

# MPC MULTI-PROTOCOL DDC CONTROLS **APPLICATION, OPERATION** NANCE MANUAL **& MA** Ξ





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# MPC Controller Overview

The Multi-Protocol (MPC) Heat Pump controller is a dual purpose controller. It contains the logic to perform as an advanced customizable thermostat when combined with a wall sensor and is designed to allow the integration of water-source heat pump equipment into DDC systems. The MPC Controller has the ability to communicate through a choice of three widely used protocols:

- BACnet MS/TP
- Johnson Controls N2
- Modbus

The protocol of choice for the particular system is selected by simply configuring DIP switches on the MPC Controller. This flexibility allows one controller, the MPC, to be used in a multitude of buildings which use any of these three common protocols.

The MPC serves as a node of information processing between the heat pump and the DDC network. The MPC commands the heat pump to heat and cool based upon sensor inputs. The MPC monitors the operation of the heat pump and communicates the operating parameters to the DDC network. The MPC always works in conjunction with a CXM2/DXM2.5 controller, which also resides in the heat pump control box. The MPC has factory pre-loaded application software which allows optimal control of the heat pump equipment. The MPC can run in stand-alone operation as well as with the DDC network. The heat pump arrives at the job site with the factory installed MPC Controller and is ready to run stand-alone and can be connected to the DDC network at any time.

#### FEATURES

#### **System Controls**

In conjunction with the wall sensors, the MPC offers features such as:

- Room-temperature sensing
- Local setpoint adjustment
- Local override into Occupied Mode
- LED for alarm status
- LED for fault status type
- Heat pump reset at the wall sensor
- Digital room-temperature display

 Information from the wall sensors can be reported to the DDC network system

Model:

MPC

- Various combination sensors support temperature control, humidity control, CO<sub>2</sub> control, occupancy control, and VOC control
- Supports water-to-air application or water-towater applications
- The MPC can be programmed with a 7-day schedule
- One binary aux output can be programmed to control various functions
- Ability to operate in heating- or cooling-only mode
- Ability to operate in full-time-electric or externalheat mode
- Input for pressure switch for dirty filter notice applications
- Can operate without ASW sensor if equipped with an Equipment Touch Service Tool unit (temperature and humidity only)
- Can alternate compressor staging (lead/lag) based on manual control, timed control, or compressor accumulated runtime
- Supports Android-based tablet in place of Equipment Touch Service Tool (does not support temp/humidity control)
- Selectively supports zone averaging using up to 5 ASW wall sensors (See Appendix for details)

#### Communications

- The Multi-Protocol communications provides DDC system flexibility.
- Supports native BACnet MS/TP communications (the ASHRAE standard protocol for interoperability)
- Supports Modbus communications for integration into Modbus DDC networks
- Four baud rate levels offer flexible communications speeds of 9600, 19.2k, 38.4k, or 76.8k baud
- High-speed 16-bit processor with 1024 kBytes RAM and 4096 kBytes Flash Memory, which allows MPC programs to be upgraded and easily downloaded in the field
- Removable field-wiring connectors for ease of field service
- Engineered for quality and reliability

# **MPC Controller Overview**

- Enables building operators to easily upgrade firmware in the future
- Program archival feature

Model:

MPC

- Supports up to one ASW018 and up to four ASW016 or ASW017 sensors
- Supports Equipment Touch Service Tool maintenance and configuration tool

#### Figure 1: Typical System – Water-to-Air Heat Pump



# **General Specifications**

Model: MPC

#### **MPC GENERAL SPECIFICATIONS**

- **Power:** 24VAC ± 10%, 50 or 60 Hz, 15VA max. power consumption
- **Size:** 51/16 inch [129 mm] width x 511/16 inch [144 mm] height x 11/2 inch [38 mm] (minimum panel depth).
- Housing: Rugged GE C<sub>2905</sub>HG Cycoloy plastic housing (complies with UL <sub>94</sub>V-O).
- Environmental: 0-130°F (-17.8 to 54.4 °C), 10% to 95% non-condensing.
- **Protection:** Surge- and Transient-protection circuitry for the power and I/O. Optical isolation for communications port.
- **Processor/Memory:** High-speed 16-bit processor with 1024kB RAM and 4096kB flash memory.
- **LED Indicators:** Individual LEDs for digital outputs, power, run, error, transmit, and receive.
- I/O Point Count:
  - Five digital outputs (on-board relays rated for 1A resistive at 24VAC)
  - Six universal inputs (IN-1 and IN-2 are jumper selectable for dry contact or 0-5VDC)
  - One analog wall sensor port for noncommunicating wall sensors
  - One digital wall sensor port for communicating (RNet) wall sensors

- Communications: EIA-485 communications port using twisted pair. A two position DIP switch allows for manual selection of desired protocol. Available protocols are BACnet MS/TP, Johnson Controls N2, and Modbus. Another two position DIP switch allows for manual selection of desired baud rate. Available baud rates are 9600, 19.2k, 38.4k, and 76.8k.
- Wall Sensor: The wall sensors provide room temperature sensing with digital display, local setpoint adjust, local override, LED for alarm status and fault type indication, and heat pump reset. The wall sensors require between two and five wires depending on the type of sensor used.
- **Mounting Hole:** Use the two mounting holes to center the line with 5‰-inch (141-mm) height spacing.
- **Dimensions:** Factory mounted.

**Board Layout** 



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Board Layout

Model: MPC

#### Figure 4: MPC Control Board Layout



The Multi-Protocol (MPC) Heat Pump controller has a Lithium 3V coin cell battery, CR2032, which provides a minimum of 10,000 hours of data retention during power outages. The CR2032 does not have a clip. It can simply be pulled from the socket using thumb and forefinger. Observe correct polarity while removing and replacing.

# NOTE: When replacing batteries, leave power applied to prevent potential loss of data.

The battery should be replaced every 5 years at minimum to ensure data retention when the unit is not powered. The life cycle of the batteries does not include any shelf life before the battery was originally installed and used. Using the Archive feature after changing settings can minimize data loss. See the Archival Procedure section within the MPC Feature Configuration section for more details.

#### 

Complete shutdown of the main power to the Heat Pump and/or Multi-Protocol (MPC) Heat Pump controller for an extended period of time leaves only the on-board battery for data retention.

# Model: MPC Communications

### **COMMUNICATIONS SELECTION**

When the Communications Selection jumper is in the BACnet over ARC156 position, DIP switch selectors SW1, SW2, SW3, and SW4 are all disabled. BACnet protocol is selected and the baud rate is also selected to be 156 kbps.

When the communications port is configured for the ARC156, use a ARC156 cable available from Automated Logic.

When the communications port is configured for RS-485 communications, use standard dedicated 22AWG- 18AWG twisted pair wire.

For complete details on wiring, termination, for BACnet MS/TP, refer to ANSI/ASHRAE 135-1995, clause 9.2.2. Refer to the Application Note for the BACnet devices that you are interfacing with for specific wiring.

### **COMMUNICATIONS WIRING INSTRUCTIONS**

- 1. Be sure the module's power is off before wiring it to the ARC156 or RS-485 communications bus.
- 2. Check the network communication wiring for shorts and grounds.
- Connect the ARC156 or RS-485 wires and shield to the module's screw terminals as shown in Figure
   Be sure to follow the same polarity as the rest of the ARC156 or RS-485 communications network.
- 4. Power up the module.
- 5. Proper communications for all protocols and baud rates can be verified by making sure the transmit (Tx) and receive (Rx) LEDs are active.

### **PROTOCOL CONFIGURE**

The communications port on the MPC has multiprotocol capability which means the MPC can be configured to communicate via BACnet, Johnson Controls N2, or Modbus communication protocols. This configuration is done via the Communications Selection jumper and the 4-position DIP switch package (SW1, SW2, SW3, SW4) located on the MPC. The communications port's baud rate is also set with this same 4-position DIP switch package. See Figure 6. NOTE: If using ARC156 wiring, then only BACnet protocol can be used. When using RS-485 wiring, any of the three protocols (BACnet, N2, Modbus) can be used.

#### Figure 5: Wiring the ARC156





#### **BACnet Setup**

The MPC can be set up to communicate via BACnet over ARC156 or BACnet MS/TP. Refer to Table 1 for setup.

#### N2 Setup

N2 must be configured for RS-485 communications with a baud rate of 9600, using 8 data bits, no parity, and 1 stop bit. The MPC is always an N2 subordinate. Refer to Table 1 for setup.

#### **Modbus Setup**

Modbus must be configured for RS-485 communications. Baud rate can be selected from 38.4 kbps, 19.2 kbps, or 9.6 kbps. Refer to Table 1 for setup.

# Addressing and Connectivity

Model: MPC

#### ADDRESSING AND POWER UP

Before setting or changing the module's hardware address, make sure the MPC Controller power is off. The MPC only reads the address when the module is powered up. The MPC has two rotary switches for assigning the module's hardware address. One switch corresponds to the tens digit and the second switch corresponds to the ones digit, allowing for hardwarebased addressing of up to address 99. For example, if the module's address is three, set the tens switch to zero and the ones switch to three. The station ID for each MS/TP node must be unique on a MS/TP segment. The MPC's rotary address switches are used to set this unique ID.

#### Figure 7: Setting Module Address



After setting the address, apply power to the MPC, the Run, Error, and Power LEDs should turn on. The Run LED should begin to flash and the Error LED should turn off.

NOTE: Set the address for heat pump #1 (HP-1) at 02 per typical BMS naming conventions. All other heat pump addresses should be assigned as HP# + 1.

### CHANGING THE DEVICE INSTANCE WHEN USING A NETWORK OF MORE THAN 99 MPC UNITS

The MPC allows the device instance to be changed using the Equipment Touch Service Tool. This feature allows an installation with more than 99 MPC-based units to be set and managed on-site rather than factory preset.

In order to change the device instance, the MPC must be powered up. Connect the Equipment Touch Service Tool to the MPC using the local access port. When the main screen displays, access the System Setup menu as follows: **System > Setup > Module Setup > Communication.** 

On the Communication screen, set "Auto Generate Device ID" to **No**. After this, you can select and change the BACnet Device ID.

The device instance is typically six digits long. The last two digits correspond to the addressing rotary dials so these should not be changed using the BACview6.

To change the device instance, select the box next to BACnet Device Instance and a keypad should display, allowing you to type in the new number. Leave the leading zeros (ex: 0001, 0002). Once complete, select **Save** to save your settings. You are returned to the previous menu after saving.

		RS-485 Communciations Options DIP					
Desired Setup	Communications Selection lumper	Baud	Rate	Protocol			
	ocicentin sumper	SW1	SW2	SW3	SW4		
BACnet Setup							
BACnet over ARC156 (156kbps baud rate)	BACnet over ARC156	Doesn'i	Matter	Doesn't Matter			
BACnet MSTP (76.8 kbps baud rate)	RS-485	On	On	Off	Off		
BACnet MSTP (38.4 kbps baud rate)	RS-485	On	Off	Off	Off		
BACnet MSTP (19.2 kbps baud rate)	RS-485	Off	On	Off	Off		
BACnet MSTP (9.6 kbps baud rate)	RS-485	Off	Off	Off	Off		
N2 Setup							
N2 (9.6 kbps baud rate)	RS-485	Off	Off	On	Off		
Modbus Setup							
Modbus (38.4 kbps baud rate)	RS-485	On	Off	Off	On		
Modbus (19.2 kbps baud rate)	RS-485	Off	On	Off	On		
Modbus (9.6 kbps baud rate)	RS-485	Off	Off	Off	On		

#### Table 1: Communications Setup

Model:

# **Additional Information**

### **ADDITIONAL INFORMATION**

#### **Room Sensors**

The MPC is designed to work with specific sensors. Two types of sensors may be used:

- 10K thermistor
- RNet

The RNet is a digital communicating sensor.

The RNet connection is at the upper left of the MPC and the 10K thermistor is at the lower left. Both are four- to five-wire sensors. The MPC comes from the factory with the room-sensor jumper set for 10K thermistor sensor. To utilize the RNet sensors, the jumper must be changed to RNet. Additionally, the MPC software defaults to RNet. You can change a software setting to use an 10K thermistor sensor.

The use of the RNet sensor allows for an extra input into the MPC. When using a unit equipped with ClimaDry<sup>®</sup> II, a combination temperature and humidity sensor is required. Refer to ASW section.

You can use the Equipment Touch Service Tool as a wall sensor if only temperature or temperature and humidity are required (water-to-air only). See the Equipment Touch Service Tool IOM for specific instructions on enabling the Equipment Touch Service Tool internal sensors. The ASW 016, 017, 018 are RNet sensors.

You can purchase ASW 016, 017 and 018 with a temperature-only sensor, temperature and humidity sensors (HUC suffix), or temperature and CO<sub>2</sub> sensors (COC suffix).

#### Table 2: MPC Inputs

Terminals	Туре	Notes
AL1	Dry Contact or 0-5V	
AL2	Dry Contact or 0-5V	
EH2/GRND	Dry Contact or 0-5V	
LAT/LWTL	Dry Contact or Thermistor (analogue)	
LWT/LWTS	Dry contact or Thermistor (analogue)	
TEMP/GRND	Optional Thermistor (analogue)	
SW/GRND	Optional Thermistor (analogue)	

#### **Retrofitting MPC to Existing Units**

The MPC can be added to any unit with the CXM2/DXM2.5 control. A retrofit kit is available with the control, necessary wiring, and additional sensors (part number ACNTRL06).

#### LAT

The leaving air temperature is reported to the BMS. LAT control is not supported.

#### iGate® 2 Communication

On units equipped with a DXM2.5 control, the iGate 2 functions are not available when the MPC is installed. The Service Tool can be connected directly to the DXM2.5 to access the DXM2.5 control board functions. The MPC does not access these functions.

#### **Additional Inputs**

The AL1/AL2 and EH2/GND inputs are available with either type of sensor. Temp/GND and SW/GND are available when the RNet sensor is used.

AL1/AL2 and EH2 input terminals can accept 0-5VDC, Thermistor, or dry-contact signals. Terminals LAT/LWTL and LWT/LWTS accept thermistor or dry-contact signals.

LAT/LWTL and LWT/LWTS come with leaving air and leaving water temperature thermistors installed, but these thermistors can be repurposed. The LStat terminals can be used for an additional thermistor input (Gnd/Temp) and SW can be used as a dryinput contact.

The MPC allows custom factory programming of the various inputs to accomplish various sequence of operations as the building may require.

The MPC can be programmed with a 7-day program.

# Equipment Touch Service Tool Service Tool Overview

Model: MPC

#### Figure 8: Equipment Service Tool Layout



Wire the Equipment Touch Service Tool to the controller's RNet port. The RNet port can have one Equipment Touch Service Tool device and up to five RNet (ASW 016, 017, or 018) sensors.

#### NOTE: The Equipment Touch Service Tool RNet port does not support RS Sensors.

When prompted for password: Password = 9999

# Model: MPC Equipment Touch Service Tool Service Tool Overview

The Equipment Touch Service Tool (Figure 8) is a touchscreen device with a 4.3-inch color LCD screen that is connected to an MPC Gen 8 Controller Unit. It provides access to most internal control/status points and alarms that normally require access to the system server (WebCTRL) to access. The Equipment Touch Service Tool replaces the BACview6 service tool and includes additional features. The Equipment Touch Service Tool can also function as a wall sensor providing temperature and humidity data to the controller when configured to do so (water-to-air only).

The Equipment Touch Service Tool connects to the MPC Controller's RNet port in the same manner as the RNet Wall Sensors and can reside with up to five RNet Sensors. Each MPC Gen 8 Controller can support up to five RNet Sensors and one Equipment Touch Service Tool (Figure 9 and 10).

A software version of Equipment Touch Service Tool that works on most Android devices is also available. (See appendix for additional information).



### Figure 9: Basic Equipment Touch Service Tool connection program

#### Figure 10: Equipment Touch Service Tool wiring diagrams

Wire the Equipment Touch Service Tool in a daisy-chain configuration with up to five RNet zone sensors as shown.



# Equipment Touch Service Tool Mounting Details

Model: MPC

### WIRING AND MOUNTING THE EQUIPMENT TOUCH SERVICE TOOL

- 1. Remove the backplate from the Equipment Touch Service Tool:
  - a. Hold the Equipment Touch Service Tool as shown in the image below:

### Figure 11: Remove the Backplate



- While firmly pressing the two tabs on top of the Equipment Touch Service Tool, pull on the backplate with your index finger until the backplate releases from the Equipment Touch Service Tool.
- 2. Pull the communication cable, power cable and external thermistor wiring (if applicable) through the large hole in the center of the backplate.
- 3. Partially cut then bend and remove the outer jacket of the RNet cable(s). Do not damage the individual wire insulation.
- 4. If wiring one cable to the Equipment Touch Service Tool, cut the shield wire off at the outer jacket, then wrap the cable with tape at the outer jacket to cover the end of the shield wire. If wiring two cables in a daisy-chain configuration, twist together the shield wires, then wrap the cable with tape.
- 5. Strip about 0.25 inch (0.6) of insulation from the end of each wire.
- 6. Connect wiring to the Equipment Touch Service Tool as shown below:

#### 

Allow no more than 0.6 inch (1.5 mm) of bare communication wire to protrude. If bare communication wire contacts the cables foil shield, shield wire or a metal surface other than the terminal block, the device may not communicate correctly.



- 7. Attach the backplate to the wall or panel. If mounting in or on a panel:
  - a. Drill two 3/16-inch (4.8 mm) pilot holes in the panel.
  - Attach a backplate using pan head 6-32 x <sup>3</sup>/<sub>8</sub>-inch to <sup>1</sup>/<sub>2</sub>-inch long machine screws. Do not overtighten screws to prevent damage to plastic housing. Recommendation: Use Loctite 220 on screw threads if the Equipment Touch Service Tool is subject to vibration.
- 8. Attach the Equipment Touch Service Tool to the backplate:
  - a. Place the bottom of the Equipment Touch Service Tool onto the backplate by aligning the two slots on the Equipment Touch Service Tool with the tabs on the backplate.
  - Push the Equipment Touch Service Tool onto the backplate until the tabs at the top of the Equipment Touch Service Tool snap onto the backplate.
- 9. Turn off the controller's Power.
- 10. Connect the other end of the RNet wiring to the controller's RNet port or to a zone sensor.

#### NOTE: Insert the shield wire with the ground wire into the controller's GND terminal. Use the same polarity throughout the RNet.

- 11. Connect power wiring to a 24VAC power supply.
- 12. Turn on the controller's power.

Model:

## **LED Codes**

#### LEDS

- **Power**: lights when power is on
- Run: flashes when the processor is running
- Error: lights when an error is detected
- **Receive (Rx)**: lights when the communication port receives data
- **Transmit (Tx)**: lights when the communication port transmits data
- **Digital Output**: lights when the associated digital output turns on

### LED POWER-UP SEQUENCE

During power-up, the module goes through an initialization and self-test sequence.

Proper module power-up can be verified by observing the LEDs as follows:

- 1. The Run and Error LEDs turn on and begin flashing.
- 2. The Error LED then turns off.
- 3. The Run LED continues flashing.

NOTE: The Error LED flashes three times in sync with the Run LED when the module is being formatted. The Run LED should never stop flashing. If it stops flashing for 1.5 seconds, the watchdog timer resets the module.

### **OVERCURRENT PROTECTION**

The MPC Controller is protected by internal solid-state polyswitches (polymeric PTC, resettable overcurrent protection device, also called PPTC) on the incoming power. The overcurrent protection circuitry is a positive temperature coefficient (PTC) thermistor that increases in resistance as it warms up and stays in that mode until the power is removed. Once the power is removed, the polyswitch resistance lowers to operational level as the device cools down. After power has been re-applied, the unit operates properly if the fault condition has been removed.

It is not necessary to remove power on the communication line in order to reset the solid state overcurrent circuit. Once the power level is low enough, the overcurrent circuit cools down to operating temperature. A blown polyswitch can indicate incorrect wiring during installation. Generally, a blown polyswitch indicates a power surge was received by the board.

# **LED Codes**

Model: MPC

#### **DIGITAL OUTPUT LEDS**

There are five digital outputs on the MPC. One output (AUX) can be custom configured to control an external device (1 amp at 24VAC.). G, O, Y2, and Y1 are required to operate the heat pump and are connected to the CXM2/DXM2.5 boards.

#### Table 3: MPC Flash Codes

Run LED	Error LED	Condition	Action
Two flashes per second	OFF	Normal	Expected behavior of a configured controller
Two flashes per second	Two flashes, alternating with Run LED	Five minute auto-restart delay after system error	Controller counts down the five minutes, then attempts to restart normally if the condition that caused the fault returns to normal. Disconnect all wiring and see if the controller restarts normally.
Two flashes per second	Three flashes then OFF	Module has just been formatted	This condition should not occur with a configured controller. Memory archive ensures the controller always has a configuration.
Two flashes per second	Four flashes then pause	Two or more devices on this network have the same ARC156 network address	Disconnect the comm connector then assign a unique network address.
Two flashes per second	Six flashes then OFF	Module's response to a LonTalk 'wink' command received from a LonWorks Network Management Tool	N/A
Two flashes per second	ON	Exec halted after frequent system errors or GFB's halted	N/A
Two flashes per second	ON	Exec start-up aborted, Boot is running	If this condition occurs manual restore the memory from archive or download memory
Two flashes per second	OFF	Firmware transfer in progress, Boot is running	Normal behavior during a memory download
Seven flashes per second	Seven flashes per second, alternating with Run LED	Ten second recovery period after brownout	Precedes the brownout condition
14 flashes per second	Seven flashes per second, alternating with Run LED	Brownout	Check power supplied to the controller

# Sequence of Operation

### FAN OPERATION

Digital output point G (DO4) is the fan output and is connected to the G terminal on the CXM2/DXM2.5 control. If Fan Mode is set to **Auto**, then the fan is energized only during a call for heating or cooling. Auto Mode is the default mode of operation. At 30% PID, the fan(G) energizes in Auto Mode.

### **HEATING/COOLING CHANGEOVER**

The digital output O (DO3) is the RV output and is connected to the O terminal on the CXM2/DXM2.5 control. O is energized during call for cooling. The RV (O) energizes at 40% PID in cooling only.

### **COMPRESSOR OPERATION**

The digital outputs Y1 (DO1) and Y2 (DO2) are the outputs for compressors stage 1 and 2. Y1 is connected to Y terminal on the CXM2/DXM2.5 and if the heat pump is dual stage, Y2 is connected to a second CXM2 Y input or Y2 on the DXM2.5.

Y1 and Y2 are off when the zone temperature is between the heating and cooling set points. As the zone temperature rises above cooling set point or below heating setpoint, **Y1 is energized at 50% PID and Y2 is energized at 75%**.

There is also a load sharing mode that permits swapping the primary status of Y1 with Y2 depending on compressor run time. The low-time compressor becomes primary and the high-time compressor assumes secondary status.

NOTE: All five digital outputs have associated LEDs to indicate operating status. If the digital output is on, then the associated LED is on.

### OCCUPIED/UNOCCUPIED CHANGEOVER

When the MPC is in the stand-alone mode of operation, the MPC defaults to the Occupied Mode of operation. Occupancy changeover may be provided through the communications network.

### **TROUBLESHOOTING TIPS**

If the BMS is having trouble communicating with the MPC, check the following items before contacting technical support.

- Make sure the MPC wiring is correct. Make sure all color codes match and that no wire strands are shorting over to other terminals.
- Make sure the MPC and other network controllers have power and are turned on. Make sure all equipment has power and LEDs lit with no solid error light. Some devices, especially communication devices, receive power from a source other than a power cable or adapter. Some panels can be reinitialized by resetting the panel.
- Verify operation of all LEDs: RX, TX, Power, Run, DOs and Error.
- Make sure that all jumpers are set to default and that there is nothing jumped on the format pin.

### WATER-TO-WATER STARTUP CHECK

- 1. Unit powered up and running.
- 2. LED check: Rx, Tx, Power, Run and no solid RED error led.
- Program initializing schedule status for Occupied Mode (default) or Unoccupied Mode determines set point range. Occupied set points are defaulted to 53 cooling and 105 heating. If a schedule is implemented, the unoccupied set points default to 73 cooling and 85 heating.
- 4. The program determines if the unit is either a Master or Subordinate.
- The program controls the water temperature based on the Entering Water Temperature (EWT) Load Sensor. This can be changed to control based off of the LWT via BAS or Equipment Touch Service Tool by setting Heating or Cooling control (BV:10 and BV:09).
- 6. The program checks for which watertemperature set point to use based on Heating Mode or Cooling Mode.

# **Sequence of Operation**

Model: MPC

- In water-to-water applications, manually change the mode via BACnet or with the Equipment Touch Service Tool. If it is in heating, it permanently stays in Heating Mode until it is changed to Cooling Mode.
- Like water-to-air, Y1 illuminates at 50% and Y2 at 75% and not off until the EWT/LWT conditions are satisfied.
- 9. A 5-minute delay is built in between compressor cycles.
- 10. While the unit is on, the program continues to monitor the CXM2/DXM2.5 control for faults. If a fault event occurs and the unit is in Lockout Mode, the relay closes (IN1/AL1/AL2/GND) and the fault code is transmitted via EH2 output to the EH2 input on the MPC. This is available through BAS network points. A history counter keeps track of past and present faults which can also be viewed via BAS or Equipment Touch Service Tool.
- 11. The MPC can also function in Metric Mode (Celsius Mode).

### WATER-TO-AIR STARTUP CHECK-EQUIPMENT TOUCH SERVICE TOOL METHOD

1. Unit is powered up?

YES: Go to step 2 NO: Apply power to MPC.

- 2. Check LED status.
  - a. Green (TxD) LED should be flashing rapidly
  - b. Green power LED should be on solid
  - c. Green run LED should be flashing at 1-2 flashes per second
  - d. RED error LED should be off.

YES: Go to step 3.

 Power down MPC and wire up the Equipment Touch Service Tool and RNet Sensor(s). Doublecheck that jumper W3 is in the **RNet** position. Once these are installed, power MPC back up. The Equipment Touch Service Tool should power up and display the Main (Home screen).

#### Figure 13: Menus screen



- 4. Navigate to the Sensor Setup and Status screen by pressing MPC Setup/Status > Sensor Setup/ Status. Press the ZS Sens Active. This should display the correct address and number of ZS Sensors that are attached to the MPC. Press Back and go to the ZS Sensor Setup screen where you can enable the alarms for each sensor installed and detected in the previous step.
- 5. From the Equipment Touch Service Tool menu, press Temp Setup and Status then Temp Units. Current Mode should be set to Fahrenheit. If this is ok, you are finished and can move on to Step 5. Otherwise uncheck the Metric Mode (BV:39) point to set the MPC to Fahrenheit Mode. Make sure the Current Mode changes to FAHRENHEIT before pressing BACK and exiting this screen. From the Temp Setup and Status screen press Temp Setpoints.
- 6. The default settings for the Fahrenheit and Celsius operation modes are listed here in this screen. If your setpoints differ from the default values listed here, please enter them in the appropriate box.

#### Table 4: Temperature Setting:

Description	Fahrenheit	Celsius
Master Zone Temp	73.0	22.7
Unoccupied Dead Band	17	9.44
Occupied Dead Band	2	1.11
Unoccupied Heat Setpoint	82	27.7
Occupied Cool Setpoint	74	23.3
Subordinate Heat Setpoint	72	22.2
Subordinate Cool Setpoint	74	23.3

# Model: Sequence of Operation

 Press Manual SP to go to the MANUAL SP screen in which you can edit the Manual Setpoint Adjust Range. The default is ± 5° Fahrenheit or ± 2.8° Celsius. This allows you to have a 10°F/4.6°C adjustment range of the setpoint from the sensor. If you would like a different range, please enter it now.

# NOTE: If it is set to zero, no adjustment can be made from the wall sensor.

- 8. The MPC defaults to RNet Sensors. If you have 10K thermistor sensor types, set jumper W3 to LStat.
- From the MPC Setup/Status screen, press
   Compressor Setup. Check the compressor settings to ensure all are set to the default factory settings. Load Balance Select controls the stage assignment of compressors. The default setting assigns Compressor 1 as primary and Compressor 2 as secondary.

# NOTE: For single compressor systems C1 should always be primary.

Description	Point	Default
Load Balance Select	AV:59	2
Compressor Shut Down	BV:53	Unchecked
C1 Manual	BV:30	Unchecked
C2 Manual	BV:31	Unchecked
C1 Runtime Reset	BV:2	Unchecked
C2 Runtime Reset	BV:5	Unchecked
C1 Cycle Reset	BV:21	Unchecked
C2 Cycle Reset	BV:22	Unchecked

#### Table 5: Compressor Setup

10. From the MPC Setup/Status screen, press Heat/ Cool Control. Ensure that the following points are set to the default values. The default values enable both the Heating and Cooling Modes and ensures the reversing valve is not in Manual Mode. If you need Heat Only or Cool Only Modes, uncheck the appropriate enable for the mode you wish to disable. Both modes are enabled in 99% of all applications.

#### Table 6: MPC Setup/Status

Description	Point	Default
Heat Mode Enabled	BV:61	Checked
Cool Mode Enabled	BV:54	Checked
Reversing Valve Manual	BV:30	Unchecked

11. From the **MPC Setup/Status** screen, press **Fan/Filter Control**. Check the following points for the correct default values. The Supply FAN is configured to cycle anytime the compressor is **ON**.

#### Table 7: Fan/Filter Control

Description	Point	Default
Emergency Shutdown	BV:8	Unchecked
Supply Fan Manual	BV:28	Unchecked
Supply Fan Configure	AV:33	1
Dirty Filter Reset	BV:7	Unchecked
Dirty Filter Interval	AV:30	1500
Dirty Filter Mode	BV:60	Time
Dirty Filter Sense	BV:59	Unchecked
Fan Speed Enable	BV:51	Unchecked
Fan Speed Trigger Type	AV:56	75%

- From the MPC Setup/Status screen, press Heat/ Cool Control. Check Occupancy BV:12 and make sure it is set to Occupancy.
- 13. From the MPC Setup/Status screen, press AUX Outputs. Check the AUX CFG setting for the default value of 1. This is Emergency Electric Heat. If other functions are needed please consult the Control Points Matrix for other functional settings associated with this point.

# Sequence of Operation

Model: MPC

- 14. From the MPC Setup/Status screen, press MPC Monitor Screen. From this screen, you can adjust the temperature setpoint and watch the function of the MPC. You can remove the Y1, Y2 output wires to keep unit from going into Heat or Cool Mode for this operation.
  - a. You should see both the Occupied icon and AUX Mode = Emergency ELEC Heat. If there is no RNet Sensor with a humidity sensor installed, the RH icon is equal to 0.0.
  - b. Read the Zone Temperature and adjust the Zone Heating Setpoint at least 2° above the Ambient Zone Temperature (you can use the RNet Sensor or the Equipment Touch Service Tool for this operation). You should be able to observe the **Heat PID** icon start increasing as the MPC is set to go into a heating cycle.
    - When the PID value increases above 30%, the **Fan** icon for the Supply Fan displays.
    - When the PID value rises above 40%, the **RV** icon disappears (assuming Cooling Mode was last active) indicating the Reversing Valve is not energized.
    - When the PID value reaches 50%, Compressor stage 1 turns on and the C1 icon displays, assuming the anti-short cycle delay expired.
    - If the space temperature is not increasing, the PID continues increasing until it reaches 75% when Compressor 2 turns on and the C2 icon displays. If the PID increases above 90%, the Emergency Electric Heat (AUX) Output is energized.
    - Decrease the Heating Setpoint 2° below the Zone Temperature and the Heating PID decreases.

- When the PID value falls below 90%, the AUX Output turns off. When it falls below 75%, C2 turns off.
- When the PID value falls below 50%, the compressor output, C1, turns off. When it falls below 40%, the Supply Fan turns off.
- c. Read the Zone Temperature and adjust the Zone Cooling Setpoint at least 2° below the Ambient Zone Temperature. You should observe the Cool PID increasing as the MPC is set to go into a Cooling cycle.
  - When the PID value increases above 30%, the **Fan** icon for the Supply Fan displays.
  - When the PID value rises above 40%, the RV icon displays indicating the Reversing Valve is energized.
  - When the PID value reaches 50%, Compressor stage 1 turns on and the C1 icon displays assuming the anti-short cycle delay expired.
  - If the space temperature is not decreasing, the PID continues increasing until it reaches 75% when Compressor 2 turns on and the C2 icon displays.
  - Increase the cooling setpoint 2° above the Zone Temperature and the Cooling PID value begins to decrease.
  - When the cooling PID value falls below 50%, the compressor output, C1, turns off. When it falls below 40%, the Supply Fan turns off.

# Gen 7 and Newer Water-to-Air Points Matrix

Do int Name	BA	BACNet		Modbus		N2		Defend	Description
Point Name	Туре	Number	Write	Туре	Register	Туре	ID	Derduir	Description
Archive Status	MSV	10	R	NA	NA	NA	NA	NA	Reports the status of the archival process.
Actual CL Setpoint	AV	1	R	Float	30007	Data Float	1	74°F	Actual cooling setpoint based upon occupancy status, setpoint adjustment and metric conversion.
Actual HT Setpoint	AV	2	R	Float	30009	Data Float	2	72°F	Actual heating setpoint based upon occupancy status, setpoint adjustment and metric conversion.
Occupied CL SP/ Fahrenheit	AV	3	R/W	Float	40001	Data Float	3	74°F	Network setpoint for the cooling setpoint (Fahrenheit) in Occupied Mode.
Master ZT/ Fahrenheit	AV	4	R/W	Float	40003	Data Float	4	73°F	Fahrenheit network setpoint for multiple MPCs sharing the same space temperature sensor. Only for subordinate units when (BV:16) is <b>ON</b> .
Occupied Deadband/ Fahrenheit	AV	5	R/W	Float	40005	Data Float	5	2°F	Creates the Fahrenheit Heating Setpoint using Occupied Cooling Setpoint minus current value when using Deadband Mode. Minimum value is 2°F. DB Mode: (BV:48) must be <b>ON</b> .
Pulse Signal Value	AV	6	R	Float	30011	Data Int	1	1	Indicates the last fault code in memory on the CXM2/DXM2.5 board. Refer to CXM2/DXM2.5 manual for fault code descriptions.
Unoccupied CL SP/ Fahrenheit	AV	7	R/W	Float	40007	Data Float	6	82°F	Network setpoint for the Fahrenheit Cooling Setpoint in Unoccupied Mode.
Override Time Remaining	AV	8	R	NA	NA	NA	NA	NA	Obsolete point found only in Gen 3 and Gen 4.
Subordinate HT SP/ Fahrenheit	AV	9	R/W	Float	40011	Data Float	8	72°F	Network Input for the actual Fahrenheit Heating Setpoint when used as a subordinate unit. This input is only used for subordinate units when the M/S Switch (BV:16) is <b>ON</b> .
Subordinate CL SP/ Fahrenheit	AV	10	R/W	Float	40009	Data Float	7	74°F	Network Input for the actual Fahrenheit Cooling Setpoint when used as a subordinate unit. This input is only used for subordinate units when the M/S Switch (BV:16) is <b>ON</b> .
HP Fault	AV	11	R	Float	30014	Data	2	0	Indicates the number of High Pressure Faults since startup
LP Fault Counter	AV	12	R	Float	30015	Data Int	3	0	Indicates the number of Low Pressure Faults since startup or the last reset via Fault Reset (BV:24).
LT1 Fault Counter	AV	13	R	Float	30016	Data Int	4	0	Indicates the number of Liquid Temperature 1 Faults since startup or the last reset via Fault Reset (BV:24).
LT2 Fault Counter	AV	14	R	Float	30017	Data Int	5	0	Indicates the number of Liquid Temperature 2 Faults since startup or the last reset via Fault Reset (BV:24).
CO Fault Counter	AV	15	R	Float	30018	Data Int	6	0	Indicates the number of Condensate Overflow Faults since startup or the last reset via Fault Reset (BV:24).
Over/Under Voltage Fault Counter	AV	16	R	Float	30019	Data Int	7	0	Indicates the number of Over/Under Voltage Faults since startup or the last reset via Fault Reset (BV:24).
UPS Fault Counter	AV	17	R	Float	30020	Data Int	8	0	Indicates the number of UPS Faults since startup or the last reset via Fault Reset (BV:24).
Swapped LT1/LT2 Fault Counter	AV	18	R	Float	30021	Data Int	9	0	Indicates the number of swapped LT1/LT2 faults since startup or the last reset via Fault Reset (BV:24).
C1 Cycle Counter	AV	19	R	Float	30022	Data Int	10	0	Indicates the number of times Compressor 1 has cycled ON/OFF more than 6 times in one hour since startup or the last reset via Fault Reset (BV:24).
C2 Cycle Counter	AV	20	R	Float	30023	Data Int	11	0	Indicates the number of times Compressor 2 has cycled ON/OFF more than 6 times in one hour since startup or the last reset via Fault Reset (BV:24).
Occupied HT Setpoint	AV	21	R/W	Float	40051	Data Float	34	72°F	Network input for the Fahrenheit Occupied Heating Setpoint when not using Deadband Mode. DB Mode (BV:48) must be <b>OFF</b> .

