



Consensio BACnet Manual

Preparation

Unpack the Consensio and inspect the contents for damaged or missing products. If any problems arise, please contact Touch-Plate at 260.426.1565 for assistance.

Precautions

The Consensio hardware is designed to be in environments that have a temperature range of 0-60°C (non-condensing atmosphere). Installing in an environment outside of these parameters will shorten the life span of the hardware.

Touch-Plate recommends the use of 18 to 22 AWG wire for low voltage wiring of contact closure products, 18 AWG wire for all 24v power connections, and 16 AWG wire for Smart Switch Stations.

All 120VAC wiring must use wire as specified by National Electric Code for load size and wire length.

Compatible Hardware

The Consensio is a smart control station that can be a part of a networked, intelligent system.

Warranty

Touch-Plate warrants this product against defects in materials or workmanship, under normal use, for a period of ONE (1) year from date of shipment. If a defect arises and a valid claim is received within the Warranty Period, Touch-Plate will repair or replace the product at no charge.

This warranty does not apply to:

- a. Damage to unit(s) caused by accident, acts of God, inappropriate installation, faulty installation, or any negligent use;
- b. Unit(s) which have been subject to being taken apart or otherwise modified;
- c. Unit not used in accordance with instructions;
- d. The finish on any portion of the product, such as surface and/or weathering, as this is considered normal wear and tear;
- e. Non-Touch-Plate hardware installed by the user;
- f. Damage caused by Non-Touch-Plate products;
- g. