Revision -

Operations & Maintenance Instructions - Addendum Communications Guide

FOR SAGE WATER & ENERGY CONSERVATION CONTROL SYSTEM

For EVAPCO Authorized Parts and Service, Contact Your Local EVAPCO Representative

EVAPCO, Inc. – World Headquarters & Research/Development Center

EVAPCO, Inc. • P.O. Box 1300 • Westminster, MD 21158 USA
PHONE: (410) 756-2600 • FAX: (410) 756-6450 • E-MAIL: Marketing@evapco.com

EVAPCO North America

EVAPCO, Inc.
World Headquarters
PO Box 1300
Westminster, MD 21158, USA
Phone: (410) 756-2600
Fax: (410) 756-6450
Email: marketing@evapco.com

EVAPCO East
5151 Allendale Lane
Taneytown, MD 21787, USA
Phone: (410) 756-2600
Fax: (410) 756-6450
Email: marketing@evapco.com

EVAPCO Midwest
1723 York Road
Greenup, IL 62428, USA
Phone: (217) 923-3431
Fax: (217) 923-3300
Email: evapcomw@evapcomw.com

EVAPCO West
1900 West Almond Avenue
Madera, CA 93637, USA
Phone: (559) 673-2207
Fax: (559) 673-2378
Email: contact@evapcowest.com

EVAPCO Iowa
925 Quality Drive
Lake View, IA 51450, USA
Phone: (712) 657-3223
Fax: (712) 657-3226

EVAPCO Iowa
Sales & Engineering
215 1st Street, NE
Medford, MN 55049, USA
Phone: (507) 446-8005
Fax: (507) 446-8239
Email: evapcomn@evapcomn.com

EVAPCO Newton
701 East Jourdan Street
Newton, IL 62448, USA
Phone: (618) 783-3433
Fax: (618) 783-3499
Email: evapcomw@evapcomw.com

Refrigeration Valves & Systems Corporation (RVS)
A wholly owned subsidiary of EVAPCO, Inc.
1520 Crosswind Drive
Bryan, TX 77808, USA
Phone: (979) 778-0095
Fax: (979) 778-0030
Email: rvs@rvscorp.com

EvapTech, Inc.
A wholly owned subsidiary of EVAPCO, Inc.
8331 Nieman Road
Lenexa, KS 66214, USA
Phone: (913) 322-5165
Fax: (913) 322-5166
Email: marketing@evaptech.com

Tower Components, Inc.
A wholly owned subsidiary of EVAPCO, Inc.
5960 US Highway 64 East
Ramseur, NC 27316, USA
Phone: (336) 824 2102
Fax: (336) 824-2190
Email: mail@towercomponentsinc.com

EVAPCO-BLCT Dry Cooling, Inc.
1011 US Highway 22 West
Bridgewater, NJ 08807, USA
Phone: (908) 379-2665
E-mail: info@evapco-blct.com

EVAPCO South America

EVAPCO SEMCO
Equipamentos de Refrigeracao Ltda.
Rua Alexandre Dumas, 1601 – 2 andar
04717-004 Sao Paulo – SP – Brazil
Phone: (55) 11-5184-0067

EVAPCO Europe

EVAPCO Europe BVBA
European Headquarters
Industrieterrein Oost 4010
3700 Tongeren, Belgium
Phone: (32) 12-395029
Fax: (32) 12-238527
Email: evapco.europe@evapco.be

EVAPCO Europe, S.r.l.
Via Ciro Menotti 10
I-20017 Passirana di Rho
Milan, Italy
Phone: (39) 02-939-9041
Fax: (39) 02-935-00840
Email: evapcoeurope@evapco.it

EVAPCO Europe, S.r.l.
Via Dosso 2
23020 Piateda Sondrio, Italy

EVAPCO Europe, GmbH
Meerbuscher Straβe 64-78
Haus 5
40670 Meerbusch, Germany
Phone: (49) 2159-69560
Fax: (49) 2159-695611
Email: info@evapco.de

Flex coil a/s
A subsidiary of EVAPCO, Inc.
Knøsgårdvej 115
DK-9440 Aabybro Denmark
Phone: (45) 9824 4999
Fax: (45) 9824 4990
Email: info@flexcoil.dk

EVAPCO S.A. (Pty.) Ltd.
A licensed manufacturer of EVAPCO, Inc.
18 Quality Road
Isando 1600
Republic of South Africa
Phone: (27) 11-392-6630
Fax: (27) 11-392-6615
Email: evapco@icon.co.za

EVAPCO Egypt Engineering Industries Co.
A licensed manufacturer of EVAPCO, Inc.
5 Al Nasr Road St.
Nasr City, Cairo, Egypt
Phone A: (20) 2-290-7483
Phone B: (20) 2-291-3610
Fax A: (20) 2-404-4667
Fax B: (20) 2-290-0892
Email: Primacool@link.net / Shady@primacool.net

EVAPCO Asia/Pacific

EVAPCO Asia/Pacific Headquarters
1159 Luoning Road
Baoshan Industrial Zone
Shanghai, 200949 P.R. China
Phone: (86) 21-6687-7786
Fax: (86) 21-6687-7008
Email: marketing@evapcochina.com

Evapco (Shanghai) Refrigeration Equipment Co., Ltd.
1159 Luoning Road
Baoshan Industrial Zone
Shanghai, 200949 P.R. China
Phone: (86) 21-6687-7786
Fax: (86) 21-6687-7008
Email: marketing@evapcochina.com

Beijing EVAPCO Refrigeration Equipment Co., Ltd.
Yan Qi Industrial District, Huai Rou
Beijing, 101407 P.R. China
Phone: (86) 10 6166-7238
Fax: (86) 10 6166-7395
Email: evapcobj@evapcochina.com

Evapco Australia Pty Ltd
34-42 Melbourne Road
Riverstone, NSW Australia 2765
Phone: (61) 2 9627-3322
Fax: (61) 2 9627-1715
Email: sales@evapco.com.au

Evapco Composites Sdn. Bhd
No. 70 (Lot 1289) Jalan Industri 2/3
Rawang Integrated Industrial Park
Rawang. Selangor, 48000 Malaysia
Phone: (60) 3 6092-2209
Fax: (60) 3 6092-2210

EvapTech Asia Pacific Sdn. Bhd
A wholly owned subsidiary of EvapTech, Inc.
IOI Business Park, 2/F Unit 21
Persiaran Puchong Jaya Selatan
Bandar Puchong Jaya,
47170 Puchong, Selangor, Malaysia
Phone: (60-3) 8070-7255
Fax: (60-3) 8070-5731
Email: marketing-ap@evaptech.com

Table of Contents

Connecting to the Controller

CONTROLLER LAYOUT:

The Sage PLC controller is equipped with the means for communicating with Building Management Systems (BMS). The default forms of communication provided with this controller are Modbus RTU, Modbus TCP/IP, BACnet MS/TP, & BACnet IP. The serial connection for Modbus RTU and BACnet MS/TP is shown in Detail A. The serial network will only be able to communicate with either Modbus RTU or BACnet MS/TP. Both communication protocols cannot function at the same time. The selection for which form of serial communication is enabled shall be made on the control panel HMI screen. Connections for Modbus TCP/IP or BACnet IP will be made to the ethernet port shown in Detail B. The Modbus TCP/IP communication protocol is always active on the ethernet network. BACnet IP and BACnet MS/TP are not available simultaneously. For BACnet IP to be active on the ethernet network, Modbus RTU needs to be active on the serial network.

