



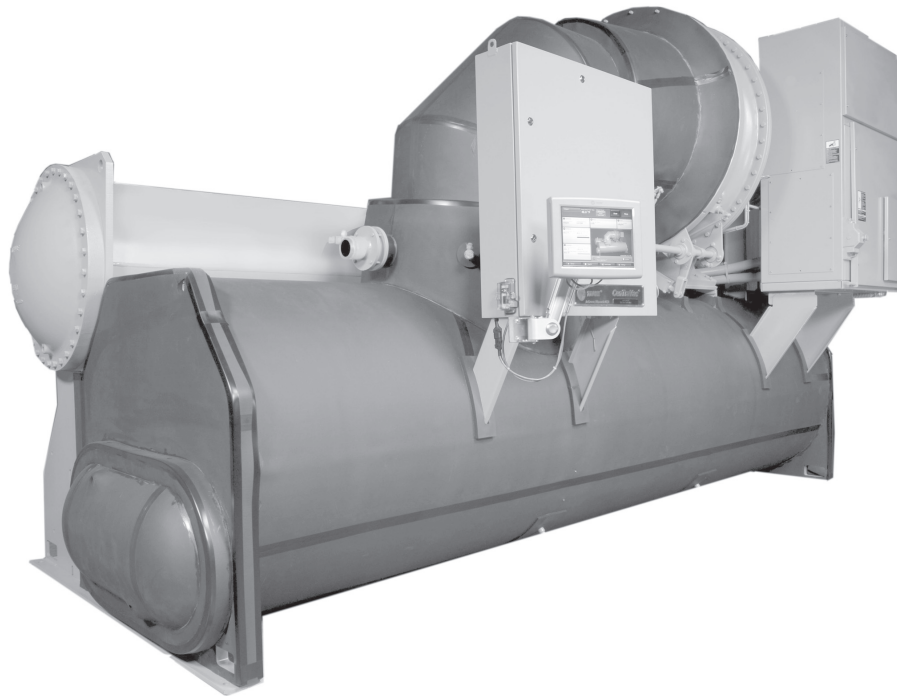
**TRANE®**

# Diagnosics Manual

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## **Diagnostic Descriptions, Troubleshooting Tables, and Control Component Overview**

*for Water-Cooled CenTraVac™ Chillers with  
Tracer AdaptiView™ Control*



X39641070-01A

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January 2008

**CTV-SVD03A-EN**

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**CAUTION:** Indicates a situation that may result in equipment or property-damage only accidents.

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# The Content and Structure of This Manual

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This document provides troubleshooting information for the Tracer AdaptiView Control diagnostics of the Trane CVHE/ F/G, CDHF/G, CVGF chiller units.

This document lists all the CTV UC800 diagnostics by major category, (for example, Starter or MP - Sensor/LLID).

## The Reference Table Columns

The diagnostic reference information in this document is presented in tabular format. For each diagnostic, the table columns list the three-digit code if applicable, diagnostic name, target, severity, persistence, active (inactive) modes, criteria and reset level.

### Column1: Unit Type

Identifies the type of CTV chiller to which the diagnostic applies.

### Column 2: 3DC Hex

Contains the three digit hexadecimal code used on all past products to uniquely identify diagnostics. The following codes were added to cover the unmapped diagnostics:

- 6B4 Unknown Purge Diagnostic
- 6B5 Unknown Starter Diagnostic
- 6B6 Unknown Chiller Diagnostic
- 6B7 Unknown Compressor Diagnostic

### Column 3: Diagnostic Name

Presents the name of the diagnostic and its source. Note that this is the exact text used in the Tracer AdaptiView display and the Tracer TU service tool display. Names are limited to 40 characters or less including spaces.

### Column 4: Effects Target

Specifies the “target” (the component or subsystem) that is affected by the diagnostic. The target is usually either the entire Chiller, or a particular Circuit (the same circuit as the source). However, in special cases, functions are modified or disabled by the diagnostic. In some cases, the affected subtarget, for example, chilled water reset is listed in parenthesis ( ).

Possible targets are:

- Chiller
- Circuit (Only applicable for Duplex items)
- Purge
- Free Cooling
- Hot Gas Bypass
- Ice Building
- Platform

## The Content and Structure of This Manual

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### Column 5: Target Severity

Defines the severity of the above effected target.

- Immediate Shutdown:  
Is the immediate shutdown of the effected portion.
- Normal Shutdown  
Is the normal or friendly shutdown of the effected portion.
- Warning  
Is a informational note or warning issued by the controller.
- See Criteria  
Is used when multiple severities exist. For example, if the target is Free Cooling, a Normal Shutdown means that Free Cooling is shut down. The chiller is still allowed to do powered cooling.

### Column 6: Target Persistence

Specifies either (1) that the diagnostic and its effects must be manually reset (Latching), or (2) that it can be manually or automatically reset (Nonlatching).

### Column 7: Active Modes [Inactive Modes]

States the modes or periods of operation during which the diagnostic is active. The inactive modes are enclosed in brackets, [ ]. Note that the modes used in this column are internal and not generally transmitted to any of the formal mode displays.

### Column 8: Criteria

Quantitatively defines the criteria used by the controller in generating the diagnostic and, if Nonlatching, the criteria for auto reset. If more explanation is necessary, a product support case may be referenced.

### Column 9: Reset Level

Defines the lowest level of manual diagnostic reset command that can clear the diagnostic. The manual diagnostic reset levels in order of priority are: Local and Remote. For example, a diagnostic that has a reset level of Remote, can be reset by either a remote diagnostic reset command or by a local diagnostic reset command.

The label Circuit X and Purge X are used for the Duplex target information. X can be either 1 or 2.

## Message Tables

The last two sections present messages in a two-column message and explanation format.

# Starter Diagnostics

These diagnostics are called out by the Starter module and communicated to the Main Processor.

**Table 1. Starter Diagnostics**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	F0	Starter Did Not Transition	Chiller Circuit X	Immediate Shutdown	Latching	Starting Compressor: On the first check after initiate transition.	For all electromechanical starters: The Starter Module did not receive a transition complete signal within 2.5 seconds 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.	Local
Simplex Duplex Gear Drive FastPak	1F5	Starter Did Not Fully Accelerate	Chiller Circuit X	Immediate Shutdown	Latching	Starting Compressor	For non-communicating SSS and non-communicating AFD: The Starter Module did not receive an Up to Speed (from SSS) or At Speed (from AFD) signal within the Maximum Acceleration Setting setpoint.	Local
Simplex Duplex Gear Drive FastPak	E5	Phase Reversal	Chiller Circuit X	Immediate Shutdown	Latching	Compressor energized to transition command [All Other Times]	Phase Reversal Protection disabled: No effect Phase Reversal Protection enabled: 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 .7 seconds from compressor start.	Local
Simplex Duplex Gear Drive FastPak	188	Starter Dry Run Test	Chiller Circuit X	Immediate Shutdown	Latching	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
Simplex Duplex Gear Drive FastPak	E4	Phase Loss	Chiller Circuit X	Immediate Shutdown	Latching	Compressor Start Sequence and Running and Stopping modes	Phase Reversal Protection disabled: 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. Actual design trippoint is 10% RLA. Time to trip shall be longer than guaranteed reset on Starter Module at a minimum, 3 seconds maximum. The actual design trip time is 2.64 seconds. Phase Reversal Protection enabled: Current is not sensed on one or two of the current transformer inputs. Logic will detect and trip in a maximum of 0.7 second from compressor start.	Local

## Starter Diagnostics

**Table 1. Starter Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	D9	Power Loss	Chiller Circuit X	Immediate Shutdown	Nonlatching	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 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", Phase Loss or a "Starter Did Not Transition" latching diagnostic.	Local
Simplex Duplex Gear Drive FastPak	E2	Momentary Power Loss	Chiller Circuit X	Immediate Shutdown	Nonlatching	All compressor running and stopping modes [all compressor starting and non-running modes]	Momentary Power Loss option disabled: No effect Momentary Power Loss option enabled: A loss of power of three line cycles or more was detected. Diagnostic is reset in 30 seconds.	Local
Simplex Duplex Gear Drive FastPak	1B2	Severe Current Unbalance	Chiller Circuit X	Normal Shutdown	Latching	All modes compressor is running	A motor Current Unbalance has been detected on one line relative to the average of all 3 lines that exceeds the Current Unbalance Trip Point setpoint for a continuous time longer than the Current Unbalance Grace Period setpoint.	Local
Simplex Duplex Gear Drive FastPak	1E9	Starter Fault Type I	Chiller Circuit X	Immediate Shutdown	Latching	Starting Compressor. Y Delta Starters Only	This is a specific starter test where 1M(2K1) 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 or a wiring error exists.	Local

## Starter Diagnostics

**Table 1. Starter Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	1ED	Starter Fault Type II	Chiller Circuit X	Immediate Shutdown	Latching	Starting Compressor All types of starters	This is a specific starter test where the Shorting Contactor S(2K3) 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 or a wiring error exists. 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 relay output).	Local
Simplex Duplex Gear Drive FastPak	1F1	Starter Fault Type III	Chiller Circuit X	Immediate Shutdown	Latching	Starting Compressor [Adaptive Frequency Drive Starter Type]	As part of the normal start sequence to apply power to the compressor, the Shorting Contactor S(2K3) and then the Main Contactor 1M(2K1) 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
Simplex Duplex Gear Drive FastPak	3D5	Transition Complete Input Shorted	Chiller Circuit X	Immediate Shutdown	Latching	Waiting to Start	The Transition Complete input was found to be shorted before the compressor was started. This is active for all electromechanical starters.	Local
Simplex Duplex Gear Drive FastPak	3D6	At Speed Input Shorted	Chiller Circuit X	Immediate Shutdown	Latching	Waiting to Start	The At Speed (For AFD)/Up to Speed (For SSS) input was found to be shorted before the compressor was started. This is active for all non-communicating SSS and non-communicating AFDs.	Local
Simplex Duplex Gear Drive FastPak	3D7	Transition Complete Input Opened	Chiller Circuit X	Immediate Shutdown	Latching	All compressor running modes after successful transition	The Transition Complete input was found to be shorted with the compressor motor running after a successful completion of transition. This is active for all electromechanical 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
Simplex Duplex Gear Drive FastPak	3D8	At Speed Input Opened	Chiller Circuit X	Immediate Shutdown	Latching	All compressor running modes after successful acceleration	The At Speed input was found to be opened with the compressor motor running after successfully obtaining at speed condition. Applies only to non-communicating Solid State Starters.	Local
Simplex Duplex Gear Drive FastPak	EC	Motor Current Overload	Chiller Circuit X	Immediate Shutdown	Latching	Compressor running in Running and Preparing to Shut Down	Compressor current exceeded overload time vs. trip characteristic.	Local



## Starter Diagnostics

**Table 1. Starter Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	EE	Compressor Did Not Accelerate: Shutdown	Chiller Circuit X	Immediate Shutdown	Latching	Compressor Accelerating	Acceleration Time Out Action set to Shutdown: Compressor motor current did not drop below 85% RLA within the Maximum Acceleration Setting setpoint. Compressor motor de-energized. Acceleration Time Out Action set to Transition: See diagnostic for Compressor Did Not Accelerate: Transitioned	Local
Simplex Duplex Gear Drive FastPak	1FA	Compressor Did Not Accelerate: Transition	Chiller Circuit X	Warning	Latching	Compressor Accelerating	Acceleration Time Out Action set to Transition: Compressor motor current did not drop below 85% RLA within the Maximum Acceleration Setting setpoint. Compressor motor put across the line. Overloads need to be verified to determine if the chiller system is set up properly. Improper settings could make the current that was sensed appear over the 85%. (Other reasons may exist as well.) See diagnostic for Compressor Did Not Accelerate: Shutdown.	Local
Simplex Duplex Gear Drive FastPak	CA	Starter Contactor Interrupt Failure	Chiller Circuit X	Immediate Shutdown	Latching	Starter Contactor not Energized [Starter Contactor Energized]	Welded starter contactor 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 for all electromechanical and solid state starters. Detection time for Adaptive Frequency Drives shall be 12 seconds minimum and 20 seconds maximum. On detection and until the controller is manually reset: generate diagnostic, energize the appropriate alarm relay, continue to energize the Evap Water and oil Pump Outputs, continue to command the affected compressor off, fully unload the effected compressor and command a normal stop to all other compressors (Duplex)	Local
Simplex Duplex Gear Drive FastPak	6B5	Starter Module Memory Error Type I	Chiller Circuit X	Warning	Latching	All	Checksum on RAM copy of the Starter LLID configuration failed. Configuration recalled from EEPROM.	Local
Simplex Duplex Gear Drive FastPak	6B5	Starter Module Memory Error Type II	Chiller Circuit X	Immediate Shutdown	Latching	All	Checksum on EEPROM copy of the Starter LLID configuration failed. Factor default values used.	Local
Simplex Duplex Gear Drive FastPak	2D0	Starter Comm Loss: Main Processor	Chiller Circuit X	Immediate Shutdown	Latching	All	The Starter module detected a continual loss of communication with the main processor for greater than the Communications Loss Time bound setpoint.	Local

## Starter Diagnostics

**Table 1. Starter Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B5	L1 Current Transformer Polarity Reversed	Chiller Circuit X	Warning	Latching	Compressor Start Sequence and Running and Stopping modes	Power Monitoring option disabled: No effect Power Monitoring option enabled: The L1 transformer signal polarity was found to be reversed. Detection time shall be 3 seconds minimum and 5 seconds maximum.	Local
Simplex Duplex Gear Drive FastPak	6B5	L2 Current Transformer Polarity Reversed	Chiller Circuit X	Warning	Latching	Compressor Start Sequence and Running and Stopping modes	Power Monitoring option disabled: No effect Power Monitoring option enabled: The L2 transformer signal polarity was found to be reversed. Detection time shall be 3 seconds minimum and 5 seconds maximum.	Local
Simplex Duplex Gear Drive FastPak	6B5	L3 Current Transformer Polarity Reversed	Chiller Circuit X	Warning	Latching	Compressor Start Sequence and Running and Stopping modes	Power Monitoring option disabled: No effect Power Monitoring option enabled: The L3 transformer signal polarity was found to be reversed. Detection time shall be 3 seconds minimum and 5 seconds maximum.	Local
Simplex Duplex Gear Drive FastPak	6B5	VAB Potential Transformer Polarity Reversed	Chiller Circuit X	Warning	Latching	All	Power Monitoring option disabled: No effect Power Monitoring option enabled: The VAB potential transformer signal polarity was found to be reversed. Detection time shall be 3 seconds minimum and 5 seconds maximum.	Local
Simplex Duplex Gear Drive FastPak	6B5	VBC Potential Transformer Polarity Reversed	Chiller Circuit X	Warning	Latching	All	Power Monitoring option disabled: No effect Power Monitoring option enabled: The VBC potential transformer signal polarity was found to be reversed. Detection time shall be 3 seconds minimum and 5 seconds maximum.	Local
Simplex Duplex Gear Drive FastPak	6B5	VCA Potential Transformer Polarity Reversed	Chiller Circuit X	Warning	Latching	All	Power Monitoring option disabled: No effect Power Monitoring option enabled: The VCA potential transformer signal polarity was found to be reversed. Detection time shall be 3 seconds minimum and 5 seconds maximum.	Local
Simplex Duplex Gear Drive FastPak	6B5	Voltage Phase Reversal	Chiller Circuit X	Warning	Latching	Compressor Start [All Other Times]	Power Monitoring option disabled: No effect Power Monitoring option enabled: A phase reversal was detected on the incoming voltage. On a compressor startup the phase reversal logic must detect and trip in a maximum of 7 second from compressor start.	Local

## Starter Diagnostics

**Table 1. Starter Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	E4	Current L1 Loss	Chiller	Warning	Latch	Start Sequence and Run modes	No current was sensed on the current transformer L1 input while starting or running. 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. If Phase reversal protection is enabled and current is not sensed on one or more current transformer inputs. Logic will detect and trip in a maximum of 0.3 second from compressor start.	Local
Simplex Duplex Gear Drive FastPak	E4	Current L2 Loss	Chiller	Warning	Latch	Start Sequence and Run modes	No current was sensed on the current transformer L2 input while starting or running. 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. If Phase reversal protection is enabled and current is not sensed on one or more current transformer inputs. Logic will detect and trip in a maximum of 0.3 second from compressor start.	Local
Simplex Duplex Gear Drive FastPak	E4	Current L3 Loss	Chiller	Warning	Latch	Start Sequence and Run modes	No current was sensed on the current transformer L3 input while starting or running. Time to trip shall be longer than guaranteed reset on Starter Module at a minimum, 3 seconds max. Actual design trip point is 10%. The actual design trip time is 2.64 seconds. If Phase reversal protection is enabled and current is not sensed on one or more current transformer inputs. Logic will detect and trip in a maximum of 0.3 second from compressor start.	Local
Simplex Duplex Gear Drive FastPak	6B5	Voltage VAB Loss	Chiller Circuit X	Warning	Latching	Start Sequence and Run modes	Power Monitoring option disabled: No effect Power Monitoring option enabled: No voltage was sensed on the potential transformer VAB input while starting or running. Detection time shall be 3 seconds min and 5 seconds max. Actual design trip point is 5 V at the Starter LLID input.	Local

**Table 1. Starter Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B5	Voltage VBC Loss	Chiller Circuit X	Warning	Latching	Start Sequence and Run modes	Power Monitoring option disabled: No effect Power Monitoring option enabled: No voltage was sensed on the potential transformer VBC input while starting or running. Detection time shall be 3 seconds min and 5 seconds max. Actual design trip point is 5 V at the Starter LLID input.	Local
Simplex Duplex Gear Drive FastPak	6B5	Voltage VCA Loss	Chiller Circuit X	Warning	Latching	Start Sequence and Run modes	Power Monitoring option disabled: No effect Power Monitoring option enabled: No voltage was sensed on the potential transformer VCA input while starting or running. Detection time shall be 3 seconds min and 5 seconds max. Actual design trip point is 5 V at the Starter LLID input.	Local



# Adaptive Frequency Drive Diagnostics

These diagnostics are called out by the Adaptive Frequency Drive and communicated to the Main Processor.

**Table 2. Adaptive Frequency Drive Diagnostics**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex FastPak	6B5	AFD Power Loss	Chiller Circuit X	Immediate Shutdown	Nonlatching	All Compressor Starting and Running modes	When power is lost for a longer period such that drive operation is impaired, the drive shall take action based on the Power Loss Mode and wait an adjustable Power Loss Time before setting a Power Loss Diagnostic that will keep the drive in the stop mode. When power is restored, the drive shall wait an adjustable Power Loss Reset Time and then automatically clear this diagnostic.	Local
Simplex Duplex FastPak	6B5	AFD Start Inhibited	Chiller Circuit X	Normal Shutdown	Nonlatching	Waiting to Start	The drive may inhibit starts due to internal conditions such as temperature.	Local
Simplex Duplex FastPak	EC	AFD Motor Current Overload	Chiller Circuit X	Immediate Shutdown	Latching	Compressor Starting and Running modes	Compressor motor current exceeded overload time vs. trip characteristic. It is assumed that the drive will not need a different overload function for starting vs. running because it will limit current during a start.	Local
Simplex Duplex FastPak	6B5	AFD Motor Short	Chiller Circuit X	Immediate Shutdown	Latching	All	Motor or power stage is shorted.	Local
Simplex Duplex FastPak	6B5	AFD Instantaneous Current Overload	Chiller Circuit X	Immediate Shutdown	Latching	All	The drive itself detected instantaneous overcurrent.	Local
Simplex Duplex FastPak	6B5	AFD High Temperature	Chiller Circuit X	Immediate Shutdown	Latching	All	The drive transistor temperature was detected to be above a safe temperature.	Local
Simplex Duplex FastPak	E4	AFD Output Phase Loss	Chiller Circuit X	Immediate Shutdown	Latching	All	A greater than 15% current unbalance is detected for more than 5 seconds while running or starting.	Local
Simplex Duplex FastPak	6B5	AFD Ground Fault	Chiller Circuit X	Immediate Shutdown	Latching	All	The drive detected ground fault current.	Local
Simplex Duplex FastPak	6B5	HPC/High AFD Heat Sink Water Pressure	Chiller Circuit X	Immediate Shutdown	Latching	All	The 'Gate Kill' input to the AFD opened. The devices that may open this circuit are the condenser high pressure cutout switch N.C. contact opening or the heat sink water pressure switch opening.	Local
Simplex Duplex FastPak	2D0	AFD Communication Loss: Main Processor	Chiller Circuit X	Immediate Shutdown	Latching	All	The AFD detected a continual loss of communication with the main processor for greater than the Communications Loss Time bound setpoint.	Local

## Adaptive Frequency Drive Diagnostics

**Table 2. Adaptive Frequency Drive Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex FastPak	6B5	AFD High Bus Voltage	Chiller Circuit X	Immediate Shutdown	Latching	All	High DC bus voltage was detected on the drive.	Local
Simplex Duplex FastPak	6B5	AFD Control Board Memory Error Type II	Chiller Circuit X	Immediate Shutdown	Latching	All	Checksum on the EEPROM on the Control board configuration failed. Factory defaults used.	Local
Simplex Duplex FastPak	6B5	AFD General Fault	Chiller Circuit X	Immediate Shutdown	Latching	All	A failure within the AFD exists. Clear the diagnostic. If persists, contact tech support	Local
Simplex Duplex FastPak	6B5	AFD Fatal Software Error	Chiller Circuit X	Immediate Shutdown	Latching	All	A fatal software fault has occurred. Cycle power. If persists, contact tech support	Local
Simplex Duplex FastPak	6B5	AFD I/O Board Failure	Chiller Circuit X	Immediate Shutdown	Latching	All	A failure has occurred on the I/O board. Clear the diagnostic. If persists, contact tech support	Local
Simplex Duplex FastPak	6B5	AFD Power Intfc Controller Board Failure	Chiller Circuit X	Immediate Shutdown	Latching	All	A failure has occurred on the Power Interface Controller (PIC) board. Clear the diagnostic. If persists, contact tech support	Local
Simplex Duplex FastPak	6B5	AFD Power Structure Board Failure	Chiller Circuit X	Immediate Shutdown	Latching	All	A failure has occurred on the Power Structure board. Clear the diagnostic. If persists, contact tech support	Local
Simplex Duplex FastPak	6B5	AFD DPI Communication Failure	Chiller Circuit X	Immediate Shutdown	Latching	All	A failure has occurred with the internal DPI communications interface.	Local
Simplex Duplex FastPak	6B5	AFD RS485 Board Memory Error Type II	Chiller Circuit X	Immediate Shutdown	Latching	All	Checksum on the EEPROM on the RS485 board failed. Factory default values used.	Local

While the chiller is in the diagnostic state (not yet reset) and an AFD Fault Exists, attach the Tracer TU service tool and go to the AF expanding box on the Unit Status tab screen and look for the AFD Last Diagnostic Code (decimal) property. Then compare to the following drive fault table for additional information.

