



# Fan Coil Controller

## EFCB Series

### BACnet Communication Module User Guide



**EFCB10TU2** (24Vac / 2 relays)

**EFCB10TU4** (24Vac / 4 relays)

**EFCB11TU2** (120Vac / 2 relays)

**EFCB11TU4** (120Vac / 4 relays)

**EFCB12TU2** (240Vac / 2 relays)

**EFCB12TU4** (240Vac / 4 relays)





## Introduction

The EFCB Series Controller BACnet Communication Module User Guide provides information about using the EFCB Series controller with BACnet communications feature. The BACnet communication protocol for building automation and control networks enables communication between client devices within a network. The controller provides a BACnet network interface between BACnet client devices and Neptronic Controller series devices. It uses the BACnet Master Slave/Token Passing (MS/TP) protocol at the BACnet MAC layer.

## Pre-requisites

The BACnet communication user guide assumes that you are familiar with the concepts of BACnet and its terminology.

## Advantages of BACnet

BACnet enabled controllers have the following advantages:

- **Quick Message Transmission.** The controller uses a synchronous implementation for BACnet messages making it quick and efficient. Each BACnet confirmed service request is answered as quickly as possible without using the **Reply Postponed** frame. The MS/TP implementation is performed within **Tusage\_delay** of 15 minutes to ensure a **Tusage\_timeout** value within 20 minutes.
- **MS/TP Support.** The controller supports a Full Master Node state machine for MS/TP. **Max\_Master** and the instances are configured to the device object through **BACnet WriteProperty** service. The MAC address is set via the DIP switches. Programming mode determines the MS/TP baud rate setting of 9600, 19200, 38400, and 76800. In the configuration mode, the device is configured through the device's keypad. For more information about the WriteProperty, refer to [Table 3 - Object Types Supported](#).
- **BIBB Support.** The controller functions the same way as the B-ASC type profile server and supports the specific BIBB as per their relevant definitions.
  - DS-RP-B
  - DS-RPM-B
  - DS-WP-B
  - DS-WPM-B
  - DM-DCC-B
  - DM-DDB-B
  - DM-DOB-B
  - DM-RD-B
  - DM-TS-B
  - DM-UTC-B
  - DS-COV-B
  - DS-COVP-B
  - SCHED-WS-I-B
- **Object Support.** The controller supports a fixed list of BACnet visible values, which appear as **Present\_Values** of various BACnet standard object types in addition to a device object. For more information, refer to [Table 3 - Object Types Supported](#).
- **Alarms.** The controller supports indication of various alarm conditions through value changes in properties of several objects. However, it does not generate BACnet event notifications.



## BACnet Properties Configuration

To establish communication on the network and guarantee a unique ID of devices in a BACnet system, the following properties may have to be configured.

**Table 1 - BACnet Properties Configuration**

| Property                  | Default Value      | Configuration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAC Address               | 000                | Set to a value between 000 and 127 via DIP switches. Can also be set to a value between 000 and 254 via menu.<br>The values from 128-254 represent MS/TP non-token passing slave devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Device Instance           | Auto               | <ul style="list-style-type: none"><li>The controller automatically configures its device instance to 153,000 + MAC address.</li><li>The value can be set manually via the menu.</li><li>The value can be set manually through the <b>WriteProperty</b> service to <b>Device Object.Object_Identifier</b>.</li><li>The device's <b>Object_Identifier</b> is a combination of the <b>Device Object_Type</b> (8) and the <b>Device_Instance</b> (0-4194302), therefore its decimal or hexadecimal representation tends to be incomprehensible.</li><li>For example, the <b>Device_Instance</b>=1000 has an equivalent <b>Object_Identifier</b> of 0x020003E8 hexadecimal or 33555432 decimal.</li></ul> |
| Baud Rate                 | 0 = Auto           | <ul style="list-style-type: none"><li>The controller configures its baud rate automatically by detecting the network upon connection.</li><li>The value can be set manually from the available values of Auto, 9600, 19200, 38400, 76800.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Max_Master                | 127                | <ul style="list-style-type: none"><li>Configure <b>Max_Master</b> value to increase network efficiency when there are less than 127 devices on the network.</li><li>The <b>Max_Master</b> value can be changed via menu or through the WriteProperty service to the Device <b>Object.Max_Master</b>.</li></ul> <p>For more information, refer to the MAC Address and Max_Master section.</p>                                                                                                                                                                                                                                                                                                         |
| Device Object.Object_Name | Name of the device | <ul style="list-style-type: none"><li>Configure the name of the device through WriteProperty service to the <b>Device Object.Object_Name</b>. For example, EFCB.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



# Configuration Options

The following Configuration options enable you to configure and run the BACnet features of the controllers quickly.

## Quick Setup

Configure the controller's baud rate and device instance without programming.

1. Set a unique MAC address using the DIP switches located on the controller.
2. Connect the controller to the network and power it up.
3. The controller automatically configures the baud rate and device instance.
4. Repeat the steps for each controller.

## Manual Setup

To use a **Device\_Instance** other than 153,000, and/or if your site has more than one controller network, go to the menu. The action buttons or the buttons used to access the menus and save changes are different in TFL24 and TDF digital room sensors. The buttons of both TFL24 and TDF have been used in the following instructions. Use the button as applicable to your digital room sensor.

1. Ensure that the digital room sensor jumper is in the RUN position.
2. Press the [  /  ] and [  /  ] buttons simultaneously for 5 seconds. The "ENTER PASSWORD" screen appears.
3. Enter the 637 password within 1 minute by using the arrow keys to increase or decrease the value and the [  /  ] and [  /  ] buttons to toggle between the digits.
4. Follow the menus to configure the MAC address, Max Master, Device Instance, and Baud Rate manually.
5. Disconnect the power to the controller, connect the controller to the network, and connect the power again.

Configure the **Max\_Master** value through **WriteProperty** service to the **Device Object.Max\_Master** to increase network efficiency or if there are less than 127 devices on the network.

## MAC Address and Max\_Master

The MAC address must be unique on the entire MS/TP network. However, having a unique MAC address and a high baud rate does not guarantee efficient operation of the controller and other MS/TP units on the MS/TP network. Some MAC address and Max\_Master combinations are more efficient than others. BACnet requires token-passing units to occasionally "poll" for other masters based on the MAC address and Max\_Master.

A poor combination of MAC addresses and Max\_Master can lead to a slower network due to lost time polling for masters that are not present. Unless there are 126 other units on the MS/TP network, the default Max\_Master value of 127 is not the most efficient choice for the controller. The Max\_Master default value of 127 was selected to ensure that any master, specifically a BACnet client can be found when the controller is initially started.

## Examples of MAC Address and Max\_Master Configurations

The following are some of the examples to indicate the optimum combination of Mac address and Max\_Master configurations to ensure a quick and efficient output.

### Example 1

- MAC=0. Max\_Master=127
- MAC=1, Max\_Master=127

This configuration is slow and inefficient because every time either unit is required to find another master unit, it has to poll 126 units until it finds the right one to pass the token.



#### Example 2

- MAC=0. Max\_Master=5
- MAC=1 to MAC=4 are not used
- MAC=5, Max\_Master=5

This configuration is better than Example 1 but it is still slower. The Max\_Master is set to the most efficient value but the gap between the two MAC addresses is high. Therefore, each unit must poll four units until it finds the right one to pass the token.

#### Example 3

- MAC=0. Max\_Master=1
- MAC=2, Max\_Master=2

This is an incorrect configuration. The MAC=0 will never find MAC=2 because it will never poll for the master MAC address=2.

#### Example 4

- MAC=0. Max\_Master=3
- MAC=1, Max\_Master=3
- MAC=2, Max\_Master=3
- MAC=3, Max\_Master=3

This is an efficient configuration as the units are numbered consecutively and the Max\_Master is set to the most efficient value. As a general guideline, the most efficient setup for an MS/TP network is one in which the units are consecutively numbered starting at MAC address 0 and having Max\_Master=the maximum MAC address in the system. If consecutive numbering is not possible, then the next most efficient setup is one in which all units have Max\_Master=the maximum MAC address in the system.

## Copy Config

Copy and broadcast the entire configuration of a controller to controllers of same type using the Copy Config feature.

1. Access Operation Mode (jumper set to RUN position).
2. Press and hold both function buttons for 5 seconds to access the Quick Access menu.
3. Enter the password, **637**.
4. Scroll to **Copy Config** programming menu and select **Yes**. Follow the rest of the onscreen instructions.



*Note: A **Copy Config** can also be executed via BACnet. See AV.165, AV.166, AV.167, and BV.90 in Table 6 - Object Table Information: Analog Value (AV) and Table 9 - Object Table Information: Binary Value (BV) for details. However, the BACnet Schedule is not copied during a **Copy Config** operation.*

## Network Reset

Reset the controller via BACnet using the **Reinitialize Device** service. The Reinitialize Device service can be accessed using the following password: **nep**.

The Reinitialize Device service has two types of reset such as:

- **Warm Reset.** The Warm Reset restarts the controller with actual configuration.
- **Cold Reset.** The Cold Reset restarts the controller with **Factory configuration**.



**Warning:** The Cold Reset erases the actual configuration when setting the MSTP address. Therefore, exercise caution while performing a Cold Reset.



## Device Object Properties

The following table lists all the BACnet properties supported for the device object. The W indicates that the property is writable using the BACnet **WriteProperty** service.

**Table 2 - Device Object Properties**

| Property                        | Value                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Writable  |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Object_Identifier               | <ul style="list-style-type: none"> <li>Programmable where the instance part of the Object_Identifier is in the range of 0-4194302</li> <li>The device instance must be unique system-wide</li> <li>The default value for the device instance=153003 (Vendor_Identifier*1000)</li> </ul>                                                                                                                                                                   | W         |
| Object_Name                     | EFCBTU4, programmable up to 32 bytes                                                                                                                                                                                                                                                                                                                                                                                                                      | W         |
| Description                     | Programmable up to 32 characters (default: BACnet Fan Coil Controller)                                                                                                                                                                                                                                                                                                                                                                                    | W         |
| Object_Type                     | Device                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |
| System_Status                   | Operational                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |
| Vendor_Identifier               | Always 153                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
| Vendor_Name                     | Always Neptronic                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
| Model_Name                      | Example, EFCBTU4                                                                                                                                                                                                                                                                                                                                                                                                                                          | Read Only |
| Firmware_Revision               | currently, 2.17                                                                                                                                                                                                                                                                                                                                                                                                                                           | Read Only |
| Application_Software_Version    | currently, 2.07                                                                                                                                                                                                                                                                                                                                                                                                                                           | Read Only |
| Protocol_Version                | Always 1                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Read Only |
| Protocol_Revision               | Always 14                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Read Only |
| DataBase_Revision               | Default: 0, incremented if Object Name and/or device ID change                                                                                                                                                                                                                                                                                                                                                                                            | Read Only |
| Max_APDU_Length_Accepted        | Always 480                                                                                                                                                                                                                                                                                                                                                                                                                                                | Read Only |
| Segmentation_Supported          | (3) = No Segmentation                                                                                                                                                                                                                                                                                                                                                                                                                                     | Read Only |
| APDU_Timeout                    | 6000                                                                                                                                                                                                                                                                                                                                                                                                                                                      | W         |
| Number_of_APDU_Retries          | Always 3                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Read Only |
| Local_Time                      | 00:00:00                                                                                                                                                                                                                                                                                                                                                                                                                                                  | W         |
| Local_Date                      | 01-Jan-2015 (Thu)                                                                                                                                                                                                                                                                                                                                                                                                                                         | W         |
| Utc_Offset                      | -300 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                              | W         |
| Daylight_Savings_Status         | False                                                                                                                                                                                                                                                                                                                                                                                                                                                     | W         |
| Backup_Failure_Timeout          | 300                                                                                                                                                                                                                                                                                                                                                                                                                                                       | W         |
| Configuration_Files             | File-1                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |
| Last_Restore_Time               | 2015-01-01 (Thu), 00:00:00:00                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
| Backup_And_Restore_State        | IDLE                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |
| Backup_Preparation_Time         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
| Restore_Completion_Time         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
| Restore_Preparation_Time        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
| Protocol_Services_Supported     | <ul style="list-style-type: none"> <li>subscribeCOV</li> <li>atomicReadFile</li> <li>atomicWriteFile</li> <li>readProperty</li> <li>readPropertyMultiple</li> <li>WriteProperty</li> <li>writePropertyMultiple</li> <li>deviceCommunicationControl</li> <li>reinitializeDevice</li> <li>unconfirmedPrivateTransfer</li> <li>timeSynchronization</li> <li>who-Has</li> <li>who-Is</li> <li>UtcTimeSynchronization</li> <li>subscribeCOVProperty</li> </ul> |           |
| Protocol_Object_Types_Supported | <ul style="list-style-type: none"> <li>analog-input</li> <li>analog-output</li> <li>analog-value</li> <li>binary-input</li> <li>binary-output</li> <li>binary-value</li> <li>device</li> <li>file</li> <li>program</li> <li>schedule</li> <li>multi-state-value</li> </ul>                                                                                                                                                                                |           |
| Object_List                     | 208                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Read Only |
| Device_Address_Binding          | Always empty                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
| Max_Master                      | Programmable in the range of 0-127 (default: 127)                                                                                                                                                                                                                                                                                                                                                                                                         | W         |
| Max_Info_Frames                 | Always 1                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |
| Proprietary property #1000      | <ul style="list-style-type: none"> <li>Represents the MS/TP MAC address in the range of 0 to 254 (default: 0)</li> <li>Writable if all MAC address DIP switches are off</li> <li>Values 128 to 254 represent MS/TP non-token passing slave devices</li> </ul>                                                                                                                                                                                             | W         |



| Property                   | Value                                                                                                                                                                                                                                                                                                | Writable |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Proprietary property #1001 | <ul style="list-style-type: none"> <li>• Programmable (default: Auto)</li> <li>• Represents the MS/TP Baud rate (unsigned type)</li> <li>• Values are 0 (auto), 9600, 19200, 38400, 76800</li> <li>• Reading this property always returns the actual Baud rate</li> </ul>                            | W        |
| Proprietary property #1002 | <ul style="list-style-type: none"> <li>• Programmable (default: 15 minutes)</li> <li>• Represents the period of time that an object in/out of service will automatically return to normal. Range = 0-120 minutes (unsigned type)</li> <li>• Writing 0 means no automatic return to normal</li> </ul> | W        |

## Object Types Supported

The following table lists all the BACnet properties supported for each object type. Most of the properties are locked. The exception is **Present\_Value**, which represents the dynamic operating values of the device, and the Status\_Flag, Event\_State, and Reliability properties, which reflect the availability of the **Present\_Value**. Unless otherwise specified, properties are not changeable.