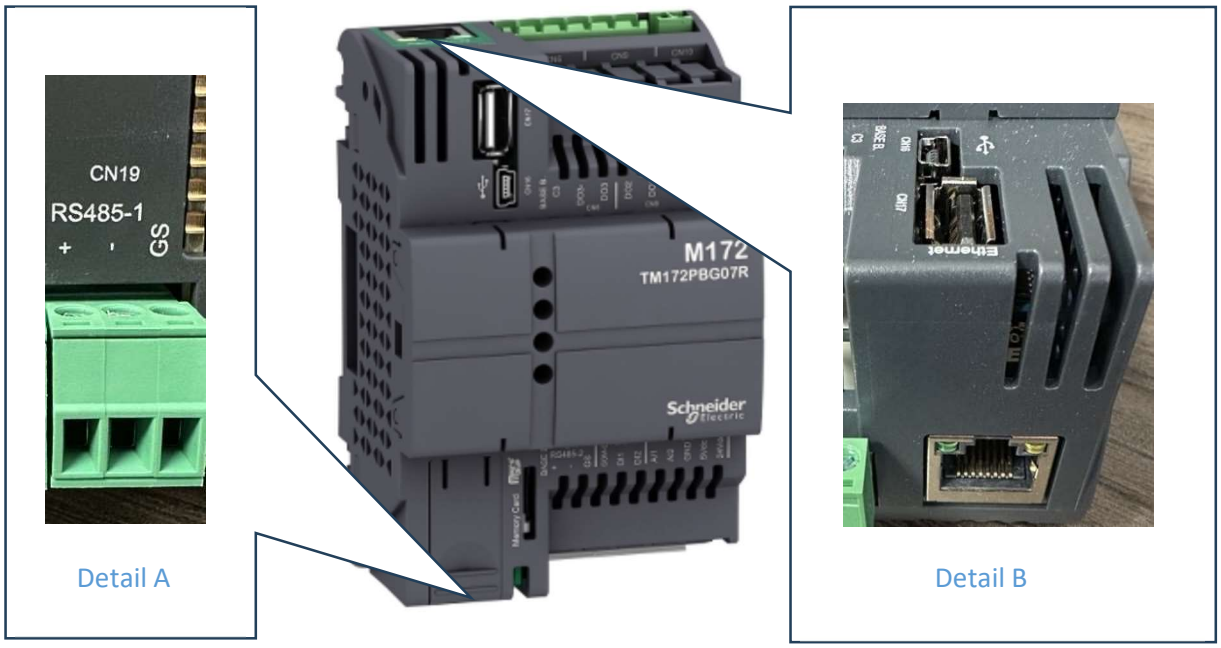

Figure 1 - Controller Layout with Communication Details

MODBUS RTU OR BACNET MS/TP:

Serial connections for either Modbus RTU or BACnet MS/TP are made directly to terminals on the PLC. It is recommended to use RS-485 approved twisted pair, shielded cable. The cable shielding should be terminated at only one end of the cable run. Only one protocol can be active at a time on the serial network. This selection is made within the **Operator Menu** of the HMI.

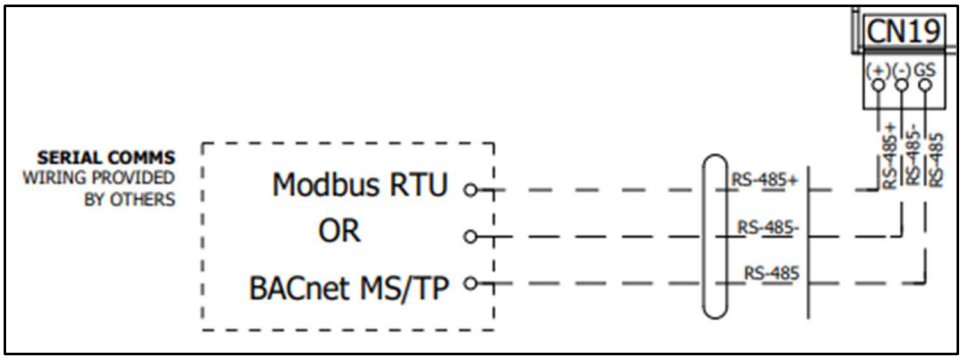

Figure 2 - Modbus RTU or BACnet MS/TP Wiring Diagram

MODBUS TCP/IP & BACNET MS/TP:

Connections for either Modbus TCP/IP or BACnet IP will be made directly to the RJ45 port of the PLC (see Figure 1 Detail B).

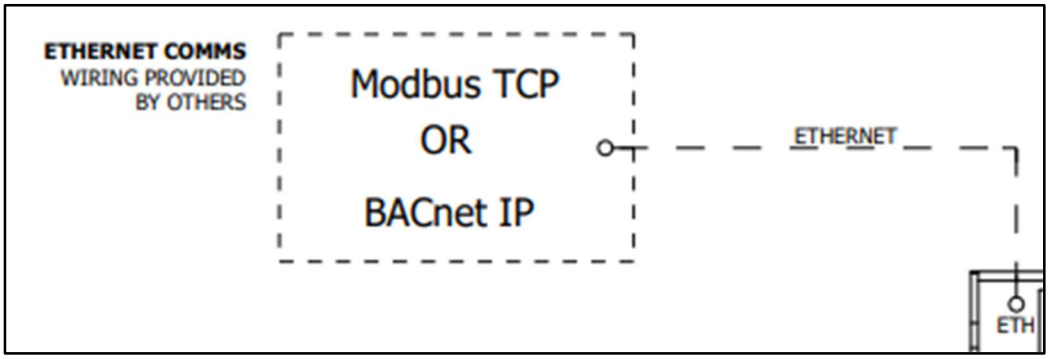

Figure 3 - Ethernet Wiring Diagram

Communication Parameters

DEFAULT COMMUNICATION PARAMETERS:

The controller is set up with default communication parameters detailed on the **Network Wiring** page of the control panel wiring schematic.

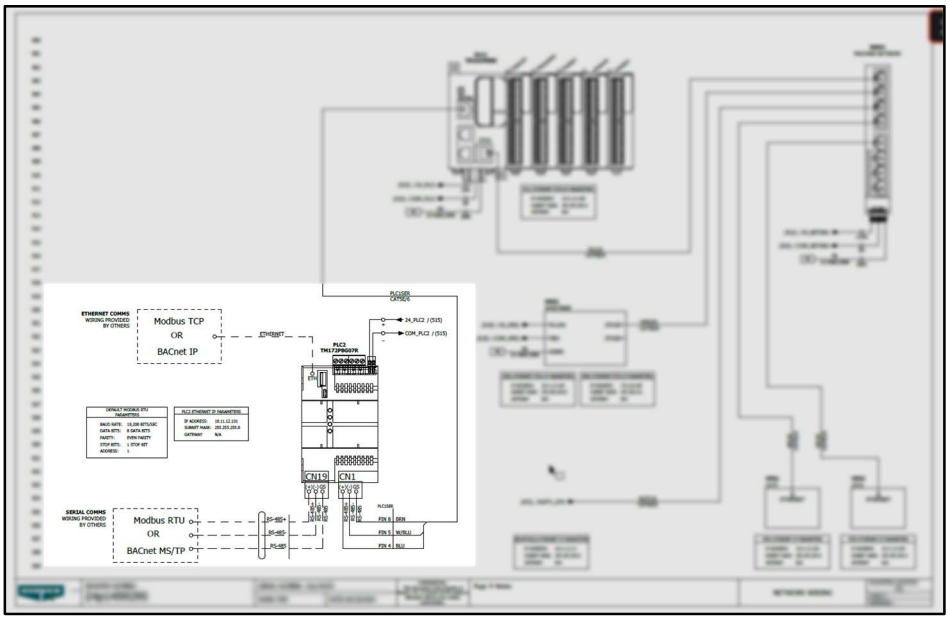

Figure 4 – Location of Communication Parameters

HOW TO CHANGE THE MODBUS RTU COMMUNICATION PARAMETERS:

Note: the status of the system must be switched to Disabled before changes can be made to the communication parameters. This is achieved via the **Setup Screen** in the **Operator Menu** of the **Main Menu**. From the **Main Menu**, log in at the Service level (password: 2357) and access the **Operator Menu**. Select the **BMS & Network** screen (Figure 7). After changing any parameter, the Update button must be pressed and held for three seconds to set the value. This will cause the controller to restart.