**Table 3. Fault Codes**

No.	Fault	No.	Fault	No.	Fault
2	Auxiliary Input	77	Volts Range	216	Rctfr Gnd Fault
3	Power Loss	78	FluxAmps Rang	217	Rctfr Base Temp
4	Under Voltage	79	Excessive Load	218	Rctfr IGBT Temp
5	Over Voltage	80	AutoTune Aborted	219	Rctfr IT Overld
7	Motor Overload	81-85	Port 1-5 DPI Loss	220	Rctfr 12T Overld
8	Invtr Base Temp	87	IXo Voltage Range	221	Ride Thru Abort
9	Invtr IGBT Temp	100	Parameter Chksum	222	High AC Line
12	HW OverCurrent	101	UnserSet1 Chksum	223	Low DC Bus
13	Ground Fault	102	UserSet2 Chksum	224	Rctfr Over Volt
24	Decel Inhibit	103	UserSet3 Chksum	225	Input I Imbalance
25	OverSpeed Limit	104	Pwr Brd Chksum1	226	Input V Imbalance
29	Analog in Loss	105	Pwr Brd Chksum2	227	AC Line Lost



## Adaptive Frequency Drive Diagnostics

**Table 3. Fault Codes (continued)**

No.	Fault	No.	Fault	No.	Fault
30	NTC Demux Fail (2)	106	Incompat MCB-PB	228	Line Feq Lost
31	Inv Temp Switch (2)	107	Replaced MCB-PB	229	Rctfr Checksum
33	Auto Rstrt Tries	120	I/O Mismatch (3)	230	Invtr HW Unk
35	Current Fbk Lost	121	I/O Comm Loss	231	Rctfr HW Unk
36	SW OverCurrent	122	I/O Board Fail (3)	232	Rctfr Not OK
37	Motor I Imbalance	123	Invtr Unk IO Brd (2)	233	Precharge Closed
38	Phase U to Grnd	197-199	Invtr Dsat U-, V-, W- (2)	234	Precharge Opened
39	Phase V to Grnd	200-202	Invtr Dsat U, V, W (3)	235	Rctfr Pwr Board
40	Phase W to Grnd	200-202	Invtr Dsat U+, V+, W+ (2)	236	Rctfr IO Board
41	Phase UV Short	203-205	Invtr Over Cur U, V, W	237	Not at Voltage
42	Phase VW Short	206	Invtr HW Unused (3)	238	Rctfr Not Login
43	Phase WU Short	207	Invtr Gate Kill	239	Power Phased ACB
48	Params Defaulted	208-210	Rctfr Dsat R, S, T (3)	240	Rctfr Gate Kill (2)
63	Shear Pin	208-210	Rctfr Dsat R+, S+, T+ (2)	241-243	Rctfr Dsat R-, S-, T- (2)
64	Drive Overload	211-213	Rctfr Over Cur R, S, T	244	Rctfr NTC Demux (2)
70	HW Fault	214	Reactor Temp	245	Rctfr Unk IO Brd (2)
71-75	Port 1-5 Adapter	215	Rctfr HW Unused (3)	246	Rctfr DPI Comm (2)

**Note:** Notes: (1) = Fault Numbers not listed are reserved for future use. (2) = Fault available on Frame 4 drive only (3) = Fault available on Frame 3 drives only

# Main Processor, Defective Sensor, or LLID Diagnostics

These are diagnostics that the Main Processor calls out after determining the data it is receiving from the Low Level Intelligent Device (LLID) is invalid or the LLID itself is indicating its data is invalid. This section includes the Purge sensor and LLID diagnostics.

**Table 4. Main Processor Defective Sensor or LLID Diagnostics**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	87	External Chilled/ Hot Water Setpoint	Chiller (Ext. Chilled Water Setpoint)	Warning	Nonlatching	All	This diagnostic will handle either functions of Ext. Chilled Water or Ext. Hot Water setpoint. Function Not "Enabled": no diagnostics. Function "Enabled ": Out-Of-Range Low or Hi or bad LLID, set diagnostic. External CWS (or HWS if selected) command will withdraw from decision to do CWS (or HWS if selected). This warning diagnostic will automatically reset if the input returns to the normal range. See Operation Maintenance manual.	Remote
Simplex Duplex Gear Drive FastPak	89	External Current Limit Setpoint	Chiller (Ext Current Limit setpoint)	Warning	Nonlatching	All	Not "Enabled": no diagnostics. "Enabled": Out-Of-Range Low or Hi or bad LLID, set diagnostic. External current limit command will withdraw from decision to do current limit. This warning diagnostic will automatically reset if the input returns to the normal range. See Operation Maintenance manual.	Remote
Simplex Duplex Gear Drive FastPak	8E	Evaporator Entering Water Temp Sensor	Chiller (Chilled Water Reset, Feed forward control, Ice Building)	See Criteria	See Criteria	All	Defective Sensor or LLID. Chiller in mode other than Ice Building: Severity is warning, persistence is latching, reset is remote If chiller in Return or Constant Return Chilled Water Reset, set CWS equal to the next higher priority chilled water setpoint Feed forward control is disabled. Display invalid value for temperature Hot water operation: No effect on controls If Chiller in Ice Building mode: Severity is Normal, persistence is Latching, reset is Remote.	See Criteria
Simplex Duplex Gear Drive FastPak	AB	Evaporator Leaving Water Temp Sensor	Chiller	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value for temperature	Remote

## Main Processor, Defective Sensor, or LLID Diagnostics

**Table 4. Main Processor Defective Sensor or LLID Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	9A	Condenser Entering Water Temp Sensor	Chiller	Warning	Latching	All	Defective Sensor or LLID Normal heating operation: feed forward control is disabled. Chilled water operation: No effect on controls Display invalid value for temperature	Remote
Simplex Duplex Gear Drive FastPak	9B	Condenser Leaving Water Temp Sensor	Chiller	See Criteria	Latching	All	Defective Sensor or LLID Chilled water control: Severity is Warning Hot water control: Severity is Normal Display invalid value for temperature	Remote
Simplex Duplex Gear Drive FastPak	2EB	Evaporator Diff Water Pressure Xdcr	Chiller	Warning	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	2EC	Condenser Diff Water Pressure Xdcr	Chiller	Warning	Latching	All	Defective Sensor or LLID Display invalid value Flow calculation shall be disabled.	Remote
Simplex Duplex Gear Drive FastPak	2E9	Second Condenser Entering Water Temp Sensor	Chiller	Warning	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	2EA	Second Condenser Leaving Water Temp Sensor	Chiller	Warning	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	AD	Evaporator Saturated Refrigerant Temp Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value for temperature	Remote
Simplex Duplex Gear Drive FastPak	8F	Condenser Saturated Refrigerant Temp Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID	Remote
Simplex	2A4	Purge Liquid Temperature Sensor	Purge	Normal Shutdown	Latching	Retrofit Purge	Display invalid value Note: This sensor only exists for a Retrofit Purge. For a unit mount Purge, the Cond or Evap sat. Refrigerant Temperature is used depending on whether the compressor is running or not.	Remote
Simplex Duplex Gear Drive FastPak	AC	Condenser Refrigerant Pressure Xdcr	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	A9	Oil Tank Temperature Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote

## Main Processor, Defective Sensor, or LLID Diagnostics

**Table 4. Main Processor Defective Sensor or LLID Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	2F1	Oil Pump Discharge pressure Transducer	Chiller Circuit X	Immediate Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	2F3	Oil Tank Pressure Transducer	Chiller Circuit X	Immediate Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	A4	Motor Winding Temperature 1 Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	A7	Motor Winding Temperature 2 Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	A8	Motor Winding Temperature 3 Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	AF	Inboard Bearing Temperature Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	B0	Outboard Bearing Temperature Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	284	Compressor Discharge Refrigerant Temperature Sensor	Chiller Circuit X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	A1	Outdoor Air Temperature Sensor	Chiller (Chilled Water Reset)	Warning	Nonlatching	All	Defective Sensor or LLID. Operation other than outdoor chilled water reset: No effect on controls See Operation Maintenance Manual for additional information. Display invalid value for temperature This warning diagnostic will automatically reset if the temperature returns to the normal range.	Remote
Simplex Duplex Gear Drive FastPak	2A3	Purge Compressor Suction Refrigerant Temp Sensor	Purge Purge X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote



## Main Processor, Defective Sensor, or LLID Diagnostics

**Table 4. Main Processor Defective Sensor or LLID Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B4	Purge Carbon Tank Temperature Sensor	Purge Purge X	Normal Shutdown	Latching	All	Defective Sensor or LLID Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	4C4	External Base Loading Setpoint	Chiller (Base Loading)	Warning	Nonlatching	Base Loading	Defective Sensor or LLID Display invalid value External base load Not "Enabled": no diagnostic. Function "Enabled": Out-Of-Range Low or Hi or bad LLID, set diagnostic, default base load setpoint to next level of priority (e.g. Front Panel Setpoint). This warning diagnostic automatically resets if the input returns to the normal range.	Remote
FastPak	6B7	RLA Input	Chiller	Normal Shutdown	Latching	All	Out-Of-Range Low or Hi or bad LLID.	

# Main Processor Purge Diagnostics

These are diagnostics that the Main Processor calls out pertaining to the Purge functions. Note that the diagnostics for the Purge Defective Sensor or LLIDs are listed in the Defective Sensor or LLID Diagnostics section.

**Table 5. Main Processor Purge Diagnostics**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	2A5	Purge Liquid Level Too High Warning	Purge Purge X	Normal Shutdown	Nonlatching	All	The level switch was open for more than 20 minutes. Diagnostic self-resets if switch is closed 20 minutes after the diagnostic occurs.	Remote
Simplex Duplex Gear Drive FastPak	2A5	Purge Liquid Level Too High Continuously	Purge Purge X	Normal Shutdown	Latching	All	The liquid level switch is still open 20 minutes after the initial liquid level diagnostic, or the initial liquid level diagnostic has occurred more than 4 times in 4 hours.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Purge Carbon Regen Temperature Not Satisfied	Purge Purge X	Normal Shutdown	Latching	All	The carbon tank temperature did not reach the required minimum temperature - 30F within 4 hours after energizing the carbon tank heater.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Purge Carbon Regen Temperature Limit Exceeded	Purge Purge X	Normal Shutdown	Latching	All	The carbon tank temperature exceeded 120% of the regeneration temperature setpoint, or the carbon temperature did not decrease more than 25°F in the first hour after entering the cool down portion of the carbon regeneration process. In either case, the diagnostic should disable the purge and open the exhaust solenoid valve.	Remote
Simplex Duplex Gear Drive FastPak	2AA	Purge Daily Pumpout Limit Exceeded	Purge Purge X	Normal Shutdown	Nonlatching	All	The 24 hour average pumpout exceeded the daily pumpout limit setpoint. Diagnostic will clear when pumpout limit is no longer exceeded.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Carbon Regeneration Temperature Too Low	Purge Purge X	Warning	Latching	All	The purge carbon temperature did not increase more than 25°F in the first hour after a carbon regeneration cycle was initiated. This is intended to identify a failed heater or temperature sensor. The diagnostic should disable future regeneration cycles, but allow all other purge algorithms to function.	Remote



# Main Processor Unit Level Diagnostics

These are diagnostics that the main processor calls out excluding those listed in the Defective Sensor or LLID, Purge, Communication, Main Processor, and Boot Messages and Special Troubleshooting Messages diagnostic sections.

**Table 6. Main Processor Unit Level Diagnostics**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	FB	Low Evaporator Refrigerant Temperature	Chiller Chiller X	Immediate Shutdown	Latching	All	The Evaporator Saturated Refrigerant Temperature dropped below the Low Refrigerant Temperature Cutout Setpoint for 30°F-sec.	Local
Simplex Duplex Gear Drive FastPak	F4	High Oil Temperature	Chiller Chiller X	Immediate Shutdown	Latching	All	If Oil Temperature exceeds 180°F (for CVHE, FG, CDHE, F) for more than 120°F seconds this diagnostic is issued.. (There will be a different cutout for CVGF)	Remote
Simplex Duplex Gear Drive FastPak	C5	Low Evap Leaving Water Temperature: Unit Off (Unit in auto but not starting or running)	Chiller (Evap Pump)	Warning	Nonlatching	Unit in Stop Mode, or in Auto Mode and No Ckt's Energized (Any Ckt Energized)	The evaporator leaving water temp. fell below the leaving evaporator 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 Evap Water pump Relay until diagnostic auto resets, then return to normal evap pump control. Automatic reset occurs when the temp rises 2(F (1.1(C) above the cutout setting for 2 minutes.	Remote
Simplex Duplex Gear Drive FastPak	C6	Low Evap Leaving Water Temp: Unit On	Chiller	Immediate Shutdown	Nonlatching	Any Ckt(s) Energized (No Ckt's Energized)	The evaporator leaving 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
Simplex Duplex Gear Drive FastPak	384	Evaporator Water Flow Overdue	Chiller	Normal Shutdown	Nonlatching	Estab. Evap. Water Flow on going from STOP to AUTO	Evaporator water flow was not proven within 4.25 minutes of the Evap. water pump relay being energized. The diagnostic will de-energize the Evaporator Water Pump output. It will be re-energized if the diagnostic clears with the return of flow and the chiller will be allowed to restart normally (to accommodate external control of pump) In manual pump control, whether in auto or stop mode, This diagnostic shall be called, however the pump will remain energized.	Remote

## Main Processor Unit Level Diagnostics

**Table 6. Main Processor Unit Level Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	ED	Evaporator Water Flow Lost	Chiller	Immediate Shutdown	Nonlatching	All Stop Modes	<p>The evaporator water flow switch input was open for more than 6-10 contiguous seconds.</p> <p>This diagnostic does not de-energize the evap pump output. (Is in Evap. Water Pump Override.)</p> <p>Transitioning from auto to stop de-energizes the Evap Water pump even if in Evap. Water Pump Override. The Evaporator Water Flow Lost Diagnostic is then cleared.</p> <p>6-10 seconds of contiguous flow shall clear this diagnostic.</p> <p>Even though the pump times out in the STOP modes, this diagnostic shall not be called out in the STOP modes.</p> <p>In manual pump control, whether in auto or stop mode, this diagnostic shall be called, and the pump will remain energized.</p>	Remote
Simplex Duplex Gear Drive FastPak	6B6	High Evaporator Water Temperature	Chiller	Info and Special Action	Nonlatch	<p>Only effective if either</p> <ol style="list-style-type: none"> <li>1)Evap Wtr Flow Overdue,</li> <li>2)Evap Wtr Flow Loss, or</li> <li>3)Low Evap Rfgt Temp,- Unit Off,</li> </ol> <p>diagnostic is active.</p>	<p>The Leaving Water Temperature exceeded the High Evap Water Temp Limit (Tracer TU service tool settable -default 105°F) for 15 continuous seconds. The evaporator water pump relay will be de-energized to stop the pump but only if it is running due to one of the diagnostics listed in 'Active modes'. The diagnostic auto resets and the pump returns 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.</p>	Local



## Main Processor Unit Level Diagnostics

**Table 6. Main Processor Unit Level Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	F5	Condenser High Pressure Cutout	Chiller Chiller X	Immediate Shutdown	Latching	All	Condenser pressure exceeded the trip point of the form C HPC switch causing it to open its N.C. contacts removing power from the compressor motor contactors and closing its N.O. contacts supplying a signal to the Tracer™ AdaptiView controls that it was the HPC switch that shut down the compressor. Other diagnostics that may occur as an expected consequence of the HPC trip will be suppressed from annunciation. These include Phase Loss, Power Loss, MPL and Transition Complete Input Open. For CVHE/E/G and CDHE/F, the available HPC trip points are 15 and 25 PSIG. (check sales order) The Condenser Refrigerant temperature or pressure sensors are not used to initiate a high pressure shutdown.	Local
Simplex Duplex Gear Drive FastPak	FD	Emergency Stop	Chiller	Immediate Shutdown	Latching	All	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
Simplex Duplex Gear Drive FastPak	399	MP: Invalid Configuration	Platform	Immediate Shutdown	Latching	All	MP recalled a configuration from nonvolatile memory that is not compatible with installed application, i.e. new software downloaded does not match configuration in MP.	NA
Simplex Duplex Gear Drive FastPak	1AD	MP: Non-Volatile Memory Reformat	Platform	Warning	Latching	All	MP has determined there was an error in a sector of the Non-Volatile memory and it was reformatted. Most likely recalled default setpoints. Check settings.	Local
Simplex Duplex Gear Drive FastPak	2E6	Check Clock	Platform	Warning	Latching	All	The real time clock had an error. The real time clock had detected loss of its oscillator at some time in the past. This diagnostic can be effectively cleared only by writing a new value to the chiller's time clock using the Tracer TU or Tracer AdaptiView display "set chiller time" functions.	Remote
Simplex Duplex Gear Drive FastPak	1D1	MP: Could Not Store Starts and Hours	Platform	Warning	Latching	All	On power-up, MP has determined that it could not complete the previous power-down store. Starts and Hours may have been lost for the last 24 hours. Most likely due to a setpoint store in progress at time of power down.	Remote
Simplex Duplex Gear Drive FastPak	1D2	MP: Non-Volatile Block Test Error	Platform	Warning	Latching	All	On power up, MP has detected a CRC error with a block in the Non-Volatile memory. Check diagnostic history and settings. Could loose history block and some setpoints. Recall ROM defaults for lost setpoints. Up to three blocks may fail before the sector is reformatted (diagnostic 1AD)	Local

## Main Processor Unit Level Diagnostics

**Table 6. Main Processor Unit Level Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	D9	MP: Reset Has Occurred	Platform	Warning	Latching	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.	Remote
Simplex Duplex Gear Drive FastPak	DA	Extended Compressor Surge	Chiller Chiller X	Normal Shutdown	See Criteria	Running and Stopping	Chiller not in Ice Building mode: An extended surge condition was detected and the Surge Protection feature was enabled. An extended surge condition is defined as being in a "continuous" surge condition for 7 + 10% minutes. Severity is Normal, persistence is Latching. Chiller in Ice Building mode: An extended surge condition was detected while in Ice Building Mode. Severity is Normal, persistence is Nonlatch. This diagnostic clears when the Ice Building command is withdrawn.	Remote
Simplex Duplex Gear Drive FastPak	D7	Over Voltage	Chiller Chiller X	Normal Shutdown	Nonlatching	Starting and any Ckt(s) Energized	Over/Under voltage option not selected: No effect Over/Under voltage option selected This diagnostic is called when the average of the three line voltages is greater than 112.5% of the Unit Line Voltage setpoint for 60 seconds. Diagnostic cleared when the average of the three line voltages is 110% or less of the Unit Line Voltage setpoint.	Remote
Simplex Duplex Gear Drive FastPak	D8	Under Voltage	Chiller Chiller X	Normal Shutdown	Nonlatching	Starting and any Ckt(s) Energized	Over/Under voltage option not selected: No effect Over/Under voltage option selected Diagnostic called when the average of the three line voltages is less than 87.5% of the Unit Line Voltage setpoint for 60 seconds. Diagnostic cleared when the average of the three line voltages is 90% or greater of the Unit Line Voltage setpoint.	Remote
Simplex Duplex Gear Drive FastPak	2F4	Low Evaporator Water Flow	Chiller	Warning	Nonlatching	Chiller Auto, manual water pump and All Running Modes	The evaporator water flow measurement option was installed and the flow dropped to or below the Evaporator Low Water Flow Warning Setpoint in Tracer TU. This IFW shall be Auto Reset and reset 0.1 gpm/ton above the adjustable trip point or when the evaporator water pump is turned off. (See "Evaporator Variable Flow Compensation," p. 76.)	Remote



