	(Auto, On), Auto (6)	Enum	1) Water Flow status	
1.a.Evap Water Pump	<Auto / On Buttons>		2) Override Time Remaining	
2. Cond Water Pump	(Auto, On), Auto (6)	Enum	1) Water Flow status	Water Cooled only (i.e. RTWD or RTUD with ACFC=None)
2.a. Cond Water Pump	<Auto / On Buttons>		2) Override Time Remaining	
3. Head Pressure Control	(Auto, Manual), Auto (7)	Enum	1) Override status - Auto/Manual	Only if Cond Head pressure control option is installed
3.a. Head Pressure Control	<Auto / Manual Buttons> (7)			
4. Staging/Stepping Control	(Auto, Manual), Auto (7)	Enum	Only if Cond Head pressure control option is installed	
4.a. Staging/Stepping Control	<Auto / Manual Buttons> (7)			
5. Capacity Modulation Control	(Auto, Manual), Auto (7)	Enum	Only if Cond Head pressure control option is installed	
5a. Capacity Modulation Control	<Auto / Manual Buttons> (7)			
6. Clear Energy Consumption	1) Resettable Energy consumption totalization (kWh)	Enum	1) Resettable Energy consumption totalization (kWh)	Only if Energy Meter option is installed
6.a. Clear Energy Consumption	<Clear Button>			

Circuit Manual Control Settings			
Description	**Resolution or (Enumerations), Default**	**Units**	**Monitor Value**
1. Compressor Pumpdown	(Continue, Not Available)	Enum	1) Override status: NotAvailable / Continue / Starting / Pumpdown
1.a. Compressor Pumpdown	<Pumpdown / Abort Buttons> (8)		2) Suction Pressure
2. Front Panel Ckt Lockout	(Not Locked Out, Locked Out), Not Locked Out	Enum	
2.a. Front Panel Ckt Lockout	<Not Locked Out / Locked Out Buttons>		
3. Expansion Valve Control	(Auto, Manual)	Enum	
3.a. Expansion Valve Control	<Auto / Manual Buttons> (7)		

DynaView Interface

1.1.1 Display Settings		
Description	**Resolution or (Enumerations), Default**	**Units**
1. Date Format	("mmm dd, yyy", "dd-mmm-yyyy"), "mmm dd, yyy"	Enum
2. Date	(4)	
3. Time Format	(12-hour, 24-hour), 12-hour	Enum
4. Time of Day	(4)	
5. Keypad/Display Lockout	(Enable, Disable), Disable (3)	Enum
6. Display Units	(SI, English), SI	Enum
7. Pressure Units	(Absolute, Gauge), Gauge	Enum
8. Language (5)	(English, Selection 2, Selection 3), English (1)	Enum

(1) Language choices are dependent on what the Service Tool has setup in the Main Processor. Get Radio Button names from Main Processor setups. Language selections will include English and qty 2 alternate as loaded by TechView.
(2) Temperatures will be adjustable to 0.1 deg F or C. The Main Processor will provide the minimum and maximum allowable value.
(3) Enables a DynaView Lockout screen. All other screens timeout in 30 minutes to this screen. The DynaView Lockout Screen will have 0-9 keypad to permit the user to re-enter the other DynaView screens with a fixed password. See below for further details.
(4) The Date and Time setup screen formats deviate slightly from the standard screens defined above. See the alternate screen layouts below.
(5) Language shall always be the last setting listed on the Control Settings menu (which will also always be the last item listed on the Settings menu list). This will allow a user to easily find language selection if looking at an unrecognizable language.
(6) The pump on mode terminates after 60 minutes.
(7) These items cannot be set to "Manual" from the DynaView - The manual buttons on the Manual Control submode screen are hidden unless the particular item has been set to manual from the Service Tool - The auto button shall be operational to change the mode back to auto. The subscreen shall also display a note: "Manual not available from Front Panel - See Service Tool for Manual Mode"
(8) Buttons are displayed on this Manual Control submode screens depending on the pumpdown status:, when in "pumpdown", the abort button is shown, when "not available", no buttons shown, when "continue", pumpdown button is shown.

DynaView Interface

Auto, Stop/Immediate Stop

The AUTO and STOP keys are radio buttons within the persistent key display area. The selected key will be black.

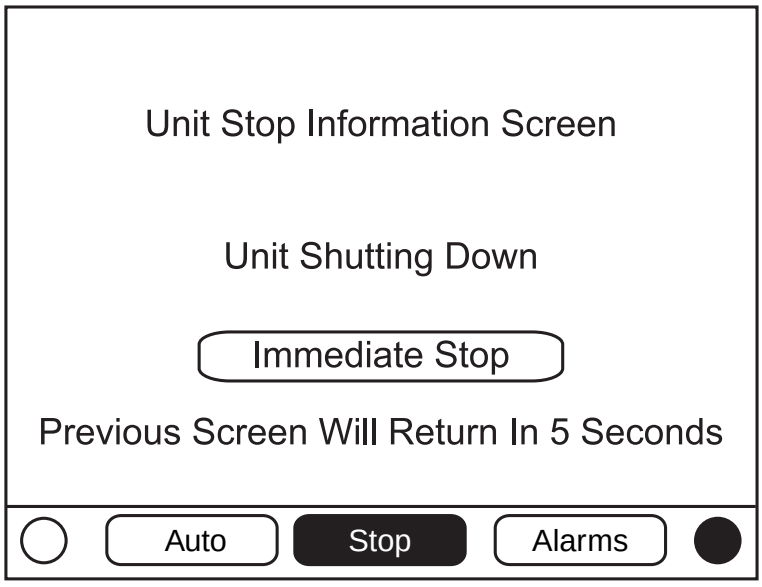
The chiller will stop when the STOP key is touched, entering the Run Unload mode. An informational screen will be displayed for 5 seconds indicating that a second depression of an "Immediate Stop" key during this time period will result in an immediate/panic stop. Pressing the "Immediate Stop" key while the panic stop screen is displayed, will cause the unit to stop immediately, skipping operational pumpdown.

Touching the Auto key will arm the chiller for active cooling if no diagnostic is present. A separate action must be taken to clear active diagnostics.

The AUTO and STOP keys take precedence over the ENTER and CANCEL keys. While a setting is being changed, AUTO and STOP keys are recognized even if ENTER or CANCEL has not been pressed.

When an active diagnostic is present, an ALARMS key will be added to the persistent display area. This key is used to alert the operator that a diagnostic exists, or to provide navigation to a diagnostic display screen.

Figure 11



DynaView Interface

Diagnostics Screen

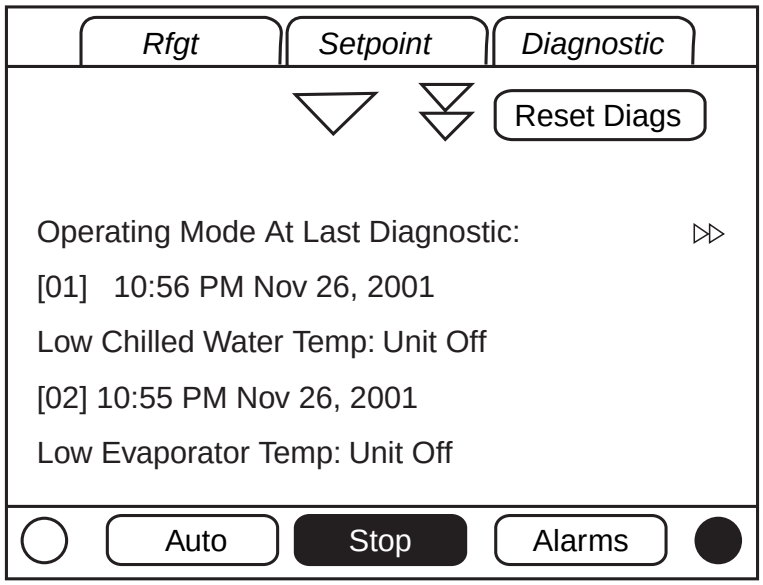
The diagnostic screen is accessible by depressing the Alarms enunciator. A verbal description will be provided. A scrollable list of the last (up to 10) active diagnostics will be presented.

Performing a Reset All Active Diagnostics will reset all active diagnostics regardless of type, machine or refrigerant circuit. Compressor diagnostics, which hold off only one compressor, will be treated as circuit diagnostics, consistent with the circuit to which they belong.

The scrollable list will be sorted by time of occurrence. If a diagnostic of severity = warning is present, the "Alarms" key will be present but not flashing. If a diagnostic of severity = shutdown (normal or immediate) is present, the "Alarm" key will display that is flashing. If no diagnostics exist, the "Alarm" key will not be present.

The "Operating Mode At Last Diagnostic" text above the most recent diagnostic will display a sub-screen listing the operating mode and submodes at the time of the last diagnostic.

Figure 12 - Diagnostics screen



Diagnostics

The following diagnostic table contains all the diagnostics possible. Not all data is available unless tech view is connected.

Code: Three digit hexadecimal code used on all past products to uniquely identify diagnostics.

Diagnostic Name: Name of Diagnostic and its source. Note that this is the exact text used in the User Interface and/or Service Tool displays.

Severity: Defines the severity of the above effect. Immediate means immediate shutdown of the effected portion, Normal means normal or friendly shutdown of the effected portion, Special Mode means a special mode of operation (limp along) is invoked, but without shutdown, and Info means an Informational Note or Warning is generated.

Persistence: Defines whether or not the diagnostic and its effects are to be manually reset (Latched), or can be either manually or automatically reset (Nonlatched).

Criteria: Quantitatively defines the criteria used in generating the diagnostic and, if nonlatching, the criteria for auto reset. If more explanation is necessary a hot link to the Functional Specification is used.

Reset Level: Defines the lowest level of manual diagnostic reset command which can clear the diagnostic. The manual diagnostic reset levels in order of priority are: Local and Remote. A diagnostic that has a reset level of Local, can only be reset by a local diagnostic reset command, but not by the lower priority remote Reset command whereas a diagnostic listed as Remote reset can be reset by either.

Affects Target itemized with an * asterisk: applied to many comm loss and starter module derived diagnostic targets, listed as circuit targeted diagnostics, but should be understood as "cprsr" targeted diagnostics.

Diagnostics

Table 4 - Main Processor Diagnostics

Diagnostic Name and Source	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Starter Did Not Transition - Compressor 1A	*Circuit	Immediate	Latch	On the first check after transition.	The Starter Module did not receive a transition complete signal in the designated time from its command to transition. The must hold time from the Starter Module transition command is 1 second. The Must trip time from the transition command is 6 seconds. Actual design is 2.5 seconds. This diagnostic is active only for Y-Delta, Auto-Transformer, Primary Reactor, and X-Line Starters.	Local
Starter Did Not Transition - Compressor 2A	*Circuit	Immediate	Latch	On the first check after transition.	The Starter Module did not receive a transition complete signal in the designated time from its command to transition. The must hold time from the Starter Module transition command is 1 second. The Must trip time from the transition command is 6 seconds. Actual design is 2.5 seconds. This diagnostic is active only for Y-Delta, Auto-Transformer, Primary Reactor, and X-Line Starters.	Local
Phase Reversal - Compressor 1A	*Circuit	Immediate	Latch	Compressor energized to transition command [All Other Times]	A phase reversal was detected on the incoming current. On a compressor startup the phase reversal logic must detect and trip in a maximum of .3 second from compressor start.	Local
Phase Reversal - Compressor 2A	*Circuit	Immediate	Latch	Compressor energized to transition command [All Other Times]	A phase reversal was detected on the incoming current. On a compressor startup the phase reversal logic must detect and trip in a maximum of .3 second from compressor start.	Local
Starter 1A Dry Run Test	*Circuit	Immediate	Latch	Starter Dry Run Mode	While in the Starter Dry Run Mode either 50 % Line Voltage was sensed at the Potential Transformers or 10 % RLA Current was sensed at the Current Transformers.	Local
Starter 2A Dry Run Test	*Circuit	Immediate	Latch	Starter Dry Run Mode	While in the Starter Dry Run Mode either 50 % Line Voltage was sensed at the Potential Transformers or 10 % RLA Current was sensed at the Current Transformers.	Local
Phase Loss - Compressor 1A	*Circuit	Immediate	Latch	Start Sequence and Run modes	a) No current was sensed on one or two of the current transformer inputs while running or starting (See Nonlatching Power Loss Diagnostic for all three phases lost while running). Must hold = 20% RLA. Must trip = 5% RLA. Time to trip shall be longer than guaranteed reset on Starter Module at a minimum, 3 seconds maximum. Actual design trippoint is 10%. The actual design trip time is 2.64 seconds. b) If Phase reversal protection is enabled and current is not sensed on one or more current xformer inputs. Logic will detect and trip in a maximum of 0.3 seconds from compressor start.	Local

Diagnostics

Diagnostic Name and Source	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Phase Loss - Compressor 2A	*Circuit	Immediate	Latch	Start Sequence and Run modes	a) No current was sensed on one or two of the current transformer inputs while running or starting (See Nonlatching Power Loss Diagnostic for all three phases lost while running). Must hold = 20% RLA. Must trip = 5% RLA. Time to trip shall be longer than guaranteed reset on Starter Module at a minimum, 3 seconds maximum. Actual design trippoint is 10%. The actual design trip time is 2.64 seconds. b) If Phase reversal protection is enabled and current is not sensed on one or more current xformer inputs. Logic will detect and trip in a maximum of 0.3 second from compressor start	Local
Power Loss - Compressor 1A	*Circuit	Immediate	NonLatch	All compressor running modes [all compressor starting and non-running modes]	The compressor had previously established currents while running and then all three phases of current were lost. Design: Less than 10% RLA, trip in 2.64 seconds. This diagnostic will preclude the Phase Loss Diagnostic and the Transition Complete Input Opened Diagnostic from being called out. To prevent this diagnostic from occurring with the intended disconnect of main power, the minimum time to trip must be greater than the guaranteed reset time of the Starter module. Note: This diagnostic prevents nuisance latching diagnostics due to a momentary power loss - It does not protect motor/compressor from uncontrolled power reapplication. See Momentary Power Loss Diagnostic for this protection. This diagnostic is not active during the start mode before the transition complete input is proven. Thus a random power loss during a start would result in either a "Starter Fault Type 3" or a "Starter Did Not Transition" latching diagnostic.	Remote
Power Loss - Compressor 2A	*Circuit	Immediate	NonLatch	All compressor running modes [all compressor starting and non-running modes]	The compressor had previously established currents while running and then all three phases of current were lost. Design: Less than 10% RLA, trip in 2.64 seconds. This diagnostic will preclude the Phase Loss Diagnostic and the Transition Complete Input Opened Diagnostic from being called out. To prevent this diagnostic from occurring with the intended disconnect of main power, the minimum time to trip must be greater than the guaranteed reset time of the Starter module.	Remote
Severe Current Imbalance - Compressor 1A	*Circuit	Immediate	Latch	All Running Modes	A 30% Current Imbalance has been detected on one phase relative to the average of all 3 phases for 90 continuous seconds.	Local
Severe Current Imbalance - Compressor 2A	*Circuit	Immediate	Latch	All Running Modes	A 30% Current Imbalance has been detected on one phase relative to the average of all 3 phases for 90 continuous seconds	Local
Starter Fault Type I - Compressor 1A	*Circuit	Immediate	Latch	Starting - Y Delta Starters Only	This is a specific starter test where 1M(1K1) is closed first and a check is made to ensure that there are no currents detected by the CT's. If currents are detected when only 1M is closed first at start, then one of the other contactors is shorted.	Local

Diagnostics

Diagnostic Name and Source	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Starter Fault Type I - Compressor 2A	*Circuit	Immediate	Latch	Starting - Y Delta Starters Only	This is a specific starter test where 1M(1K1) is closed first and a check is made to ensure that there are no currents detected by the CT's. If currents are detected when only 1M is closed first at start, then one of the other contactors is shorted.	Local
Starter Fault Type II - Compressor 1A	*Circuit	Immediate	Latch	Starting All types of starters	a. This is a specific starter test where the Shorting Contactor (1K3) is individually energized and a check is made to ensure that there are no currents detected by the CT's. If current is detected when only S is energized at Start, then 1M is shorted. b. This test in a. above applies to all forms of starters (Note: It is understood that many starters do not connect to the Shorting Contactor.).	Local
Starter Fault Type II - Compressor 2A	*Circuit	Immediate	Latch	Starting - All types of starters	a. This is a specific starter test where the Shorting Contactor (1K3) is individually energized and a check is made to ensure that there are no currents detected by the CT's. If current is detected when only S is energized at Start, then 1M is shorted. b. This test in a. above applies to all forms of starters (Note: It is understood that many starters do not connect to the Shorting Contactor.).	Local
Starter Fault Type III - Compressor 1A	*Circuit	Immediate	Latch	Starting [Adaptive Frequency Starter Type]	As part of the normal start sequence to apply power to the compressor, the Shorting Contactor (1K3) and then the Main Contactor (1K1) were energized. 1.6 seconds later there were no currents detected by the CT's for the last 1.2 Seconds on all three phases. The test above applies to all forms of starters except Adaptive Frequency Drives.	Local
Starter Fault Type III - Compressor 2A	*Circuit	Immediate	Latch	Starting [Adaptive Frequency Starter Type]	As part of the normal start sequence to apply power to the compressor, the Shorting Contactor (1K3) and then the Main Contactor (1K1) were energized. 1.6 seconds later there were no currents detected by the CT's for the last 1.2 seconds on all three phases. The test above applies to all forms of starters except Adaptive Frequency Drives.	Local
Compressor Did Not Accelerate: Transition - Compressor 1A	*Circuit	Info	Latch	Start Mode	The compressor did not come up to speed (fall to <85%RLA) in the allotted time defined by the Maximum Acceleration Timer and a transition was forced (motor put across the line) at that time. This applies to all starter types.	Remote
Compressor Did Not Accelerate: Transition - Compressor 2A	*Circuit	Info	Latch	Start Mode	The compressor did not come up to speed (fall to <85%RLA) in the allotted time defined by the Maximum Acceleration Timer and a transition was forced (motor put across the line) at that time. This applies to all starter types.	Remote
Transition Complete Input Shorted - Compressor 1A	*Circuit	Immediate	Latch	Pre-Start	The Transition Complete input was found to be shorted before the compressor was started. This is active for all electromechanical starters.	Local
Transition Complete Input Shorted - Compressor 2A	*Circuit	Immediate	Latch	Pre-Start	The Transition Complete input was found to be shorted before the compressor was started. This is active for all electromechanical starters.	Local

Diagnostics

Diagnostic Name and Source	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Transition Complete Input Opened - Compressor 1A	*Circuit	Immediate	Latch	All running modes	The Transition Complete input was found to be opened with the compressor motor running after a successful completion of transition. This is active only for Y-Delta, Auto-Transformer, Primary Reactor, and X-Line Starters. To prevent this diagnostic from occurring as the result of a power loss to the contactors, the minimum time to trip must be greater than the trip time for the power loss diagnostic.	Local
Transition Complete Input Opened - Compressor 2A	*Circuit	Immediate	Latch	All running modes	The Transition Complete input was found to be opened with the compressor motor running after a successful completion of transition. This is active only for Y-Delta, Auto-Transformer, Primary Reactor, and X-Line Starters. To prevent this diagnostic from occurring as the result of a power loss to the contactors, the minimum time to trip must be greater than the trip time for the power loss diagnostic.	Local
Motor Current Overload - Compressor 1A	Circuit	Immediate	Latch	Cprsr Energized	Compressor current exceeded overload time vs. trip characteristic. Must trip = 140% RLA, Must hold=125%, nominal trip 132.5% in 30 seconds	Local
Motor Current Overload - Compressor 2A	Circuit	Immediate	Latch	Cprsr Energized	Compressor current exceeded overload time vs. trip characteristic. Must trip = 140% RLA, Must hold=125%, nominal trip 132.5% in 30 seconds	Local
Starter Contactor Interrupt Failure - Compressor 1A	Chiller	Special Action	Latch	Starter Contactor not Energized [Starter Contactor Energized]	Detected compressor currents greater than 10% RLA on any or all phases when the compressor was commanded off. Detection time shall be 5 second minimum and 10 seconds maximum. On detection and until the controller is manually reset: generate diagnostic, energize the appropriate alarm relay, continue to energize the Evap Pump Output, continue to command the affected compressor off, fully unload the effected compressor and command a normal stop to all other compressors. For as long as current continues, perform liquid level, oil return, and fan control on the circuit effected.	Local
Starter Contactor Interrupt Failure - Compressor 2A	Chiller	Special Action	Latch	Starter Contactor not Energized [Starter Contactor Energized]	Detected compressor currents greater than 10% RLA on any or all phases when the compressor was commanded off. Detection time shall be 5 second minimum and 10 seconds maximum. On detection and until the controller is manually reset: generate diagnostic, energize the appropriate alarm relay, continue to energize the Evap Pump Output, continue to command the affected compressor off, fully unload the effected compressor and command a normal stop to all other compressors. For as long as current continues, perform liquid level, oir return, and fan control on the circuit effected.	Local
Over Voltage	Chiller	Normal	NonLatch	Pre-Start and Any Ckt(s) Energzd	Nom. trip: 60 seconds at greater than 112.5%, + 2.5%, Auto Reset at 110% or less for 10 cont secs.	Remote
Under Voltage	Chiller	Normal	NonLatch	Pre-Start and Any Ckt(s) Energzd	Nom. trip: 60 seconds at less than 87.5%, + 2.8% at 200V 1.8% at 575V, Auto Reset at 90% or greater for 10 cont secs.	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
MP: Reset Has Occurred	None	Info	NonLatch	All	The main processor has successfully come out of a reset and built its application. A reset may have been due to a power up, installing new software or configuration. This diagnostic is immediately and automatically cleared and thus can only be seen in the Historic Diagnostic List in TechView	Remote
Unexpected Starter Shutdown	Circuit	Normal	NonLatch	All Cprsr Running modes, Starting, Running and Preparing to Shutdown	The Starter module status reported back that it is stopped when the MP thinks it should be running and no Starter diagnostic exist. This diagnostic will be logged in the active buffer and then automatically cleared. This diagnostic could be caused by intermittent communication problems from the Starter to the MP, or due to misbinding.	NA
High Motor Winding Temperature - Compressor 1A	Circuit	Immediate	Latch	All	The respective compressor's motor winding thermostat is detected to be open	Local
High Motor Winding Temperature - Compressor 2A	Circuit	Immediate	Latch	All	The respective compressor's motor winding thermostat is detected to be open	Local
Low Evaporator Refrigerant Temperature - Circuit 1	Circuit	Immediate	Latch	All Ckt Running Modes	The inferred Saturated Evap Refrigerant Temperature (calculated from suction pressure transducer dropped below the Low Refrigerant Temperature Cutout Setpoint for 1125°F-sec (25°F-sec max rate) while the circuit was running. The minimum LRTC setpoint is -5°F (18.7 Psia) the point at which oil separates from the refrigerant. During the time that the trip integral is non zero, the unload solenoid(s) of the running compressors on the circuit, shall be energized continuously and the load solenoid shall be off. Normal load/unload operation will be resumed if the trip integral decays to zero by temps above the cutout setpoint. The integral is held nonvolatily though power down, is continuously calculated, and can decay during the circuit's off cycle as conditions warrant.	Remote
Low Evaporator Refrigerant Temperature - Circuit 2	Circuit	Immediate	Latch	All Ckt Running Modes	The inferred Saturated Evap Refrigerant Temperature (calculated from suction pressure transducer dropped below the Low Refrigerant Temperature Cutout Setpoint for 1125°F-sec (25°F-sec max rate) while the circuit was running. The minimum LRTC setpoint is -5°F (18.7 Psia) the point at which oil separates from the refrigerant. During the time that the trip integral is non zero, the unload solenoid(s) of the running compressors on the circuit, shall be energized continuously and the load solenoid shall be off. Normal load/unload operation will be resumed if the trip integral decays to zero by temps above the cutout setpoint. The integral is held nonvolatily though power down, is continuously calculated, and can decay during the circuit's off cycle as conditions warrant.	Remote

TRANE
Cooling and Heating Systems and Services

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Low Oil Flow - Compressor 1A	Circuit	Immediate	Latch	Cprsr Energized and Delta P above 15 Psid	The intermediate oil pressure transducer for this compressor was out of the acceptable pressure range for 15 seconds, while the Delta Pressure was greater than 15 Psid (172.4 kPa).: Acceptable range is 0.50 > $(P_C-P_I) / (P_C-P_E)$ for the first 2.5 minutes of operation, and 0.28 > $(P_C-P_I) / (P_C-P_E)$ thereafter.	Local
Low Oil Flow - Compressor 2A	Circuit	Immediate	Latch	Cprsr Energized and Delta P above 15 Psid	The intermediate oil pressure transducer for this compressor was out of the acceptable pressure range for 15 seconds, while the Delta Pressure was greater than 15 Psid (172.4 kPa).: Acceptable range is 0.50 > $(P_C-P_I) / (P_C-P_E)$ for the first 2.5 minutes of operation, and 0.28 > $(P_C-P_I) / (P_C-P_E)$ thereafter.	Local
Loss of Oil - Compressor 1A (Running)	Circuit	Immediate	Latch	Starter Contactor Energized	In running modes , Oil Loss Level Sensor detects lack of oil in the oil sump feeding the compressor (distinguishing a liquid flow from a vapor flow)	Local
Loss of Oil - Compressor 2A (Running)	Circuit	Immediate	Latch	Starter Contactor Energized	In running modes , Oil Loss Level Sensor detects lack of oil in the oil sump feeding the compressor (distinguishing a liquid flow from a vapor flow)	Local
Loss of Oil - Compressor 1A (Stopped)	Circuit	Immediate and Special Action	Latch	Compressor Pre-start [all other modes]	Oil Loss Level Sensor detects a lack of oil in the oil sump feeding the compressor for 90 seconds just prior to attempted compressor start. Note: Compressor start is delayed while waiting for oil to be detected, and compressor start is not allowed.	Local
Loss of Oil - Compressor 2A (Stopped)	Circuit	Immediate and Special Action	Latch	Compressor Pre-start [all other modes]	Oil Loss Level Sensor detects a lack of oil in the oil sump feeding the compressor for 90 seconds just prior to attempted compressor start. Note: Compressor start is delayed while waiting for oil to be detected, and compressor start is not allowed.	Local
No Differential Refrigerant Pressure - Circuit 1	Circuit	Immediate	Latch	Compressor running on Circuit	The system differential pressure was below 7.7 Psid (53 kPa) for 6 seconds after the 11 seconds ignore time relative to cprsr/circuit startup had expired.	Remote
No Differential Refrigerant Pressure - Circuit 2	Circuit	Immediate	Latch	Compressor running on Circuit	The system differential pressure was below 7.7 Psid (53 kPa) for 6 seconds after the 11 seconds ignore time relative to cprsr/circuit startup had expired.	Remote
Low Differential Refrigerant Pressure - Circuit 1	Circuit	Immediate	Latch	Cprsr Energized	The system differential pressure for the respective circuit was below 25 Psid (240.5 kPa) while its compressor was unstepped or pressure ratio was below 1.75 if stepped - for a varying period of time - refer to specification for trip time as a function of system DP below the requirement	Remote
Low Differential Refrigerant Pressure - Circuit 2	Circuit	Immediate	Latch	Cprsr Energized	The system differential pressure for the respective circuit was below 25 Psid (240.5 kPa) while its compressor was unstepped or pressure ratio was below 1.75 if stepped - for a varying period of time - refer to specification for trip time as a function of system DP below the requirement	Remote
High Differential Refrigerant Pressure - Circuit 1	Circuit	Normal	Latch	Cprsr Energized	**High Vi Cprsr:** The differential pressure for the respective circuit was above 275 Psid (1890 kPa) for 2 consecutive samples or more than 10 seconds. **Low Vi Cprsr:** The system differential pressure was above 188 Psid (1296.4 kPa) - for 2 consecutive samples or more than 10 seconds.	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
High Differential Refrigerant Pressure - Circuit 2	Circuit	Normal	Latch	Cprsr Energized	**High Vi Cprsr:** The differential pressure for the respective circuit was above 275 Psid (1890 kPa) for 2 consecutive samples or more than 10 seconds. **Low Vi Cprsr:** The system differential pressure was above 188 Psid (1296.4 kPa) - for 2 consecutive samples or more than 10 seconds.	Remote
High Refrigerant Pressure Ratio - Circuit 1	Circuit	Immediate	Latch	Service Pumpdown Only	The pressure ratio for the respective circuit exceeded 5.61 for 1 contiguous minute while in service pumpdown. This pressure ratio is a fundamental limitation of the compressor. The pressure ratio is defined as Pcond (abs)/Pevap(abs).	Remote
High Refrigerant Pressure Ratio - Circuit 2	Circuit	Immediate	Latch	Service Pumpdown Only	The pressure ratio for the respective circuit exceeded 5.61 for 1 contiguous minute while in service pumpdown. This pressure ratio is a fundamental limitation of the compressor. The pressure ratio is defined as Pcond (abs)/Pevap(abs).	Remote
High Discharge Temperature - Compressor 1A	Circuit	Immediate	Latch	All [compressor run unload or compressor not running]	The compressor discharge temperature exceeded 200°F (without oil cooler) or 230ºF (with oil cooler). This diagnostic will be suppressed during Run-Unload or after the compressor has stopped. Note: As part of the Compressor High Temperature Limit Mode (aka Minimum Capacity Limit), the compressor shall be forced loaded as the filtered discharge temperature reaches 190ºF(without oil coolers), or 220ºF (with oil coolers).	Remote
High Discharge Temperature - Compressor 2A	Circuit	Immediate	Latch	All [compressor run unload or compressor not running]	The compressor discharge temperature exceeded 200°F (without oil cooler) or 230ºF (with oil cooler). This diagnostic will be suppressed during Run-Unload or after the compressor has stopped. Note: As part of the Compressor High Temperature Limit Mode (aka Minimum Capacity Limit), the compressor shall be forced loaded as the filtered discharge temperature reaches 190ºF(without oil coolers), or 220ºF (with oil coolers).	Remote
Low Discharge Superheat - Circuit 1	Circuit	Normal	Latch	Any Running Mode	While Running Normally, the Discharge Superheat was less than 12 degrees F +- 1F for more than 6500 degree F seconds.. At circuit startup the Discharge Superheat will be ignored for 5 minutes.	Remote
Low Discharge Superheat - Circuit 2	Circuit	Normal	Latch	Any Running Mode	While Running Normally, the Discharge Superheat was less than 12 degrees F +- 1F for more than 6500 degree F seconds.. At circuit startup the Discharge Superheat will be ignored for 5 minutes.	Remote
Discharge Temperature Sensor - Compressor 1A	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Discharge Temperature Sensor - Compressor 2A	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Evaporator Liquid Level Sensor - Circuit 1	Circuit	Normal	Latch	All	Bad Sensor or LLID	Remote
Evaporator Liquid Level Sensor - Circuit 2	Circuit	Normal	Latch	All	Bad Sensor or LLID	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Fan Inverter Fault - Circuit 1	Circuit (fan control)	Special Mode (or in single fan deck: Circuit Immediate shutdown	NonLatch (or in single fan deck:Latch)	Prestart and Running w/ Low Ambient Variable Spd Fan configured	A fault signal has been detected from the respective condenser's Variable Speed Inverter Drive (fan). Condenser Fan control will revert to constant speed operation without the use of the inverter's fan. If the inverter's fault clears, fan control will switch back to variable speed. For single fan deck configurations, this diagnostic causes a latching circuit shutdown	
Fan Inverter Fault - Circuit 2	Circuit (fan control)	Special Mode (or in single fan deck: Circuit Immediate shutdown	NonLatch (or in single fan deck:Latch)	Prestart and Running w/ Low Ambient Variable Spd Fan configured	A fault signal has been detected from the respective condenser's Variable Speed Inverter Drive (fan). Condenser Fan control will revert to constant speed operation without the use of the inverter's fan. If the inverter's fault clears, fan control will switch back to variable speed. For single fan deck configurations, this diagnostic causes a latching circuit shutdown	
BAS Failed to Establish Communication	None	Special Action	NonLatch	At power-up	The BAS was setup as "installed" and the BAS did not communicate with the Lontalk LCIC within 15 minutes after chiller controls power-up. Refer to Section on Setpoint Arbitration to determine how setpoints and operating modes may be effected. Note that this diagnostic is never operational for BacNet Communication interface (BCIC) and only operational with a LonTalk Communication interface (LCIC) if so configured by the BAS or Tracer system.	Remote
BAS Communication Lost	None	Special Action	NonLatch	All	The BAS was setup as "installed" at the MP and the Lontalk LCIC lost communications with the BAS for 15 contiguous minutes after it had been established. Refer to Section on Setpoint Arbitration to determine how setpoints and operating modes may be effected by the comm loss. The chiller follows the value of the Tracer Default Run Command which can be previously written by Tracer and stored nonvolatilely by the MP (either use local or shutdown). Note that this diagnostic is never operational for BacNet Communication interface (BCIC) and only operational with a LonTalk Communication interface (LCIC) if so configured by the BAS or Tracer system.	Remote
Low Evaporator Liquid Level - Circuit 1	None	Info	NonLatch	Starter Contactor Energized [all Stop modes]	The liquid level sensor is seen to be at or near its low end of range for 80 contiguous minutes while the compressor is running and the EXV has not been in low differential pressure control during that time. Design: approx 20% or less of bit count corresponding to -40 mm or less liquid level for 80 minutes - the minute counter is reset if EXV is in Low DP control for 5 iterations (10 sec) implemented as an integral.	Remote
Low Evaporator Liquid Level - Circuit 2	None	Info	NonLatch	Starter Contactor Energized [all Stop modes]	The liquid level sensor is seen to be at or near its low end of range for 80 contiguous minutes while the compressor is running and the EXV has not been in low differential pressure control during that time. Design: approx 20% or less of bit count corresponding to -40 mm or less liquid level for 80 minutes - the minute counter is reset if EXV is in Low DP control for5 iterations (10 sec) implemented as an integral .	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
High Evaporator Liquid Level - Circuit 1 (early Phase 1 RTWD production only - eliminated in 2nd Phase 1 release in Sept 08)	Circuit	Normal	Latch	Starter Contactor Energized [all Stop modes]	The liquid level sensor is seen to be at or near its high end of range for 80 contiguous minutes while the compressor is running. (The diagnostic timer will hold, but not clear when the circuit is off). Design: approx 80% or more of bit count corresponding to +30 mm or more liquid level for 80 minutes).	Remote
High Evaporator Liquid Level - Circuit 2 (early Phase 1 RTWD production only - eliminated in 2nd Phase 1 release in Sept 08)	Circuit	Normal	Latch	Starter Contactor Energized [all Stop modes]	The liquid level sensor is seen to be at or near its high end of range for 80 contiguous minutes while the compressor is running. (The diagnostic timer will hold, but not clear when the circuit is off). Design: approx 80% or more of bit count corresponding to +30 mm or more liquid level for 80 minutes).	Remote
External Chilled/Hot Water Setpoint	None	Info	Latch	All	a. Function Not "Enabled": no diagnostics. b. "Enabled ": Out-Of-Range Low or Hi or bad LLID, set diagnostic, default CWS to next level of priority (e.g. Front Panel SetPoint). This Info diagnostic will automatically reset if the input returns to the normal range.	Remote
External Current Limit Setpoint	None	Info	Latch	All	a. Not "Enabled": no diagnostics. b. "Enabled ": Out-Of-Range Low or Hi or bad LLID, set diagnostic, default CLS to next level of priority (e.g. Front Panel SetPoint. This Info diagnostic will automatically reset if the input returns to the normal range.	Remote
Evaporator Water Flow (Entering Water Temp)	None	Info	Latch	Any Ckt(s) Energzd [No Ckt(s) Energzd]	The entering evaporator water temp fell below the leaving evaporator water temp by more than 2°F for 100°F-sec. For falling film evaporators, this diagnostic cannot reliably indicate loss of flow, but can warn of improper flow direction through the evaporator, misbound water temperature sensors, improper sensor installation, partially failed sensors, or other system problems. Note that either entering or leaving water temp sensor could be at fault.	Remote
Evaporator Entering Water Temperature Sensor	Chiller	Normal	Latch	All	Bad Sensor or LLID. Note: Entering Water Temp Sensor is used in EXV pressure control as well as ice making so it must cause a unit shutdown even if ice or CHW reset is not installed.	Remote
Evaporator Leaving Water Temperature Sensor	Chiller	Normal	Latch	All	Bad Sensor or LLID	Remote
Condenser Entering Water Temperature Sensor	Chiller	Info and Special Action	Latch	All	RTWD only: Bad Sensor or LLID. If chiller running, and condenser water regulating valve option installed, force valve to 100% flow.	Remote
Condenser Leaving Water Temperature Sensor	Chiller	Info and Special Action	Latch	All	RTWD only: Bad Sensor or LLID. If Chiller is running in the heat mode of operation - normal chiller shutdown, otherwise, informational warning only. Discontinue Min Capacity Limit forced cprsr loading due to Low DP in subsequent startups.	Remote
Condenser Refrigerant Pressure Transducer - Circuit 1	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Condenser Refrigerant Pressure Transducer - Circuit 2	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Suction Refrigerant Pressure Transducer - Circuit 1	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Suction Refrigerant Pressure Transducer - Circuit 2	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Evaporator Approach Error - Circuit 1	Circuit	Immediate	Latch	Respective circuit running	The Evaporator approach temperature for the respective circuit (ELWT - Evap Sat Temp Ckt x) is negative by 10ºF or more, for 1 minute continuously while the circuit / compressor is operating. Either the Evap Leaving Water Temp sensor, or Evap Suction Rfgt Pressure Transducer Ckt 1 is in error.	Remote
Evaporator Approach Error - Circuit 2	Circuit	Immediate	Latch	Respective circuit running	The Evaporator approach temperature for the respective circuit (ELWT - Evap Sat Temp Ckt x) is negative by 10ºF or more, for 1 minute continuously while the circuit / compressor is operating. Either the Evap Leaving Water Temp sensor, or Evap Suction Rfgt Pressure Transducer Ckt 2 is in error	Remote
Oil Pressure Transducer - Compressor 1A	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Oil Pressure Transducer - Compressor 2A	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Oil Pressure System Fault - Circuit 1	Circuit	Immediate	Latch	Starter Contactor Energized [all Stop modes]	The Intermediate Oil Pressure Transducer for this cprsr is reading a pressure either above its respective circuit's Condenser Pressure by 15 Psia or more, or below its respective Suction Pressure 10 Psia or more for 30 seconds continuously.	Local
Oil Pressure System Fault - Circuit 2	Circuit	Immediate	Latch	Starter Contactor Energized [all Stop modes]	The Intermediate Oil Pressure Transducer for this cprsr is reading a pressure either above its respective circuit's Condenser Pressure by 15 Psia or more, or below its respective Suction Pressure 10 Psia or more for 30 seconds continuously.	Local
Low Evaporator Refrigerant Pressure - Circuit 1	Circuit	Immediate	Latch	Cprsr Prestart and Cprsr Energized	a. The Evap Refrig Pressure dropped below 10 Psia just prior to compressor start (after EXV preposition). b. For RTUD A/C during early startup period: The Evap Refrig Pressure fell below the Condenser Pressure ÷ 8, limited to between 2 and 10 psia. c. For RTWD (or RTUD, ACFC=none) during early startup period: The Evap Refrig Pressure fell below 10 Psia. d. For all chiller types, after early Startup Period expires: The Evap Refrig Pressure fell below 16 Psia. (Note: the Startup Period for RTWD is 3 min ; for RTUD it is between 1 and 5 min for as an inverse function of the Cond Temp measured at time of circuit startup).	Local

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Low Evaporator Refrigerant Pressure - Circuit 2	Circuit	Immediate	Latch	Cprsr Prestart and Cprsr Energized	a. The Evap Refrig Pressure dropped below 10 Psia just prior to compressor start (after EXV preposition). b. For RTUD A/C during early startup period: The Evap Refrig Pressure fell below the Condenser Pressure ÷ 8, limited to between 2 and 10 psia. c. For RTWD (or RTUD, ACFC=none) during early startup period: The Evap Refrig Pressure fell below 10 Psia. d. For all chiller types, after early Startup Period expires: The Evap Refrig Pressure fell below 16 Psia. (Note: the Startup Period for RTWD is 3 min; for RTUD it is between 1 and 5 min for as an inverse function of the Cond Temp measured at time of circuit startup).	Local
Very Low Evaporator Refrigerant Pressure - Circuit 1	Chiller	Immediate	Latch	All [compressor or circuit in manual lockout]	The respective circuit's evaporator pressure dropped below 80% of the current Low Evap Refrig Press Cutout setting (see above) or 8 psia, whichever is less, regardless of the running state of the circuit's compressor. If a given compressor or circuit is locked out, the suction pressure transducer(s) associated with it, will be excluded from causing this diagnostic.	Local
Very Low Evaporator Refrigerant Pressure - Circuit 2	Chiller	Immediate	Latch	All [compressor or circuit in manual lockout]	The respective circuit's evaporator pressure dropped below 80% of the current Low Evap Refrig Press Cutout setting (see above) or 8 psia, whichever is less, regardless of the running state of the circuit's compressor. If a given compressor or circuit is locked out, the suction pressure transducer(s) associated with it, will be excluded from causing this diagnostic.	Local
Low Evaporator Leaving Water Temp: Unit Off	Evap (and circ) Pump	Special Action	NonLatch	Unit in Stop Mode, or in Auto Mode and No Ckt(s) Energzd [Any Ckt Energzd]	The leaving Evaporator water temp. fell below the leaving water temp cutout setting for 30 degree F seconds while the Chiller is in the Stop mode, or in Auto mode with no compressors running. Energize small Evap Circulating Pump (RTUD A/C) and Evap Water pump Relay (but only if "Evap Water Pump Diagnostic Override" setting is enabled) until diagnostic auto resets, then de-energize the circ pump and return to normal evap pump control. Automatic reset occurs when the temp rises 2°F (1.1°C) above the cutout setting for 30 minutes. This diagnostic even while active, does not prevent operation of either circuit	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Low Evaporator Temp - Ckt 1: Unit Off	Evap (and circ) Pump	Special Action	NonLatch	Unit in Stop Mode, or in Auto Mode and No Ckt's Energzd [Any Ckt Energzd]	The respective evap sat temp fell below the water temp cutout setting while the evap liquid level was greater than -36 mm for 150º-sec degree F seconds while Chiller is in the Stop mode, or in Auto mode with no compressors running. Energize small Evap Circulating Pump (RTUD A/C) and Evap Water pump Relay (but only if "Evap Water Pump Diagnostic Override" setting is enabled) until diagnostic auto resets, then de-energize the circ pump and return to normal evap pump control. Automatic reset occurs when the derived evap sat temp rises 2°F (1.1°C) above the cutout setting for 1 minute or the liquid level is below -36.0 mm for 20 minutes, or any compressor restarts. OA temp is substituted for evap sat temp in case of invalidity. This diagnostic even while active, does not prevent operation of either circuit.	Remote
Low Evaporator Temp - Ckt 2: Unit Off	Evap (and circ) Pump	Special Action	NonLatch	Unit in Stop Mode, or in Auto Mode and No Ckt's Energzd [Any Ckt Energzd]	The respective evap sat temp fell below the water temp cutout setting while the evap liquid level was greater than -36 mm for 150º-sec degree F seconds while Chiller is in the Stop mode, or in Auto mode with no compressors running. Energize small Evap Circulating Pump (RTUD A/C) and Evap Water pump Relay (but only if "Evap Water Pump Diagnostic Override" setting is enabled) until diagnostic auto resets, then de-energize the circ pump and return to normal evap pump control. Automatic reset occurs when the derived evap sat temp rises 2°F (1.1°C) above the cutout setting for 1 minute or the liquid level is below -36.0 mm for 20 minutes, or any compressor restarts. OA temp is substituted for evap sat temp in case of invalidity. This diagnostic even while active, does not prevent operation of either circuit.	Remote
Low Evaporator Water Temp: Unit On	Chiller	Immediate and Special Action	NonLatch	Any Ckt[s] Energzd [No Ckt(s) Energzd]	The evaporator water temp. fell below the cutout setpoint for 30 degree F Seconds while the compressor was running. Automatic reset occurs when the temperature rises 2° F (1.1°C) above the cutout setting for 2 minutes. This diagnostic shall not de-energize the Evaporator Water Pump Output.	Remote
Evaporator Water Flow Overdue	Chiller	Normal	NonLatch	Estab. Evap. Water Flow on going from STOP to AUTO or Evap Pump Override.	Evaporator water flow was not proven within 20 minutes of the Evaporator water pump relay being energized in normal "Stop" to "Auto" transition. If the pump is overridden to "On" for certain diagnostics, the delay on diagnostic callout shall be only 255 seconds. The pump command status will not be effected by this diagnostic in either case.	Remote
Evaporator Water Flow Lost	Chiller	Immediate	NonLatch	[All Stop modes]	a. The Evaporator water flow switch input was open for more than 6 contiguous seconds (or 15 seconds for thermal dispersion type flow switch). b. This diagnostic does not de-energize the evap pump output c. 6 seconds of contiguous flow shall clear this diagnostic.	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
High Evaporator Refrigerant Pressure	Chiller	Immediate	NonLatch	All	The evaporator refrigerant pressure of either circuit has risen above 190 psig. The evaporator water pump relay will be de-energized to stop the pump regardless of why the pump is running. The diagnostic will auto reset and the pump will return to normal control when all of the evaporator pressures fall below 185 psig. The primary purpose is to stop the evaporator water pump and its associated pump heat from causing refrigerant side pressures, close to the evaporator relief valve setting, when the chiller is not running, such as could occur with Evap Water Flow Overdue or Evaporator Water Flow Loss Diagnostics.	Remote
High Evaporator Water Temperature	Chiller	Info and Special Action	NonLatch	Only effective if either 1)Evap Wtr Flow Overdue, 2)Evap Wtr Flow Loss, or 3)Low Evap Rfgt Temp,-Unit Off, diagnostic is active.	The leaving water temperature exceeded the high evap water temp limit (TV service menu settable -default 105F) for 15 continuous seconds. The evaporator water pump relay will be de-energized to stop the pump but only if it is running due one of the diagnostics listed on the left . The diagnostic will auto reset and the pump will return to normal control when the temperature falls 5°F below the trip setting. The primary purpose is to stop the evaporator water pump and its associated pump heat from causing excessive waterside temperatures and waterside pressures when the chiller is not running but the evap pump is on due to either Evap Water Flow Overdue, Evaporator Water Flow Loss , or Low Evap Temp - Unit Off Diagnostics. This diagnostic will not auto clear solely due to the clearing of the enabling diagnostic.	Remote
Condenser Water Flow Overdue	Chiller	Normal	NonLatch	Estab Cond Water Flow	Condenser water flow was not proven within 20 minutes of the condenser pump relay being energized. The Cond Pump shall be commanded off. Diagnostic is reset with return of flow (although only possible with external control of pump).	Remote
Condenser Water Flow Lost	Chiller	Immediate	NonLatch	Start and All Run Modes	The condenser water flow proof input was open for more than 6 contiguous seconds (or 15 seconds for thermal dispersion type flow switch) after flow had been proven. This diagnostic is automatically cleared once the compressor is stopped by a fixed time out of 7 sec. In Cooling Mode: The Cond Pump shall be commanded off but the Evap pump command will not be effected. - once the diagnostic auto clears, if diff to start is met, the cond pump can be restarted. In Heating Mode: The Cond Pump shall remain on, and the Evap pump shall shut off - once diagnostic auto clears, if diff to start is met, the chiller may restart normally and the evap pump can be restarted.	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
High Pressure Cutout - Compressor 1A	Circuit	Immediate	Latch	All	A high pressure cutout was detected on Compressor 1A; trip at 270 ± 5 PSIG. Note: Other diagnostics that may occur as an expected consequence of the HPC trip will be suppressed from annunciation. These include Phase Loss, Power Loss, and Transition Complete Input Open. For Air Cooled Condenser, check for dirty coils or any fouling or restrictions as well as proper operation and rotational direction of all fans..	Local
High Pressure Cutout - Compressor 2A	Circuit	Immediate	Latch	All	A high pressure cutout was detected on Compressor 1A; trip at 270 ± 5 PSIG. Note: Other diagnostics that may occur as an expected consequence of the HPC trip will be suppressed from annunciation. These include Phase Loss, Power Loss, and Transition Complete Input Open. For Air Cooled Condenser, check for dirty coils or any fouling or restrictions as well as proper operation and rotational direction of all fans..	Local
Excessive Condenser Pressure - Circuit 1	Circuit	Immediate	Latch	All	The condenser pressure transducer of this circuit has detected a pressure in excess of the safe high side pressure as limited by the particular compressor type or the evaporator distributor present on this particular chiller. For Air Cooled Condenser, check for dirty coils or any fouling or restrictions as well as proper operation and rotational direction of all fans.	Remote
Excessive Condenser Pressure - Circuit 2	Circuit	Immediate	Latch	All	The condenser pressure transducer of this circuit has detected a pressure in excess of the safe high side pressure as limited by the particular compressor type or the evaporator distributor present on this particular chiller. For Air Cooled Condenser, check for dirty coils or any fouling or restrictions as well as proper operation and rotational direction of all fans.	Remote
Emergency Stop	Chiller	Immediate	Latch	All	a. EMERGENCY STOP input is open. An external interlock has tripped. Time to trip from input opening to unit stop shall be 0.1 to 1.0 seconds.	Local
Outdoor Air Temperature Sensor	Chiller	RTUD with ACFC#NONE-Normal Shutdown; OATS=INST-Special Action Latch	Latch	All	Bad Sensor or LLID. If the outdoor temperature is used for CHW reset, there shall be no CHW reset. Apply slew rates per Chilled Water Reset spec. RTUD: if this diagnostic occurs, operational pumpdown will be performed regardless of the last valid temperature. For RTWD, if installed for low ambient lockout, there shall be no LA lockout .	Remote
Starter Panel High Temperature Limit - Compressor 1A	Circuit	Immediate and Special Action	NonLatch	All	Starter Panel High Limit Thermostat (170°F) trip was detected. Compressor 1A is shutdown and inoperative until the thermostat resets. Note: Other diagnostics that may occur as an expected consequence of the Panel High Temp Limit trip will be suppressed from annunciation. These include Momentary Power Loss, Phase Loss, Power Loss, and Transition Complete Input for Compressor 1A.	Local
Starter Module Memory Error Type 1Starter 1A	None	Info	Latch	All	Checksum on RAM copy of the Starter LLID configuration failed. Configuration recalled from EEPROM.	Local