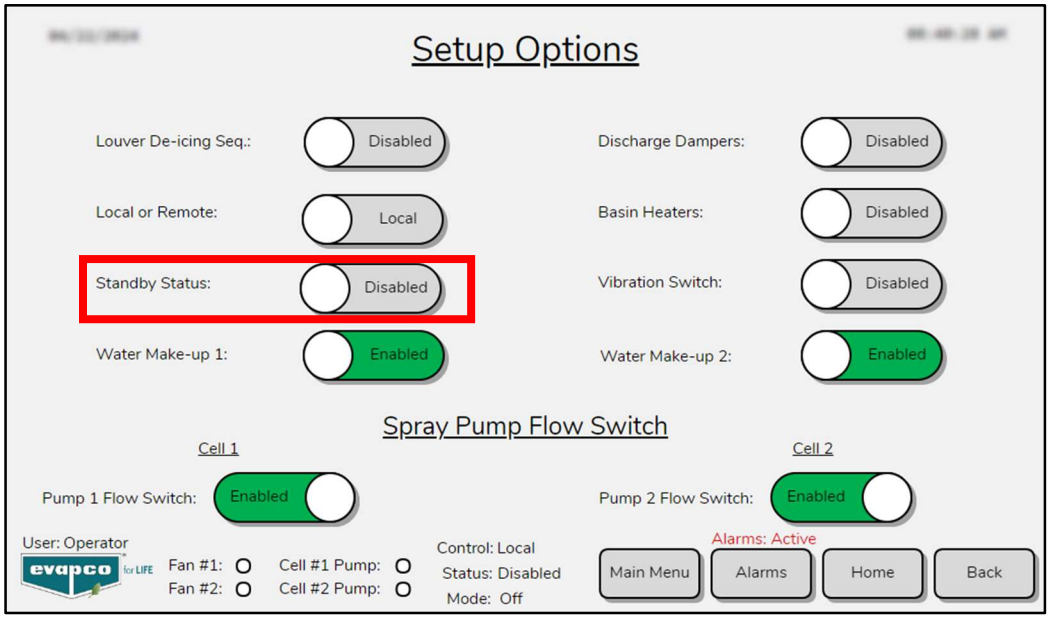

Figure 5 – Standby Status Disabled

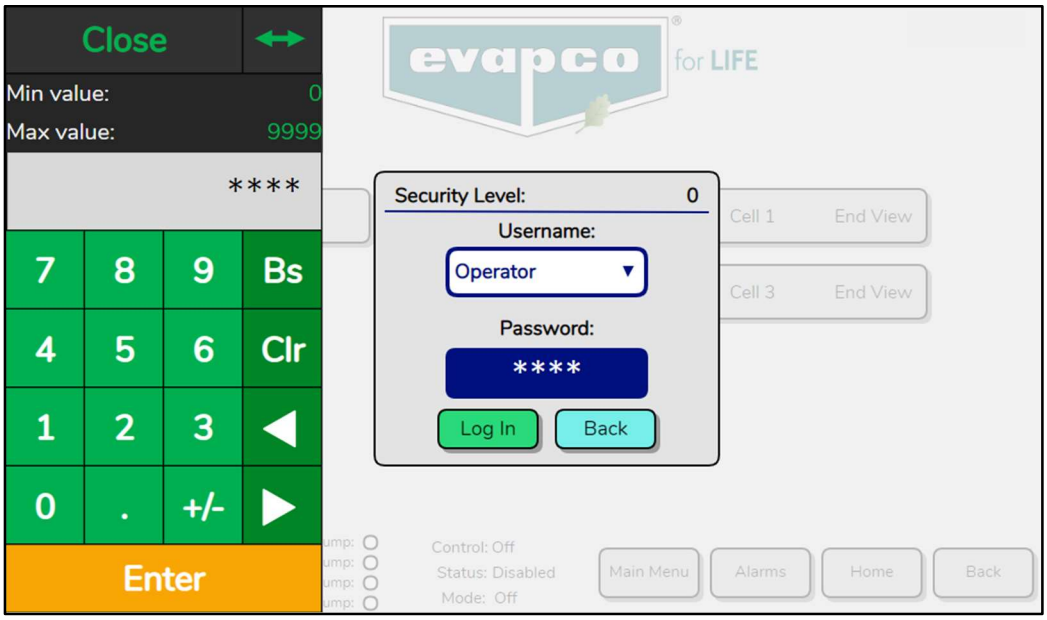

Figure 6 – Operator Level Login

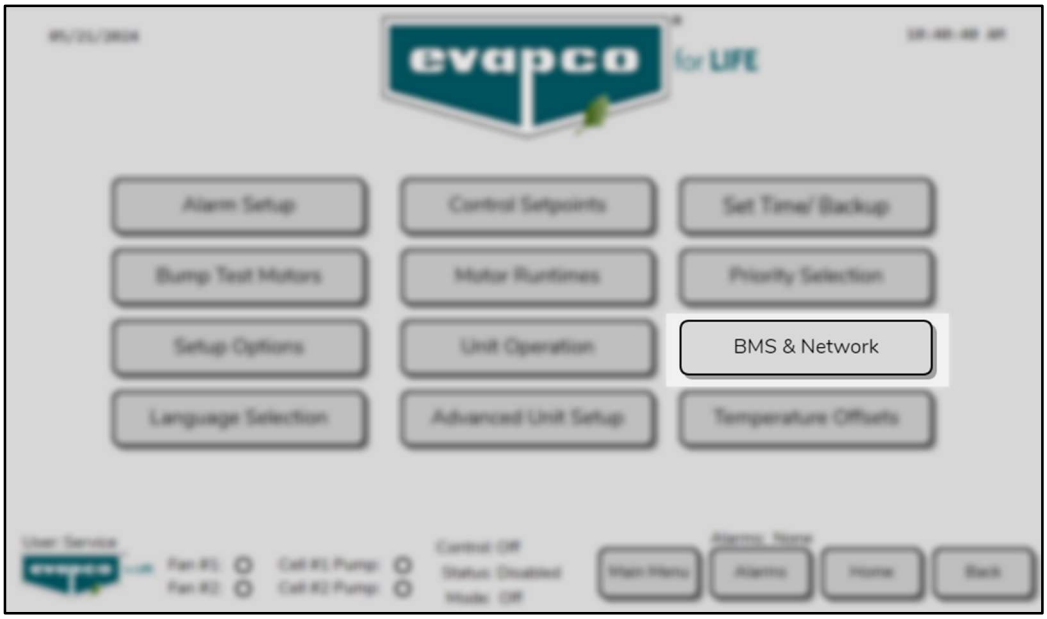

Figure 7 – Operator Menu, BMS & Network

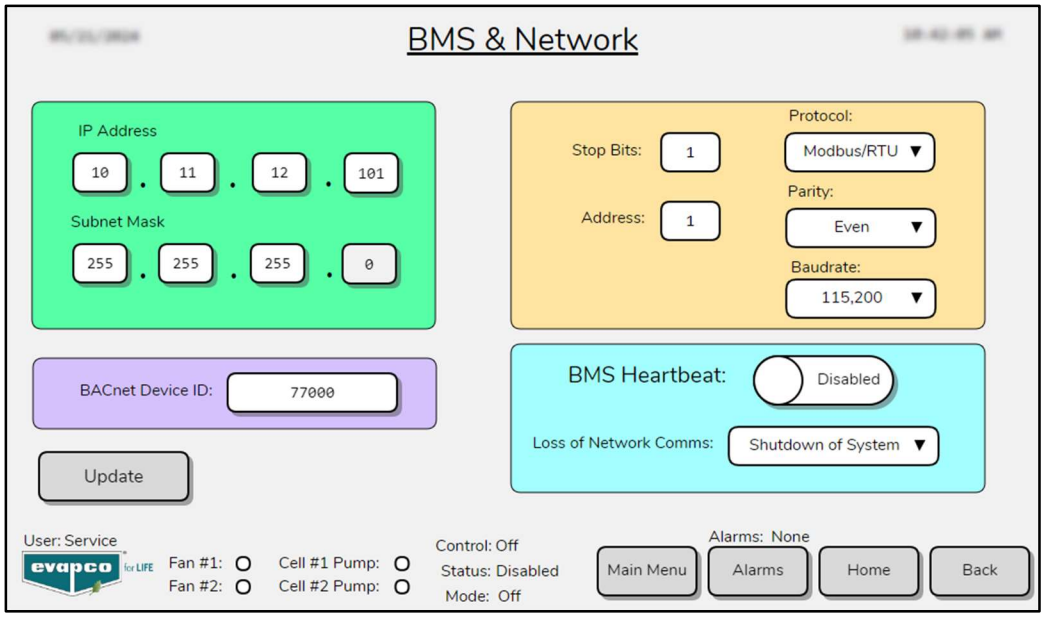

Figure 8 - BMS & Network parameter options

MODBUS Communication Points

Non-volatile memory registers contain parameters that are retained in the event of the PLC power cycling. Volatile memory consists of status variables (EX: PLC IO, calculations, alarms, etc.) that do not need to be retained with a power loss to the PLC.