## Main Processor Unit Level Diagnostics

**Table 6. Main Processor Unit Level Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	DC	Condenser Water Flow Overdue	Chiller	Normal Shutdown	Nonlatching	Waiting to Start	Condenser water flow was not proven within 4.25 minutes of the Condenser water pump relay being energized. The diagnostic will de-energize the Condenser Water Pump output. It will be re-energized if the diagnostic clears with the return of flow and the chiller will be allowed to start normally (to accommodate external control of pump)	Remote
Simplex Duplex Gear Drive FastPak	F7	Condenser Water Flow Lost	Chiller	Normal Shutdown	Nonlatching	Starting (after established flow running and stopping) [All Stop Modes]	<p>In cooling mode The condenser water flow proof input was open for more than 6 continuous seconds after flow had been proven. This diagnostic is cleared 7 seconds after the Condenser Water Pump is stopped. The 7 seconds is put in to avoid fast cycling of the condenser pump. In order to arm the Condenser Overdue diagnostic, the condenser pump must be turned off. Seven seconds is a reasonable time to cycle this pump. Do not cycle any faster. The condenser pump will be commanded off, but the evaporator pump command will not be affected.</p> <p>In heating mode the condenser water flow proof input was open for more than 6 contiguous seconds after flow had been proven. This diagnostic is automatically cleared after 6-10 seconds of contiguous flow. This diagnostic does not de-energize the Condenser Water pump output (in Condenser Water Pump override). Transitioning from auto to stop de-energizes the cond water pump even if in Condenser Water Pump Override. The Condenser Water Flow Lost diagnostic is then cleared. Even though the condenser water pump times out in the Stop mode, this diagnostic is not called out in the Stop mode.</p>	Remote
Simplex Duplex Gear Drive FastPak	F9	Free Cooling Actuators Not Open	Free Cooling	Normal Shutdown	Latching	Free Cooling	The FC valve closed limit switches did not open within 3 minutes after energizing the FC relays.	Remote
Simplex Duplex Gear Drive FastPak	F9	Free Cooling Actuators Not Open During FC	Free Cooling	Normal Shutdown	Latching	Free Cooling	The FC valve limit switches closed while in the Free Cooling mode.	Remote

## Main Processor Unit Level Diagnostics

**Table 6. Main Processor Unit Level Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	F9	Free Cooling Actuators Not Closed	Free Cooling	Normal Shutdown	Latching	Free Cooling	The FC valve closed limit switches did not close within 3 minutes after de-energized the FC relays.	Remote
Simplex Duplex Gear Drive FastPak	F9	Free Cooling Actuators Unexpectedly Open	Chiller	Immediate Shutdown	Latching	Free Cooling	The FC valve limit switches are open while not in a free cooling mode.	Remote
Simplex Duplex Gear Drive FastPak	6B5	Unexpected Starter Shutdown	Chiller Circuit X	Normal Shutdown	Nonlatching	All Cprsr Running modes, Starting, Running and Preparing to Shutdown	The Starter module status reported back that it is stopped when it should be running and no Starter diagnostic exists. This diagnostic will be logged in the history buffer and then cleared.	Local
Simplex Duplex Gear Drive FastPak	6B5	Starter Failed to Arm/Start	Chiller Circuit X	Normal Shutdown	Latching	All	Starter failed to arm or start within the allotted time (10 minutes).	Remote
Simplex Duplex Gear Drive FastPak	189	Solid State Starter Fault	Chiller Circuit X	Immediate Shutdown	Latching	All	A fault condition was detected on the non-communicating Solid State Starter. The fault relay contacts on the SSS opened while the SSS had control power. Filtering of the fault signal must allow for an approximate 2 second delay time from when the SSS is powered to when the fault relay contacts are valid.	Local
Simplex Duplex Gear Drive FastPak	F2	Low Differential Oil Pressure	Chiller Circuit X	Immediate Shutdown	Latching	After established Diff. Oil Press in Starting. Also at all times in Running and Stopping	When the compressor is running, if the differential oil pressure falls below the Low Differential Oil Pressure Cutout setpoint for more than (cutout * 3) psid seconds then this diagnostic is issued. However for any listed mode, if the differential pressure ever falls below 3/4 of the Low Differential Oil Pressure Cutout this diagnostic is issued within 2 seconds.	Remote
Simplex Duplex Gear Drive FastPak	4C1	Check Oil Filter	Chiller Circuit X	Warning	Latching	Oil Pump Running and Feature Enabled [Manual oil pump]	Check Oil Filter Diagnostic disabled: No diagnostic Check Oil Filter Diagnostic enabled: The calculated differential oil pressure fell below the Check Oil Filter Setpoint for the specified psid-seconds.	Remote
Simplex Duplex Gear Drive FastPak	2E7	Oil Pressure Sensor Calibration	Chiller Circuit X	Normal Shutdown	Latching	All modes in which the oil pump is not running nor has been running in the previous five minutes	The calibration error between the Oil Tank and Oil Discharge Pressure sensors exceeded the Differential Pressure Calibration Limit (The limit is not a setpoint.)	Remote



## Main Processor Unit Level Diagnostics

**Table 6. Main Processor Unit Level Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	287	High Vacuum Lockout	Chiller Circuit X	Immediate Shutdown	Latching	Waiting to Start	The oil tank pressure is at or below the High Vacuum Lockout Limit. A high vacuum lockout mode is entered and a timed recovery is attempted. If the recovery is unsuccessful, the High Vacuum Lockout diagnostic is called.	Remote
Simplex Duplex Gear Drive FastPak	482	Low Oil Temperature	Chiller Circuit X	Immediate Shutdown	Latching	All Running Modes	If the oil temperature is at or below the Low Oil Temperature Cutout (Not a setpoint), this diagnostic will be issued stopping the compressor. This diagnostic is ignored for the first 10 minutes of compressor run.	Local
Simplex Duplex Gear Drive FastPak	EA	High Inboard Bearing Temperature	Chiller Circuit X	Immediate Shutdown	Latching	All	The Inboard Bearing temperature sensor exceeded 180 + or - 5°F (82.2°C) for 0.5 - 2 seconds.	Local
Simplex Duplex Gear Drive FastPak	EB	High Outboard Bearing Temperature	Chiller Circuit X	Immediate Shutdown	Latching	All	The Outboard Bearing temperature sensor exceeded 180 + or - 5°F (82.2°C) for 0.5 - 2 seconds.	Local
Simplex Duplex Gear Drive FastPak	1C2	High Compressor Discharge Refrigerant Temperature	Chiller Circuit X	Immediate Shutdown	Nonlatching	All	The discharge temp. exceeded the High Discharge Temp Cutout setpoint. Time to trip from trip value exceeded shall be 0.5 to 2.0 seconds. The diag. shall reset automatically 50°F below the trip point.	Remote
Simplex Duplex Gear Drive FastPak	18B	High Motor Winding Temperature 1	Chiller Circuit X	Immediate Shutdown	Latching	All	The motor winding temp. at sensor #2 exceeded 265°F for 0.5 - 2 seconds.	Local
Simplex Duplex Gear Drive FastPak	18C	High Motor Winding Temperature 2	Chiller Circuit X	Immediate Shutdown	Latching	All	The motor winding temp. at sensor #2 exceeded 265°F for 0.5 - 2 seconds.	Local
Simplex Duplex Gear Drive FastPak	18D	High Motor Winding Temperature 3	Chiller Circuit X	Immediate Shutdown	Latching	All	The motor winding temp. at sensor #2 exceeded 265°F for 0.5 - 2 seconds.	Local
Simplex Duplex Gear Drive FastPak	2F2	Refrigerant Monitor Input	Chiller	Warning	Nonlatching	All	Defective Sensor or LLID Display invalid value The generic refrigerant monitor input read a value that was out of range. < 2mA/1Vdc or >22mA/11Vdc.	Remote
Simplex Duplex Gear Drive FastPak	E8	Unexpected Differential Oil Pressure	Chiller Circuit X	Immediate Shutdown	Latching	Idle Oil Management Mode	The differential oil pressure did not fall far enough below the Differential Oil Pressure Cutout after waiting the required time after the oil pump was shut off. (Could be due to a defective pressure transducer or stuck oil pump relay).	Remote

## Main Processor Unit Level Diagnostics

**Table 6. Main Processor Unit Level Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	1FF	Differential Oil Pressure Overdue	Chiller Circuit X	Immediate Shutdown	Latching	Waiting to Start; Establishing Oil Pressure	Sufficient differential oil pressure was not established within the specified time of starting the oil pump.	Remote
Simplex Duplex Gear Drive FastPak	390	BAS Failed to Establish Communication	Chiller Circuit X	Warning	Nonlatching	At power up or rebuild	The BAS did not communicate with the Comm4 interface module within two minutes after Comm4 LLID came out of reset. This is also the same time MP comes out of reset. Set default setpoints to next level of priority (e.g. Front Panel Setpoint). Refer to Section on Setpoint Arbitration to determine how setpoints may be effected. Diagnostic is cleared when successful communication is received from the BAS.	Remote
Simplex Duplex Gear Drive FastPak	398	BAS Communication Lost	Chiller Circuit X	Warning	Nonlatching	All	The local BAS Comm4 interface module lost communications with the BAS for 15 continuous minutes after it had been established. This is a warning diagnostic. Use last valid BAS setpoints. Refer to Section on Setpoint Arbitration to determine how setpoints may be affected. Diagnostic is cleared when successful communication is received from the BAS.	Remote
Simplex Duplex Gear Drive FastPak	3B6	Hot Gas Bypass Valve Closure Overdue	HGBP	Normal Shutdown	Latching	When exiting HGBP, on reset	The HGBP Valve was commanded to close and did not close in the three minutes allowed for closure	Remote
Simplex Duplex Gear Drive FastPak	6B6	Hot Gas Bypass Valve Unexpectedly Open	HGBP	Normal Shutdown	Latching	Normal or Manual HGBP [in HGBP mode]	The HGBP valve opened unexpectedly. Also if in manual, and switch closes and opens without an Open command, a diagnostic. is issued.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Hot Gas Bypass Valve Opening Overdue	HGBP	Normal Shutdown	Latching	When starting HGBP, on reset	The HGBP Valve was commanded to open and did not open in the three minutes allowed for opening	Remote
Simplex Duplex Gear Drive FastPak	4C5	Generator Fault Relay Open	Chiller Circuit X	Normal Shutdown	Latching	All	The generator fault relay input has opened.	Remote
Simplex Duplex Gear Drive FastPak	4C6	Generator Ready Overdue	Chiller Circuit X	Normal Shutdown	Latching	All	The generator on line input was not closed within 4.25 minutes of the generator run relay being energized.	Remote
FastPak	27E	Safety String Tripped	Chiller	Normal Shutdown	Latching	All	The safety string input is open	Remote



## Main Processor Unit Level Diagnostics

**Table 6. Main Processor Unit Level Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
FastPak	27F	Motor Temperature Cutout Tripped	Chiller	Normal Shutdown	Latching	All	The MTC switch input is open	Remote
FastPak	6B6	Starter Interlock Failed to Close	Chiller	Normal Shutdown	Latching	Starting	Upon a call for cooling, If the start interlock does not pull in within 40 minutes.	Remote
FastPak	6B6	Starter Interlock Failed to Open	Chiller	Normal Shutdown	Latching	Stopping	Once a call for cooling drops out, if the start interlock does not drop out within 10 seconds.	Remote
FastPak	6B6	Starter Interlock Unexpectedly Open	Chiller	Normal Shutdown	Latching	Running	Once the call for cooling and the start interlock are established, if the start interlock drops out for more than 2 seconds while there is a call for cooling.	Remote
FastPak	6B6	Starter Interlock Unexpectedly Closed	Chiller	Normal Shutdown	Latching	Stopped	If there is no call for cooling, if the start interlock makes.	Remote
FastPak	6B6	IGV Closure Overdue	Chiller	Warning	Latching	All non running modes	The Inlet Guide Vanes were commanded to close and did not close in the 3 minutes allowed for closure.	Remote
Simplex Duplex Gear Drive FastPak	6B6	LCI-C Software Mismatch: Use BAS Tool	Chiller	Warning	Nonlatching	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

# Main Processor Communication Diagnostics

These are diagnostics that the Main Processor calls out when it does not hear from a particular device (functional ID) for the specified duration.

The following communication loss diagnostics do not occur unless that input or output is required to be present by the particular configuration and installed options for the chiller.

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 them. A communication loss with a multiple function board generates multiple diagnostics. Refer to the chiller’s wiring diagrams to relate the occurrence of multiple communication diagnostics back to the physical LLID boards to which they have been assigned (bound).

**Table 7. Main Processor Communication Diagnostics**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B6	Excessive Loss of Communication	Platform	Immediate Shutdown	Latching	All	This diagnostic is disabled as the default setting. The diagnostic is called out if communication is lost to over 255 devices. Since the maximum number of devices is 255, the diagnostic will never be called.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: External Auto/ Stop	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Emergency Stop	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: External Ice Building Command	Ice Building Mode	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller will revert to normal (non-ice building) mode regardless of last state.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Outdoor Air Temperature	Chiller	(Chilled Water Reset)	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. If Tracer not installed or has an invalid outdoor air temperature, default to chilled water reset of zero. If using a valid Tracer outdoor temp, no effect. Display invalid value for temperature.	Remote



## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Evap Leaving Water Temp	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value for temperature.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Evap Entering Water Temp	(Chilled Water Reset, Feed forward control, Ice Building)	See Criteria	See Criteria	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller in mode other than Ice Building: Severity is warning, persistence is latching. If chiller in Return or Constant Return Chilled Water Reset, set CWS' equal to the next higher priority chilled water setpoint. Feed forward control is disabled. Display invalid value for temperature. Hot water operation: No effect on controls. Chiller in Ice Building mode: Severity is Normal, persistence is latching. This diagnostic shall clear when the Ice Building command is withdrawn.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Condenser Leaving Water Temp	Chiller	See Criteria	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chilled water control: Severity is Normal. Hot water control: Severity is Normal. Display invalid value for temperature.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Condenser Entering Water Temp	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Default to a chilled water reset of zero if in load based chilled water reset. Normal heating operation: feed forward control is disabled. Chilled water operation: No effect on controls. Display invalid value for temperature.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Sec Cond Leaving Water Temp	Chiller	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Sec Cond Entering Water Temp	Chiller	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value.	Remote

## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Oil Tank Temperature	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Ext Chilled/Hot Wtr Setpoint	Chiller (Ext. Chilled Water Setpoint)	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. External CWS (or HWS if selected) command will withdraw from decision to do CWS (or HWS if selected). This warning diagnostic will automatically clear when successful communication is reestablished.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Ext Current Limit Setpoint	Chiller (Ext. Chilled Water Setpoint)	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. External current limit command will withdraw from decision to do current limit. This warning diagnostic will automatically clear when successful communication is reestablished.	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Cond High Pressure Cutout	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Evaporator Water Flow Switch	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Condenser Water Flow Switch	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Evap Saturated Rfgr Temp	Chiller Circuit X	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Cond Saturated Rfgr Temp	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex	6B4	Comm Loss: Purge Liquid Temperature	Purge	Normal Shutdown	Latching	Retrofit Purge	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value Note: This sensor and thus diagnostic only exists on a retrofit Purge.	Remote



## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Cond Refrigerant Pressure	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Oil Tank Pressure	Chiller Circuit X	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Oil Pump Discharge Pressure	Chiller Circuit X	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Evaporator Water Pump Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Condenser Water Pump Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Ice Building Relay	Ice Building	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall revert to normal (non-ice building) mode regardless of last state.	Remote
Simplex Duplex Gear Drive FastPak	2AD	Comm Loss: Starter	Chiller Circuit X	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Local
Simplex Duplex Gear Drive FastPak	2AD	Comm Loss: Adaptive Frequency Drive	Chiller Circuit X	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Local
Simplex Duplex Gear Drive FastPak	389	Comm Loss: Local BAS Interface	Chiller Circuit X	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Use last valid BAS setpoints. Diagnostic is cleared when successful communication is established with the Comm4 LLID.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Compressor Running Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Non-Wrn Latching Alarm Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote

## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Non-Wrn NonLatching Alm Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Unit Purge Alarm Relay	Chiller Circuit X	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Limit Warning Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Maximum Capacity Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Head Relief Request Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Evap Diff Water Pressure	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Flow and tons calculation shall be disabled.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Cond Diff Water Pressure	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Flow calculation shall be disabled.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Cond Rfgr Pressure Output	Chiller Circuit X	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Compressor Motor % RLA Output	Chiller Circuit X	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Refrigerant Monitor Input	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display out of range value (dashes)	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: External Free Cooling Command	Free Cooling	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall revert to normal (non-free cooling) mode regardless of last state.	Remote



## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Free Cool Actrs Closed Input	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Free Cool Liq Line Actuator Relay	Free Cooling	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall revert to normal (non-free cooling) mode regardless of last state.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Free Cool Gas Line Actr Relay	Free Cooling	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall revert to normal (non-free cooling) mode regardless of last state.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Free Cooling Auxiliary Relay	Free Cooling	Normal Shutdown	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Cprsr Suction Rfgt Temp	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Carbon Tank Temperature	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Liquid Level Switch	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Chiller Cprsr Run Input	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Pumpout Relay	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Carbon Tank Heater Relay	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Regen Solenoid Relay	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote

## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Alarm Relay	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Pumpout Solenoid Output	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Exhaust Solenoid Output	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B4	Comm Loss: Purge Condensing Unit Relay	Purge Purge X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B5	Comm Loss: Solid State Starter Fault	Chiller Circuit X	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Local
Simplex Duplex Gear Drive FastPak	6B5	Comm Loss: PFCC Relay	Chiller Circuit X	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Diagnostic is cleared when communications is reestablished.	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Oil/ Refrigerant Pump Relay	Chiller Circuit X	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Oil Tank Heater Relay	Chiller Circuit X	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Compressor allowed to start if oil temperature is okay. If oil temperature is not okay to enter a start, this diagnostic is called.	Remote
Gear Drive	6B7	Comm Loss: Oil Tank Heater 4E1 Relay	Chiller	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Compressor allowed to start if oil temperature is okay. If oil temperature is not okay to enter a start, this diagnostic is called.	Remote
Gear Drive	6B7	Comm Loss: Oil Tank Heater 4E2 Relay	Chiller	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Compressor allowed to start if oil temperature is okay. If oil temperature is not okay to enter a start, this diagnostic is called.	Remote



## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Motor Winding Temperature 1	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Motor Winding Temperature 2	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Motor Winding Temperature 3	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Inboard Bearing Temperature	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Outboard Bearing Temperature	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Display invalid value	Remote
Simplex Duplex Gear Drive FastPak	6B7	Comm Loss: Cprsr Discharge Rfqt Temp	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	2B0	Comm Loss: IGV First Stage Actuator	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	2B1	Comm Loss: IGV Second Stage Actuator	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Ext Base Loading Setpoint	Chiller (Base Loading)	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall discontinue use of the External Base Loading Setpoint source and revert to the next higher priority for setpoint arbitration.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Ext Base Loading Command	Chiller (Base Loading)	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall discontinue use of the External Base Loading Setpoint source and revert to the next higher priority for setpoint arbitration.	Remote

## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: External Hot Water Command	Chiller (Ext. Hot Water)	Warning	Nonlatching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall discontinue use of the External Hot Water Setpoint source and revert to the next higher priority for setpoint arbitration.	Remote
Simplex Duplex Gear Drive FastPak	3B8	Comm Loss: Hot Gas Bypass Load Relay	HGBP	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall revert to normal (non-HGBP) mode regardless of last state.	Remote
Simplex Duplex Gear Drive FastPak	3B8	Comm Loss: Hot Gas Bypass Unload Relay	HGBP	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall revert to normal (non-HGBP) mode regardless of last state.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Hot Gas Bypass Actr Closed In	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall revert to normal (non-HGBP) mode regardless of last state.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Generator Start/ Stop Relay	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Generator Speed Signal Output	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Generator Up To Speed Input	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Simplex Duplex Gear Drive FastPak	6B6	Comm Loss: Generator Fault Input	Chiller Circuit X	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Duplex	6B6	Comm Loss: External Circuit Lockout	Circuit X	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. MP will nonvolatily hold the lockout state (enabled or disabled) that was in effect at the time of comm loss.	Remote
Gear Drive FastPak	6B7	Comm Loss: Oil Diff Pressure Switch	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B7	Comm Loss: Motor Temperature Cutout	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote



## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
FastPak	6B7	Comm Loss: RLA Input	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B7	Comm Loss: Starter Command Relay	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B7	Comm Loss: Starter Running Input	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B7	Comm Loss: Pulsed IGV Control	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B6	Comm Loss: IGV Closed Switch	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B7	Comm Loss: Transition Complete Input	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B7	Comm Loss: Starter Fault Output	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B7	Comm Loss: Winding Temperature Status	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B7	Comm Loss: Oil Pressure Status	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B6	Comm Loss: AFD Speed Signal VDC Output	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B6	Comm Loss: Call for Cooling Relay	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B6	Comm Loss: Starter Interlock	Chiller	Normal Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
FastPak	6B6	Comm Loss: Safety String Input	Chiller	Immediate Shutdown	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Gear Drive	6B7	Comm Loss: High Lift Unload Valve Relay	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote

## Main Processor Communication Diagnostics

**Table 7. Main Processor Communication Diagnostics (continued)**

1. Unit Type	2. 3DC (Hex)	3. Diagnostic Name	4. Effects Target	5. Target Severity	6. Target Persistence	7. Active Modes [Inactive Modes]	8. Criteria	9. Reset Level
Duplex	6B6	Comm Loss: Programmable Relay Board 1	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the LLID has occurred for a 35-40 second period.	Remote
Duplex	6B6	Comm Loss: Programmable Relay Board 2	Chiller	Warning	Latching	All	Continual loss of communication between the MP and the LLID has occurred for a 35-40 second period.	Remote



# Main Processor Boot Messages and Diagnostics

These messages indicate various problems or conditions related to Main Processor startup, program execution, and maintenance with the Tracer TU service tool.