# Gen 7 and Newer Water-to-Air Points Matrix

Model: MPC

Table	continued	from	previous	page.
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Point Namo	BACNet		Read/	ead/ Modbus		N2 Default		Default	Description	
Type Numbe	Number	Write	Туре	Register	Туре	ID	Deldoli	Description		
Occupied HT Setpoint Celsius	AV	22	R/W	Float	40053	Data Float	35	22.2°C	Network input for the Celsius Occupied Heating Setpoint when not using Deadband Mode. DB Mode (BV:48) must be <b>OFF</b> .	
Unoccupied HT Setpoint	AV	23	R/W	Float	40055	Data Float	36	65°F	Network input for the Fahrenheit Unoccupied Heating Setpoint when not using Deadband Mode. DB Mode (BV:48) must be <b>OFF</b> .	
Unoccupied HT Setpoint Celsius	AV	24	R/W	Float	40057	Data Float	37	18.3°C	Network input for the Celsius Unoccupied Heating Setpoint when not using Deadband Mode. DB Mode (BV:48) must be <b>OFF</b> .	
HT PID	AV	28	R	Float	30024	Data Float	17	0	Heating PID based on the setpoint and actual space temperature in Percent (%).	
CL PID	AV	29	R	Float	30026	Data Float	18	0	Cooling PID based on the setpoint and actual space temperature in Percent (%).	
Dirty Filter Interval	AV	30	R/W	Float	40027	Data Float	19	1,500 Hrs	Time Interval for the time based Dirty Filter Replacement Alarm.	
AUX CFG	AV	31	R/W	Float	29	Data Float	20	1	Sets Configuration parameters for the AUX output Relay (W). See AUX CFG SETTINGS section below.	
TSTAT Mode	AV	32	R/W					1	Determines method of Temp Control in Gen 3 Hardware.	
SF CFG	AV	33	R/W	Float	33	Data Float	22	1	Sets Configuration parameters for the Supply Fan.	
Zone Temp Status	AV	34	R	Float	30028	Data Float	23	NA	Network Output for Space (Room Temp)Temperature. Celsius/Fahrenheit.	
LVG Air Temp Status	AV	35	R	Float	30030	Data Float	24	NA	Leaving Air Temperature for WSHP. Celsius/Fahrenheit.	
LVG Water Temp Status	AV	36	R	Float	30032	Data Float	25	NA	Leaving Water Temperature for WSHP. Celsius/ Fahrenheit.	
Manual SP Adjust	AV	37	R/W	Float	40035	Data Float	26	5°F	Network Input for User Defined Fahrenheit Setpoint Adjustment. Should not be used with LStat Sensors If = 0 cannot adjust SP at ASW.	
Master ZT Celsius	AV	38	R/W	Float	40037	Data Float	27	22.7°C	Celsius Network Input for multiple WSHP sharing the same Space Sensor. This is only for Subordinate units where the M/S Switch is (BV:16) <b>ON</b> .	
Unoccupied CL SP Celsius	AV	39	R/W	Float	40039	Data Float	28	27.7°C	Network Input for the Celsius cooling setpoint in the Unoccupied Mode.	
Occupied Deadband Celsius	AV	40	R/W	Float	40041	Data Float	29	1.1°C	Creates the Celsius Heating Setpoint using Occupied Cooling Setpoint minus current value when using the Dead Band Mode. Minimum Value is 1.11° C. DB Mode (BV:48) must be <b>ON</b> .	
Subordinate CL Setpoint Celsius	AV	41	R/W	Float	40043	Data Float	30	23.3°C	Network input for the actual Celsius Cooling Setpoint when used as a subordinate unit. This input is only used for subordinate units where the M/S Switch (BV:16) is <b>ON</b> .	
Subordinate HT Setpoint Celsius	AV	42	R/W	Float	40045	Data Float	31	22.2°C	Network input for the actual Celsius Switch Heating Setpoint when used as a subordinate unit. This input is only used for subordinate units where the M/S Switch (BV:16) is <b>ON</b> .	
Occupied CL SP Celsius	AV	43	R/W	Float	40047	Data Float	32	23.3°C	Network Input for the Celsius cooling setpoint in the Occupied Mode.	
Manual Setpoint Adj Celsius	AV	44	R/W	Float	40049	Data Float	33	2.7°C	Network Input for user defined Celsius Setpoint Adjustment. Should not be used with RS Pro Sensors.	
Unoccupied Deadband	AV	45	R/W	Float	40015	Data Float	10	17.0°F	Creates the Fahrenheit heating setpoint using Unoccupied Cooling Setpoint minus current value when using Deadband Mode. Minimum value is 2° F. DB Mode (BV:48) value must be <b>ON</b> .	
RV Status	BV	13	R	DI	10006	BI	6	NA	Indicates the Reversing Valve Status (ON/ OFF).	
Work Schedule	BV	14	R/W	NA	NA	NA	NA	NA	Reads Schedule from BMS and informs controls whether they are in Occupied or Unoccupied Mode.	
UPS Signal	BV	15	R	DI	10007	BI	7	NA	Indicates if the UPS Mode is ON/OFF. Refer to CXM2/DXM2.5 AOM for UPS Definition.	

# Gen 7 and Newer Water-to-Air Points Matrix

Point Name	BA	CNet	Read/	Мо	dbus	N2		Default	Description
Tohin Nume	Туре	Number	Write	Туре	Register	Туре	ID	Delutin	Description
M/S Switch	BV	16	R/W	DO	8	BI	8	OFF	Master/Subordinate network input to enable the use of Master ZT. Master unit is defined as one WSHP per sensor and the default value is <b>OFF</b> . Subordinate is defined as a unit that does not have it's own wall sensor and that shares a wall sensor with Master unit and the value is <b>ON</b> .
C1 Runtime Alarm	BV	17	R	DI	10008	BI	8	NA	Indicates the number of operational hours for C1 has exceeded 5000. Reset via C1 Reset(BV:2).
C2 Runtime Alarm	BV	18	R	DI	10009	BI	9	NA	Indicates the number of operational hours for C2 has exceeded 5000. Reset via C2 Reset(BV:5).
Dirty Filter Alarm	BV	19	R	DI	10010	BI	10	NA	Indicates the number of Supply Fan operational Hours has exceeded the Dirty Filter Interval setting. Reset via Dirty Filter Reset (BV:7).
Valid Sensor Alarm	BV	20	R	DI	10011	BI	11	NA	Indicates there is no valid Room Sensor connected to the MPC Unit.
C1 Cycle Reset	BV	21	R/W	DO	9	BO	9	OFF	Network Input to reset the C1 Cycle Counter (AV:20) back to zero.
C2 Cycle Reset	BV	22	R/W	DO	10	BO	10	OFF	Network Input to reset the C2 Cycle Counter (AV:20) back to zero.
Lockout Alarm	BV	23	R	DI	10012	BI	12	NA	Indicates the CXM2/DXM2.5 is in Lockout Mode.
Fault Counter Reset	BV	24	R/W	DO	11	BO	11	OFF	Network Input used to reset the historical counters for each fault code back to zero.
C1 Cycle Alarm	BV	25	R	DI	10013	BI	13	NA	Indicates the Compressor C1 has cycled ON/OFF more than 5 times during 1 hour.
C2 Cycle Alarm	BV	26	R	DI	10014	BI	14	NA	Indicates the Compressor C2 has cycled ON/OFF more than 5 times during 1 hour.
AUX Status	BV	27	R	DI	10015	BI	15	NA	Indicates the AUX output (W) is OFF/ON.
SF Manual	BV	28	R/W	DO	12	BO	12	OFF	Manual Switch to turn Supply Fan (OFF/ON). Only works while in Test Mode.
RV Manual	BV	29	R/W	DO	13	BO	13	OFF	Manual Switch to turn Reversing Valve (OFF/ON). Only works while in Test Mode.
C1 Manual	BV	30	R/W	DO	14	BO	14	OFF	Manual Switch to turn Compressor C1 (OFF/ON). Only works while in Test Mode.
C2 Manual	BV	31	R/W	DO	15	BO	15	OFF	Manual Switch to turn Compressor C2 (OFF/ON). Only works while in Test Mode.
TStat Reset	BV	33	R/W	ADF	28	Coil	29	OFF	Obsolete Point found only in Gen 5.
AUX Manual	BV	32	R/W	DO	16	BO	16	OFF	Manual switch to turn AUX Output (W) (OFF/ON). Only works while in Test Mode.
Test Mode	BV	34	R/W	DO	18	во	18	OFF	Network input used to bypass normal operations in order to operate the unit manually, maximum ON time for Test Mode is 60 minutes.
Test Mode Alarm	BV	38	R	DI	10025	BI	21	NA	Indicates the unit is still in Test Mode after the Test Mode timer has expired.
Metric	BV	39	R/W	DO	21	BO	28	OFF	Network input used to define inputs and outputs. Celsius- ON/Fahrenheit- OFF.
AUX Toggle	BV	40	R/W	DO	17	BO	17	OFF	Network input used to toggle the auxiliary output (W) <b>ON</b> and <b>OFF</b> . Used when AUX CFG (AV:31) is set to a value of 11.
Unoccupied Deadband Celsius	AV	46	R/W	Float	40017	Data Float	11	9.44°C	Creates the Celsius Heating Setpoint using Unoccupied Cooling Setpoint minus current value when using the Deadband Mode. Minimum value is 1.1°C . DB Mode (BV:48) must be <b>ON</b> .
Relative Humidity Setpoint	AV	47	R/W	Float	59	Data Float	38	60%	Network input for the Dehumidification Setpoint above which the Auxiliary Output (W) is activated when AUX CFG (AV:31) is set to 12 for Humidity Control.
Relative Humidity Deadband	AV	48	R/W	Float	61	Data Float	39	5%	Creates dehumidification turn off point using Relative Humidity SP minus the RH current value when AUX CFG (AV:31) is set to 12 for Humidity Control.

#### Table continued from previous page.

# Gen 7 and Newer Water-to-Air Points Matrix

Model: MPC

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De la	BA	CNet	Read/	Mo	dbus	N2		Default	Description		
Point Name	Туре	Number	Write	Туре	Register	Туре	ID	Detault			
Relative Humidity Status	AV	49	R	Float	34	Data Float	40	NA	Network Output for Space Relative Humidity when using appropriate sensor.		
Aux 5 Temp	AV	50	R	Float	36	Data Float	41	NA	Network Output for Auxiliary Temperature 5 when RNet Mode (BV:44) is <b>ON</b> and AUX 5 CFG (BV:47) is set to <b>ON</b> for temperature sensor.		
Aux 6 Temp	AV	51	R	Float	38	Data Float	42	NA	Network Output for Auxiliary Temperature 6 when RNet Mode (BV:44) is <b>ON</b> and AUX 6 CFG (BV:46) is set to <b>ON</b> for temperature sensor.		
CO <sub>2</sub> Status	AV	52	R	Float	40	Data Float	43	NA	Network Output for Space CO <sub>2</sub> level when using the appropriate sensor.		
VOC Status	AV	53	R	Float	42	Data Float	44	NA	Network Output for Space VOC level when using the appropriate sensor.		
CO2 Trip point	AV	54	R/W	Float	63	Data Float	45	800 PPM	Network Input for $CO_2$ trip point above which the Auxiliary Output is activated when AUX CFG (AV:31) is set to 13 for $CO_2$ Control.		
VCO Trip point	AV	55	R/W	Float	65	Data Float	46	800 PPM	Network Input for VOC trip point above which the Auxiliary Output is activated when AUX CFG (AV:31) is set to 14 for VOC control.		
FAN Speed Trigger	AV	56	R/W	Integer	67	Data Int	12	75%	Network input for Heating or Cooling PID above which the AUX Output (W) turns <b>ON</b> when AUX CFG is set to 5 for Fan Speed Control. Requires field wired relay for PSC motors only.		
Airflow Fault Counter	AV	57	R	Integer	44	Data Int	13	0	Indicates the number of airflow faults that have occurred since unit startup or resetting the fault counter via Fault Count Reset (BV:24).		
Pump Fault Counter	AV	58	R	Integer	45	Data Int	14	0	Indicates the number of pump faults that have occurred since unit startup or resetting the fault counter via Fault Count Reset (BV:24).		
Application Type	AV	99	R	Float	13	Data Float	9	NA	Factory use only.		
Alarm State	BV	1	R	DI	10001	BI	1	NA	<b>ON</b> indicates a lockout condition exists, <b>OFF</b> indicates normal operation.		
C1 Reset	BV	2	R/W	DO	1	BO	1	OFF	Network Input used to reset the C1 Runtime Alarm (BV:17) once the event is triggered		
C1 Status	BV	3	R	DI	10002	BI	2	NA	Indicates if Compressor 1 is <b>ON</b> or <b>OFF</b> .		
System Reset	BV	4	R/W	DO	2	во	2	OFF	Network Input used to reset the unit from Lockout Mode. User must turn it <b>ON</b> then turn it <b>OFF</b> , not a momentary switch.		
C2 Reset	BV	5	R/W	DO	3	BO	3	OFF	Network Input used to reset the C2 Runtime Alarm (BV:17) once the event is triggered.		
C2 Status	BV	6	R	DI	10003	BI	3	NA	Indicates if Compressor 2 is <b>ON</b> or <b>OFF</b> .		
Dirty Filter Reset	BV	7	R/W	DO	4	BO	4	OFF	Network Input used to reset the Dirty Filter Alarm (BV:19).		
Emergency Shutdown	BV	8	R/W	DO	5	BO	5	OFF	Network Input for Emergency Shutdown. When engaged, Y1, Y2, G & W output relays turn <b>OFF</b> .		
Supply Fan Operational Mode	BV	9	NA	NA	NA	NA	NA		Sets Supply Fan Mode: OFF=auto fan/ON=fan on Gen 2, Gen 3 and Gen 4 only.		
SF Status	BV	10	R	DI	10004	BI	4	NA	Indicates if the Supply Fan is <b>ON</b> or <b>OFF</b> .		
Occupied Status	BV	11	R	DI	10005	BI	5	NA	Indicates whether the WSHP is in Occupied <b>ON</b> or Unoccupied <b>OFF</b> Mode.		
Occupied Mode	BV	12	R/W	DO	7	BO	7	ON	Network Input to put WSHP in Unoccupied Mode <b>OFF</b> or Occupied Mode <b>ON</b> . Can be used instead of Work Schedule.		
Air Duct Mode	BV	41	R/W	DO	26	во	30	OFF	Network Input used to activate Air Duct Mode. The Air Duct Mode uses Aux5 Temp for the controlling Zone Temperature.		
AUX5	BV	42	R	DI	10026	BI	22	NA	Indicates the status of Aux Input 5 when RNet (BV:44) is <b>ON</b> . And AUX5 CFG ( BV:46) is set to <b>OFF</b> for Binary Input.		

# Gen 7 and Newer Water-to-Air Points Matrix

Paint Nama	BA	CNet	Read/	Мо	dbus	N2		Default	Description
Point Name	Туре	Number	Write	Туре	Register	Туре	ID	Derduit	Description
AUX6	BV	43	R	DI	10027	BI	23	NA	Indicates the status of Aux Input 6 when RNet (BV:44) is <b>ON</b> . And AUX6 CFG (BV:47) is set to <b>OFF</b> for Binary Input.
RNet Mode	BV	44	R/W	DO	27	BO	31	ON	Network Input used to select between LStat wall sensors and communicating wall sensors(ASW 016-018). RNet should be <b>OFF</b> when using LStat Sensors and <b>ON</b> for all other configurations. The MPC board jumper W3 must be set to LStat for LStat sensors or RNet for RNet sensors.
Humidity Occupancy	BV	45	R/W	DO	28	BO	32	OFF	Network Input used to enable/disable humidity control when AUX CFG (AV:31) set to 12.
Aux 5 Config	BV	46	R/W	DO	29	во	33	ON	Network input used to select the configuration of Auxillary Input 5 when RNET (BV:44 ) is <b>ON</b> . <b>ON</b> = Temperature, <b>OFF</b> = Binary.
Aux 6 Config	BV	47	R/W	DO	30	BO	34	ON	Network input used to select the configuration of Auxillary Input 6 when RNET (BV:44 ) is <b>ON</b> . <b>ON</b> = Temperature, <b>OFF</b> = Binary.
DB Mode	BV	48	R/W	DO	31	BO	35	OFF	Network input to select between using separate cooling and heating setpoints. Set to <b>OFF</b> for Cooling or Heating Setpoint or <b>ON</b> for the Cooling Setpoint and deadband to determine the Heating Setpoint. Used when replacing Gen 4 or lower with Gen 6 or higher.
CO <sub>2</sub> Alarm	BV	49	R	DI	10028	BI	24	NA	Indicates the $CO_2$ status (AV:52) is above the $CO_2$ trip point (AV:54) when using an appropriate wall sensor.
VOC Alarm	BV	50	R	DI	10029	BI	25	NA	Indicates the $CO_2$ status (AV:53) is above the VOC trip point (AV:55) when using an appropriate wall sensor.
Fan Speed Enable	BV	51	R/W	DO	32	BO	36		Network input to activate the auxiliary output for High Speed Fan when AUX CFG (AV:31) is set to 5 for Fan Speed Control: Required field wired relay for PSC Motors only.
Compressor Shutdown	BV	53	R/W	DO	33	BO	37	OFF	Network input used to shut down all compressor functions, C1 and C2. Compressors disabled = <b>ON</b> , Compressors Enabled = <b>OFF</b>
Fault	MSV	1	R	NA	NA	NA	NA		Multi-state BACnet value for text description of current alarm state.
AUX Config Status	MSV	2	R	NA	NA	NA	NA		Multi-state BACnet value for text description of current Auxiliary Output Configuration.
Zone Mode Status	MSV	3	R	NA	NA	NA	NA		Multi-state BACnet value for text description of current operating mode.
Heating Mode	BV	61	R/W	DI	78	BI	74	ON	This is used to disable heating demand when it is desired to run Cooling Mode only. <b>ON</b> = Heating Enabled, <b>OFF</b> = Heating Disabled. Special feature in Gen 6, standard feature in Gen 8.
Cooling Mode	BV	54	R/W	DI	77	BI	73	ON	This is used to disable cooling demand when it is desired to run Heating Mode only. ON=Cooling Enabled, OFF=Cooling Disabled. Special feature in Gen 6, standard feature in Gen 8.
Electric Heat Mode	B∨	57	R	DI	16	BI	1	OFF	This enables Full time Electric Heating. Control (W) is used to enable heating element. <b>ON</b> = Full Time Electric Heating, <b>OFF</b> = Heat Pump. (Heat Pump function is shut down in the mode and AUX provides output to drive external heating element. Requires external relay and heating element). Special feature in Gen 6, standard feature in Gen 8.
Electric Heat Demand	BV	58	R	DI	17	BI	2	OFF	Status signal is <b>ON</b> when a Heating Demand is present and in Full time Electric Heating Mode (AUX_CTL = 15). Special feature in Gen 6, standard feature in Gen 8.
Ext Occ/Dirty Filt Sens	BV	59		DI	76	BI	80	000	Selects between External Motion Sensor or Dirty Filter Air Pressure into BI:8. OCC= Occupancy, DFS= Dirty Filter Sense. Special feature in Gen 6, standard feature in Gen 8.
Dirty Filter Mode	BV	60	R/W	DI	76	BI	3	TIME	Selects between Time Mode or DFS( Air Pressure )Mode as the method for determining the Dirty Filter Interval. For DFS (Dirty Filter) Mode set (BV:59) to DFS. Special feature in Gen 6, standard feature in Gen 8.
Archive Enable	BV	62	R/W	DI	75	BI	4	OFF	Network input used to archive the current control program. Standard feature in Gen 8, not present in previous generations.