**Table 3 - Object Types Supported**

| Object Type                                                                                                                                                  | Enabled                             | Optional Properties Supported                                                                                                                                                                   | Writable Properties                                                                                                  | Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Note: Writable properties are different for some objects. Refer to the respective Object Table information to know the writable property for objects.</i> |                                     |                                                                                                                                                                                                 |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Analog Input                                                                                                                                                 | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>• Reliability</li> <li>• Description</li> <li>• Min_Present_Value</li> <li>• Max_Present_Value</li> <li>• Resolution</li> <li>• COV-Increment</li> </ul> | <ul style="list-style-type: none"> <li>• Out_of_Service</li> <li>• COV-Increment</li> </ul>                          | <ul style="list-style-type: none"> <li>• If "Out of Service" is true, Present_Value and Status_Flag become writable properties.</li> <li>• Out_of_Service property is writable for objects to which Present_Value is not writable.</li> <li>• Refer to Out of Service Property section on page 7 for more information.</li> <li>• Object will automatically return to Normal after a programmable period of time. Refer to Proprietary property #1002 of Device Object in Table 2 - Device Object Properties.</li> </ul>                                                                                                                                                                                             |
| Analog Value                                                                                                                                                 | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>• Reliability</li> <li>• Description</li> <li>• COV-Increment</li> <li>• Priority_Array</li> <li>• Relinquish_Default</li> </ul>                         | <ul style="list-style-type: none"> <li>• Present_Value</li> <li>• Out_of_Service</li> <li>• COV-Increment</li> </ul> | <ul style="list-style-type: none"> <li>• Present_Value property is writable for every AV object except AV.20, AV.24, AV.35, AV.50, AV.58, AV.60, AV.70, AV.78, AV.79.</li> <li>• Out_of_Service property is writable for objects indicated in Table 6 - Object Table Information: Analog Value (AV) on page 9.</li> <li>• Refer to Out of Service Property section on page 7 for more information.</li> <li>• Object will automatically return to Normal after a programmable period of time. Refer to Proprietary property #1002 of Device Object in Table 2 - Device Object Properties. Some objects are commandable. In such case, the priority-array and relinquish-default properties are available.</li> </ul> |
| Analog Output                                                                                                                                                | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>• Description</li> <li>• Reliability</li> <li>• Min-Pres-Value</li> <li>• Max-Pres-Value</li> <li>• Resolution</li> <li>• COV-Increment</li> </ul>       | <ul style="list-style-type: none"> <li>• Present_Value</li> <li>• COV-Increment</li> </ul>                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Binary Input                                                                                                                                                 | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>• Reliability</li> <li>• Active_Text</li> <li>• Inactive_Text</li> <li>• Description</li> </ul>                                                          | Out_of_Service                                                                                                       | <ul style="list-style-type: none"> <li>• If "Out of Service" is true, Present_Value and Status_Flag become writable properties.</li> <li>• Out_of_Service property is writable for objects to which Present_Value is not writable.</li> <li>• Refer to Out of Service Property section on page 7 for more information.</li> <li>• Object will automatically return to Normal after a programmable period of time. Refer to Proprietary property #1002 of Device Object in Table 2 - Device Object Properties.</li> </ul>                                                                                                                                                                                             |





| Object Type       | Enabled                             | Optional Properties Supported                                                                                                                                                                                                                                                                                                                                                    | Writable Properties                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Binary Value      | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>Reliability</li> <li>Active_Text</li> <li>Inactive_Text</li> <li>Description</li> <li>Priority_Array</li> <li>Relinquish_Default</li> </ul>                                                                                                                                                                                               | Present_Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Present_Value property is writable for every Binary Value object.</li> <li>Out_of_Service property is writable for BV.30.</li> <li>Some objects are commandable. In such case, the priority-array and relinquish-default properties are available for BV.30.</li> <li>Object automatically returns to Normal after a programmable time. Refer to Proprietary property #1002 of Device Object in Table 2 - Device Object Properties.</li> </ul> |
| Binary Output     | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>Description</li> <li>Reliability</li> <li>Inactive-text</li> <li>Active-text</li> </ul>                                                                                                                                                                                                                                                   | Present_Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Device            | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>Max_Master</li> <li>Max_Info_Frame</li> <li>Description</li> <li>Active-COV-subscriptions</li> <li>#1000 (MSTP addr)</li> <li>#1001 (Baud rate)</li> <li>#1002 (Time out)</li> <li>Local_Time</li> <li>Local_Date</li> <li>Uts_Offset</li> <li>Daylight_Savings_Statu s</li> <li>Apdu_Timeout</li> <li>Backup_Failure_Timeo ut</li> </ul> | <ul style="list-style-type: none"> <li>Object_Identifier</li> <li>Object_Name</li> <li>Max_Master</li> <li>Description</li> <li>Local_Time</li> <li>Local_Date</li> <li>Uts_Offset</li> <li>Daylight_Savings_Status</li> <li>Apdu_Timeout</li> <li>Backup_Failure_Timeout</li> <li>#1000</li> <li>#1001</li> <li>#1002</li> <li>Configuration_Files</li> <li>Last_Restore_Time</li> <li>Backup_And_Restore_Stat e</li> <li>Backup_Preparation_Time</li> <li>Restore_Completion_Time</li> <li>Restore_Preparation_Time</li> </ul> | Refer to Table 2 - Device Object Properties on page 5.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Multi-State Value | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>Description</li> <li>Reliability</li> <li>States_Text</li> </ul>                                                                                                                                                                                                                                                                          | Present_Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Present_Value property is writable for every Multi State Value object except MSV.14, MSV.15.</li> <li>Out_of_Service property is not writable for MSV.</li> </ul>                                                                                                                                                                                                                                                                              |
| Program           | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>Description</li> <li>Reliability</li> </ul>                                                                                                                                                                                                                                                                                               | Program_Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Only LOAD and RESTART are supported for Program Change.</li> <li>Use LOAD to apply the new firmware.</li> </ul>                                                                                                                                                                                                                                                                                                                                |
| File              | <input checked="" type="checkbox"/> | Description                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Archive</li> <li>File Size</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Only 0 is the accepted value to be written to file size.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Schedule          | <input checked="" type="checkbox"/> | <ul style="list-style-type: none"> <li>Description</li> <li>Weekly Schedule</li> </ul>                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Effective Period</li> <li>Weekly Schedule</li> <li>Schedule Default</li> <li>Priority For Writing</li> <li>Out_of_Service</li> </ul>                                                                                                                                                                                                                                                                                                                                                      | If "Out of Service" is true, Present_Value becomes writable property.                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Out of Service Property

Neptronic controllers offer the use of the Out of Service writable property. When the value of this property is set to True, it disconnects the object from the physical input, enabling you to input other values. This is useful for special applications or while troubleshooting. For example, you can ignore the temperature read from a sensor and input the desired temperature value in order to perform specific tests.

For security reasons, a timeout will set the Out of Service property back to False after 15 minutes. This value can be modified to between 0 and 120 minutes (For more information, see proprietary property #1002 in [Table 2 - Device Object Properties](#)).



## Object Table Information

The EFCB Controller series use the following BACnet object tables, categorized on the basis of their ID. The type is the BACnet Object type, the instance is the BACnet Object. Together, the type and instance form the **BACnet Object\_Identifier** for an object according to the following C-language algorithm:

- object\_identifier=((unsigned long)((unsigned long)type<<22))+instance

## Analog Input (AI)

**Table 4 - Object Table Information: Analog Input (AI)**

| ID    | Name              | Description                                                                                                                                     | W?                                    | EFCB1xTU2 | EFCB1xTU4 | Notes                                                              |
|-------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------|-----------|--------------------------------------------------------------------|
| AI.1  | ExternTemp        | External temperature sensor value (ETS) when AI.1 is wired or AI.3 is configured to Extern Temp Sensor.                                         | Out of service<br>COV Increment (0.5) | x         | x         | 32°F to 122°F or 0°C to 50°C, ± 5°C<br>Resolution 0.02°F/0.01°C    |
| AI.2  | ChangeOverTemp    | Changeover temperature value (SENS) when AI.2 is wired.                                                                                         | Out of service<br>COV Increment (0.5) | x         | x         | 32°F to 122°F or 0°C to 50°C, ± 5°C<br>Resolution 0.02°F/0.01°C    |
| AI.3  | AnalogInput3      | Temperature or humidity sensor value. For accurate reading, set the corresponding DIP switch and configurations properly.                       | Out of service<br>COV Increment (0.5) | x         | x         | -40°F to 212°F or -40°C to 100°C, ± 5%<br>Resolution 0.02°F/0.01°C |
| AI.4  | AnalogInput4      | Temperature or humidity sensor value. For accurate reading, set the corresponding DIP switch and configurations properly.                       | Out of service<br>COV Increment (0.5) | x         | x         | -40°F to 212°F or -40°C to 100°C, ± 5%<br>Resolution 0.02°F/0.01°C |
| AI.5  | AnalogInput5      | Temperature or humidity sensor value. For accurate reading, set the corresponding DIP switch and configurations properly.                       | Out of service<br>COV Increment (0.5) | x         | x         | -40°F to 212°F or -40°C to 100°C, ± 5%<br>Resolution 0.02°F/0.01°C |
| AI.6  | AnalogInput6      | Temperature or humidity sensor value. For accurate reading, set the corresponding DIP switch and configurations properly.                       | Out of service<br>COV Increment (0.5) | x         | x         | -40°F to 212°F or -40°C to 100°C, ± 5%<br>Resolution 0.02°F/0.01°C |
| AI.7  | InternTemp        | Internal temperature sensor value (ITS) of the integrated sensor in the TFL/TDF. Set MSV.21 value to <b>Internal</b> to use it as Control Temp. | Out of service<br>COV Increment (0.5) | x         | x         | 32°F to 122°F or 0°C to 50°C, ± 5%<br>Resolution 0.02°F/0.01°C     |
| AI.8  | InternHumidity    | Internal humidity sensor value (Irh) of the integrated sensor in the TFLH/TDF. Set BV.25 value to <b>Internal</b> to use it as reference.       | Out of service<br>COV Increment (0.5) | x         | x         | 5% RH to 95% RH, ± 5%,<br>Resolution 0.1% RH                       |
| AI.9  | Trlg_CO2          | Internal CO <sub>2</sub> sensor value of the integrated sensor in the TFL/TDF.                                                                  | Out of service<br>COV Increment (0.5) | x         | x         | 0 to 2000 PPM, Resolution 1 PPM                                    |
| AI.10 | InternLightSensor | Internal light sensor reading in Luxes.                                                                                                         | Out of service<br>COV Increment (0.5) | x         | x         | 0 to 16000 Luxes<br>Resolution 1 Lux                               |
| AI.11 | InterVOCsSensor   | Internal VOC sensor reading in ppb.                                                                                                             | Out of service<br>COV Increment (0.5) | x         | x         | 1 to 60000 ppb<br>Resolution 1 ppb                                 |

## Analog Output (AO)

**Table 5 - Object Table Information: Analog Output (AO)**

| ID   | Name          | Description                                           | W?                                   | EFCB1xTU2 | EFCB1xTU4 | Notes                      |
|------|---------------|-------------------------------------------------------|--------------------------------------|-----------|-----------|----------------------------|
| AO.1 | AnalogOutput1 | Percentage value of analog output 1, based on demand. | Present Value<br>COV Increment (0.5) | x         | x         | 0 to 100%, Resolution 0.1% |
| AO.2 | AnalogOutput2 | Percentage value of analog output 2, based on demand. | Present Value<br>COV Increment (0.5) | x         | x         | 0 to 100%, Resolution 0.1% |
| AO.3 | AnalogOutput3 | Percentage value of analog output 3, based on demand. | Present Value<br>COV Increment (0.5) | x         | x         | 0 to 100%, Resolution 0.1% |
| AO.4 | AnalogOutput4 | Percentage value of analog output 4, based on demand. | Present Value<br>COV Increment (0.5) | x         | x         | 0 to 100%, Resolution 0.1% |