The non-volatile memory is specified for a life cycle of 100,000 writes (minimum). Using the non-volatile memory for a cyclic write operation may result in quickly exceeding its life cycle limits, resulting in inoperative memory.

NOTICE

Do not use non-volatile memory registers for cyclic write operations. Failure to follow these instructions may result in equipment damage.

DANGER

Holding Registers that are not published below are factory reserved. Modification of any register not listed below can result in rendering the unit nonoperational, equipment damage, and possible severe personal injury and/or death.

Register	Name	Units	Access	Description
VOLATILE MEMORY				
408961	Heater Control Temperature	0.1°F	R	The basin water temperature below which the basin heaters will energize. Default is 400.
408963	De-icing Sequence Start Temperature	0.1°F	R	The basin water temperature below which the louver de-icing sequence will begin (if de-icing is enabled). Default is 400.
408965	Active Setpoint	0.1°F	R	The active target return fluid temperature which the fluid cooler unit will maintain. Default is 850.
408967	Ambient Air Temperature	0.1°F	R	The temperature of the ambient air.
408969	Cell 1 Return Fluid Temperature	0.1°F	R	The temperature of the process fluid entering the fluid cooler unit.
408971	Cell 1 Supply Fluid Temperature	0.1°F	R	The temperature of the process fluid leaving the fluid cooler unit.
408973	Cell 1 Basin Water Temperature	0.1°F	R	The temperature of the basin water in the fluid cooler unit.
408975	Cell 1 VFD Speed	0.1%	R	The current speed of the fan as percentage of full speed.
408981	Current Mode	Integer	R	The current mode in which the fluid cooler is currently operating. 0 indicates the cooler is off.
408982	Hot Start Time Left	Minutes	R	The number of minutes remaining for the hot start routine.
408983	Duration Between De-icing Sequences	Minutes	R	The time between a de-icing start and stop if the basin water temperature is below the de-icing sequence start temperature (if de-icing is enabled). Default is 60.
408984	Cell 1 De-icing Time Left	Minutes	R	The number of minutes remaining for the de-icing routine.
408985	Cell 1 Time Left Until De-icing Start	Minutes	R	The number of minutes remaining until the de-icing routine begins.
408986	Cell 1 Cycle Pumps Time Left	Minutes	R	The number of minutes remaining for the cycle pumps routine.
408987	Cell 1 Pump Lock Time Left	Minutes	R	The number of minutes remaining until the pump operation is unlocked and may turn off automatically.
408988	Cell 1 Pump Runtime	Hours	R	Cell 1 pump runtime hours.

Register	Name	Units	Access	Description
408989	Cell 1 Fan Runtime	Hours	R	Cell 1 fan motor runtime hours.
408990,00	Local or Remote Status	-	R	0: Local (Default) 1: Remote
408991,00	System Enabled	-	R	0: Not Enabled (Default) 1: Enabled
408992,00	Current Operation	-	R	0: Automatic (Default) 1: Manual
408993,00	Hot Start Routine	-	R	0: Not Active 1: Active
408994,00	Cell 1 Make-up Solenoid	-	R	0: Solenoid Off 1: Solenoid On
408995,00	Cell 1 Pump Status	-	R	0: Pump Off 1: Pump On
408996,00	Cell 1 Pump Locked Status	-	R	0: Pump Locked On 1: Pump Not Locked On
408997,00	Cell 1 Basin Heaters	-	R	0: Heaters Off 1: Heaters On
408998,00	Cell 1 Discharge Dampers	-	R	0: Dampers Closed 1: Dampers Energized
408999,00	Cell 1 Discharge Damper Auxiliary Switch	-	R	0: Dampers Closed 1: Dampers Open
409000,00	Cell 1 De-icing Sequence	-	R	0: Not Active 1: Active
409001,00	Cell 1 Cycle Pumps Routine	-	R	0: Not Active 1: Active
409002,00	Cell 1 VFD Status	-	R	0: Off 1: On
409003,00	Cell 1 Fan Motor Heaters	-	R	0: Off 1: On
409004,00	Cell 1 Drain Basin/Make-up Disable	-	R	0: Make-up Enabled (Default) 1: Drain Basin/Make-up Disabled
409005,00	High Ambient Temperature Alarm	-	R	0: No Alarm 1: Alarm
409006,00	Low Ambient Temperature Alarm	-	R	0: No Alarm 1: Alarm
409007,00	100% Capacity	-	R	0: No Alarm 1: 100% Capacity
409008,00	Cell 1 Heater Low Water Alarm	-	R	0: No Alarm 1: Alarm
409009,00	Cell 1 Heater Contactor Alarm	-	R	0: No Alarm 1: Alarm
409010,00	Cell 1 Pump Contactor Fault Alarm	-	R	0: No Alarm 1: Alarm
409011,00	Cell 1 High Water Alarm	-	R	0: No Alarm 1: Alarm
409012,00	Cell 1 Low Water Alarm	-	R	0: No Alarm 1: Alarm
409013,00	Cell 1 Low Basin Water Temperature Alarm	-	R	0: No Alarm 1: Alarm
409014,00	Cell 1 High Supply Water Temp. Alarm	-	R	0: No Alarm 1: Alarm

Register	Name	Units	Access	Description
409015,00	Cell 1 Low Supply Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409016,00	Cell 1 High Return Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409017,00	Cell 1 Low Return Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409018,00	Cell 1 Fan Bypass Contactor Alarm	-	R	0: No Alarm 1: Alarm
409019,00	Cell 1 VFD Fault Alarm	-	R	0: No Alarm 1: Alarm
409020,00	Cell 1 Damper Limit Switch Fault	-	R	0: No Alarm 1: Alarm
409021,00	Cell 1 Fan Vibration Alarm	-	R	0: No Alarm 1: Alarm
409022,00	Cell 1 Pump No Flow Alarm	-	R	0: No Alarm 1: Alarm
409023,00	Cell 2 VFD Status	-	R	0: Off 1: On
409024,00	Cell 2 Fan Motor Heaters	-	R	0: Off 1: On
409025,00	Cell 2 Discharge Dampers	-	R	0: Dampers Closed 1: Dampers Energized
409026,00	Cell 2 Discharge Damper Auxiliary Switch	-	R	0: Dampers Closed 1: Dampers Open
409027,00	Cell 2 Fan Bypass Contactor Alarm	-	R	0: No Alarm 1: Alarm
409028,00	Cell 2 VFD Fault Alarm	-	R	0: No Alarm 1: Alarm
409029,00	Cell 2 Damper Limit Switch Fault	-	R	0: No Alarm 1: Alarm
409030,00	Cell 2 Fan Vibration Alarm	-	R	0: No Alarm 1: Alarm
409031	Cell 2 Fan Runtime	Hours	R	Cell 2 fan motor runtime hours.
409032	Cell 2 Pump Runtime	Hours	R	Cell 2 pump runtime hours.
409033	Cell 2 Cycle Pumps Time Left	Minutes	R	The number of minutes remaining for the cycle pumps routine.
409034	Cell 2 De-icing Time Left	Minutes	R	The number of minutes remaining for the de-icing routine.
409035	Cell 2 Time Left Until De-icing Start	Minutes	R	The number of minutes remaining until the de-icing routine begins.
409036	Cell 2 Pump Lock Time Left	Minutes	R	The number of minutes remaining until the pump operation is unlocked and may turn off automatically.
409037	Lead Cell Number	Integer	R	The current lead cell.
409043	Common Supply Fluid Temperature	0.1°F	R	The average temperature of the process fluid leaving all the installed fluid cooler unit cells.
409045	Cell 2 Supply Fluid Temperature	0.1°F	R	The temperature of the process fluid entering the fluid cooler unit.
409047	Cell 2 Return Fluid Temperature	0.1°F	R	The temperature of the process fluid leaving the fluid cooler unit.
409049	Cell 2 Basin Water Temperature	0.1°F	R	The temperature of the basin water in the fluid cooler unit.