**Table 8. Main Processor Boot Messages and Diagnostics**

Tracer AdaptiView Display Message	Description //Troubleshooting
Boot Software Part Numbers: LS Flash --> 6200-0318-07 MS Flash --> 6200-0319-07	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 Tracer AdaptiView display during the early portion of the power up sequence and during special programming and converter modes. See below. // 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 the Tracer TU service tool to the MP's USB port, provide chiller model number (configuration information) and download the configuration if prompted by Tracer TU. Then proceed to download the most recent MP software 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 the Tracer TU service tool to the MP's USB port, provide chiller model number (configuration information) and download the configuration if prompted by Tracer TU. Then proceed to download the most recent MP software application or specific version as recommended by Technical Service. If the problem persists, replace the MP.
Err4: UnHandled Interrupt Restart Timer: [30 sec countdown timer]	An unhandled interrupt has occurred while running the application code. This event normally causes a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor resets, clears diagnostics, and attempts 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 Tracer AdaptiView 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.
Err5: Operating System Error Restart Timer: [30 sec countdown timer]	An Operating System error has occurred while running the application code. This event normally causes 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 WatchDog Timer Error has occurred while running the application code. This event normally causes 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

## Special Troubleshooting and Informational Messages

**Table 8. Main Processor Boot Messages and Diagnostics (continued)**

Tracer AdaptiView Display Message	Description //Troubleshooting
Converter Mode	A command was received from the Tracer TU service tool to stop the running application and run in the "converter mode". In this mode the MP acts as a simple gateway and allows the Tracer TU service computer to talk to all the LLIDs on the IPC3 bus.
Programming Mode	A command was received by the MP from Tracer TU service tool and the MP is in the process of first erasing, then writing the program code to its internal Flash (nonvolatile) Memory

# Special Troubleshooting and Informational Messages

The first of these two messages indicates that there is a problem with the chiller configuration. The second message confirms that the configuration is valid.

**Table 9. Special Troubleshooting and Informational Messages**

Tracer AdaptiView Display Message	Description //Troubleshooting
Error Resulted From Invalid Configuration - Record Condition and Call Trane Service Assertion: 'File Name' 'Line Number'	<p>This error message is displayed when the MP code finds itself in an illegal location. These assertion points are placed in code locations to aid the software team in identifying why the MP locked up as a result of vectoring to an invalid location.</p> <p>When this message occurs, copy down the file name and line number and have this information ready to provide Trane Technical Service.</p> <p>This message remains on the screen for two minutes. After two minutes, the watchdog times out and a 'Watchdog Error' message is displayed. The watchdog then resets the MP. The MP heads into a boot and configuration mode the same as it does on a power up.</p> <p>These error messages are displayed on the Tracer AdaptiView display screen and do not appear in the Tracer TU service tool nor in the diagnostic logs.</p>
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.



# Troubleshooting the UC800 Controller

The Tracer UC800 may experience problems under certain conditions. Use the tables in the following sections to identify the symptoms your Tracer UC800 is experiencing and find the likely causes and possible solutions to the problem.

## Communication

Use [Table 10](#) to help you identify and resolve communication issues.

**Table 10. Troubleshooting Communication Problems**

Symptom (what occurs)	Likely causes	Possible remedies
Tracer TU does not connect. It could connect at one time but then lost the connection (e.g., there is an unstable connection).	There are too many USB extension cords ganged together (e.g., 100 ft USB but with out a USB signal booster).	Use a cable the appropriate length (refer to the <i>Tracer TU Service Tool for Water-Cooled CenTraVac Chillers with AdaptiView Control Programming Guide</i> , CTV-SVP02A-EN).
General communication failures	There may be shorts between adjacent terminals.	Fix the shorts.
There is no communication on the following links: <ul style="list-style-type: none"> <li>Ethernet (error at display)</li> <li>USB (nothing)</li> <li>IMC (nothing)</li> <li>MBUS (Comm. Loss with LLIDS)</li> </ul>	<ol style="list-style-type: none"> <li>There are open connections on any conductor (Power, Ethernet, USB, IMC).</li> <li>Polarity is reversed on the Link terminals.</li> </ol>	<ol style="list-style-type: none"> <li>Fix the open connections on the conductors.</li> <li>Fix the polarity.</li> </ol>
Degraded communications	A partial failure is causing degraded communications.	Replace the controller.
When using Tracer TU, a download stops before it is complete.	Communication is cut to the Tracer TU service tool during a download.	Reconnect and re-download.
Experiencing communication failures or there is no activity on the MBUS LEDs.	<ol style="list-style-type: none"> <li>The Frame LLID is plugged into the IMC bus.</li> <li>Old LLIDS are plugged into the new IMC communication link.</li> </ol>	<ol style="list-style-type: none"> <li>Correct the wiring.</li> <li>Correct the wiring.</li> </ol>
Error occurs when trying to connect with Tracer TU.	Incorrect drivers are installed on the laptop computer.	Uninstall the drivers through the device manager. Then reconnect to the UC800. If this doesn't work, uninstall Tracer TU and then re-install.
There are comm errors or there is no device seen through the BAS.	The UC800 has the same address as another device on the network.	Set the rotary switches to a new unique ID.
Progress stops during a download	The USB cable becomes disconnected during configuration download.	Reconnect the cable and re-start the download.
Progress stops during an upgrade	The USB cable becomes disconnected while upgrading device.	Reconnect the cable and re-start the upload.
There is a comm loss error on the AdaptiView display.	The AdaptiView display's Ethernet cable is disconnected.	Reconnect the cable.
The marquee LED on the UC800 is solid red.	The UC800 fails (lockup, power fail, etc.), but the AdaptiView display does not.	Cycle power on the controller.
When using Tracer TU, there is a comm loss diagnostic for a LLID.	The LLIDs have been hot swapped.	The new LLID needs to be bound (you may need to rebuild the list if you are already on the LLID-binding screen).

## Troubleshooting the UC800 Controller

### Hardware

Use [Table 11](#) help you identify and resolve hardware issues.

**Table 11. Troubleshooting Hardware Problems**

Symptom (what occurs)	Likely causes	Possible remedies
The LEDs activity on the UC800 is not correct.	The communication lines are reversed (wired to the wrong terminals).	Fix the wiring terminations.
There will be no symptom until power is cycled, then the BAS might show communication errors.	The rotary switch address changed while the UC800 was powered up.	Either re-map the building automation system, or set the switches back to their original positions.
The UC800s device ID changes on power up.	The rotary switch address changed while the UC800 is off. If not soft-set, on powerup, the device ID will change.	Either re-map the building automation system, or set the switches back to their original positions.
The Marquee LED is solid red	An internal failure is disabling an individual module.	Cycle Power
Experiencing periodic resets.	Intermittent failure.	Replace the controller

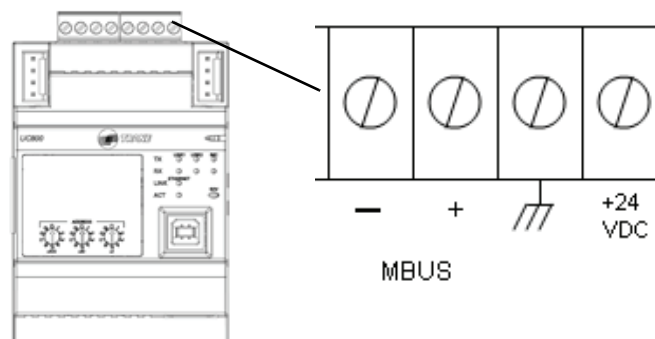
### Power

Use [Table 12](#) to help you identify and resolve power issues

**Table 12. Troubleshooting Power Problems**

Symptom (what occurs)	Likely causes	Possible remedies
Tracer TU won't work.	Tracer TU lost power while connected to the UC800.	Re-power Tracer TU
The module resets.	There may be shorts between adjacent terminals.	Fix the shorts.
The marquee Light is solid red	There is an inadequate power supply, or there has been a power droop.	Fix Power supply.
The UC800 is powered off, no LEDs lit	The UC800 lost power during configuration download.	Reconnect and re-download.
The UC800 loses power while upgrading the device.	There may be loose power connections or there may have been a power failure.	Reconnect and re-download.
The laptop computer turns off during configuration download or while upgrading the device.	<ol style="list-style-type: none"> <li>Power loss.</li> <li>There is a dead battery in the laptop computer.</li> </ol>	<ol style="list-style-type: none"> <li>Reconnect and re-download.</li> <li>Restore power or recharge battery.</li> </ol>

*Note: The UC800 controller receives 24 Vdc power, which is factory wired.*





# Tracer AdaptiView Control Component Overview

This section provides an overview of the Tracer AdaptiView control system components for CenTraVac chillers. It explains how the different features and sensing mechanisms are wired, the sequence of operations, and how protective and adaptive mechanisms function.

## Interprocessor Communication - The IPC3 Network

When using the Tracer UC800, you are not required to know all the details about the structure of the IPC3 bus. However this page gives detailed information about the system for those of you that are really interested in how it works. The IPC3 protocol is based on RS485 signal technology. IPC3 was designed to be very efficient. It communicates at 19.2 Kbaud.

This data rate allows for three rounds of data per second on a 64 device network. A typical CVHE control network has less than 50 devices. IPC3 allows for a maximum of 255 devices per network.

The following table lists and describes essential IPC3 terms.

**Table 13. IPC3 Terminology**

Term	Description
Bus Management	The Tracer AdaptiView display provides the bus management that restarts the link, or fills in for missing nodes when the normal communication has been degraded. This involves reassigning node addresses and filling in for nodes that are off-line. The Tracer AdaptiView display always has a node number of 01.
Node Assignment	When a unit is factory commissioned, the Low Level Intelligent Devices (LLIDs) must have their node addresses assigned to them for storage in non-volatile memory. The node addresses are normally assigned sequentially during factory commissioning.
Node Zero	Node number zero is a special node assignment that is reserved for devices that are service selected. A LLID communicating on node address zero also communicates on an assigned node address. A LLID only communicates on node address zero if it is service selected.
Binding	Binding is the process of assigning a node number and functional IDs to a LLID. Binding is a simple process involving: 1. Service selecting the LLID with a magnet. 2. Assigning functional IDs to that LLID with Tracer TU.
Functional Identification	When each LLID on the bus is bound, its inputs and outputs are given a functional ID. The Frame LLIDS have only one functional ID, but most Panel LLIDs have more than one functional ID. A dual high voltage binary input has two functional IDs, a quad relay output has four functional IDs.

The Tracer AdaptiView control with its Machine bus communicates to the control panel devices, unit mounted devices, and any remote devices on the IPC3 bus network. The various devices are discussed in the upcoming subsections.

### Control System Components

This subsection lists the standard and optional control panel devices.

#### Control Panel Internally Mounted Devices

For visual identification, internal control panel mounted devices are identified by their respective schematic designation number. Control panel items are marked on the inner back panel in the control panel.

Modules 1A1, 1A3, 1A4, 1A5, 1A6, 1A7, and 1A13 are standard and present in all configurations. Other Modules vary depending on machine optional devices. (Refer to [Figure 1, p. 48](#) on the following page, along with [Table 14, p. 49](#) through [Table 23, p. 57](#) in this section for main panel locations and descriptions.

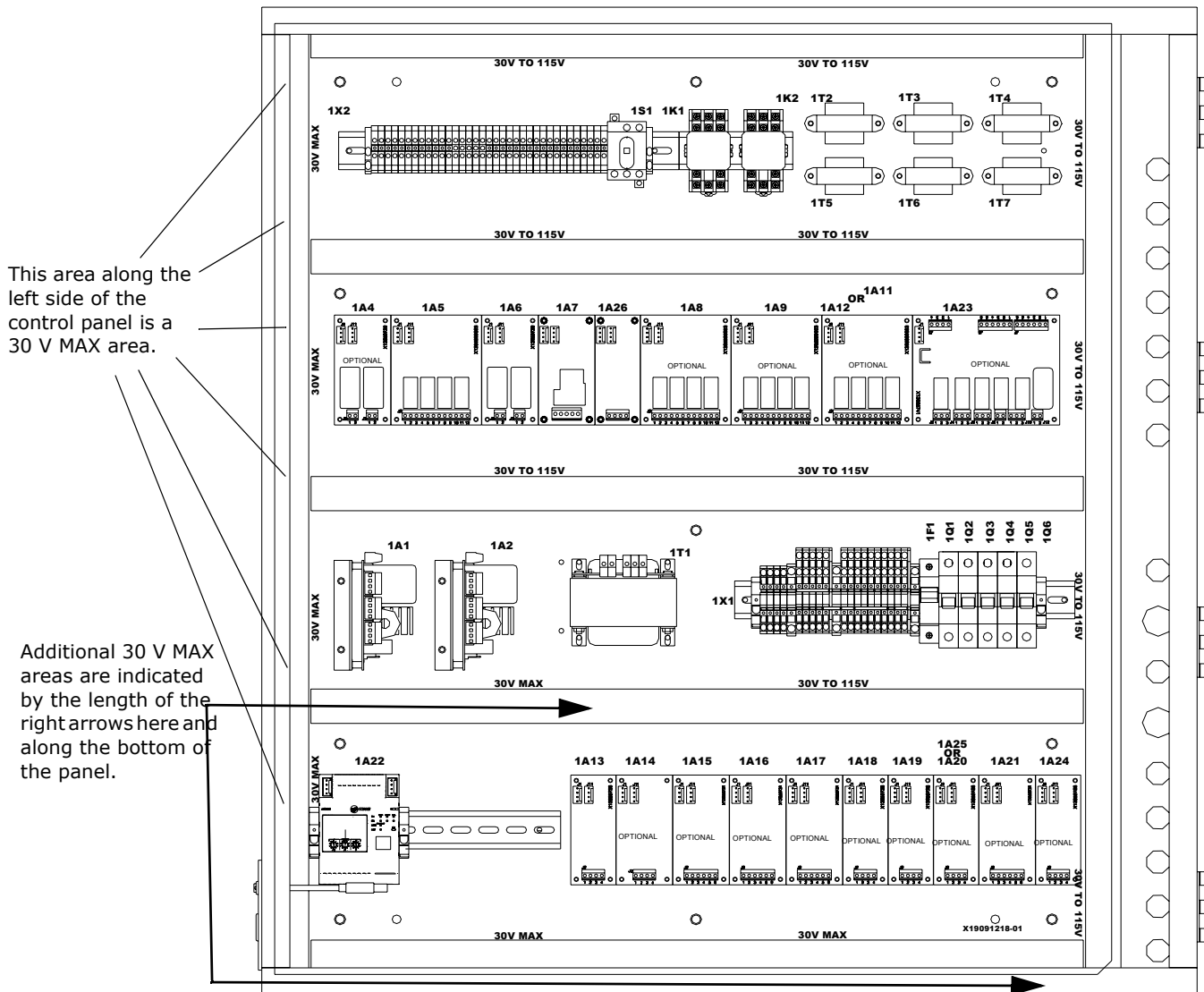
Optional controls are present when a specific optional controls package is specified, as listed in the second column of [Table 15](#) through [Table 23](#) that follow in this subsection. Optional controls packages are:

OPST---Operating Status	GBAS---Generic Building Systems
EXOP---Extended operation	CDRP---Condenser Pressure
TRMM---Tracer communications	WPSR---Water Flow Pressure sensing
FRCL---Free Cooling	HGBP--- Hot Gas Bypass
EPRO---Enhanced Protection	

## Tracer AdaptiView Control Component Overview

The following figure shows the main control panel assembly with device designations..

**Figure 1. Main Control Panel Assembly, Device Designations, and Circuit Descriptions (CVHE-CVHF-CVHG)**



*Note: Do not mix 30 V to 115 V wiring into 30 V MAX areas. Doing so can cause electrical signal problems.*

## Tracer AdaptiView Control Component Overview

Table 14 lists the standard devices.

**Table 14. Control Panel Devices (Standard Devices)**

Description	Controls Package	Purpose	Field Connection Point Terminals
1A1 Power Supply	Standard #1	Converts 24 vac to 24 Vdc	not for field use
1A2 Power Supply	(as required) #2	Converts 24 vac to 24 Vdc	not for field use
1A3 Dual Relay Output modules	Standard Relay #1	Oil Heater Relay	not for field use
1A4 Dual High Voltage Input	Standard	High Pressure Cutout	not for field use
1A5 Quad Relay Output Modules	Standard Relay #1	Chilled water pump (Relay #1)	J2-4 NO, J2-5 NC, J2-6 common
1A5 Quad Relay Output modules	Standard Relay #2	Condenser water pump control (relay #2)	J2-1 NO, J2-2 NC, J2-3 common
1A6 Dual High Voltage Input	Standard Input 1	Condenser Flow Input	J2-2 Condenser water flow switch
1A6 Dual High Voltage Input	Standard Input 2	Evaporator Flow Input	J3-2 Chilled water flow switch
1A7 High Power Output Relay	Standard	Oil Pump and Refrigerant Pump	not for field use
1A13 Dual LV Binary input module	Standard Signal #1	External Auto Stop	J2-1 Binary Input Signal #1, J2-2 Ground
1A13 Dual LV Binary input module	Standard Signal #2	Emergency stop	J2-3 Binary Input Signal #2, J2-4 Ground
1A26 <sup>(a)</sup>	Standard	Compressor Motor Winding Temp Sensor (Duplex: Compressor Motor)	not for field use
1F1	Standard	LLID Power Supply Transformer Primary Circuit protection	not for field use
1T1	Standard	Control Panel Power Transformer ; 120:24Vac	not for field use
1Q1	Standard	Circuit Breaker - Compressor Motor Controller Control Power - Branch Circuit	not for field use
1Q2	Standard	Circuit Breaker Purge System Branch Circuit	not for field use
1Q3	Standard	Circuit Breaker - Module [-LLID] Power Supply Branch Circuit	not for field use
1Q4	Standard	Circuit Breaker - Oil System Control Branch Circuit	not for field use
1Q5	Standard	Oil Pump Motor Branch Circuit protection	not for field use
1X1 Terminal Block	Standard	Control Panel Terminal Block, Flow switch connections	1X1-5 Chilled water flow flow switch input 1X1-6 Condenser water flow switch input

(a) Was previously located in Purge Control Panel.

## Tracer AdaptiView Control Component Overview

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### Chilled and Condenser Water Flow Interlock Circuits

Proof of chilled water flow for the evaporator is made by the closure of flow switch 5S1 and the closure of auxiliary contacts 5K1 on terminals 1X1-5 and 1A6-J3-2. Proof of condenser water flow for the condenser is made by the closure of flow switch 5S2 and the closure of auxiliary contacts 5K2 on terminals 1X1-6 and 1A6-J2-2.

**Table 15. OPST Operations Status Option (CVHE-CVHF-CVHG)**

Description	Controls Package	Relay #	Purpose	Field Connection Point Terminals
1A8 Optional Quad Relay Output Status	OPST	Relay #1	Compressor running relay	J2-10 NO, J2-11 NC, J2-12 common
1A8 Optional Quad Relay Output Status	OPST	Relay #2	MMR Alarm Relay (Latching)	J2-7 NO, J2-8 NC, J2-9 common
1A8 Optional Quad Relay Output Status	OPST	Relay #3	Limit Warning Relay	J2-4 NO, J2-5 NC, J2-6 common
1A8 Optional Quad Relay Output Status	OPST	Relay #4	MAR Alarm Relay (Non-Latching)	J2-1 NO, J2-2 NC, J2-3 common
1A9 Optional Quad Relay Output Status	OPST	Relay #2	Purge Alarm Relay	J2-7 NO, J2-8 NC, J2-9 common
1A9 Optional Quad Relay Output Status	OPST	Relay #3	Head Relief Request Relay	J2-4 NO, J2-5 NC to J2-6 common
1A9 Optional Quad Relay Output Status	OPST	Relay #4	Maximum Capacity Relay	J2-1 NO, J2-2 NC, to J2-3 common

### Head Relief Request Output

When the chiller is running in Condenser Limit Mode or in Surge Mode, the head relief request relay (1 minute default) on the 1A9–J2-6 to J2-4 will be energized and can be used to control or signal for a reduction in the entering condenser water temperature. This feature is designed to prevent high refrigerant pressure trip-outs during critical periods of chiller operation.

If the unit is not equipped with the CDPR Enhanced Condenser Limit Option the unit uses the condenser refrigerant temperature sensor (input converted to saturated refrigerant pressure) to perform the Standard Condenser Limit function, without the head relief request relay, by limiting inlet guide vane stroke and chiller capacity.

Keep in mind that Condenser Limit Control supplements the protection provided by the condenser pressure high pressure cutout switch 3S1.

### Compressor Motor Winding Temp Sensor Module

The motor temperature module 1A26 connects through unit wiring to the three motor winding temperature sensors.

This module is located in the control panel where the module is connected to the IPC bus. Default status relay selections are shown. Selections can be altered using Tracer TU service tool. Other choices are: Circuit 1 Running, Circuit 2 Running, Chiller Alarm, Circuit 1 Alarm, Circuit 2 Alarm, and Purge Alarm.

## Tracer AdaptiView Control Component Overview

### Maximum Capacity Relay

When the chiller has been operating at maximum capacity for 10 minutes, this relay activates. (Use Tracer TU to adjust the number of minutes between 1 and 60.) Also upon being less than maximum capacity for 10 minutes this relay will deactivate.