## Analog Value (AV)

**Table 6 - Object Table Information: Analog Value (AV)**

| ID   | Name                  | Description                                                                                                                                                                                                                                                     | W?                                                                     | EFCB1xTU2 | EFCB1xTU4 | Notes                                                      |
|------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------|-----------|------------------------------------------------------------|
| AV.1 | ControlTemp           | Temperature value that is used to calculate demand. The value is configured with MSV.21 Temp Control Source.                                                                                                                                                    | Out of service<br>(writable if MSV.21 = remote)<br>COV Increment (0.5) | x         | x         | -40°F to 212°F or -40°C to 100°C, Resolution 0.02°F/0.01°C |
| AV.2 | Cfg_NetworkTimeOut    | Configuration time value. If MSV.21 is set to <b>Remote</b> and no value has been sent via BMS for more than AV.2 time, the EFC goes to <b>Off</b> mode. AV.1 displays 999°C and object in Fault. If time is set to <b>0</b> mins, AV.1 is reset to AV.9 value. | Present Value<br>COV Increment (1)                                     | x         | x         | 0 to 60 Minutes, Resolution 1 minute                       |
| AV.5 | Cfg_InternTempOffset  | Configuration value used to calibrate the integrated temperature sensor of the TFL/TDF (ITS).                                                                                                                                                                   | Present Value<br>COV Increment (0.1)                                   | x         | x         | ±9°F/±5°C, Resolution 0.2°F/0.1°C                          |
| AV.6 | Cfg_ExternTempOffset  | Configuration value used to calibrate the 10kΩ external temperature sensor (ETS) wired to AI.1. Cannot be used to calibrate the temperature sensor wired to AI.3.                                                                                               | Present Value<br>COV Increment (0.1)                                   | x         | x         | ±9°F/±5°C, Resolution 0.2°F/0.1°C                          |
| AV.7 | Cfg_AIExtern Temp Min | Configuration value that represents the minimum temperature read by the sensor (minimum range value).                                                                                                                                                           | Present Value<br>COV Increment (5)                                     | x         | x         | -40°F to 32°F or -40°C to 0°C<br>Resolution 1°F/0.5°C      |

| ID    | Name                      | Description                                                                                                                                                                                                                                                   | W?                                   | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                        |
|-------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------|-----------|------------------------------------------------------------------------------|
| AV.8  | Cfg_AIExtern Temp Max     | Configuration value that represents the maximum temperature read by the sensor (maximum range value).                                                                                                                                                         | Present Value<br>COV Increment (5)   | x         | x         | 122°F to 212°F or 50°C to 100°C<br>Resolution 1°F/0.5°C                      |
| AV.9  | TempSetPoint              | Configuration value used to set the actual user setpoint of the zone in occupied/day operation mode. This value may be locked to prevent the user from changing the setpoint (BV.2).                                                                          | Present Value<br>COV Increment (0.5) | x         | x         | 50°F to 104°F or 10°C to 40°C (AV.10 to AV.11), ±5°C, Resolution 1°F/0.5°C   |
| AV.10 | Cfg_MinSetPoint           | Configuration value used to set the minimum temperature setpoint of the zone in occupied/day operation mode, allowed by the user.                                                                                                                             | Present Value<br>COV Increment (0.5) | x         | x         | 50°F to 104°F or 10°C to 40°C (0 to AV.11), Resolution 1°F/0.5°C             |
| AV.11 | Cfg_MaxSetPoint           | Configuration value used to set the maximum temperature setpoint of the zone in occupied/day operation mode, allowed by the user.                                                                                                                             | Present Value<br>COV Increment (0.5) | x         | x         | 50°F to 104°F or 10°C to 40°C (AV.10 to 104°F or 40°C), Resolution 1°F/0.5°C |
| AV.12 | SetPointCoolNoOccNSB      | Configuration value of the cooling setpoint when in night setback or unoccupied mode. Set BV.35 value to <b>setpoint</b> for the value to be active.                                                                                                          | Present Value<br>COV Increment (0.5) | x         | x         | 50°F to 104°F or 10°C to 40°C (AV.13 to 104°F or 40°C), Resolution 1°F/0.5°C |
| AV.13 | SetPointHeatNoOccNSB      | Configuration value of the heating setpoint when in night setback or unoccupied mode. Set BV.35 value to <b>setpoint</b> for the value to be active.                                                                                                          | Present Value<br>COV Increment (0.5) | x         | x         | 50°F to 104°F or 10°C to 40°C<br>Resolution 1°F/0.5°C                        |
| AV.20 | HeatingDemand             | Status value that represents the heating demand for the Heating Ramp. This value is based on zone temperature, zone setpoint and values set for the actual ramp.                                                                                              | Read only<br>COV Increment (5)       | x         | x         | 0 to 100%, Resolution 0.5%, Writable                                         |
| AV.21 | Cfg_HeatingPropBand       | Configuration value that represents the range through which the controller will modulate the heating output from 0 to 100%.                                                                                                                                   | Present Value<br>COV Increment (0.5) | x         | x         | 1°F to 9°F or 0.5°C to 5.0°C<br>Resolution 1°F/0.5°C                         |
| AV.22 | Cfg_HeatingDeadBand       | Configuration value that represents the range at which the controller will not take action when temperature is below the zone setpoint.                                                                                                                       | Present Value<br>COV Increment (0.1) | x         | x         | 0°F to 9°F or 0.0°C to 5.0°C<br>Resolution 0.2°F/0.1°C                       |
| AV.24 | ReHeatDemand              | Status value that represents the heating demand for the Reheat Ramp. This value is based on zone temperature, zone setpoint and values set for the actual ramp.                                                                                               | Read only<br>COV Increment (5)       | x         | x         | 0 to 100%, Resolution 1°F/0.5°C                                              |
| AV.25 | Cfg_ReHeatPropBand        | Configuration value that represents the range through which the controller will modulate the reheat output from 0 to 100%.                                                                                                                                    | Present Value<br>COV Increment (0.5) | x         | x         | 1°F to 9°F or 0.5°C to 5.0°C<br>Resolution 1°F/0.5°C                         |
| AV.26 | Cfg_ReHeatDeadBand        | Configuration value that represents the range at which the controller will not take action when temperature is below the zone setpoint.                                                                                                                       | Present Value<br>COV Increment (0.1) | x         | x         | 0°F to 9°F or 0.0°C to 5.0°C<br>Resolution 0.2°F/0.1°C                       |
| AV.32 | Cfg_IntegralTimeHeating   | Configuration value that represents the reciprocal of the integral time in secs (1/I or repeats per second). To obtain a slower reaction time, the value of the integral must be small. To obtain a quicker reaction time, the integral value must be bigger. | Present Value<br>COV Increment (5)   | x         | x         | 0 to 250 seconds, Resolution 5 seconds                                       |
| AV.35 | CoolingDemand             | Status value that represents the cooling demand for the Cooling Ramp. This value is based on zone temperature, zone setpoint and values set for the actual ramp.                                                                                              | Read only<br>COV Increment (5)       | x         | x         | 0 to 100%, Resolution 0.5%, Writable                                         |
| AV.36 | Cfg_CoolingPropBand       | Configuration value that represents the range through which the controller will modulate the cooling output from 0 to 100%.                                                                                                                                   | Present Value<br>COV Increment (0.5) | x         | x         | 1°F to 9°F or 0.5°C to 5.0°C<br>Resolution 1°F/0.5°C                         |
| AV.37 | Cfg_CoolingDeadBand       | Configuration value that represents the range at which the controller will not take action when temperature is above the zone setpoint.                                                                                                                       | Present Value<br>COV Increment (0.1) | x         | x         | 0°F to 9°F or 0.0°C to 5.0°C<br>Resolution 0.2°F/0.1°C                       |
| AV.45 | Cfg_IntegralTimeCooling   | Configuration value represents the reciprocal of the integral time in secs (1/I or repeats per second). For a slower reaction time, the value of the integral must be small. To obtain a quicker reaction time, the integral value must be bigger.            | Present Value<br>COV Increment (5)   | x         | x         | 0 to 250 seconds, Resolution 5 seconds                                       |
| AV.46 | Cfg_CoolingAntiCycleDelay | Configuration value in mins to prevent the cooling outputs to cycle on and off. This a protection feature used when cooling is done through compressors.                                                                                                      | Present Value<br>COV Increment (1)   | x         | x         | 0 to 15 minutes, Resolution 1 minute                                         |

| ID    | Name                     | Description                                                                                                                                                                                                      | W?                                    | EFCB1xTU2 | EFCB1xTU4 | Notes                                                   |
|-------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------|-----------|---------------------------------------------------------|
| AV.50 | ChangeOverDemand         | Status value that represents the changeover demand for the fan coil. This value is based on zone temperature, zone setpoint and values set for the actual ramp. Available only if a 2-pipe system is configured. | Read only<br>COV Increment (5)        | x         | x         | 0 to 100%, Resolution 0.5%                              |
| AV.51 | Cfg_ChangeOverPropBand   | Configuration value that represents the range through which the controller modulates the cooling and heating output from 0 to 100%. The heating and cooling proportional band will be set by this value.         | Present Value<br>COV Increment (0.5)  | x         | x         | 1°F to 9°F or 0.5°C to 5.0°C<br>Resolution 1°F/0.5°C    |
| AV.52 | Cfg_ChangeOverDeadBand   | Configuration value that represents the range at which the controller will not take action when above or below the zone setpoint. The heating and cooling dead band will be set by this value.                   | Present Value<br>COV Increment (1)    | x         | x         | 0°F to 9°F or 0.0°C to 5.0°C<br>Resolution 0.2°F/0.1°C  |
| AV.53 | ChangeOverSetPoint       | Configuration value of the temperature at which the water that enters is considered to be in cooling or heating state. Note that there is a 1.5°C (2.7°F) dead band on each side of the setpoint.                | Present Value<br>COV Increment (0.5)  | x         | x         | 50°F to 104°F or 10°C to 40°C<br>Resolution 1°F/0.5°C   |
| AV.56 | Cfg_CL_HT_SwitchTimer    | Configuration value of the time required before the changeover is permitted to take place (time in mins).                                                                                                        | Present Value<br>COV Increment (5)    | x         | x         | 0 to 120 minutes, Resolution 1 minute                   |
| AV.58 | CL_HT_SwitchTimerCount   | Status value of the remaining time before the changeover is authorised. This value counts down from the time set in AV.56.                                                                                       | Read only<br>COV Increment (5)        | x         | x         | 0 to 7,200 seconds, Resolution 1 second, Writable       |
| AV.60 | FanDemand                | Status value that represents the fan demand for the fan coil. This value is based on zone temperature and setpoint. Demand is also affected by the number of fan speed configured in MSV.25.                     | Read only<br>COV Increment (5)        | x         | x         | 0 to 100%, Resolution 0.5%                              |
| AV.61 | Cfg_FanAutoTimeOutDelay  | Configuration value to prevent the cycling of the fan. If the fan was in operation and stopped, the EFC will countdown from this value before reactivating the fan again.                                        | Present Value<br>COV Increment (1)    | x         | x         | 0 to 255 seconds, Resolution 1 second                   |
| AV.62 | Cfg_FanDampingFactor     | Configuration value in secs that represents the delay before changing fan speed.                                                                                                                                 | Present Value<br>COV Increment (1)    | x         | x         | 0 to 255 seconds, Resolution 1 second                   |
| AV.70 | ExternHumidity           | External humidity sensor value (Erh). Set BV.25 value to <b>external</b> to use it as the reference.                                                                                                             | Out of Service<br>COV Increment (0.5) | x         | x         | 5% RH to 95% RH, ± 5%, Resolution 0.1% RH               |
| AV.71 | Cfg_InternHumidityOffset | Configuration value used to calibrate the integrated relative humidity sensor of the TFLH/TDF (Irh).                                                                                                             | Present Value<br>COV Increment (0.5)  | x         | x         | ± 5%, Resolution 0.1% RH                                |
| AV.72 | Cfg_ExternHumidityOffset | Configuration value used to calibrate the external relative humidity sensor (Erh).                                                                                                                               | Present Value<br>COV Increment (0.5)  | x         | x         | ± 5%, Resolution 0.1% RH                                |
| AV.73 | HumSetPoint              | Configuration value used to set the actual user humidity setpoint of the zone in occupied/day operation mode. This value may be locked to prevent the user from changing the setpoint (BV.26).                   | Present Value<br>COV Increment (5)    | x         | x         | 10% RH to 90% RH (AV.74 to AV.75)<br>Resolution 0.5% RH |
| AV.74 | Cfg_HumMinSetPoint       | Configuration value used to set the minimum relative humidity setpoint of the zone in occupied/day operation mode allowed by the user.                                                                           | Present Value<br>COV Increment (5)    | x         | x         | 10% RH to 90% RH (10% to AV.75)<br>Resolution 0.5% RH   |
| AV.75 | Cfg_HumMaxSetPoint       | Configuration value used to set the maximum relative humidity setpoint of the zone in occupied/day operation mode allowed by the user.                                                                           | Present Value<br>COV Increment (5)    | x         | x         | 10% RH to 90% RH (AV.74 to 90%)<br>Resolution 0.5% RH   |
| AV.76 | DehumSPNoOccNSB          | Configuration value of the highest relative humidity allowed when in night setback or unoccupied mode. Set BV.35 value to <b>setpoint</b> for the value to be active.                                            | Present Value<br>COV Increment (0.1)  | x         | x         | 10% RH to 65% RH (10% to AV.77)<br>Resolution 0.5% RH   |

| ID     | Name                   | Description                                                                                                                                                                                                                                                                                                                                                                                       | W?                                   | EFCB1xTU2 | EFCB1xTU4 | Notes                                                     |
|--------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------|-----------|-----------------------------------------------------------|
| AV.77  | HumidifySPNoOccNSB     | Configuration value of the lowest relative humidity allowed when in night setback or unoccupied mode. Set BV.35 value to <b>setpoint</b> for the value to be active.                                                                                                                                                                                                                              | Present Value<br>COV Increment (0.1) | x         | x         | 10% RH to 65% RH (AV.76 to 90%)<br>Resolution 0.5% RH     |
| AV.78  | HumidifDemand          | Status value that represents the humidifier modulation, based on demand.                                                                                                                                                                                                                                                                                                                          | Read only<br>COV Increment (5)       | x         | x         | 0% RH to 100% RH, Resolution 1% RH                        |
| AV.79  | DehumidifyDemand       | Status value that represents the dehumidification percentage, based on demand.                                                                                                                                                                                                                                                                                                                    | Read only<br>COV Increment (5)       | x         | x         | 0% RH to 100% RH, Resolution 1% RH                        |
| AV.80  | Cfg_HumPropBand        | Configuration value that represents the range through which the controller modulates the humidifier or dehumidification output from 0 to 100%.                                                                                                                                                                                                                                                    | Present Value<br>COV Increment (0.5) | x         | x         | 3% RH to 10% RH, Resolution 0.5% RH                       |
| AV.81  | Cfg_HumDeadBand        | Configuration value that represents the range at which the controller will not take action when below or above the humidity setpoint.                                                                                                                                                                                                                                                             | Present Value<br>COV Increment (0.1) | x         | x         | 0% RH to 5% RH, Resolution 0.5% RH                        |
| AV.85  | Cfg_NSBOVERRIDEdelay   | Maximum configuration time in mins when in night setback mode and an override has been activated on the TFL/TDF. Each time the user presses the fan button, an increment of 15 mins is added to this value.                                                                                                                                                                                       | Present Value<br>COV Increment (5)   | x         | x         | 0 to 180 minutes, Resolution 5 minutes                    |
| AV.86  | Cfg_NoOccOverrideDelay | Maximum configuration time in mins when in unoccupied mode and an override has been activated on the TFL/TDF. Each time the user presses the fan button, an increment of 15 mins is added to this value.                                                                                                                                                                                          | Present Value<br>COV Increment (1)   | x         | x         | 0 to 180 minutes, Resolution 5 minutes                    |
| AV.87  | Cfg_NoOccOvCountDown   | Time in mins before the state of the input changes from Occupied to Unoccupied mode. There is no time to change the state from Unoccupied to Occupied.                                                                                                                                                                                                                                            | Read only<br>COV Increment (1)       | x         | x         | 0 to 180 minutes (0-AV.86)<br>Resolution 1 minute         |
| AV.88  | Cfg_OccupancyMinTime   | Time in mins before the state of the input changes from Occupied to Unoccupied mode. Used when motion detector is not equipped with an internal timer.                                                                                                                                                                                                                                            | Present Value<br>COV Increment (1)   | x         | x         | 0 to 240 minutes, Resolution 1 minute                     |
| AV.90  | Cfg_DigitalInput1Delay | Configuration time in secs. When DI1 is activated, AV.90 will countdown from the set value. Once the time has expired, the EFC changes the state of the input.                                                                                                                                                                                                                                    | Present Value<br>COV Increment (1)   | x         | x         | 0 to 3,600 seconds, Resolution 10 seconds                 |
| AV.91  | Cfg_DigitalInput2Delay | Configuration time in secs. When DI2 is activated, AV.90 will countdown from the set value. Once the time has expired, the EFC changes the state of the input.                                                                                                                                                                                                                                    | Present Value<br>COV Increment (1)   | x         | x         | 0 to 3,600 seconds, Resolution 10 seconds                 |
| AV.93  | Cfg_DigitalInput4Delay | Configuration time in secs. When DI4 is activated, AV.90 will countdown from the set value. Once the time has expired, the EFC changes the state of the input.                                                                                                                                                                                                                                    | Present Value<br>COV Increment (1)   | x         | x         | 0 to 3,600 seconds, Resolution 10 seconds                 |
| AV.100 | Cfg_AnalogOutput1Min   | This value represents the minimum control signal of the controlled element. If the signal is 0-10Vdc, then the minimum value is 0 Volts and if the signal is 2-10 Vdc, the minimum value is 2 Volts. This value is the 0 position at 0% demand. If set at 2 Volts, a 2 Volt is applied continuously even when there is no demand. It is not used to set the minimum starting activation position. | Present Value<br>COV Increment (0.5) | x         | x         | 0 Volts to 10 Volts (0 to AV.101)<br>Resolution 0.1 Volt  |
| AV.101 | Cfg_AnalogOutput1Max   | This value represents the maximum control signal of the controlled element. If signal is 0-10Vdc or 2-10Vdc, then the maximum value is 10 Volts. It can also be used to limit the maximum output of the EFC. If the control signal is 0-10Vdc and the maximum voltage value is set to 8 Volts, the controlled element will never go over 80% of its total capacity.                               | Present Value<br>COV Increment (0.5) | x         | x         | 0 Volts to 10 Volts (AV.100 to 10)<br>Resolution 0.1 Volt |
| AV.103 | Cfg_AnalogOutput2Min   | Same description as AV.100                                                                                                                                                                                                                                                                                                                                                                        | Present Value<br>COV Increment (0.5) | x         | x         | 0 Volts to 10 Volts (0 to AV.104)<br>Resolution 0.1 Volt  |

| ID     | Name                           | Description                                                                                                                       | W?                                   | EFCB1xTU2 | EFCB1xTU4 | Notes                                                     |
|--------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------|-----------|-----------------------------------------------------------|
| AV.104 | Cfg_AnalogOutput2Max           | Same description as AV.101                                                                                                        | Present Value<br>COV Increment (0.5) | x         | x         | 0 Volts to 10 Volts (AV.104 to 10)<br>Resolution 0.1 Volt |
| AV.106 | Cfg_AnalogOutput3Min           | Same description as AV.100                                                                                                        | Present Value<br>COV Increment (0.5) | x         | x         | 0 Volts to AV.106, Resolution 0.1 Volt                    |
| AV.107 | Cfg_AnalogOutput3Max           | Same description as AV.101                                                                                                        | Present Value<br>COV Increment (0.5) | x         | x         | 0 Volts to 10 Volts (AV.107 to 10)<br>Resolution 0.1 Volt |
| AV.109 | Cfg_AnalogOutput4Min           | Same description as AV.100                                                                                                        | Present Value<br>COV Increment (0.5) | x         | x         | 0 Volts to 10 Volts (0 to AV.109)<br>Resolution 0.1 Volt  |
| AV.110 | Cfg_AnalogOutput4Max           | Same description as AV.101                                                                                                        | Present Value<br>COV Increment (0.5) | x         | x         | 0 Volts to 10 Volts (AV.109 to 10), Resolution 0.1 Volt   |
| AV.115 | Cfg_DigitalOutput1ClosePos     | Configuration value that indicates the percentage of demand at which the contact closes to energize the controlled element.       | Present Value<br>COV Increment (1)   | x         | x         | 15% to 80%, Resolution 1%                                 |
| AV.116 | Cfg_DigitalOutput1OpenPos      | Configuration value that indicates the percentage of demand at which the contact opens to de-energize the controlled element.     | Present Value<br>COV Increment (1)   | x         | x         | 0% to 76% (0 to DO1closepos-4%),<br>Resolution 1%         |
| AV.117 | Cfg_DigitalOutput1ContactDelay | Configuration value in mins to add a delay before changing DO1 from inactive to active state.                                     | Present Value<br>COV Increment (1)   | x         | x         | 0 to 15 minutes, Resolution 1 minute                      |
| AV.120 | Cfg_DigitalOutput2ClosePos     | Same description as AV.115                                                                                                        | Present Value<br>COV Increment (1)   | x         | x         | 15% to 80%, Resolution 1%                                 |
| AV.121 | Cfg_DigitalOutput2OpenPos      | Same description as AV.116                                                                                                        | Present Value<br>COV Increment (1)   | x         | x         | 0% to 76% (0 to DO2closepos-4%),<br>Resolution 1%         |
| AV.122 | Cfg_DigitalOutput2ContactDelay | Configuration value in mins to add a delay before changing DO2 from inactive to active state.                                     | Present Value<br>COV Increment (1)   | x         | x         | 0 to 15 minutes, Resolution 1 minute                      |
| AV.125 | Cfg_DigitalOutput3ClosePos     | Same description as AV.115                                                                                                        | Present Value<br>COV Increment (1)   |           | x         | 15% to 80%, Resolution 1%                                 |
| AV.126 | Cfg_DigitalOutput3OpenPos      | Same description as AV.116                                                                                                        | Present Value<br>COV Increment (1)   |           | x         | 0% to 76% (0 to DO3closepos-4%),<br>Resolution 1%         |
| AV.127 | Cfg_DigitalOutput3ContactDelay | Configuration value in mins to add a delay before changing DO3 from inactive to active state.                                     | Present Value<br>COV Increment (1)   |           | x         | 0 to 15 minutes, Resolution 1 minute                      |
| AV.130 | Cfg_DigitalOutput4ClosePos     | Same description as AV.115                                                                                                        | Present Value<br>COV Increment (1)   |           | x         | 15% to 80%, Resolution 1%                                 |
| AV.131 | Cfg_DigitalOutput4OpenPos      | Same description as AV.116                                                                                                        | Present Value<br>COV Increment (1)   |           | x         | 0% to 76% (0 to DO4closepos-4%),<br>Resolution 1%         |
| AV.132 | Cfg_DigitalOutput4ContactDelay | Configuration value in mins to add a delay before changing DO4 from inactive to active state.                                     | Present Value<br>COV Increment (1)   |           | x         | 0 to 15 minutes, Resolution 1 minute                      |
| AV.135 | Cfg_TO1ClosePos                | Configuration value that indicates the percentage of the demand at which the contact closes to energize the controlled element.   | Present Value<br>COV Increment (1)   | x         | x         | 15% to 80%, Resolution 1%                                 |
| AV.136 | Cfg_TO1OpenPos                 | Configuration value that indicates the percentage of the demand at which the contact opens to de-energize the controlled element. | Present Value<br>COV Increment (1)   | x         | x         | 0% to 76% (0 to TO1closepos-4%)<br>Resolution 1%          |



| ID     | Name                     | Description                                                                                                                                                          | W?                                                          | EFCB1xTU2 | EFCB1xTU4 | Notes                                             |
|--------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------|-----------|---------------------------------------------------|
| AV.137 | Cfg_TO2ClosePos          | Same description as AV.135                                                                                                                                           | Present Value<br>COV Increment (1)                          | x         | x         | 15% to 80%, Resolution 1%                         |
| AV.138 | Cfg_TO2OpenPos           | Same description as AV.136                                                                                                                                           | Present Value<br>COV Increment (1)                          | x         | x         | 0% to 76% (0 to TO2closepos-4%)<br>Resolution 1%  |
| AV.139 | Cfg_TO3ClosePos          | Same description as AV.135                                                                                                                                           | Present Value<br>COV Increment (1)                          | x         | x         | 15% to 80%, Resolution 1%                         |
| AV.140 | Cfg_TO3OpenPos           | Same description as AV.136                                                                                                                                           | Present Value<br>COV Increment (1)                          | x         | x         | 0% to 76% (0 to TO3closepos-4%)<br>Resolution 1%  |
| AV.141 | Cfg_TO4ClosePos          | Same description as AV.135                                                                                                                                           | Present Value<br>COV Increment (1)                          | x         | x         | 15% to 80%, Resolution 1%                         |
| AV.142 | Cfg_TO4OpenPos           | Same description as AV.136                                                                                                                                           | Present Value<br>COV Increment (1)                          | x         | x         | 0% to 76% (0 to TO4closepos-4%)<br>Resolution 1%, |
| AV.145 | FloatingTO1/TO2          | Status value to show the floating signal demand. This value may be overridden. Activated only if TO1 signal type MSV.81 is set to <b>floating</b> .                  | Present Value<br>COV Increment (0.5)                        | x         | x         | 0 to 100%, Resolution 0.5%                        |
| AV.146 | Cfg_FloatingTO1/TO2Timer | Configuration value of the time required by the actuator to complete a 90° run. Value required only when MSV.81 TO1 Signal Type is set to <b>floating</b> .          | Present Value<br>COV Increment (5)                          | x         | x         | 15-250 seconds, Resolution 5 seconds              |
| AV.150 | FloatingTO3/TO4          | Status value to show the floating signal demand. This value may be overridden. Activated only if TO3 signal type MSV.85 is set to <b>floating</b> .                  | Present Value<br>COV Increment (0.5)                        | x         | x         | 0 to 100%, Resolution 0.5%                        |
| AV.151 | Cfg_FloatingTO3/TO4Timer | Configuration value of the time required by the actuator to complete a 90° run. Value required only when MSV.85 TO3 Signal Type is set to <b>floating</b> .          | Present Value<br>COV Increment (10)                         | x         | x         | 15-250 seconds, Resolution 5 seconds              |
| AV.155 | TO1Pulsing               | Status value to show the pulse signal demand. This value may be overridden. Activated only if TO1 signal type MSV.81 is set to <b>pulsing</b> .                      | Present Value<br>(if MSV.81 = Pulse)<br>COV Increment (0.5) | x         | x         | 0 to 100%, Resolution 0.5%                        |
| AV.156 | TO2Pulsing               | Status value to show the pulse signal demand. This value may be overridden. Activated only if TO2 signal type MSV.83 is set to <b>pulsing</b> .                      | Present Value<br>(if MSV.83 = Pulse)<br>COV Increment (0.5) | x         | x         | 0 to 100%, Resolution 0.5%                        |
| AV.157 | TO3Pulsing               | Status value to show the pulse signal demand. This value may be overridden. Activated only if TO3 signal type MSV.85 is set to <b>pulsing</b> .                      | Present Value<br>(if MSV.85 = Pulse)<br>COV Increment (0.5) | x         | x         | 0 to 100%, Resolution 0.5%                        |
| AV.158 | TO4Pulsing               | Status value to show the pulse signal demand. This value may be overridden. Activated only if TO4 signal type MSV.87 is set to <b>pulsing</b> .                      | Present Value<br>(if MSV.87 = Pulse)<br>COV Increment (0.5) | x         | x         | 0 to 100%, Resolution 0.5%                        |
| AV.159 | CO2SetPoint              | Configuration value that represents the maximum limit of CO <sub>2</sub> concentration before the EFCB sends an alarm.                                               | Present Value<br>COV Increment (1)                          | x         | x         | 100 to CO2RangePPM, Resolution 1 PPM              |
| AV.160 | Cfg_CO2 Range            | Configuration value that represents the maximum range of the CO <sub>2</sub> sensor (PPM) or the external sensor if CO <sub>2</sub> enabled on AI3, AI4, AI5 or AI6. | Present Value<br>COV Increment (1)                          | x         | x         | 100 to 5000PPM, Resolution 1 PPM                  |
| AV.161 | CO2_SensorValue          | External CO <sub>2</sub> sensor reading in PPM.                                                                                                                      | Present Value<br>COV Increment (1)                          | x         | x         | 1 to CO2RangePPM, Resolution 1 PPM                |



| ID     | Name                | Description                                                                                                                            | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                          |
|--------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|--------------------------------|
| AV.165 | CopyCfgStartAddress | Represents the first address in the range of copied controllers while using the Copy Config option.                                    | Present Value | x         | x         | 0 to 254, Resolution 1 No unit |
| AV.166 | CopyCfgEndAddress   | Represents the last address in the range of copied controllers while using the Copy Config option.                                     | Present Value | x         | x         | 0 to 254, Resolution 1 No unit |
| AV.167 | CopyCfgResult       | Value is used to verify whether the copy to the controllers operation was successful or has failed while using the Copy Config option. | Present Value | x         | x         | 0 to 254, Resolution 1 No unit |

## Binary Input (BI)

**Table 7 - Object Table Information: Binary Input (BI)**

| ID   | Name            | Description                                                               | W?             | EFCB1xTU2 | EFCB1xTU4 | Notes                           |
|------|-----------------|---------------------------------------------------------------------------|----------------|-----------|-----------|---------------------------------|
| BI.1 | DigitalInput1   | Contact status of the input: (0) Open, (1) Close.                         | Out of service | x         | x         | 0 = Open, 1 = Close             |
| BI.2 | DigitalInput2   | Contact status of the input: (0) Open, (1) Close.                         | Out of service | x         | x         | 0 = Open, 1 = Close             |
| BI.3 | DigitalInput3   | Contact status of the input: (0) Open, (1) Close.                         | Out of service | x         | x         | 0 = Open, 1 = Close             |
| BI.4 | DigitalInput4   | Contact status of the input: (0) Open, (1) Close.                         | Out of service | x         | x         | 0 = Open, 1 = Close             |
| BI.5 | AI3DigitalInput | Status of AI3 digital input: (0) Open, (1) Close.                         | Out of service | x         | x         | 0 = Open, 1 = Close             |
| BI.6 | AI4DigitalInput | Status of AI4 digital input: (0) Open, (1) Close.                         | Out of service | x         | x         | 0 = Open, 1 = Close             |
| BI.7 | AI5DigitalInput | Status of AI5 digital input: (0) Open, (1) Close.                         | Out of service | x         | x         | 0 = Open, 1 = Close             |
| BI.8 | AI6DigitalInput | Status of AI6 digital input: (0) Open, (1) Close.                         | Out of service | x         | x         | 0 = Open, 1 = Close             |
| BI.9 | InternPIR       | Status of the internal PIR sensor value: (0) No Occupancy, (1) Occupancy. | Out of service | x         | x         | 0 = No Occupancy, 1 = Occupancy |

## Binary Output (BO)

**Table 8 - Object Table Information: Binary Output (BO)**

| ID    | Name           | Description                                                                           | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes               |
|-------|----------------|---------------------------------------------------------------------------------------|---------------|-----------|-----------|---------------------|
| BO.1  | FanContactHigh | Contact status of the output: (0) Open, (1) Close.                                    | Present Value | x         | x         | 0 = Open, 1 = Close |
| BO.2  | FanContactMed  | Contact status of the output: (0) Open, (1) Close.                                    | Present Value | x         | x         | 0 = Open, 1 = Close |
| BO.3  | FanContactLow  | Contact status of the output: (0) Open, (1) Close.                                    | Present Value | x         | x         | 0 = Open, 1 = Close |
| BO.4  | DigitalOutput1 | Contact status of the output: (0) Open, (1) Close.                                    | Present Value | x         | x         | 0 = Open, 1 = Close |
| BO.5  | DigitalOutput2 | Contact status of the output: (0) Open, (1) Close.                                    | Present Value | x         | x         | 0 = Open, 1 = Close |
| BO.6  | DigitalOutput3 | Contact status of the output: (0) Open, (1) Close.                                    | Present Value |           | x         | 0 = Open, 1 = Close |
| BO.7  | DigitalOutput4 | Contact status of the output: (0) Open, (1) Close.                                    | Present Value |           | x         | 0 = Open, 1 = Close |
| BO.8  | TO1OnOff       | Contact status of the output. Set MSV.81 to <b>On/Off</b> for the value to be active. | Present Value | x         | x         | 0 = Off, 1 = On     |
| BO.9  | TO2OnOff       | Contact status of the output. Set MSV.83 to <b>On/Off</b> for the value to be active. | Present Value | x         | x         | 0 = Off, 1 = On     |
| BO.10 | TO3OnOff       | Contact status of the output. Set MSV.85 to <b>On/Off</b> for the value to be active. | Present Value | x         | x         | 0 = Off, 1 = On     |
| BO.11 | TO4OnOff       | Contact status of the output. Set MSV.87 to <b>On/Off</b> for the value to be active. | Present Value | x         | x         | 0 = Off, 1 = On     |

## Binary Value (BV)

**Table 9 - Object Table Information: Binary Value (BV)**

| ID   | Name                 | Description                                                                                                                                                                       | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                       |
|------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|-----------------------------|
| BV.1 | Cfg_TempUnitBACnet   | Configuration of the temperature units used in BACnet.<br>If set to (0), the temperature will be in Celsius scale.<br>If set to (1), the temperature will be in Fahrenheit scale. | Present Value | x         | x         | 0 = Celsius, 1 = Fahrenheit |
| BV.2 | Cfg_TempSetPointLock | Configuration to lock the zone setpoint and prevent users to change the value. (0) Disable setpoint lock, (1) Enable setpoint lock.                                               | Present Value | x         | x         | 0 = Disable, 1 = Enable     |
| BV.3 | Cfg_UserSysOffMode   | Configuration to allow users to turn off the EFC. (0) Enable - user can turn off the EFC, (1) Disable - prevents the user from turning off the EFC.                               | Present Value | x         | x         | 0 = Enable, 1 = Disable     |

| ID    | Name                   | Description                                                                                                                                                                                                                                                                    | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                |
|-------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|--------------------------------------|
| BV.4  | Cfg_TempUnitTstat      | Configuration of the user temperature units used on TFL/TDF. If set to (0), the temperature will be in Celsius scale. If set to (1), the temperature will be in Fahrenheit scale.                                                                                              | Present Value | x         | x         | 0 = Celsius, 1 = Fahrenheit          |
| BV.5  | AL_FreezeProtection    | When option is configured, the controller will activate the heating outputs when zone temperature is at 4°C (39.2°F) and will deactivate when zone temperature is at 5°C (41°F).                                                                                               | Present Value | x         | x         | 0 = Off, 1 = On                      |
| BV.10 | Cfg_HeatingRampLock    | Configuration value used to lock the heating ramp when a heating demand is active.                                                                                                                                                                                             | Present Value | x         | x         | 0 = Off, 1 = On                      |
| BV.11 | Cfg_ReHeatRampLock     | Configuration value used to lock the reheat ramp when a reheat demand is active.                                                                                                                                                                                               | Present Value | x         | x         | 0 = Off, 1 = On                      |
| BV.13 | Cfg_CoolingRampLock    | Configuration value used to lock the cooling ramp when a cooling demand is active.                                                                                                                                                                                             | Present Value | x         | x         | 0 = Off, 1 = On                      |
| BV.16 | AL_Condensation        | Use to link a digital input to the condensation alarm. When active, the controller will deactivate cooling and fan outputs. Heating outputs are not affected by this state. Writable object via BACnet only.                                                                   | Present Value | x         | x         | 0 = Off, 1 = On                      |
| BV.17 | Cfg_ChangeOverRampLock | Configuration value used to lock the changeover ramp even when a cooling or heating demand is active.                                                                                                                                                                          | Present Value | x         | x         | 0 = Off, 1 = On                      |
| BV.20 | Cfg_UserFanAutoMode    | Configuration value to enable or disable the automatic fan option. If set to (0) Enabled, the user has the option to let the EFC decide the fan speed automatically. If set to (1) Disable, the user must set the fan coil fan speed manually.                                 | Present Value | x         | x         | 0 = Enable, 1 = Disable              |
| BV.25 | Cfg_HumControlSource   | Configuration value to indicate which relative humidity sensor is to be used by the EFC.                                                                                                                                                                                       | Present Value | x         | x         | 0 = Intern Sensor, 1 = Extern Sensor |
| BV.26 | Cfg_HumSetPointLock    | Configuration value to prevent the user to change the relative humidity setpoint.                                                                                                                                                                                              | Present Value | x         | x         | 0 = Disable, 1 = Enable              |
| BV.27 | Cfg_HumidifyRampLock   | Configuration value used to lock the humidification ramp even when a humidification demand is active.                                                                                                                                                                          | Present Value | x         | x         | 0 = Off, 1 = On                      |
| BV.28 | Cfg_DehumidifyRampLock | Configuration value used to lock the dehumidification ramp even when a dehumidification demand is active.                                                                                                                                                                      | Present Value | x         | x         | 0 = Off, 1 = On                      |
| BV.30 | ChangeOverMode         | Status value of the actual mode (0) Cooling, (1) Heating. Note that this value can be set via BACnet or locally with MSV.10. If locally is required, see configurations available for AI.2 dedicated input.                                                                    | Present Value | x         | x         | 0 = Cooling, 1 = Heating             |
| BV.34 | Cfg_OccControlSource   | Determines the source of occupancy control to be used by the EFC.                                                                                                                                                                                                              | Present Value | x         | x         | 0 = DigitalInput3, 1 = InternSensor  |
| BV.35 | Cfg_NightSetBackMode   | Configuration to determine the action of the EFC when in night setback mode. When set to (0) setpoint, the EFC will maintain the setpoint values of AV.12 & AV.13. If set to (1) Off, the EFC will turn off and will not consider the setpoint values for cooling and heating. | Present Value | x         | x         | 0 = Setpoint, 1 = OFF                |
| BV.36 | AL_DirtyFilter         | Status value to inform if a filter change is required. (0) No, (1) Yes                                                                                                                                                                                                         | Read only     | x         | x         | 0 = No, 1 = Yes                      |

| ID    | Name                        | Description                                                                                                                                                                                                                                                        | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                         |
|-------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|-------------------------------|
| BV.37 | AL_FlowSwitch               | Status value to inform if an airflow alarm is active. (0) No, (1) Yes                                                                                                                                                                                              | Read only     | x         | x         | 0 = No, 1 = Yes               |
| BV.38 | AL_Override                 | Status value to inform if an override is active. (0) No, (1) Yes                                                                                                                                                                                                   | Read only     | x         | x         | 0 = No, 1 = Yes               |
| BV.39 | AL_WindowOpened             | Status value to inform that a window has been opened. (0) No, (1) Yes                                                                                                                                                                                              | Read only     | x         | x         | 0 = No, 1 = Yes               |
| BV.40 | AL_DoorOpened               | Status value to inform that a door has been opened. (0) No, (1) Yes                                                                                                                                                                                                | Read only     | x         | x         | 0 = No, 1 = Yes               |
| BV.41 | AL_OverHeat                 | Status value to inform if a heat/reheat with fan override is active. (0) No, (1) Yes                                                                                                                                                                               | Read only     | x         | x         | 0 = No, 1 = Yes               |
| BV.45 | Cfg_DigitalInput1Contact    | Configuration to change the contact's normal position. Input can be set to (0) Normally Opened or (1) Normally Closed.                                                                                                                                             | Present Value | x         | x         | 0 = Norm Open, 1 = Norm Close |
| BV.46 | Cfg_DigitalInput2Contact    | Configuration to change the contact's normal position. Input can be set to (0) Normally Opened or (1) Normally Closed.                                                                                                                                             | Present Value | x         | x         | 0 = Norm Open, 1 = Norm Close |
| BV.48 | Cfg_DigitalInput4Contact    | Configuration to change the contact's normal position. Input can be set to (0) Normally Opened or (1) Normally Closed.                                                                                                                                             | Present Value | x         | x         | 0 = Norm Open, 1 = Norm Close |
| BV.50 | Cfg_AnalogOutput1Direction  | Configuration of the analog output direction. When set to (0) Direct, the signal ramp is configured from 0-10Vdc. When set to (1) Reverse, the signal ramp is configured from 10-0Vdc.                                                                             | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.51 | Cfg_AnalogOutput2Direction  | Same description as BV.50                                                                                                                                                                                                                                          | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.52 | Cfg_AnalogOutput3Direction  | Same description as BV.50                                                                                                                                                                                                                                          | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.53 | Cfg_AnalogOutput4Direction  | Same description as BV.50                                                                                                                                                                                                                                          | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.60 | Cfg_DigitalOutput1Direction | Configuration of the digital outputs' contact normal state. When set to (0) Direct, the contact is considered Normally Opened. When set to (1) Reverse, the contact is considered Normally Closed.                                                                 | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.61 | Cfg_DigitalOutput2Direction | Same description as BV.60                                                                                                                                                                                                                                          | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.62 | Cfg_DigitalOutput3Direction | Same description as BV.60                                                                                                                                                                                                                                          | Present Value |           | x         | 0 = Direct, 1 = Reverse       |
| BV.63 | Cfg_DigitalOutput4Direction | Same description as BV.60                                                                                                                                                                                                                                          | Present Value |           | x         | 0 = Direct, 1 = Reverse       |
| BV.70 | Cfg_TO1Direction            | Configuration of the TRIAC output's contact normal state. When set to (0) Direct, the contact goes to ground. When set to (1) Reverse, 24Vac passes through the contact. If MSV.81 is set to pulse, it will reverse the pulse signal from 0 to 100% to 100% to 0%. | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.71 | Cfg_TO2Direction            | Same description as BV.70                                                                                                                                                                                                                                          | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.72 | Cfg_TO3Direction            | Same description as BV.70                                                                                                                                                                                                                                          | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |
| BV.73 | Cfg_TO4Direction            | Same description as BV.70                                                                                                                                                                                                                                          | Present Value | x         | x         | 0 = Direct, 1 = Reverse       |

| ID    | Name                           | Description                                                                                                                                                                                                     | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                    |
|-------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|------------------------------------------------------------------------------------------|
| BV.74 | Cfg_FloatingTO1/TO2Direction   | Configuration value to set the rotation direction. When set to <b>Direct</b> , TO1 output closes and TO2 output opens the valve. When set to <b>Reverse</b> , TO1 output opens and TO2 output closes the valve. | Present Value | x         | x         | 0 = Direct, 1 = Reverse                                                                  |
| BV.75 | Cfg_FloatingTO3/TO4Direction   | Configuration value to set the rotation direction. When set to <b>Direct</b> , TO3 output closes and TO4 output opens the valve. When set to <b>Reverse</b> , TO3 output opens and TO4 output closes the valve. | Present Value | x         | x         | 0 = Direct, 1 = Reverse                                                                  |
| BV.85 | Cfg_ServiceDisplayAddress      | When activated, the TFL/TDF lights up and displays the MSTP address. It remains active until deactivated via BACnet. Useful when troubleshooting and/or servicing the controller.                               | Present Value | x         | x         | 0 = Off, 1 = On                                                                          |
| BV.86 | Cfg_KeyPadUpperLeftLock        | If object is <b>ON</b> , the button is inactive in <b>RUN</b> mode but is active in the <b>PRG</b> mode via the TFL/TDF. Button is used to change the fan speed.                                                | Present Value | x         | x         | 0 = Off, 1 = On<br>If set to "On", functionality of these buttons will not be available. |
| BV.87 | Cfg_KeyPadBottomLeftLock       | If object is <b>ON</b> , the button is inactive in <b>RUN</b> mode but is active in the <b>PRG</b> mode via the TFL/TDF. Button is used to change temperature control modes.                                    | Present Value | x         | x         | 0 = Off, 1 = On<br>If set to "On", functionality of these buttons will not be available. |
| BV.88 | Cfg_KeyPadArrowsLock           | If object is <b>ON</b> , the button is inactive in <b>RUN</b> mode but is active in the <b>PRG</b> mode via the TFL/TDF. Buttons are used to change the setpoint.                                               | Present Value | x         | x         | 0 = Off, 1 = On<br>If set to "On", functionality of these buttons will not be available. |
| BV.89 | Cfg_ProgramModeLock            | If object is <b>ON</b> , all buttons are inactive and <b>PRG</b> mode is not accessible via the TFL/TDF.                                                                                                        | Present Value | x         | x         | 0 = Off, 1 = On                                                                          |
| BV.90 | CopyCfgExecute                 | When using Copy Config, this value is used to start the copy to other controllers.                                                                                                                              | Present Value | x         | x         | 0 = No, 1 = Yes                                                                          |
| BV.91 | Cfg_ActivateSchedule           | Configuration to activate the schedule. The schedule is configurable via BACnet. If no schedule is configured, the mode will always be occupied. The time and day will be displayed on the TFL/TDF.             | Present Value | x         | x         | 0 = No, 1 = Yes                                                                          |
| BV.92 | Cfg_DisplayCO2                 | Configuration to display CO <sub>2</sub> reading.                                                                                                                                                               | Present Value | x         | x         | 0 = Off, 1 = On                                                                          |
| BV.93 | CO <sub>2</sub> _Source_Select | Determines the source of the CO <sub>2</sub> reading. TFL = Onboard sensor of TFL/TDF (models with CO <sub>2</sub> sensor) unit. Analog = external sensor on AI.                                                | Present Value | x         | x         | 0 = TFL, 1 = Analog                                                                      |
| BV.98 | Cfg_DOEnable                   | Configuration value to select whether to enable or disable the digital output for the ECM motor.                                                                                                                | Present Value | x         | x         | 0 = Off, 1 = On                                                                          |

## Multi State Value (MSV)

**Table 10 - Object Table Information: Multi State Value (MSV)**

| ID     | Name                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                           | W?            | EFCB1XTU2 | EFCB1XTU4 | Notes                                                                                                                                     |
|--------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|
| MSV.1  | SystemMode                | Status of the actual mode selected. These values may be restricted by MSV.20.<br><b>Auto:</b> Fan coil mode changes automatically between heating and cooling in operation when there is a cooling or heating demand.<br><b>Heat:</b> Fan coil mode is in heating (in operation only when there is a heating demand).<br><b>Cool:</b> Fan coil mode is in cooling (in operation only when there is a cooling demand).<br><b>Off:</b> Fan coil mode is off.            | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Auto (All modes available)<br>Heat<br>Cool<br>Off (if BV.3 is enabled) |
| MSV.2  | UserFanSpeedSelect        | Status of the actual fan speed. This value may be changed via the TFL/TDF and/or BACnet.<br><b>Auto:</b> Fan coil automatically changes speed, based on demand.<br><b>Low:</b> Fan coil is limited to low fan speed.<br><b>Medium:</b> Fan coil is limited to medium fan speed.<br><b>High:</b> Fan coil is limited to high fan speed.                                                                                                                                | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Auto<br>Low<br>Medium<br>High                                          |
| MSV.5  | HumControlMode            | Configuration value to authorize humidification and/or dehumidification in order to maintain relative humidity setpoints.<br><b>Auto:</b> The EFC will operate automatically to humidify or dehumidify, according to the demand.<br><b>Dehumidification:</b> The EFC is authorized only to dehumidify.<br><b>Humidification:</b> The EFC is authorized only to humidify.<br><b>Off:</b> Relative humidity setpoints are not considered and no action will be taken.   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Auto<br>Dehumidification<br>Humidification<br>Off                      |
| MSV.10 | Cfg_ChangeOverControlMode | Configuration that indicates the source of the changeover value.<br><b>Locally:</b> Analog or digital input is configured in the EFC and will execute the changeover with the set parameters.<br><b>Cooling:</b> Changeover is sent and controlled by the BMS. No changeover will occur unless the BMS sends the signal to do so.<br><b>Heating:</b> Changeover is sent and controlled by the BMS. No changeover will occur unless the BMS sends the signal to do so. | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Locally<br>Cooling<br>Heating                                          |
| MSV.13 | NsbOccCommand             | Configuration to set the occupancy or night setback mode.<br><b>Locally:</b> Occupancy or Night setback is activated via a configured input wired to a timer or an occupancy sensor.<br><b>Off:</b> Forces the EFC Off. Signal sent via BMS.<br><b>Occupancy:</b> Forces the EFC to occupied or day mode. Signal sent via BMS.<br><b>No Occupancy:</b> Forces the EFC to unoccupied or night setback mode. Signal sent via BMS.                                       | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Locally<br>Off<br>Occupancy/Day<br>No Occupancy/Night                  |



| ID     | Name                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                  |
|--------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| MSV.14 | OccupancyStatus           | Status that indicates the actual occupancy.<br><b>Unoccupied:</b> Zone is not occupied.<br><b>Occupied:</b> Zone is occupied.<br><b>Override:</b> Zone is unoccupied but put back to occupied mode for a maximum pre-determined time set at AV.86.                                                                                                                                                                                                                                                                                                                                                                                                                                   | Read only     | x         | x         | The available options vary based on selection of other objects.<br>NoOccupancy<br>Occupancy<br>Override                                                |
| MSV.15 | NightSetBackStatus        | Status that indicates the actual mode of the zone.<br><b>Day:</b> Zone is in day operation mode.<br><b>Night:</b> Zone is in night setback mode.<br><b>Override:</b> Zone is in night setback mode but put back to day operation for a maximum pre-determined time set at AV.85.                                                                                                                                                                                                                                                                                                                                                                                                     | Read only     | x         | x         | The available options vary based on selection of other objects.<br>Day<br>Night<br>Override                                                            |
| MSV.20 | Cfg_Sequence Select       | Selected user temperature control mode (according to MSV.1).<br><b>Auto:</b> All modes available.<br><b>Heating:</b> Only Heating.<br><b>Cooling:</b> Only Cooling.<br><b>HeatingOrCooling:</b> Heating or Cooling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Auto<br>Heating<br>Cooling<br>HeatingOrCooling                                      |
| MSV.21 | Cfg_TempControlSource     | Configuration value to set the control temperature to be used by the EFC.<br><b>Remote Temp:</b> AV.1 will use temperature value sent via the BMS. See AV.2 for timeout safety feature.<br><b>Intern Temp:</b> AV.1 will use the integrated temperature sensor of the TFL/TDF (ITS).<br><b>Extern Temp:</b> AV.1 will use the external temperature sensor configured (ETS).                                                                                                                                                                                                                                                                                                          | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Network (Net)<br>Internal (ItS)<br>External (EtS)                                   |
| MSV.25 | Cfg_FanOperationType      | Configuration value to set the number of fan speed available on the fan coil.<br><b>1 Speed:</b> Fan coil has a one speed fan (wired to Low).<br><b>2 Speed:</b> Fan coil has a two speed fan (wired to Medium).<br><b>3 Speed:</b> Fan coil has a three speed fan (wired to High).                                                                                                                                                                                                                                                                                                                                                                                                  | Present Value | x         | x         | The available options vary based on selection of other objects.<br>1Speed<br>2Speeds<br>3Speeds                                                        |
| MSV.36 | Cfg_ChangeOverInputSignal | Configuration value of Analog Input 2. This value will only affect the 2 pipe application.<br><b>Changeover Sensor:</b> A 10kΩ Thermistor is used to determine the changeover state.<br><b>Changeover Normally Cool:</b> A digital temperature switch is used to determine the changeover state. When contact is opened, the water that enters is in cooling mode. When contact is closed, the water that enters is in heating mode.<br><b>Changeover Normally Heat:</b> A digital temperature switch is used to determine the changeover state. When contact is opened, the water that enters is in heating mode. When contact is closed, the water that enters is in cooling mode. | Present Value | x         | x         | The available options vary based on selection of other objects.<br>ChangeOverSensor (Sens)<br>ChOvContactNormCool (NoCl)<br>ChOvContactNormHeat (NoHt) |

| ID     | Name                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                                        |
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| MSV.38 | Cfg_AIExtern Temp Type  | Configuration value that represents the type of signal used for an external temperature sensor wired to AI. Set MSV.21 to Extern Temp (Ets). For this input, the DIP switch has no impact and is overridden with this configuration.<br><b>Off:</b> AI is not used as an external temperature sensor.<br><b>2-10V:</b> AI signal type is a 2-10Vdc temperature sensor.<br><b>0-10V:</b> AI signal type is a 0-10Vdc temperature sensor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>2 to 10V<br>0 to 10V                                                                                               |
| MSV.39 | Cfg_ExternHumidityInput | Configuration value that represents the input used for an external relative humidity sensor. Set BV.25 to external (Erh) and the appropriate DIP switch for the input to 0-10Vdc.<br><b>Off:</b> No external relative humidity sensor used.<br><b>AI3:</b> Analog Input 3 is used as an external relative humidity sensor.<br><b>AI4:</b> Analog Input 4 is used as an external relative humidity sensor.<br><b>AI5:</b> Analog Input 5 is used as an external relative humidity sensor.<br><b>AI6:</b> Analog Input 6 is used as an external relative humidity sensor.                                                                                                                                                                                                                                                                                                                                                                                                                                                | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Analog Input3<br>Analog Input4<br>Analog Input5<br>Analog Input6                                                   |
| MSV.45 | Cfg_NsbOccContact       | Configuration of BI.3 mode. The mode will determine the action taken by the EFC when BI.3 is activated or deactivated.<br><b>Off:</b> Digital Input is not used.<br><b>OCC Norm Open:</b> Occupancy Normally Opened contact. If the value of BI.3 is (0), then the zone is occupied. If the value of BI.3 is (1), then the zone is unoccupied.<br><b>OCC Norm Close:</b> Occupancy Normally Closed contact. If the value of BI.3 is (0), then the zone is unoccupied. If the value of BI.3 is (1), then the zone is occupied.<br><b>NSB Norm Open:</b> Night Setback Normally Opened contact. If the value of BI.3 is (0), then the zone is in day operation. If the value of BI.3 is (1), then the zone is in night setback.<br><b>NSB Norm Close:</b> Night Setback Normally Closed contact. If the value of BI.3 is (0), then the zone is in night setback mode. If the value of BI.3 is (1), then the zone is in day operation.                                                                                    | Present Value | x         | x         | The available options vary based on selection of other objects.<br>1 = Off<br>2 = OccNorm.Open (OCC.o)<br>3 = OccNorm.Close (OCC.c)<br>4 = NSBNorm.Open (nSb.o)<br>5 = NSBNorm.Close (nSb.c) |
| MSV.46 | Cfg_DigitalInput1Type   | Configuration of Digital Input 1. Description based on Normally Opened Contact (see BV.45).<br><b>Off:</b> Digital Input not used.<br><b>Override:</b> When active, BV.38 indicates alarm state and TFL/TDF displays alarm icon. The controller overrides all outputs.<br><b>Window:</b> When active, BV.39 indicates alarm state and TFL/TDF displays WINDOW. The controller deactivates all outputs.<br><b>Door:</b> When active, BV.40 indicates alarm state and TFL/TDF displays DOOR. The controller deactivates all outputs.<br><b>Dirty Filter:</b> When active, BV.36 indicates alarm state and TFL/TDF displays alarm icon. The controller remains in operation.<br><b>Flow Switch:</b> When active, BV.37 indicates alarm state and TFL/TDF displays an alarm icon. The controller deactivates all outputs except the fan.<br><b>Overheat:</b> When active, BV.41 indicates alarm state and TFL/TDF displays alarm icon. The controller overrides heat and reheat with fan outputs (not reheat without fan). | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Override<br>Window<br>Door<br>Dirty Filter<br>Flow Switch<br>Overheat                                              |

| ID     | Name                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                              |
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| MSV.47 | Cfg_DigitalInput2Type | <p>Configuration of Digital Input 2. Description based on Normally Opened Contact (see BV.46).</p> <p><b>Off:</b> Digital Input not used.</p> <p><b>Override:</b> When active, BV.38 indicates alarm state and TFL/TDF displays an alarm icon. The controller overrides all outputs.</p> <p><b>Window:</b> When active, BV.39 indicates alarm state and TFL/TDF displays <b>WINDOW</b>. The controller deactivates all outputs.</p> <p><b>Door:</b> When active, BV.40 indicates alarm state and TFL/TDF displays <b>DOOR</b>. The controller deactivates all outputs.</p> <p><b>Dirty Filter:</b> When active, BV.36 indicates alarm state and TFL/TDF displays an alarm icon. The controller remains in operation.</p> <p><b>Flow Switch:</b> When active, BV.37 indicates alarm state and TFL/TDF displays an alarm icon. The controller deactivates all outputs except the fan.</p> <p><b>Overheat:</b> When active, BV.41 indicates alarm state and TFL /TDF displays alarm icon. The controller overrides heat and reheat with fan outputs (not reheat without fan).</p> | Present Value | x         | x         | <p>The available options vary based on selection of other objects.</p> <p>Off</p> <p>Override</p> <p>Window</p> <p>Door</p> <p>Dirty Filter</p> <p>Flow Switch</p> <p>Overheat</p> |
| MSV.49 | Cfg_DigitalInput4Type | <p>Configuration of Digital Input 4. Description based on Normally Opened Contact (see BV.48).</p> <p><b>Off:</b> Digital Input not used.</p> <p><b>Override:</b> When active, BV.38 indicates alarm state and TFL/TDF displays an alarm icon. The controller overrides all outputs.</p> <p><b>Window:</b> When active, BV.39 indicates alarm state and TFL/TDF displays <b>WINDOW</b>. The controller deactivates all outputs.</p> <p><b>Door:</b> When active, BV.40 indicates alarm state and TFL/TDF displays <b>DOOR</b>. The controller deactivates all outputs.</p> <p><b>Dirty Filter:</b> When active, BV.36 indicates alarm state and TFL/TDF displays an alarm icon. The controller remains in operation.</p> <p><b>Flow Switch:</b> When active, BV.37 indicates alarm state and TFL/TDF displays an alarm icon. The controller deactivates all outputs except the fan.</p> <p><b>Overheat:</b> When active, BV.41 indicates alarm state and TFL /TDF displays alarm icon. The controller overrides heat and reheat with fan outputs (not reheat without fan).</p> | Present Value | x         | x         | <p>The available options vary based on selection of other objects.</p> <p>Off</p> <p>Override</p> <p>Window</p> <p>Door</p> <p>Dirty Filter</p> <p>Flow Switch</p> <p>Overheat</p> |

| ID     | Name                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                                                                                                             |
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| MSV.55 | Cfg_AnalogOutput1Ramp | <p>Configuration of the ramp used to modulate AO1 based on demand.</p> <p><b>Off:</b> Output not used.</p> <p><b>Alarm:</b> This ramp is used for alarms. If any of the BV object alarms are triggered, there will be a 10V signal output on AO1.</p> <p><b>Changeover Ramp (Cor):</b> This ramp is used when the water that enters at the coil does both heating and cooling (2 pipe application). It requires a changeover sensor to operate. The ramp is configured with AV.51 Changeover Proportional Band and AV.52 Changeover Dead Band. When the zone is in cooling demand and the water that enters is in cooling mode, the EFC will modulate the valve actuator between the minimum and maximum position. When the zone is in heating demand and the water that enters is in heating mode, the EFC will modulate the valve actuator between the minimum and maximum position. When the demand and the incoming water are not in the same mode, the valve actuator remains closed.</p> <p><b>Cooling Ramp (Cool):</b> This ramp is used for cooling. The ramp is configured with AV.36 Cooling Proportional Band and AV.37 Cooling Dead Band. Pulse signal type is not available for cooling.</p> <p><b>Heating Ramp (Heat):</b> This ramp is used for heating. The ramp is configured with AV.21 Heating Proportional Band and AV.22 Heating Dead Band.</p> <p><b>Reheat with fan Ramp (Reheat):</b> This ramp is used for a reheat coil. The ramp is configured with AV.25 Reheat Proportional Band and AV.26 Reheat Dead Band.</p> <p><b>Reheat without fan Ramp (Reheat):</b> This ramp is used for a reheat element that does not require the fan to operate such as baseboard heaters. The ramp is configured with AV.25 Reheat Proportional Band and AV.26 Reheat Dead Band.</p> <p><b>Humidity with fan:</b> Option available with the TFLH/TDF (models with humidity sensor only). This ramp is used to modulate a humidifier based on demand. The ramp is configured with AV.73 Hum setpoint, AV.80 Hum Prop Band and AV.81 Hum Dead Band.</p> <p><b>Cooling or Heating:</b> This ramp is used for cooling or heating, when MSV.20 Sequence Select is set to ON (Cooling or Heating). The output will alternate between the cooling and heating ramps based on the mode selected in MSV.1 SystemMode and the current demand value. The ramp is configured with AV.36 Cooling Proportional Band and AV.37 Cooling Dead Band, or AV.21 Heating Proportional Band and AV.22 Heating Dead Band.</p> | Present Value | x         | x         | <p>The available options vary based on selection of other objects.</p> <p>Off</p> <p>Alarm</p> <p>Changeover with Fan</p> <p>Cooling with Fan</p> <p>Heating with Fan</p> <p>ReHeat with fan</p> <p>ReHeat</p> <p>Humidity with Fan</p> <p>Cooling or Heating</p> |

| ID     | Name                   | Description                                                                                                                                                                                                                                      | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                                                                         |
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| MSV.57 | Cfg_ AnalogOutput2Ramp | Same description as MSV.55                                                                                                                                                                                                                       | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Alarm<br>Changeover with Fan<br>Cooling with Fan<br>Heating with Fan<br>ReHeat with fan<br>ReHeat<br>Humidity with Fan<br>Cooling or Heating        |
| MSV.59 | Cfg_ AnalogOutput3Ramp | Same description as MSV.55                                                                                                                                                                                                                       | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Alarm<br>Changeover with Fan<br>Cooling with Fan<br>Heating with Fan<br>ReHeat with fan<br>ReHeat<br>Humidity with Fan<br>Cooling or Heating        |
| MSV.61 | Cfg_ AnalogOutput4Ramp | Same description as MSV.55<br><b>Fan:</b> This ramp is used to modulate the fan demand based on the difference between the actual temperature and the setpoint value when set to auto fan speed. The ramp is configured using AV.9 TempSetPoint. | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Alarm<br>Changeover with Fan<br>Cooling with Fan<br>Heating with Fan<br>ReHeat with fan<br>ReHeat<br>Humidity with Fan<br>Fan<br>Cooling or Heating |

| ID     | Name                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                                                                                   |
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| MSV.70 | Cfg_DigitalOutput1Ramp | <p>Configuration of the ramp used to activate/deactivate DO1 based on demand. Configuration includes AV.115 DO1 Close Position and AV.116 DO1 Open Position.</p> <p><b>Off:</b> Output not used.</p> <p><b>Alarm:</b> This ramp is used for alarms. If any of the BV object alarms are triggered, there will be a 10V signal output on DO1.</p> <p><b>Changeover Ramp (Cor):</b> This ramp is used when the water that enters at the coil does both heating and cooling (2 pipe application). It requires a changeover sensor to operate. The ramp is configured with AV.51 Changeover Proportional Band and AV.52 Changeover Dead Band. When the zone is in cooling demand and the water that enters is in cooling mode, the EFC will modulate the valve actuator between the minimum and maximum position. When the zone is in heating demand and the incoming water is in heating mode, the EFC will modulate the valve actuator between the minimum and maximum position. When the demand and the incoming water are not in the same mode, the valve actuator remains closed.</p> <p><b>Cooling Ramp (Cool):</b> This ramp is used for cooling. The ramp is configured with AV.36 Cooling Proportional Band and AV.37 Cooling Dead Band. Pulse signal type is not available for cooling.</p> <p><b>Heating Ramp (Heat):</b> This ramp is used for heating. The ramp is configured with AV.21 Heating Proportional Band and AV.22 Heating Dead Band.</p> <p><b>Reheat with fan Ramp (Reheat):</b> This ramp is used for a reheat coil. The ramp is configured with AV.25 Reheat Proportional Band and AV.26 Reheat Dead Band.</p> <p><b>Reheat without fan Ramp (Reheat):</b> This ramp is used for a reheat element that does not require the fan to operate such as baseboard heaters. The ramp is configured with AV.25 Reheat Proportional Band and AV.26 Reheat Dead Band.</p> <p><b>Humidity with fan:</b> Option available with the TFLH/TDF (models with humidity sensor only). This ramp is used to activate/deactivate a humidifier based on demand. The ramp is configured with AV.73 Hum setpoint, AV.80 Hum Prop Band and AV.81 Hum Dead Band.</p> | Present Value | x         | x         | <p>The available options vary based on selection of other objects.</p> <p>Off</p> <p>Alarm</p> <p>Changeover with Fan</p> <p>Cooling with Fan</p> <p>Heating with Fan</p> <p>ReHeat with fan</p> <p>ReHeat</p> <p>Humidity with Fan</p> |
| MSV.71 | Cfg_DigitalOutput2Ramp | <p>Configuration of the ramp used to activate/deactivate DO2 based on demand. Configuration includes AV.120 DO2 Close Position and AV.121 DO2 Open Position. See MSV.70.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Present Value | x         | x         | <p>The available options vary based on selection of other objects.</p> <p>Off</p> <p>Alarm</p> <p>Changeover with Fan</p> <p>Cooling with Fan</p> <p>Heating with Fan</p> <p>ReHeat with fan</p> <p>ReHeat, Humidity with Fan</p>       |