#### Table continued from previous page.

# Gen 7 and Newer Water-to-Air Points Matrix

Model: MPC

Point Name	BA	CNet	Read/	Мо	dbus	N2		Default	Description	
rom Name	Туре	Number	Write	Туре	Register	Туре	ID	Delduli	Description	
RNet Sensor 1 Enable	BV	63	R/W	DI	74	BI	70	ON	Network input for enabling RNet Sensor 1 Present Alarm. Should be turned on if RNet1 Sensor is used.	
RNet Sensor 2 Enable	BV	64	R/W	DI	70	BI	78	OFF	Network input for enabling RNet Sensor 2 Present Alarm. Should be turned on if RNet2 Sensor is used.	
RNet Sensor 3 Enable	BV	65	R/W	DI	71	BI	77	OFF	Network input for enabling RNet Sensor 3 Present Alarm. Should be turned on if RNet3 Sensor is used.	
RNet Sensor 4 Enable	BV	66	R/W	DI	72	BI	76	OFF	Network input for enabling RNet Sensor 4 Present Alarm. Should be turned on if RNet4 Sensor is used.	
RNet Sensor 5 Enable	BV	67	R/W	DI	73	BI	75	OFF	Network input for enabling RNet Sensor 5 Present Alarm. Should be turned on if RNet5 Sensor is used.	
EQ Touch Temp Enable	BV	68	R/W	DI	68	BI	72	OFF	Network input that allows the use of the Equipment Touch Service Tool Internal Sensors for Space Temperature.	
Load Balance Select Mode	AV	59	R/W	Float	19	ADI	70	2	Network Input used to select how the compressors are sequenced to balance Compressor Runtime.	

#### Table continued from previous page.

#### Table 8: AUX CFG Settings

AUX CFG Mode (AV:31)	Value
Electric Heat when Demand > 90%	1
Cycle w/Y1	2
Cycle w/G	3
Slow Opening Water Valve	4
High Speed Fan	5
Alarm Relay	6
Reheat ICM/DXM Std	7
Reheat ICM/DXM Rev	8
Reheat DXM Std	9
Reheat DXM Rev	10
Manual Control	11
Humidity Control	12
CO <sub>2</sub> Control	13
VOC Control	14
Full time Electric Heat	15

#### **Table 9: Supply Fan Settings**

SF CFG ( AV:33 )	Value
Cycle with Compressor	1
On during occupancy, cycle with Compressor during unoccupancy	2
On all the Time	3

#### **Table 10: Compressor Load Balance Select Settings**

Load Balance Select Mode (AV:59)	Value
Runtime Compare Mode	1
Manual Mode, C1 -Stage 1/C2-Stage 2	2
Manual Mode, C2 -Stage 1/C1-Stage 2	3
Time Toggle Mode, Toggles every 12 Hrs	4

#### **Table 11: Supply Fan Configuration Settings**

SF CFG (AV:33)	Value
Supply Fan is ON anytime the Compressor is ON	1
Supply Fan ON only when in occupied hours and the Compressor is ON	2
Supply Fan is ON all the time regardless of occupancy or Compressor state	3

# Feature Configuration: Water-to-Air

- 1. **Occupancy Settings**: These control points are used to set occupancy.
  - a. Occupancy (All Generations) This point (BV:12) controls whether the unit is in Occupied or Unoccupied Mode. It defaults to Occupied. It can be set and overridden via the Equipment Touch Service Tool or from the BMS control program (WEBCTRL).
  - b. Occupancy Override (Gen 7-8) Is a digital input (BI:8) that receives a signal from an external motion sensor to override occupancy status. For this to function, OCC/ Dirty Filter Sens (BV:59) must be set to OFF.
  - c. Network OCC Override (Gen 7-8) BNI is used via the Network to override the occupancy status of the MPC.
- RNet Sensor Setup (Gen 7-8 only): The Gen 7-8 MPC is capable of averaging up to five ZS Sensors together over the RNet link. Use one ASW 018 and up to four ASW 016 sensors. If you wish to use the sensor alarm feature, you must enable the appropriate alarm enables so that the MPC logic knows how many RNet Sensors are present.
  - a. **RNet Sensor 1 Alarm Enable** Checking this notifies the sensor-alarm logic to expect a valid sensor to be present at Sensor Address 1.
  - b. **RNet Sensor 2 Alarm Enable** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Sensor Address 2.
  - c. **RNet Sensor 3 Alarm Enable** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Sensor Address 3.
  - d. **RNet Sensor 4 Alarm Enable** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Sensor Address 4.
  - e. **RNet Sensor 5 Alarm Enable** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Sensor Address 5.

 AUX\_CFG (All Generations): Controls the output function of the AUX output dependent on the value of (AV: 31). See Table below.

#### Table 12: AUX Options

AUX_ CFG	Function of AUX Output	Behavior				
1	Emergency Electric Heat	AUX output turns <b>ON</b> if PID > 90% in Heating Mode.				
2	Cycle with Compressor	AUX output turns <b>ON</b> if PID > 90% turns <b>ON</b> when Compressor (C1) is <b>ON</b> .				
3	Cycle with FAN	AUX output turns <b>ON</b> when FAN (SF) is <b>ON</b> .				
4	Slow Opening Water Valve	AUX output turns <b>ON</b> when C1 or C2 has a demand call.				
5	High Speed Fan	AUX output turns <b>ON</b> if HMODE or CMODE < Fan Speed Trigger.				
6	Alarm Relay Output	AUX output turns <b>ON</b> anytime ALARM is True.				
7	Reheat ICM & DXM STD	Reheat with MPC SF, C and RV <b>ON</b> .				
8	Reheat ICM & DXM REV	Reheat with MPC SF, C and RV <b>ON</b> .				
9	Reheat DXM STD	Reheat with MPC SF, C and RV <b>OFF</b> .				
10	Reheat DXM REV	Reheat with MPC SF, C and RV <b>OFF</b> .				
11	AUX Toggle	AUX assumes value of BV:40.				
12	Relative Humidity Mode	AUX output turns <b>ON</b> anytime RH Exceeds trip point.				
13	CO2 Trip Point Exceeded	AUX output turns <b>ON</b> anytime CO <sub>2</sub> Exceeds trip point.				
14	VOC Trip Point Exceeded	AUX output turns <b>ON</b> anytime VOC Exceeds trip point.				
15	Full Time Electric Heat	AUX output turns <b>ON</b> anytime there is a call for heat.				

AUX\_CFG= 15 (only found in Gen 7-8)

- 4. Air Duct Mode (All Generations): Air Duct Mode (ADM) allows for the control of Zone Temperature based on the return air temperature as sensed in the air duct. To activate ADM, turn (BV:41) to ON and BV:44 to ON. This requires a 10KΩ type II Duct Sensor installed into the MPC unit across the Temp Input and GND Input on the LStat connector.
- Cooling Only or Heating Only Setup (Gen 7-8 only): For applications that require cooling only or heating only, use the following control points:
  - a. Heating Mode Enabled (BV:57) When Heating Mode is checked, Heating Mode is enabled. The default is checked. This allows Heating Mode to be disabled when cooling only is desired.
  - b. Cooling Mode Enable (BV:54) When Cooling Mode is checked, Cooling Mode is enabled. The default is checked. This allows Cooling Mode to be disabled when heating only is desired.

# Feature Configuration: Water-to-Air

Model: MPC

- Load Balancing Mode (Gen 7-8 only): Defines the mode of operation for the runtime balancing of a 2 Compressor application. The modes are set by entering the following in (AV:59):
  - a. **AV:59 = 01- Runtime Comparison Mode** The compressor with the least runtime becomes the stage 1 compressor while the high time compressor becomes the stage 2 compressor.
  - b. AV:59 = 02 C1 is Stage 1, C2 is Stage 2
  - c. **AV:59** = 03 C2 is Stage 1, C1 is Stage 2
  - d. **AV:59** = 04 Time Toggle- C1 and C2 swap stages every 12 hours dependent on demand.
- 7. Compressor Shutdown (Gen 7-8 only): To disable the compressor turn (BV:53) to OFF.
- 8. Manual Setpoint Adjust (All Generations): Sets the maximum number of degrees the user can adjust the zone setpoint at the zone sensor. Example: If Manual Setpoint Adjust = 2 and the Master Zone Temperature = 72°F the user can adjust the temperature at the zone sensor between 70°F and 74°F. Enter the Manual Setpoint Adjust value via (AV:37) for degrees in Fahrenheit, or (AV:44) for degrees Celsius.
- Dirty Filter Detection Setup Options (All Generations): The MPS indicates a filter change is necessary based on run time or (in Gen 7-8 only) based on an air pressure sensor. The dirty filter indicator defaults to 1,500 hours of run time and can be changed using (AV:30)

Setup for Air Pressure Sensor (Gen 7-8 only):

- a. Dirty Filter Sensor Setting (BV:59) to ON allows Dry Contact Input 6 (SW, GND) to function as pressure input. This requires a pressure switch on the output side of the return air filter. (User supplied)
- b. Dirty Filter Mode Set (BV:60) to Pressure.

- Configuring the Supply Fan (All Generations): (AV:33) is used to control the behavior of the supply fan.
  - 1. Fan is **ON** by demand, Occupied or Unoccupied
  - 2. Fan is **ON** while Occupied and **ON** by demand during Unoccupied hours
  - 3. Fan is **ON** all the time
- 11. **Test Mode (All Generations)**: Test Mode is used to test the output functions of the MPC unit. This configuration remains active for 30 minutes. To activate Test Mode, turn (BV:34) to **ON**. When in Test Mode the following can be tested in the indicated order:
  - 1. (BV:28) Supply Fan Manual **ON**
  - 2. (BV: 30) C1 Manual ON
  - 3. (BV: 31) C2 Manual **ON**
  - 4. (BV: 32) AUX Manual ON
  - 5. (BV: RV) Manual ON
- 12. Input 5 and 6 (Gen 5-8): Gen 5 and above allow the user to use Input 5 (TEMP, GND) and Input 6 (SW, GND) for added features such as temperature monitoring or current switch sensing. With RNet Mode (BV:44) set to ON, inputs 5 and 6 monitors field supplied 10KΩ type II thermistors via Aux5 Temp (AV:50) and Aux6 Temp AV51. If used as a dry contact, activate Aux5 CFG, (BV:46) and/or Aux6 CFG, (BV:47). When configured as a dry contact, the user can monitor switch closure status at Aux5 (BV:42) and/or Aux6 (BV:43).

This function is only available with the following sensors (ASW 016, 017,018). Not compatible with LStat Sensors or 10K thermistor.

# Feature Configuration: Water-to-Air

13. **Master/Subordinate Setup (All Generations)**: Before attempting this setup, ensure no wall sensors are connected to the subordinate (WebCTRL) is capable of mapping points between units.

This method applies for one master and one subordinate but is scalable for one master and multiple subordinate units.

- 1. Turn (BV:16) to **ON** on the sensor(s) you would like to act as a subordinate.
- 2. Identify the following points in the Master Unit.
  - a. Zone Temp Status (AV:34)
  - b. Actual HTSP (AV:2)
  - c. Actual CLSP (AV:1)
  - d. Occupied Status (BV:11)
- 3. Identify the following Subordinate(s) Points.
  - a. Master ZT (AV:4)
  - b. Subordinate HTSP (AV:9)
  - c. Subordinate CLSP (AV:10)
  - d. Occupied Mode(BV:12)
- 4. Map the Master Points to the Subordinate points.
  - a. Zone Temp Status (AV:34) → Master ZT (AV:4)
  - b. Actual HTSP (AV:2) → Subordinate HTSP (AV:9)
  - c. Actual CLSP (AV:1) → Subordinate CLSP (AV:10)
  - d. Occupied Status (BV:11) → Occupied Mode (BV:12)
- 5. When the mappings are complete, verify that the subordinate Actual CLSP (AV:1) and the Actual HTSP (AV:2) match those of the master unit. This forces the subordinate(s) to mirror the operation of the master unit.

#### 14. Using Equipment Touch Service Tool as a Wall

**Sensor**: To use the Equipment Touch Service Tool as the Wall Sensor, it must first have the internal Temperature and Humidity Sensors enabled. To do this, navigate to the Sensor Setup Menu in Equipment Touch Service Tool

#### $\textbf{SETUP} \rightarrow \textbf{TOUCHSCREEN SETUP} \rightarrow \textbf{SENSOR SETUP}$

- 1. Set Temperature Sensor to Internal
- 2. Set Temperature Sensor Transmit to **ON**
- 3. Set Humidity Sensor Enable Transmit to ON
- 4. Then press SAVE

- 15. Archival Procedure (Gen 7-8): There are two archives stored within the controller,
  - 1. Factory Archive is generated at the factory or when downloaded by WebCTRL or APPLOADER.
  - 2. Field Archive or application specific archive is generated by the archiving function to be discussed here.

Because of this, there are separate procedures for reverting to these archives.

#### **Factory Archive Retrieval Procedure**

- 1. Power down the MPC.
- 2. Change the address on the Rotary Switches to 0,0.
- 3. Place a jumper across the format pins W8.
- 4. Power up the device.
- 5. Run and Error LEDs flash three times together. This is the indication that the archive retrieval has taken place. It should take less than 10 seconds.
- 6. Power down the MPC and remove the jumper on the format pins W8. Reset the Rotary Switches to 0,2.
- 7. After powering the MPC up, it is ready to run with the restored factory programming.

#### **Field Archive Procedure**

- 1. Power down the MPC.
- 2. Change the address on the Rotary Switches to anything but 0,0. You can leave it set to 0,2.
- 3. Place a jumper across the format pins W8.
- 4. Power up the device.
- 5. Run and Error LEDs flash three times together. This is the indication that the archive retrieval has taken place. It should take less than 10 seconds to occur.
- 6. Power down the MPC and remove the jumper on the format pins W8. Reset the Rotary Switches to 0,2.
- 7. After powering the MPC up, it is ready to run with the restored Field Archive.

# Gen 8 and Newer Water-to-Water Points Matrix

Model: MPC

Point Namo	BACNet		Read/	Modbus		N2		Default	Description	
Point Name	Туре	Number	Write	Туре	Register	Туре	ID	Derduir	Description	
HTD	AV	23	R/W	NA	NA	NA	NA	5°F	Heating Differential Deadband → Heating SP + HTD = Turnoff	
CLD	AV	22	R/W	NA	NA	NA	NA	5°F	Cooling Differential Deadband → Cooling SP - CLD = Turnoff	
Actual CL Setpoint	AV	1	R	NA	NA	NA	NA	NA	Actual cooling setpoint based upon occupancy status, setpoint adjustment and metric conversion.	
Actual HT Setpoint	AV	2	R	NA	NA	NA	NA	NA	Actual heating setpoint based upon occupancy status, setpoint adjustment and metric conversion.	
Occupied CL SP/ Fahrenheit	AV	3	R/W	NA	NA	NA	NA	53°F	Network setpoint for the cooling setpoint (Fahrenheit) in Occupied Mode.	
Master WT/ Fahrenheit	AV	4	R/W	NA	NA	NA	NA	105°F	Fahrenheit network setpoint for multiple MPCs sharing the same space temperature sensor. Only for subordinate units when M/S Switch (BV:16) is <b>ON</b> .	
SUBORDINATE CLD	AV	24	R/W	NA	NA	NA	NA	5°F	Subordinate Cooling Differential Deadband. Active only when M/S Switch (BV:16) is <b>ON</b> .	
Pulse Signal Value	AV	6	R	NA	NA	NA	NA	1	Indicates the last fault code in memory on the CXM2/DXM2.5 board. Refer to CXM2/DXM2.5 manual for fault code descriptions.	
Unoccupied CL SP/Fahrenheit	AV	7	R/W	NA	NA	NA	NA	73°F	Network setpoint for the Fahrenheit cooling setpoint in Unoccupied Mode.	
SUBORDINATE HTD	AV	25	R	NA	NA	NA	NA	5°F	Subordinate Heating Differential Deadband. Active only when M/S Switch (BV:16) is <b>ON</b> .	
Subordinate HT SP/Fahrenheit	AV	9	R/W	NA	NA	NA	NA	105°F	Network Input for the actual Fahrenheit heating setpoint when used as a subordinate unit. This input is only used for subordinate units when the M/S Switch (BV:16) is <b>ON</b> .	
Subordinate CL SP/Fahrenheit	AV	10	R/W	NA	NA	NA	NA	53°C	Network Input for the actual Fahrenheit cooling setpoint when used as a subordinate unit. This input is only used for subordinate units when the M/S Switch ( BV:16) is <b>ON</b> .	
HP Fault Counter	AV	11	R	NA	NA	NA	NA	0	Indicates the number of High Pressure faults since startup or the last reset via Fault Count Reset (BV:22).	
LP Fault Counter	AV	12	R	NA	NA	NA	NA	0	Indicates the number of Low Pressure faults since startup or the last reset via Fault Count Reset (BV:22).	
LT1 Fault Counter	AV	13	R	NA	NA	NA	NA	0	Indicates the number of Liquid Temperature 1 faults since startup or the last reset via Fault Count Reset (BV:22).	
LT2 Fault Counter	AV	14	R	NA	NA	NA	NA	0	Indicates the number of Liquid Temperature 2 faults since startup or the last reset via Fault Count Reset (BV:22).	
CO Fault Counter	AV	15	R	NA	NA	NA	NA	0	Indicates the number of Condensate Overflow faults since startup or the last reset via Fault Count Reset (BV:22).	
Over/Under Voltage Fault Counter	AV	16	R	NA	NA	NA	NA	0	Indicates the number of Over/Under Voltage faults since startup or the last reset via Fault Count Reset (BV:22).	
UPS Fault Counter	AV	17	R	NA	NA	NA	NA	0	Indicates the number of UPS faults since startup or the last reset via Fault Reset (BV:24).	
Swapped LT1/LT2 Fault Counter	AV	18	R	NA	NA	NA	NA	0	Indicates the number of swapped LT1/LT2 faults since startup or the last reset via Fault Count Reset (BV:22).	
C1 Cycle Counter	AV	19	R	DI	22	ADI	10	0	Indicates the number of times Compressor 1 has cycled on/off more than 6 times in one hour since startup or the last reset via Fault Count Reset (BV:22).	
C2 Cycle Counter	AV	20	R	DI	23	ADI	11	0	Indicates the number of times Compressor 2 has cycled on/off more than 6 times in one hour since startup or the last reset via Fault Count Reset (BV:22).	
Occupied HT Setpoint	AV	5	R/W	NA	NA	NA	NA	105°F	Network Input for the Fahrenheit Occupied heating setpoint.	
Occupied HT Setpoint Celsius	AV	29	R/W	NA	NA	NA	NA	40.5°C	Network Input for the Celsius Occupied heating setpoint.	
Unoccupied HT Setpoint	AV	21	R/W	NA	NA	NA	NA	85°F	Network Input for the Fahrenheit Unoccupied heating setpoint.	
Unoccupied HT Setpoint Celsius	AV	28	R/W	NA	NA	NA	NA	29.4°C	Network Input for the Celsius Unoccupied heating setpoint.	

# Gen 8 and Newer Water-to-Water Points Matrix

De te ta Marine a	BA	CNet	Read/	Mo	dbus	N2		Default	Decedenter	
Point Name	Туре	Number	Write	Туре	Register	Туре	ID	Default	Description	
HT PID	AV	38	R	NA	NA	NA	NA	0	Heating PID based on the setpoint and actual space temperature in percent (%).	
CL PID	AV	39	R	NA	NA	NA	NA	0	Cooling PID based on the setpoint and actual space temperature in percent (%).	
AUX CFG	AV	26	R/W	NA	NA	NA	NA	1	Sets configuration parameters for the AUX output Relay (W).	
Zone Temp Status	AV	37	R	NA	NA	NA	NA	NA	Network Output for Space (Room Temp)Temperature. Celsius/Fahrenheit.	
Master WT/Celsius	AV	27	R/W	NA	NA	NA	NA	40.5°C	Celsius Network Input for multiple WSHP sharing the same Space Sensor. This is only for Subordinate units where the M/S switch is (BV:22) <b>ON</b> .	
Unoccupied CL SP Celsius	AV	30	R/W	NA	NA	NA	NA	22.7°C	Network Input for the Celsius cooling setpoint in the Unoccupied Mode.	
Subordinate CL Setpoint Celsius	AV	33	R/W	NA	NA	NA	NA	11.6°C	Network Input for the actual Celsius cooling Setpoint when used as a subordinate unit. This input is only used for subordinate units where the M/S Switch (BV:16) is <b>ON</b> .	
Subordinate HT Setpoint Celsius	AV	32	R/W	NA	NA	NA	NA	40.5°C	Network Input for the actual Celsius Heating Setpoint when used as a subordinate unit. This input is only used for subordinate units where the M/S Switch (BV:22) is <b>ON</b> .	
Occupied CL SP Celsius	AV	31	R/W	NA	NA	NA	NA	11.6°C	Network Input for the Celsius cooling setpoint in the Occupied Mode.	
RV Status	BV	13	R	NA	NA	NA	NA	NA	Indicates the Reversing Valve Status (ON/OFF).	
Work Schedule	BV	14	R/W	NA	NA	NA	NA	NA	Reads schedule from WebCTRI and informs controls whether they are in Occupied or Unoccupied Mode.	
UPS Signal	BV	21	R	NA	NA	NA	NA	NA	Indicates if the UPS Mode is ON/OFF. Refer to CXM2/DXM2.5 manual for UPS definition.	
M/S Switch	BV	16	R/W	NA	NA	NA	NA	OFF	Master/Subordinate network input to enable the use of Master ZT. Master unit is defined as one WSHP per sensor and the value is <b>OFF</b> . Subordinate is defined as a unit that shares a sensor with Master unit and the value is <b>ON</b> .	
C1 Runtime Alarm	BV	17	R	DI	8	BI	8	NA	Indicates that the number of operational hours for C1 has exceeded 5000. Reset via C1 Reset (BV:2).	
C2 Runtime Alarm	BV	18	R	DI	9	BI	9	NA	Indicates that the number of operational hours for C2 has exceeded 5000. Reset via C2 Reset (BV:5).	
C1 Cycle Reset	BV	19	R/W	Coil	9	BO	9	OFF	Network Input to reset the C1 Cycle Counter (AV:19) back to zero	
C2 Cycle Reset	BV	20	R/W	Coil	10	BO	10	OFF	Network Input to reset the C2 Cycle Counter (AV:20) back to zero.	
Lockout Alarm	BV	21	R	NA	NA	NA	NA	NA	Indicates the CXM2/DXM2.5 is in Lockout Mode.	
C1 Cycle Alarm	BV	23	R	DI	13	BI	13	NA	Indicated the Compressor C1 has cycled ON/OFF more than five times within an hour.	
C2 Cycle Alarm	BV	24	R	DI	14	BI	14	NA	Indicated the Compressor C2 has cycled ON/OFF more than five times within an hour.	
AUX Status	BV	31	R	NA	NA	NA	NA	NA	Indicates the AUX output (W) is OFF/ON.	
RV Manual	BV	25	R/W	NA	NA	NA	NA	OFF	Manual Switch to turn Reversing Valve (OFF/ON). Only works while in Test Mode.	
C1 Manual	BV	26	R/W	Coil	14	BO	14	OFF	Manual Switch to turn Compressor C1 (OFF/ ON). Only works while in Test Mode.	
C2 Manual	BV	27	R/W	NA	NA	NA	NA	OFF	Manual Switch to turn Compressor C2 (OFF/ON). Only works while in Test Mode.	
AUX Manual	BV	32	R/W	NA	NA	NA	NA	OFF	Manual Switch to turn AUX output (W) (OFF/ON). Only works while in Test Mode.	
Test Mode	BV	29	R/W	NA	NA	NA	NA	OFF	Network Input used to bypass normal operations and operate the unit manually. Maximum on-time for Test Mode is 60 minutes.	
Test Mode Alarm	BV	30	R	NA	NA	NA	NA	NA	Indicates the unit is still in Test Mode after the test mode timer has expired.	

#### Table continued from previous page.

# Gen 8 and Newer Water-to-Water Points Matrix

Model: MPC

De tal Maria	BA	CNet	Read/	Mo	dbus	N2		Defeat	Decedetion
Point Name	Туре	Number	Write	Туре	Register	Туре	ID	Derduit	Description
Metric	BV	33	R/W	NA	NA	NA	NA	OFF	Network input used to define inputs and outputs. Celsius- ON/Fahrenheit -Off.
LWT Load Status	AV	34		NA	NA	NA	NA	NA	Leaving Water Temperature of the Load Coil.
EWT Load Status	AV	35		NA	NA	NA	NA	NA	Entering Water Temperature of the Load Coil.
MC Switch	BV	7		NA	NA	NA	NA	OFF	Mode Control: ON for Cooling, OFF for Heating.
LWT Source Status	AV	36		NA	NA	NA	NA	NA	Leaving Water Temperature of the Source Coil.
Application Type	AV	99	R	NA	NA	NA	NA	NA	Factory Use Only.
Alarm State	BV	1	R	NA	NA	NA	NA	NA	<b>ON</b> indicates a lockout condition exists, Off indicates normal operation.
C1 Reset	BV	2	R/W	Coil	1	BO	1	OFF	Network Input used to reset the C1 Runtime Alarm (BV:17) once the event is triggered.
C1 Status	BV	3	R	DI	2	BI	2	NA	Indicates if Compressor 1 is <b>ON</b> or <b>OFF</b> .
System Reset	BV	4	R/W	NA	NA	NA	NA	OFF	Network Input used to reset the unit from lockout mode. Must turn it <b>ON</b> then turn it <b>OFF</b> , not momentary.
C2 Reset	BV	5	R/W	Coil	3	BO	3	OFF	Network Input used to reset the C2 Runtime Alarm (BV:18) once the event is triggered.
C2 Status	BV	6	R	DI	3	BI	3	NA	Indicates if Compressor 2 is <b>ON</b> or <b>OFF</b> .
Emergency Shutdown	BV	8	R/W	NA	NA	NA	NA	OFF	Network Input for Emergency Shutdown. When engaged, Y1, Y2, G & W output relays turn <b>OFF</b> .
CC Mode	BV	9		NA	NA	NA	NA	OFF	Cooling Control: OFF (EWT), ON (LWT).
HC Mode	BV	10		NA	NA	NA	NA	OFF	Heating Control: OFF (EWT), ON (LWT).
Occupied Status	BV	11	R	NA	NA	NA	NA	NA	Indicates whether the WSHP is in Occupied <b>ON</b> or Unoccupied <b>OFF</b> Mode.
Occupied Mode	B∨	12	R/W	NA	NA	NA	NA	ON	Network Input to put WSHP in Unoccupied Mode <b>OFF</b> or Occupied Mode <b>ON</b> . Can be used instead of Work Schedule.
C1 Override	BV	61	R/W	NA	NA	NA	NA	OFF	Used to override C1 output when multi-stage enable (BV:62) is <b>ON</b> .
C2 Override	BV	63	R/W	NA	NA	NA	NA	OFF	Used to override C2 output when multi-stage enable (BV:62) is <b>ON</b> .
RV Override	BV	60	R/W	NA	NA	NA	NA	OFF	Used to override RV output when multi-stage enable (BV:62) is <b>ON</b> .
Multi Stage Enable	BV	62	R/W	NA	NA	NA	NA	OFF	When <b>ON</b> allows network control of C1, C2 and RV.
Load Balance Mode	AV	59	RW	HR	19	ADI	70	2	Network Input used to select how the compressors are sequenced to balance compressor runtime.
Compressor Swap time	AV	60	R	NA	NA	NA	NA	OFF	Reboots swap time when (AV:59) is set to 4. Not editable and set to 24 hours.
Archive Enable	BV	70	R/W	DI	75	BI	71	OFF	Network Input used to archive current program. Standard feature in Gen 7-8 water-to-air controllers.

#### Table continued from previous page.

# Wall Sensors

ASW sensors are wall-mounted temperature sensors for use with the MPC controller on Water-to-Air units. The ASW is available in three different models to allow for application flexibility. Features such as room temperature sensing, digital LCD readout, set point adjustment, override push button, heat pump reset, lockout recognition, fault type, LED indicator, cosmetics and occupancy status can be supplied by the different types of ASW wall sensors. The ASW wall mounted sensors are low profile, which provides a distinguished look for building architects and engineers.

The three different types of ASW wall sensors feature easy to use analog to digital connections on the MPC. With only 4- to 5-wire connections, the field technician can easily troubleshoot the ASW to determine if it is operating properly. The ASW 018 displays zone temperature, heating setpoint, cooling set point. And if so equipped displays sensed values of humidity and CO<sub>2</sub>.

Room temperature is measured using a 10k thermistor and can be indicated on an easy to read LCD display (with display only wall sensor). The set point adjust is a slide potentiometer which provides an analog output and is available with a Warm/Cool legend imprinted on the unit's base. The override is a momentary, normally open, push contact.

ASW wall sensors are suitable for direct-wall mount or electrical box mounting. Terminations are easily made at the screw terminal block located on the wall sensor backplate.



ASW 016

ASW 017

**ASW 018** 

# ASW 016, 017, 018 Wall Sensors (MPC)

Model: MPC

### SENSOR SPECIFICATIONS

#### • Temperature:

- Temperature with any option (exluding Humidity): -4°F to 122°F (-20°C to 50°C) ±0.35°F (0.2°C)
- Temperature with Humidity and any Option: 50°F to 104°F (10°C to 40°C) ±0.5°F (0.3°C)
- Humidty: 20% to 80% ±2% typical
- CO<sub>2</sub>:
  - 400 to 1250 PPM ±30 PPM or ±3% (the greater of the two)
  - $\odot~$  1,250 to 2,000 PPM ±5% of reading plus 30 PPM
- Power Requirements, Sensor Type, and Power Required:
  - **Temperature Only (all models):** 12VDC @ 8 mA Temperature with Humidity
  - Temp with CO<sub>2</sub>, or Temp/CO<sub>2</sub> /Humidity (all models): 12VDC @ 15 mA (idle) to 190 mA (CO<sub>2</sub> measurement cycle)

- **Power Supply:** A controller supplies the RNet sensor network with 12VDC @ 210 mA. Additional power may be required. See sensor power requirements above.
- **Communication:** 115 kbps RNet connection between sensor(s) and controller 15 sensors max per RNet network; five sensors maximum per control program
- Local Access Port: For connecting a laptop computer to the local equipment or WebCTRL<sup>®</sup> network for maintenance and commissioning
- Environmental Operating Range: 32°F to 122°F (0°C - 50°C), 10% to 90% relative humidity, non-condensing
- **Mounting Dimensions:** Standard 4" x 2" electrical box using provided <sup>1</sup>/<sub>32</sub>" x <sup>1</sup>/<sub>2</sub>" mounting screws
- Overall Dimensions:
  - Width: 2.75" (6.99 cm)
  - Height: 4.75" (12.07 cm)
  - Depth: <sup>13</sup>/16" (2.01 cm)

#### Table 13: Sensor Part Numbers and Descriptions

Part	System	Display
ASW016HON	Standard Sensor w/ Humidity and CO2 - No Brand	none
ASW016HUC	Standard Sensor w/ Humidity	none
ASW016HUN	Standard Sensor w/ Humidity - No Brand	none
ASW016STC	Standard Sensor	none
ASW016STN	Standard Sensor - No Brand	none
ASW017CON	Sensor w/Setpoint Adjustment, Override and CO2 - No Brand	Occupancy status LED and fault indication
ASW017HON	Sensor w/Setpoint Adjustment, Override , Humidity and CO2 - No Brand	Occupancy status LED and fault indication
ASW017HUC	Sensor w/Setpoint Adjustment, Override, and Humidity	Occupancy status LED and fault indication
ASW017HUN	Sensor w/Setpoint Adjustment, Override, and Humidity - No Brand	Occupancy status LED and fault indication
ASW017STC	Sensor w/Setpoint Adjustment and Override	Occupancy status LED and fault indication
ASW017STN	Sensor w/Setpoint Adjustment and Override - No Brand	Occupancy status LED and fault indication
ASW018COC	Digital Display Sensor w/Setpoint Adjustment, Override and CO2	Digital
ASW018CON	Digital Display Sensor w/Setpoint Adjustment, Override and $CO_2$ - No Brand	Digital
ASW018HON	Digital Display Sensor w/Setpoint Adjustment, Override Humidity and $CO_2$ - No Brand	Digital
ASW018HUC	Digital Display Sensor w/Setpoint Adjustment, Override and Humidity	Digital
ASW018HUN	Digital Display Sensor w/Setpoint Adjustment, Override and Humidity - No Brand	Digital
ASW018STC	Digital Display Sensor w/Setpoint Adjustment and Override	Digital
ASW018STN	Digital Display Sensor w/Setpoint Adjustment and Override - No Brand	Digital

# Model: ASW 016, 017, 018 Wall Sensors (RNet Sensors)

### WIRE AND MOUNT AN ASW 016-018 SENSOR

**PREREQUISITE**: The RNet cable is wired to the controller. The shield wire and the ground wire should be inserted into the controller's GND terminal.

- 1. Turn off the controller's power.
- 2. Pull the backplate off the RNet Sensor. You may need to turn the set screw in the bottom of the sensor clockwise until you can remove the backplate.
- 3. Pull the RNet communication cable through the large rectangle in the backplate.

#### Figure 14: RNet Cable



- 4. Use two screws to mount the backplate to the wall or outlet box.
- 5. Partially cut, then bend and pull off the outer jacket of the RNet cable(s). Do not nick the inner insulation.

#### Figure 15: Remove Cable Jacket



- 6. Strip about 0.25 inch (0.6 cm) of the inner insulation from each wire.
- 7. If wiring one cable to the RNet Sensor, cut the shield wire off at the outer jacket, then wrap the cable with tape at the outer jacket to cover the end of the shield wire. If wiring two cables in a daisy-chain configuration, twist together the shield wires, then wrap the shield wires with tape.

#### 

Allow no more than 0.06 inch (1.5 mm) bare communication wire to protrude. If bare communication wire contacts the cable's foil shield, shield wire, or a metal surface other than the terminal block, the sensor may not communicate correctly.

 Insert the other four wires into the RNet Sensor's screw terminal connector. If wiring two cables, insert like-colored wires into each terminal.

#### **Figure 16: Insert Wires**



Use the following RNet wiring scheme:

Connect this wire		To this terminal.	
Red	$\rightarrow$	+12V	
Black	÷	RNet-	
White	÷	RNet+	
Green	÷	Gnd	

- 9. Attach the sensor's cover and circuit board to the mounted backplate, inserting the top first.
- 10. Turn the set screw one full turn counterclockwise so that the cover cannot be removed.
- 11. Turn on the controller's power.

#### To address an ASW 016-018 Sensor:

Each ASW 016-018 Sensor on an RNet must have a unique address, but addresses do not have to be sequential. Use the DIP switches on the back of the RNet Sensor to set an address from 0 to 14 (0 is factory default) Each DIP switch has the value shown in the figure below. Turn on as many DIP switches as you need so that their total value equals the address.

#### Figure 17: Dip Switch Values



**EXAMPLE:** DIP switches 1 and 4 above are on. Their values (1 + 8) total 9, so the sensor's address is 9.

ASW LED indicator on the wall sensor turns ON during Occupied Mode and turns OFF during Unoccupied Mode.

# ASW 016, 017, 018 Wall Sensors (RNet Sensors)

Model: MPC

#### Push Button Override (if equipped)

**To override the Unoccupied Mode**: Press override button for 1 second. The LED indicator on the ASW wall sensor illuminates to indicate occupied status. The controller goes into Occupied Mode for 60, 120, or 180 minutes, determined by the number of times the override button is pressed by the occupant.

**To increase the override time**: If override time has not expired, press the override button for additional minutes of override time. The maximum override time is always 180 minutes.

**To cancel override**: Press and hold the override button for 3 seconds or more. The override time is cancelled and the ASW LED indicator turns off. The MPC returns to Unoccupied Mode.

#### Reading Lockout Code at ASW Wall Sensor

If a heat pump experiences a lockout condition (for example, high-pressure refrigeration failure), a corresponding code is displayed at the wall sensor (providing a sensor with LED/display is used). See CXM2/DXM2.5 Application Manual for detailed description of operation and fault types.

The Lockout Code is displayed as long as the alarm relay on the CXM2/DXM2.5 is closed, meaning that the CXM2/DXM2.5 remains locked out. When the CXM2/DXM2.5 is reset from Lockout Mode, the ASW LED/display returns to indicating Occupied or Unoccupied Mode.

NOTE: If the MPC Controller is connected to a dual compressor heat pump with two CXM2 controls, the wall sensor only display the lockout information for the CXM2 that is connected to compressor stage 1. Lockout information from the CXM2 controlling the 2nd stage compressor is never be displayed. If the MPC is connected to a dual compressor heat pump with two DXM2.5 controls, the wall sensor displays the lockout fault code for either compressor stage.

#### **Table 14: LED and Fault Indications**

LED or LCD Indicator	Operation Indication
LED ON or	Occupied Mode with no
Occupied LCD display	heat-pump taults
LED OFF or Unoccupied LCD display	Unoccupied Mode with no heat-pump faults
Two flashes (E2 display)	High-pressure lockout
Three flashes (E3 display)	Low-pressure lockout
Four flashes (E4 display)	Water coil low-temperature lockout
Five flashes (E5 display)	Air coil low-temperature lockout
Six flashes (E6 display)	Condensate overflow lockout
Seven flashes (E7 display)	Over- / Under-voltage shutdown
Eight flashes (E8 display)	UPS (Unit Performance Sentinel) warning
Nine flashes (E9 display)	Thermistor swapped position

#### Resetting Lockout at ASW wall sensor

Use the Override or Manual On button to reset a heat-pump lockout at the wall sensor.

- 1. The LED or indicator indicates a lockout code.
- Push the Override or Manual On button for 1 second.
- 3. The MPC interprets the button press as a manual reset and the MPC resets the heat pump.
- 4. The MPC returns the heat pump to normal operating mode.

NOTE: If the MPC was in Unoccupied Mode before the heat pump lockout, and the heat pump is reset via the Override/Manual On button, the MPC resets AND has 60 minutes of override time.

#### **Setpoint Adjust**

The setpoint adjust is a slide pot which provides an analog output and is available with a Warm/Cool legend imprinted on the unit's base. The user can adjust the setpoint to the minimum user set value (default 5° less than scheduled setpoint) by sliding the adjust to the **cool** position. The user can adjust the setpoint to the maximum user set value (default 5° more than scheduled setpoint) by sliding the adjust to the **heat** position. The setpoint adjust operation can be modified by changing the function block programming within the MPC (See Water-to-Air Sequence of Operation).

#### Fail Safe Mode

If the connections between the MPC and ASW wall sensor are interrupted or disconnected, the MPC forces the digital outputs to the Off state. When the connections to the wall sensor thermistor are restored, the MPC resumes normal control.

# Model: MPC Android App Installation

This section covers the installation and setup of the Android Application from OEMCntl that allows an Android capable tablet/phone to replace the physical Equipment Touch Service Tool module. The tablet/ phone must have an available USB connection. Most phones require a micro or sub micro USB to standard USB adapter. (See Figure 23.)

#### **Required Components:**

- Tablet Model Used: RCA Galileo PRO
- **Operating System**: Android 6.0 (Marshmallow).
- USB Cable: AAPPLDRKIT KIT, SW, MPC, APPLDR/ VBAVIEW/ EQ TOUCH
- **App**: Equipment Touch Service Tool (OEM), Available at Google Play store. WWW.play. GOOGLE.com
- Vendor: OEMCntl, Cost: \$29.00



Equipment Touch (OEM) United Technologies Cc

The Equipment Touch App allows you to connect an Android phone or tablet direc..

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#### Installation

- Navigate a browser to play.google.com (Google Store) and download the Android Equipment Touch Service Tool application on to the tablet or phone to be used in this application. Note: Each individual device to be used must have a separate license.
- When the Equipment Touch Service Tool Application is installed, connect the USB dongle included in the AAPPLDRKIT (See Figure 18) to the Tablet or Phone (As stated before, the phone may require a Micro USB to USB adapter. See Figure 19.
- 3. Connect a cable from the MPC USB port to the dongle.

- 4. Launch the Equipment Touch Service Tool Application.
- 5. When the app starts it brings up a device list. Click on the USB Device. The App loads and brings up the Main Equipment Touch Service Tool menu.
- 6. At this point you can use the Tablet or Phone to set up and monitor the MPC just as if it had an Equipment Touch Service Tool screen attached.
- 7. The Equipment Touch Service Tool has built-in Temperature and Humidity Sensors allowing it to function as a Wall Sensor. The Tablet/Phone does not, so it cannot function as a wall sensor.

#### Figure 18: USB Dongle and Cable



#### Figure 19: Micro USB to USB Adapter



# Frequently Asked Questions

### Q. Why does the set point go to 45°F in Heating Mode 5 minutes after unit startup?

A. This is the default condition if there is not a valid resistance between the GND and SW terminals on the MPC. If this occurs, check the MPC for loose strands of copper or a missed wire.

# Q. Why is my compressor, fan or RV not energizing?

A. Wait 5 minutes after startup. If the unit has not started after 5 minutes, check the output LEDs on the MPC. If they are OFF, make sure that the unit is not in Unoccupied Mode. If any of them are ON and you still have no activity verify that you have 'R' wired to the 'R' on the unit controller. If not, jump 24Vac to 'Y', 'O', or 'G' and check if they are energized. If not, contact tech support.

# Q. Why was the MPC board destroyed after I replaced a CXM2/DXM2.5 control board?

A. Jumper JW1 on the CXM2/DXM2.5 control is not cut and 24V power was incorrectly applied to the MPC. This is not repairable, the MPC must be replaced.

# Q. Why does the alarm relay indicate the unit is in an alarm state on the BMS but not at the CXM2?

A. The jumper IN1 on the MPC is set to 0-5Vdc instead of dry. Jump back to dry contact to resolve this issue.

#### Q. Can I use another sensor besides the ASW?

A. A 10k type 2 temperature thermistor can be connected to the LStat terminals. Connect between temp and ground. Also, connect a 2.4k 1% resistor between SW and ground. Thermostats do not work with the MPC.

# Q. Why isn't my unit communicating on the network?

Model:

MPC

A. Verify that all baud rates, protocol and communication selections are correct. Then verify that the Tx and/or Rx LEDs are flickering. Make sure that the addressing is correct, unique and not sharing a same address as another controller.

# Q. Why is my temperature reading different than the actual temperature?

A. Make sure that the gain jumper is set in the OFF position. The jumper puts the temperature on a sharper curve meant for water-to-water applications. Also, make sure that the sensor is in a reasonable location and not right in front of the airway of the unit.

#### Q. Why is my RNet sensor all buggy?

A. Make sure that you move the jumper from LStat to RNet.

#### Q. Can a thermostat be used with MPC?

A. No, ASW sensors must be used.

#### Q. What type/size of wire do ASW sensors require?

A. Typical thermostat cable is suitable 22 to 18 gauge. ASW 008 sensor requires 5-conductor all others require 4-conductor.

#### Q. Is temperature averaging available?

A. Yes using the RNet sensors. Up to five sensors may be daisy chained. One ASW 018 and up to four ASW 016 can be connected. Wire to ASW 018 first and then to the ASW 016's. Address each ASW 016 with a unique address.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

### **SCREEN DESCRIPTIONS**

All application specific user screens are covered in this document. There are built in factory screens that are not covered in this document. For information on those screens, please refer to the Equipment Touch Service Tool Installation and Setup Guide available from the OEMCtrl web portal.

#### **Home Screen**

Model:

MPC

The Home screen allows access to all setup and status screens both application specific and factory screens. The Home screen contains the following buttons allowing access to the following screens:

- Alarm: For monitoring and clearing all active alarms.
- **Archive**: Used to archive the current downloaded MPC file.
- MPC Setup/Status: Navigates to the screen allowing access to all user setup/status screens.
- **Maintenance**: Navigates to the Monitor screen used for observing MPC operation.
- System: Used to access MPC setup screens.
- About: Version Information.
- **Reserved**: Future use.

#### Figure 20: Home Screen

	DATE WHI: WHI WAY		
Alarm	About		
Archive	System		
Maintenance	MPC Setup/ Status		
Reserved			

The **Home**, **Back**, and **Information** icons display on every screen. Clickthe **Home** screen icon to return to the screen which is the top level of the screen hierarchy. Use the **Back** arrow to go up one screen in the hierarchy. The **Information** icon displays any active alarms or other pertinent system information.

#### Figure 21: Home, Back, and Information Icons



#### **Maintenance Screen**

The Maintenance screen is used to monitor normal operation of the MPC unit and contains various status points. Using the Home icon or Home button returns the user to the Home screen. For information on the Maintenance screen, the Help button provides help on the meaning and use of the icons used in the screen.



- 1. Compressor Stage 1 **ON** when  $\rightarrow$  C1 icon is visible.
- 2. Compressor Stage 2 **ON** when  $\rightarrow$  C2 icon is visible.
- 3. Reversing Value **ON** when  $\rightarrow$  RV icon is visible.
- 4. Auxiliary Output 2 **ON** when  $\rightarrow$  AUX icon is visible.
- 5. Occupancy Status Unoccupied or Occupied.
- 6. Fan Output **ON** when  $\rightarrow$  Fan icon is visible.
- 7. Heating PID %.
- 8. Cooling PID %.
- 9. Zone Temperature.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

Model: MPC

- 10. AUX Mode setting.
- 11. Heating/cooling setpoints.
- 12. Heat/cool icons displayed when greater than 50% demand.
- 13. Relative Humidity Display.
- 14. Test Mode/Dirty Air Filter Mode.

### MPC Setup/Status Screen

From this screen, you can access all control and status-checking functions within the MPC Gen 7 and newer Controllers.

### Figure 23: System Setup & Status



• **Temp Setup and Status:** Provides user access to Temp Units and Temp Setpoints screen for setting temperature units and temperature setpoints respectively. There are no control or status points on this screen.

### Figure 24: Temp Setup & Status



- **Compressor Setup:** Provides user access to all control points and status points related to compressor operation. All control points are on the main screen while status points are contained in the Status submenu.
- **Auxiliary Inputs:** Provides user access to the control points and status of the auxiliary inputs.
- Auxiliary Outputs: Provides user access to the control points and status of the auxiliary outputs. (Control/Status).
- Fan/Filter Control: Provides access to all control points and status of the fan or Dirty Filter alarm function.
- **CO<sub>2</sub>/VOC/Humidity:** Provides access to the control points and status of the CO<sub>2</sub>/VOC and Humidity sensing functions.
- **Occupancy:** Provides access to the control points related to setting and overriding Occupancy.
- Heat/Cool Control: Provides access to the control points and status of the heating and cooling functions.
- **MPC Alarms:** Provides access to the MPC Alarm Status screen (status only).
- **MPC Faults:** Provides access to the MPC Fault Status screen (status only).
- LAT/LWT Status: Provides access to I/O related to LWT/LAT points (status only).
- **Zone Status:** Provides access to Zone Temperature Status and PID values.
- Sensor Setup/Status: Provides access to RNet Sensor Setup sub-screen and the RNet Sensor Active screen.
- MPC Monitor screen: Quick view of the system status.
- **System Reset:** takes the user to Mode Settings screen that gives the user the option to reset the MPC to its default settings.
- **Mode Settings:** Provides the user the option to enable certain modes and to reset the MPC to its default settings.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

### **TEMPERATURE UNITS SCREEN**

#### **Password Protected**

User can set the temperature units (Fahrenheit or Celsius) via the (BV:39) check box and view the current temperature mode selected. Checking (BV:39) selects Metric (Celsius) Mode. The Help button takes the user to a Help screen that explains the settings available in this screen.

#### Figure 25: Temperature Units

☆ ◀ !	Temperature Units		
Current Mode	=> <sup>®</sup> Maathriaen heit		
Metric Mode	>>>BV:39 =>		
Back	Help		

- **Current Mode:** displays the current Temperature Mode as Celsius or Fahrenheit.
- Metric Mode: Selection point (BV:39), Check to put unit in Metric or Celsius Mode.

### **TEMPERATURE SETPOINTS SCREEN**

#### **Password Protected**

Gives the user access to all Temperature Related Setpoints available in this screen. It also provides access to the Manual Setpoints screen via the Manual SP button.

#### Figure 26: Temperature Setpoints



- Master ZT: Sets the Master Zone Temperature setpoints (°F/°C).
- **UnOcc DB:** Sets the Unoccupied Dead Band setpoints (°F/°C).
- Occ DB: Sets the Occupied Dead Band Setpoints.
- UnOcc HTSP: Sets the Unoccupied Heating Setpoints (°F/°C).
- Occ HTSP: Sets the Occupied Heating Setpoints (°F/°C).
- UnOcc CLSP: Sets the Unoccupied Cooling Setpoints (°F/°C).
- Occ CLSP: Sets the Occupied Cooling Setpoints (°F/°C).
- Subordinate HTSP: Sets the Subordinate Heating Setpoints (°F/°C).
- Subordinate CLSP: Sets the Subordinate Cooling Setpoints (°F/°C).

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

Model: MPC

### MANUAL SETPOINT ADJUSTMENT

#### **Password Protected**

Sets the maximum number of degrees the user can adjust the zone's setpoints from a zone sensor. The adjustment range is defined as  $\pm$  the value of Manual SP Adjust. Example: If Manual SP Adjust is = 2 the adjustment range would be  $\pm$  2 degrees from the Master Zone Temperature (72°) or from 70° to 74°.

#### Figure 27: Manual Setpoint ADJ

☆ ◀ !	Manual Setpoint ADJ			
Manual Setpoint Adjust	>>>AV:37 => 00.0 °F			
Manual Setpoint Adjust	>>>AV:44 => 00.0 °C			
Back	Help			

- 1. **Manual Setpoint Adjust (AV:37):** Sets the Adjustment span when in Fahrenheit Mode.
- 2. **Manual Setpoint Adjust (AV:44):** Sets the Adjustment span when in Celsius Mode.

#### **COMPRESSOR SETUP**

#### **Password Protected**

The Compressor Setup screen contains the following control points and a button for accessing the Status screen and the Help screen.

#### Figure 28: Compressor Setup



- Load Balancing Mode: Defines the mode of operation for the runtime balancing of a 2 Compressor application. The modes are set by entering the following in AV:59
  - AV:59 = 01 Runtime Comparison Mode The compressor with the least runtime becomes the stage 1 compressor while the high time compressor becomes the stage 2 compressor.
  - AV:59 = 02 Manual C1 is Stage 1, C2 is Stage 2.
  - AV:59 = 03 Manual C2 is Stage 1 and C1 is Stage 2.
  - **AV:59 = 04** Time Toggle- C1 and C2 swap stages every 12 hours dependent on demand.
- **Compressor Enable/Disable:** This setting either enables or disables both C1/C2 Compressor Outputs.
- **Compressor Runtime Resets:** This resets the C1/C2 runtime counters back to zero. The compressor alarms are set to trigger at 5,000 hours.
- **Compressor Cycle Alarm Resets:** Resets the Alarm that gets triggered when there are more than 6 compressor demand cycles within any one hour period of time.
- **Compressor Manual ON controls:** These points are used to manually turn on the C1 or C2 outputs. Unit must be in Test Mode for these to function.

#### **COMPRESSOR STATUS SCREEN**

This screen allows the user to monitor all compressor related status points real time. The points contained are listed below with a short description of their individual function.

#### Figure 29: Compressor Status



# Model: MPC Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

- **C1 Status:** Reports the state of the C1 Compressor Output as either ON or OFF.
- **C2 Status:** Reports the state of the C2 Compressor Output as either ON or OFF.
- **C1 Cycle Counter:** Records the number of C1 Cycle Alarms that have occurred.
- **C2 Cycle Counter:** Records the number of C2 Cycle Alarms that have occurred.
- **C1 Cycle Alarm:** Reports the presence of a C1 Cycle Alarm. No alarm displays as **None**.
- **C2 Cycle Alarm:** Reports the presence of a C2 Cycle Alarm. No alarm displays as **None**.
- **C1 Runtime Alarm:** Reports the presence of a C1 Compressor runtime alarm. No alarm displays as **None**.
- **C2 Runtime Alarm:** Reports the presence of a C2 Compressor runtime alarm. No alarm displays as **None**.

#### **AUX INPUT SCREEN**

#### **Password Protected**

This screen allows user to set Aux Input configuration and monitor the status of Aux Inputs and Outputs. It contains no sub screens other than the Help screen.



- AUX5 CFG: Determines if AUX5 is set for Temperature or Dry Contact Input. Setting: Checking the box sets it for Temp, unchecked is for Dry Contact.
- AUX6 CFG: Determines if AUX6 is set for Temperature or Dry Contact Input. Setting: Checking the box sets it for Temp, unchecked is for Dry Contact.

- **AUX1:** Dry Contact Input. This status point returns the current value of AUX1.
- **AUX2:** Dry Contact Input. This status point returns the current value of AUX2
- **AUX3:** Dry Contact Input. This status point returns the current value of AUX3.
- **AUX4:** Dry Contact Input. This status point returns the current value of AUX4.
- **AUX3 Temp:** Binary (Temp) Input. This status point returns the current value of AUX3.
- **AUX4 Temp:** Binary (Temp) Input. This status point returns the current value of AUX4.
- AUX5: Aux 5 Binary Output. Configured by AUX5 CFG.
- AUX6: Aux 6 Binary Output.Configured by AUX6 CFG.
- AUX5 Temp: Aux 5 Analog Output.Configured by AUX5 CFG.
- AUX6 Temp: Aux 6 Analog Output.Configured by AUX6 CFG.

#### AUX OUTPUTS SCREEN

#### **Password Protected**

This screen allows user to set AUX Config, AUX Manual and Aux Toggle in addition to monitoring the same via the Status sub screen.

#### Figure 31: Aux Output



- **AUX\_CFG:** Controls the output function of the AUX output dependent on the value of AV: 31. See Table 16.
- **AUX\_Manual:** AUX Manual enables/disables the AUX output. Must be in TEST Mode for this to function.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

Model: MPC

• **AUX\_TOGGLE:** Sets the value of the AUX output while in AUX TOGGLE Mode.

### Table 15: Aux Outputs

AUX_CNTL	Function of AUX Output	Behavior
1	Emergency Electric Heat	AUX ON if PID > 90% Demand
2	Cycle with Compressor	AUX ON when Compressor (C1) ON
3	Cycle with FAN	AUX ON when FAN( SF) ON

### AUX OUTPUTS STATUS SCREEN

This screen allows user to view AUX Config, AUX Output and Electric Heat status.

### Figure 32: Aux Out Status



- AUX CFG Stat: Reports current AUX CFG Setting.
- AUX Output Stat: Reports the current state of the AUX output.
- **100% Electric Heat:** Reports if this mode is selected or not selected.
- **100% Electric Heat:** Reports if there is electric heat demand or no demand.

### FAN/FILTER CONTROL SCREEN

#### **Password Protected**

Provides access to all control points associated with controlling the fan or the Dirty Filter alarming function. Also provides access to Fan/Filter Control Status screen.

### Figure 33: Fan/Filter Control



Control Points associated with this screen are described below:

- Emergency Shutdown: This point shuts down the fan, compressors and all associated control logic.
- **Supply Fan Configure:** This point is used to control the action and behavior of the supply fan.
  - $\circ~$  ON by demand, Occupied or Unoccupied.
  - ON while Occupied and ON by demand in unoccupied hours.
  - 0 ON all the time.
- **Dirty Filter Reset:** Resets the Dirty Filter Timer back to zero.
- **Dirty Filter Interval:** Allows setting of time interval for Dirty Filter. Must be in Time Mode.
- **Dirty Filter Sensor:** Checking this option allows (BI:8) to function as pressure input for Dirty Filter Detection.
- Fan Speed Enable: Forces AUX out to ON state when in High Speed Fan Mode.
- Fan Speed Trigger Type: Sets the Trigger point for the high speed fan AUX output (W) when in High Speed Fan Mode. Should be between 41% and 99%.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

### FAN/FILTER CONTROL STATUS SCREEN

Provides access to the fan/ Dirty Filter Alarm Status points.

### Figure 34: Fan/Filter Status

☆ ◀ !	Fan / Filter Status	
Supply Fan Status	>>> BV: 10 => Off	
Dirty Filter Alarm	>>> BV:19 => Off	
Supply Fan Config	>>>AV:33=> ON with DEMAND	
		4
Back		

Status points associated with this screen are described below:

- **Supply Fan Status:** Reports whether the Supply Fan is OFF or ON.
- **Dirty Filter Alarm:** Reports whether the Dirty Filter Alarm is OFF or ON.
- **Supply Fan Config:** Reports the Current configuration of the Supply Fan. The valid states are as follows:
  - 0 ON with Demand
  - 0 ON while Occupied
  - 0 ON all the time

### CO<sub>2</sub>/VOC/HUMIDITY CONTROL SCREEN

#### **Password Protected**

This screen contains all points associated with setting the trip points and access to the status sub screen for the  $CO_2/VOC/Humidity$  sensors.

