USER GUIDE
UGH038-0120

www.conairgroup.com

Pump Reservoir Systems

PTCS Carbon Steel Reservoir Systems 2100 to 6000 Gallons
PTSS Stainless Steel Reservoir Systems 275 to 6000
PTFG Fiberglass Reservoir Systems 250 to 2200

Please record your equipment's model and serial number(s) and the date you received it in the spaces provided.

It's a good idea to record the model and serial number(s) of your equipment and the date you received it in the User Guide. Our service department uses this information, along with the manual number, to provide help for the specific equipment you installed.

Please keep this User Guide and all manuals, engineering prints and parts lists together for documentation of your equipment.

Date: _____

Manual Number: UGH038-0120

Serial Number(s): _____

Model Number(s) _____

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Table of Contents

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Foreword

The pumping system is a packaged pump skid with or without a reservoir, which typically includes a fluid pump or pumps and a system control panel. The purpose is to provide circulation and temperature control of a cooling fluid.

This manual is to serve as a guide for installing, operating, and maintaining the equipment. Improper installation, operation, and maintenance can lead to poor performance and/or equipment damage. Use qualified installers and service technicians for all installation and maintenance of this equipment.

This manual is for our standard product. The information in this manual is general in nature. Unit-specific drawings and supplemental documents are included with the equipment as needed. Additional copies of documents are available upon request.

Due to the ever-changing nature of applicable codes, ordinances, and other local laws pertaining to the use and operation of this equipment, we do not reference them in this manual.

Safety Guidelines

Observe all safety precautions during installation, start-up, and service of this equipment. The following is a list of symbols used in this manual and their meaning.

General Warning

Electricity Warning

Sharp Element Warning

Hot Surface Warning

Flammable Material Warning

Explosive Material Warning

General Mandatory Action

Wear Eye Protection

Wear Protective Gloves

Wear Ear Protection

Disconnect Before Carrying Out Maintenance or Repair

Connect an Earth Terminal to Ground

Only qualified personnel should install, start-up, and service this equipment. When working on this equipment, observe precautions in literature, and on tags, stickers, and labels located on the equipment.

WARNING: Any use or misuse of this equipment outside of the design intent may cause injury or harm.

WARNING: This equipment contains hazardous voltages that can cause severe injury or death.

WARNING: This equipment may contain fan blades or other sharp edges. Make sure all fan guards and other protective shields are securely in place.

WARNING: The exposed surfaces of motors, piping, and other fluid circuit components can be very hot and can cause burns if touched with unprotected hands.

CAUTION: Disconnect and lock out incoming power before installing, servicing, or maintaining the equipment. Connecting power to the main terminal block energizes the entire electric circuitry of the unit. Shut off the electric power at the main disconnect before opening access panels for repair or maintenance.

CAUTION: Wear eye protection when installing, maintaining, or repairing the equipment to protect against any sparks, debris, or fluid leaks.

CAUTION: The equipment will exceed 70 dBA sound pressure at 1 meter distance and 1 meter elevation when operating. Wear ear protection as required for personal comfort when operating or working in close proximity to the chiller.

CAUTION: Wear protective gloves when installing, maintaining, or repairing the equipment to protect against any sparks, debris, or fluid leaks.

Pre-Installation

Receiving Inspection

When the unit arrives, verify the information on the unit nameplate agrees with the order acknowledgement and shipping papers. Inspect the equipment for any visible damage and verify all items shown on the bill of lading are present. If damage is evident, document it on the delivery receipt by clearly marking any item with damage as "unit damage" and notify the carrier. In addition, notify our Customer Service Department and they will provide assistance with preparing and filing freight damage claims, including arranging for an estimate on repair costs; however, filing the shipping damage claim is the responsibility of the receiving party. Do not install damaged equipment without getting the equipment repaired.

Shipping damage is the responsibility of the carrier. To protect against possible loss due to damage incurred during shipping and to expedite payment for damages, it is important to follow proper procedures and keep records. Photographs of damaged equipment are excellent documentation for your records.

Start unpacking the unit, inspect for concealed damage, and take photos of any damage found. Once received, equipment owners have the responsibility to provide reasonable evidence that the damage did not occur after delivery. Photos of the equipment damage while the equipment is still partially packed will help in this regard. Refrigerant lines can be susceptible to damage in transit. Check for broken lines, oil leaks, damaged controls, or any other major component torn loose from its mounting point.

Record any signs of concealed damage and file a shipping damage claim immediately with the shipping company. Most carriers require concealed damages be reported within 15 days of receipt of the equipment. In addition, notify our Customer Service Department and they will provide assistance with preparing and filing freight damage claims, including arranging for an estimate on repair costs; however, filing the shipping damage claim is the responsibility of the receiving party.

Unit Storage

When storing the unit it is important to protect it from damage. Blow out any water from the unit; cover it to keep dirt and debris from accumulating on or getting in and store in an indoor sheltered area that does not exceed 145°F.

Installation - Mechanical

Foundation

Install the unit on a rigid, non-warping mounting pad, concrete foundation, or level floor suitable to support the full operating weight of the equipment. When installed the equipment must be level within ¼ inch over its length and width.

Unit Location

The unit is available in many different configurations for various environments. Refer to the proposal and order acknowledgement document for the equipment to verify the specific design conditions in which it can operate.

To ensure proper airflow and clearance space for proper operation and maintenance allow a minimum of 12 inches of clearance between the sides of the equipment and any walls or obstructions. Avoid locating piping or conduit over the unit to ensure easy access with an overhead crane or lift to lift out heavier components during replacement or service.

Rigging

Pumps decks and reservoir systems typically have a structural steel frame to facilitate easy movement and positioning. Follow proper rigging methods to prevent damage to components. Avoid impact loading caused by sudden jerking when lifting or lowering the reservoir. Use pads where abrasive surface contact may occur. Use the frame supporting the unit for positioning it with a crane or a forklift.

Water Piping

Proper insulation of chilled process fluid piping is crucial to prevent condensation. The formation of condensation adds a substantial heat load to the cooling system.

The importance of properly sized piping cannot be overemphasized. See the ASHRAE Handbook or other suitable design guide for proper pipe sizing. In general, run full size piping out to the process and then reduce the pipe size to match the connections on the process equipment. One of the most common causes of unsatisfactory unit performance is poor piping system design. Avoid long lengths of hoses, quick disconnect fittings, and manifolds wherever possible as they offer high resistance to water flow. When manifolds are required, install them as close to the use point as possible. Provide flow-balancing valves at each machine to assure adequate water distribution in the entire system. Install shut-off valves at each machine to allow for isolation of the unit.

CAUTION: Do not use the reservoir as a means of supporting piping. Supporting piping on the reservoir can result in fiberglass fractures, sidewall stresses, and piping deflections that could develop into a leak or a complete loss of the water reservoir structural integrity.

Installation - Electrical

All wiring must comply with local codes and the National Electric Code. Minimum circuit amps (MCA) and other unit electrical data are on the unit nameplate. A unit specific electrical schematic ships with the unit. Measure each leg of the main power supply voltage at the main power source. Voltage must be within the voltage utilization range given on the drawings included with the unit. If the measured voltage on any leg is not within the specified range, notify the supplier and correct before operating the unit. Voltage imbalance must not exceed two percent. Excessive voltage imbalance between the phases of a three-phase system can cause motors to overheat and eventually fail.

Check the electrical phase sequence at installation and prior to start-up. Operation with incorrect electrical phase sequencing will result in mechanical damage to components. Check the phasing with a phase sequence meter prior to applying power. The proper sequence should read “ABC” on the meter. If the meter reads “CBA”, open the main power disconnect and switch two line leads on the line power terminal blocks (or the unit mounted disconnect). Do not interchange any load leads that are from the unit contactors or the motor terminals.

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WARNING: This equipment may contain fan blades or other sharp edges. Make sure all fan guards and other protective shields are securely in place.

WARNING: The exposed surfaces of motors, piping, and other fluid circuit components can be very hot and can cause burns if touched with unprotected hands.

CAUTION: Disconnect and lock out incoming power before installing, servicing, or maintaining the equipment. Connecting power to the main terminal block energizes the entire electric circuitry of the unit. Electric power at the main disconnect should be shut off before opening access panels for repair or maintenance.

CAUTION: Wear eye protection when installing, maintaining, or repairing the equipment to protect against any sparks, debris, or fluid leaks.

CAUTION: Wear protective gloves when installing, maintaining, or repairing the equipment to protect against any sparks, debris, or fluid leaks.

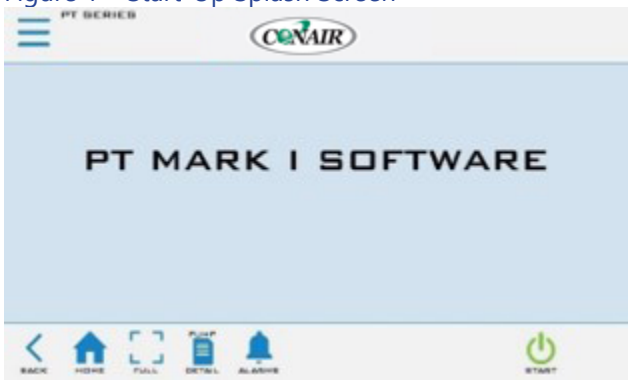
CAUTION: Wire the unit ground in compliance with local and national codes.

General Control Operation

System Initialization

Upon power-up, the first screen to appear is the Start-Up Screen. This screen will display while the Programmable Logic Controller (PLC) and Human Machine Interface (HMI) establish communications. The PLC/HMI version shows on the screen.

Figure 1 – Start-Up Splash Screen



Once the control communication system is established, the HMI screen automatically switches to the Home Screen. Your screen may differ depending on pump setup.

Home - System Overview

System Overview

This screen provides an overall synopsis of the pump tank system, quick links to other views, as well as other additional information. Below are two examples of overview screens; however, your screen will vary in appearance based on your actual system configuration.

Figure 2 – Example of Dual Standby Pump System Overview Screen

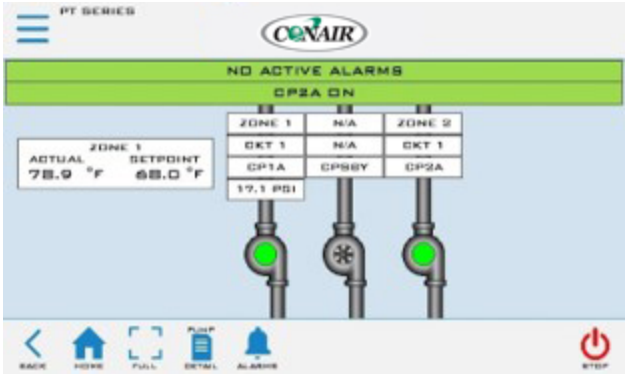


Figure 3 – Example of 5 pump Multi-Zone System Overview Screen

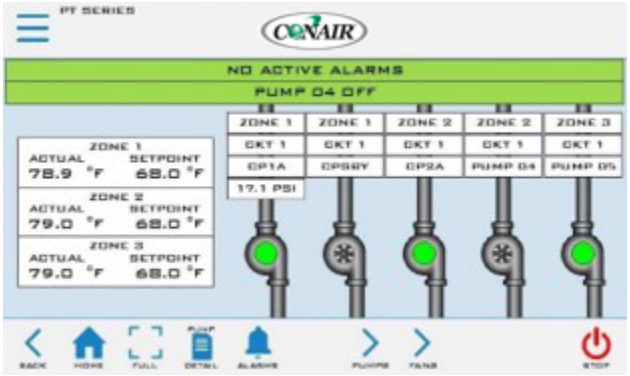


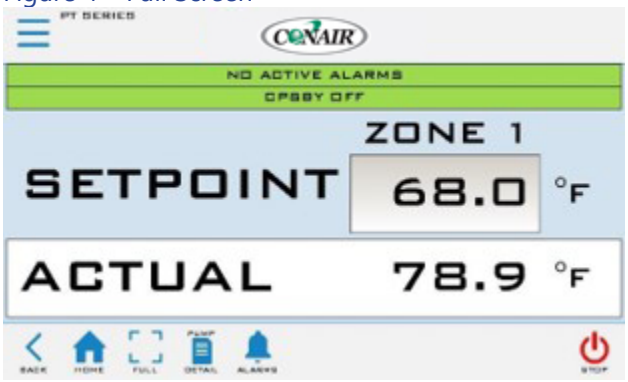
Table 1 – System Overview Functions

Function	Description	Screen Reference
Zone 1-3	Shows which zone each pump is associated with.	None
Circuit 1-4	Shows which circuit each pump is associated with.	None
Pump 01-Pump 15	Shows names for each pump up to 15 different pumps.	Figure 3
Process Variable	Shows value of the analog sensor driving the PID. Changes to associated zone and circuit control screen for each PID.	Figure 12
Alarm Messaging	Provides information about any warnings or alarms which may have occurred.	None
Pump Messaging	Provides information on which pump is on/off	None
Actual	Shows the actual temperature readings up to 3 different zones.	None
Setpoint	Modify the Setpoint by touching the current Setpoint on the HMI. An authorized security level password is required to enter a new Setpoint.	None
Menu Button	Changes to the Menu screen	Figure 7
Full Screen Display	Displays only the Setpoint and process temperature of active zones a larger font.	Figure 4
Alarms	A listing of active and prior alarm history.	Figure 8 Figure 9
Silence	Will silence alarm horn.	None
Pump Detail	Additional information on each pumps mode and status.	Figure 5
Pumps	Changes to home screen with more pumps.	Figure 2 Figure 3
Fans	Changes to home screen showing any fans present in the system.	Figure 6
Start / Stop	Pressing the Start button will start the system as well as any other networked chillers attached to the system. The Start button will disappear after the system is running. Pressing the Stop button will stop the system and any other networked chillers attached to the system.	None

Home – Full Screen

The Full Screen provides a simplified view of the system. The SETPOINT and ACTUAL temperatures appear in a large font easily seen from a distance, providing a "quick glance" look to validate proper operation. This screen can show the SETPOINT and ACTUAL temperature of up to three different zones in the same screen.

Figure 4 – Full Screen



Home – Pump Details

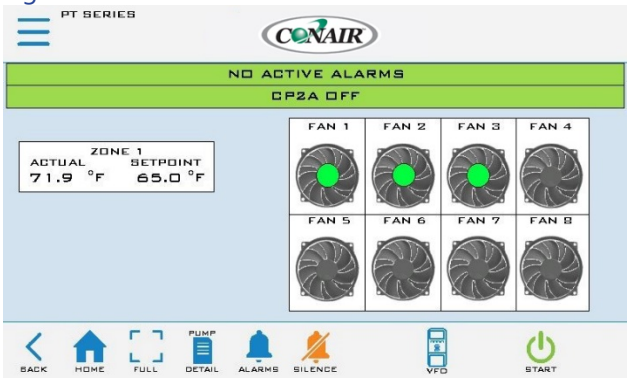
Pump Details provides addition information on each pump's (up to 15) mode and status.

Figure 5 – Pump Details Screen

Home – Tower Fans

Tower Fans provides overall information on tower fans, quick links to other views, as well as other additional information.

Figure 6 – Tower Fans Screen



Note: The above shows eight tower fans; the number will vary depending on number of tower fans in the system.

Menu - Overview

The Menu Screen contains a central menu of links to most common adjustment and setting screens. Some parameters are password protected. The main user-level password is 9999 used for gaining access to changing the main system set point and various other warning and alarm settings. A few higher-level areas require a high-level user password that is 7720. If you are attempting to access an area where neither of these passwords is accepted, you may require a technician level password. For access to these areas of the program, contact our Customer Service Department for assistance.

Figure 7 – Menu Screen

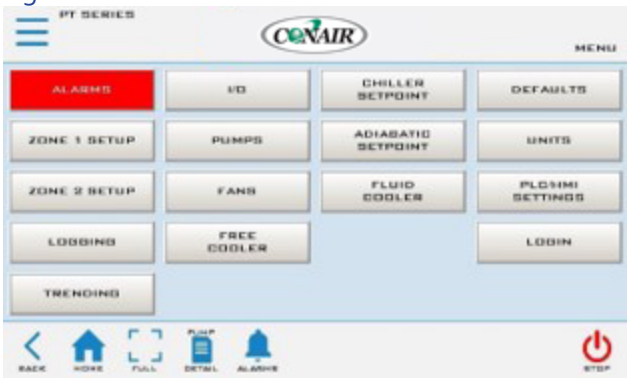


Table 2 – Menu Functions

Function	Description	Screen Reference
Alarms	A listing of all active, history, and frequency of system alarms.	Figure 8 Figure 9
Zone 1 Setup	Zone 1 Setup Screen	Figure 10 Figure 11
Zone 2 Setup	Zone 2 Setup Screen	None
Zone 3 Setup	Zone 3 Setup Screen	None
Logging	Start / Stop logs data / alarm and export to thumb drive	Figure 13
Trending	Graphical display of critical process values	Figure 14
Input / Output	The Input / Output screens provide the status of all digital inputs, outputs, and analog inputs.	Figure 15 Figure 16 Figure 17 Figure 18 Figure Figure 2
Pumps	Pumps Menu	Figure 2
Fans	Fans Menu	Figure 3
Free Cooler	Provides information on control of a fluid cooler.	Figure 4
Defaults	Provides the ability to restore the control system back to factory defaults in the case that an unknown setting occurred and the system now behaves unexpectedly.	Figure 3 Figure
Units	Imperial or Metric units can be selected directly from this screen. Touch the UNITS button to toggle the selection between Imperial or Metric units	Figure 4
Chiller Setpoint	Analog Chiller setpoint configuration can be adjusted	Figure 4
Adiabatic Setpoint	Analog fluid cooler setpoint configuration can be adjusted	Figure 43
Fluid Cooler	Provides simple fluid cooler control	Figure 44
PLC / HMI Settings	IP addresses HMI and PLC Setup	N/A
Login	Touch this button to access the different user-level.	N/A
Logout	Sign out session.	N/A

Menu - Alarms

Alarms Active

When a critical system fault occurs, the controller activates the HMI alarm handler. This forces the alarm screen to appear and will display the current faults. To silence this alarm, press the ALARM SILENCE button. If multiple alarms are active at once, use the DOWN and UP buttons to view all alarms. When no alarms are active, the white portion of the display will be blank. All alarms must be resolved and reset using the RESET ALARM button.

Figure 8 – HMI Alarm Handler

Note: The above shows there are no alarms; if an alarm condition were present, it would appear in this window.

Temperature Alarm Setup

Temperature alarm set points are modifiable on this screen.

Figure 9 – Temperature Alarm Setup Screen

Menu – Zone Setup

Zone Setup Screen

This screen provides zone related information. Pressing the Fluid Circuit Control button will lead to Zone X Fluid Circuit X Control Screen (Figure 12). This screen provides additional information relative to the circuit. The temperature setup button changes the Temperature Alarm Setup Screen (Figure 9). This screen provides adjustable temperature alarm/warning set points.

Figure 10 – Zone Setup Screen (Analog Level Sensor)

Figure 11 – Zone Setup Screen (Digital Level Sensor)

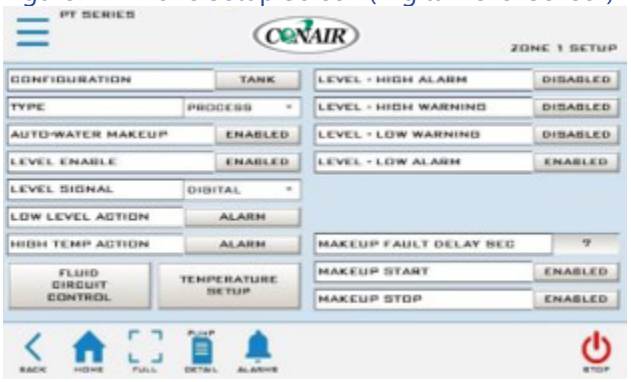


Table 3 – Zone Setup Table

Function	Description	Default Value
Zone Configuration	Enables level sensor when "Tank" is selected, disables sensor when "Deck" is selected.	Tank
Zone Type	Designates if the zone is for process, chiller, or tower.	Process
Zone Auto-Water Makeup	Enables or disables make-up valve function.	Disabled
Zone Level Enable	Enables or disables zone level alarm.	Disabled
Zone Level Signal	Sets zone level sensor type to either digital or analog.	Analog
Zone Low Level Action	Sets alarm action to alarm only or system shutdown.	Alarm
MakeUp Fault Delay (Sec)	Time delay until Makeup fault occurs	7 seconds
Analog Function	**Description**	**Default Value**
Zone Level – High Alarm SP	High level alarm trigger setpoint for Analog sensor.	0 inches
Zone Level – High Warning SP	High level warning trigger setpoint for Analog sensor.	0 inches
Zone Level – Low Alarm SP	Low level alarm trigger setpoint for Analog sensor.	0 inches
Zone Level – Low Warning SP	Low level warning trigger setpoint for Analog sensor.	0 inches
Zone Makeup Start Setpoint	Setpoint trigger to start makeup	0
Zone Makeup Stop Setpoint	Setpoint trigger to stop makeup	0

Table 3 – Zone Setup Table (continued)

Digital Function	Description	Default Value
Zone High Level Alarm	High level alarm will trigger if enabled and sensor is energized for 7 seconds.	Disabled
Zone High Level Warning	High level warning will trigger if enabled and sensor is energized for 7 seconds.	Disabled
Zone Low Level Alarm	Low level alarm will trigger if enabled and sensor is de-energized for 7 seconds.	Disabled
Zone Low Level Warning	Low level alarm will trigger if enabled and sensor is de-energized for 7 seconds.	Disabled
Zone Makeup Start	If Makeup Start is enabled and the sensor has been off for over 7 seconds, the water makeup valve will energize.	Disabled
Zone Makeup Stop	If Makeup Stop is enabled and the sensor has activated, the water makeup valve will de-energize.	Disabled

Fluid Circuit Control

Fluid circuit related parameters are adjustable on this screen.

Figure 12 – Zone X Fluid Circuit X Control Screen

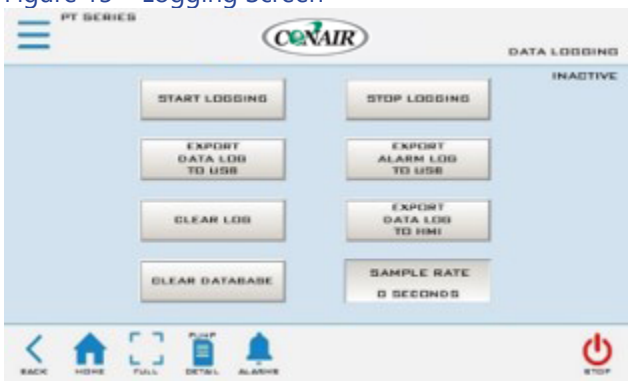
Table 4 – Zone X Fluid Circuit X Control Table

Function	Description	Default Value
PID Mode	DISABLED: PID is disabled for the zone x fluid circuit x. FIXED PRESSURE: pressure transducer input used to control VFD speed. DIFFERENTIAL PRESSURE: differential pressure transducer input used to control VFD speed. FLOW CONTROL: flow sensor input used to control VFD speed. TEMPERATURE CONTROL: temperature sensor input used to control VFD speed to achieve setpoint.	Disabled
Mode	AUTO: PID in auto mode MANUAL: PID in manual mode	AUTO
Manual Speed	Will stay at this speed if PID mode was set to MANUAL.	50
PID low limit	Lowest output limit for the PID	0
PID High Limit	Highest output limit for the PID	100
PID Setpoint	Setpoint value for running PID in Auto	50
PID Kp	Proportional PID value	1
PID Ti	Integral PID value	100
PID Td	Derivative PID value	1
PID Deadband	Deadband for the PID	0
PID Action	Sets action to reverse (increase in error/decrease in output) or direct (increase in error, increase in output)	Direct
Fluid Circuit Mode	Sets VFD control to manual or PID mode	Manual
Analog Sensor	Name will change according to the selected sensor and displays input value.	
PID Output	PID output to the VFD in 0-100%	
Alarm	Enables or disables high/low alarms for PID	Disabled
High Alarm Delta	User adjustable delta for PID high alarm	
High Warning Delta	User adjustable delta for PID high warning	
Low Warning Delta	User adjustable delta for PID low warning	
Low Alarm Delta	User adjustable delta for PID low alarm	

Menu – Logging

The HMI is constantly logging key registers internal to the HMI. In the event that the data and/or alarm logs require review, the data is available for export to an external thumb drive. Data logging occurs every inputted sample rate in a FIFO methodology for a total of 24 hours.

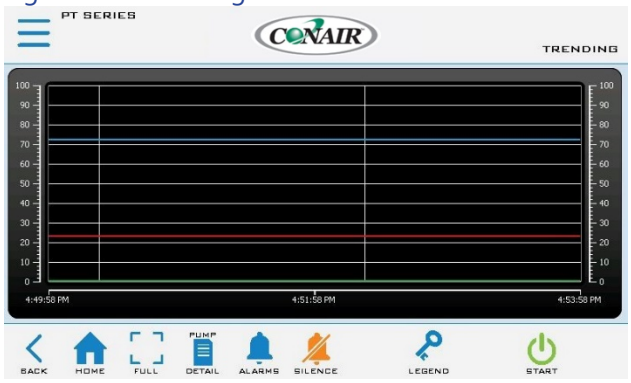
Figure 13 – Logging Screen



Menu – Trending

The Trending Screen displays the setpoint temperature, process temperature, and fluid circuit sensors such as pressure, flow, and level sensor values and setpoints. Trending is always enabled and always running.

Figure 14 – Trending Screen



Menu – Inputs/Outputs

Inputs / Outputs Screens

The Inputs/Outputs screens provide the status of all digital inputs, digital outputs, analog inputs, and outputs. The following screens show a full complement of inputs and outputs. Your screen may differ depending on sensors and pumps used in the system.

Figure 15 – Input/Output Selection Screen

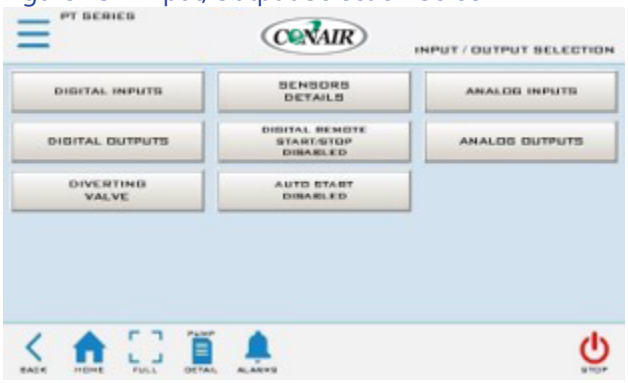


Table 5 – Zone Setup Table

Function	Description	Screen Reference
Digital Inputs	Provides status of all digital inputs	Figure 16
Digital Outputs	Provides status of all digital outputs as well as "test" feature.	Figure 17
Analog Inputs	Provides information/reading on Analog sensors	Figure 18 & Figure 19
Analog Outputs	Provides all analog outputs in percent bases.	Figure
Sensor Details	Provides menu for all sensors in the system.	Figure 2
Diverting Valve	Provides in-depth detail on functionality of diverting valve	Figure 2
Digital Remote Start/Stop	Disables/Enables digital remote input for starting the system in auto mode	N/A
Auto Start	Disables/Enables auto start function for power loss	N/A

Figure 16 – Digital Inputs Screen

Figure 17 – Digital Outputs Screen

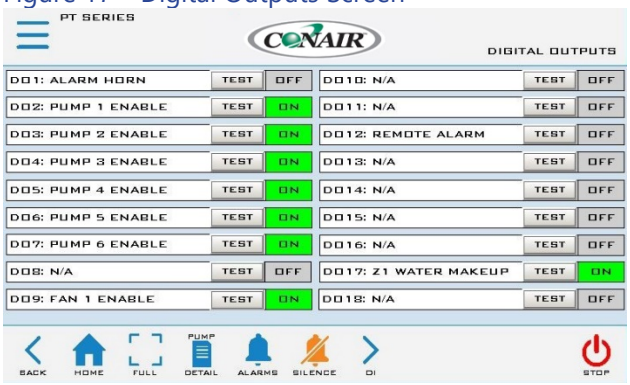


Figure 18 – Analog Inputs Screen

Figure 19 – Analog Inputs 2 Screen

Figure 20 – Analog Outputs Screen

Sensor Details

Analog sensor menus provides in depth information on various sensors.

Figure 21 – Sensor Details Screen (Analog Menu)

Figure 22 – Temperature Sensor Screen

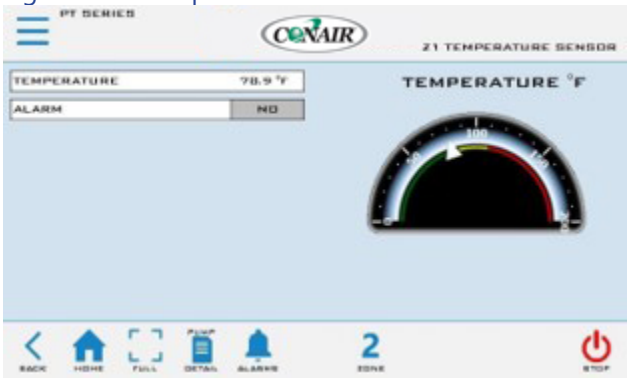


Figure 23 – Flow Sensor Screen

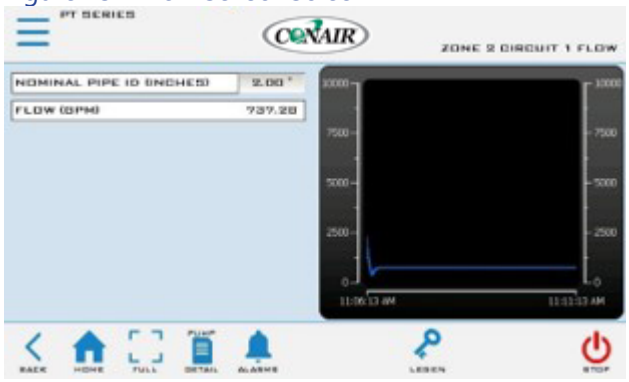


Figure 24 – Pressure Sensor Screen

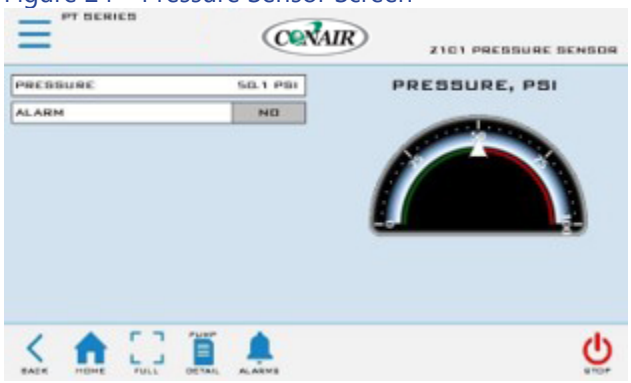


Figure 25 – Differential Pressure Sensor Screen

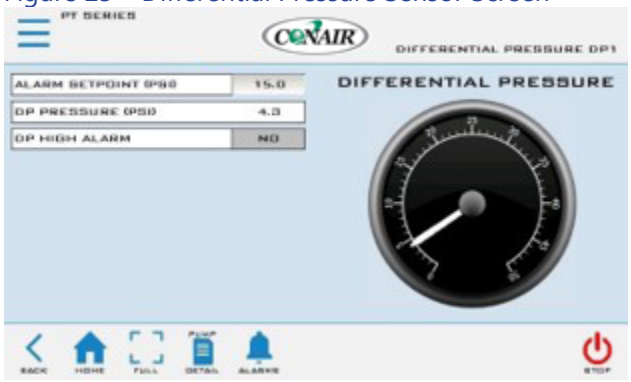
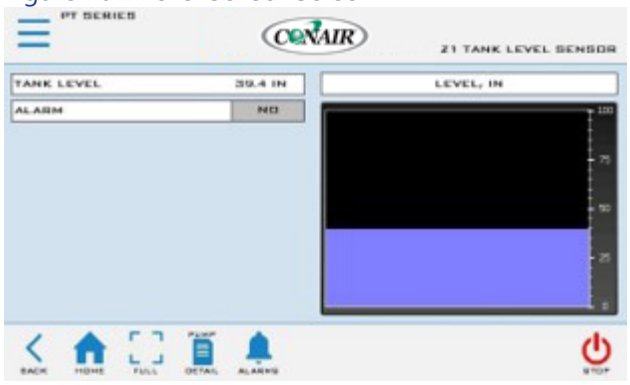


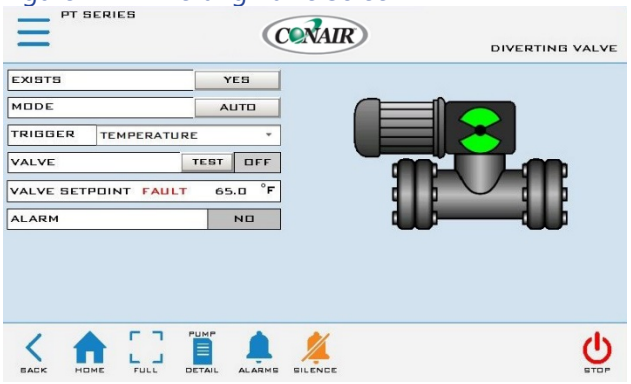
Figure 26 – Level Sensor Screen



Diverting Valve

Diverting Valve will energize when setpoint is greater than chosen TRIGGER analog sensor's value shown below.

Figure 27 – Diverting Valve Screen

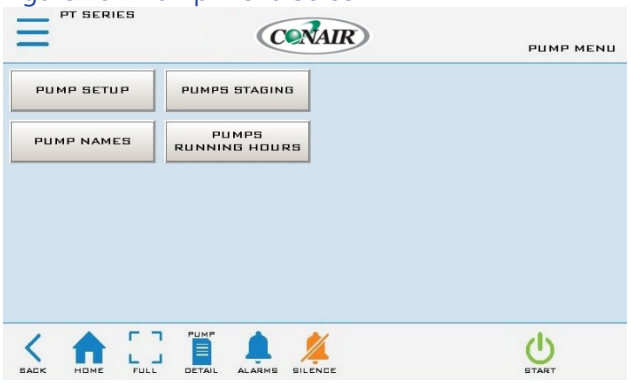


Menu – Pumps

Pump Menu Screen

There are a number of screens related to pumps: Pump Setup screens (Figure 2 and Figure), Pump Names screen (Figure 3), Pump Staging screen (Figure 3), and Pumps Running Hours screen (Figure 3).

Figure 28 – Pump Menu Screen



Pump Setup Screen

This screen displays pertinent pump status information for a system with the optional pump controls and provides the ability to change mode selections.

Figure 29 – Pump Setup Screen (Dual Standby Pump)

Note: The above shows dual standby pump setup, primary or dedicated standby pump are shown in Figure 30.

Figure 30 – Pump Setup Screen (Primary Pump)

Pump VFD Control Screen

This screen displays pertinent pump VFD status information for associated zone and circuit in a system with the optional integral pump controls with pump VFDs.

Figure 31 – Pump VFD Control Screen

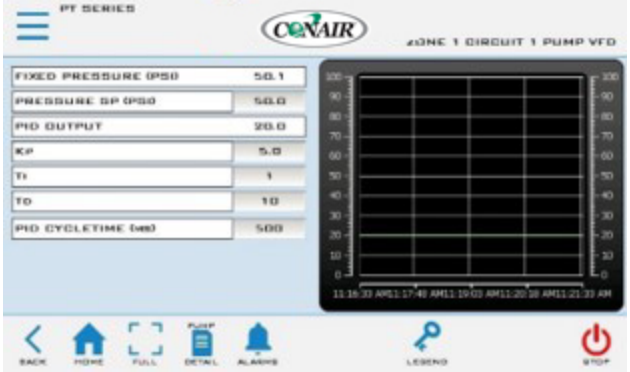


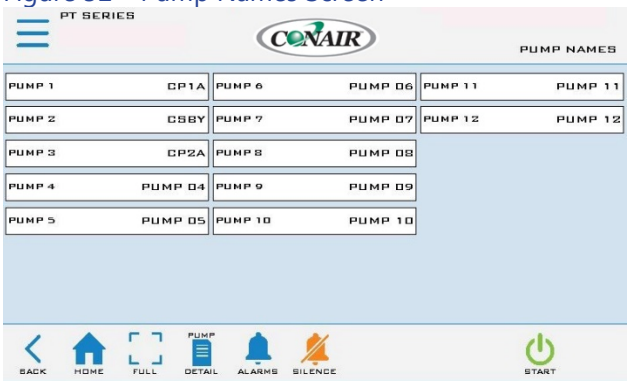
Table 6 – Pump Setup Parameters

Menu Item	Description	Default Value
Pump Mode	AUTOMATIC: allows for automatic timer enable of the pumps. MANUAL: Requires manual enable of the pumps.	MANUAL
Pump Name	Allows for customization of the pump name.	Pump xx
Pump Type	PRIMARY: Pump will act as primary pump in the chosen Zone (A) and Circuit (A) DEDICATED STANDBY: Pump will act as a dedicated standby pump in the chosen Zone (A) and Circuit (A) DUAL STANDBY: Pump will act as a dual standby pump between chosen Zone (A), Circuit (A) and Zone (B), Circuit (B)	Primary
Pump Zone (A)	Zone designation for the pump between 1 and 3.	1
Pump Fluid Circuit (A)	Fluid circuit designation for Zone (A) between 1 and 4.	1
Pump Zone (B)	If Dual Standby, secondary zone designation between 1 and 3.	2
Pump Fluid Circuit (B)	If Dual Standby, fluid circuit designation between 1 and 4 for Zone (B).	1
Pump Valve Position	UNKNOWN: Valve is disabled A: Dual standby pump valve is position to run as Zone (A), Circuit (A). B: Dual standby pump valve is position to run as Zone (B), Circuit (B).	Unknown
Pump Starter Type	NON-VFD: Contactor or Soft-Starter used for the pump. VFD: VFD is used for the pump.	VFD
Pump Custom Name	Click to change pump name.	Pump xx
Pump X	Changes to next pump screen.	
Pressure Setpoint	Pump Pressure Setpoint (VFD option only)	50 PSI
PID Kp	Proportional PID value	1
PID Ti	Integral PID value	100
PID Td	Derivative PID value	1

Pump Names

This screen displays user adjustable names up to seven characters long for up to 15 pumps.

Figure 32 – Pump Names Screen



Pump Staging

This screen displays available pump staging options for secondary pumps, zone staging order, and stage on/off time delays in seconds. Your screen may differ depending number of zones in the system.

Figure 33 – Pump Staging Screen

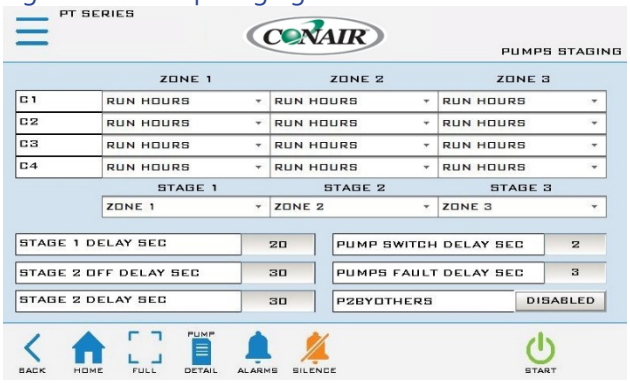


Table 7 – Pump Setup Parameters

Menu Item	Description	Default Value
Zone 1-3 Circuit 1-4	MANUAL: user manually has to change pump configurations. FIFO: first in first out order is used to rotate secondary pumps. RUN HOURS: secondary pumps are rotated based on run time hours.	MANUAL
Stage 1-Stage 3	Selectable list of zone 1 to zone 3 to stage first, second, and third.	N/A
Pump Switch Delay(sec)	Delay in seconds between pump switches from one pump to another.	1 second
Pumps Fault Delay(sec)	Delay in seconds until pump fault occurs.	3 seconds
Stage 1 Delay (sec)	Stage 1 delay occurs before stage 2 zone is able to turn on.	120 seconds
Stage 2 Delay (sec)	Stage 2 delay occurs before stage 3 zone is able to turn on.	120 seconds
Stage 2 Off Delay (sec)	Stage 2 zone off delay occurs when system is in shut down mode.	120 seconds
P2ByOthers	When enabled, system will wait for feedback from chiller to turn on zone 2 pumps.	Disabled

Pumps Running Hours

This screen shows the run hours of each pumps.

Figure 34 – Pumps Run Hours Screen

Menu – Fans

Tower Menu Screen

This screen displays menu related to tower fans: Fans screen (Figure 6), Fans Setup screen (Figure 3), and Fan Zone Setup screen (Figure 3).

Figure 35 – Tower Menu Screen

Tower Fans Setup

This screen displays pertinent tower fan status information for a system with the optional integral fan controls and provides the ability to change mode selection.

Figure 36 – Tower Fan Setup Screen

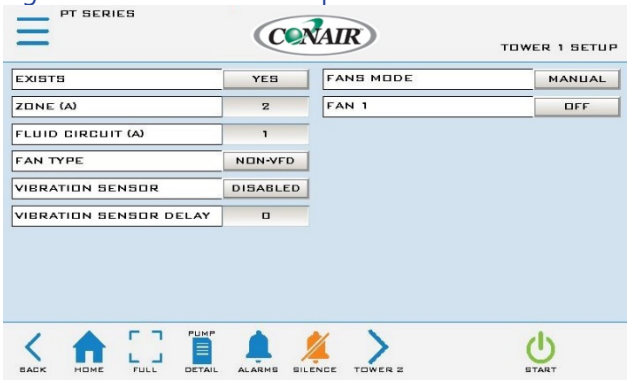


Table 8 – Tower Fan Setup Parameters

Menu Item	Description	Default Value
Tower Fan Mode	AUTOMATIC: Allows for automatic timer enable of the pumps. MANUAL: Requires manual enable of the pumps.	MANUAL
Fan 1	Pump name will change depending on given custom name	OFF
Tower Fan Zone	Zone designation for tower fan between 1 and 3.	1
Tower Fan Fluid Circuit	Fluid circuit designation for zone between 1 and 4.	1
Pump Starter Type	NON-VFD: Contactor or Soft-Starter used for the pump. VFD: VFD is used for the pump.	VFD
Vibration Sensor	Vibration sensor should be enabled if exists in the system.	Disabled
Vibration Sensor Delay(Sec)	Vibration sensor delay until fault occurs given vibration sensor is enabled.	0
Tower X	Changes to next pump screen.	

Tower Fan Zone Setup

This screen shows selectable zone and circuit for up to three different tower zone PID controls. Optional VFD control, tower zone, and circuit control parameters.

Figure 37 – Tower Zone x Circuit x Setup Screen

Tower Zone x Circuit x VFD

This screen displays pertinent tower fan VFD status information for associated zone and circuit in a system with the optional integral tower fan controls with fan VFDs.

Figure 38 – Tower Zone x Circuit x VFD Screen

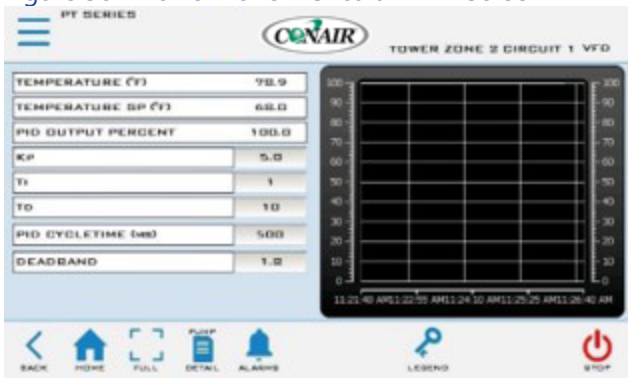


Table 9 – Zone X Fluid Circuit X Control Table

Function	Description	Default Value
Tower 1 Control Circuit	Tower fan control can be assigned to any zone (1-3) and any circuit (1-4).	N/A
PID Mode	DISABLED: PID is disabled for the zone x fluid circuit x. FIXED PRESSURE: pressure transducer input used to control VFD speed. DIFFERENTIAL PRESSURE: differential pressure transducer input used to control VFD speed. FLOW CONTROL: flow sensor input used to control VFD speed. TEMPERATURE CONTROL: temperature sensor input used to control VFD speed to achieve temperature setpoint.	Disabled
Mode	AUTO: PID in auto mode MANUAL: PID in manual mode	AUTO
Manual Speed	Will stay at this speed if PID mode was set to MANUAL.	50
PID Cycletime	Tower Fan Cycle Time	0 second
PID low limit	Lowest output limit for the PID	0
PID High Limit	Highest output limit for the PID	100
Anticycle on time	Fan minimum run time	0 second
Anticycle off time	Fan minimum off time	0 second
PID Setpoint	Setpoint value for running PID in Auto	50
CutIn Delta Temp	Offset temperature above setpoint to start tower fans.	3
CutOut Delta Temp	Offset temperature below setpoint to stop tower fans.	2
Pump Cutout Delta Temp	Offset temperature above setpoint to start tower pumps.	2.0 F
Analog Sensor	Name will change according to the selected sensor and displays input value.	
PID Output	PID output to the VFD in 0-100%	
Temperature Setpoint (F)	Temperature setpoint to drive the PID for the system.	65 F
PID Kp	Proportional PID value	1
PID Ti	Integral PID value	100
PID Td	Derivative PID value	1
PID Deadband	Deadband for the PID	0.00

Menu – Default

CAUTION: The Defaults screen provides the ability to restore the control system back to factory defaults in the case that an unknown setting modification occurred and the system now behaves unexpectedly.

Touching "LOAD" on the Restore Factory Setting screen (Figure 3) will restore all the system parameters to a factory stable state and indicate that the process has finished as shown in Figure .

Figure 39 – Restore Factory Settings

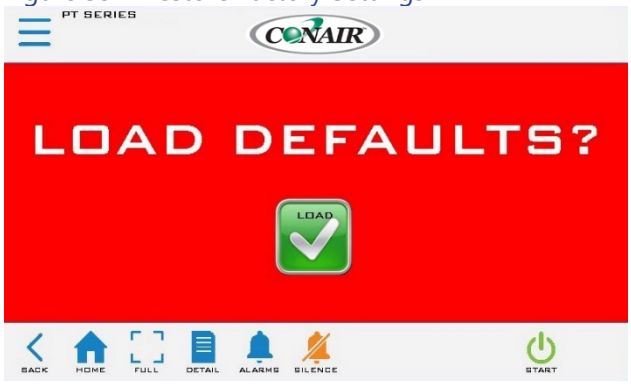
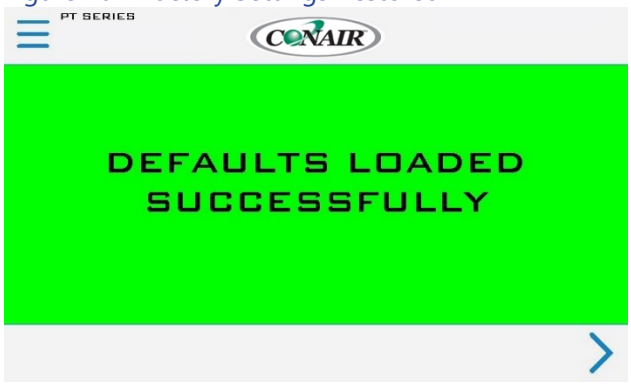


Figure 40 – Factory Settings Restored



Menu – Free Cooler

The free cooling source may be dedicated to free cooling or could be the primary cooling source with a dual or dynamic set point that changes based on the outdoor air temperature. Cooling source mode is divided into four categories: Static Isolated Source, Static Common Source, Dynamic Separate Source, and Dynamic Common Source as shown in Figure 41.

In the Static Isolated Source mode of operation, the cooling source is dedicated to free cooling and it is isolated from the process loop by a heat exchanger. The cooling source remains off until the Static Set Point Delay Timer is satisfied. Once the Static Mode Delay Timer has been satisfied the cooling source is started with a set point equal to the Process Set Point Temperature less the Heat Exchanger Differential. The cooling source remains on as long as the Static Set Point Delay Timer is satisfied.

In the Static Common Source mode of operation, the cooling source is dedicated to free cooling and is in a common fluid circuit with the process loop. The cooling source remains off until the Static Set Point Delay Timer is satisfied. Once the Static Set Point Delay has been satisfied the cooling source is started with a set point equal to the Process Set Point Temperature. The cooling source remains on as long as the Static Set Point Delay Timer is satisfied.

In the Dynamic Isolated Source mode of operation, the cooling source is used to cool multiple processes and it is isolated from the process loop by a heat exchanger. The cooling source is always running with a set point equal to the Outdoor Air Temperature less the Ambient Differential with an upper limit of the Cooling Source Standard Set Point Temperature and a lower limit of the Process Set Point Temperature less the Heat Exchanger Differential. This mode is primarily used when the cooling source is used for cooling water-cooled condenser chillers that are being used to cool the process loop. By dynamically adjusting the set point of the cooling source the chiller efficiency is increased and as the temperature of the cooling source drops, load shedding can occur prior to the chillers turning off once full free-cooling is achieved.

In the Dynamic Common Source mode of operation, the cooling source is used to cool multiple processes and it is in a common fluid circuit with the process loop. The cooling source is always running and its set point is dynamically changed to be the Outdoor Air Temperature less the Ambient Differential with an upper limit of the Cooling Source Standard Set Point Temperature and a lower limit of the Process Set Point Temperature less the Heat Exchanger Differential. This mode is primarily used for dedicated condenser cooling to achieve optimal energy efficiency.

Figure 41 – Free Cooler Screen

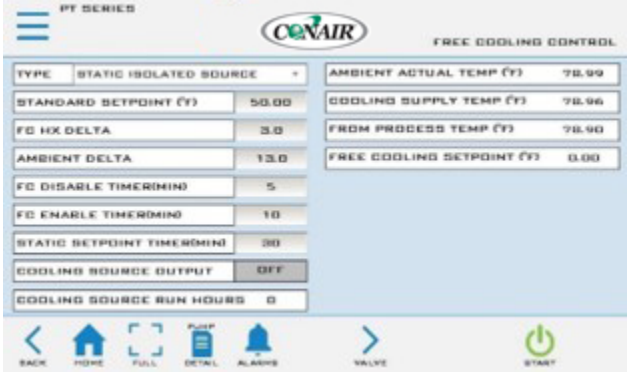


Table 10 – Free Cooling Control

Function	Description	Default Value
Type	Static Isolated Source Static Common Source Dynamic Isolated Source Dynamic Common Source	Static Isolated Source
Standard Setpoint	This is the set point temperature for the cooling source when the Outside Air Temperature is not cool enough for free cooling. This is only used when the free cooling mode is set to Dynamic mode. This temperature is set manually	85 °F
FC HX Delta	This is the number of degrees the Cooling Supply Temperature must be below the Process Set Point Temperature in order for the Free Cooling to be enabled. This temperature is manually set	3 °F (0-125F)
Ambient Delta	This is the minimum number of degrees the Outdoor Air Temperature must be below the Process Set Point Temperature in order for the cooling system to be enabled. This temperature is manually set	13 °F (0-125F)
FC Disable Timer(Min)	This is the required time the Free Cooling Bypass Valve will fully bypass the Free Cooling Heat Exchanger after the free cooling system is disabled. This timer resets when the system starts	30 min (15-720 min)

Table 10 – Free Cooling Control (continued)

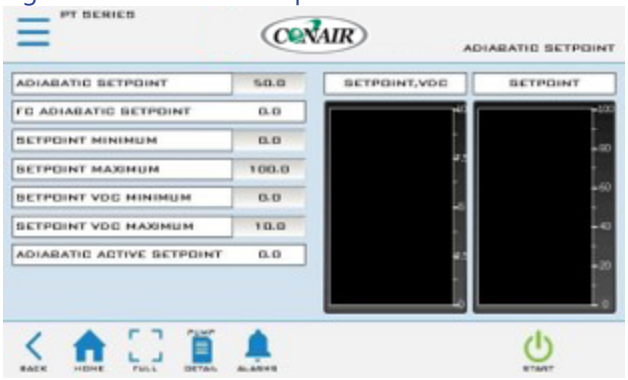
Function	Description	Default Value
FC Enable Timer(Min)	This is the required time the Cooling Supply Temperature must be cooler than the From Process Temperature before the system enters the free cooling mode. This timer is only active if the Free Cooling Disable Timer has elapsed. This timer resets when the system starts or in the event the Cooling Supply Temperature is equal to or greater than the From Process Temperature. When this timer resets, the system moves the Free Cooling Modulating Valve to fully bypass the Free Cooling Heat Exchanger and the Free Cooling Disable Timer starts	5 min (5-60 min)
Static Setpoint Timer(Min)	This is the required time the Outdoor Air Temperature must be cooler than the Process Set Point Temperature less the Ambient Differential before the Static mode of Cooling Source Set Point Mode is activated. This timer starts when the Outdoor Air Temperature is less than the Process Set Point Temperature less the Ambient Differential. This timer resets when the system starts or when the Outdoor Air Temperature is equal to or greater than the Process Set Point Temperature less the Ambient Differential	30 min (15-720min)
Cooling Source Output	Cooling source digital output	
Cooling Source Run Hours	Shows run hours for the cooling source	
Ambient Actual Temperature	This is the dry-bulb temperature of the outside ambient air	(-50-150°F)
Cooling Supply Temperature	This is the temperature of the fluid returning to the Process Cooling System	(0-125°F)
From Process Temperature	This is the temperature of the fluid coming from the Process Cooling System	(0-125°F)
Free Cooling Setpoint	This is the set point temperature for the cooling source when the Outside Air Temperature is cool enough for free cooling. This is calculated and is the Process Set Point Temperature less the Heat Exchanger Differential	(0-125°F)

Figure 42 – Free Cooling Modulating Valve Screen

Menu – Adiabatic Setpoint

When the adiabatic setpoint option is active, analog output signal can be adjusted by the ADIABATIC SETPOINT. MINIMUM SETPOINT to the MAXIMUM SETPOINT are used as scaling for the current/voltage scale defined by SETPOINT VDC/mA MINIMUM to the SETPOINT VDC/mA MAXIMUM as shown in Figure 43.

Figure 43 – Adiabatic Setpoint Screen



Menu – Fluid Cooler

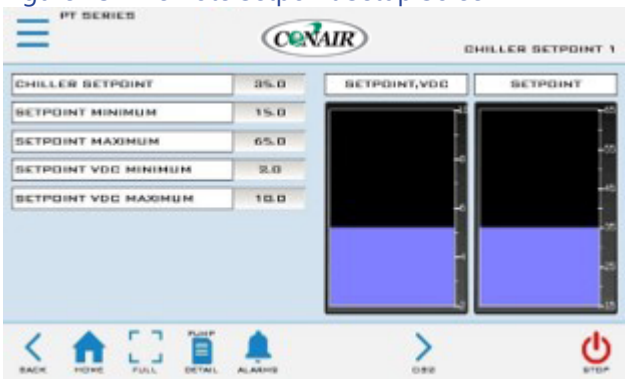
When fluid cooler is to be staged based on ambient temperature or a pump located in a zone and a circuit, fluid cooler control will be active shown in Figure 44.

Figure 44 – Fluid Cooler Screen

Menu – Chiller Setpoint

When the chiller setpoint option is active, 4- 20mA output signal will be adjusted by the CHILLER SETPOINT PERCENT. MINIMUM SETPOINT to the MAXIMUM SETPOINT is used as scaling for the current as defined in Figure 4.

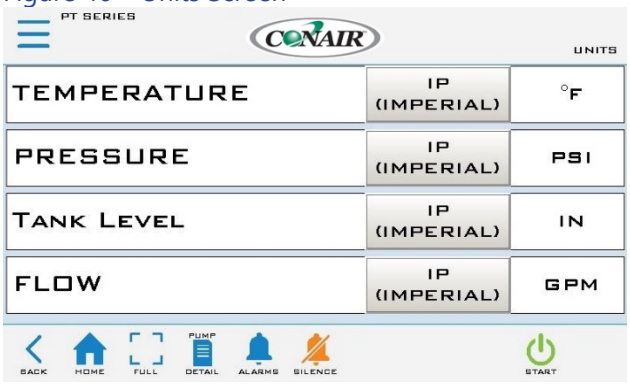
Figure 45 – Remote Setpoint Setup Screen



Menu – Units

Imperial or Metric units can be selected directly from this screen. Touch the UNITS button to toggle the selection between Imperial or Metric units for temperature, pressure, tank level, and flow.

Figure 46 – Units Screen



Modbus Registers

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
00000	Bool	OnOffUnitMng.BmsOnOff	Bit	R/W	Unit On/Off by BMS
00001	Bool	Ethernet.IP_DHCP	Bit	R/W	IP DHCP
00002	Bool	Ethernet.Save_IP_Address	Bit	R/W	Save Ip address
00003	Bool	GeneralMng.En_Date	Bit	R/W	Enable for new date/time write
00004	Bool	AlarmMng.AlrmResByBms	Bit	R/W	Alarm reset by BMS
00006	Bool	Zone1Tank	Bit	R/W	0 = Tank, 1 = Deck
00007	Bool	Zone2Tank	Bit	R/W	0 = Tank, 1 = Deck
00008	Bool	Zone3Tank	Bit	R/W	0 = Tank, 1 = Deck
00009	Bool	FreeCool Enable	Bit	R/W	0 = Not Present, 1 = Exists
00012	Bool	PumpInfo[1].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00013	Bool	PumpInfo[1].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00014	Bool	Pump1_Auto	Bit	R/W	0 = Manual, 1 = Auto
00015	Bool	Pump1_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00016	Bool	PumpInfo[2].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00017	Bool	PumpInfo[2].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00018	Bool	Pump2_Auto	Bit	R/W	0 = Manual, 1 = Auto
00019	Bool	Pump2_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00020	Bool	PumpInfo[3].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00021	Bool	PumpInfo[3].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00022	Bool	Pump3_Auto	Bit	R/W	0 = Manual, 1 = Auto
00023	Bool	Pump3_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00024	Bool	PumpInfo[4].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00025	Bool	PumpInfo[4].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00026	Bool	Pump4_Auto	Bit	R/W	0 = Manual, 1 = Auto
00027	Bool	Pump4_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00028	Bool	PumpInfo[5].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00029	Bool	PumpInfo[5].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00030	Bool	Pump5_Auto	Bit	R/W	0 = Manual, 1 = Auto
00031	Bool	Pump5_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00032	Bool	PumpInfo[6].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00033	Bool	PumpInfo[6].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00034	Bool	Pump6_Auto	Bit	R/W	0 = Manual, 1 = Auto
00035	Bool	Pump6_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00036	Bool	PumpInfo[7].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00037	Bool	PumpInfo[7].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00038	Bool	Pump7_Auto	Bit	R/W	0 = Manual, 1 = Auto
00039	Bool	Pump7_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00040	Bool	PumpInfo[8].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
00041	Bool	PumpInfo[8].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00042	Bool	Pump8_Auto	Bit	R/W	0 = Manual, 1 = Auto
00043	Bool	Pump8_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00044	Bool	PumpInfo[9].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00045	Bool	PumpInfo[9].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00046	Bool	Pump9_Auto	Bit	R/W	0 = Manual, 1 = Auto
00047	Bool	Pump9_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00048	Bool	PumpInfo[10].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00049	Bool	PumpInfo[10].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00050	Bool	Pump10_Auto	Bit	R/W	0 = Manual, 1 = Auto
00051	Bool	Pump10_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00052	Bool	PumpInfo[11].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00053	Bool	PumpInfo[11].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00054	Bool	Pump11_Auto	Bit	R/W	0 = Manual, 1 = Auto
00055	Bool	Pump11_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00056	Bool	PumpInfo[12].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00057	Bool	PumpInfo[12].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00058	Bool	Pump12_Auto	Bit	R/W	0 = Manual, 1 = Auto
00059	Bool	Pump12_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00060	Bool	PumpInfo[13].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00061	Bool	PumpInfo[13].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00062	Bool	Pump13_Auto	Bit	R/W	0 = Manual, 1 = Auto
00063	Bool	Pump13_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00064	Bool	PumpInfo[14].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00065	Bool	PumpInfo[14].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00066	Bool	Pump14_Auto	Bit	R/W	0 = Manual, 1 = Auto
00067	Bool	Pump14_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00068	Bool	PumpInfo[15].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00069	Bool	PumpInfo[15].StarterType	Bit	R/W	0= Non-VFD , 1 = VFD
00070	Bool	Pump15_Auto	Bit	R/W	0 = Manual, 1 = Auto
00071	Bool	Pump15_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00072	Bool	Tank_Info[1].LevelSignal	Bit	R/W	0=Analog, 1=Digital
00073	Bool	Tank_Info[1].AutoWaterMakeUp	Bit	R/W	Auto Water Makeup 0=Disabled, 1=Enabled
00074	Bool	Tank_Info[1].HiLvlAlrmSwEn	Bit	R/W	High Level Alarm Switch 0=Disabled, 1=Enabled
00075	Bool	Tank_Info[1].HiLvlWarnSwEn	Bit	R/W	High Level Warn Switch 0=Disabled, 1=Enabled
00076	Bool	Tank_Info[1].LoLvlWarnSwEn	Bit	R/W	Low Level Warn Switch 0=Disabled, 1=Enabled
00077	Bool	Tank_Info[1].LoLvlAlrmSwEn	Bit	R/W	Low Level Alarm Switch 0=Disabled, 1=Enabled
00078	Bool	Tank_Info[1].LoLvlAction	Bit	R/W	Low Level Alarm Action 0=Alarm Only, 1=Pump Shutdown
00079	Bool	Tank_Info[1].H2OMakeupStopSwEn	Bit	R/W	0 = No, 1 = Yes
00080	Bool	Tank_Info[1].H2OMakeupStartSwEn	Bit	R/W	0 = No, 1 = Yes

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
00081	Bool	Zone1MakeUpValve	Bit	R/W	Digital Output; 0 = Off, 1 = On
00082	Bool	Tank_Info[2].LevelSignal	Bit	R/W	0=Analog, 1=Digital
00083	Bool	Tank_Info[2].AutoWaterMakeUp	Bit	R/W	Auto Water Makeup 0=Disabled, 1=Enabled
00084	Bool	Tank_Info[2].HiLvlAlrmSwEn	Bit	R/W	High Level Alarm Switch 0=Disabled, 1=Enabled
00085	Bool	Tank_Info[2].HiLvlWarnSwEn	Bit	R/W	High Level Warn Switch 0=Disabled, 1=Enabled
00086	Bool	Tank_Info[2].LoLvlWarnSwEn	Bit	R/W	Low Level Warn Switch 0=Disabled, 1=Enabled
00087	Bool	Tank_Info[2].LoLvlAlrmSwEn	Bit	R/W	Low Level Alarm Switch 0=Disabled, 1=Enabled
00088	Bool	Tank_Info[2].LoLvlAction	Bit	R/W	Low Level Alarm Action 0=Alarm Only, 1=Pump Shutdown
00089	Bool	Tank_Info[2].H2OMakeupStopSwEn	Bit	R/W	0 = No, 1 = Yes
00090	Bool	Tank_Info[2].H2OMakeupStartSwEn	Bit	R/W	0 = No, 1 = Yes
00091	Bool	Zone2MakeUpValve	Bit	R/W	Digital Output; 0 = Off, 1 = On
00092	Bool	Tank_Info[3].LevelSignal	Bit	R/W	0=Analog, 1=Digital
00093	Bool	Tank_Info[3].AutoWaterMakeUp	Bit	R/W	Auto Water Makeup 0=Disabled, 1=Enabled
00094	Bool	Tank_Info[3].HiLvlAlrmSwEn	Bit	R/W	High Level Alarm Switch 0=Disabled, 1=Enabled
00095	Bool	Tank_Info[3].HiLvlWarnSwEn	Bit	R/W	High Level Warn Switch 0=Disabled, 1=Enabled
00096	Bool	Tank_Info[3].LoLvlWarnSwEn	Bit	R/W	Low Level Warn Switch 0=Disabled, 1=Enabled
00097	Bool	Tank_Info[3].LoLvlAlrmSwEn	Bit	R/W	Low Level Alarm Switch 0=Disabled, 1=Enabled
00098	Bool	Tank_Info[3].LoLvlAction	Bit	R/W	Low Level Alarm Action 0=Alarm Only, 1=Pump Shutdown
00099	Bool	Tank_Info[3].H2OMakeupStopSwEn	Bit	R/W	0 = No, 1 = Yes
00100	Bool	Tank_Info[3].H2OMakeupStartSwEn	Bit	R/W	0 = No, 1 = Yes
00101	Bool	Zone3MakeUpValve	Bit	R/W	Digital Output; 0 = Off, 1 = On
00102	Bool	Zone1Enabled	Bit	R/W	0 = Disabled, 1 = Enabled
00103	Bool	Zone2Enabled	Bit	R/W	0 = Disabled, 1 = Enabled
00104	Bool	Zone3Enabled	Bit	R/W	0 = Disabled, 1 = Enabled
00105	Bool	Z1C1PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00106	Bool	Z1C1ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00107	Bool	Z1C2PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00108	Bool	Z1C2ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00109	Bool	Z1C3PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00110	Bool	Z1C3ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00111	Bool	Z1C4PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00112	Bool	Z1C4ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00113	Bool	Z2C1PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00114	Bool	Z2C1ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00115	Bool	Z2C2PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00116	Bool	Z2C2ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00117	Bool	Z2C3PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00118	Bool	Z2C3ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00119	Bool	Z2C4PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00120	Bool	Z2C4ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
00121	Bool	Z3C1PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00122	Bool	Z3C1ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00123	Bool	Z3C2PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00124	Bool	Z3C2ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00125	Bool	Z3C3PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00126	Bool	Z3C3ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00127	Bool	Z3C4PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00128	Bool	Z3C4ManMode	Bit	R/W	0 - PID Controlled, 1 - Manual Speed
00129	Bool	Tower_Fan_Conf[1].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00130	Bool	Tower_Fan_Conf[1].Starter_Type	Bit	R/W	0= Non-VFD , 1 = VFD
00131	Bool	Fan1_Auto	Bit	R/W	0 = Manual, 1 = Auto
00132	Bool	Fan1_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00133	Bool	Tower_Fan_Conf[2].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00134	Bool	Tower_Fan_Conf[2].Starter_Type	Bit	R/W	0= Non-VFD , 1 = VFD
00135	Bool	Fan2_Auto	Bit	R/W	0 = Manual, 1 = Auto
00136	Bool	Fan2_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00137	Bool	Tower_Fan_Conf[3].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00138	Bool	Tower_Fan_Conf[3].Starter_Type	Bit	R/W	0= Non-VFD , 1 = VFD
00139	Bool	Fan3_Auto	Bit	R/W	0 = Manual, 1 = Auto
00140	Bool	Fan3_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00141	Bool	Tower_Fan_Conf[4].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00142	Bool	Tower_Fan_Conf[4].Starter_Type	Bit	R/W	0= Non-VFD , 1 = VFD
00143	Bool	Fan4_Auto	Bit	R/W	0 = Manual, 1 = Auto
00144	Bool	Fan4_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00145	Bool	Tower_Fan_Conf[5].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00146	Bool	Tower_Fan_Conf[5].Starter_Type	Bit	R/W	0= Non-VFD , 1 = VFD
00147	Bool	Fan5_Auto	Bit	R/W	0 = Manual, 1 = Auto
00148	Bool	Fan5_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00149	Bool	Tower_Fan_Conf[6].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00150	Bool	Tower_Fan_Conf[6].Starter_Type	Bit	R/W	0= Non-VFD , 1 = VFD
00151	Bool	Fan6_Auto	Bit	R/W	0 = Manual, 1 = Auto
00152	Bool	Fan6_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00153	Bool	Tower_Fan_Conf[7].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00154	Bool	Tower_Fan_Conf[7].Starter_Type	Bit	R/W	0= Non-VFD , 1 = VFD
00155	Bool	Fan7_Auto	Bit	R/W	0 = Manual, 1 = Auto
00156	Bool	Fan7_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On
00157	Bool	Tower_Fan_Conf[8].Enabled	Bit	R/W	0 = Not Present, 1 = Enabled
00158	Bool	Tower_Fan_Conf[8].Starter_Type	Bit	R/W	0= Non-VFD , 1 = VFD
00159	Bool	Fan8_Auto	Bit	R/W	0 = Manual, 1 = Auto
00160	Bool	Fan8_Call_To_Run	Bit	R/W	Digital Output; 0 = Off, 1 - On

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
00161	Bool	Z1_TowerManSpd	Bit	R/W	0 - PID Controlled, 1 - Man Speed
00162	Bool	Z2_TowerManSpd	Bit	R/W	0 - PID Controlled, 1 - Man Speed
00163	Bool	Z3_TowerManSpd	Bit	R/W	0 - PID Controlled, 1 - Man Speed
00164	Bool	Pump01_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00165	Bool	Pump02_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00166	Bool	Pump03_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00167	Bool	Pump04_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00168	Bool	Pump05_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00169	Bool	Pump06_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00170	Bool	Pump07_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00171	Bool	Pump08_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00172	Bool	Pump09_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00173	Bool	Pump10_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00174	Bool	Pump11_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00175	Bool	Pump12_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00176	Bool	Pump13_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00177	Bool	Pump14_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00178	Bool	Pump15_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00179	Bool	Fan1_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00180	Bool	Fan2_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00181	Bool	Fan3_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00182	Bool	Fan4_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00183	Bool	Fan5_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00184	Bool	Fan6_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00185	Bool	Fan7_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00186	Bool	Fan8_Start_Stop_HMI	Bit	R/W	0 = Stop, 1 = Start
00187	Bool	Fan1_Vib_Sensor_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00188	Bool	Fan2_Vib_Sensor_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00189	Bool	Fan3_Vib_Sensor_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00190	Bool	Fan4_Vib_Sensor_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00191	Bool	Fan5_Vib_Sensor_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00192	Bool	Fan6_Vib_Sensor_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00193	Bool	Fan7_Vib_Sensor_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00194	Bool	Fan8_Vib_Sensor_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00197	Bool	Zone1_Temp_Alrm_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00198	Bool	Zone2_Temp_Alrm_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00199	Bool	Zone3_Temp_Alrm_Enable	Bit	R/W	0 = Disabled, 1 = Enabled

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
00201	Bool	FreeCool_Type	Bit	R/W	0 = Fixed, 1 = Loadshed
00202	Bool	T1PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00203	Bool	T2PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00204	Bool	T3PIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00205	Bool	Tank_Info[1].ZoneAlrm	Bit	R/W	Zone to Look At for Alarms. 1 = Enabled
00206	Bool	Tank_Info[2].ZoneAlrm	Bit	R/W	Zone to Look At for Alarms. 1 = Enabled
00207	Bool	Tank_Info[3].ZoneAlrm	Bit	R/W	Zone to Look At for Alarms. 1 = Enabled
00208	Bool	Chiller_Tower	Bit	R/W	0 = Chiller, 1 = Tower
00209	Bool	Tank1_Low_Lvl_Present	Bit	R/W	Tank1_Low_Lvl_Present. 1 = Exists
00210	Bool	Local_Remote_Sel_HMI	Bit	R/W	0 = Local Mode, 1 = Remote Mode
00211	Bool	CP2_Enable_DI	Bit	R/W	Chiller Enable Input. 0 = Off, 1 = On
00212	Bool	Chiller_Status_DI	Bit	R/W	Chiller Status Input. 0 = Ok, 1 = Fault
00213	Bool	Chiller_Enable	Bit	R/W	Chiller_Enable Output. 0 = Off, 1 = On
00214	Bool	Alarm_Horn	Bit	R/W	0 = Off, 1 = On
00215	Bool	Emergency_Stop_HMI	Bit	R/W	0 = Emergency Stop from HMI Inactive, 1 = Emergency Stop from HMI Active
00222	Bool	PressureUofMHMI	Bit	R/W	0 = Imperial, 1 = Metric UoM zone for mask visualization
00223	Bool	LevelUofMHMI	Bit	R/W	0 = Imperial, 1 = Metric UoM zone for mask visualization
00224	Bool	FlowUofMHMI	Bit	R/W	0 = Imperial, 1 = Metric UoM zone for mask visualization
00227	Bool	DefaultPressed	Bit	R/W	0 = Default Values Off, 1= Default Values Active
00228	Bool	AlarmMng.AlrmResByPGD1	Bit	R/W	Alarm reset by PGD1
00229	Bool	Horn_Silence	Bit	R/W	0 = Off, 1 = On
00230	Bool	Zone1_DP_Alrm_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00231	Bool	Zone2_DP_Alrm_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00232	Bool	Zone3_DP_Alrm_Enable	Bit	R/W	0 = Disabled, 1 = Enabled
00233	Bool	Chiller Setpoint Enable	Bit	R/W	0 = Not Present, 1 = Exists
00234	Bool	Tank2_Low_Lvl_Present	Bit	R/W	Tank2_Low_Lvl_Present. 1 = Exists
00235	Bool	Tank3_Low_Lvl_Present	Bit	R/W	Tank3_Low_Lvl_Present. 1 = Exists
00236	Bool	System_HOA_Enable	Bit	R/W	0 = Not Present, 1 = Exists
00237	Bool	Emergency_Stop_DI_Enable	Bit	R/W	0 = Not Present, 1 = Exists
00238	Bool	FluidCooler Enable	Bit	R/W	0 = Not Present, 1 = Exists
00239	Bool	TestDO01	Bit	R/W	0 = Off, 1 = On
00240	Bool	TestDO02	Bit	R/W	0 = Off, 1 = On
00241	Bool	TestDO03	Bit	R/W	0 = Off, 1 = On
00242	Bool	TestDO04	Bit	R/W	0 = Off, 1 = On
00243	Bool	TestDO05	Bit	R/W	0 = Off, 1 = On
00244	Bool	TestDO06	Bit	R/W	0 = Off, 1 = On
00245	Bool	TestDO07	Bit	R/W	0 = Off, 1 = On

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
00246	Bool	TestDO08	Bit	R/W	0 = Off, 1 = On
00247	Bool	TestDO09	Bit	R/W	0 = Off, 1 = On
00248	Bool	TestDO10	Bit	R/W	0 = Off, 1 = On
00249	Bool	TestDO11	Bit	R/W	0 = Off, 1 = On
00250	Bool	TestDO12	Bit	R/W	0 = Off, 1 = On
00251	Bool	TestDO13	Bit	R/W	0 = Off, 1 = On
00252	Bool	TestDO14	Bit	R/W	0 = Off, 1 = On
00253	Bool	TestDO15	Bit	R/W	0 = Off, 1 = On
00254	Bool	TestDO16	Bit	R/W	0 = Off, 1 = On
00255	Bool	TestDO17	Bit	R/W	0 = Off, 1 = On
00256	Bool	TestDO18	Bit	R/W	0 = Off, 1 = On
00257	Bool	Modulating Valve Enable	Bit	R/W	0 = Not Present, 1 = Exists
00258	Bool	Adiabatic Enable	Bit	R/W	0 = Not Present, 1 = Exists
00259	Bool	diverting_valve_enable	Bit	R/W	0 = Not Present, 1 = Exists
00268	Bool	Zone_1_Hi_Temp_Action	Bit	R/W	0 = Alarm, 1 = Shutdown
00269	Bool	Zone_1_Hi_Temp_Action	Bit	R/W	0 = Alarm, 1 = Shutdown
00270	Bool	Zone_1_Hi_Temp_Action	Bit	R/W	0 = Alarm, 1 = Shutdown
00271	Bool	P2byOthersEnabled	Bit	R/W	0 = Disabled, 1 = Shutdown
00272	Bool	DataLogStart	Bit	R/W	0 = Disabled, 1 = Enabled
00273	Bool	ChillerVDC_mA	Bit	R/W	0 = Current, 1 = Voltage
00274	Bool	AdiabaticVDC_mA	Bit	R/W	0 = Current, 1 = Voltage
00279	Bool	Z1C1PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00280	Bool	Z1C2PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00281	Bool	Z1C3PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00282	Bool	Z1C4PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00283	Bool	Z2C1PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00284	Bool	Z2C2PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00285	Bool	Z2C3PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00286	Bool	Z2C4PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00287	Bool	Z3C1PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00288	Bool	Z3C2PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00289	Bool	Z3C3PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00290	Bool	Z3C4PIDAlarmEnabled	Bit	R/W	0 = Disabled, 1 = Enabled
00291	Bool	Z1FlowSensorEnable	Bit	R/W	0 = Disabled, 1 = Enabled
00292	Bool	Z2FlowSensorEnable	Bit	R/W	0 = Disabled, 1 = Enabled
00293	Bool	Z3FlowSensorEnable	Bit	R/W	0 = Disabled, 1 = Enabled
00295	Bool	ModValvePIDAction	Bit	R/W	0 = Direct, 1 = Reverse
00296	Bool	ModValveManMode	Bit	R/W	0 = PID Auto Mode, 1 = PID Manual Mode
00297	Bool	ChillerSetpointEnable_2	Bit	R/W	0 = Disabled, 1 = Enabled
00298	Bool	ChillerSetpointEnable_3	Bit	R/W	0 = Disabled, 1 = Enabled
00299	Bool	ChillerSetpointEnable_4	Bit	R/W	0 = Disabled, 1 = Enabled
00300	Bool	ChillerVDC_mA_2	Bit	R/W	0 = Current, 1 = Voltage

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
00301	Bool	ChillerVDC_mA_3	Bit	R/W	0 = Current, 1 = Voltage
00302	Bool	ChillerVDC_mA_4	Bit	R/W	0 = Current, 1 = Voltage
00303	Bool	RemoteChillerEnable_2	Bit	R/W	0 = Disabled, 1 = Enabled
00304	Bool	RemoteChillerEnable_3	Bit	R/W	0 = Disabled, 1 = Enabled
00305	Bool	RemoteChillerEnable_4	Bit	R/W	0 = Disabled, 1 = Enabled
00306	Bool	AutoStartEnable	Bit	R/W	0 = Disabled, 1 = Enabled
10000	Bool	Remote_Start_En	Bit	R	Remote Start Digital Input. 0 = Off, 1 = On
10001	Bool	Pump1_Running	Bit	R	Digital Input 0 = On, 1 = Off
10002	Bool	Al_PmpGroup_PMP_1.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10003	Bool	Pump2_Running	Bit	R	Digital Input 0 = On, 1 = Off
10004	Bool	Al_PmpGroup_PMP_2.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10005	Bool	Pump3_Running	Bit	R	Digital Input 0 = On, 1 = Off
10006	Bool	Al_PmpGroup_PMP_3.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10007	Bool	Pump4_Running	Bit	R	Digital Input 0 = On, 1 = Off
10008	Bool	Al_PmpGroup_PMP_4.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10009	Bool	Pump5_Running	Bit	R	Digital Input 0 = On, 1 = Off
10010	Bool	Al_PmpGroup_PMP_5.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10011	Bool	Pump6_Running	Bit	R	Digital Input 0 = On, 1 = Off
10012	Bool	Al_PmpGroup_PMP_6.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10013	Bool	Pump7_Running	Bit	R	Digital Input 0 = On, 1 = Off
10014	Bool	Al_PmpGroup_PMP_7.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10015	Bool	Pump8_Running	Bit	R	Digital Input 0 = On, 1 = Off
10016	Bool	Al_PmpGroup_PMP_8.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10017	Bool	Pump9_Running	Bit	R	Digital Input 0 = On, 1 = Off
10018	Bool	Al_PmpGroup_PMP_9.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10019	Bool	Pump10_Running	Bit	R	Digital Input 0 = On, 1 = Off
10020	Bool	Al_PmpGroup_PMP_10.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10021	Bool	Pump11_Running	Bit	R	Digital Input 0 = On, 1 = Off
10022	Bool	Al_PmpGroup_PMP_11.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10023	Bool	Pump12_Running	Bit	R	Digital Input 0 = On, 1 = Off
10024	Bool	Al_PmpGroup_PMP_12.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10025	Bool	Pump13_Running	Bit	R	Digital Input 0 = On, 1 = Off
10026	Bool	Al_PmpGroup_PMP_13.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10027	Bool	Pump14_Running	Bit	R	Digital Input 0 = On, 1 = Off
10028	Bool	Al_PmpGroup_PMP_14.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10029	Bool	Pump15_Running	Bit	R	Digital Input 0 = On, 1 = Off
10030	Bool	Al_PmpGroup_PMP_15.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10031	Bool	Al_Tank_1_HiLvl_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10032	Bool	Al_Tank_1_HiLvl_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10033	Bool	Al_Tank_1_LoLvl_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10034	Bool	Al_Tank_1_LoLvl_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10035	Bool	Tank1LowLvlAlrmSw	Bit	R	Digital input: 0 = Off, 1 = On

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
10036	Bool	Tank1LowLvlWarnSw	Bit	R	Digital input: 0 = Off, 1 = On
10037	Bool	Tank1HiLvlWarnSw	Bit	R	Digital input: 0 = Off, 1 = On
10038	Bool	Tank1HiLvlAlrmSw	Bit	R	Digital input: 0 = Off, 1 = On
10039	Bool	Tank1H2OMakeupStopSw	Bit	R	Digital input: 0 = Off, 1 = On
10040	Bool	Tank1H2OMakeupStartSw	Bit	R	Digital input: 0 = Off, 1 = On
10041	Bool	Al_Tank_2_HiLvl_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10042	Bool	Al_Tank_2_HiLvl_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10043	Bool	Al_Tank_2_LoLvl_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10044	Bool	Al_Tank_2_LoLvl_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10045	Bool	Tank2LowLvlAlrmSw	Bit	R	Digital input: 0 = Off, 1 = On
10046	Bool	Tank2LowLvlWarnSw	Bit	R	Digital input: 0 = Off, 1 = On
10047	Bool	Tank2HiLvlWarnSw	Bit	R	Digital input: 0 = Off, 1 = On
10048	Bool	Tank2HiLvlAlrmSw	Bit	R	Digital input: 0 = Off, 1 = On
10049	Bool	Tank2H2OMakeupStopSw	Bit	R	Digital input: 0 = Off, 1 = On
10050	Bool	Tank2H2OMakeupStartSw	Bit	R	Digital input: 0 = Off, 1 = On
10051	Bool	Al_Tank_3_HiLvl_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10052	Bool	Al_Tank_3_HiLvl_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10053	Bool	Al_Tank_3_LoLvl_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10054	Bool	Al_Tank_3_LoLvl_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10055	Bool	Tank3LowLvlAlrmSw	Bit	R	Digital input: 0 = Off, 1 = On
10056	Bool	Tank3LowLvlWarnSw	Bit	R	Digital input: 0 = Off, 1 = On
10057	Bool	Tank3HiLvlWarnSw	Bit	R	Digital input: 0 = Off, 1 = On
10058	Bool	Tank3HiLvlAlrmSw	Bit	R	Digital input: 0 = Off, 1 = On
10059	Bool	Tank3H2OMakeupStopSw	Bit	R	Digital input: 0 = Off, 1 = On
10060	Bool	Tank3H2OMakeupStartSw	Bit	R	Digital input: 0 = Off, 1 = On
10061	Bool	Fan1_Running	Bit	R	Digital Input 0 = On, 1 = Off
10062	Bool	Al_FanGroup_Fan_1.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10063	Bool	Fan2_Running	Bit	R	Digital Input 0 = On, 1 = Off
10064	Bool	Al_FanGroup_Fan_2.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10065	Bool	Fan3_Running	Bit	R	Digital Input 0 = On, 1 = Off
10066	Bool	Al_FanGroup_Fan_3.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10067	Bool	Fan4_Running	Bit	R	Digital Input 0 = On, 1 = Off
10068	Bool	Al_FanGroup_Fan_4.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10069	Bool	Fan5_Running	Bit	R	Digital Input 0 = On, 1 = Off
10070	Bool	Al_FanGroup_Fan_5.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10071	Bool	Fan6_Running	Bit	R	Digital Input 0 = On, 1 = Off
10072	Bool	Al_FanGroup_Fan_6.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10073	Bool	Fan7_Running	Bit	R	Digital Input 0 = On, 1 = Off
10074	Bool	Al_FanGroup_Fan_7.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10075	Bool	Fan8_Running	Bit	R	Digital Input 0 = On, 1 = Off

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
10076	Bool	AI_FanGroup_Fan_8.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10078	Bool	AI_Phase_Loss.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10079	Bool	AI_Tank_1_LoTmp_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10080	Bool	AI_Tank_1_LoTmp_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10081	Bool	AI_Tank_1_HiTmp_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10082	Bool	AI_Tank_1_HiTmp_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10083	Bool	AI_Tank_2_LoTmp_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10084	Bool	AI_Tank_2_LoTmp_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10085	Bool	AI_Tank_2_HiTmp_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10086	Bool	AI_Tank_2_HiTmp_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10087	Bool	AI_Tank_3_LoTmp_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10088	Bool	AI_Tank_3_LoTmp_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10089	Bool	AI_Tank_3_HiTmp_Warn.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10090	Bool	AI_Tank_3_HiTmp_Alrm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10091	Bool	FreeCool_Call_To_Run	Bit	R	Free Cooling Digital Output
10092	Bool	AI_Fan1_Vibration.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10093	Bool	AI_Fan2_Vibration.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10094	Bool	AI_Fan3_Vibration.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10095	Bool	AI_Fan4_Vibration.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10096	Bool	AI_Fan5_Vibration.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10097	Bool	AI_Fan6_Vibration.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10098	Bool	AI_Fan7_Vibration.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10099	Bool	AI_Fan8_Vibration.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10100	Bool	AI_DP1_Hi_Alarm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10101	Bool	AI_DP2_Hi_Alarm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10102	Bool	AI_DP3_Hi_Alarm.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10103	Bool	AI_Zone1_Makeup_Flt.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10104	Bool	AI_Zone2_Makeup_Flt.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10105	Bool	AI_Zone3_Makeup_Flt.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10106	Bool	AI_Zone1_Temp_Sensor_Flt.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10107	Bool	AI_Zone2_Temp_Sensor_Flt.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10108	Bool	AI_Zone3_Temp_Sensor_Flt.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10109	Bool	System_HOA_Auto	Bit	R	Digital Input: 0 = Hand mode 1 = PLC mode
10110	Bool	Emergency_Stop_CP	Bit	R	Digital input: 0 = Off, 1 = On
10111	Bool	FluidCoolerOut	Bit	R	Digital output 0 = Off, 1 = On
10112	Bool	UnitOn	Bit	R	Unit On status: TRUE = Unit ON
10113	Bool	AI_AmbientTemp.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10114	Bool	AI_TT2_Temp.Active	Bit	R	Automatic generated by Alarm editor - Alarm status
10115	Bool	Three_Way_Vlve_Enable	Bit	R	Valve digital output 0 = Off, 1 = On

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
10116	Bool	ID01_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10117	Bool	ID02_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10118	Bool	ID03_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10119	Bool	ID04_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10120	Bool	ID05_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10121	Bool	ID06_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10122	Bool	ID07_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10123	Bool	ID08_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10124	Bool	ID09_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10125	Bool	ID10_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10126	Bool	ID11_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10127	Bool	ID12_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10128	Bool	ID13_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10129	Bool	ID14_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10130	Bool	ID15_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10131	Bool	ID16_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10132	Bool	ID17_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10133	Bool	ID18_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10134	Bool	NO01_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10135	Bool	NO02_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10136	Bool	NO03_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10137	Bool	NO04_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10138	Bool	NO05_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10139	Bool	NO06_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10140	Bool	NO07_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10141	Bool	NO08_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10142	Bool	NO09_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10143	Bool	NO10_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10144	Bool	NO11_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10145	Bool	NO12_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10146	Bool	NO13_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10147	Bool	NO14_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10148	Bool	NO15_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10149	Bool	NO16_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10150	Bool	NO17_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10151	Bool	NO18_Channel.Val	1	R	Channel Value 0 = Off, 1 = On
10152	Bool	AI_FC1_Warn.Active	1	R	0 = Warning off, 1 = Warning on
10153	Bool	AI_FC1_Alarm.Active	1	R	0 = Alarm off, 1 = Alarm on
10154	Bool	AI_FC2_Warn.Active	1	R	0 = Warning off, 1 = Warning on
10155	Bool	AI_FC2_Alarm.Active	1	R	0 = Alarm off, 1 = Alarm on

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
10156	Bool	AI_FC3_Warn.Active	1	R	0 = Warning off, 1 = Warning on
10157	Bool	AI_FC3_Alarm.Active	1	R	0 = Alarm off, 1 = Alarm on
10158	Bool	AI_FC4_Warn.Active	1	R	0 = Warning off, 1 = Warning on
10159	Bool	AI_FC4_Alarm.Active	1	R	0 = Alarm off, 1 = Alarm on
10160	Bool	AI_DP1_Fault.Active	1	R	0 = Fault off, 1 = Fault on
10161	Bool	AI_DP2_Fault.Active	1	R	0 = Fault off, 1 = Fault on
10162	Bool	AI_DP3_Fault.Active	1	R	0 = Fault off, 1 = Fault on
10163	Bool	AI_Chiller_Fault.Active	1	R	0 = Fault off, 1 = Fault on
10205	Bool	AI_Zone1_Level_Flt.Active	1	R	0 = Fault off, 1 = Fault on
10206	Bool	AI_Zone2_Level_Flt.Active	1	R	0 = Fault off, 1 = Fault on
10207	Bool	AI_Zone3_Level_Flt.Active	1	R	0 = Fault off, 1 = Fault on
10212	Bool	AI_Z1_Flow_Flt.Active	1	R	0 = Fault off, 1 = Fault on
10213	Bool	AI_Z2_Flow_Flt.Active	1	R	0 = Fault off, 1 = Fault on
10214	Bool	AI_Z3_Flow_Flt.Active	1	R	0 = Fault off, 1 = Fault on
10215	Bool	AI_FromProcessTempFlt.Active	1	R	0 = Fault off, 1 = Fault on
10216	Bool	CoolingSourceOut	1	R	Free Cooling Digital Output On
10217	Bool	AI_Chiller_Fault_2.Active	1	R	0 = Fault off, 1 = Fault on
10218	Bool	AI_Chiller_Fault_3.Active	1	R	0 = Fault off, 1 = Fault on
10219	Bool	AI_Chiller_Fault_4.Active	1	R	0 = Fault off, 1 = Fault on
30007	Real	Tank_Info[1].Level	32 Bit	R	0 = Analog 1 = Digital
30009	Real	Tank1ActLvl	32 Bit	R	Tank 1 Actual Level
30011	Real	Tank_Info[2].Level	32 Bit	R	0 = Analog 1 = Digital
30013	Real	Tank2ActLvl	32 Bit	R	Tank 2 Actual Level
30015	Real	Tank_Info[3].Level	32 Bit	R	0 = Analog 1 = Digital
30017	Real	Tank3ActLvl	32 Bit	R	Tank 3 Actual Level
30019	Real	Z1C1ProcVar_HMI	32 Bit	R	Z1C1 Process Variable Value
30021	Real	Z1C2ProcVar_HMI	32 Bit	R	Z1C2 Process Variable Value
30023	Real	Z1C3ProcVar_HMI	32 Bit	R	Z1C3 Process Variable Value
30025	Real	Z1C4ProcVar_HMI	32 Bit	R	Z1C4 Process Variable Value
30027	Real	Z2C1ProcVar_HMI	32 Bit	R	Z2C1 Process Variable Value
30029	Real	Z2C2ProcVar_HMI	32 Bit	R	Z2C2 Process Variable Value
30031	Real	Z2C3ProcVar_HMI	32 Bit	R	Z2C3 Process Variable Value
30033	Real	Z2C4ProcVar_HMI	32 Bit	R	Z2C4 Process Variable Value
30035	Real	Z3C1ProcVar_HMI	32 Bit	R	Z3C1 Process Variable Value
30037	Real	Z3C2ProcVar_HMI	32 Bit	R	Z3C2 Process Variable Value
30039	Real	Z3C3ProcVar_HMI	32 Bit	R	Z3C3 Process Variable Value
30041	Real	Z3C4ProcVar_HMI	32 Bit	R	Z3C4 Process Variable Value
30043	Real	Z1Tower_ProcVar_HMI	32 Bit	R	Z1 Process Variable Value
30045	Real	Z2Tower_ProcVar_HMI	32 Bit	R	Z2 Process Variable Value
30047	Real	Z3Tower_ProcVar_HMI	32 Bit	R	Z3 Process Variable Value
30049	Real	GeneralMng.BoardTemp_Msk	32 Bit	R	Board temperature

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
30053	Real	Zone1ActTemp	32 Bit	R	Zone 1 Actual Temperature
30057	Real	Zone2ActTemp	32 Bit	R	Zone 2 Actual Temperature
30061	Real	Zone3ActTemp	32 Bit	R	Zone 3 Actual Temperature
30065	Real	Ambient_Temp_Act	32 Bit	R	Ambient Actual temperature
30069	Real	FreeCool_TT2_Act_Temp	32 Bit	R	TT2 Actual Temperature
30071	Real	PID_Output[1]	32 Bit	R	Z1C1 PID Output (0-100%) (0-10V)
30073	Real	PID_Output[2]	32 Bit	R	Z1C2 PID Output (0-100%) (0-10V)
30075	Real	PID_Output[3]	32 Bit	R	Z1C3 PID Output (0-100%) (0-10V)
30077	Real	PID_Output[4]	32 Bit	R	Z1C4 PID Output (0-100%) (0-10V)
30079	Real	PID_Output[5]	32 Bit	R	Z2C1 PID Output (0-100%) (0-10V)
30081	Real	PID_Output[6]	32 Bit	R	Z2C2 PID Output (0-100%) (0-10V)
30083	Real	PID_Output[7]	32 Bit	R	Z2C3 PID Output (0-100%) (0-10V)
30085	Real	PID_Output[8]	32 Bit	R	Z2C4 PID Output (0-100%) (0-10V)
30087	Real	PID_Output[9]	32 Bit	R	Z3C1 PID Output (0-100%) (0-10V)
30089	Real	PID_Output[10]	32 Bit	R	Z3C2 PID Output (0-100%) (0-10V)
30091	Real	PID_Output[11]	32 Bit	R	Z3C3 PID Output (0-100%) (0-10V)
30093	Real	PID_Output[12]	32 Bit	R	Z3C4 PID Output (0-100%) (0-10V)
30095	Int	Alarm_Number	16 Bit	R	Alarm_Number
30096	Int	U01_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30097	Int	U02_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30098	Int	U03_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30099	Int	U04_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30100	Int	U05_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30101	Int	U06_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30102	Int	U07_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30103	Int	U08_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30104	Int	U09_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30105	Int	U10_Channel.ChErr	16 Bit	R	Channel error if not equal to 10
30106	Real	UI01_Value_HMI	32 Bit	R	Channel U1 input value
30108	Real	UI02_Value_HMI	32 Bit	R	Channel U1 input value
30110	Real	UI03_Value_HMI	32 Bit	R	Channel U1 input value
30112	Real	UI04_Value_HMI	32 Bit	R	Channel U1 input value
30114	Real	UI05_Value_HMI	32 Bit	R	Channel U1 input value
30116	Real	UI06_Value_HMI	32 Bit	R	Channel U1 input value
30118	Real	UI07_Value_HMI	32 Bit	R	Channel U1 input value
30120	Real	UI08_Value_HMI	32 Bit	R	Channel U1 input value
30122	Real	UI09_Value_HMI	32 Bit	R	Channel U1 input value
30124	Real	UI10_Value_HMI	32 Bit	R	Channel U1 input value
30126	Real	Tower_Pump_CutOut_SP	32 Bit	R	Tower Side Zone 1 Pump Cutout Setpoint
30128	Real	Tower_Pump_2_CutOut_SP	32 Bit	R	Tower Side Zone 2 Pump Cutout Setpoint
30130	Real	Tower_Pump_3_CutOut_SP	32 Bit	R	Tower Side Zone 3 Pump Cutout Setpoint

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
30132	Real	T1Delta_Cut_In_Temp_SP	32 Bit	R	Tower Side Zone 1 Fan CutIn Setpoint
30134	Real	T1Delta_Cut_Out_Temp_SP	32 Bit	R	Tower Side Zone 1 Fan Cutout Setpoint
30136	Real	T2Delta_Cut_In_Temp_SP	32 Bit	R	Tower Side Zone 2 Fan CutIn Setpoint
30138	Real	T2Delta_Cut_Out_Temp_SP	32 Bit	R	Tower Side Zone 2 Fan Cutout Setpoint
30140	Real	T3Delta_Cut_In_Temp_SP	32 Bit	R	Tower Side Zone 3 Fan CutIn Setpoint
30142	Real	T3Delta_Cut_Out_Temp_SP	32 Bit	R	Tower Side Zone 3 Fan Cutout Setpoint
30144	Real	Z1Tower_Setpt_HMI	32 Bit	R	Tower Zone 1 Setpoint
30146	Real	Z2Tower_Setpt_HMI	32 Bit	R	Tower Zone 2 Setpoint
30148	Real	Z3Tower_Setpt_HMI	32 Bit	R	Tower Zone 3 Setpoint
30170	Int	Z1C1Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30171	Int	Z1C2Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30172	Int	Z1C3Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30173	Int	Z1C4Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30174	Int	Z2C1Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30175	Int	Z2C2Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30176	Int	Z2C3Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30177	Int	Z2C4Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30178	Int	Z3C1Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30179	Int	Z3C2Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30180	Int	Z3C3Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30181	Int	Z3C4Sensor_Fault	16 Bit	R	1 = Pressure Sensor Fault, 2 = Differential Pressure Fault, 3 = Flow Sensor Fault, 4 = Temperature Sensor Fault
30194	Real	FluidCoolerCutOut	32 Bit	R	Fluid Cooler Cut Out Setpoint
30196	Int	Z1C1HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30197	Int	Z1C1HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
30198	Int	Z1C1LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30199	Int	Z1C1LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30200	Int	Z1C2HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30201	Int	Z1C2HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30202	Int	Z1C2LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30203	Int	Z1C2LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30204	Int	Z1C3HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30205	Int	Z1C3HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30206	Int	Z1C3LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30207	Int	Z1C3LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30208	Int	Z1C4HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30209	Int	Z1C4HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30210	Int	Z1C4LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30211	Int	Z1C4LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30212	Int	Z2C1HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30213	Int	Z2C1HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30214	Int	Z2C1LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30215	Int	Z2C1LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
30216	Int	Z2C2HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30217	Int	Z2C2HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30218	Int	Z2C2LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30219	Int	Z2C2LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30220	Int	Z2C3HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30221	Int	Z2C3HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30222	Int	Z2C3LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30223	Int	Z2C3LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30224	Int	Z2C4HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30225	Int	Z2C4HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30226	Int	Z2C4LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30227	Int	Z2C4LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30228	Int	Z3C1HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30229	Int	Z3C1HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30230	Int	Z3C1LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30231	Int	Z3C1LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30232	Int	Z3C2HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30233	Int	Z3C2HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
30234	Int	Z3C2LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30235	Int	Z3C2LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30236	Int	Z3C3HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30237	Int	Z3C3HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30238	Int	Z3C3LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30239	Int	Z3C3LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30240	Int	Z3C4HighAlarmHMI	16 Bit	R	1 = High Pressure Alarm, 2 = High Differential Pressure Alarm, 3 = High Flow Alarm, 4 = High Temperature Alarm
30241	Int	Z3C4HighWarningHMI	16 Bit	R	1 = High Pressure Warning, 2 = High Differential Pressure Warning, 3 = High Flow Warning, 4 = High Temperature Warning
30242	Int	Z3C4LowWarningHMI	16 Bit	R	1 = Low Pressure Warning, 2 = Low Differential Pressure Warning, 3 = Low Flow Warning, 4 = Low Temperature Warning
30243	Int	Z3C4LowAlarmHMI	16 Bit	R	1 = Low Pressure Alarm, 2 = Low Differential Pressure Alarm, 3 = Low Flow Alarm, 4 = Low Temperature Alarm
30244	Real	FromProcessTemp_HMI	32 Bit	R	From Process Actual Temperature
40005	UInt	GeneralMng.YearIn	1	R/W	Writing of new year value enabled by EnDate
40006	USInt	Ethernet.IPAddr0	1	R/W	IP Address byte 0
40007	USInt	Ethernet.IPAddr1	1	R/W	IP Address byte 1
40008	USInt	Ethernet.IPAddr2	1	R/W	IP Address byte 2
40009	USInt	Ethernet.IPAddr3	1	R/W	IP Address byte 3
40010	USInt	Ethernet.IPSubnet0	1	R/W	IP Subnet byte 0
40011	USInt	Ethernet.IPSubnet1	1	R/W	IP Subnet byte 1
40012	USInt	Ethernet.IPSubnet2	1	R/W	IP Subnet byte 2
40013	USInt	Ethernet.IPSubnet3	1	R/W	IP Subnet byte 3
40014	USInt	Ethernet.IPGateway0	1	R/W	IP Gateway byte 0
40015	USInt	Ethernet.IPGateway1	1	R/W	IP Gateway byte 1
40016	USInt	Ethernet.IPGateway2	1	R/W	IP Gateway byte 2
40017	USInt	Ethernet.IPGateway3	1	R/W	IP Gateway byte 3
40026	Int	NumberOfZones	1	R/W	NumberOfZones (1-3)
40027	Int	ZoneType1	1	R/W	0 = Process , 1 = Chiller, 2 = Tower
40028	Int	ZoneType2	1	R/W	0 = Process , 1 = Chiller, 2 = Tower
40029	Int	ZoneType3	1	R/W	0 = Process , 1 = Chiller, 2 = Tower