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Starter Module Memory Error Type 1 - Starter 2A	None	Info	Latch	All	Checksum on RAM copy of the Starter LLID configuration failed. Configuration recalled from EEPROM.	Local
Starter Module Memory Error Type 2 - Starter 1A	Circuit	Immediate	Latch	All	Checksum on EEPROM copy of the Starter LLID configuration failed. Factory default values used.	Local
Starter Module Memory Error Type 2 - Starter 2A	Circuit	Immediate	Latch	All	Checksum on EEPROM copy of the Starter LLID configuration failed. Factory default values used.	Local
Pumpdown Terminated - Circuit 1	Circuit	Info	NonLatch	Service or Operational Pumpdown	Operational or Service Pumpdown cycle for this circuit was terminated abnormally due to excessive time (op pd only) or due to a specific set of diagnostic criteria - but w/o associated latching diagnostics . (RTWD max Operation Pumpdown = 2 min)	Local
Pumpdown Terminated - Circuit 2	Circuit	Info	NonLatch	Service or Operational Pumpdown	Operational or Service Pumpdown cycle for this circuit was terminated abnormally due to excessive time (op pd only) or due to a specific set of diagnostic criteria - but w/o associated latching diagnostics . (RTWD max Operation Pumpdown = 2 min)	Local
Pumpdown Terminated by Time - Circuit 1	Circuit	Info	NonLatch	Service Pumpdown	Service Pumpdown cycle for this circuit was terminated abnormally due to excessive time (RTWD max Service Pumpdown = 4 min).	Local
Pumpdown Terminated by Time - Circuit 2	Circuit	Info	NonLatch	Service Pumpdown	Service Pumpdown cycle for this circuit was terminated abnormally due to excessive time (RTWD max Service Pumpdown = 4 min).	Local
MP: Invalid Configuration	None	Immediate	Latch	All	MP has an invalid configuration based on the current software installed.	Remote
MP Application Memory CRC Error	Chiller	Immediate	Latch	All Modes	Memory error criteria TBD	Remote
MP: Non-Volatile Memory Reformat	None	Info	Latch	All	MP has determined there was an error in a sector of the Non-Volatile memory and it was reformatted. Check settings.	Remote
Check Clock	Chiller	Info	Latch	All	The real time clock had detected loss of its oscillator at some time in the past. Check / replace battery? This diagnostic can be effectively cleared only by writing a new value to the chiller's time clock using the TechView or DynaView's "set chiller time" functions.	Remote
MP: Could not Store Starts and Hours	None	Info	Latch	All	MP has determined there was an error with the previous power down store. Starts and Hours may have been lost for the last 24 hours.	Remote
MP: Non-Volatile Block Test Error	None	Info	Latch	All	MP has determined there was an error with a block in the Non-Volatile memory. Check settings.	Remote
Starter Failed to Arm/Start - Cprsr 1A	Circuit	Normal	Latch	All	Starter failed to arm or start within the allotted time (15 seconds).	Local
Starter Failed to Arm/Start - Cprsr 2A	Circuit	Normal	Latch	All	Starter failed to arm or start within the allotted time (15 seconds).	Local
Oil Analysis Recommended - Ckt #1	Circuit	Info	Latch	"Service Messages" enabled	Diagnostic occurs when accumulated circuit operating hours since last initialized exceeds 2000 hours. Diagnostic can be manually cleared but will reoccur every month (720 hours on real time clock) as long as accumulator is not re-initialized.	Remote

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Oil Analysis Recommended - Ckt #2	Circuit	Info	Latch	"Service Messages" enabled	Diagnostic occurs when accumulated circuit operating hours since last initialized exceeds 2000 hours. Diagnostic can be manually cleared but will reoccur every month (720 hours on real time clock) as long as accumulator is not re-initialized.	Remote
Oil Filter Change Recommended - Cprsr 1A	Circuit	Info	Latch	"Service Messages" enabled	(After RTUD release in Fall of 09:) Diagnostic occurs only when "service messages" are enabled and when Oil Filter Life remaining falls below 5 %. Diagnostic can be manually cleared but will reoccur every month real time (720 hours on real time clock) as long as the oil filter life remaining does not rise above 20% (through normal calculations or reinitializing) (Prior to RTUD Release in Fall of 09): Diagnostic occurs only when "service messages" are enabled and when average oil pressure drop exceeds 18%. Diagnostic can be manually cleared but will reoccur every month (720 hours on real time clock) as long as average pressure drop does not fall below 16%.	Remote
Oil Filter Change Recommended - Cprsr 2A	Circuit	Info	Latch	"Service Messages" enabled	(After RTUD release in Fall of 09:) Diagnostic occurs only when "service messages" are enabled and when Oil Filter Life remaining falls below 5 %. Diagnostic can be manually cleared but will reoccur every month real time (720 hours on real time clock) as long as the oil filter life remaining does not rise above 20% (through normal calculations or reinitializing) (Prior to RTUD Release in Fall of 09): Diagnostic occurs only when "service messages" are enabled and when average oil pressure drop exceeds 18%. Diagnostic can be manually cleared but will reoccur every month (720 hours on real time clock) as long as average pressure drop does not fall below 16%.	Remote
LCI-C Software Mismatch: Use BAS Tool	Chiller	Info	NonLatch	All	The neuron software in the LCI-C module does not match the chiller type. Download the proper software into the LCI-C neuron. To do this, use the Rover service tool, or a LonTalk® tool capable of downloading software to a Neuron 3150®.	Remote
Software Error 1001: Call Trane Service	All functions	Immediate	Latch	**All**	A high level software watchdog has detected a condition in which there was a continuous 1 minute period of compressor operation, with neither Evaporator water flow nor a" contactor interrupt failure" diagnostic active. The presence of this software error message suggests an internal software problem has been detected. The events that led up to this failure, if known, should be recorded and transmitted to Trane Controls Engineering.	Local

Main Processor Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Software Error 1002: Call Trane Service	All functions	Immediate	Latch	**All**	Reported if state chart misalignment in stopped or inactive state occurred while a compressor was seen to be operating and this condition lasted for at least 1 minute (cmprsr operation due to Service Pumpdown or with Contactor Interrupt Failure diagnostic is excluded). The presence of this software error message suggests an internal software problem has been detected. The events that led up to this failure, if known, should be recorded and transmitted to Trane Controls Engineering.	Local
Software Error 1003: Call Trane Service	All functions	Immediate	Latch	**All**	Reported if state chart misalignment occurred inferred from either the Capacity Control, Circuit, or Compressor State Machines remaining in the Stopping state for more than 3 minutes. The presence of this software error message suggests an internal software problem has been detected. The events that led up to this failure, if known, should be recorded and transmitted to Trane Controls Engineering.	Local

Diagnostics

Table 5 - Communication Diagnostics

Notes:

1. The following communication loss diagnostics will not occur unless that input or output is required to be present by the particular configuration and installed options for the chiller.
2. Communication diagnostics (with the exception of "Excessive Loss of Comm" are named by the Functional Name of the input or output that is no longer being heard from by the Main Processor.