### Compressor Running Relay

Relay activates while compressor is running.

### Machine Shutdown Manual Reset (MMR)

Limit warning machine shutdown auto reset relays activate with such conditions for remote status indication.

**Table 16. EXOP Extended Operation Option (Including 1A17, 1A18, 1A19)**

Description	Controls Package	Relay # Signal	Purpose	Field Connection Point Terminals
1A5 Quad Relay Output Modules <sup>(a)</sup>	EXOP	Relay #4	Ice Building Relay	J2-10 NO, J2-11 NC J2-12 common
1A17 Optional Dual Analog Input/Output Module	EXOP	Signal #2	External Base Loading Setpoint input	J2-1 Output #1 J2-3 Ground
1A17 Optional Dual Analog Input/Output Module	EXOP	Signal #2	Refrigerant Monitor inputs	J2-4 Output #2, J2-6 Ground
1A18 Optional Dual LV Binary input Module	EXOP	Signal #1	External Base Loading Enable or Disable input points	J2-1 Binary, Input Signal #1 J2-2 Ground
1A18 Optional Dual LV Binary input Module	EXOP	Signal #2	External Hot Water Control Enable or Disable input	J2-3 Binary Input Signal #2 J2-4 Ground
1A19 Optional Dual LV Binary input Module	EXOP	Signal #1	Ice Building Control Enable or Disable input point	J2-1 Binary Input Signal #1 J2-2 Ground

(a) Previously this was 1A10.

### Refrigerant Monitor Input 1A17

Analog type input 4-20ma input signal to the 1A17 J2-4 to J2-6 (ground). This represents 0-100 ppm.

**Table 17. FRCL Free Cooling Option**

Description	Controls Package	Relay # Signal	Purpose	Field Connection Point Terminals
1A11 Optional Quad Relay Output Status	FRCL	Relay #1	Free Cooling Relay 1	J2-4 NO, J2-6 common
1A20 Optional Dual LV Binary Input Module	FRCL	Signal #1	External Free Cooling Switch	J2-1 Binary Input Signal #1 J2-2 Ground
1A20 Optional Quad Relay Output Status	FRCL	Signal #2	Free Cooling Valves closed	Not for field use

## Tracer AdaptiView Control Component Overview

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**Table 18. HGBP Hot Gas Bypass Option**

Description	Controls Package	Relay # / Signal	Purpose	Field Connection Point Terminals
1A7 Dual High Voltage Binary Input	HGBP	#1	Hot Gas Bypass input	Not for field use
1A20 Optional Dual LV Binary Input Module	HGBP	Signal #1	Auxiliary Relays	Not for field use

**Table 19. TRMM TRM4 Tracer Comm4 Interface**

Description	Controls Package	Relay #	Purpose	Field Connection Point Terminals
1A14 Optional Dual Communication Interface Module	TRM4 or LCI-C	(Not applicable)	Tracer Communications	J2-1 COMM+, J2-2 COMM -J2-3, COMM +, J2-4 COMM -

**Table 20. CDRP (Condenser Refrigerant Pressure Output)<sup>(a)</sup>**

Description	Controls Package	Signal #	Purpose	Field Connection Point Terminals
1A15 Optional Dual Analog Input/Output Module	CDRP or GBAS	Signal #2	Condenser Refrigerant Pressure Output	J2-4 Output #2, J2-6 Ground

(a) See the *Engineering Bulletin: Condenser Water Temperature Control* (CTV-PRB006-EN).

**Table 21. EPRO (Enhanced Protection)**

Description	Controls Package	Purpose
4R22	EPRO	Condenser Refrigerant Pressure Transducer
4R16	EPRO	Compressor Discharge Refrigerant Temperature Sensor. (This is also included with HGBP).
4R1	EPRO	Inboard Bearing Temperature Sensor
4R2	EPRO	EPRO Outboard Bearing Temperature Sensor

## **CDRP Refrigerant Pressure Output Option 1A15**

Refrigerant Pressure Output can be configured at commissioning to correspond to either A) the absolute condenser pressure, or B) the differential pressure of the evaporator to condenser pressures. This Vdc output is located at 1A15 –J2 – 4 (+) to J2-6 (Ground).

The Voltage DC Output can source a maximum of 22 mA of current.

This output is Voltage DC only, 4-20 mA is not supported.

### **A) Condenser Pressure Output**

2 to 10 Vdc corresponds to 0 psia to the HPC (in psia) setting.

*Note: The Tracer UC800 control allows for Delta Pressure, or, condenser pressure, but not both on one circuit.*

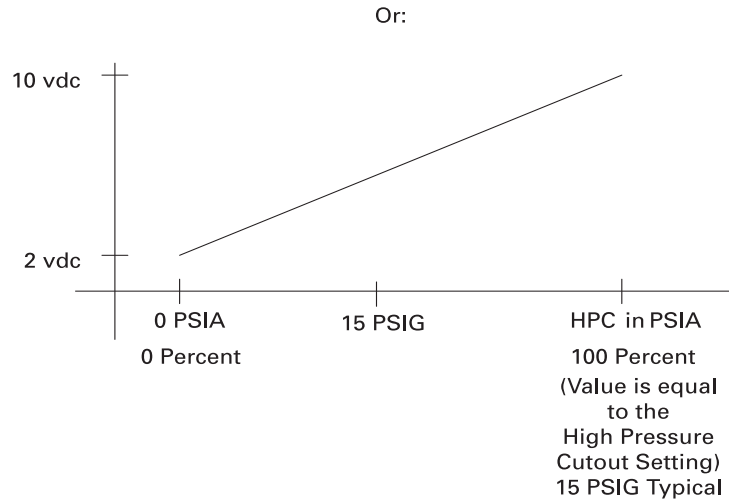
#### **Temperature Based**

On standard machines the Percent Condenser Pressure Indication is based on the Saturated Condenser Refrigerant and a temperature to pressure conversion is made. If the Condenser Saturated Temperature goes out of range due to an open or short, a pressure sensor diagnostic is called and the output also goes to the respective out of range value. That is, for an out of range low on the sensor, the output is limited to 2.0 Vdc. For an out of range high on the sensor, the output is limited to 10.0 Vdc.

#### **Pressure Based**

With the Enhanced Protection (EPRO) option, a condenser pressure transducer is installed and the pressure is measured. If the Condenser Pressure sensor goes out of range due to either an open or short, a pressure sensor diagnostic is called and the output goes to end of range low. That is, for an out of range low on the sensor, the output is limited to 2.0 Vdc. For an out of range high on the sensor, the output is limited to 2.0 Vdc.

**Figure 2. Condenser Pressure Based Output**



## B) Refrigerant Differential Pressure Indication Output:

A 2 to 10 Vdc analog output is provided instead of the previous condenser pressure output signal. This signal corresponds to predetermined minimum and maximum pressure settings, which are set up at the commissioning of this feature. You can alter this relationship using the Tracer TU service tool, if required. The “Minimum Delta Pressure” is typically set to 0 psi and will then correspond to 2 Vdc. The “Maximum Delta Pressure” is typically set to 30 psi and corresponds to 10 Vdc.

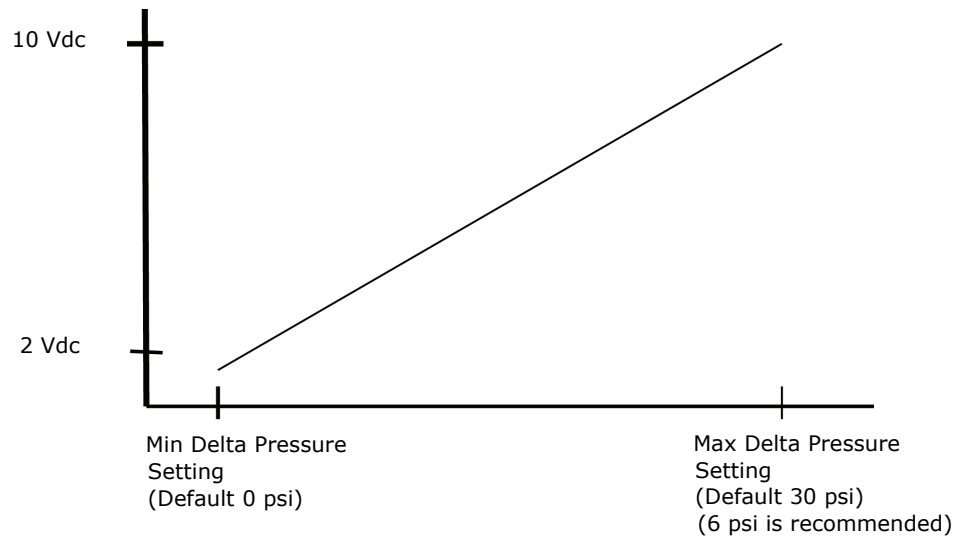
The Minimum Delta Pressure Calibration setting has a range of 0-400 psid (0-2758 kPa) in increments of 1 psid (1kPa). The Maximum Delta Pressure Calibration setting has a range of 1-400 psid (7-2758 kPa) in increments of 1 psid (1kPa). The condenser refrigerant pressure is based on the Condenser Refrigerant Temperature sensor if the Condenser Pressure Option is selected as “Not Installed” at the display.

The evaporator refrigerant pressure is based on the Saturated Evaporator Refrigerant Temperature Sensor.

See *Engineering Bulletin: Condenser Water Temperature Control* (CTV-PRB006-EN) for additional information about condenser water temperature control.

## Tracer AdaptiView Control Component Overview

**Figure 3. Delta Pressure Setting - Differential Pressure Based Output (Defaults Shown)**



In this example, 2 Vdc corresponds to 0 psi differential and 10 Vdc corresponds to 30 psi differential. The min value of 0 psi, and the max value of 30 psi are individually adjustable using the Tracer TU service tool.

*Note: Typical settings for CVHE, F, G with refrigerant pumps are as follows.*

- *Min pressure 0 psid (= 2 Vdc)*
- *Max pressure 6 psid (= 10 Vdc)*
- *Target tower control at 4 psid*

**Table 22. GBAS (Generic Building Automation System)**

Description	Controls Package	Signal #	Purpose	Field Connection Point Terminals
1A15 Optional Dual Analog Input/Output Module	GBAS or CDRP	Signal #1	Percent RLA Compressor Output	J2-1 Output #1, J2-3 Ground
1A16 Optional Dual Analog Input/Output Module	GBAS	Signal #1	External Current Limit Setpoint	J2-2 Input #1, J2-3 Ground
1A16 Optional Dual Analog Input/Output Module	GBAS	Signal #2	Chilled Water Reset Input, or External Chiller Water Setpoint	J2-5 Input #2, J2-6 Ground

## Tracer AdaptiView Control Component Overview

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### Percent RLA Output

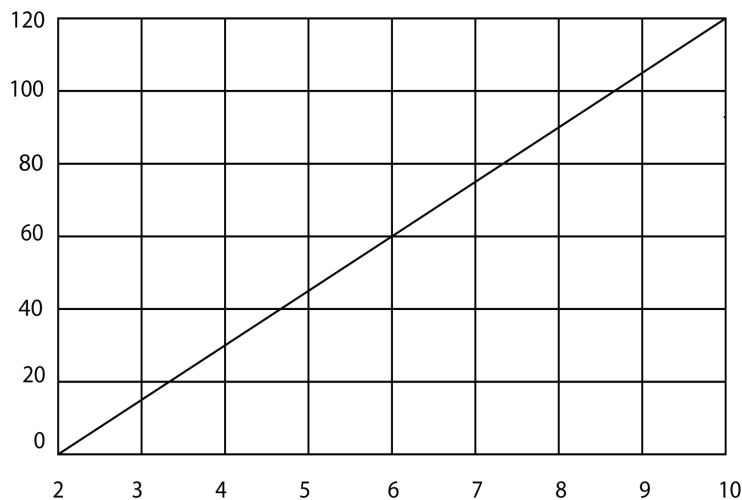
Two (2) to 10 Vdc corresponding to 0 to 120% RLA. With a resolution of 0.146%. The Percent RLA Output connections are on the terminals 1A15–J2-1 (+) to J2-3 (Ground). The Percent RLA Output is polarity sensitive.

*Note: 0% RLA = 2 Vdc 120% RLA = 10 Vdc*

*Example: If RLA is 500 amps then 10 Vdc = 600 amps.*

The following graph illustrates the output:

**Figure 4. Voltage Versus Percent RLA**



### External Chilled Water Setpoint (ECWS)

The External Chilled Water Setpoint allows the chilled water setpoint to be changed from a remote location. The External Chilled Water Setpoint is found on 1A16 J2-5 to J2-6 (Ground). 2-10 Vdc and 4-20 mA correspond to 34°F to 65°F (-17.8 to 18.3°C) CWS range. Default is 34°F to 65°F and is adjustable using the Tracer TU service tool.

Perform the following steps to install ECWS.

1. Configure and bind 1A16 for 2 to 10 Vdc or 4 to 20 mA.
2. Select setpoints for minimum and maximum temperature that correlate to the analog signal.
3. Select the proper setpoint source (either EXT or FP).
4. Enable this setpoint on the Field Startup tab screen within the Tracer TU service tool Equipment Utility.

## Tracer AdaptiView Control Component Overview

### External Current Limit Setpoint

The External Current Limit is an option that allows the Current Limit setpoint to be changed from a remote location. The External Limit Setpoint is found on 1A16 J2-2 to J2-3 (ground), 2-10 Vdc and 4-20 mA. Each corresponds to a 40 to 100 percent RLA range. The control panel limits the maximum ECLS to 100 percent. The default of 40 to 100% is adjustable using the Tracer TU service tool.

*Note: To use external inputs, the setpoint source setting on the Tracer AdaptiView display must be set to "Ext/FP"*

The ECWS or ECLS LLID reports either a very low or very high value when there is either an open or short in the system. When an open or short is detected (or the signal is severely beyond the valid range) on the 2-10 Vdc or 4-20 mA ECLS input, and when the ECLS option is installed, an informational diagnostic is generated. The Active Current Limit setpoint defaults to the panel (or next priority) Current Limit setpoint. Open and short criteria is set as close to the end of the range values as possible while maintaining the ability to reliably detect an open and short.

**Table 23. WPSR (WFC Water Pressure Sensing Option)**

Description	Controls Package	Signal #	Purpose
1A21 Optional Dual Analog Input or Output Module	WPSR = WFC	Signal #1	Evaporator Differential Water Pressure
1A21 Optional Dual Analog Input or Output Module	WPSR = WFC	Signal #2	Condenser Differential Water Pressure

### Module Characteristics

#### 1A1, 1A2 Power Supply:

Unit Control Power Supply Module	Converts 27 vac to 24 Vdc.
Power Input Voltage	23VRMS minimum, 27VRMS Nominal, 30VRMS maximum
Frequency	50 - 60 Hz
Current	Full load 27 VAC – 4.30 A (RMS)
Inrush	27 VAC (RMS) ~ 30A (RMS)
Power Output	Class II Voltage 24 Vdc, Rated Current 2.44 Amps.
Fused @ 3 amps	(FUS01513)



## Tracer AdaptiView Control Component Overview

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### 1A3, 1A5, 1A10 Dual Relay Output Modules

Relay #1	J2-1 NO, J2-2 NC, J2-3 common
Relay #2	J2 4 NO, J2-5 NC, J2-6 common
Relay Outputs at 10 VAC	7.2 Amps resistive, 2.88 Amps pilot duty, 1/3 HP, 7.2 FLA at 240 VAC: 5 Amps general purpose, 14 - 26 AWG with a maximum of two 14 AWG.
Power	24 +/- 10 percent Vdc, 60 mA maximum, Trane IPC3 protocol. J1-1 +24Vdc, J1-2 Ground, J1-3 COMM + J1-4 COMM -

### 1A4, 1A6 Dual High Voltage Binary Input Module

Binary Input Signal #1	J2-1 to 2
Binary Input Signal #2	J3-1 to 2
High Voltage Binary Input	Off Voltage: 0 to 40 VAC RMS On Voltage: 70 to 276 VAC RMS 14 - 26 AWG with a maximum of two 14 AWG
Power	24 +/- 10 percent Vdc, 20 mA maximum. Trane IPC3 protocol. J1-1 +24 Vdc, J1-2 Ground, J1-3 COMM +, J1-4 COMM -

### 1A7 High Power Relay

Relay output contacts at 120 VAC	16.0 Amps resistive, 6.4 Amps pilot duty, 1 HP, 16.0 FLA
J2	14-26 AWG with a maximum of two 14 AWG J2-1 NO, J2-2 NO, J2-3 NC, J2-4 COM, J2-5 COM
Power	24 +/- 10% Vdc, 60 mA max. Communications, RS485 Physical layer, 19.2 Kbaud, Trane IPC3 protocol.
J1	J1-1 +24 Vdc, J1-2 GND, J1-3 COMM +, J1-4 COMM - J11: J11-1 +24 Vdc, J11-2 GND, J11-3 COMM +, J11-4 COMM -

## Tracer AdaptiView Control Component Overview

### 1A8, 1A9, 1A11, 1A12 Quad Relay Output Status

Relay #1	2-1 NO, J2-2 NC, J2- common
Relay #2	J2-4 NO, J2-5 NC, J2-6 common
Relay #3	J2-7 NO, J2-8 NC, J2-9 common
Relay #4	J2-10 NO, J2-11 NC, J2-12 common
Relay Outputs	at 120 VAC: 7.2 Amps resistive, 2.88 Amps pilot duty, 1/3 HP, 7.2 FLA, at 240 VAC: 5 Amps general purpose 14-26 AWG, two 14 AWG Maximum Power, 24 +/- 10 percent Vdc, 100 ma maximum. Trane IPC3 protocol.

### 1A13, 1A18, 1A19, 1A20 Dual Binary input module

J2-1 Binary Input Signal #1, J2-2 Ground, J2-3 Binary Input Signal #2, J2-4 Ground	
Binary Input	Looks for a dry contact closure. Low Voltage 24V 12 mA. 14 - 26 AWG with a maximum of two 14 AWG
Power	24 +/- 10 percent Vdc, 40 mA maximum Trane IPC3 protocol.

### 1A14 Communication Interface Module

Power, 24 +/- 10 percent Vdc, 50 mA maximum.

J1-1 +24 VDC		J2-1 COMM +	J11-1+24 VDC
J1-2	Ground	J2-2 COMM -	J11-2 Ground
J1-3	COMM +	J2-3 COMM +	J11-3 COMM +
J1-4	COMM -	J2-4 COMM -	J11-4 COMM -

### 1A15, 1A16, 1A17, 1A21 Dual Analog Input/output Module

**Analog Output:** The Analog Output is a voltage only signal. 2-10 Vdc at 22mA

J2	14 - 26 AWG with a maximum of two 14 AWG
J2-1	Output #1 to J2-3 (Ground), J2-4 Output #2 to J2-6 (Ground)

The control panel provides a 2-10 Vdc analog signals as outputs. The output's maximum source capability is 22mA. The maximum recommended length to run this signal is included in the table below.

## Tracer AdaptiView Control Component Overview

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*Note: This table applies to copper conductors only.*

**Table 24. Recommended Length to Run External Output Signals**

Gauge	Ohms Per Feet	Length (Feet)	Maximum Length (Meters)
14	0.00 2823	1062.7	324
16 0	0.004489	668.3	203.8
18	0.007138	420.3	128.1
20	0.01135	264.3	80.6
22	0.01805	166.3	50.7
24	0.0287	104.5	31.9
26	0.04563	65.7	20
28	0.07255	41.4	12.6

### Analog Input:

The analog input can be software switched between a voltage input or a current input. When used as a current input a 200 Ohm load resistor is switched in.

### 2-12 Vdc or 4 to 20 mA Analog Inputs

The control panel accepts either a 2-10 Vdc or 4-20 analog input suitable for customer external control. The type is determined at unit commissioning during feature installation.

J2	14 - 26 AWG with a maximum of two 14 AWG
J2-2	Input #1 to J2-3 (Ground)
J2-5	J2-5 Input #2 to J2-6 (Ground).
Power	24 +/- 10 percent VDC, 60 mA maximum, Trane IPC3 protocol.

## Unit Mounted Devices

### Vane Actuator Control

The Stepper Module within the stepper vane actuator (4M2) (and 4M4 extended capacity) pulses a DC voltage to the windings of the Stepper Motor Actuator(s) to control inlet guide vane position. While operation of this stepper motor is automatic, manual control is possible by going to the Mode Overrides settings menu within the Tracer AdaptiView display. Compressor Control Signal allows the operator to manually increase or decrease the compressor load by adjusting the compressor control signal.

*Note: If the chiller is operating in a limit mode (current limit, condenser limit, evaporator limit, and so on.) The limit operation has priority over all Tracer AdaptiView display manual modes of operation.*

On each control panel power-up, the inlet guide vanes are driven full closed to recalibrate the zero position (Steps) of the Stepper motor vane actuator.

## Tracer AdaptiView Control Component Overview

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### Temperature Sensors

The following sensors are used on CenTraVac models:

- Evaporator sensors 4R6 and 4R7
- Condenser sensors 4R8, 4R9 entering and leaving,
- Bearing temperature sensors 4R1, 4R2,
- Oil temperature sensor 4R5
- Outdoor air temperature 4R13
- Evaporator 4R10 saturated refrigerant temperature sensor
- Condenser 4R11 saturated refrigerant temperature sensor

Probe Operating Temperature Range -40 to 250°F (-40 to 121° C)

Accuracy +/- 0.25° C over the range -4 to 122°F (-20 to 50° C), +/- 0.50° C over the range -40 to 250°F (-40 to 121° C)

Power and Communications and Terminations Power 24 +/- 10% VDC, 20 mA maximum.

Trane IPC3 protocol communications.

### Pressure Sensors

- Oil tank sump 4R4
- Oil pump discharge 4R3
- Evaporator and condenser refrigerant pressure 4R22

Working Pressure Range: 0 to 50 Psia

Accuracy: ± 0.3% of full scale output at 68°F (20°C)

Power and Communications and Terminations Power 24 +/- 10% VDC, 20 mA maximum.

Communications, RS485 Physical Layer, 19.2 Kbaud, Trane IPC3 protocol.

### Starter Module

In the hierarchy of modules the Starter module 2A1 (1A23 when customer supplied starter specified) is second only to the Tracer AdaptiView display. The starter module is present in all starter selections (except AFD) .This includes Wye Delta, Across the Line, and Solid State whether remote unit mounted or supplied by others. The starter module provides the logic to provide the motor protection for Current overload, phase reversal, phase loss, phase imbalance, and momentary power loss. These functions are discussed in "[Machine Protection and Adaptive Control](#)," p. 68.

Relay outputs @ 120 vac: 7.2 amps resistive 2.88 amps Pilot Duty 1/3 hp, 7.2 FLA.

Relay outputs @ 240 vac: 5 amps 6 general purpose.



## Tracer AdaptiView Control Component Overview

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### EarthWise™ Purge

Trane has also revolutionized its controller-integrated purge, which features an automatic regeneration system for high-efficiency, maintenance-free refrigerant containment. Air and noncondensables are pumped out faster, and the lower temperature refrigeration system enhances the base purge efficiency. See the *EarthWise Purge Operation and Maintenance Manual* for details.

## Control Sequence of Operation

This section will acquaint you with the control logic governing CVHE, CVHF, and CVHG, chillers equipped with the Tracer AdaptiView control system.

### Electrical Sequence - Wye-Delta Starter

When reviewing the step-by-step electrical sequences of operation, refer to the typical wiring schematics for the unit-mounted Wye-Delta starter shown in the installation manual shipped with the chiller.

*Note: The typical wiring diagrams are representative of standard units and are provided only for general reference. They may not reflect the actual wiring of your unit. For specific electrical schematic and connection information, always refer to the wiring diagrams that shipped with the chiller.*

With the supply power disconnect switch or circuit breaker (2Q1 or 2K3) closed, 115-volt control power transformer 2T5 and a 40-amp starter panel fuse (2F4 ) to terminal (2X1-1) starter panel to terminal 1X1- 1 in the control panel. From this point, control voltage flows to:

1. Circuit Breaker 1Q1 which provides power to the starter module (2A1) relay outputs and the High Pressure Cutout switch (3S1).
2. Circuit Breaker 1Q2 which provides power to the Purge circuitry.
3. Circuit Breaker 1Q3 which provides power to Transformer (1T1) which steps down the 115 Vac to 24 Vac. This 24 Vac then powers the 24 Vdc power supply 1A1, and 1A2 if present. The 24 Vdc is then connected to all modules via the Interprocessor communications Bus providing module power.  
1Q3 also provides power to the external chiller water proof of flow device connected between terminal block 1X1-5 to 1A6-J3-2, and condenser water proof of flow device connected at 1X1-6 to 1A6-J2-2.
4. Circuit Breaker 1Q4 which provides power to the Oil Heater 4HR1 circuit and to Circuit Breaker 1Q5 oil and refrigerant pump circuits.
5. The Tracer AdaptiView display module, receives 24 Vdc power from the IPC bus.

## Control Panel and Wye-Delta Starter Control Circuits

Logic Circuits within the various modules will determine the starting, running, and stopping operation of the chiller. When operation of the chiller is required the chiller mode is set at "Auto". Using customer supplied power, the chilled water pump relay (5K1) is energized by the 1A5 Module output at 1A5-J2-4, and chilled water flow must be verified within 4 minutes 15 seconds by the 1A6 Module. The main processors logic decides to start the chiller based on the differential to start setpoint. With the differential to start criteria met, module 1A5 then energizes condenser water pump relay (5K2) with customer supplied power at 1A5 J2-1.

Based on the Restart Inhibit function and the Differential to Start setpoint, oil and refrigerant pump (4M3) are energized by 1A7 Module (1A7-J1). The oil pressure must be at least 9 psid for 60 continuous seconds and condenser water flow verified within 4 minutes and 15 seconds for the compressor start sequence to be initiated.

When less than 2.5 seconds remain before compressor start, a starter test is conducted to verify contactor states prior to starting the compressor. The following test or start sequence is conducted for "Wye-Delta" starters: (Also refer to [Figure 6, p. 66.](#))

- A. Test for transition complete contact open (2A1-J12-2) –160 to 240 msec. An MMR diagnostic will be generated if the contact is closed.
- B. Delay time - 20 msec.
- C. Close start contactor (2K1) and check for no current - 500 msec. If currents are detected, the MMR diagnostic "Starter Fault Type I" is generated.
- D. Stop relay (2A1-J10-3 to 1) closes for one second for test "C" above.
- E. Delay time - 200 msec. (Opens 2K1).
- F. Close shorting contactor, (2K3) and check for no current - one second. If currents are detected the MMR diagnostic "Starter Fault Type II" is generated (Starter Integrity Test).
- G. If no diagnostics are generated in the above tests, the Stop Relay (2A1-J10) is closed for 2 seconds and the Start Relay (2A1-J8) is closed to energize the start contactor (2K1). The shorting contactor (2K3) has already been energized from (F) above. The compressor motor (4M1) starts in the "Wye" configuration, an auxiliary contact (2K1-AUX) locks in the start contactor (2K1) coil.
- H. After the compressor motor has accelerated and the maximum phase current has dropped below 85 percent of the chiller nameplate RLA for 1.5 seconds, the starter transition to the "Delta" configuration is initiated.
- J. The transition contactor (2K4) is closed through relay 2A1-J2, placing the transition resistors (2R1, 2R2, and 2R3) in parallel with the compressor motor windings. (The run relay (2A1-J6-3 to 1) is closed.
- K. The shorting contactor (2K3) is opened through the opening of relay 2A1-J4 100 msec after the closure of the transition relay 2A1-J2, and the run relay 2A1-J6.

## Tracer AdaptiView Control Component Overview

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L. The run contactor (2K2) is closed through auxillary contacts on the shorting contactor (2K3), shorting out the transition resistors. This places the compressor motor in the “Delta” configuration and the starter module waits to look for this transition for about 2.3 seconds through the closure of the transition complete contacts 2K2-Aux at module 2A1-J12 input) .

M. The starter module must now confirm closure of the transition complete contact (2K2-AUX) within 2.5 seconds after the shorting relay (2A1-J4) is opened.

Finally, the transition relay (2A1-J2) is opened de-energizing the transition contactor (2K4) and the compressor motor starting sequence is complete. An MMR diagnostic will be generated if the transition complete contacts (2K2-AUX) do not close. A diagram of this test or start sequence is shown in [Figure 6](#).

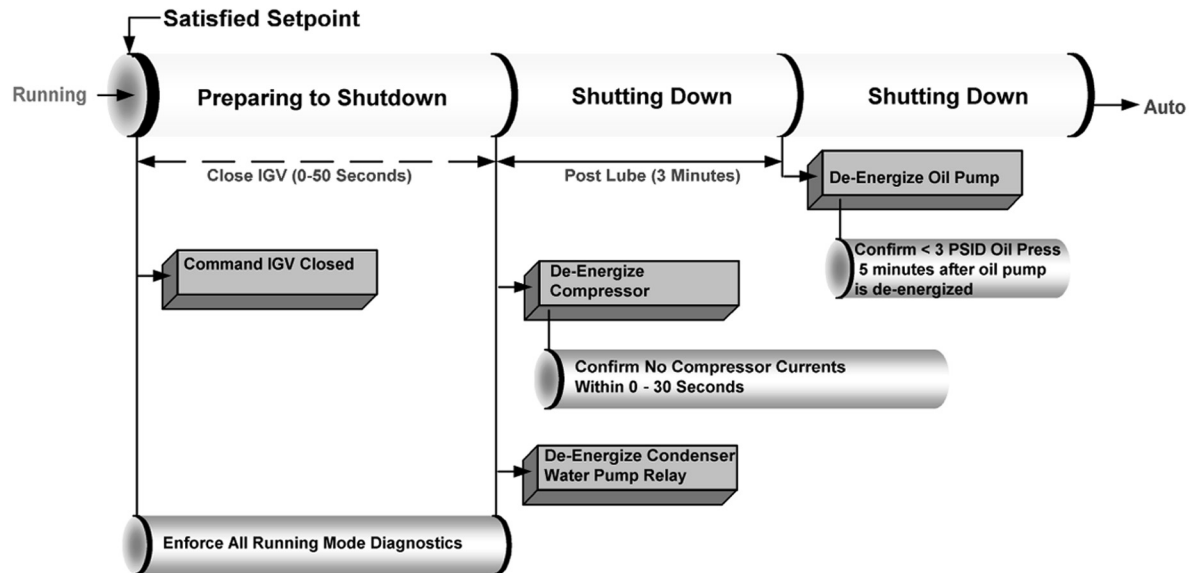
Now that the compressor motor (4M1) is running in the “Delta” configuration, the inlet guide vanes will modulate, opening and closing to the chiller load variation by operation of the stepper vane motor actuator (4M2) to satisfy chilled water setpoint. The chiller continues to run in its appropriate mode of operation: Normal, Softload, Limit Mode, and so on.

If the chilled water temperature drops below the chilled water set point by an amount set as the “differential to stop” setpoint, a normal chiller stop sequence is initiated as follows:

1. The inlet guide vanes are driven closed up to 50 seconds.
2. After the inlet guide vanes are closed, the stop relay (2A1-J10) and the condenser water pump relays (1A5-J2) open to turn off. The oil and refrigerant pump motor (4B3) will continue to run for 3 minutes post lube while the compressor coasts to a stop. The chilled water pump will continue to run while the Main processor module (1A22) monitors leaving chilled water temperature preparing for the next compressor motor start based on the “differential to start” setpoint.

[Figure 5, p. 65](#) illustrates this sequence.

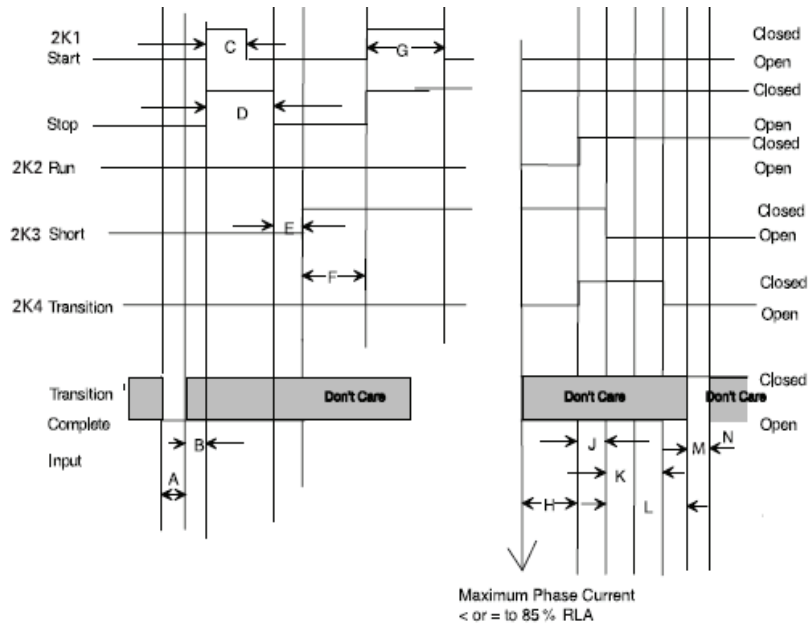
**Figure 5. CVHE, CVHF, and CVHG Sequence of Operation: Satisfied Setpoint**



If the STOP key is pressed on the operator interface, the chiller will follow the same stop sequence as above except the chilled water pump relay (1A5-J2) will also open and stop the chilled water pump after the chilled water pump delay timer has timed out after compressor shut down.

If the "Immediate Stop" is initiated, a panic stop occurs which follows the same stop sequence as pressing the STOP key once except the inlet guide vanes are not sequence closed and the compressor motor is immediately turned off.

**Figure 6. Test and Start Timing Sequence**



Timing requirements to operate the “Stop”, “Start”, “Short”, “Transition”, and “Run” contact closure outputs are shown below. Prior to closing the “Short” contact, the transition complete input shall be verified to be open, otherwise an MMR diagnostic is generated.

**Table 25. Timing Requirements to Operate Stop, Start, Short, Transition, and Run Closure Outputs**

Interval	Minimum	Maximum	Units	Actual Design
Steps A to F: Starter Integrity Test				
Steps F to N: Starter Timing				
A. (Test for transition complete input open)	---	---	---	160 to 240 milliseconds
B. (Just delay time)	---	---	---	20 milliseconds
C. (Close 1M (2K1) Contactor and test for no current.) (Starter integrity test)	---	---	---	500 milliseconds
D. (Hold 1M (2K1) Contactor and test for no current.) (Starter integrity test)	---	---	---	1 second
E. (Open 1M (2K1) Delay time)	---	---	---	200 milliseconds
F. (Close Shorting Contactor (2K3) and test for no current, then wait for Start command.) (Starter integrity test)	100	---	milliseconds	1 second (Minimum)
G. (Close 1M ( <b>Non-duplex:</b> 2K1) ( <b>Duplex:</b> 2K1 and 2K11))	2.0	---	second	2 seconds
H. (Wait 1.5 seconds after phase currents drop to 85 percent)	1	2	second	1.5 seconds

## Tracer AdaptiView Control Component Overview

**Table 25. Timing Requirements to Operate Stop, Start, Short, Transition, and Run Closure Outputs (continued)**

Interval	Minimum	Maximum	Units	Actual Design
J. (Begin Transition sequence)	85	100	milliseconds	100 milliseconds
K. (Open S (Shorting) Contactor)	250	300	milliseconds	260 milliseconds
L. (Close 2M (2K2) Contactor)				140 milliseconds
M. (Wait to look for Transition complete)			milliseconds	2.32 to 2.38 seconds
N. (Filtering time on Transition complete input)			milliseconds	160 to 240 milliseconds

Current passing through fuse 1F2 reaches 2 normally open parallel sets of contacts: those of refrigerant and oil pump relay (1A7-J2-5 to 1), and the start contactor 2K1-aux . Connected at module 1A7-J2-2 to 4.

*Note: While the (1A7-J2-5 to 1) relay automatically is closed by the main processor 1A22 as a part of the start sequence. It can also be closed manually by changing the oil pump status to "ON" in the manual override settings of the Tracer AdaptiView display.*

Closure of the (1A7-J2-5 to 1), or 2K1 auxiliary contacts also allows current to pass through the coil of the refrigerant pump starter relay (4K8), to the start windings of the refrigerant pump. When motor 4M3 first starts, current draw is high. This causes current sensing relay 4K8 to close its normally open contacts and pull in pump Capacitor 4C1. Increasing motor speed and related decreasing current through the main winding and relay coil reduce the magnetic force and the armature "drops out" to open the start contacts and disconnect the start windings and capacitor. Current now flows only to the run windings of the oil pump motor or refrigerant and oil pump motor.

**Table 26. Maximum Acceleration Timer Setting by Starter Type**

Wye-Delta	27 Seconds
Auto-Transformer	16
Primary Reactor	16
Across the Line	6
Solid State	25
AFD	30

## Machine Protection and Adaptive Control

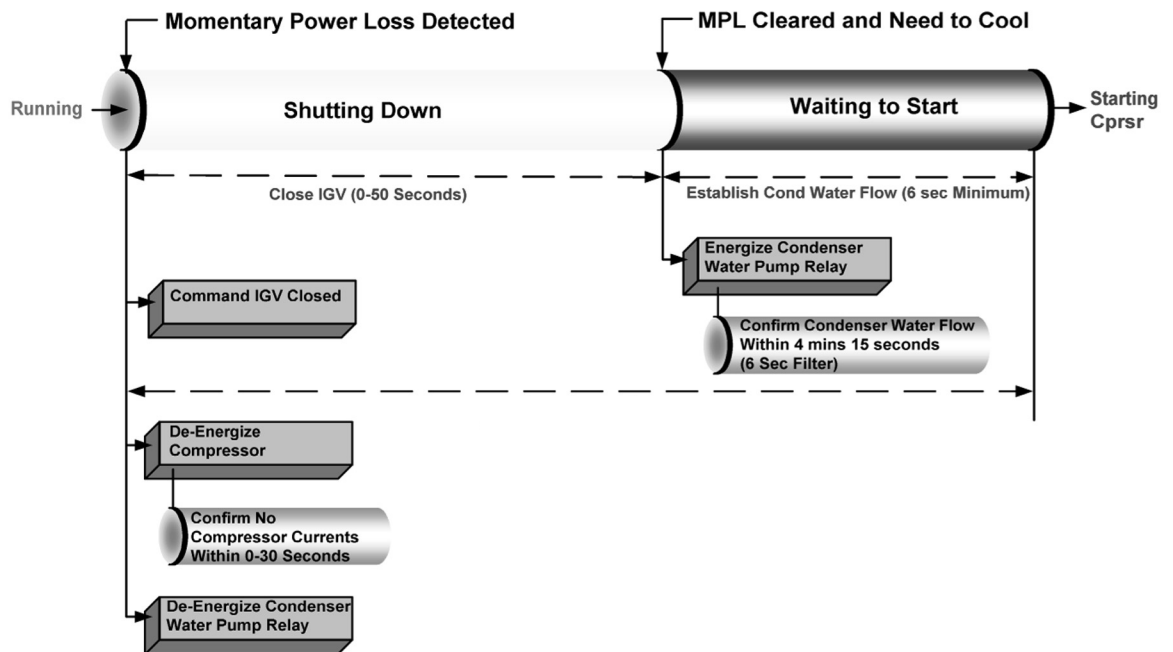
### Momentary Power Loss (MPL) Protection

Momentary Power Loss (MPL) detects the existence of a power loss to the compressor motor and responds by initiating the disconnection of the compressor motor from the power source. Power interruptions of less than 30 line-cycles are defined as momentary power losses. Tests have shown that these short-term power interruptions can be damaging to the motor and compressor if the chiller is reconnected to the line while the motor and line phases do not match. The chiller is shut down when a MPL is detected and displays a non-latching diagnostic indicating the failure. The oil pump is run for the post-lube time period when power returns. The compressor and compressor motor are protected from damage from large torques and inrush currents resulting from reconnecting the compressor motor to the power source following a momentary loss of power.

MPLs greater than 2 or 3 cycles are detected resulting in unit shut down. Disconnection from the line is initiated within 6 line cycles of the power loss. MPL protection is active anytime the compressor is in the running mode. (The transition complete input has been satisfied).

MPL is enabled. However, it can be disabled, if required, by using the Tracer TU service tool.

**Figure 7. Sequence of Operation: Momentary Power Loss (Tracer AdaptiView Display and Starter Module Remain Powered)**



### Current Overload Protection

Motor currents are continuously monitored for over current protection and locked rotor protection. This protects the Chiller itself from damage due to current overload during starting and running modes but is allowed to reach full load amps. This overload protection logic is independent of the current limit. The overload protection will ultimately shut the unit down anytime the highest of the three phase currents exceeds the time-trip curve. A manual reset diagnostic describing the failure will be displayed.

Overload protection for the motor starts based on the Maximum Time to Transition permitted for a particular motor.

### Running Over Current Protection

In the run mode, a “time-to-trip” curve is looked at to determine if a diagnostic should be called. The control panel continuously monitors compressor line currents to provide running over current and locked rotor protection.

Over current protection is based on the line with the highest current. It triggers a manually resettable diagnostic shutting down the compressor when the current exceeds the specified time-trip curve.

The compressor overload time trip curve is expressed as a percent of the Rated Load Amps of the compressor and is not adjustable:

Overload Must Hold = 102 %RLA.

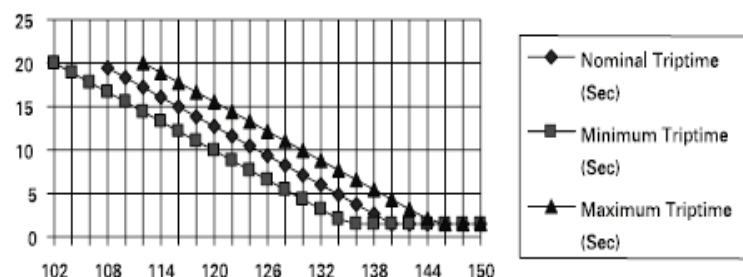
Overload Must Trip in 20 (+0 -3) seconds = 112 %RLA

(Note the above gives a nominal 20 second must trip point of 107 %RLA.)

Overload Must Trip in 1.5 seconds = 140 %RLA (Nominal)

The linear time-trip curve is as follows:

**Figure 8. Overload Trip Time Versus %RLA**



The Maximum Acceleration Time Setting and Current Transformer Setting are factory set. However they can be set with the Tracer TU service tool.

### Current Limit Protection

Current Limit Protections exist to avoid motor current overload and damage to the compressor motor during starting and running. Compressor motor current is continuously monitored and current is controlled by a limit function to prevent running over into current diagnostic trips.