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40031	Real	Tank_Info[1].LvlLowScale	2	R/W	Analog Level Low Scale
40033	Real	Tank_Info[1].LvlHighScale	2	R/W	Analog Level High Scale
40035	Real	Tank_Info[1].LvlOffset	2	R/W	Analog Level Offset
40037	Real	Tank_InfoHMI[1].AutoWaterStopSP	2	R/W	Auto Water Makeup Stop Level
40039	Real	Tank_InfoHMI[1].AutoWaterStartSP	2	R/W	Auto Water Makeup Start Level
40041	Real	Tank_InfoHMI[1].HiLvlAlrmSP	2	R/W	Analog High Level Alarm Setpt
40043	Real	Tank_InfoHMI[1].HiLvlWarnSP	2	R/W	Analog High Level Warn Setpt
40045	Real	Tank_InfoHMI[1].LoLvlWarnSP	2	R/W	Analog Low Level Warn Setpt
40047	Real	Tank_InfoHMI[1].LoLvlAlrmSP	2	R/W	Analog Low Level Alarm Setpt
40050	Real	Tank_Info[2].LvlLowScale	2	R/W	Analog Level Low Scale
40052	Real	Tank_Info[2].LvlHighScale	2	R/W	Analog Level High Scale
40054	Real	Tank_Info[2].LvlOffset	2	R/W	Analog Level Offset
40056	Real	Tank_InfoHMI[2].AutoWaterStopSP	2	R/W	Auto Water Makeup Stop Level
40058	Real	Tank_InfoHMI[2].AutoWaterStartSP	2	R/W	Auto Water Makeup Start Level
40060	Real	Tank_InfoHMI[2].HiLvlAlrmSP	2	R/W	Analog High Level Alarm Setpt
40062	Real	Tank_InfoHMI[2].HiLvlWarnSP	2	R/W	Analog High Level Warn Setpt
40064	Real	Tank_InfoHMI[2].LoLvlWarnSP	2	R/W	Analog Low Level Warn Setpt
40066	Real	Tank_InfoHMI[2].LoLvlAlrmSP	2	R/W	Analog Low Level Alarm Setpt
40069	Real	Tank_Info[3].LvlLowScale	2	R/W	Analog Level Low Scale
40071	Real	Tank_Info[3].LvlHighScale	2	R/W	Analog Level High Scale
40073	Real	Tank_Info[3].LvlOffset	2	R/W	Analog Level Offset
40075	Real	Tank_InfoHMI[3].AutoWaterStopSP	2	R/W	Auto Water Makeup Stop Level
40077	Real	Tank_InfoHMI[3].AutoWaterStartSP	2	R/W	Auto Water Makeup Start Level
40079	Real	Tank_InfoHMI[3].HiLvlAlrmSP	2	R/W	Analog High Level Alarm Setpt
40081	Real	Tank_InfoHMI[3].HiLvlWarnSP	2	R/W	Analog High Level Warn Setpt
40083	Real	Tank_InfoHMI[3].LoLvlWarnSP	2	R/W	Analog Low Level Warn Setpt
40085	Real	Tank_InfoHMI[3].LoLvlAlrmSP	2	R/W	Analog Low Level Alarm Setpt
40087	Int	PumpInfo[1].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40088	Int	PumpInfo[1].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40089	Int	PumpInfo[1].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40090	Int	PumpInfo[1].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40091	Int	PumpInfo[1].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40092	Int	PumpInfo[1].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40093	Int	PumpInfo[2].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40094	Int	PumpInfo[2].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40095	Int	PumpInfo[2].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40096	Int	PumpInfo[2].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40097	Int	PumpInfo[2].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40098	Int	PumpInfo[2].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40099	Int	PumpInfo[3].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40100	Int	PumpInfo[3].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40101	Int	PumpInfo[3].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40102	Int	PumpInfo[3].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40103	Int	PumpInfo[3].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40104	Int	PumpInfo[3].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40105	Int	PumpInfo[4].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40106	Int	PumpInfo[4].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40107	Int	PumpInfo[4].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40108	Int	PumpInfo[4].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40109	Int	PumpInfo[4].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40110	Int	PumpInfo[4].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40111	Int	PumpInfo[5].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40112	Int	PumpInfo[5].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40113	Int	PumpInfo[5].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40114	Int	PumpInfo[5].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40115	Int	PumpInfo[5].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40116	Int	PumpInfo[5].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40117	Int	PumpInfo[6].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40118	Int	PumpInfo[6].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40119	Int	PumpInfo[6].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40120	Int	PumpInfo[6].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40121	Int	PumpInfo[6].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40122	Int	PumpInfo[6].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40123	Int	PumpInfo[7].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40124	Int	PumpInfo[7].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40125	Int	PumpInfo[7].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40126	Int	PumpInfo[7].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40127	Int	PumpInfo[7].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40128	Int	PumpInfo[7].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40129	Int	PumpInfo[8].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40130	Int	PumpInfo[8].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40131	Int	PumpInfo[8].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40132	Int	PumpInfo[8].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40133	Int	PumpInfo[8].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40134	Int	PumpInfo[8].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40135	Int	PumpInfo[9].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40136	Int	PumpInfo[9].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40137	Int	PumpInfo[9].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40138	Int	PumpInfo[9].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40139	Int	PumpInfo[9].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40140	Int	PumpInfo[9].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40141	Int	PumpInfo[10].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40142	Int	PumpInfo[10].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40143	Int	PumpInfo[10].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40144	Int	PumpInfo[10].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40145	Int	PumpInfo[10].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40146	Int	PumpInfo[10].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40147	Int	PumpInfo[11].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40148	Int	PumpInfo[11].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40149	Int	PumpInfo[11].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40150	Int	PumpInfo[11].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40151	Int	PumpInfo[11].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40152	Int	PumpInfo[11].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40153	Int	PumpInfo[12].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40154	Int	PumpInfo[12].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40155	Int	PumpInfo[12].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40156	Int	PumpInfo[12].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40157	Int	PumpInfo[12].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40158	Int	PumpInfo[12].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40159	Int	PumpInfo[13].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40160	Int	PumpInfo[13].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40161	Int	PumpInfo[13].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40162	Int	PumpInfo[13].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40163	Int	PumpInfo[13].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40164	Int	PumpInfo[13].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40165	Int	PumpInfo[14].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40166	Int	PumpInfo[14].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40167	Int	PumpInfo[14].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40168	Int	PumpInfo[14].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40169	Int	PumpInfo[14].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40170	Int	PumpInfo[14].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B
40171	Int	PumpInfo[15].ZoneA	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40172	Int	PumpInfo[15].CircuitA	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40173	Int	PumpInfo[15].Duty	1	R/W	0 = primary, 1 = dedicated standby, 2 = dual standby
40174	Int	PumpInfo[15].ZoneB	1	R/W	Assigns the pump to the secondary zone 1, 2, or 3
40175	Int	PumpInfo[15].CircuitB	1	R/W	Assigns the pump to the secondary circuit 1, 2, 3, or 4
40176	Int	PumpInfo[15].VlveLoc	1	R/W	0 = none, 1 = Zone A, 2 = Zone B

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40177	Int	Z1C1Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40178	Int	Z1C2Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40179	Int	Z1C3Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40180	Int	Z1C4Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40181	Int	Z2C1Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40182	Int	Z2C2Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40183	Int	Z2C3Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40184	Int	Z2C4Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40185	Int	Z3C1Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40186	Int	Z3C2Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40187	Int	Z3C3Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40188	Int	Z3C4Conf.RotTyp	1	R/W	Function block configuration - Type of rotation (0:---, 1:FIFO, 2:LIFO, 3:Timed, 4:Custom, 5:Custom 2)
40189	Int	Z1C1PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40190	Real	Z1C1ManSpd	2	R/W	0-100%
40192	Real	Z1C1PIDLowLimOut	2	R/W	Z1C1PIDLowLimOut
40194	Real	Z1C1PIDHiLimOut	2	R/W	Z1C1PIDHiLimOut
40196	Real	Z1C1ProcSetpt_HMI	2	R/W	Z1C1ProcSetpt_HMI
40198	UInt	Z1C1CycleTime	1	R/W	Z1C1CycleTime
40199	Real	Z1C1KP	2	R/W	Z1C1KP
40201	UInt	Z1C1Ti	1	R/W	Z1C1Ti
40202	UInt	Z1C1Td	1	R/W	Z1C1Td
40203	Real	Z1C1Deadband	2	R/W	Z1C1Deadband
40205	Int	Z1C2PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40206	Real	Z1C2ManSpd	2	R/W	0-100%
40208	Real	Z1C2PIDLowLimOut	2	R/W	Z1C2PIDLowLimOut
40210	Real	Z1C2PIDHiLimOut	2	R/W	Z1C2PIDHiLimOut
40212	Real	Z1C2ProcSetpt_HMI	2	R/W	Z1C2ProcSetpt_HMI
40214	UInt	Z1C2CycleTime	1	R/W	Z1C2CycleTime
40215	Real	Z1C2KP	2	R/W	Z1C2KP
40217	UInt	Z1C2Ti	1	R/W	Z1C2Ti
40218	UInt	Z1C2Td	1	R/W	Z1C2Td
40219	Real	Z1C2Deadband	2	R/W	Z1C2Deadband
40221	Int	Z1C3PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40222	Real	Z1C3ManSpd	2	R/W	0-100%
40224	Real	Z1C3PIDLowLimOut	2	R/W	Z1C3PIDLowLimOut

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40226	Real	Z1C3PIDHiLimOut	2	R/W	Z1C3PIDHiLimOut
40228	Real	Z1C3ProcSetpt_HMI	2	R/W	Z1C3ProcSetpt_HMI
40230	UInt	Z1C3CycleTime	1	R/W	Z1C3CycleTime
40231	Real	Z1C3KP	2	R/W	Z1C3KP
40233	UInt	Z1C3Ti	1	R/W	Z1C3Ti
40234	UInt	Z1C3Td	1	R/W	Z1C3Td
40235	Real	Z1C3Deadband	2	R/W	Z1C3Deadband
40237	Int	Z1C4PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40238	Real	Z1C4ManSpd	2	R/W	0-100%
40240	Real	Z1C4PIDLowLimOut	2	R/W	Z1C4PIDLowLimOut
40242	Real	Z1C4PIDHiLimOut	2	R/W	Z1C4PIDHiLimOut
40244	Real	Z1C4ProcSetpt_HMI	2	R/W	Z1C4ProcSetpt_HMI
40246	UInt	Z1C4CycleTime	1	R/W	Z1C4CycleTime
40247	Real	Z1C4KP	2	R/W	Z1C4KP
40249	UInt	Z1C4Ti	1	R/W	Z1C4Ti
40250	UInt	Z1C4Td	1	R/W	Z1C4Td
40251	Real	Z1C4Deadband	2	R/W	Z1C4Deadband
40253	Int	Z2C1PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40254	Real	Z2C1ManSpd	2	R/W	0-100%
40256	Real	Z2C1PIDLowLimOut	2	R/W	Z2C1PIDLowLimOut
40258	Real	Z2C1PIDHiLimOut	2	R/W	Z2C1PIDHiLimOut
40260	Real	Z2C1ProcSetpt_HMI	2	R/W	Z2C1ProcSetpt_HMI
40262	UInt	Z2C1CycleTime	1	R/W	Z2C1CycleTime
40263	Real	Z2C1KP	2	R/W	Z2C1KP
40265	UInt	Z2C1Ti	1	R/W	Z2C1Ti
40266	UInt	Z2C1Td	1	R/W	Z2C1Td
40267	Real	Z2C1Deadband	2	R/W	Z2C1Deadband
40269	Int	Z2C2PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40270	Real	Z2C2ManSpd	2	R/W	0-100%
40272	Real	Z2C2PIDLowLimOut	2	R/W	Z2C2PIDLowLimOut
40274	Real	Z2C2PIDHiLimOut	2	R/W	Z2C2PIDHiLimOut
40276	Real	Z2C2ProcSetpt_HMI	2	R/W	Z2C2ProcSetpt_HMI
40278	UInt	Z2C2CycleTime	1	R/W	Z2C2CycleTime
40279	Real	Z2C2KP	2	R/W	Z2C2KP
40281	UInt	Z2C2Ti	1	R/W	Z2C2Ti
40282	UInt	Z2C2Td	1	R/W	Z2C2Td
40283	Real	Z2C2Deadband	2	R/W	Z2C2Deadband
40285	Int	Z2C3PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40286	Real	Z2C3ManSpd	2	R/W	0-100%

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40288	Real	Z2C3PIDLowLimOut	2	R/W	Z2C3PIDLowLimOut
40290	Real	Z2C3PIDHiLimOut	2	R/W	Z2C3PIDHiLimOut
40292	Real	Z2C3ProcSetpt_HMI	2	R/W	Z2C3ProcSetpt_HMI
40294	UInt	Z2C3CycleTime	1	R/W	Z2C3CycleTime
40295	Real	Z2C3KP	2	R/W	Z2C3KP
40297	UInt	Z2C3Ti	1	R/W	Z2C3Ti
40298	UInt	Z2C3Td	1	R/W	Z2C3Td
40299	Real	Z2C3Deadband	2	R/W	Z2C3Deadband
40301	Int	Z2C4PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40302	Real	Z2C4ManSpd	2	R/W	0-100%
40304	Real	Z2C4PIDLowLimOut	2	R/W	Z2C4PIDLowLimOut
40306	Real	Z2C4PIDHiLimOut	2	R/W	Z2C4PIDHiLimOut
40308	Real	Z2C4ProcSetpt_HMI	2	R/W	Z2C4ProcSetpt_HMI
40310	UInt	Z2C4CycleTime	1	R/W	Z2C4CycleTime
40311	Real	Z2C4KP	2	R/W	Z2C4KP
40313	UInt	Z2C4Ti	1	R/W	Z2C4Ti
40314	UInt	Z2C4Td	1	R/W	Z2C4Td
40315	Real	Z2C4Deadband	2	R/W	Z2C4Deadband
40317	Int	Z3C1PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40318	Real	Z3C1ManSpd	2	R/W	0-100%
40320	Real	Z3C1PIDLowLimOut	2	R/W	Z3C1PIDLowLimOut
40322	Real	Z3C1PIDHiLimOut	2	R/W	Z3C1PIDHiLimOut
40324	Real	Z3C1ProcSetpt_HMI	2	R/W	Z3C1ProcSetpt_HMI
40326	UInt	Z3C1CycleTime	1	R/W	Z3C1CycleTime
40327	Real	Z3C1KP	2	R/W	Z3C1KP
40329	UInt	Z3C1Ti	1	R/W	Z3C1Ti
40330	UInt	Z3C1Td	1	R/W	Z3C1Td
40331	Real	Z3C1Deadband	2	R/W	Z3C1Deadband
40333	Int	Z3C2PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40334	Real	Z3C2ManSpd	2	R/W	0-100%
40336	Real	Z3C2PIDLowLimOut	2	R/W	Z3C2PIDLowLimOut
40338	Real	Z3C2PIDHiLimOut	2	R/W	Z3C2PIDHiLimOut
40340	Real	Z3C2ProcSetpt_HMI	2	R/W	Z3C2ProcSetpt_HMI
40342	UInt	Z3C2CycleTime	1	R/W	Z3C2CycleTime
40343	Real	Z3C2KP	2	R/W	Z3C2KP
40345	UInt	Z3C2Ti	1	R/W	Z3C2Ti
40346	UInt	Z3C2Td	1	R/W	Z3C2Td
40347	Real	Z3C2Deadband	2	R/W	Z3C2Deadband
40349	Int	Z3C3PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40350	Real	Z3C3ManSpd	2	R/W	0-100%
40352	Real	Z3C3PIDLowLimOut	2	R/W	Z3C3PIDLowLimOut
40354	Real	Z3C3PIDHiLimOut	2	R/W	Z3C3PIDHiLimOut
40356	Real	Z3C3ProcSetpt_HMI	2	R/W	Z3C3ProcSetpt_HMI
40358	UInt	Z3C3CycleTime	1	R/W	Z3C3CycleTime
40359	Real	Z3C3KP	2	R/W	Z3C3KP
40361	UInt	Z3C3Ti	1	R/W	Z3C3Ti
40362	UInt	Z3C3Td	1	R/W	Z3C3Td
40363	Real	Z3C3Deadband	2	R/W	Z3C3Deadband
40365	Int	Z3C4PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40366	Real	Z3C4ManSpd	2	R/W	0-100%
40368	Real	Z3C4PIDLowLimOut	2	R/W	Z3C4PIDLowLimOut
40370	Real	Z3C4PIDHiLimOut	2	R/W	Z3C4PIDHiLimOut
40372	Real	Z3C4ProcSetpt_HMI	2	R/W	Z3C4ProcSetpt_HMI
40374	UInt	Z3C4CycleTime	1	R/W	Z3C4CycleTime
40375	Real	Z3C4KP	2	R/W	Z3C4KP
40377	UInt	Z3C4Ti	1	R/W	Z3C4Ti
40378	UInt	Z3C4Td	1	R/W	Z3C4Td
40379	Real	Z3C4Deadband	2	R/W	Z3C4Deadband
40381	UDInt	PumpEtm[1]	2	R/W	Pump Running Hours
40383	UDInt	PumpEtm[2]	2	R/W	Pump Running Hours
40385	UDInt	PumpEtm[3]	2	R/W	Pump Running Hours
40387	UDInt	PumpEtm[4]	2	R/W	Pump Running Hours
40389	UDInt	PumpEtm[5]	2	R/W	Pump Running Hours
40391	UDInt	PumpEtm[6]	2	R/W	Pump Running Hours
40393	UDInt	PumpEtm[7]	2	R/W	Pump Running Hours
40395	UDInt	PumpEtm[8]	2	R/W	Pump Running Hours
40397	UDInt	PumpEtm[9]	2	R/W	Pump Running Hours
40399	UDInt	PumpEtm[10]	2	R/W	Pump Running Hours
40401	UDInt	PumpEtm[11]	2	R/W	Pump Running Hours
40403	UDInt	PumpEtm[12]	2	R/W	Pump Running Hours
40405	UDInt	PumpEtm[13]	2	R/W	Pump Running Hours
40407	UDInt	PumpEtm[14]	2	R/W	Pump Running Hours
40409	UDInt	PumpEtm[15]	2	R/W	Pump Running Hours
40411	UDInt	FanETM[1]	2	R/W	Fan Running Hours
40413	UDInt	FanETM[2]	2	R/W	Fan Running Hours
40415	UDInt	FanETM[3]	2	R/W	Fan Running Hours
40417	UDInt	FanETM[4]	2	R/W	Fan Running Hours
40419	UDInt	FanETM[5]	2	R/W	Fan Running Hours
40421	UDInt	FanETM[6]	2	R/W	Fan Running Hours
40423	UDInt	FanETM[7]	2	R/W	Fan Running Hours

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40425	UDInt	FanETM[8]	2	R/W	Fan Running Hours
40427	UInt	Fan_Min_On_Time	1	R/W	Fan_Min_On_Time
40428	UInt	Fan_Min_Off_Time	1	R/W	Fan_Min_Off_Time
40429	Real	T1_Fan_PID_kP_HMI	2	R/W	T1_Fan_PID_kP_HMI
40431	UInt	T1_Fan_PID_Ti_HMI	1	R/W	T1_Fan_PID_Ti_HMI
40433	UInt	T1_Fan_PID_Td_HMI	1	R/W	T1_Fan_PID_Td_HMI
40436	Real	T1_Fan_Man_Spd	2	R/W	0-100%
40438	Real	T1_Fan_PID_LowLimOut	2	R/W	T1_Fan_PID_LowLimOut
40440	Real	T1_Fan_PID_HiLimOut	2	R/W	T1_Fan_PID_HiLimOut
40442	UInt	T1_Fan_PID_CycleTime	1	R/W	T1_Fan_PID_CycleTime
40443	Real	T1_Fan_PID_Deadband	2	R/W	T1_Fan_PID_Deadband
40445	Int	Tower_Fan_Conf[1].Zone	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40446	Int	Tower_Fan_Conf[1].Circuit	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40447	Int	Tower_Fan_Conf[2].Zone	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40448	Int	Tower_Fan_Conf[2].Circuit	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40449	Int	Tower_Fan_Conf[3].Zone	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40450	Int	Tower_Fan_Conf[3].Circuit	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40451	Int	Tower_Fan_Conf[4].Zone	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40452	Int	Tower_Fan_Conf[4].Circuit	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40453	Int	Tower_Fan_Conf[5].Zone	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40454	Int	Tower_Fan_Conf[5].Circuit	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40455	Int	Tower_Fan_Conf[6].Zone	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40456	Int	Tower_Fan_Conf[6].Circuit	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40457	Int	Tower_Fan_Conf[7].Zone	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40458	Int	Tower_Fan_Conf[7].Circuit	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40459	Int	Tower_Fan_Conf[8].Zone	1	R/W	Assigns the pump to the primary zone 1, 2, or 3
40460	Int	Tower_Fan_Conf[8].Circuit	1	R/W	Assigns the pump to the primary circuit 1, 2, 3, or 4
40461	Real	Z1C1Tower_Setpt_HMI	2	R/W	Tower 1 Control Setpoint
40463	Real	Z2C1Tower_Setpt_HMI	2	R/W	Tower 2 Control Setpoint
40465	Real	Z3C1Tower_Setpt_HMI	2	R/W	Tower 3 Control Setpoint
40467	Real	T1_Module_Pwr_Req	2	R/W	Tower 1 PID Output (0-100%) (0-10V)
40469	Real	T2_Module_Pwr_Req	2	R/W	Tower 2 PID Output (0-100%) (0-10V)
40471	Real	T3_Module_Pwr_Req	2	R/W	Tower 3 PID Output (0-100%) (0-10V)
40473	UInt	TowerControl1	1	R/W	11 = Z1C1 Control, 12 = Z1C2 Control, 13 = Z1C3 Control, 14 = Z1C4 Control, 21 = Z2C1 Control, 22 = Z2C2 Control, 23 = Z2C3 Control, 24 = Z2C4 Control, 31 = Z3C1 Control, 32 = Z3C2 Control, 33 = Z3C3 Control, 34 = Z3C4 Control.
40474	UInt	TowerControl2	1	R/W	11 = Z1C1 Control, 12 = Z1C2 Control, 13 = Z1C3 Control, 14 = Z1C4 Control, 21 = Z2C1 Control, 22 = Z2C2 Control, 23 = Z2C3 Control, 24 = Z2C4 Control, 31 = Z3C1 Control, 32 = Z3C2 Control, 33 = Z3C3 Control, 34 = Z3C4 Control.