Register	Name	Units	Access	Description
409051	Cell 2 VFD Speed	0.1%	R	The current speed of the fan as percentage of full speed.
409057,00	Cell 2 Make-up Solenoid	-	R	0: Solenoid Off 1: Solenoid On
409058,00	Cell 2 Pump Status	-	R	0: Pump Off 1: Pump On
409059,00	Cell 2 Pump Locked Status	-	R	0: Pump Locked On 1: Pump Not Locked On
409060,00	Cell 2 Basin Heaters	-	R	0: Heaters Off 1: Heaters On
409061,00	Cell 2 De-icing Sequence	-	R	0: Not Active 1: Active
409062,00	Cell 2 Cycle Pumps Routine	-	R	0: Not Active 1: Active
409063,00	Cell 2 Drain Basin/Make-up Disable	-	R	0: Make-up Enabled (Default) 1: Drain Basin/Make-up Disabled
409064,00	Cell 2 Heater Low Water Alarm	-	R	0: No Alarm 1: Alarm
409065,00	Cell 2 Heater Contactor Alarm	-	R	0: No Alarm 1: Alarm
409066,00	Cell 2 Pump Contactor Fault Alarm	-	R	0: No Alarm 1: Alarm
409067,00	Cell 2 High Water Alarm	-	R	0: No Alarm 1: Alarm
409068,00	Cell 2 Low Water Alarm	-	R	0: No Alarm 1: Alarm
409069,00	Cell 2 Low Basin Water Temperature Alarm	-	R	0: No Alarm 1: Alarm
409070,00	Cell 2 High Supply Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409071,00	Cell 2 Low Supply Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409072,00	Cell 2 High Return Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409073,00	Cell 2 Low Return Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409074,00	Cell 2 Pump No Flow Alarm	-	R	0: No Alarm 1: Alarm
409075,00	High Common Supply Temp. Alarm	-	R	0: No Alarm 1: Alarm
409076,00	Low Common Supply Temp. Alarm	-	R	0: No Alarm 1: Alarm
409077,00	Lead/Lag Locked	-	R	0: Unlocked 1: Locked
409078,00	Cell 3 Bypass Contactor Alarm	-	R	0: No Alarm 1: Alarm
409079,00	Cell 4 Bypass Contactor Alarm	-	R	0: No Alarm 1: Alarm
409080,00	Cell 3 VFD Fault Alarm	-	R	0: No Alarm 1: Alarm

Register	Name	Units	Access	Description
409081,00	Cell 4 VFD Fault Alarm	-	R	0: No Alarm 1: Alarm
409082,00	Cell 3 Damper Limit Switch Fault	-	R	0: No Alarm 1: Alarm
409083,00	Cell 4 Damper Limit Switch Fault	-	R	0: No Alarm 1: Alarm
409084,00	Cell 3 Fan Vibration Alarm	-	R	0: No Alarm 1: Alarm
409085,00	Cell 4 Fan Vibration Alarm	-	R	0: No Alarm 1: Alarm
409086,00	Cell 3 VFD Status	-	R	0: Off 1: On
409087,00	Cell 4 VFD Status	-	R	0: Off 1: On
409088,00	Cell 3 Fan Motor Heaters	-	R	0: Off 1: On
409089,00	Cell 4 Fan Motor Heaters	-	R	0: Off 1: On
409095	Cell 3 VFD Speed	0.1%	R	The current speed of the fan as percentage of full speed.
409097	Cell 4 VFD Speed	0.1%	R	The current speed of the fan as percentage of full speed.
409103	Cell 3 Fan Runtime	Hours	R	Cell 3 fan motor runtime hours.
409104	Cell 4 Fan Runtime	Hours	R	Cell 4 fan motor runtime hours.
409105	Cell 3 Pump Runtime	Hours	R	Cell 3 pump runtime hours.
409106	Cell 4 Pump Runtime	Hours	R	Cell 4 pump runtime hours.
409107	Cell 3 Cycle Pumps Time Left	Minutes	R	The number of minutes remaining for the cycle pumps routine.
409108	Cell 4 Cycle Pumps Time Left	Minutes	R	The number of minutes remaining for the cycle pumps routine.
409109	Cell 3 Pump Lock Time Left	Minutes	R	The number of minutes remaining until the pump operation is unlocked and may turn off automatically.
409110	Cell 4 Pump Lock Time Left	Minutes	R	The number of minutes remaining until the pump operation is unlocked and may turn off automatically.
409116	Cell 3 Supply Fluid Temperature	0.1°F	R	The temperature of the process fluid entering the fluid cooler unit.
409118	Cell 4 Supply Fluid Temperature	0.1°F	R	The temperature of the process fluid entering the fluid cooler unit.
409120	Cell 3 Return Fluid Temperature	0.1°F	R	The temperature of the process fluid leaving the fluid cooler unit.
409122	Cell 4 Return Fluid Temperature	0.1°F	R	The temperature of the process fluid leaving the fluid cooler unit.
409128,00	Cell 3 Pump Status	-	R	0: Off 1: On
409129,00	Cell 4 Pump Status	-	R	0: Off 1: On
409130,00	Cell 3 Pump Locked Status	-	R	0: Pump Locked On 1: Pump Not Locked On
409131,00	Cell 4 Pump Locked Status	-	R	0: Pump Locked On 1: Pump Not Locked On
409132,00	Cell 3 Discharge Dampers	-	R	0: Dampers Closed 1: Dampers Energized

Register	Name	Units	Access	Description
409133,00	Cell 4 Discharge Dampers	-	R	0: Dampers Closed 1: Dampers Energized
409134,00	Cell 3 Discharge Damper Auxiliary Switch	-	R	0: Dampers Closed 1: Dampers Open
409135,00	Cell 4 Discharge Damper Auxiliary Switch	-	R	0: Dampers Closed 1: Dampers Open
409136,00	Cell 3 Cycle Pumps Routine	-	R	0: Not Active 1: Active
409137,00	Cell 4 Cycle Pumps Routine	-	R	0: Not Active 1: Active
409138,00	Cell 3 Pump Contactor Fault Alarm	-	R	0: No Alarm 1: Alarm
409139,00	Cell 4 Pump Contactor Fault Alarm	-	R	0: No Alarm 1: Alarm
409140,00	Cell 3 High Supply Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409141,00	Cell 4 High Supply Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409142,00	Cell 3 Low Supply Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409143,00	Cell 4 Low Supply Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409144,00	Cell 3 High Return Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409145,00	Cell 4 High Return Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409146,00	Cell 3 Low Return Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409147,00	Cell 4 Low Return Water Temp. Alarm	-	R	0: No Alarm 1: Alarm
409148,00	Cell 3 Pump No Flow Alarm	-	R	0: No Alarm 1: Alarm
409149,00	Cell 4 Pump No Flow Alarm	-	R	0: No Alarm 1: Alarm
409150,00	Cell 1 Pump Runtime Reset	-	RW	0: No Reset 1: Reset Runtime Hours
409151,00	Cell 1 Fan Runtime Reset	-	RW	0: No Reset 1: Reset Runtime Hours
409152,00	Alarm Acknowledge	-	RW	0: Not Acknowledged 1: Alarms Acknowledged
409188,00	Cell 2 Fan Runtime Reset	-	RW	0: No Reset 1: Reset Runtime Hours
409189,00	Cell 2 Pump Runtime Reset	-	RW	0: No Reset 1: Reset Runtime Hours
409190,00	Cell 3 Fan Runtime Reset	-	RW	0: No Reset 1: Reset Runtime Hours
409191,00	Cell 3 Pump Runtime Reset	-	RW	0: No Reset 1: Reset Runtime Hours
409192,00	Cell 4 Fan Runtime Reset	-	RW	0: No Reset 1: Reset Runtime Hours