The current limit control logic attempts to prevent the motor from shutting down on a diagnostic trip by limiting compressor current draw relative to an adjustable current limit Tracer AdaptiView display Current Limit Setpoint. This setpoint can also be lowered to provide electrical demand limiting on the unit as required. This could also be set to allow the chiller to continue to run at a lower load to avoid tripping off from a diagnostic.

The Current Limit function uses a PID algorithm (similar to the Leaving Water Temperature control) that allows the chiller to run at the Current Limit Setpoint. At machine startup, or with any setpoint change the new Current Limit Setpoint reached after the filtered setpoint softload time elapses. The minimum current limit setpoint is default set to 40 percent RLA (20-100 percent). The filtering time is default set to 10 minutes (0-120 minutes), however, these can be altered using the Tracer TU service tool. This filtered setpoint allows for stable control if the Current Limit setpoint is adjusted during a run.

The Current Limit Setpoint (CLS) can be changed from: Front Panel, External Analog input (with GBAS option), or Tracer (Tracer option). However, if present, Tracer Current setpoint has the highest priority, unless disabled in the Tracer AdaptiView display setpoint Source Override menu. The External CLS has second priority, and is used if Tracer is disabled or not installed. The Front Panel setpoint has the lowest priority, and is used if Tracer and the External CLS are both disabled.

### Phase Loss Protection

Loss of phase detection protects the chiller motor from damage due to a single-phasing condition. The controls will shut down the chiller if any of the three phase currents feeding the motor are lost. The shutdown will result in a latching diagnostic indicating the failure. The motor is protected from over-current during a single-phase condition by the Current Overload Protection feature. Phase Loss Protection provides redundant protection and a diagnostic that more accurately describes the fault.

### Base Loading Control Algorithm:

This feature allows an external controller to directly modulate the capacity of the chiller. It is typically used in applications where virtually infinite sources of evaporator load and condenser capacity are available and it is desirable to control the loading of the chiller. Two examples are industrial process applications and cogeneration plants. Industrial process applications might use this feature to impose a specific load on the facility's electrical system. Cogeneration plants might use this feature to balance the system's heating, cooling and electrical generation. All chiller safeties and adaptive control functions are in full effect when Base Loading control is enabled. If the chiller approaches full current, the evaporator temperature drops too low, or the condenser pressure rises too high, Tracer UC800 Adaptive Control logic limits the loading of the chiller to prevent

## Tracer AdaptiView Control Component Overview

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the chiller from shutting down on a safety limit. These limits may prevent the chiller from reaching the load requested by the Base Loading signal. Base Loading Control is basically a variation of the current limit algorithm. During base loading, the leaving water control algorithm provides a load command every 5 seconds. The current limit routine may limit the loading when the current is below setpoint. When the current is within the deadband of the setpoint the current limit algorithm holds against this loading command. If the current exceeds the setpoint, the current limit algorithm unloads. The “Capacity Limited By High Current” message normally displayed while the current limit routine is active is suppressed while base loading.

Base loading can occur through Tracer, External signal, or front panel.

### **Tracer Base Loading: Current Setpoint Range: (20 - 100) percent RLA Requires Tracer and Optional Tracer Communications Module (LLID)**

The Tracer commands the chiller to enter the base load mode by sending the base load mode request. If the chiller is not running, it will start regardless of the differential to start (either chilled water or hot water). If the chiller is already running, it will continue to run regardless of the differential to stop (either chilled water or hot water), using the base load control algorithm. While the unit is running in base loading, it will report that status back to the Tracer by setting “Base Load Status = true” in the Tracer Status Byte. When the Tracer removes the base load mode request (sets the bit to 0). The unit will continue to run, using the normal chilled or hot water control algorithm, and will turn off, only when the differential to stop has been satisfied.

### **External Base Loading: Current Setpoint Range: (20 - 100) percent RLA**

The UCP accepts 2 inputs to work with external base loading. The binary input is at 1A18 Terminals J2- 1 and J2-2 (Ground) which acts as a switch closure input to enter the base-loading mode. The second input, an analog input, is at 1A17 terminals J2 – 1 and 3 (Ground) which sets the external base loading setpoint, and can be controlled by either a 2-10Vdc or 4-20ma Signal. At startup the input type is configured. The graphs in Figure 13 show the relationship between input and percent RLA. While in base loading the active current limit setpoint is set to the Tracer or external base load setpoint, providing that the base load setpoint is not equal to 0 (or out of range). If it is out of range, the front panel current limit setpoint is used. During base loading, all limits are enforced with the exception of current limit. The human interface displays the message “Unit is Running Base Loaded”. Hot Gas Bypass is not run during base loading. If base loading and ice making are commanded simultaneously, ice making takes precedence. An alternative and less radical approach to Base Loading indirectly controls chiller capacity.

Artificially load the chiller by setting the chilled water setpoint lower than it is capable of achieving. Then, modify the chiller’s load by adjusting the current limit setpoint. This method provides greater safety and control stability in the operation of the chiller because it has the advantage of leaving the chilled water temperature control logic in effect. The chilled water temperature control logic responds quicker to dramatic system changes, and can limit the chiller loading prior to reaching an Adaptive Control limit point.

## Tracer AdaptiView Control Component Overview

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### Reverse Rotation Protection

This function protects the compressor from being driven in the reverse direction. Incorrect phase rotation detection results in a manually resettable diagnostic. Phase Reversal protection is default to Enable. However it can be disabled from the Tracer TU service tool.

### Phase Imbalance Protection

The Tracer UC800 provides phase imbalance protection based on the average three-phase current. The three phase currents supplied to the motor are monitored for unequal amperage draw. Motor overload is not considered to be a problem since each phase of the motor is monitored for overcurrent. In addition, since each phase is monitored for loss of current, the motor will be protected against single phasing.

### Under and Over Voltage Protection

Under/over voltage protection can be enabled (default) or disabled from the Tracer TU service tool.

If Disabled : No effect.

If enabled and an overvoltage condition occurs:

- Diagnostic called when the average of the three line voltages is greater than 112.5% of the unit line voltage set point for 60 seconds.
- Diagnostic cleared when the average of the three line voltages is 110% or less of the unit line voltage set point.

If enabled and an undervoltage condition occurs:

- Diagnostic called when the average of the three line voltages is less than 87.5% of the unit line voltage set point for 60 seconds.
- Diagnostic cleared when the average of the three line voltages is 90% or greater of the unit line voltage set point.

### Differential to Start or Stop

The Differential to Start setpoint is adjustable from 1 to 10°F (0.55 to 5.55°C) and the Differential to Stop setpoint adjustable from 1 to 10°F (0.55 to 5.55°C). Both setpoints are with respect to the Active Chilled Water Setpoint. When the chiller is running and the LWT (Leaving Water Temperature) reaches the Differential to Stop setpoint the chiller goes through its shutdown sequence to AUTO. (Refer to [Figure 5, p. 65.](#))

### Softloading

Softloading stabilizes the startup control during the initial chiller pulldown. Soft loading is used to bring the building loop temperature from its start value to the Chilled Water or Hot Water Setpoint in a controlled manner. Without soft loading, the chiller controls will load the chiller rapidly and use the full chiller capacity to bring the loop temperature to setpoint. Although the start temperature of loop may have been high, the actual system load may be low. Thus, when the setpoint is met, the chiller must unload quickly

## Tracer AdaptiView Control Component Overview

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to the system load value. If it is not able to unload quickly enough, the supply water temperature will drop below setpoint and may even cause the chiller to cycle off. Soft loading prevents the chiller from going to full capacity during the pulldown period. After the compressor has been started, the starting point of the filtered setpoint is initialized to the value of the Evaporator Leaving Water temperature and the percent RLA.

There are three independent Softload setpoints:

- Capacity Control Softload Time (default to 10 minutes, 0-120 minutes)  
This setting controls the time constant of the Filtered Chilled Water Setpoint.
- Current Limit Control Softload Time (default 10 minutes; 0-120 minutes)  
This Setting controls the time constant of the Filtered Current Limit Setpoint.
- Current Limit Softload Starting Percent (default is 40 percent RLA; 20-100 percent):  
This setting controls the Starting point of the Filtered Current Limit Setpoint.

The Tracer TU service tool provides access to these three setpoints, if you determine that it is necessary to change from the defaults.

Softloading is not active during Ice Making or during the Ice To Normal Transition. Softloading is enabled after the Ice to Normal Transition timer has expired.

Softloading is not active during Free Cooling, The softloading is active during the transition from Free Cooling to Powered Operation.

Softloading times can be active during Hot Gas Bypass Control.

### Minimum and Maximum Capacity Limit

A Minimum Capacity can be set to limit the unloading ability of the compressor thus forcing differential to stop to be reached cycling the chillers. Minimum capacity limit will be displayed when in this limit mode. This indicates when the chiller is running fully unloaded.

Similarly a maximum capacity can be set to limit normal chilled water temperature control, the maximum capacity relay is energized which is a signal used by generic BAS systems to start another chiller.

The minimum (default at 0 percent) and maximum (default at 100 percent) capacity are adjustable using the Tracer TU service tool.

## Evaporator Limit

Evaporator refrigerant temperature is continuously monitored to provide a limit function that prevents low refrigerant temperature trips which allows the chiller to continue to run at a reduced load instead of tripping off at the Low Evaporator Refrigerant Temperature Cutout Setpoint (LRTC).

Evaporator limit could occur with an initial pull down of a loop where the Condenser is colder than the Evaporator (Inverted Start), the Evaporator refrigerant temperature may drop below the Low Refrigerant Temperature Cutout (LRTC). This limit prevents the unit from shutting down on a diagnostic during this type of pulldown. Another example is a

## Tracer AdaptiView Control Component Overview

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Chiller that is low on refrigerant charge will run with low Evaporator refrigerant temperatures. This limit allows the chiller to continue to run at a reduced load.

Evaporator Limit uses the Evaporator Refrigerant Temperature sensor in a PID algorithm (Similar to the Leaving Water Temperature control) that allows the chiller to run at the LRTC + 2 degree F.

When actively limiting machine control “Evaporator Temperature Limit” will be displayed as a suboperating mode.

### Leaving Water Temperature Cutout

Leaving water temperature cutout is a safety control that protects the chiller from damage caused by water freezing in the evaporator. The cutout setpoint is factory set however is adjustable with the Service tool.

The “Leaving Water Temperature Cutout Setpoint” is independently adjustable from the chilled water setpoint and factory set. Shutdown of the compressor due to violation of the Leaving Water Temperature Cutout results in an automatically resettable diagnostic (MAR). The Tracer AdaptiView™ Operating Mode indicates when the “Leaving Water Temperature Cutout Setpoint” conflicts with the chilled water temperature setpoint by a message on the display. The “Leaving Water Temperature Cutout Setpoint” and chilled water setpoint, both active and front panel, are separated by a minimum of 1.7°F. (See Cutout Strategy, [Figure 9, p. 75.](#)) When either difference is violated, the control panel does not permit the above differences to be violated and the display exhibits a message to that effect and remains at the last valid setpoint. After violation of the “Leaving Water Temperature Cutout Setpoint” for 30°F seconds the chiller will shutdown and indicate a diagnostic.

### High Evaporator Leaving Water Temperature Cutout

A High Evaporator Water Temperature Diagnostic was implemented that will turn off the Evaporator Water pump relay if the relay is being forced on due to a Loss of Evaporator Water Flow Lost diagnostic (MAR Diagnostic) and the Evaporator Leaving Water Temperature exceeds an adjustable High Evaporator Water Temperature Cutout for 15 continuous seconds. The High Evaporator Water Temperature diagnostic is an immediate shutdown and is nonlatching. The diagnostic will auto reset and the pump will return to normal control when the temperature falls 5°F below the cutout setting. High Evaporator Water Temperature Cutout is a setpoint that is adjustable in Tracer TU from 80°F and 150°F. The default is 105°F.

### Low Refrigerant Temperature Cutout

The purpose of the low evaporator refrigerant temperature protection is to prevent water in the evaporator from freezing. When the Low Evaporator Refrigerant Temperature Cutout (LRTC) trip point is violated, a latching diagnostic indicating the condition is displayed. The Low Evaporator Refrigerant Temperature Diagnostic is active in both the Running and Stopped modes.

## Tracer AdaptiView Control Component Overview

The Low Evaporator Refrigerant Cutout Setpoint is factory set to 36°F. This can be altered via the Tracer TU service tool. A service tool adjustable setpoint that should be based on the percentage of antifreeze used in the customer's water loop. The service tool will display a warning message such as "Warning: Adequate Antifreeze required" for any Evaporator Refrigerant Temperature Cutout below 28°F and any Leaving Water Temperature Cutout below 35°F.

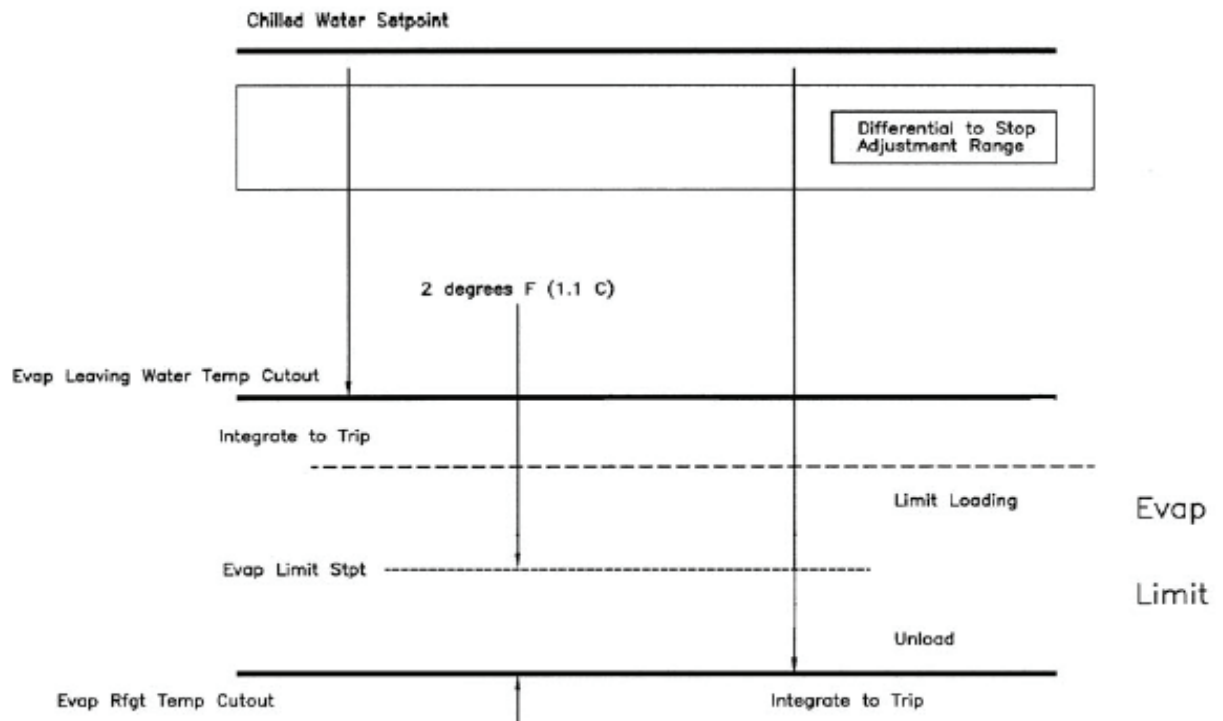
The percent of antifreeze required is a function of the Leaving Water Temperature setpoint and the worse case (lowest permitted water flow) approach temperatures of the chiller's evaporator design.

### Head Relief Relay

Surge, condenser limit, and certain conditions in Ice Mode can energize the head relief relay. (Also see "Head Relief Request Output," p. 50.)

*Note: There is a Tracer TU programmable Head Relief Relay Filter Time setpoint. The default is 1 minute.*

**Figure 9. Cutout Strategy**



**Limit Loading:** The potential to limit loading increases as the saturated evaporator temperature approaches the evaporator limit setpoint.

## Tracer AdaptiView Control Component Overview

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Unload: The potential to unload increases as the saturated evaporator temperature falls further below the evaporator limit setpoint.

Figure 9, p. 75 illustrates these functions as follows:

- Chilled water setpoint
- Evap leaving water temp cutout
- Evap rfgt temp output

### Evaporator Variable Flow Compensation

This option includes transducers for the differential evaporator and condenser water pressures (psid). Flow switches or some other means to prove flow are still required and must be field connected. The following data will be shown at the Tracer AdaptiView and Tracer TU displays and at Tracer Summit.

- Evaporator and condenser differential water pressures (psid)
- Evaporator and condenser gpm
- Evaporator tons

#### How It Works

The Tracer chiller controller uses a patented, variable, water-flow compensation algorithm to maintain stable, precise capacity control. Variable flow compensation is an optional control feature for CTV chillers.

It will automatically adjust capacity control to:

- Maintain control stability at low flow.
- Reject variable-flow disturbance.

If the water-pressure transducer fails and the flow switch continues to prove flow, water-flow compensation will be disabled and the design delta T will be used.

For applications designed to operate with variable-primary (VPF) waterflow, variable flow compensation allows the chiller to respond quickly to accelerating or decelerating water. By automatically adjusting the control gain, large changes in the water-flow rate can be tolerated. For details, refer to the Product Catalog, *EarthWise™ CenTraVac™ Water-Cooled Liquid Chillers* (CTV-PRC007-EN).

#### Low Flow Warning

The default setpoint is calculated internally at 1.2 gpm/ton. So the default value is 1.2 times the PTON set in the configuration. For example, for a 500 performance ton chiller, 1.2 gpm/ton X 500pton = 600 gpm.

*Note: PTON is performance tons whereas NTON in nominal tons used to define the compressor. Use PTON in this calculation.*

## Tracer AdaptiView Control Component Overview

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Set the Low Flow Warning at startup as follows:

- The Low Flow Setpoint should be set to be above the point where the external proof of flow device “Opens.” This allows the warning to be annunciated before the loss of flow occurs.
- The proof of flow cutout device should cutout at or above the minimum flow point for the machines particular bundle. (See the sales catalog for minimum flows or submittal.)

The reset of the low flow is 0.1 gpm/ton. In the above example this is 1.3 gpm/ton X 500ptons = 650 gpm.

### Condenser Limit

Condenser pressure is continuously monitored to provide a limit function that prevents High Pressure Cutout (HPC) trips. This protection is called Condenser Refrigerant Pressure Limit, or High Pressure Limit. A fully loaded compressor, operating at high Evaporator Leaving Water Temperature (ELWT) and high condenser temperatures causes high condenser pressures. The purpose of this limit is to avoid High Pressure Cutout (HPC) trips by allowing the Chiller to continue to run at a lower load instead of tripping off through HPC. The Condenser Limit is based from a pressure conversion from the Condenser Refrigerant Temperature sensor, unless there is a Condenser Refrigerant Pressure sensor installed (CDRP option). If the Condenser Refrigerant Pressure Sensor is installed, then the limit is based from the Pressure sensor.

When limited by this action, “Condenser Pressure Limit” is displayed as a sub-operating mode. The Condenser Limit Setpoint is factory set (93 percent of HPC). However it can be altered using the Tracer TU service tool.

### Restart Inhibit

This function provides short cycle protection for the motor, and indirectly also short cycling protection for the starter since the starter is designed to operate the motor under all the conditions of motor performance.

The operation of the Restart Inhibit function is dependent upon two setpoints. The Restart Inhibit Free Starts (1-5, 3 default), and the Restart Inhibit Start to Start Timer (10-30 min, 20 default). These settings are adjustable using the Tracer TU service tool.

### Restart Inhibit Free Starts

This setting allows a number of rapid restarts equal to its value. If the number of free starts is set to “1”, only one start is allowed within the time period set by the Start to Start Time Setting. The next start is allowed only after the Start to Start Timer has expired. If the number of free starts is programmed to “3”, the control allows three starts in rapid succession, but thereafter, it would hold off on a compressor start until the Start to Start Timer has expired. (For example, with 3 free starts and 20 minutes restart inhibit settings, it takes 60 minutes of run time to restore the total of 3 free starts.)

## Tracer AdaptiView Control Component Overview

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### Restart Inhibit Start to Start Time Setting

This setting defines the shortest chiller cycle period possible after the free starts have been used. If the number of free starts is programmed to “1”; and the Start to Start Time Setting is programmed to 10 minutes, then the compressor will be allowed one start every 10 minutes. The start-to-start time is the time from when the motor was commanded to energize to when the next command to enter prestart is given.

### Clear Restart Inhibit

A Clear Restart Inhibit Timer button is provided on the Manual Control Settings screen (Equipment Settings column on the Settings screen of the Tracer AdaptiView display). You can use this Clear Restart Inhibit Timer capability to allow a compressor start when there is a currently active Restart Inhibit that is prohibiting such a start. Pressing the button has no other function than to remove the restart inhibit if one is active. Clearing a restart inhibit does not change the count of any internal restart inhibit timers or accumulators.

The restart inhibit function, setpoints and clear features exist for each compressor and operate independently of other compressors on that chiller.

During the time the start is inhibited due to the Start-to-Start Timer, the mode ‘Restart Inhibit’ along with the time remaining for the restart inhibit is shown on the Tracer AdaptiView display.

A “Restart Inhibit Invoked” warning diagnostic exists when the attempted restart of a compressor is inhibited.

If all three motor winding temperatures are less than the “Restart Inhibit Temperature” Setpoint (default 165°F/74°C) then restart is allowed.