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40475	UInt	TowerControl3	1	R/W	11 = Z1C1 Control, 12 = Z1C2 Control, 13 = Z1C3 Control, 14 = Z1C4 Control, 21 = Z2C1 Control, 22 = Z2C2 Control, 23 = Z2C3 Control, 24 = Z2C4 Control, 31 = Z3C1 Control, 32 = Z3C2 Control, 33 = Z3C3 Control, 34 = Z3C4 Control.
40476	Int	T1PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40477	Int	T2PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40478	Int	T3PIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
40479	Int	Pump_Off_Delay_HMI	1	R/W	Pump_Off_Delay_HMI
40480	Real	T1Delta_Cut_In_Temp	2	R/W	T1Delta_Cut_In_Temp
40482	Real	T1Delta_Cut_Out_Temp	2	R/W	T1Delta_Cut_Out_Temp
40484	Real	T2Delta_Cut_In_Temp	2	R/W	T2Delta_Cut_In_Temp
40486	Real	T2Delta_Cut_Out_Temp	2	R/W	T2Delta_Cut_Out_Temp
40488	Real	T3Delta_Cut_In_Temp	2	R/W	T3Delta_Cut_In_Temp
40490	Real	T3Delta_Cut_Out_Temp	2	R/W	T3Delta_Cut_Out_Temp
40492	Int	Fan_Vib_TD_HMI	1	R/W	Fan Vibration Time Delay
40493	Real	T2_Fan_PID_kP_HMI	2	R/W	T2_Fan_PID_kP_HMI
40495	UInt	T2_Fan_PID_Ti_HMI	1	R/W	T2_Fan_PID_Ti_HMI
40496	UInt	T2_Fan_PID_Td_HMI	1	R/W	T2_Fan_PID_Td_HMI
40497	Real	T2_Fan_Man_Spd	2	R/W	0-100%
40499	Real	T2_Fan_PID_LowLimOut	2	R/W	T2_Fan_PID_LowLimOut
40501	Real	T2_Fan_PID_HiLimOut	2	R/W	T2_Fan_PID_HiLimOut
40503	UInt	T2_Fan_PID_CycleTime	1	R/W	T2_Fan_PID_CycleTime
40504	Real	T2_Fan_PID_Deadband	2	R/W	T2_Fan_PID_Deadband
40506	Real	T3_Fan_PID_kP_HMI	2	R/W	T3_Fan_PID_kP_HMI
40508	UInt	T3_Fan_PID_Ti_HMI	1	R/W	T3_Fan_PID_Ti_HMI
40509	UInt	T3_Fan_PID_Td_HMI	1	R/W	T3_Fan_PID_Td_HMI
40510	Real	T3_Fan_Man_Spd	2	R/W	0-100%
40512	Real	T3_Fan_PID_LowLimOut	2	R/W	T3_Fan_PID_LowLimOut
40514	Real	T3_Fan_PID_HiLimOut	2	R/W	T3_Fan_PID_HiLimOut
40516	UInt	T3_Fan_PID_CycleTime	1	R/W	T3_Fan_PID_CycleTime
40517	Real	T3_Fan_PID_Deadband	2	R/W	T3_Fan_PID_Deadband
40519	Int	Stage_1_Zone_HMI	1	R/W	1 = Zone 1, 2 = Zone 2, 3 = Zone 3
40520	Int	Stage_2_Zone_HMI	1	R/W	1 = Zone 1, 2 = Zone 2, 3 = Zone 3
40521	Int	Stage_3_Zone_HMI	1	R/W	1 = Zone 1, 2 = Zone 2, 3 = Zone 3
40522	Int	Stage_1_TD_HMI	1	R/W	Stage 1 time delay
40523	Int	Stage_2_TD_HMI	1	R/W	Stage 2 time delay
40525	Real	Zone1_TempOffSet	2	R/W	Zone1_TempOffSet
40527	Real	Zone1_LoTmpAlrmDiff	2	R/W	Zone1_LoTmpAlrmDiff
40529	Real	Zone1_LoTmpWarnDiff	2	R/W	Zone1_LoTmpWarnDiff

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40531	Real	Zone1_HiTmpWarnDiff	2	R/W	Zone1_HiTmpWarnDiff
40533	Real	Zone1_HiTmpAlrmDiff	2	R/W	Zone1_HiTmpAlrmDiff
40535	Real	Zone2_TempOffSet	2	R/W	Zone2_TempOffSet
40537	Real	Zone2_LoTmpAlrmDiff	2	R/W	Zone2_LoTmpAlrmDiff
40539	Real	Zone2_LoTmpWarnDiff	2	R/W	Zone2_LoTmpWarnDiff
40541	Real	Zone2_HiTmpWarnDiff	2	R/W	Zone2_HiTmpWarnDiff
40543	Real	Zone2_HiTmpAlrmDiff	2	R/W	Zone2_HiTmpAlrmDiff
40545	Real	Zone3_TempOffSet	2	R/W	Zone3_TempOffSet
40547	Real	Zone3_LoTmpAlrmDiff	2	R/W	Zone3_LoTmpAlrmDiff
40549	Real	Zone3_LoTmpWarnDiff	2	R/W	Zone3_LoTmpWarnDiff
40551	Real	Zone3_HiTmpWarnDiff	2	R/W	Zone3_HiTmpWarnDiff
40553	Real	Zone3_HiTmpAlrmDiff	2	R/W	Zone3_HiTmpAlrmDiff
40555	Real	Ambient_Temp_OffSet	2	R/W	Ambient_Temp_OffSet
40557	Real	FreeCool_Setpt	2	R/W	FreeCool_Setpoint
40559	Real	FreeCool_Diff	2	R/W	FreeCool_Diff
40561	Int	FreeCool_DT	1	R/W	FreeCool_Delay Time
40562	Real	TT2_Temp_Offet	2	R/W	TT2_Temp_Offet
40564	Int	FreeCool_Off_DT	1	R/W	FreeCool_Off_DelayTime
40565	Int	Pump_Flt_TD_HMI	1	R/W	Pump_Fault_TimeDelay_HMI
40566	Real	Tower_Pump_Cutout_Diff	2	R/W	Tower_Pump_Cutout_Diff
40568	Int	Stage_2_OFF_TD	1	R/W	Stage_2_OFF_TimeDelay
40569	UDInt	Pump_Start_Delay	2	R/W	Pump_Start_Delay
40586	Real	Tower_Pump_2_Cutout_Diff	2	R/W	Tower_Pump_2_Cutout_Diff
40588	Real	Tower_Pump_3_Cutout_Diff	2	R/W	Tower_Pump_3_Cutout_Diff
40590	USInt	U01_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40592	Real	U01_Channel.MinLim	2	R/W	Minimum limit in SI
40594	Real	U01_Channel.MaxLim	2	R/W	Maximum limit in SI
40596	UInt	U01_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40599	USInt	U02_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40601	Real	U02_Channel.MinLim	2	R/W	Minimum limit in SI
40603	Real	U02_Channel.MaxLim	2	R/W	Maximum limit in SI
40605	UInt	U02_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40608	USInt	U03_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40610	Real	U03_Channel.MinLim	2	R/W	Minimum limit in SI
40612	Real	U03_Channel.MaxLim	2	R/W	Maximum limit in SI
40614	UInt	U03_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40617	USInt	U04_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40619	Real	U04_Channel.MinLim	2	R/W	Minimum limit in SI

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40621	Real	U04_Channel.MaxLim	2	R/W	Maximum limit in SI
40623	UInt	U04_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40626	USInt	U05_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40628	Real	U05_Channel.MinLim	2	R/W	Minimum limit in SI
40630	Real	U05_Channel.MaxLim	2	R/W	Maximum limit in SI
40632	UInt	U05_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40635	USInt	U06_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40637	Real	U06_Channel.MinLim	2	R/W	Minimum limit in SI
40639	Real	U06_Channel.MaxLim	2	R/W	Maximum limit in SI
40641	UInt	U06_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40644	USInt	U07_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40646	Real	U07_Channel.MinLim	2	R/W	Minimum limit in SI
40648	Real	U07_Channel.MaxLim	2	R/W	Maximum limit in SI
40650	UInt	U07_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40653	USInt	U08_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40655	Real	U08_Channel.MinLim	2	R/W	Minimum limit in SI
40657	Real	U08_Channel.MaxLim	2	R/W	Maximum limit in SI
40659	UInt	U08_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40662	USInt	U09_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40664	Real	U09_Channel.MinLim	2	R/W	Minimum limit in SI
40666	Real	U09_Channel.MaxLim	2	R/W	Maximum limit in SI
40668	UInt	U09_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40671	USInt	U10_Channel.ChDir	1	R/W	Channel direction, 0 - AIN, 1 - AOut
40673	Real	U10_Channel.MinLim	2	R/W	Minimum limit in SI
40675	Real	U10_Channel.MaxLim	2	R/W	Maximum limit in SI
40677	UInt	U10_Channel.Unit_Of_Measure	1	R/W	0 - no UOM, 1 - °C, 2 - Bar, 3-MM, 4 – LPM, 5 - °F, 6 – PSI, 7 – IN, 8 – GPM
40795	Real	Zone1_Temp_Setpt	2	R/W	Zone 1 Temperature Setpoint
40798	Real	Zone2_Temp_Setpt	2	R/W	Zone 2 Temperature Setpoint
40801	Real	Zone3_Temp_Setpt	2	R/W	Zone 3 Temperature Setpoint
40828	DInt	TempUofMHMI	2	R/W	1 = °C, 2 = °F
40849	Real	Y1_Channel.Val	2	R/W	Analog Output Y1 Value
40851	Real	Y2_Channel.Val	2	R/W	Analog Output Y2 Value
40853	Real	Y3_Channel.Val	2	R/W	Analog Output Y3 Value
40855	Real	Y4_Channel.Val	2	R/W	Analog Output Y4 Value
40857	Real	Y5_Channel.Val	2	R/W	Analog Output Y5 Value
40859	Real	Y6_Channel.Val	2	R/W	Analog Output Y6 Value
40906	Real	Zone1_DP_Setpt_HMI	2	R/W	Zone1_DP_Setpoint
40908	Real	Zone2_DP_Setpt_HMI	2	R/W	Zone2_DP_Setpoint
40910	Real	Zone3_DP_Setpt_HMI	2	R/W	Zone3_DP_Setpoint

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
40912	Real	Zone1ActDP_HMI	2	R/W	Zone 1 Actual Differential Pressure Value
40914	Real	Zone2ActDP_HMI	2	R/W	Zone 2 Actual Differential Pressure Value
40916	Real	Zone3ActDP_HMI	2	R/W	Zone 3 Actual Differential Pressure Value
40918	Real	Zone1_DP_HighLim	2	R/W	Zone1_DP_HighLim
40920	Real	Zone1_DP_LowLim	2	R/W	Zone1_DP_LowLim
40922	Int	ChillerCntl	1	R/W	11 = Z1C1 Control, 12 = Z1C2 Control, 13 = Z1C3 Control, 14 = Z1C4 Control, 21 = Z2C1 Control, 22 = Z2C2 Control, 23 = Z2C3 Control, 24 = Z2C4 Control, 31 = Z3C1 Control, 32 = Z3C2 Control, 33 = Z3C3 Control, 34 = Z3C4 Control.
40923	Real	ChillerSetpoint	2	R/W	Chiller Setpoint
40925	Real	ChillerSetpoint_min	2	R/W	ChillerSetpoint_minimum
40927	Real	ChillerSetpoint_max	2	R/W	ChillerSetpoint_maximum
40929	Real	ChillerSetpointmA	2	R/W	Chiller Setpoint in mA
40936	Real	FluidCoolerCutout	2	R/W	FluidCooler Cutout temperature
40954	Real	AdiabaticSetpoint	2	R/W	Adiabatic Setpoint
40956	Real	AdiabaticSP_Min	2	R/W	Adiabatic Setpoint_Minimum
40958	Real	AdiabaticSP_Max	2	R/W	Adiabatic Setpoint_Maximum
40960	Real	AdiabaticSetpoint_Vdc	2	R/W	AdiabaticSetpoint in voltage
40962	Real	Zone2_DP_LowLim	2	R/W	Zone2_DP_LowLim
40964	Real	Zone2_DP_HighLim	2	R/W	Zone2_DP_HighLim
40966	Real	Zone3_DP_LowLim	2	R/W	Zone3_DP_LowLim
40968	Real	Zone3_DP_HighLim	2	R/W	Zone3_DP_HighLim
40970	UDint	FreeCoolETM	2	R/W	Free Cooling Run Hours
40972	UDint	FluidCoolerETM	2	R/W	Fluid Cooler Run Hours
40978	Int	FluidCoolerZCSel	1	R/W	Fluid Cooler Zone and Circuit Selector
40980	UInt	RotHrs	1	R/W	Rotation Hours input for pump staging
40981	Real	DsbyVFDSpeed	2	R/W	Dual Standby pump VFD manual speed
40985	Real	ChillerSetpointVDC_min	2	R/W	Chiller Setpoint minimum in voltage
40987	Real	ChillerSetpointVDC_max	2	R/W	Chiller Setpoint maximum in voltage
40989	Real	AdiabaticSetpointVDC_min	2	R/W	Adiabatic Setpoint minimum in voltage
40991	Real	AdiabaticSetpointVDC_max	2	R/W	Adiabatic Setpoint maximum in voltage
40993	Real	RecircVFDSpeed	2	R/W	Recirculation pump VFD manual speed
40996	Int	AutoH20_Flt_TD	1	R/W	Make up fault time delay
40997	Real	FC_Cooling_Source_Setpoint	2	R/W	Cooling Source Setpoint
40999	Real	AdiabaticNormalSetpoint	2	R/W	Adiabatic Setpoint
41017	Real	Z1C1PID_HighAlarmDiff	2	R/W	Zone 1 Circuit 1 High Alarm Differential from Setpoint
41019	Real	Z1C1PID_HighWarningDiff	2	R/W	Zone 1 Circuit 1 High Warning Differential from Setpoint
41021	Real	Z1C1PID_LowWarningDiff	2	R/W	Zone 1 Circuit 1 Low Warning Differential from Setpoint
41023	Real	Z1C1PID_LowAlarmDiff	2	R/W	Zone 1 Circuit 1 Low Alarm Differential from Setpoint
41025	Real	Z1C2PID_HighAlarmDiff	2	R/W	Zone 1 Circuit 2 High Alarm Differential from Setpoint
41027	Real	Z1C2PID_HighWarningDiff	2	R/W	Zone 1 Circuit 2 High Warning Differential from Setpoint
41029	Real	Z1C2PID_LowWarningDiff	2	R/W	Zone 1 Circuit 2 Low Warning Differential from Setpoint
41031	Real	Z1C2PID_LowAlarmDiff	2	R/W	Zone 1 Circuit 2 Low Alarm Differential from Setpoint

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
41033	Real	Z1C3PID_HighAlarmDiff	2	R/W	Zone 1 Circuit 3 High Alarm Differential from Setpoint
41035	Real	Z1C3PID_HighWarningDiff	2	R/W	Zone 1 Circuit 3 High Warning Differential from Setpoint
41037	Real	Z1C3PID_LowWarningDiff	2	R/W	Zone 1 Circuit 3 Low Warning Differential from Setpoint
41039	Real	Z1C3PID_LowAlarmDiff	2	R/W	Zone 1 Circuit 3 Low Alarm Differential from Setpoint
41041	Real	Z1C4PID_HighAlarmDiff	2	R/W	Zone 1 Circuit 4 High Alarm Differential from Setpoint
41043	Real	Z1C4PID_HighWarningDiff	2	R/W	Zone 1 Circuit 4 High Warning Differential from Setpoint
41045	Real	Z1C4PID_LowWarningDiff	2	R/W	Zone 1 Circuit 4 Low Warning Differential from Setpoint
41047	Real	Z1C4PID_LowAlarmDiff	2	R/W	Zone 1 Circuit 4 Low Alarm Differential from Setpoint
41049	Real	Z2C1PID_HighAlarmDiff	2	R/W	Zone 2 Circuit 1 High Alarm Differential from Setpoint
41051	Real	Z2C1PID_HighWarningDiff	2	R/W	Zone 2 Circuit 1 High Warning Differential from Setpoint
41053	Real	Z2C1PID_LowWarningDiff	2	R/W	Zone 2 Circuit 1 Low Warning Differential from Setpoint
41055	Real	Z2C1PID_LowAlarmDiff	2	R/W	Zone 2 Circuit 1 Low Alarm Differential from Setpoint
41057	Real	Z2C2PID_HighAlarmDiff	2	R/W	Zone 2 Circuit 2 High Alarm Differential from Setpoint
41059	Real	Z2C2PID_HighWarningDiff	2	R/W	Zone 2 Circuit 2 High Warning Differential from Setpoint
41061	Real	Z2C2PID_LowWarningDiff	2	R/W	Zone 2 Circuit 2 Low Warning Differential from Setpoint
41063	Real	Z2C2PID_LowAlarmDiff	2	R/W	Zone 2 Circuit 2 Low Alarm Differential from Setpoint
41065	Real	Z2C3PID_HighAlarmDiff	2	R/W	Zone 2 Circuit 3 High Alarm Differential from Setpoint
41067	Real	Z2C3PID_HighWarningDiff	2	R/W	Zone 2 Circuit 3 High Warning Differential from Setpoint
41069	Real	Z2C3PID_LowWarningDiff	2	R/W	Zone 2 Circuit 3 Low Warning Differential from Setpoint
41071	Real	Z2C3PID_LowAlarmDiff	2	R/W	Zone 2 Circuit 3 Low Alarm Differential from Setpoint
41073	Real	Z2C4PID_HighAlarmDiff	2	R/W	Zone 2 Circuit 4 High Alarm Differential from Setpoint
41075	Real	Z2C4PID_HighWarningDiff	2	R/W	Zone 2 Circuit 4 High Warning Differential from Setpoint
41077	Real	Z2C4PID_LowWarningDiff	2	R/W	Zone 2 Circuit 4 Low Warning Differential from Setpoint
41079	Real	Z2C4PID_LowAlarmDiff	2	R/W	Zone 2 Circuit 4 Low Alarm Differential from Setpoint
41081	Real	Z3C1PID_HighAlarmDiff	2	R/W	Zone 3 Circuit 1 High Alarm Differential from Setpoint
41083	Real	Z3C1PID_HighWarningDiff	2	R/W	Zone 3 Circuit 1 High Warning Differential from Setpoint
41085	Real	Z3C1PID_LowWarningDiff	2	R/W	Zone 3 Circuit 1 Low Warning Differential from Setpoint
41087	Real	Z3C1PID_LowAlarmDiff	2	R/W	Zone 3 Circuit 1 Low Alarm Differential from Setpoint
41089	Real	Z3C2PID_HighAlarmDiff	2	R/W	Zone 3 Circuit 2 High Alarm Differential from Setpoint
41091	Real	Z3C2PID_HighWarningDiff	2	R/W	Zone 3 Circuit 2 High Warning Differential from Setpoint
41093	Real	Z3C2PID_LowWarningDiff	2	R/W	Zone 3 Circuit 2 Low Warning Differential from Setpoint
41095	Real	Z3C2PID_LowAlarmDiff	2	R/W	Zone 3 Circuit 2 Low Alarm Differential from Setpoint
41097	Real	Z3C3PID_HighAlarmDiff	2	R/W	Zone 3 Circuit 3 High Alarm Differential from Setpoint
41099	Real	Z3C3PID_HighWarningDiff	2	R/W	Zone 3 Circuit 3 High Warning Differential from Setpoint
41101	Real	Z3C3PID_LowWarningDiff	2	R/W	Zone 3 Circuit 3 Low Warning Differential from Setpoint
41103	Real	Z3C3PID_LowAlarmDiff	2	R/W	Zone 3 Circuit 3 Low Alarm Differential from Setpoint
41105	Real	Z3C4PID_HighAlarmDiff	2	R/W	Zone 3 Circuit 4 High Alarm Differential from Setpoint
41107	Real	Z3C4PID_HighWarningDiff	2	R/W	Zone 3 Circuit 4 High Warning Differential from Setpoint
41109	Real	Z3C4PID_LowWarningDiff	2	R/W	Zone 3 Circuit 4 Low Warning Differential from Setpoint
41111	Real	Z3C4PID_LowAlarmDiff	2	R/W	Zone 3 Circuit 4 Low Alarm Differential from Setpoint
41113	Real	Z1ActualFlow_HMI	2	R/W	Zone 1 Actual Flow
41115	Real	Z2ActualFlow_HMI	2	R/W	Zone 2 Actual Flow