### Table 16: CO<sub>2</sub>/VOC/Humdity Control

☆ ◀ !	CO2/ VOC	/HU	IM Control
CO2 Trippoint	>>> AV:54	=>	000 ppm
VOC Trippoint	>>>AV:55	=>	000 ppm
Humidity Trippoin	t >>>AV:47	=>	00 %rh
Humidity Deadba	nd >>>AV:48	=>	0.00
Humidity Ocupan	cy >>> BV:45	=>	$\checkmark$
Back	Status		Help

Control Points associated with this screen are shown below:

- **CO<sub>2</sub> Trip Point:** Sets the trip level of the CO<sub>2</sub> sensor in Parts Per Million (PPM).
- **VOC Trip Point:** Sets the trip level of the VOC sensor in Parts Per Million (PPM).
- Humidity Trip Point: Sets the trip level of the RH sensor in percent Humidity (%RH). There is no alarm associated with this as exceeding the trip point is used to turn on the AUX output only when in Relative Humidity Mode.
- Humidity Dead Band: Subtracts the Dead Band Value from the Setpoint Value keeping the AUX from responding until it has exceeded the setpoint by the Dead Band Value:
- **Example:** If the setpoint is 30% and the Dead Band is 2%, the AUX does not respond until it reaches 32% R.H. So AUX does not trip until it reaches the Setpoint + Dead Band.
- Humidity Occupancy: This point controls the actuation of the AUX output in Relative Humidity Mode. When OFF the AUX output goes on when the Trip Point is exceeded and the MPC is in Occupancy Mode. When It is ON the AUX output responds anytime the setpoint is exceeded regardless of Occupancy status.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

Model: MPC

### CO<sub>2</sub>/VOC/HUMIDITY STATUS SCREEN

This sub-screen of the CO<sub>2</sub>/VOC/Humidity Control screen is used to access the status of the various alarms and readings of the afore mentioned sensors.

### Figure 35: CO<sub>2</sub>/VOC/Humdity Control Status

☆ ◀ !	CO2/ VOC/ HUM Status		
CO2 Alarm	>>>BV:49	=>	Off 🔼
VOC Alarm	>>>BV:50	=>	Off
CO2 Status	>>>AV:52	=>	0000 ppm
VOC Status	>>>AV:53	=>	0000 ppm
R H Status	>>>AV:49	=>	000 %rh
Back			

Control Points associated with this screen are shown below:

- **CO<sub>2</sub> Alarm:** Set the CO<sub>2</sub> Alarm when the CO<sub>2</sub> level exceeds the setpoint. The Alarm extinguishes when the CO<sub>2</sub> levels drop below the setpoint.
- **VOC Alarm:** Set the VOC Alarm when the VO<sub>2</sub> level exceeds the setpoint. The Alarm extinguishes when the VOC levels drop below the setpoint.
- CO<sub>2</sub> Status: Displays the actual CO<sub>2</sub> level from the sensor in PPM.
- **VOC Status:** Displays the VOC level from the sensor in PPM.
- **R.H Status:** Displays the Relative Humidity from the sensor in %.

### **OCCUPANCY SCREEN**

#### **Password Protected**

Provides access to the control points related to setting and overriding occupancy. (Control/Status)

#### Figure 36: Occupancy

☆ ◀ !	Occupancy		
Occupancy	>>>BV:12 =>	Unoccupied ▼	
<<<< External O	ccupancy Switch	Inputs >>>>	
Occupancy Overr	ride >>>BI:8	3 => Off	
Network OCC Ov	erride >>>BNI	=> Off	
Back		Help	

- Occupancy: This point controls whether the unit is in Occupied or Unoccupied Mode. It is normally defaulted to Occupied. It can be set and overridden via the Equipment Touch Service Tool or from the BMS control program (WEBCTRbn L).
- Occupancy Override: is a digital input (BI:8) used to input a signal from an external motion sensor to override the occupancy. For this to function OCC/ Dirty Filter Sensor (BV:59) must be set to OFF.
- Network OCC Override: BNI is used via the Network to override the occupancy status of the MPC unit.

# Model: MPC Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

### HEAT/COOL CONTROL

### **Password Protected**

Provides access to the control points and status screen related to controlling heating and cooling function.

### Figure 37: Heat/ Cool Control



- Heating Mode Enabled: When Heating Mode is checked, Heating Mode is enabled. The default is checked. This allows Heating Mode to be disabled when cooling only is desired.
- **Cooling Mode Enabled:** When **Cooling Mode** is checked, Cooling Mode is enabled. The default is checked. This allows Cooling Mode to be disabled when heating only is desired.
- **Reversing Valve Manual:** Used in conjunction with Test Mode to manually engage/disengage the reversing valve.

# HEAT/ COOL CONTROL STATUS SCREEN

This is a sub screen of the Heat/ Cool Control screen used to show the status of the RV, and derivatives of the PID Control Block.

### Figure 38: Heat/ Cool Control Status

☆ ◀ !	Heat/ Cool Cn	ll Status
Reversing Valve	=> Off	
HMODE	=> 00 %	
CMODE	=> 00 %	
Back		

- **Reversing Valve:** Shows the current status of the Reversing Valve.
- **HMODE:** Conveys the status of the Heating PID output. HMODE reads zero when in Test Mode.
- **CMODE:** Conveys the Status of the Cooling PID output. CMODE reads zero when in Test Mode.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

Model: MPC

### **MPC ALARMS**

Provides access to the status of MPC Alarms

#### Figure 39: MPC Alarms

☆ ◀ !	MPC Alarms			
Alarm Relay	>>>BI:1	=>	Off	A
Pulsed Alarm	>>>BI:2	=>	Off	
C1 Runtime Alarm	>>>BV:17	=>	Off	
C2 Runtime Alarm	>>>BV:18	=>	Off	
Dirty Filter Alarm	>>>BV:19	=>	Off	
Back				

- Alarm Relay: Monitors the Alarm Relay Input BI:1 from DXM2.5, EXM etc.
- **Pulsed Alarm:** Monitors the Pulsed Alarm Input BI:2 from DXM2.5, EXM etc.
- **C1 Runtime Alarm:** Alarm set to trigger when Compressor 1 exceeds 5,000 hours runtime.
- **C2 Runtime Alarm:** Alarm set to trigger when Compressor 2 exceeds 5,000 hours runtime.
- **Dirty Filter Alarm:** This alarm is based on accumulated time or air pressure sensor and indicates the return air filter is dirty.
- Valid Sensor Alarm: This alarm indicates that the ZS Sensor is not present. Select Alarm Enabled for each sensor in the system. If Alarm Enabled is not checked for a sensor, and that sensor is missing, an alarm is not activated.
- Lockout Alarm: This alarm is present anytime a fault causes a lockout. This alarm self-clears when the lockout condition is removed.
- **C1 Cycle Alarm:** Alarm set to trigger when Compressor 1 exceeds 6.5 demand cycles within a 1 hour period.
- C2 Cycle Alarm: Alarm set to trigger when Compressor 2 exceeds 6.5 demand cycles within a 1-hour period.
- **TEST Mode Alarm:** This alarm is present when the MPC is put into Test Mode and stays in Test Mode longer than 1 hour.

- **CO<sub>2</sub> Alarm:** Alarm triggers when CO<sub>2</sub> level exceeds the setpoint.
- VOC Alarm: Alarm triggers when VOC level exceeds the setpoint.

### **MPC FAULTS**

This screen reports the fault count for various fault types and includes the reset function to clear those same faults. For more information on these faults, please refer to the DXM2.5 Software specification.

#### Figure 40: MPC Faults

☆ ◀ 🚦	MPC Faults
HP Fault Counter	>>>AV:11 => 000
LP Fault Counter	>>>AV:12 => 000
FP1Fault Counter	>>>AV:13 => 000
FP1Fault Counter	>>>AV:14 => 000
CO Fault Counter Back	>>>∆\/·15 => 000 ▼ Help

- HP Fault Counter: High-pressure fault counter.
- LP Fault Counter: Low-pressure fault counter.
- **FP1 Fault Counter:** Freeze Protect 1 Fault (open or shorted).
- FP2 Fault Counter: Freeze Protect 2 Fault (open or shorted).
- CO Fault Counter: Condensate Overflow fault alarm.
- **Over/Under Fault Counter:** Over/Under Voltage Fault detection alarm.
- UPS Fault Counter: Unit Performance Sentinel Fault.
- Swapped FP1/FP2 Fault: Indicates FP1 and FP2 are swapped or reversed.
- Airflow Fault Counter: Airflow Fault.
- Pump Fault Counter: Pump Fault.
- Fault: Aggregate Fault number.
- **Pulse Signal Value:** Previous Pulse Alarms counts from external Controller.
- **UPS Signal Enable:** Reports the status of the Unit Performance Sentinel.

# Model: MPC Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

- Valid Sensor: Valid Sensor Detected.
- Fault Count Reset: Resets all Fault Counters when ON.

#### LAT/LWT STATUS

This screen reports the Leaving Air Temperature and the Leaving Water Temperature status. These points do not affect control of the MPC unit but instead are for reporting purposes for the BMS and are available via analog outputs 1 and 2.

#### Figure 41: Leaving Water/ Air Temp Status



- Leaving Air Temp: Reports the Leaving Air Temp when an appropriate sensor is connected to AI:2.
- Leaving Water Temp: Reports the Leaving Water Temp when an appropriate sensor is connected to Al:3.
- Leaving Air Temp: Network output representing Leaving Air Temp. It is in °F or °C depending on the status of the Metric Control Point (BV:39).
- Leaving Water Temp: Network output representing Leaving Water Temp. It is in °F or °C depending on the status of the Metric Control Point (BV:39).
- RS LAT: Leaving Air Temperature analog output
- LRS LWT: Leaving Water Temperature analog output.

### **ZONE STATUS SCREEN**

This screen allows the user to monitor Zone Temperature status and PID Outputs. The PID outputs also appear in the Maintenance screen.

#### Figure 42: Zone Status

☆ ◀ !	Zone Statu	IS
Zone Temp	>>>>AV:34 =>	00.0 °€
Actual CL Setpoint	>>>>AV:1 =>	00.0 °E
Actual HT Setpoint	>>>AV:2 =>	00.0 °€
Cool PID	>>>AV:29 =>	000 %
Back		

- **Zone Temp:** Reports the Zone or Room Air Temperature. It is in F° or C° depending on the status of the Metric Control Point (BV:39).
- Actual CL Setpoint: Reports the Actual Cooling Setpoint that includes the Master Setpoint plus/ minus adjustments the user has made. It is in °F or °C depending on the status of the Metric Control Point (BV:39).
- Actual HT Setpoint: Reports the Actual Heating Setpoint that includes the Master Setpoint plus/ minus adjustments the user has made. It is in °F or °C depending on the status of the Metric Control Point (BV:39).
- **Cool PID:** Displays the output of the cooling PID calculation which is between 0 100 %. This value also displays in the Maintenance screen.
- Heat PID: Displays the output of the heating PID calculation which is between 0 100 %. This value also displays in the Maintenance screen.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

Model: MPC

### SENSOR SETUP/STATUS SCREEN

The Sensor Setup/Status screen allows access to the RNet Sensor Setup sub-screen and the RNet Sensor Active screen. It contains the RS Sensor Status and the Sensor Alarm Status. It also has a check box for enabling the internal Equipment Touch Service Tool Temp and Humidity sensors.

#### Figure 43: Sensor Setup/Status



- **RS TEMP Sensor:** Status of the RS Temperature Sensor, Present or Not Present.
- **Sensor Alarm:** ON if one of the RNet Sensors enabled is missing or not functional.
- EQ Touch Sensor Enable: Checked to enable internal Equipment Touch Service Tool Sensors.

### **RNET (ZS) SENSOR SETUP SCREEN**

#### **Password Protected**

This screen allows access to the Enables for the RNet Sensor Alarms. If a Sensor is installed, the associated Alarm Enable must be checked for it to generate an alarm when not present or non-functional.

#### Figure 44: ZS Sensor Setup



- **RNet Sensor 1 Alarm Enable:** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Address 1. If it is not present, a Sensor Not Present Alarm is generated. This is required because the unit can have up to five zone sensors and is set to look for all five even when only one or two are present. (It is normally defaulted to checked.)
- **RNet Sensor 2 Alarm Enable:** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Address 2.
- **RNet Sensor 3 Alarm Enable:** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Address 3.
- **RNet Sensor 4 Alarm Enable:** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Address 4.
- **RNet Sensor 5 Alarm Enable:** Checking this notifies the sensor alarm logic to expect a valid sensor to be present at Address 5.

Model: MPC

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

### **RNET (ZS) TEMP SENSOR ACTIVE SCREEN**

This screen shows which RNet Sensors are detected and present within the system.

#### Figure 45: ZS Temp Sensor Status

☆ ◀ !	ZS Temp Sensor Active		
ZS Temp Sensor1	=>	Not Present	
ZS Temp Sensor2	=>	Not Present	
ZS Temp Sensor3	=>	Not Present	
ZS Temp Sensor4	=>	Not Present	
ZS Temp Sensor5	=>	Not Present	
Back			

- RNet Sensor 1: Address 1, Present or Not Present
- RNet Sensor 2: Address 2, Present or Not Present
- RNet Sensor 3: Address 3, Present or Not Present
- RNet Sensor 4: Address 4, Present or Not Present
- RNet Sensor 5: Address 5, Present or Not Present

### **MODE SETTINGS**

#### **Password Protected**

This screen contains mode settings used to configure and test the MPC unit.

#### Figure 46: Mode Settings

☆ ◀ 🚦	Mode Settings
RNET Mode	>>> BV:44 => 🧭 🔺
Dead Band Mode	>>> BV:48 => 🔗
TEST Mode	>>> BV:34 => 🔗
Master/Subordinate Mode	>>> BV:16 => 🔗
System Reset	>>> BV:4 => 🛷 🔻
Back	Help

- **RNet Mode:** Allows the MPC to function with LStat Sensors when RNet is OFF. Also allows monitoring of inputs 5 and 6 (temp or dry contact) when a RNet sensor is used.
- **Dead Band Mode:** Dead Band Mode forces a user selectable dead band between heat and cool set points.

**Example**: if the heat set point is lowered by 2°, then the cool set point is lowered by 2°.

- Test Mode: Shuts everything down so that the Compressors, Supply Fan and Reversing Valve can be tested manually via their associated manual control points.
- **Master/Subordinate Mode:** Checking this box puts the unit in Subordinate Mode.
- System Reset: Reset the MPC.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

Model: MPC

### **INITIAL SENSOR SETUP**

Revision 7 and higher software can handle up to five - RNet Sensors connected in parallel or one RS Sensor (Obsolete). The Equipment Touch Service Tool itself can also function as a Temperature/humidity Sensor in place of the RNet/RS Sensors. Setup and screens related to sensor function is covered below.

### **RNET SENSOR SETUP**

The RNet Sensor address must be between 1 and 5. Set the address on the back of the sensor as required. It is best to start at sensor number 1 and increase the address for each additional unit connected. Make sure all of the required sensors are wired to the RNet connector correctly.

Equipment Touch Service Tool has an alarm feature that activates an alarm if the Alarm Enable is selected and no sensor is present. The alarm resets automatically when a sensor is plugged in.

To configure the Equipment Touch Service Tool for RNet Sensors, navigate to the following menu:

#### MPC Setup/ Status > Sensor Setup/Status > ZS Sens Setup

Click or select the appropriate RNet Sensor Alarm Enable button for the number of sensors installed and their associated addressing. In the figure below, only one RNet Sensor is installed so only Address 1 is selected.

#### Figure 47: Alarm Enable Option



To confirm you are seeing the RNet Sensors, navigate to the ZS Sens Active screen.

#### MPC Setup/ Status > Sensor Setup/Status > ZS Sens Active

This takes you to the RNet Active screen, which allows you to see if a individual sensor is present.

#### Figure 48: RNet Active Screen

ZS Temp Sensor1	=>	Not Present
ZS Temp Sensor2	=>	Not Present
ZS Temp Sensor3	=>	Not Present
ZS Temp Sensor4	=>	Not Present
ZS Temp Sensor5	=>	Not Present

This is all that is required to setup for running RNet sensors with the Gen 7 Version of the MPC.

### EQUIPMENT TOUCH SERVICE TOOL SETUP

To use the Equipment Touch Service Tool as the Wall Sensor, it must first have the internal Temperature and Humidity sensors enabled so they can transmit this data. To do this, navigate to the Sensor Setup screen.

#### MPC Setup/ Status >Touchscreen Setup > Sensor Setup

- 1. Set Temperature Sensor to **internal** and Enable Transmit to **ON**.
- 2. Set Humidity Sensor Enable transmit to **ON**.
- 3. Then press SAVE.

The next step is to navigate to the Sensor Setup/ Status screen and make sure the Equipment Touch Service Tool Sensor Enable is checked.

#### MPC Setup/ Status > Sensor Setup/Status > EQ Touch Sensor Enable =>

# Equipment Touch Service Tool Screen Descriptions (Water-to-Air) Gen 8

### **GENERATING A FIELD ARCHIVE**

To archive the current MPC Download, click the Archive button then select the **Archive Now** check box.

#### Figure 49: Archive

Archive Now	>>>BV:62	=>	$\sim$
Archive Status	>>>MSV:10	=>	Unsupported
Current Archive	Number	=>	00
Month		=>	00
Day of Month		=>	00
Year		=>	0000

When the **Archive Now** box is checked, the MPC archives the current modified program including all control settings and display the current archive number, Month, Day, and Year of the archive is displayed. See the above information on retrieval procedures.

### **TEST MODE**

Test Mode allows the field personnel to manually manipulate the following for troubleshooting purposes:

- Compressor 1
- Compressor 2
- Supply Fan
- Reversing Valve

To enter Test Mode, navigate to the Mode Settings screen. Check the box for Test Mode. When navigating to the maintenance screen, the icon for Test Mode is displayed and the icons for C1, C2, RV, and Fan is not displayed.

#### Figure 50: Test Mode



The correct test sequence is shown below: Note the Compressors do not turn on unless the Supply Fan is on, so it must be turned on first.

#### Figure 51: Supply Fan



To test the supply fan, navigate to the Fan/Filter Control screen and check the **Supply Fan Manual** box. Check the maintenance screen to ensure the fan icon is present.

To test the compressors, navigate to the Compressor Setup screen. Once here, the compressors may be turned ON or OFF via the Manual Compressor Check Boxes. The icons on the maintenance screen display when the compressors are turned ON and disappear when the compressors are turned OFF.

#### Figure 52: Compressors



To test the Reversing Valve function, navigate to the HEAT/COOL Control screen and check the **Reversing Valve Manual** check box. You can verify that the RV icon displays on the maintenance screen when the RV is turned on.

#### Figure 53: Reversing Valve



# Equipment Touch Service Tool Screen Descriptions (Water-to-Water) Gen 8

Model: MPC

### **SCREEN DESCRIPTIONS**

All application specific user screens are covered in this document. There are built in factory screens that are not covered in this document. For information on those screens, please refer to the Equipment Touch Service Tool Installation and Setup Guide available from the OEMCtrl web portal.

#### System Setup Screen

The System Setup screen allows access to all setup and status screens both application specific and factory screens. The passcode to access the main menu is 9999. The System Setup screen contains the following buttons allowing access to the following screens:

- Alarm: For monitoring and clearing all active alarms.
- **Archive**: Used to archive the current downloaded MPC file.
- MPC Setup/Status: Navigates to the screen allowing access to all user setup/status screens.
- Monitor: Used for monitoring system status.
- System: Used to access MPC setup screens.
- About: Version Information.
- Home: Returns to Home screen.