Restart Inhibit Mode exists when at least one of the three motor winding temperatures is greater than or equal to the Restart Inhibit Temperature Setpoint, but less than 265°F/ 129.4°C. Restart inhibit mode is entered until all three motor winding temperatures are less than the ‘Restart Inhibit Temperature’ Setpoint

*Notes:*

- *When one of the three motor winding temperatures is 265°F/ 129.4°C or greater, a High Motor Winding Temperature diagnostic is called.*
- *When the start is inhibited by the Restart Inhibit function, the time remaining is displayed along with the Restart Inhibit mode.*

### High Vacuum Lockout

The oil sump pressure is below the lockout setpoint. Starting of compressor is inhibited as a result.

### Low Oil Temperature Start Inhibit

The oil temperature is at or below the low oil temperature start inhibit setpoint (143°F/ 61.7°C). The heater is energized to raise the oil temperature.

## Tracer AdaptiView Control Component Overview

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Low oil temperature is indicative of refrigerant dilution in the oil. Oil temperature is used to estimate this dilution since the oil temperature directly corresponds to amount of refrigeration dilution in the oil. It is required that oil contains minimal refrigerant in it. This is accomplished by boiling the refrigerant out of the oil by maintaining a high enough oil temperature.

If the oil temperature is at or below a given Low Oil Temperature Inhibit setting (default 95°F/35°C), the compressor cannot be started. This is an inhibit mode and is displayed on the operator interface. The oil heater is energized in an attempt to raise the oil temperature over this inhibit temperature setpoint. The compressor is inhibited from starting until the oil temperature is raised 5 or more degrees above this setpoint.

The Low Oil Temperature Start Inhibit is tested on every start unless a quick restart is being performed during post lube.

If the Enhanced Oil Temperature Protection setting is enabled, the Low Oil Temperature Start Inhibit value is the greater of 100°F/37.8°C or the Saturated Evaporator Refrigerant Temperature + 30°F/ 16.7°C.

If the Enhanced Oil Temperature Protection setting is not enabled, the Low Oil Temperature Start Inhibit value is settable with the Low Oil Temperature Start Inhibit Setpoint using the Tracer TU service tool.

### **Oil Temperature Control**

The oil heater is used to maintain the oil temperature within +/- 2.5°F (1.4°C) of the oil temperature control setpoint. The oil heater is commanded off when the oil pump is commanded on.

If the oil temperature is at or below the Low Oil Temperature Cutout setpoint, this diagnostic is issued and stops the compressor.

This diagnostic is ignored for the first 10 minutes of compressor run. After that, if the oil temperature falls below this cutout temperature for more than 60 consecutive seconds this diagnostic is issued.

### **High Oil Temperature Cutout**

The High Oil Temperature Cutout diagnostic is Latching and results in an Immediate Shutdown. (Default Setpoint value: 180°F (82.2°C)). It is implemented to avoid overheating of the oil and the bearings.

If the oil temperature is at or above the High Oil Temperature Cutout setpoint this diagnostic is issued, which will stop the compressor.

If Oil Temperature violates this temperature cutout for more than 120 seconds this diagnostic is issued.

## Tracer AdaptiView Control Component Overview

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### Manual Oil Pump Control

The oil pump control accepts commands to turn on the oil pump. The manual oil pump choices will be “Auto” or “On”. When the oil pump is commanded “On”, it reverts to “Auto” in 15 minutes.

### Oil Management

The primary purpose of Oil Management is to ensure appropriate and sufficient lubrication to the bearings during compressor operation and to minimize refrigerant dilution in the oil.

**Table 27. Oil Management Setpoints**

Setpoint	Default	User Specified Range
Low Differential Oil Pressure Cutout Setpoint	12 psid	9 - 35 psid
Check Oil Filter Setpoint	15 psid	9 - 60 psid
Check Oil Filter	Enable	Enable/Disable
Low Oil Temperature Start Inhibit Setpoint <sup>(a)</sup>	95 F	80 - 140 F
Oil temperature Control Setpoint <sup>(b)</sup>	143 F	100 - 160 F
Enhanced Oil Temp Protection	Enable	Enable/Disable
Differential Pressure Calibration Limit	3psid	N/A
High Vacuum Lockout Limit	3.1 psia	N/A
Low Oil Temperature Cutout	80 F	N/A
High Oil Temperature Cutout	(See Note) <sup>(c)</sup>	N/A

(a) If Enhanced Oil Temp Protection is enabled, then this setpoint value is max(100F, T<sub>sat</sub> + 30) F for Direct Drive and max(105 F, T<sub>sat</sub> + 30) F or Gear Drive.)

(b) If Enhanced Oil Temp Protection is enabled, then this setpoint value is fixed at 143 F for Direct Drive and 136 F for Gear Drive.)

(c) For a unit type of Direct Drive, this value is fixed at 180° F. For a unit type of Gear Drive, this value is fixed at 165° F.)

### Controls Chilled Water Reset (CWR)

Chilled water reset is designed for those applications where the design chilled water temperature is not required at partload. In these cases, the leaving chilled water temperature setpoint can be reset upward using the CWR features.

When the CWR function is based on return water temperature, the CWR feature is standard.

When the CWR function is based on outdoor air temperature, the CWR feature is an option requiring an outdoor temperature sensor module installed in the control panel and a sensor installed outdoors.

The type of CWR is selected on the Chilled Water Reset screen (Equipment Settings column on the Settings screen of the Tracer AdaptiView display) along with the Reset Ratio, Start Reset Setpoint, and the Maximum Reset Setpoint.

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The following equations and parameters apply for CWR.

- **Return Water**

$CWS' = CWS + \text{RATIO} (\text{START RESET} - \text{TWE} - \text{TWL})$  and  $CWS' > \text{or} = CWS$   
and  $CWS' - CWS < \text{or} = \text{Maximum Reset}$ .

- **Outdoor Air Temperature**

$CWS = CWS + \text{RATIO} (\text{START RESET} - \text{TOD})$  and  $CWS' > \text{or} = CWS$  and  
 $CWS - CWS < \text{or} = \text{Maximum Reset}$ .

*Where:*

CWS'	is the new chilled water setpoint.
CWS	is the active chilled water setpoint before any reset has occurred.
RESET RATIO	is a user adjustable gain.
START RESET	is a user adjustable reference.
TOD	is the Temperature Outdoor Sensor.
TWE	is entering evaporator water temperature.
TWL	is the Leaving Evaporator Temperature.
Maximum Reset	is a user adjustable limit providing the maximum amount of reset. For all types of reset, $CWS - CWS < \text{or} = \text{Maximum Reset}$ .

Both Return and Outdoor Reset do not apply to Heating Mode where the control panel is controlling the Leaving Condensing Hot Water Temperature.

Constant Return Reset resets the leaving water temperature setpoint so as to provide a constant entering water temperature. The Constant Return Reset equation is the same as the Return Reset equation except on selection of Constant Return Reset, the control panel automatically sets RATIO, START RESET, and MAXIMUM RESET to the following:

- The RATIO = 100 percent
- The START RESET = Design Delta Temperature
- The MAXIMUM RESET = Design Delta Temperature

Table 28 shows the values for the start reset types.

**Table 28. Values for Start Reset Types**

The values for "RESET Type" are:				
Reset Type:	Disable	Outdoor Air Reset	Return Reset	Const Return Reset
The values for "RESET RATIO" for each of the reset types are:				
Reset Type:	Reset Ratio Range	Increment English Units	Increment SI Units	Factory Default Value
Return	10 to 120 percent	1 percent	1 percent	50 percent
Outdoor	-80 to 80 percent	1 percent	1 percent	10 percent

## Tracer AdaptiView Control Component Overview

**Table 28. Values for Start Reset Types (continued)**

The values for "START RESET" for each of the reset types are:				
Reset Type	Start Reset Range	Increment English Units	Increment SI Units	Factory Default Value
Return	4 to 30 degrees F (2.2 to 16.7 deg C)	0.1 degree F	0.1 degree C	10 degrees F (5.6 degrees C)
Outdoor	50 to 130 degrees F (10 to 54.44 degrees C)	0.1 degree F	0.1 degree C	90 degrees F (32.22 degrees C)

The values for "MAXIMUM RESET" for each of the reset types are:				
Reset	Maximum Rest Range	Increment English Units	Increment SI Units	Factory Default Value
Return	0 to 20 degrees F (0.0 to 11.11 degrees C)	0.1 degrees F	0.1 degrees C	5 degrees F (2.78% degrees C)
Outdoor	0 to 20 degrees F (0.0 to 11.11 degrees C)	0.1 degrees F	0.1 degrees F	5 degrees F (2.78% degrees C)

### Constant Return

The equation for Constant Return is as follows:

$$CWS' = CWS + 100 \text{ percent (Design Delta Temperature)} - (TWETWL) \text{ and } CWS' > \text{ or } = CWS \text{ and } CWS' - CWS < \text{ or } = \text{Maximum Reset}$$

Notice that Constant Return is nothing more than a specific case of Return Reset offered for operator convenience.

When any type of CWR is enabled, the control panel steps the CWS toward the desired CWS (based on the above equations and setup parameters) at a rate of 1°F every 5 minutes until the Active CWS equals the desired CWS'. This applies when the chiller is running only.

### Using the Equation for Calculating CWR for Outdoor Air Temperature

Equation:

$$\text{Degrees of Reset} = \text{Reset Ratio} * (\text{Start Reset} - \text{TOD})$$

(where \* = multiply)

The chiller will start at the Differential to Start value above a fully reset CWS or CWS for both Return and Outdoor Reset.

The graph on the next page, shows the reset function for Outdoor Air Temperature:

*Note: This graph assumes that Maximum Reset is set to 20 degrees.*

## Tracer AdaptiView Control Component Overview

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### Degrees of Reset:

Degrees of Reset = Active CWS - Front Panel CWS or Degrees of Reset = CWS' - CWS

### To obtain Active CWS from Degrees of Reset:

Active CWS = Degrees of Reset + Front Panel CWS

### Reset Ratio

The Reset Ratio is displayed as a percentage. To use it in the above equation it must be converted to its decimal form.

Reset Ratio percent /100 = Reset Ratio decimal

Here's an example of converting Reset Ratio:

If the Reset Ratio displayed on the CLD is 50 percent then use (50/100)= .5 in the equation

TOD = Outdoor Air Temperature

Start Reset = Outdoor Air Start Reset

### Example of Calculating Reset for Outdoor Air Temperature:

If:

- Reset Ratio = 35 percent
- Start Reset = 80
- TOD = 65
- Maximum Reset = 10.5

How many Degrees of Reset will there be?

Degrees of Reset = Reset Ratio\*(Start Reset - TOD)

Degrees of Reset = .35\*(80-65)

Degrees of Reset = 5.25

(where \* = multiply)

If:

- Reset Ratio = -70 percent
- Start Reset = 90
- TOD = 100
- Maximum Reset = 17

How many Degrees of Reset will there be?

Degrees of Reset = Reset Ratio\* (Start Reset - TOD)

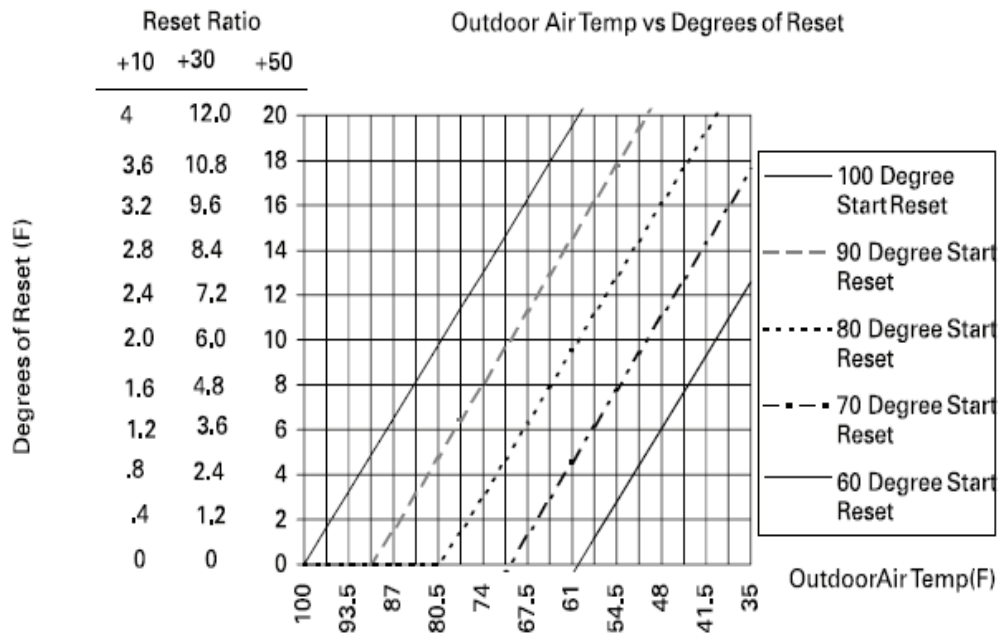
Degrees of Reset = -7\* (90-100)

## Tracer AdaptiView Control Component Overview

Degrees of Reset = 7

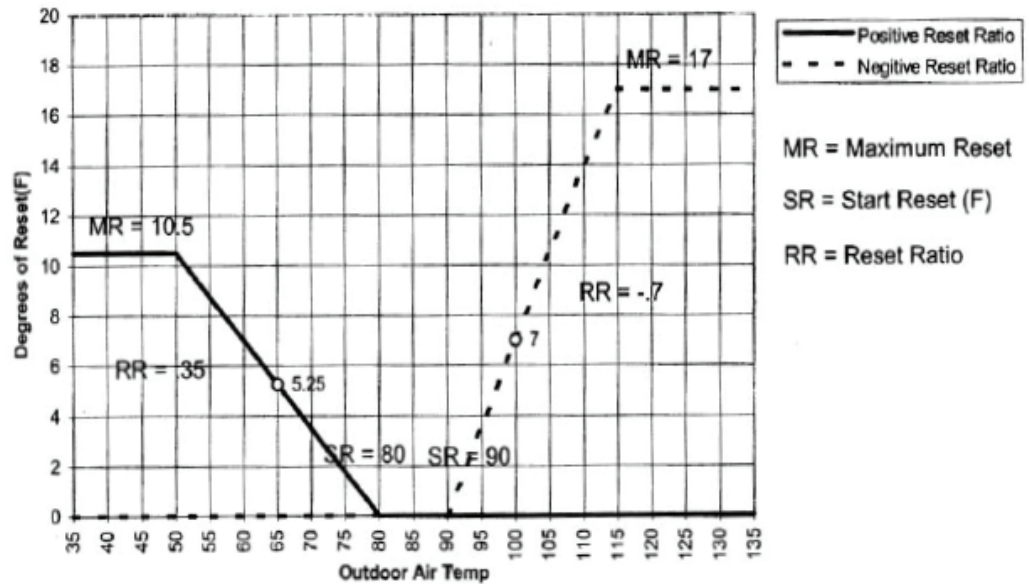
(where \* = multiply)

**Figure 10. Outdoor Air Temperature Versus Degrees of Reset**

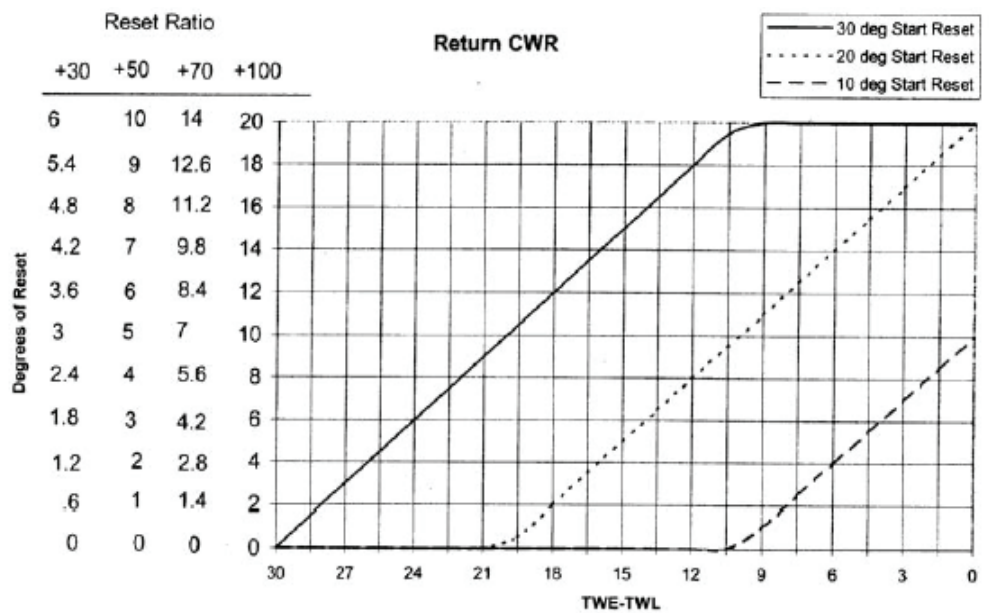


## Tracer AdaptiView Control Component Overview

**Figure 11. Reset Function for Return CWR**



**Figure 12. Reset Function for Return CWR**



## Tracer AdaptiView Control Component Overview

Example of Calculating Return Reset:

If:

- Reset Ratio = 50%
- Start Reset = 25
- TWE = 65
- TWL = 45
- Maximum Reset = 8

How many Degrees of Reset will there be?

$$\text{Degrees of Reset} = \text{Reset Ratio} * (\text{Start Reset} - (\text{TWE} - \text{TWL}))$$

$$\text{Degrees of Reset} = .5 * (25 - (65 - 45))$$

$$\text{Degrees of Reset} = 2.5$$

If:

- Reset Ratio = 70%
- Start Reset = 20
- TWE = 60
- TWL = 53
- Maximum Reset = 14

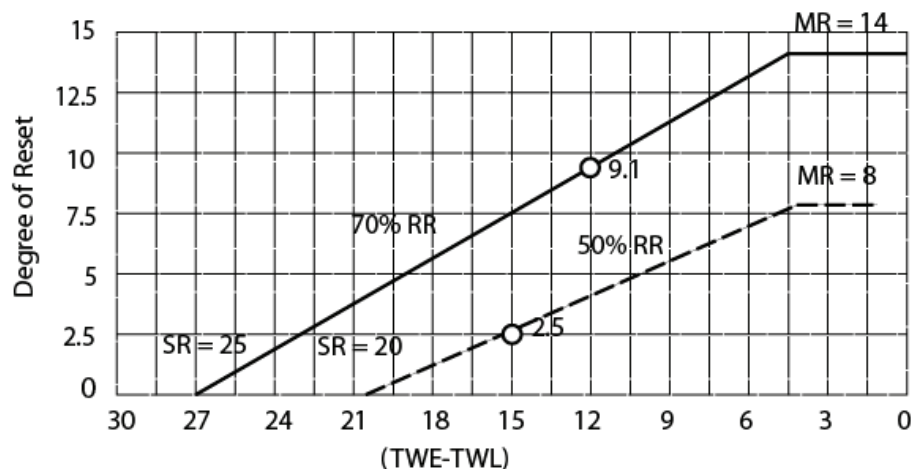
How many Degrees of Reset will there be?

$$\text{Degrees of Reset} = \text{Reset Ratio} * (\text{Start Reset} - (\text{TWE} - \text{TWL}))$$

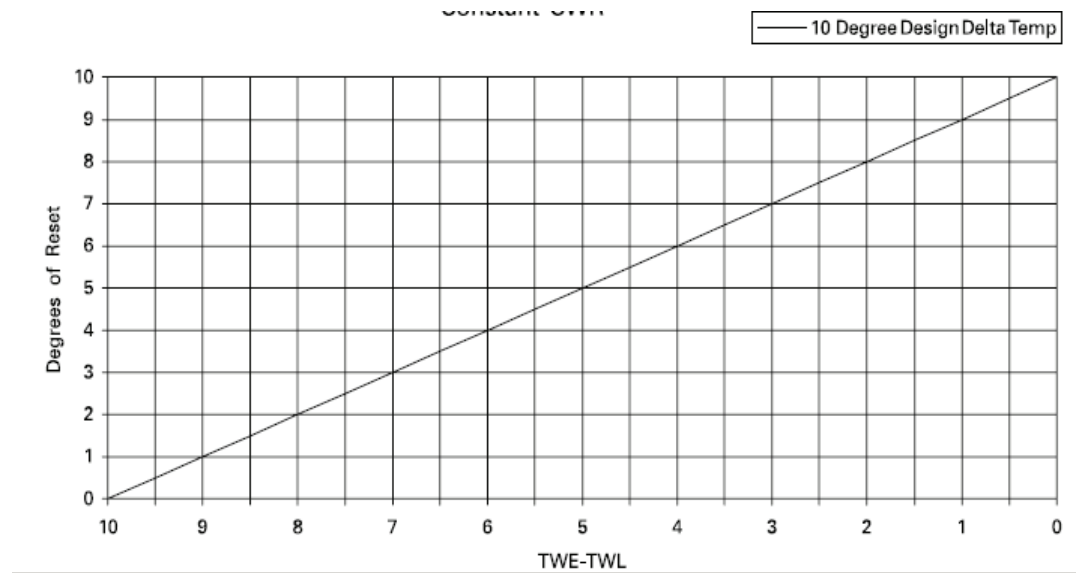
$$\text{Degrees of Reset} = .7 * (20 - (60 - 53))$$

$$\text{Degrees of Reset} = 9.1$$

**Figure 13. Return CWR**



**Figure 14. Constant CWR**













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Literature Order Number	CTV-SVD03A-EN
Date	January 2008
Supersedes	New

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