Register	Name	Units	Access	Description
409193,00	Cell 4 Pump Runtime Reset	-	RW	0: No Reset 1: Reset Runtime Hours
409194,00	BMS Heartbeat	-	RW	BMS Heartbeat between PLC and HMI: 0: Waiting for PLC to change value to 1 (5 sec.) 1: Waiting for BMS to change value to 0 (30 secs.)
NON-VOLATILE MEMORY				
416391,00	Cell 1 Drain Basin/Make-up Disable	-	RW	0: Make-up Enable (Default) 1: Drain Basin/Make-up Disable
416392,00	Cell 2 Drain Basin/Make-up Disable	-	RW	0: Make-up Enable (Default) 1: Drain Basin/Make-up Disable
416393,00	Savings Priority	-	RW	0: Water Savings Priority (Default) 1: Energy Savings Priority
416395,00	Lead Lag Set	-	RW	0: Cell 2 Lead 1: Cell 1 Lead (Default)
416401	High Return Water Temp. Alarm Setpoint	0.1°F	RW	The maximum allowed temperature before a high alarm is triggered. Default is 1050.
416403	Low Return Water Temp. Alarm Setpoint	0.1°F	RW	The minimum allowed temperature before a low alarm is triggered. Default is 850.
416405	High Supply Temp. Alarm Setpoint	0.1°F	RW	The maximum allowed temperature before a high alarm is triggered. Default is 950.
416407	Low Supply Temp. Alarm Setpoint	0.1°F	RW	The minimum allowed temperature before a low alarm is triggered. Default is 750.
416409	High Ambient Temp. Alarm Setpoint	0.1°F	RW	The maximum allowed temperature before a high alarm is triggered. Default is 1000.
416411	Low Ambient Temp. Alarm Setpoint	0.1°F	RW	The minimum allowed temperature before a low alarm is triggered. Default is 320.
416413	Low Basin Water Temp. Alarm Setpoint	0.1°F	RW	The minimum allowed temperature before a low alarm is triggered. Default is 380.
416415	Damper Offset Temp. Setpoint	0.1°F	RW	See the **Advanced Unit Setup Screen**. Default is 30.
416417	Basin Heater Temp Setpoint	0.1°F	RW	Basin heater temperature setpoint. Default is 400.
416419	Deice temp setpoint	0.1°F	RW	De-icing temperature setpoint. Default is 400.
416421	BAS Setpoint	0.1°F	RW	The temperature of the leaving process fluid that should be maintained by the fluid cooler unit. Default is 850.

BACNET Communication Points

Non-volatile memory registers contain parameters that are retained in the event of the PLC power cycling. Volatile memory consists of status variables (EX: PLC IO, calculations, alarms, etc.) that do not need to be retained with a power loss to the PLC.

The non-volatile memory is specified for a life cycle of 100,000 writes (minimum). Using the non-volatile memory for a cyclic write operation may result in quickly exceeding its life cycle limits, resulting in inoperative memory.

NOTICE

Do not use non-volatile memory registers for cyclic write operations. Failure to follow these instructions may result in equipment damage.