Many LLIDs, such as the Quad Relay LLID, have more than one functional output associated with it. A comm loss with such a multiple function board will generate multiple diagnostics. Refer to the Chiller's wiring diagrams to relate the occurrence of multiple communication diagnostics back to the physical llid boards that they have been assigned to (bound).

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Comm Loss: Male Port Unload Compressor 1A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Male Port Load Compressor 1A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Male Port Unload Compressor 2A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Male Port Load Compressor 2A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Female Step Load Compressor 1A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Female Step Load Compressor 2A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Motor Winding Thermostat Compressor 1A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Motor Winding Thermostat Compressor 2A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: External Auto/Stop	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Emergency Stop	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: External Circuit Lockout, Circuit #1	Circuit	Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. MP will nonvolatily hold the lockout state (enabled or disabled) that was in effect at the time of comm loss.	Remote
Comm Loss: External Circuit Lockout, Circuit #2	Circuit	Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. MP will nonvolatily hold the lockout state (enabled or disabled) that was in effect at the time of comm loss	Remote
Comm Loss: External Ice Building Command	Ice Making Mode	Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Chiller shall revert to normal (non-ice building) mode regardless of last state.	Remote

Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Comm Loss: Heat/Cool Switch	Heat Mode	Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. The external input shall revert to normal (cooling) request regardless of last state. Chiller mode shall follow "OR" arbitration for heating/cooling mode, i.e. If any of the remaining inputs (front panel of BAS) are requesting heat mode, then the chiller shall be in heat mode.	Remote
Comm Loss: Outdoor Air Temperature	Chiller	RTUD with ACFC#NONE-Normal Shutdown; OATS=INST-Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. If the outdoor temperature is used for CHW reset, there shall be no CHW reset. Apply slew rates per Chilled Water Reset spec. For RTUD if this diagnostic occurs, operational pumpdown will be performed regardless of the last valid temperature. For RTWD, if installed for low ambient lockout, there shall be no lockout	Remote
Comm Loss: Evaporator Leaving Water Temperature	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Evaporator Entering Water Temperature	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Note: Entering Water Temp Sensor is used in EXV pressure control as well as ice making & CHW reset, so it must cause a unit shutdown even if Ice or CHW reset is not installed.	Remote
Comm Loss: Condenser Leaving Water Temperature	Chiller	Info and Special Action	Latch	All	RTWD Only: Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. If Chiller is running in the heat mode of operation - normal shutdown, otherwise, informational only. Discontinue Min Capacity Limit forced cprsr loading due to Low DP in subsequent startups.	Remote
Comm Loss: Condenser Entering Water Temperature	Chiller	Info and Special Action	Latch	All	RTWD Only: Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. If chiller running, and condenser water regulating valve option installed, force valve to 100% flow.	Remote
Comm Loss: Discharge Temperature Circuit 1, Cprsr 1A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Discharge Temperature, Circuit 2 , Cprsr 2A	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote

Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Comm Loss: External Chilled/Hot Water Setpoint	External Chilled Water setpoint	Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Chiller shall discontinue use of the External Chilled Water Setpoint source and revert to the next higher priority for setpoint arbitration	Remote
Comm Loss: External Current Limit Setpoint	External Current Limit setpoint	Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Chiller shall discontinue use of the External Current limit setpoint and revert to the next higher priority for Current Limit setpoint arbitration	Remote
Comm Loss: High Pressure Cutout Switch, Cprsr 1A	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: High Pressure Cutout Switch, Cprsr 2A	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Evaporator Water Flow Switch	Chiller	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Condenser Water Flow Switch	Chiller	Immediate	Latch	All	RTWD only: Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Suction Rfgt Pressure, Circuit #1	Circuit	Immediate	Latch	All [Ckt/Cprsr lock out]	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Note: This diagnostic is replaced by diagnostic 5FB below with Rev 15.0	Remote
Comm Loss: Suction Rfgt Pressure, Circuit #2	Circuit	Immediate	Latch	All [Ckt/Cprsr lock out]	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Note: This diagnostic is replaced by diagnostic 5FD below with Rev 15.0	Remote
Comm Loss: Cond Rfgt Pressure, Circuit #1	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Cond Rfgt Pressure, Circuit #2	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Oil Pressure, Cprsr 1A	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Oil Pressure, Cprsr 2A	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Oil Return Gas Pump Fill - Circuit #1	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote

Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Comm Loss: Oil Return Gas Pump Fill - Circuit #2	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Oil Return Gas Pump Drain - Circuit #1	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Oil Return Gas Pump Drain - Circuit #2	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Oil Loss Level Sensor Input - Circuit #1	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Oil Loss Level Sensor Input - Circuit #2	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Evaporator Water Pump Relay	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Condenser Water Pump Relay	Chiller	Normal	Latch	All	RTWD only: Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Ice-Making Status	Chiller	Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Chiller shall revert to normal (non-ice building) mode regardless of last state.	Remote
Comm Loss: Evaporator Rfgt Liquid Level, Circuit #1	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Evaporator Rfgt Liquid Level, Circuit #2	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Starter 1A	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Local
Comm Loss: Starter 2A	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Local
Comm Loss: Electronic Expansion Valve, Circuit #1	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Electronic Expansion Valve, Circuit #2	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Starter 1A Comm Loss: MP	Circuit	Immediate	Latch	All	Starter has had a loss of communication with the MP for a 15 second period.	Local

Diagnostics

Diagnostic Name	Affects Target	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Starter 2A Comm Loss: MP	Circuit	Immediate	Latch	All	Starter has had a loss of communication with the MP for a 15 second period.	Local
Comm Loss: Local BAS Interface	Chiller	Info	NonLatch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Use last valid BAS setpoints. Diagnostic is cleared when successful communication is established with the LonTalk LLID (LCIC) or BacNet LLID (BCIC).	Remote
Comm Loss: Op Status Programmable Relays	None	Info	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Starter Panel High Temperature Limit , Compressor 1A	None	Info	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Local
Comm Loss: Condenser Rfgt Pressure Output	Chiller	Info	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Cond Head Press Cntrl Output	Chiller	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Chiller % RLA Output	Chiller	Info	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Fan Inverter Fault, Circuit #1	Circuit (fan control)	Special Mode (or in single fan deck: Circuit Immediate shutdown)	Latch (or in single fan deck:Latch)	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Operate the remaining fans as fixed speed fan deck. For single fan deck configurations, this diagnostic causes a latching circuit shutdown	Remote
Comm Loss: Fan Inverter Fault, Circuit #2	Circuit (fan control)	Special Mode (or in single fan deck: Circuit Immediate shutdown)	Latch (or in single fan deck:Latch)	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Operate the remaining fans as fixed speed fan deck. For single fan deck configurations, this diagnostic causes a latching circuit shutdown	Remote
Comm Loss: Fan Inverter Speed Command, Circuit #1	Circuit (fan control)	Special Mode (or in single fan deck: Circuit Immediate shutdown)	Latch (or in single fan deck:Latch)	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Operate the remaining fans as fixed speed fan deck. For single fan deck configurations, this diagnostic causes a latching circuit shutdown	Remote
Comm Loss: Fan Inverter Speed Command, Circuit #2	Circuit (fan control)	Special Mode (or in single fan deck: Circuit Immediate shutdown)	Latch (or in single fan deck:Latch)	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Operate the remaining fans as fixed speed fan deck. For single fan deck configurations, this diagnostic causes a latching circuit shutdown	Remote
Comm Loss: Fan Control Relays, Circuit #1	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Fan Control Relays, Circuit #2	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Ext Noise Setback Command	None	Info	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Noise Setback Relay	None	Info	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
Comm Loss: Evaporator Off-cycle Freeze Protection Relay	None	Info	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote

Diagnostics

Table 6 - Main Processor - Boot Messages and Diagnostics

DynaView Display Message	Description Troubleshooting
Boot Software Part Numbers: LS Flash --> 6200-0318-04 MS Flash --> 6200-0319-04	The "boot code" is the portion of the code that is resident in all MPs regardless of what application code (if any) is loaded. Its main function is to run power up tests and provide a means for downloading application code via the MP's serial connection. The Part numbers for the code are displayed in the lower left hand corner of the DynaView during the early portion of the power up sequence and during special programming and converter modes. See below. For the EasyView, the extension of the boot code part number is displayed for approximately 3 immediately following power up. // This is normal, but you should provide this information when contacting Technical Service about power up problems.
Err2: RAM Pattern 1 Failure	There were RAM errors detected in RAM Test Pattern #1. // Recycle power, if the error persists, replace MP.
Err2: RAM Pattern 2 Failure	There were RAM errors detected in RAM Test Pattern #2. //Recycle power, if the error persists, replace MP.
Err2: RAM Addr Test #1 Failure	There were RAM errors detected in RAM Address Test #1. // Recycle power, if error persists, replace MP.
Err2: RAM Addr Test #2 Failure	There were RAM errors detected in RAM Address Test #2. //Recycle power, if the error persists, replace MP.
No Application Present Please Load Application...	No Main Processor Application is present - There are no RAM Test Errors. // Connect a TechView Service Tool to the MP's serial port, provide chiller model number (configuration information) and download the configuration if prompted by TechView. Then proceed to download the most recent RTAC application or specific version as recommended by Technical Service.
App Present. Running Selftest.... Selftest Passed	An application has been detected in the Main Processor's nonvolatile memory and the boot code is proceeding to run a check on its entirety. 8 seconds later, the boot code had completed and passed the (CRC) test. // Temporary display of this screen is part of the normal power up sequence.
App Present. Running Selftest... Err3: CRC Failure	An application has been detected in Main Processor's nonvolatile memory and the boot code is proceeding to run a check on its entirety. A few seconds later, the boot code had completed but failed the (CRC) test. //Connect a TechView Service Tool to the MP's serial port, provide chiller model number (configuration information) and download the configuration if prompted by TechView. Then proceed to download the most recent RTAC application or specific version as recommended by Technical Service. Note that this error display may also occur durring the programming process, if the MP never had a valid application any time prior to the download. If the problem persists, replace the MP.
A Valid Configuration is Present	A valid configuration is present in the MP's nonvolatile memory. The configuration is a set of variables and settings that define the physical makeup of this particular chiller. These include: number/airflow,/and type of fans, number/and size of compressors, special features, characteristics, and control options. // Temporary display of this screen is part of the normal power up sequence.
Err4: UnHandled Interrupt Restart Timer: [3 sec countdown timer]	An unhandled interrupt has occurred while running the application code. This event will normally cause a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor will reset, clear diagnostics, and attempt to restart the application and allow a normal restart of chiller as appropriate. // This condition might occur due to a severe electro-magnetic transient such as can be caused by a near lightening strike. Such events should be rare or isolated and if no damage results to the CH530 control system, the Chiller will experience a shutdown and restart. If this occurs more persistently it may be due to an MP hardware problem. Try replacing the MP. If replacement of the MP proves ineffective, the problem may be a result of extremely high radiated or conducted EMI. Contact Technical Service. If this screen occurs immediately after a software download, attempt to reload both the configuration and the application. Failing this, contact Technical Service.