#### Figure 54: Home Screen

☆ ◀ !	Menu
<sup>®</sup> MPC Setup/ Status	Archive
Monitor Screen	System
Alarm	Home
Ab	oout

These three icons that are present on every screen; Home, Back, and Information. Clicking the Home screen icon returns the user to the screen which is the top of the screen hierarchy. The Back Arrow icon is used to go up one screen in the hierarchy. The Information icon displays any active alarms or other pertinent system information.

#### Figure 55: Home, Back, and Information Icons



#### **Monitor Screen**

The Monitor screen is used for monitoring the function of the MPC unit under operatin conditions. Using the Home icon or Home button returns the user to the Home screen. For information on the Monitor screen, the Help button provides help on the meaning and use of the icons used in the screen.

#### Figure 56: Icon Descriptions



- 1. Compressor Stage 1 **ON** when  $\rightarrow$  C1 icon is visible.
- 2. Compressor Stage 2 **ON** when  $\rightarrow$  C2 icon is visible.
- 3. Reversing Valve **ON** when  $\rightarrow$  RV icon is visible.
- 4. Auxiliary Output 2 **ON** when  $\rightarrow$  AUX icon is visible.
- 5. Occupancy Status < Unoccupied or Occupied>.
- 6. Fan Output **ON** when  $\rightarrow$  Fan icon is visible.
- 7. Heating PID %.
- 8. Cooling PID %.
- 9. Zone Temperature.
- 10. AUX Mode setting.
- 11. Heating/cooling setpoints.
- 12. Heat/cool icons displayed when greater than 50% demand.
- 13. Relative Humidity Display.
- 14. Test Mode/Dirty Air Filter Mode.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Water) Gen 8

#### System Setup & Status Screen

Model:

MPC

From this screen, you can access all control and status-checking functions within the MPC Gen 7 and newer Controllers.

#### Figure 57: System Setup & Status

System Setup &Status		
Temp Setup and Status	LAT/ LWT Status	
Compressor Setup	Zone Status	
Auxillary Inputs	Sensor Setup/Status	
Auxiliary Outputs	Mode Settings	L
Back	MDC Monitor Scroon	

• **Temp Setup and Status:** Provides user access to Temp Units and Temp Setpoints screen for setting temperature units and temperature setpoints respectively. There are no control or status points on this screen.

#### Figure 58: Temp Setup & Status



- **Compressor Setup:** Provides user access to all control points and status points related to compressor operation. All control points are on the main screen while status points are contained in the Status submenu.
- Auxiliary Inputs: Provides user access to the control points and status of the auxiliary inputs.
- Auxiliary Outputs: Provides user access to the control points and status of the auxiliary outputs. (Control/Status).

- **Occupancy:** Provides access to the control points related to setting and overriding Occupancy.
- Heat/Cool Control: Provides access to the control points and status of the heating and cooling functions.
- **MPC Alarms:** Provides access to the MPC Alarm Status screen (Status Only).
- **MPC Faults:** Provides access to the MPC Fault Status screen (Status Only).
- **Zone Status:** Provides access to Zone Temperature Status and PID values.
- MPC Monitor screen: Quick view of the system status.
- **System Reset:** takes the user to Mode Settings screen that gives the user the option to reset the MPC to its default settings.
- Mode/Reset Settings: Provides the user the option to enable certain modes and to reset the MPC to its default settings.

#### **TEMPERATURE UNITS SCREEN**

User can set the temperature units (Fahrenheit or Celsius) via the (BV:33) check box and view the current temperature mode selected. Checking (BV:33) selects Metric (Celsius) Mode. The Help button takes the user to a Help screen that explains the settings available in this screen.

#### Figure 59: Temperature Units



- **Current Mode:** displays the current Temperature Mode as Celsius or Fahrenheit.
- **Metric Mode:** Selection point (BV:39), Check to put unit in Metric or Celsius Mode.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Water) Gen 8

Model: MPC

### **TEMPERATURE SETPOINTS SCREEN**

Gives the user access to all Temperature Related Setpoints available in this screen. It also provides access to the Manual Setpoints screen via the Manual SP button.

### Figure 60: Temperature Setpoints



- Master WT: Sets the Master Water Temperature setpoints (°F/°C).
- Occ DB: Sets the Occupied Dead Band Setpoints.
- UnOcc HTSP: Sets the Unoccupied Heating Setpoints (°F/°C).
- Occ HTSP: Sets the Occupied Heating Setpoints (°F/°C).
- UnOcc CLSP: Sets the Unoccupied Cooling Setpoints (°F/°C).
- Occ CLSP: Sets the Occupied Cooling Setpoints (°F/°C).
- **Subordinate HTSP:** Sets the Subordinate Heating Setpoints (°F/°C).
- Subordinate CLSP: Sets the Subordinate Cooling Setpoints (°F/°C).

### **COMPRESSOR SETUP**

The Compressor Setup screen contains the following control points and a button for accessing the Status screen and the Help screen.

### Figure 61: Compressor Setup



- Load Balancing Mode: Defines the mode of operation for the runtime balancing of a 2 Compressor application. The modes are set by entering the following in AV:59
  - AV:59 = 01 Runtime Comparison Mode The compressor with the least runtime becomes the stage 1 compressor while the high time compressor becomes the stage 2 compressor.
  - AV:59 = 02 Manual C1 is Stage 1, C2 is Stage 2.
  - AV:59 = 03 Manual C2 is Stage 1 and C1 is Stage 2.
  - **AV:59 = 04** Time Toggle- C1 and C2 swap stages every 12 hours dependent on demand.
- **Compressor Enable/Disable:** When a compressor run time reaches the amount of time specified, the lead and lag compressors switch.
- **Compressor Runtime Resets:** This resets the C1/C2 runtime counters back to zero. The compressor alarms are set to trigger at 5,000 hours.
- **Compressor Cycle Alarm Resets:** Resets the Alarm that gets triggered when there are more than 6 compressor demand cycles within any one hour period of time.

# Model:<br/>MPCEquipment Touch Service ToolScreen Descriptions (Water-to-Water) Gen 8

- **Compressor Manual ON controls:** These points are used to manually turn on the C1 or C2 outputs. Unit must be in Test Mode for these to function.
- When multistage is enabled (BV:62) checking the override box overrides the network call for a compressor or RV.

### **COMPRESSOR STATUS SCREEN**

This screen allows the user to monitor all compressor related status points real time. The points contained are listed below with a short description of their individual function.

#### Figure 62: Compressor Status



- **C1 Status:** Reports the state of the C1 Compressor Output as either ON or OFF.
- **C2 Status:** Reports the state of the C2 Compressor Output as either ON or OFF.
- **C1 Cycle Counter:** Records the number of C1 Cycle Alarms that have occurred.
- **C2 Cycle Counter:** Records the number of C2 Cycle Alarms that have occurred.
- **C1 Cycle Alarm:** Reports the presence of a C1 Cycle Alarm. No alarm displays as **None**.
- **C2 Cycle Alarm:** Reports the presence of a C2 Cycle Alarm. No alarm displays as **None**.
- **C1 Runtime Alarm:** Reports the presence of a C1 Compressor runtime alarm. No alarm displays as **None**.
- **C2 Runtime Alarm:** Reports the presence of a C2 Compressor runtime alarm. No alarm displays as **None**.

### **AUX INPUT SCREEN**

This screen allows user view the entering water, leaving water, and source-water temperatures. It contains no sub screens other than the Help screen.

#### Figure 63: Aux Input



### AUX OUTPUTS SCREEN

This screen allows user to set AUX Config, AUX Manual and Aux Toggle in addition to monitoring the same via the Status sub screen.

#### Figure 64: Aux Output



- **AUX\_CFG:** Controls the output function of the AUX output dependent on the value of AV: 31. See table to the right.
- **AUX\_Manual:** AUX Manual enables/disables the AUX output. Must be in TEST Mode for this to function.
- AUX\_STATUS: Shows the status of the Aux output.
- **Reversing Valve Manual:** Manual switch to turn reversing valve on or off in Test mode.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Water) Gen 8

Model: MPC

#### Table 17: Aux Outputs

AUX_CNTL	Function of AUX Output	Behavior
1	Emergency Electric Heat	AUX ON if PID > 90% Demand
2	Cycle with Compressor	AUX ON when Compressor (C1) ON
3	Cycle with FAN	AUX ON when FAN( SF) ON

### SYSTEM SCREEN

Used to access to MPC setup screens.

#### Figure 65: System

☆ ◀ !	Device: 1	1616005	16:22
Value:	55	<b>-</b> °F )	
Module Status	Alarms		rends
Schedules	Setup	В	owser

- **Module Status:** Provides information about software and firmware versions.
- Alarms: Displays active alarms.
- **Trands:** Allows the user to select and graph data from the bank.
- **Schedules:** Create schedule to be recorded in the bank.
- **Setup:** Access the initial setup of the module and touchscreen.
- **Browser:** View list of points and their status.

#### **OCCUPANCY SCREEN**

#### **Password Protected**

Provides access to the control points related to setting and overriding occupancy. (Control/Status)

#### Figure 66: Occupancy

🔂 ┥ <mark>!</mark>	Occupancy		
Occupancy >>>BV:12 =>	Occupied		
Occupancy Status >>>BV:1	1 => Occupied		
Back	Help		

**Occupancy:** This point controls whether the unit is in Occupied or Unoccupied Mode. It is normally defaulted to Occupied. It can be set and overridden via the Equipment Touch Service Tool or from the BMS control program (WEBCTRL).

### HEAT/COOL CONTROL

Provides access to the control points and status screen related to controlling heating and cooling function.

#### Figure 67: Heat/ Cool Control



• **HC Mode:** When HC Mode is checked, in heating mode the unit is controlled based on EWT, when unchecked it is controlled based on LWT.

# Model:<br/>MPCEquipment Touch Service ToolScreen Descriptions (Water-to-Water) Gen 8

- CC Mode: When CC Mode is checked, in cooling mode the unit is controlled based on EWT, when unchecked it is controlled based on LWT.
- **RV Override:** When multi-stage control is selected this allows the user to override the RV output from the BMS.
- **Reversing Valve Manual:** Manual switch to turn the reversing valve on or off in Test mode.
- MC Switch: ON for cooling and OFF for heating.

### HEAT/ COOL CONTROL STATUS SCREEN

This is a sub screen of the Heat/ Cool Control screen used to show the status of the RV, and derivatives of the PID Control Block.

#### Figure 68: Heat/ Cool Control Status

🚹 ┥ 📙 🛛 Heat/ Co	Heat/ Cool Cntl Status	
Beversing Valve >>>> BV:13 =>	Off	
HT_PID >>>> AV:38 =>	100 %	
CL_PID >>>> AV:39 =>	0 %	
Back		
Back		

- **Reversing Valve:** Shows the current status of the Reversing Valve.
- **HMODE:** Conveys the status of the Heating PID output. HMODE reads zero when in Test Mode.
- **CMODE:** Conveys the Status of the Cooling PID output. CMODE reads zero when in Test Mode.

### **MPC ALARMS**

Provides access to the various MPC Alarms (Status Only)

#### Figure 69: MPC Alarms

͡ᠿ ◀ 📘	MPC Alarms
Atarm Relay >>>BI:1 =>	Off 🔺
Pulsed Alarm >>>BI:2 =>	Off
C1 Runtime Alarm >>>BV:17	=> Off
C2 Runtime Alarm >>>BV:18	=> Off
Dirty Filter Alarm >>>BV:19 =	> Off
Back	

- Alarm Relay: Monitors the Alarm Relay Input BI:1 from DXM2.5, EXM etc.
- **Pulsed Alarm:** Monitors the Pulsed Alarm Input BI:2 from DXM2.5, EXM etc.
- **C1 Runtime Alarm:** Alarm set to trigger when Compressor 1 exceeds 5,000 hours runtime.
- **C2 Runtime Alarm:** Alarm set to trigger when Compressor 2 exceeds 5,000 hours runtime.
- Alarm State: ON indicates a lockout condition exists, OFF indicates normal operation.
- Lockout Alarm: This alarm is present anytime a fault causes a lockout. This alarm self-clears when the lockout condition is removed.
- **C1 Cycle Alarm:** Alarm set to trigger when Compressor 1 exceeds 6.5 demand cycles within a 1 hour period.
- **C2 Cycle Alarm:** Alarm set to trigger when Compressor 2 exceeds 6.5 demand cycles within a 1-hour period.
- **TEST Mode Alarm:** This alarm is present when the MPC is put into Test Mode and stays in Test Mode longer than 1 hour.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Water) Gen 8

Model: MPC

### **MPC FAULTS**

This screen reports the fault count for various fault types and includes the reset function to clear those same faults. For more information on these faults, please refer to the DXM2.5 Software specification.

#### Figure 70: MPC Faults



- HP Fault Counter: High Pressure fault counter.
- LP Fault Counter: Low Pressure fault counter.
- LT1 Fault Counter: Liquid temperature 1 fault counter.
- LT2 Fault Counter: Liquid temperature 2 fault counter.
- CO Fault Counter: Condensate Overflow fault alarm.
- **Over/Under Fault Counter:** Over/Under Voltage Fault detection alarm.
- UPS Fault Counter: Unit Performance Sentinel Fault.
- Swapped LT1/LT2 Fault: Indicates LT1 and LT2 are swapped or reversed.
- Fault: Aggregate Fault number.
- **Pulse Signal Value:** Previous Pulse Alarms counts from external Controller.
- **UPS Signal:** Reports the status of the Unit Performance Sentinel.
- Fault Count Reset: Resets all Fault Counters when ON.

#### **ZONE STATUS SCREEN**

This screen allows the user to monitor Zone Temperature status and PID Outputs. The PID outputs also appear in the Maintenance screen.

#### Figure 71: Zone Status

🔂 ┥ 📙	Zone Status
2ene Temp >>>>AV:34 =>	45.0 °F
Actual CL Setpoint >>>>AV:1	=> 70.0 °F
Actual HT Setpoint >>>>AV:2	=> 68.0 °F
Cool PID >>>AV:29 =>	0 %
Heat PID >>>>AV:28 =>	0 %
Back	

- Actual CL Setpoint: Reports the Actual Cooling Setpoint that includes the Master Setpoint plus/ minus adjustments the user has made. It is be in °F or °C depending on the status of the Metric Control Point (BV:39).
- Actual HT Setpoint: Reports the Actual Heating Setpoint that includes the Master Setpoint plus/ minus adjustments the user has made. It is in °F or °C depending on the status of the Metric Control Point (BV:39).
- Cool PID: Displays the output of the cooling PID calculation. PID calculation is displayed between 0 – 100%. This value also displays in the Maintenance screen.
- Heat PID: Displays the output of the heating PID calculation. PID calculation is displayed between 0 – 100%. This value also displays in the Maintenance screen.

# Equipment Touch Service Tool Screen Descriptions (Water-to-Water) Gen 8

### **MODE/RESET SETTINGS**

This screen contains mode settings used to configure and test the MPC unit.

### Figure 72: Mode Settings



- Emergency Shutfown: When engaged, Y1, Y2, G, and W output relays turn OFF.
- C1/C2 Reset: Resets the C1/C2 Runtime Alarm.
- **Test Mode:** Shuts everything down so that the Compressors, Supply Fan, and Reversing Valve can be tested manually via their associated manual control points.
- **Master/Subordinate Mode:** Checking this box puts the unit in Subordinate Mode.
- System Reset: Reset the MPC.
- **C1/C2 Cycle Reset:** Resets the C1 Cycle Counter to zero.
- Slave CL Deadband: Subordinate Cooling Differential Deadband. Active only when M/S Switch is **ON**.
- **Slave HT Deadband:** Subordinate Heating Differential Deadband. Active only when M/S Switch is **ON.**

### **GENERATING A FIELD ARCHIVE**

To archive the current MPC Download, navigate to the Archive screen and click the **Archive Now** check box.

### Figure 73: Archive

Archive Now	>>>BV:62	=>	$\ll$
Archive Status	>>>MSV:10	=>	Unsupported
Current Archive Number =>		=>	00
Month		=>	00
Day of Month		=>	00
Year		=>	0000

When the **Archive Now** box is checked the MPC archives the current modified program including all control settings and display the current archive number, Month, Day and Year of the archive is displayed. See above information on retrieval procedures.

### **TEST MODE**

Test Mode allows the field personnel to manually manipulate the following for troubleshooting purposes:

- Compressor 1
- Compressor 2
- Reversing Valve

To enter Test Mode, navigate to the Mode Settings screen. Select the **Test Mode** box. When navigating to the maintenance screen, the icon for Test Mode is displayed and the icons for C1, C2, RV and Fan are not displayed.

#### Figure 74: Test Mode

'EST Mode >>> BV:34 =>ຶ∣

# Equipment Touch Service Tool Screen Descriptions (Water-to-Water) Gen 8

Model: MPC

The correct test sequence is shown below:

To test the compressors, navigate to the Compressor Setup screen. Once here, the compressors may be turned ON or OFF via the Manual Compressor Check Boxes. The icons on the maintenance screen displays when the compressors are turned ON and disappear when the compressors are turned OFF.

#### Figure 75: Compressors



To test the Reversing Valve function, navigate to the HEAT/COOL Control screen and check the **Reversing Valve Manual** check box. You can verify that the RV icon displays on the maintenance screen when the RV is turned on.

### Figure 76: Reversing Valve



### ALARMS

The Alarms screen allows the user to view all active alarms, active faults, and to clear the alarms and faults. After viewing the active alarms, press **Back** to access the menu.

#### Figure 77: Alarms

		Alarms	
@!	Active Alarms		
!	Active Faults		
!	Return to Normal		
!	Manually Cleared		

### **ARCHIVE SCREEN**

This screen is used to archive the current MPC file.

### Figure 78: Archive

🟠 ┥ <mark>!</mark>	Archive
GArchive Now >>>BV:70 =>	
Archive Status >>>MSV:10 =>	> Valid
Current Archive Number =>	0
Month =>	0
Day of Month =>	0
Year =>	0
Menu	

- Archive now: Check to archive the latest MPC file.
- Archive Status: Confirms the latest MPC file is valid.
- Current Archive Number: The number of the archive file in use.
- Month/Day of Month/Year: The date of the latest archive file.



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Notes	Model: MPC

# **Revision History**

Date:	Section	Action:
10/16/24	Gen 7 and Newer Water-to-Air Points Matrix	Updated Gen 7 and Newer Water-to-Air Points Matrix
		Converted document to new template.
08/08/24	All	Updated ASW sensor part numbers and descriptions
		Added Equipment Service Tool screen descriptions for water-to-water use.
01/31/24	Page 20, 28, and 30	Updated point matrix name and description information
01/25/24	Page 21	Corrected the BACnet number for Metric Mode
11/15/23	Page 3	Corrected the number of communication protocols the MPC Controller supports
08/29/23	Page 23	Corrected Compressor Shutdown (BV:53) description
08/01/23	All	Updated to software revision 8
08/13/21	Page 7 and 47	Update ASW sensor model numbers, add battery info and warning
08/13/21	Update Sensors	Updated Part and Model numbers
05/14/21	All	Changed Slave to Subordinate
11/06/20	First Published	







A NIBE GROUP MEMBER

7300 SW 44<sup>th</sup> St | Oklahoma City, OK 73179 Phone: 800.299.9747 www.climatemaster.com

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