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
41117	Real	Z3ActualFlow_HMI	2	R/W	Zone 3 Actual Flow
41119	Int	Z1FlowSensor_Var_Sel	1	R/W	Zone 1 Flow Sensor Input Selector
41120	Int	Z2FlowSensor_Var_Sel	1	R/W	Zone 2 Flow Sensor Input Selector
41121	Int	Z3FlowSensor_Var_Sel	1	R/W	Zone 3 Flow Sensor Input Selector
41122	Int	FlowSensor1ZoneCircuit	1	R/W	Flow Sensor 1 Zone and Circuit Selector
41123	Int	FlowSensor2ZoneCircuit	1	R/W	Flow Sensor 2 Zone and Circuit Selector
41124	Int	FlowSensor3ZoneCircuit	1	R/W	Flow Sensor 3 Zone and Circuit Selector
41125	Real	Z1_Flow_PipeSizeIn	2	R/W	Pipe Size for Zone 1 Flow Sensor in Inches
41127	Real	Z2_Flow_PipeSizeIn	2	R/W	Pipe Size for Zone 2 Flow Sensor in Inches
41129	Real	Z3_Flow_PipeSizeIn	2	R/W	Pipe Size for Zone 3 Flow Sensor in Inches
41133	Int	FC_StaticSP_TD	1	R/W	Free Cooling Static Setpoint time delay in minute
41134	Int	FreeCoolType	1	R/W	0 = NA, 1 = SIS, 2 = SCS, 3 = DIS, 4 = DCS
41135	Real	StaticIsolatedSourceSP	2	R/W	Static Isolated Source Setpoint
41137	Int	ModValvePIDMode	1	R/W	1=Fixed Press, 2=Diff Pressure, 3 = Flow Control, 4 = Temperature control
41138	Real	ModValveManSpd	2	R/W	Modulating Valve PID Manual Speed
41140	Real	ModValveDeadband	2	R/W	PID Deadband
41142	Real	ModValveKP	2	R/W	Proportional gain
41144	UInt	ModValveTi	1	R/W	Integral gain
41145	UInt	ModValveTd	1	R/W	Derivative gain
41146	UInt	ModValveCycleTime	1	R/W	PID cycle time in seconds
41147	Real	ModValvePIDHiLimOut	2	R/W	PID Output High Limit
41149	Real	ModValvePIDLowLimOut	2	R/W	PID Output Low Limit
41151	Real	ModValvePIDOutput	2	R/W	PID Output
41153	Int	ValveTD	1	R/W	Valve Time Delay in Seconds
41154	Real	StaticCommonSourceSP	2	R/W	Static Common Source Setpoint Output
41156	Real	DynamicIsolatedSourceSP	2	R/W	Dynamic Isolated Source Setpoint Output
41158	Real	DynamicCommonSourceSP	2	R/W	Dynamic Common Source Setpoint Output
41160	Real	FC_ambient_diff	2	R/W	Free Cooling Ambient Differential
41162	Real	CoolingSourceStandardSP	2	R/W	Cooling Source Standard Setpoint Output
41164	Int	FromProcessTempSel	1	R/W	From Process Temperature sensor input selector
41165	Real	ChillerSetpoint_2	2	R/W	Chiller Setpoint 2 Analog Output
41167	Real	ChillerSetpoint_min_2	2	R/W	Chiller Setpoint 2 Output Minimum
41169	Real	ChillerSetpoint_max_2	2	R/W	Chiller Setpoint 2 Output Maximum
41171	Real	ChillerSetpointVDC_min_2	2	R/W	Chiller Setpoint 2 Analog Output Minimum
41173	Real	ChillerSetpointVDC_max_2	2	R/W	Chiller Setpoint 2 Analog Output Maximum
41175	Real	ChillerSetpointmA_2	2	R/W	Chiller Setpoint 2 Analog Output
41177	Real	ChillerSetpoint_3	2	R/W	Chiller Setpoint 3 Analog Output
41179	Real	ChillerSetpoint_min_3	2	R/W	Chiller Setpoint 3 Output Minimum
41181	Real	ChillerSetpoint_max_3	2	R/W	Chiller Setpoint 3 Output Maximum
41183	Real	ChillerSetpointVDC_min_3	2	R/W	Chiller Setpoint 3 Analog Output Minimum
41185	Real	ChillerSetpointVDC_max_3	2	R/W	Chiller Setpoint 3 Analog Output Maximum

Modbus Registers (continued)

Modbus Register	Data Format	Parameter	Data	Access Level	Comment
41187	Real	ChillerSetpointmA_3	2	R/W	Chiller Setpoint 3 Analog Output
41189	Real	ChillerSetpoint_4	2	R/W	Chiller Setpoint 4 Analog Output
41191	Real	ChillerSetpoint_min_4	2	R/W	Chiller Setpoint 4 Output Minimum
41193	Real	ChillerSetpoint_max_4	2	R/W	Chiller Setpoint 4 Output Maximum
41195	Real	ChillerSetpointVDC_min_4	2	R/W	Chiller Setpoint 4 Analog Output Minimum
41197	Real	ChillerSetpointVDC_max_4	2	R/W	Chiller Setpoint 4 Analog Output Maximum
41199	Real	ChillerSetpointmA_4	2	R/W	Chiller Setpoint 4 Analog Output
41209	Int	ChillerCntl_2	1	R/W	11 = Z1C1 Control, 12 = Z1C2 Control, 13 = Z1C3 Control, 14 = Z1C4 Control, 21 = Z2C1 Control, 22 = Z2C2 Control, 23 = Z2C3 Control, 24 = Z2C4 Control, 31 = Z3C1 Control, 32 = Z3C2 Control, 33 = Z3C3 Control, 34 = Z3C4 Control.
41210	Int	ChillerCntl_3	1	R/W	11 = Z1C1 Control, 12 = Z1C2 Control, 13 = Z1C3 Control, 14 = Z1C4 Control, 21 = Z2C1 Control, 22 = Z2C2 Control, 23 = Z2C3 Control, 24 = Z2C4 Control, 31 = Z3C1 Control, 32 = Z3C2 Control, 33 = Z3C3 Control, 34 = Z3C4 Control.
41211	Int	ChillerCntl_4	1	R/W	11 = Z1C1 Control, 12 = Z1C2 Control, 13 = Z1C3 Control, 14 = Z1C4 Control, 21 = Z2C1 Control, 22 = Z2C2 Control, 23 = Z2C3 Control, 24 = Z2C4 Control, 31 = Z3C1 Control, 32 = Z3C2 Control, 33 = Z3C3 Control, 34 = Z3C4 Control.

Start-Up

Every unit is factory set to operate in accordance with the standard operating specifications for that particular unit. Due to variables involved with different applications and different installations, minor adjustments may be required during the initial start-up to ensure proper operation. Use a qualified technician to perform the start-up procedure in sequence. The following serves as a checklist for the initial start-up and for subsequent start-ups if the unit is out of service for a prolonged time.

WARNING: This equipment contains hazardous voltages that can cause severe injury or death.

WARNING: This equipment may contain fan blades or other sharp edges. Make sure all fan guards and other protective shields are securely in place.

WARNING: The exposed surfaces of motors, piping, and other fluid circuit components can be very hot and can cause burns if touched with unprotected hands.

CAUTION: Disconnect and lock out incoming power before installing, servicing, or maintaining the equipment. Connecting power to the main terminal block energizes the entire electric circuitry of the unit. Electric power at the main disconnect should be shut off before opening access panels for repair or maintenance.

CAUTION: Wear eye protection when installing, maintaining, or repairing the equipment to protect against any sparks, debris, or fluid leaks.

CAUTION: Wear protective gloves when installing, maintaining, or repairing the equipment to protect against any sparks, debris, or fluid leaks.

CAUTION: Wire the unit ground in compliance with local and national codes.

Step 1 - Connect Main Power

Connect main power properly ensuring it matches the voltage shown on the nameplate of the unit. Check the electrical phase sequence prior to start-up. Operation of the equipment with incorrect electrical phase sequencing will cause damage to components. Check the phasing prior to applying power. The proper sequence is "ABC." If the phasing is incorrect, open the main power disconnect and switch two line leads on the main power terminal blocks (or the unit mounted disconnect). All electrical components are in-phase at the factory. Do not interchange any load leads that are from the unit contactors or the motor terminals. After making proper power connection and grounding, turn the main power on.

Step 2 - Fill Coolant Circuit

Check to make sure all piping connections are secure. Fill the coolant reservoir with the proper water or water/glycol solution following the guidelines shown below. When using a glycol solution only use glycol with a corrosion inhibitor.

System Fill Water Chemistry Requirements

The properties of water make it ideal for heat transfer applications. It is safe, non-flammable, non-poisonous, easy to handle, widely available, and inexpensive in most industrialized areas.

When using water as a heat transfer fluid it is important to keep it within certain chemistry limits to avoid unwanted side effects. Water is a "universal solvent" because it can dissolve many solid substances and absorb gases. As a result, water can cause the corrosion of metals used in a cooling system. Often water is in an open system (exposed to air) and when the water evaporates, the dissolved minerals remain in the process fluid. When the concentration exceeds the solubility of some minerals, scale forms. The life giving properties of water can also encourage biological growth that can foul heat transfer surfaces.

To avoid the unwanted side effects associated with water cooling, proper chemical treatment and preventive maintenance is required for continuous plant productivity.

Unwanted Side Effects of Improper Water Quality

- Corrosion
- Scale
- Fouling
- Biological Contamination

Cooling Water Chemistry Properties

- Electrical Conductivity
- pH
- Alkalinity
- Total Hardness
- Dissolved Gases

The complex nature of water chemistry requires a specialist to evaluate and implement appropriate sensing, measurement and treatment needed for satisfactory performance and life. The recommendations of the specialist may include filtration, monitoring, treatment and control devices. With the ever-changing regulations on water usage and treatment chemicals, the information is usually up-to-date when a specialist in the industry is involved. Table 10 shows the list of water characteristics and quality limitations.

Table 10 – Fill Water Chemistry Requirements

Water Characteristic	Quality Limitation
Alkalinity (HCO_3^-)	70-300 ppm
Aluminum (Al)	Less than 0.2 ppm
Ammonium (NH_3)	Less than 2 ppm
Chlorides (Cl^-)	Less than 300 ppm
Electrical Conductivity	10-500µS/cm
Free (aggressive) Carbon Dioxide (CO_2)†	Less than 5 ppm
Free Chlorine(Cl_2)	Less than 1 PPM
HCO_3^-/SO_4^{2-}	Greater than 1.0
Hydrogen Sulfide (H_2S)	Less than 0.05 ppm
Iron (Fe)	Less than 0.2 ppm
Manganese (Mn)	Less than 0.1 ppm
Nitrate (NO_3)	Less than 100 ppm
pH	7.5-9.0
Sulfate (SO_4^{2-})	Less than 70 ppm
Total Hardness (dH)k	4.0-8.5

† Dissolved carbon dioxide calculation is from the pH and total alkalinity values shown below or measured on the site using a test kit. Dissolved Carbon Dioxide, PPM = TA x $2^{[(6.3-pH)/0.3]}$ where TA = Total Alkalinity, PPM as $CaCO_3$

Table 11 - Recommended Glycol Solutions

Chilled Water Temperature	Percent Glycol By Volume
50°F (10°C)	Not required
45°F (7.2°C)	5 %
40°F (4.4°C)	10 %
35°F (1.7°C)	15 %
30°F (-1.1°C)	20 %
25°F (-3.9°C)	25 %
20°F (-6.7°C)	30 %

CAUTION: When your application requires the use of glycol, use industrial grade glycol specifically designed for heat transfer systems and equipment. Never use glycol designed for automotive applications. Automotive glycols typically have additives engineered to benefit the materials and conditions found in an automotive engine; however, these additives can gel and foul heat exchange surfaces and result in loss of performance or even failure of the unit. In addition, these additives can react with the materials of the pump shaft seals resulting in leaks or premature pump failures.

WARNING: Ethylene Glycol is flammable at higher temperatures in a vapor state. Carefully handle this material and keep away from open flames or other possible ignition sources.

CAUTION: If the reservoir includes a make-up valve and the make-up water supply pressure is above 50 PSI, the float may have a hard time shutting off the water. If this is the case, a pressure-reducing valve will be required.

Step 3 – Adjust Valves

Adjust the suction valve of each pump to be fully open (parallel to the suction leg pipe). Adjust the discharge of each pump to be fully closed (perpendicular to discharge pipe). Also, adjust the valve to each pump pressure gauge to be fully open (parallel to the pilot tube).

Step 4 – Turn On Control Power

Turn on the control power by touching the operator interface. The panel displays should illuminate. For systems provided without a control panel, make sure the control system is powered and ready for operation.

Step 5 – Check Pump Rotation

Check to make sure all suction valves are still open (parallel to suction leg) and then open the discharge

valve to about the 10% open position (100% open position is parallel to discharge pipe).

Momentarily start each pump individually. Cooling tower reservoir systems typically control the Cooling Tower Pump thermostatically. To start the Cooling Tower Pump, make sure the control system is set so the pump is activated and lower the set point of the cooling tower reservoir system setpoint until the Cooling Tower Pump energizes. Note the pressure reading of each pump discharge pressure gauge. If the pressure reading is lower than design, it may be an indication that the pump is running backwards. If the pump is running backwards, you can correct rotation by performing the following:

1. Stop the pump
2. Shut off disconnect
3. Switch any two leads of the three-phase power to the pump motor
4. Reconnect wiring
5. Switch on disconnect
6. Start the pump again and check for proper rotation. If pump rotation is correct and the pressure is still too low, contact the Customer Service Department for assistance before proceeding further.

Once the proper pump rotation and operation is verified, proceed to the next step. If you encounter problems getting the pump(s) to produce the pressure, stop the start-up procedure and contact our Customer Service Department for assistance.

Step 6 – Start Pumps

Check to make sure all suction valves are still open (parallel to suction leg) and open the discharge valve to about the 10% open position (100% open position is parallel to discharge pipe).

Run each pump circuit for short periods to allow the system to slowly fill. Slowly filling the system will remove air in the system piping. Failure to do so can result in excessive water hammer and broken piping connections.

Note: Monitor the water level in the reservoir during system pipe filling to ensure the water level always remains above the suction legs of the pumps. Operating a pump without water will cause cavitation and pump seal failure.

Once water starts to return to the reservoir from the system return lines, turn the pump on, and leave it on.

Open the discharge valve slowly until the pump discharge pressure gauge is at the desired pressure. Refer to the pump curves to help in determining the proper pressure associated with the desired flow.

Allow the system to operate for about 15 minutes. During this period, carefully monitor the water level in the reservoir to ensure the pump suction legs remain under water. If a low-level condition occurs, stop the pumps and add fluid to the reservoir.

After the system has been operating for 15 minutes, check for leaks, vibration, or excessive noise in the pumps or system piping. If there are signs of these, stop the system and make repairs before proceeding.

Before turning off the pumps, measure the amperage on each power lead for each pump (and cooling tower fan motor is applicable). The measured amperage on any lead must not exceed the amperage listed on the motor nameplate(s).

The unit is now ready to be placed into service.

Operation

Each reservoir system is custom designed for a particular application and therefore the control and operation of the reservoir system cannot be universally described in this manual. The reservoir system is typically provided with a suggested piping schematic, wiring diagram and mechanical layout diagram. These drawings are usually shipped inside the control panel of the unit. If the system was ordered without a control panel these drawings would have been shipped with the unit. Please refer to these drawings for specific information about the system design and operation of your particular system.

Preventive Maintenance

Once the pump reservoir system is in service, the following maintenance procedures should be adhered to as closely as possible. The importance of a properly established maintenance program cannot be over emphasized. Taking the time to follow these simple procedures will result in substantially reduced down time, reduced repair cost, and an extended useful lifetime for the equipment. Any monetary costs associated with implementing these procedures will usually more than pay for themselves.

To help make the preventive maintenance as simple as possible, a checklist should be prepared which lists the recommended service operations and the time at which they are to be performed. With this information, maintenance personnel may be able to correct a potential problem before it causes significant down time. For best results, these readings should be taken with a full heat load from process, preferably with similar operating conditions each time.

The following is a list of suggested periodic maintenance.

Once a Week

1. Check the interior of the reservoir for dirt and debris.

2. Check all pumps in the system for signs of leaks in the pump seal area. Replace pump seal if necessary.

3. Check the pump discharge pressure on the gauges of each pump in the system. Investigate further if the pump discharge pressure starts to stray away from the normal operating pressure. This could be a sign that the pump impeller is worn or damaged. Replace if necessary.

4. Check the coolant level in the reservoir. Replenish if necessary making sure to take proper precautions to maintain the appropriate glycol concentration for chilled water system reservoirs.

Repeat items 1 through 4 listed above and continue with the following.

Once a Month

5. With the main disconnect shut off and locked out, check the condition of all electrical connections at the contactors, starters and controls. Check for loose or frayed wires and make repairs as necessary.

6. Check the incoming voltage to make sure it is within 10% of the design voltage for the system.

7. Check the amp draws to each leg of all motors in the system and confirm that they are drawing the proper current.

Repeat items 1 through 7 listed above and continue with the following.

Once Every 6 Months

8. Close the isolation valve for the fluid level pressure sensor, remove pressure sensor and clear sensor and/or sensor port to remove any dirt or debris to ensure proper fluid level sensing.

Troubleshooting

Problem	Cause	Remedy
Pump does not produce enough discharge pressure	Pressure gauge defective	Replace pressure gauge
	Pump operating at the end of the operating curve	Throttle back the discharge valve until the gauge reads design pressure
	Backwards pump rotation	Check rotation and change any two wires to reverse rotation
Pump runs rough and makes pinging sound indicating cavitation	Water level too low in the reservoir	Fill to proper level
	Debris in suction line	Clean suction line of any debris
	Suction valve partially closed	Make sure suction valve is fully open
Motor runs excessively hot	Overload	Reduce number of starts per hour or increase motor size
	Blocked ventilation	Clean external ventilation system
	TEFC Motor	Check fan
	ODP Motor	Blow out internal ventilation passages
	Ambient temperature over 105°F	Reduce ambient temperature or provide source of cooler air
	Unbalanced current draw	Balance supply voltage
	Single-phasing	Eliminate single-phasing
Pump will not start (hums and heats up)	Single-phasing	Eliminate single-phasing
	Rotor bearings locked	Check motor and replace if needed
Pump runs noisy under load (excessive electrical noise or chatter under load)	Single-phasing	Be sure proper sized overload relays are in each of the three phases
Excessive pump vibration	Motor mount loose	Check motor mount is tight
	Motor bearing failure	Replace motor
	Coupling loose	Check coupling to ensure it is tight and properly aligned (if base-mount pump coupling)
Intermittent or faulty fluid level readings.	Debris in the pressure transducer well.	Close isolation valve, remove level sensor, and clean transducer and transduce well.

Drawings

We have prepared a custom set of drawings for your unit and placed them inside the control panel prior to shipment. Please refer to these drawings when troubleshooting, servicing, and installing the unit. If you cannot find these drawings or wish to have additional copies sent, please contact our Customer Service Department and reference the serial number of your unit.

We’re Here to Help

Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

How to Contact Customer Service

To contact Customer Service personnel, call:

NOTE: Normal operating hours are 8:00 am - 5:00 pm (EST). After hours emergency service is available at the same phone number.

From outside the United States, call: 814-437-6861
You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department. Standard rates include an on-site hourly rate, with a one-day minimum plus expenses.

Before You Call...
If you do have a problem, please complete the following checklist before calling Conair:

- ❒ Make sure you have all model, control type from the serial tag, and parts list numbers for your particular equipment. Service personnel will need this information to assist you.
- ❒ Make sure power is supplied to the equipment.
- ❒ Make sure that all connectors and wires within and between control systems and related components have been installed correctly.
- ❒ Check the troubleshooting guide of this manual for a solution.
- ❒ Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.
- ❒ Check that the equipment has been operated as described in this manual.
- ❒ Check accompanying schematic drawings for information on special considerations.

Equipment Guarantee

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

Performance Warranty

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

Warranty Limitations

Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.