| ID     | Name                   | Description                                                                                                                                                           | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                                            |
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| MSV.72 | Cfg_DigitalOutput3Ramp | Configuration of the ramp used to activate/deactivate DO3 based on demand. Configuration includes AV.125 DO3 Close Position and AV.126 DO3 Open Position. See MSV.70. | Present Value |           | <b>x</b>  | The available options vary based on selection of other objects.<br>Off<br>Alarm<br>Changeover with Fan<br>Cooling with Fan<br>Heating with Fan<br>ReHeat with fan<br>ReHeat<br>Humidity with Fan |
| MSV.73 | Cfg_DigitalOutput4Ramp | Configuration of the ramp used to activate/deactivate DO4 based on demand. Configuration includes AV.130 DO4 Close Position and AV.131 DO4 Open Position. See MSV.70. | Present Value |           | <b>x</b>  | The available options vary based on selection of other objects.<br>Off<br>Alarm<br>Changeover with Fan<br>Cooling with Fan<br>Heating with Fan<br>ReHeat with fan<br>ReHeat<br>Humidity with Fan |



| ID     | Name              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                                                          |
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| MSV.80 | Cfg_TO1Ramp       | <p>Configuration of the ramp used to modulate (pulse or floating) or activate/deactivate (On/Off) TO1 based on demand. When set to On/Off, configuration includes AV.135 TO1 Open Position and AV.136 TO1 Close Position.</p> <p><b>Off:</b> Output not used.</p> <p><b>Alarm:</b> This ramp is used for alarms. If any of the BV object alarms are triggered, there will be a 10V signal output on TO1.</p> <p><b>Changeover Ramp (Cor):</b> This ramp is used when the water that enters at the coil does both heating and cooling (2 pipe application). It requires a changeover sensor to operate. The ramp is configured with AV.51 Changeover Proportional Band and AV.52 Changeover Dead Band. When the zone is in cooling demand and the water that enters is in cooling mode, the EFC will modulate the valve actuator between the minimum and maximum position. When the zone is in heating demand and the water that enters is in heating mode, the EFC will modulate the valve actuator between the minimum and maximum position. When the demand and the incoming water are not in the same mode, the valve actuator remains closed.</p> <p><b>Cooling Ramp (Cool):</b> This ramp is used for cooling. The ramp is configured with AV.36 Cooling Proportional Band and AV.37 Cooling Dead Band. Pulse signal type is not available for cooling.</p> <p><b>Heating Ramp (Heat):</b> This ramp is used for heating. The ramp is configured with AV.21 Heating Proportional Band and AV.22 Heating Dead Band.</p> <p><b>Reheat with fan Ramp (Reheat):</b> This ramp is used for a reheat coil. The ramp is configured with AV.25 Reheat Proportional Band and AV.26 Reheat Dead Band.</p> <p><b>Reheat without fan Ramp (Reheat):</b> This ramp is used for a reheat element that does not require the fan to operate such as baseboard heaters. The ramp is configured with AV.25 Reheat Proportional Band and AV.26 Reheat Dead Band.</p> | Present Value | x         | x         | <p>The available options vary based on selection of other objects.</p> <p>Off</p> <p>Alarm</p> <p>Changeover with Fan</p> <p>Cooling with Fan</p> <p>Heating with Fan</p> <p>ReHeat with fan</p> <p>ReHeat</p> |
| MSV.81 | Cfg_TO1SignalType | <p>Configuration of TO1 output signal type.</p> <p><b>Pulse:</b> Modulating output affected by BV.70. Pulse is available for heating ramp and reheat ramp only.</p> <p><b>On/Off:</b> Digital output affected by AV.135, AV.136 and BV.70.</p> <p><b>Floating:</b> Modulating output affected by AV.146 and BV.74. When TO1 is set to (3) floating, it automatically changes MSV.82 TO2 Ramp and MSV.83 TO2 Signal Type settings to match the configuration of TO1.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Present Value | x         | x         | <p>The available options vary based on selection of other objects.</p> <p>Pulse (if heat or reheat is selected)</p> <p>On_Off</p> <p>Floating</p>                                                              |
| MSV.82 | Cfg_TO2Ramp       | <p>Configuration of the ramp used to modulate (pulse or floating) or activate/deactivate (On/Off) TO2 based on demand. When set to On/Off, configuration includes AV.137 TO2 Open Position and AV.138 TO2 Close Position. See MSV.80.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Present Value | x         | x         | <p>The available options vary based on selection of other objects.</p> <p>Off</p> <p>Alarm</p> <p>Changeover with Fan</p> <p>Cooling with Fan</p> <p>Heating with Fan</p> <p>ReHeat with fan</p> <p>ReHeat</p> |

| ID     | Name              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                       |
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| MSV.83 | Cfg_TO2SignalType | Configuration of TO2 output signal type.<br><b>Pulse:</b> Modulating output affected by BV.71. Pulse is available for heating and reheat ramps only.<br><b>On/Off:</b> Digital output affected by AV.137, AV.138 and BV.71.<br><b>Floating:</b> See MSV.81 floating option.                                                                                                                                                                                                                                                 | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Pulse (if heat or reheat is selected)<br>On_Off<br>Floating                                              |
| MSV.84 | Cfg_TO3Ramp       | Configuration of the ramp used to modulate (pulse or floating) or activate/deactivate (On/Off) TO3 based on demand. When set to On/Off, configuration includes AV.139 TO3 Open Position and AV.140 TO3 Close Position. See MSV.80.                                                                                                                                                                                                                                                                                          | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Alarm<br>Changeover with Fan<br>Cooling with Fan<br>Heating with Fan<br>ReHeat with fan<br>ReHeat |
| MSV.85 | Cfg_TO3SignalType | Configuration of TO3 output signal type.<br><b>Pulse:</b> Modulating output affected by BV.72. Pulse is available for heating and reheat ramps only.<br><b>On/Off:</b> Digital output affected by AV.139, AV.140 and BV.72.<br><b>Floating:</b> Modulating output affected by AV.151 and BV.75. When TO3 is set to (3) floating, it automatically changes MSV.86 TO4 Ramp and MSV.87 TO4 Signal Type settings to match the configuration of TO3.                                                                            | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Pulse (if heat or reheat is selected)<br>On_Off<br>Floating                                              |
| MSV.86 | Cfg_TO4Ramp       | Configuration of the ramp used to modulate (pulse or floating) or activate/deactivate (On/Off) TO4 based on demand. When set to On/Off, configuration includes AV.141 TO4 Open Position and AV.142 TO4 Close Position. See MSV.80.                                                                                                                                                                                                                                                                                          | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Alarm<br>Changeover with Fan<br>Cooling with Fan<br>Heating with Fan<br>ReHeat with fan, ReHeat   |
| MSV.87 | Cfg_TO4SignalType | Configuration of TO4 output signal type.<br><b>Pulse:</b> Modulating output affected by BV.73. Pulse is available for heating and reheat ramps only.<br><b>On/Off:</b> Digital output affected by AV.141, AV.142 and BV.73.<br><b>Floating:</b> See MSV.85 floating option.                                                                                                                                                                                                                                                 | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Pulse (if heat or reheat is selected)<br>On_Off<br>Floating                                              |
| MSV.95 | Cfg_DisplayInfo   | Configuration value of the information displayed on the TFL/TDF.<br><b>Display Temp Demand:</b> The TFL/TDF will display the actual temperature and cooling/heating demand.<br><b>Display Setpoint Demand:</b> TFL/TDF will display the actual setpoint and cooling/heating demand.<br><b>Display Temp:</b> TFL/TDF will display the actual temperature but no demand.<br><b>Display Setpoint:</b> TFL/TDF will display the actual setpoint but no demand.<br><b>Display Off:</b> TFL/TDF display will be off (no display). | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Temp and demand<br>Setpoint and demand<br>Temp only<br>Setpoint only<br>Off                              |

| ID      | Name                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                      |
|---------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MSV.100 | Cfg_universalInputAI3 | Configuration of Analog Input 3.<br><b>Off:</b> No logic. The input is monitored as an analog input (0-10VDC) or a dry contact based on the type of input connected.<br><b>Temperature:</b> AI3 is used as an external temperature sensor of 0-10VDC or 10K Type 3 based on the dip switch configuration.<br><b>CO2:</b> AI3 is used as an external CO <sub>2</sub> sensor.<br><b>Humidity:</b> AI3 is used as an external humidity sensor.                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Temperature<br>CO2<br>Humidity                                                                   |
| MSV.101 | Cfg_universalInputAI4 | Same description as MSV.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Temperature<br>CO2<br>Humidity                                                                   |
| MSV.102 | Cfg_universalInputAI5 | Same description as MSV.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Temperature<br>CO2<br>Humidity                                                                   |
| MSV.103 | Cfg_universalInputAI6 | Same description as MSV.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Off<br>Temperature<br>CO2<br>Humidity                                                                   |
| MSV.104 | Cfg_TO1AlarmSource    | Configuration of TO1 alarm source.<br><b>Alarm Override:</b> When BV.38 is in alarm state, TO1 is triggered.<br><b>Alarm Overheat:</b> When BV.41 is in alarm state, TO1 is triggered.<br><b>Alarm Door:</b> When BV.40 is in alarm state, TO1 is triggered.<br><b>Alarm Window Contact:</b> When BV.39 is in alarm state, TO1 is triggered.<br><b>Alarm FlowSwitch:</b> When BV.37 is in alarm state, TO1 is triggered.<br><b>Alarm CO2:</b> When the CO <sub>2</sub> value exceeds the setpoint and it is in alarm state, TO1 is triggered. | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.105 | Cfg_TO2AlarmSource    | Same description as MSV.104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |

| ID      | Name                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                      |
|---------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MSV.106 | Cfg_TO3AlarmSource           | Same description as MSV.104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.107 | Cfg_TO4AlarmSource           | Same description as MSV.104                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.108 | Cfg_AnalogOutput1AlarmSource | Configuration of AO1 alarm source.<br><b>Alarm Override:</b> When BV.38 is in alarm state, AO1 is triggered.<br><b>Alarm Overheat:</b> When BV.41 is in alarm state, AO1 is triggered.<br><b>Alarm Door:</b> When BV.40 is in alarm state, AO1 is triggered.<br><b>Alarm Window Contact:</b> When BV.39 is in alarm state, AO1 is triggered.<br><b>Alarm FlowSwitch:</b> When BV.37 is in alarm state, AO1 is triggered.<br><b>Alarm CO2:</b> When the CO <sub>2</sub> value exceeds the setpoint and it is in alarm state, AO1 is triggered. | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.109 | Cfg_AnalogOutput2AlarmSource | Same description as MSV.108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.110 | Cfg_AnalogOutput3AlarmSource | Same description as MSV.108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |

| ID      | Name                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | W?            | EFCB1xTU2 | EFCB1xTU4 | Notes                                                                                                                                                                      |
|---------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MSV.111 | Cfg_AnalogOutput4AlarmSource  | Same description as MSV.108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.112 | Cfg_DigitalOutput1AlarmSource | Configuration of DO1 alarm source.<br><b>Alarm Override:</b> When BV.38 is in alarm state, DO1 is triggered.<br><b>Alarm Overheat:</b> When BV.41 is in alarm state, DO1 is triggered.<br><b>Alarm Door:</b> When BV.40 is in alarm state, DO1 is triggered.<br><b>Alarm Window Contact:</b> When BV.39 is in alarm state, DO1 is triggered.<br><b>Alarm FlowSwitch:</b> When BV.37 is in alarm state, DO1 is triggered.<br><b>Alarm CO2:</b> When the CO <sub>2</sub> value exceeds the setpoint and it is in alarm state, DO1 is triggered. | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.113 | Cfg_DigitalOutput2AlarmSource | Same description as MSV.112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value | x         | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.114 | Cfg_DigitalOutput3AlarmSource | Same description as MSV.112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value |           | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |
| MSV.115 | Cfg_DigitalOutput4AlarmSource | Same description as MSV.112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present Value |           | x         | The available options vary based on selection of other objects.<br>Alarm Override<br>Alarm Overheat<br>Alarm Door<br>Alarm Window Contact<br>Alarm FlowSwitch<br>Alarm CO2 |

## Other

**Table 11 - Object Table Information: Other**

| ID    | Name               | Description                                                                                                                                                                                            | W?                                                                                                | EFCB1XTU2 | EFCB1XTU4 | Notes                                                        |
|-------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------|-----------|--------------------------------------------------------------|
| FIL.1 | FirmwareBinaryFile | Firmware binary file. Set the File Size to 0 to erase the previous binary file before uploading a new one. Use only the binary file provided by Neptronic.                                             | File Size<br>Archive                                                                              | x         | x         | File Size is accepted for 0 value only.                      |
| PGM.1 | ProgramFirmware    | Program firmware. Set to LOAD to program the file in application memory. The controller will be reset and the firmware will be LOADED into the memory. Use only the binary file provided by Neptronic. | Program Change                                                                                    | x         | x         | Program Change, only LOAD (1) and RESTART (4) are supported. |
| SCH.1 | OccupancySchedule  | Weekly occupancy schedule to specify which occupancy state is active during specific periods of day.                                                                                                   | Weekly Schedule<br>Schedule Default<br>Priority for Writing<br>Effective Period<br>Out of Service | x         | x         |                                                              |

[illegible]





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