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
BINARY_VALUE: 0	bnC1MakeupOn	-	R	Cell 1 Make-up Solenoid: 0: Off 1: On	
BINARY_VALUE: 1	bnC1PumpAStatus	-	R	Cell 1 Pump Status: 0: Off 1: On	
BINARY_VALUE: 2	bnC1PumpALockedStatus	-	R	Cell 1 Pump Locked Status: 0: Pump Locked On 1: Pump Not Locked On	
BINARY_VALUE: 3	bnC1BasinHeaterStatus	-	R	Cell 1 Basin Heater Status: 0: Heaters Off 1: Heaters On	
BINARY_VALUE: 4	bnC1DischargeDamper	-	R	Cell 1 Discharge Damper Status: 0: Dampers Closed 1: Dampers Energized	
BINARY_VALUE: 5	bnC1DischargeDamperAUXSwitch	-	R	Cell 1 Damper AUX Switch Status: 0: Dampers Closed 1: Dampers Open	
BINARY_VALUE: 6	bnC1DeicingSeq	-	R	Cell 1 De-icing Sequence Status: 0: Not Active 1: Active	
BINARY_VALUE: 7	bnC1CyclePumps	-	R	Cell 1 Cycle Pump Routine Status: 0: Not Active 1: Active	
BINARY_VALUE: 8	bnC1VFDStatus	-	R	Cell 1 VFD Status: 0: Off 1: On	
BINARY_VALUE: 9	bnC1FanMotorHeaters	-	R	Cell 1 Fan Space Heater Status: 0: Off 1: On	
BINARY_VALUE: 10	bnC1HeaterLWA	-	R	Cell 1 Basin Heater Low Water Alarm: 0: No Alarm 1: Alarm	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
BINARY_VALUE: 11	bnC1HeaterCONALM	-	R	Cell 1 Basin Heater Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 12	bnC1PumpAConFault	-	R	Cell 1 Pump Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 13	bnC1HWA	-	R	Cell 1 High Water Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 14	bnC1LWA	-	R	Cell 1 Low Water Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 15	bnC1LowBasinTempALM	-	R	Cell 1 Low Basin Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 16	bnC1HighSupplyTempALM	-	R	Cell 1 High Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 17	bnC1LowSupplyTempALM	-	R	Cell 1 Low Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 18	bnC1HighReturnTempALM	-	R	Cell 1 High Return Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 19	bnC1LowReturnTempALM	-	R	Cell 1 Low Return Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 20	bnC1BYPConALM	-	R	Cell 1 Fan Bypass Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 21	bnC1VFDFaultALM	-	R	Cell 1 VFD Fault Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 22	bnC1DamperLimitSwitchFLT	-	R	Cell 1 Damper Limit Switch Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 23	bnC1VibrationFaultALM	-	R	Cell 1 Vibration Switch Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 24	bnC1PumpANoFlow	-	R	Cell 1 Pump No Flow Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 25	bnLocalRemoteStatus	-	R	System Control Mode: 0: Local (Default) 1: Remote	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
BINARY_VALUE: 26	bnSYSEnabled	-	R	System Enabled Status: 0: Not Enabled (Default) 1: Enabled	
BINARY_VALUE: 27	bnHotStartRoutine	-	R	System Hot Start Routine Status: 0: Not Active 1: Active	
BINARY_VALUE: 28	bnHighAmbientTempALM	-	R	High Ambient Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 29	bnLowAmbientTemp	-	R	Low Ambient Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 30	bn100CapALM	-	R	100% Capacity Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 31	bnC1MakeupDisable	-	R	Cell 1 Drain Basin/Make-up Disable Status: 0: Make-up Enabled (Default) 1: Drain Basin/Make-up Disabled	
BINARY_VALUE: 32	bnC1PumpARuntimeReset	-	RW	Cell 1 Pump Runtime Rese: 0: No Reset 1: Reset Runtime Hours	
BINARY_VALUE: 33	bnC1FanRuntimeReset	-	RW	Cell 1 Fan Runtime Reset: 0: No Reset 1: Reset Runtime Hours	
BINARY_VALUE: 34	bnSavingsPrority	-	RW	System Savings Priority: 0: Water Savings Priority (Default) 1: Energy Savings Priority	✓
BINARY_VALUE: 35	bnEnableSystem	-	RW	System Enabled: 0: Not Enabled (Default) 1: Enabled	✓
BINARY_VALUE: 36	bnALM_ACK	-	RW	Acknowledge Alarms: 0: Not Acknowledged 1: Alarms Acknowledged	
BINARY_VALUE: 37	bnC2MakeupON	-	R	Cell 2 Make-up Solenoid: 0: Off 1: On	
BINARY_VALUE: 38	bnC2PumpAStatus	-	R	Cell 2 Pump Status: 0: Off 1: On	
BINARY_VALUE: 39	bnC2PumpALockedStatus	-	R	Cell 2 Pump Locked Status: 0: Pump Locked On 1: Pump Not Locked On	
BINARY_VALUE: 40	bnC2BasinHeaterStatus	-	R	Cell 2 Basin Heater Status: 0: Heaters Off 1: Heaters On	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
BINARY_VALUE: 41	bnC2DischargeDamper	-	R	Cell 2 Discharge Damper Status: 0: Dampers Closed 1: Dampers Energized	
BINARY_VALUE: 42	bnC2DischargeDamperAUXSwitch	-	R	Cell 2 Discharge Damper Status: 0: Dampers Closed 1: Dampers Open	
BINARY_VALUE: 43	bnC2DeicingSeq	-	R	Cell 2 De-icing Sequence Status: 0: Not Active 1: Active	
BINARY_VALUE: 44	bnC2CyclePumps	-	R	Cell 2 Cycle Pump Routine Status: 0: Not Active 1: Active	
BINARY_VALUE: 45	bnC2VFDStatus	-	R	Cell 2 VFD Status: 0: Off 1: On	
BINARY_VALUE: 46	bnC2FanMotorHeaters	-	R	Cell 2 Fan Space Heater Status: 0: Off 1: On	
BINARY_VALUE: 47	bnC2HeaterLWA	-	R	Cell 2 Basin Heater Low Water Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 48	bnC2HeaterCONALM	-	R	Cell 2 Basin Heater Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 49	bnC2PumpAConFault	-	R	Cell 2 Pump Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 50	bnC2HWA	-	R	Cell 2 High Water Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 51	bnC2LWA	-	R	Cell 2 Low Water Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 52	bnC2LowBasinTempALM	-	R	Cell 2 Low Basin Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 53	bnC2HighSupplyTempALM	-	R	Cell 2 High Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 54	bnC2LowSupplyTempALM	-	R	Cell 2 Low Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 55	bnC2HighReturnTempALM	-	R	Cell 2 High Return Water Temperature Alarm: 0: No Alarm 1: Alarm	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
BINARY_VALUE: 56	bnC2LowReturnTempALM	-	R	Cell 2 Low Return Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 57	bnC2BYPConALM	-	R	Cell 2 Fan Bypass Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 58	bnC2VFDFaultALM	-	R	Cell 2 VFD Fault Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 59	bnC2DamperLimitSwitchFLT	-	R	Cell 2 Damper Limit Switch Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 60	bnC2VibrationFaultALM	-	R	Cell 2 Vibration Switch Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 61	bnC2PumpANoFlow	-	R	Cell 2 Pump No Flow Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 62	bnC2MakeupDisable	-	R	Cell 2 Drain Basin/Make-up Disable Status: 0: Make-up Enabled (Default) 1: Drain Basin/Make-up Disabled	
BINARY_VALUE: 63	bnC2PumpARuntimeReset	-	RW	Cell 2 Pump Runtime Reset: 0: No Reset 1: Reset Runtime Hours	
BINARY_VALUE: 64	bnC2FanRuntimeReset	-	RW	Cell 2 Fan Runtime Reset: 0: No Reset 1: Reset Runtime Hours	
BINARY_VALUE: 65	bnLeadLagSet	-	RW	System Lead Lag Set: 0: Cell 2 Lead 1: Cell 1 Lead (Default)	✓
BINARY_VALUE: 66	bnC3PumpAStatus	-	R	Cell 3 Pump Status: 0: Off 1: On	
BINARY_VALUE: 67	bnC3PumpALockedStatus	-	R	Cell 3 Pump Locked Status: 0: Pump Locked On 1: Pump Not Locked On	
BINARY_VALUE: 68	bnC3DischargeDamper	-	R	Cell 3 Discharge Damper Status: 0: Dampers Closed 1: Dampers Energized	
BINARY_VALUE: 69	bnC3DischargeDamperAUXSwitch	-	R	Cell 3 Discharge Damper Switch Status: 0: Dampers Closed 1: Dampers Open	
BINARY_VALUE: 70	bnC3CyclePumps	-	R	Cell 3 Cycle Pump Routine Status: 0: Not Active 1: Active	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
BINARY_VALUE: 71	bnC3VFDStatus	-	R	Cell 3 VFD Status: 0: Off 1: On	
BINARY_VALUE: 72	bnC3FanMotorHeaters	-	R	Cell 3 Fan Space Heater Status: 0: Off 1: On	
BINARY_VALUE: 73	bnC3PumpAConFault	-	R	Cell 3 Pump Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 74	bnC3HighSupplyTempALM	-	R	Cell 3 High Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 75	bnC3LowSupplyTempALM	-	R	Cell 3 Low Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 76	bnC3HighReturnTempALM	-	R	Cell 3 High Return Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 77	bnC3LowReturnTempALM	-	R	Cell 3 Low Return Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 78	bnC3BYPConALM	-	R	Cell 3 Fan Bypass Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 79	bnC3VFDFaultALM	-	R	Cell 3 VFD Fault Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 80	bnC3DamperLimitSwitchFLT	-	R	Cell 3 Damper Limit Switch Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 81	bnC3VibrationFaultALM	-	R	Cell 3 Vibration Switch Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 82	bnC3PumpANoFlow	-	R	Cell 3 Pump No Flow Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 83	bnC3PumpARuntimeReset	-	RW	Cell 3 Pump Runtime Reset Status: 0: No Reset 1: Reset Runtime Hours	
BINARY_VALUE: 84	bnC3FanRuntimeReset	-	RW	Cell 3 Fan Runtime Reset: 0: No Reset 1: Reset Runtime Hours	
BINARY_VALUE: 85	bnC4PumpAStatus	-	R	Cell 4 Pump Status: 0: Off 1: On	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
BINARY_VALUE: 86	bnC4PumpALockedStatus	-	R	Cell 4 Pump Locked Status: 0: Pump Locked On 1: Pump Not Locked On	
BINARY_VALUE: 87	bnC4DischargeDamperAUXSwitch	-	R	Cell 4 Discharge Damper Status: 0: Dampers Closed 1: Dampers Open	
BINARY_VALUE: 88	bnC4CyclePumps	-	R	Cell 4 Cycle Pump Routine Status: 0: Not Active 1: Active	
BINARY_VALUE: 89	bnC4VFDStatus	-	R	Cell 4 VFD Status: 0: Off 1: On	
BINARY_VALUE: 90	bnC4FanMotorHeaters	-	R	Cell 4 Fan Space Heater Status: 0: Off 1: On	
BINARY_VALUE: 91	bnC4PumpAConFault	-	R	Cell 4 Pump Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 92	bnC4HighSupplyTempALM	-	R	Cell 4 High Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 93	bnC4LowSupplyTempALM	-	R	Cell 4 Low Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 94	bnC4HighReturnTempALM	-	R	Cell 4 High Return Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 95	bnC4LowReturnTempALM	-	R	Cell 4 Low Return Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 96	bnC4BYPConALM	-	R	Cell 4 Fan Bypass Contactor Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 97	bnC4VFDFaultALM	-	R	Cell 4 VFD Fault Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 98	bnC4DamperLimitSwitchFLT	-	R	Cell 4 Damper Limit Switch Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 99	bnC4VibrationFaultALM	-	R	Cell 4 Vibration Switch Alarm: 0: No Alarm 1: Alarm	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
BINARY_VALUE: 100	bnC4PumpANoFlow	-	R	Cell 4 Pump No Flow Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 101	bnC4PumpARuntimeReset	-	RW	Cell 4 Pump Runtime Reset Status: 0: No Reset 1: Reset Runtime Hours	
BINARY_VALUE: 102	bnC4FanRuntimeReset	-	RW	Cell 4 Fan Runtime Reset: 0: No Reset 1: Reset Runtime Hours	
BINARY_VALUE: 103	bnHighCommonTempALM	-	R	High Common Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 104	bnLowCommonTempALM	-	R	Low Common Supply Water Temperature Alarm: 0: No Alarm 1: Alarm	
BINARY_VALUE: 105	bnLeadLagLocked	-	R	Lead/Lag Cell Locked: 0: Cell 2 Lead 1: Cell 1 Lead	
BINARY_VALUE: 106	bnC1MakeupDisableBAS	-	RW	Cell 1 Disable Make-up: 0: Make-up Enabled (Default) 1: Drain Basin/Make-up Disabled	✓
BINARY_VALUE: 107	bnC2MakeupDisableBAS	-	RW	Cell 2 Disable Make-up: 0: Make-up Enabled (Default) 1: Drain Basin/Make-up Disabled	✓
BINARY_VALUE: 108	bnCurrentOperation	-	R	System Current Operation: 0: Automatic (Default) 1: Manual	
BINARY_VALUE: 109	bnC4DischargeDamper	-	R	Cell 4 Discharge Damper Status: 0: Dampers Closed 1: Dampers Energized	
BINARY_VALUE: 109	bnBMSHeartbeat	-	RW	BMS Heartbeat between PLC and HMI: 0: Waiting for PLC to change value to 1 (5 sec.) 1: Waiting for BMS to change value to 0 (30 secs.)	
ANALOG_VALUE: 0	bnC1ReturnTemp	0.1°F	R	The temperature of the process fluid entering the fluid cooler unit for cell 1.	
ANALOG_VALUE: 1	bnC1SupplyTemp	0.1°F	R	The temperature of the process fluid leaving the coil outlet of the fluid cooler unit for cell 1.	
ANALOG_VALUE: 2	bnC1BasinWaterTemp	0.1°F	R	The temperature of the basin water in the fluid cooler unit for cell 1.	
ANALOG_VALUE: 3	bnAmbientTemp	0.1°F	R	The temperature of the ambient air.	
ANALOG_VALUE: 4	bnC1PumpARuntime	Hours	R	Pump runtime hours for cell 1.	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
ANALOG_VALUE: 5	bnC1CyclePumpTime	Minutes	R	The number of minutes remaining for the cycle pumps routine for cell 1.	
ANALOG_VALUE: 6	bnC1DeicingTimeLeft	Minutes	R	The number of minutes remaining for the de-icing routine for cell 1.	
ANALOG_VALUE: 7	bnC1TimeLeftUnitDeicingStart	Minutes	R	The number of minutes remaining until the de-icing routine begins for cell 1.	
ANALOG_VALUE: 8	bnC1PumpALockTime	Minutes	R	The number of minutes remaining until the pump is unlocked and may be turned off automatically for cell 1.	
ANALOG_VALUE: 9	bnC1FanRuntime	Hours	R	Fan 1 motor runtime hours.	
ANALOG_VALUE: 10	bnHeaterCntrlTemp	0.1°F	R	The basin water temperature below which the basin heaters will energize. Default is 400.	
ANALOG_VALUE: 11	bnDeicingSeqStartTemp	0.1°F	R	The basin water temperature below which the louver de-icing sequence will begin (if de-icing is enabled). Default is 400.	
ANALOG_VALUE: 12	bnCurrentMode	Integer	R	The current mode in which the fluid cooler is currently operating. 0 indicates the cooler is off.	
ANALOG_VALUE: 13	bnHotStartTimeLeft	Minutes	R	The number of minutes remaining for the hot start routine.	
ANALOG_VALUE: 14	bnHighReturnALMSP	0.1°F	RW	The maximum allowed temperature before a high alarm is triggered. Default is 1050.	✓
ANALOG_VALUE: 15	bnLowReturnALMSP	0.1°F	RW	The minimum allowed temperature before a low alarm is triggered. Default is 850.	✓
ANALOG_VALUE: 16	bnHighSupplyALMSP	0.1°F	RW	The maximum allowed temperature before a high alarm is triggered. Default is 950.	✓
ANALOG_VALUE: 17	bnLowSupplyALMSP	0.1°F	RW	The minimum allowed temperature before a low alarm is triggered. Default is 750.	✓
ANALOG_VALUE: 18	bnHighAmbientALMSP	0.1°F	RW	The maximum allowed temperature before a high alarm is triggered. Default is 1000.	✓
ANALOG_VALUE: 19	bnLowAmbientALMSP	0.1°F	RW	The minimum allowed temperature before a low alarm is triggered. Default is 320.	✓
ANALOG_VALUE: 20	bnLowBasinTempALMSP	0.1°F	RW	The minimum allowed temperature before a low alarm is triggered. Default is 380.	✓