Diagnostics

Err5: Operating System Error **Restart Timer:** **[30 sec countdown timer]**	An Operating System error has occurred while running the application code. This event will normally cause a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor will reset, clear diagnostics, and attempt to restart the application and allow a normal restart of chiller as appropriate. // See Err 4 above
Err6: Watch Dog Timer Error **Restart Timer:** **[30 sec countdown timer]**	A Watch Dog Timer Error has occurred while running the application code. This event will normally cause a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor will reset, clear diagnostics, and attempt to restart the application allowing a normal restart of chiller as appropriate.
Err7: Unknown Error **Restart Timer:** **[30 sec countdown timer]**	An unknown Error has occurred while running the application code. This event will normally cause a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor will reset, clear diagnostics, and attempt to restart the application allowing a normal restart of chiller as appropriate
Err8: Held in Boot by User Key Press	The boot detected a key press in the center of the DynaView or both the + and - keys pressed on an EasyView while the MP was in the boot code. Upon seeing this message the user can use Techview to connect to the MP to perform a software download or another service tool function.
Converter Mode	A command was received from the Service Tool (Tech View) to stop the running application and run in the "converter mode". In this mode the MP acts as a simple gateway and allows the TechView service computer to talk to all the LLIDS on the IPC3 bus.
Programming Mode	A command was received by the MP from the Tech View Service Tool and the MP is in the process of first erasing and then writing the program code to its internal Flash (nonvolatile) Memory. Note that if the MP never had a prior application already in memory, the error code "Err3"will be displayed instead of this, during the programming download process.
Software Error 1001: Call Trane Service	See item in Main Processor Diagnostics table above
Software Error 1002: Call Trane Service	See item in Main Processor Diagnostics table above
Software Error 1003: Call Trane Service	See item in Main Processor Diagnostics table above

Design Note: In general, all failures/comm loss due to CH530 components should have a latching diagnostic and effect. All customer inputs failures (out of range, etc) are generally nonlatching.

Diagnostics

Programmable Relays (Alarms and Status)

CH530 provides a flexible alarm or chiller status indication to a remote location through a hard wired interface to a dry contact closure.

Four relays are available for this function, and they are provided (generally with a Quad Relay Output LLID) as part of the Alarm Relay Output Option.

The events/states that can be assigned to the programmable relays are listed in the following table and through a TechView configuration.

Alarm - Latching

This output is true whenever there is any active latching shutdown diagnostic that targets the Unit, Circuit, or any of the Compressors on a circuit.

Alarm - NonLatching

This output is true whenever there is any active non-latching shutdown diagnostic that targets the Unit, Circuit, or any of the Compressors on a circuit.

Alarm

This output is true whenever there is any active latching or non-latching shutdown diagnostic that targets the Unit, Circuit, or any of the Compressors on a circuit.

Alarm Ckt 1

This output is true whenever there is any active latching or non-latching shutdown diagnostic that targets Circuit 1, or any of the Compressors on Circuit 1.

Alarm Ckt 2

This output is true whenever there is any active latching or non-latching shutdown diagnostic that targets Circuit 2, or any of the Compressors on Circuit 2.

Unit Limit Mode

This output is true whenever a circuit on the unit has been running in one of the limit modes continuously for the Limit Relay debounce time. A given limit or overlapping of different limits must be in effect continuously for the debounce time prior to the output becoming true. It will become false if no limits are present for the debounce time.

Compressor Running

The output is true whenever any compressor is running.

Circuit 1 Running

The output is true whenever any compressor of Circuit 1 is running.

Circuit 2 Running

The output is true whenever any compressor of Circuit 2 is running.

Maximum Capacity

The output is true whenever the unit has reached maximum capacity continuously for the Max Capacity Relay debounce time. The output is false when the unit is not at maximum capacity continuously for the fitler debounce time.

Head Pressure Relief Request

This relay output is energized anytime the chiller or a single circuit on the chiller is running in one of the following modes; Ice Making Mode, or Condenser Pressure Limit continuously for the duration specified by the Chiller Head Relief Relay Filter Time. The Chiller Head Relief Relay Filter Time is a service setpoint. The relay output is de-energized anytime the chiller exits all above modes continuously for the duration specified by the same Chiller Head Relief Relay Filter Time

None:

This selection is desireable to provide an easy way for a customer to defeat the effect of the relay, if it has already been wired. For instance, if the relay was normally programmed as an "alarm" relay, and was wired to a claxon, it may be desirable to temporarily defeat the feature without changing wiring.

Default Assignments

The four available relays the Alarm Package Option shall be assigned with the following defaults as follows:

Operation of the Relays:

If any of the four programmable annunciation relays are assigned with the given event or state, that relay shall be energized when the event or state is true and de-energized when the event or state is false pursuant to debounce or filter timing that may be applied per the details of a given assignment.

Table 7 - Default settings

LLID Name	LLID Software Relay Designation	Output Name	Default
Operating Status Programmable Relays	Relay 0	Status Relay 4, J2-1,2,3	Unit Limit Mode
	Relay 1	Status Relay 3, J2-4,5,6	Maximum Capacity
	Relay 2	Status Relay 2, J2-7,8,9	Compressor Running
	Relay 3	Status Relay 1, J2-10,11,12	Alarm

TechView Interface

TechView is the PC (laptop) based tool used for servicing Tracer CH530. Technicians that make any chiller control modification or service any diagnostic with Tracer CH530 must use a laptop running the software application "TechView." TechView is a Trane application developed to minimize chiller downtime and aid the technicians' understanding of chiller operation and service requirements.

CAUTION: *Performing any Tracer CH530 service functions should be done only by a properly trained service technician. Please contact your local Trane service agency for assistance with any service requirements.* TechView software is available via Trane.com. (http://www.trane.com/commercial/software/tracerch530/) This download site provides a user the TechView installation software and CH530 main processor software that must be loaded onto your PC in order to service a CH530 main processor. The TechView service tool is used to load software into the Tracer CH530 main processor.

Minimum PC requirements to install and operate TechView are:

- Pentium II or higher processor
- 128Mb RAM
- 1024 x 768 resolution of display
- CD-ROM
- 56K modem
- 9-pin RS-232 serial connection
- Operating system - Windows XP Pro or Vista Business
- USB 2.0 or higher
- Internet Explorer 6.0 or higher

Note: *TechView was designed for the proceeding listed laptop configuration. Any variation will have unknown results. Therefore, support for TechView is limited to only those operating systems that meet the specific configuration listed here. KestrelView is designed and validated for this specific laptop configuration. Any variation from this configuration may have different results. Therefore, support for KestrelView is limited to only those laptops configured as described above. Trane will not support KestrelView on a laptop configured differently. There is no support for laptops running Intel Celeron, AMD, Cyrix, or processors other than Pentium. Only laptops with a Pentium II class processor or better are supported.*

TechView is also used to perform any CH530 service or maintenance function.

Servicing a CH530 main processor includes:

- Updating main processor software
- Monitoring chiller operation
- Viewing and resetting chiller diagnostics
- Low Level Intelligent Device (LLID) replacement and binding
- Main processor replacement and configuration modifications
- Setpoint modifications
- Service overrides

TechView Interface

TechView installation has been simplified. All related software, including Main Processor software, is now packaged together with the TechView application resulting in a single installation.

Note: You do not have to uninstall an earlier version of TechView. The new TechView will update the existing files.

To install TechView on your computer

1. Create a new folder titled CH530 (C:\CH530) on your hard drive. This \CH530 folder is the standard location for the installation file. Storing the installation file in this location helps you remember where it is stored and makes it easier for technical support personnel to assist you.
2. Click the Download link for the latest version on the TechView Software Download page. The File Download – Security Warning dialog box appears.
3. Click Save to copy the installation file to your hard drive. Specify the \CH530 folder you created in Step 1 on the Save dialog box.
4. Double-click the installation (.exe) file. The License Agreement dialog box appears.
5. Click I Agree after reviewing the License Agreement.

The Choose Components dialog box appears. All components are selected by default. (These are the actual MP versions for all units.) Deselect any components you do not want included in the installation.

Note: Deselecting components reduces the size of the installed application.

6. Click Install. The Installation dialog appears with a progress meter indicating the percentage of the installation that has occurred. An installation information file appears when the installation is complete.
7. Click Close to exit the installation routine.

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