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
ANALOG_VALUE: 21	bnDamperOffsetTempSP	0.1°F	RW	See the **Advanced Unit Setup Screen**. Default is 30.	✓
ANALOG_VALUE: 22	bnBasinHeaterTempSP	0.1°F	RW	Basin heater temperature setpoint. Default is 400.	✓
ANALOG_VALUE: 23	bnDeiceTempSP	0.1°F	RW	De-icing temperature setpoint. Default is 400.	✓
ANALOG_VALUE: 24	bnBASSP	0.1°F	RW	The temperature of the leaving process fluid that should be maintained by the fluid cooler unit. Default is 850.	✓
ANALOG_VALUE: 25	bnC2ReturnTemp	0.1°F	R	The temperature of the process fluid entering the fluid cooler unit for cell 2.	
ANALOG_VALUE: 26	bnC2SupplyTemp	0.1°F	R	The temperature of the process fluid leaving the fluid cooler unit for cell 2.	
ANALOG_VALUE: 27	bnC2BasinWaterTemp	0.1°F	R	The temperature of the basin water in the fluid cooler unit for cell 2.	
ANALOG_VALUE: 28	bnC1VFDSpeed	0.1%	R	The current speed of the fan as percentage of full speed for cell 1.	
ANALOG_VALUE: 29	bnC2VFDSpeed	0.1%	R	The current speed of the fan as percentage of full speed for cell 2.	
ANALOG_VALUE: 30	bnCommonLeavingTemp	0.1°F	R	The average temperature of the process fluid leaving all the installed fluid cooler unit cells.	
ANALOG_VALUE: 31	bnC2PumpARuntime	Hours	R	Pump runtime hours for cell 2.	
ANALOG_VALUE: 32	bnC2CyclePumpTimeLeft	Minutes	R	The number of minutes remaining for the cycle pumps routine for cell 2.	
ANALOG_VALUE: 33	bnC2TimeLeftUnitDeicingStart	Minutes	R	The number of minutes remaining until the de-icing routine begins for cell 2.	
ANALOG_VALUE: 34	bnC2DeicingTimeLeft	Minutes	R	The number of minutes remaining for the de-icing routine for cell 2.	
ANALOG_VALUE: 35	bnC2PumpALockTime	Minutes	R	The number of minutes remaining until the pump is unlocked and may be turned off automatically for cell 2.	
ANALOG_VALUE: 36	bnC2FanRuntime	Hours	R	Fan 2 motor runtime hours.	
ANALOG_VALUE: 37	bnRecordLeadCell	Integer	R	The current lead cell.	
ANALOG_VALUE: 38	bnC3FanRuntime	Hours	R	Fan 3 motor runtime hours.	
ANALOG_VALUE: 39	bnC3CyclePumpTimeLeft	Minutes	R	The number of minutes remaining for the cycle pumps routine for cell 3.	

Object Identifier	Object Name	Units	Access	Description	Non-Volatile Memory
ANALOG_VALUE: 40	bnC3PumpALockTime	Minutes	R	The number of minutes remaining until the pump is unlocked and may be turned off automatically for cell 3.	
ANALOG_VALUE: 41	bnC3PumpARuntime	Hours	R	Pump runtime hours for cell 3.	
ANALOG_VALUE: 42	bnC3ReturnTemp	0.1°F	R	The temperature of the process fluid entering the fluid cooler unit for cell 3.	
ANALOG_VALUE: 43	bnC3SupplyTemp	0.1°F	R	The temperature of the process fluid leaving the fluid cooler unit for cell 3.	
ANALOG_VALUE: 44	bnC3VFDSpeed	0.1%	R	The current speed of the fan as percentage of full speed for cell 3.	
ANALOG_VALUE: 45	bnC4ReturnTemp	0.1°F	R	The temperature of the process fluid entering the fluid cooler unit for cell 4.	
ANALOG_VALUE: 46	bnC4SupplyTemp	0.1°F	R	The temperature of the process fluid leaving the fluid cooler unit for cell 4.	
ANALOG_VALUE: 47	bnC4VFDSpeed	0.1%	R	The current speed of the fan as percentage of full speed for cell 4.	
ANALOG_VALUE: 48	bnC4PumpARuntime	Hours	R	Pump runtime hours for cell 4.	
ANALOG_VALUE: 49	bnC4CyclePumpTimeLeft	Minutes	R	The number of minutes remaining for the cycle pumps routine for cell 4.	
ANALOG_VALUE: 50	bnC4PumpALockTime	Minutes	R	The number of minutes remaining until the pump is unlocked and may be turned off automatically for cell 4.	
ANALOG_VALUE: 51	bnC4FanRuntime	Hours	R	Fan 4 motor runtime hours.	
ANALOG_VALUE: 52	bnActiveSetpoint	0.1°F	R	The active target return fluid temperature which the fluid cooler unit will maintain. Default 850.	
ANALOG_VALUE: 53	bnTimeBTWNDeicingSequences	Minutes	R	The time between a de-icing start and stop if the basin water temperature is below the de-icing sequence start temperature (if de-icing is enabled). Default is 60.	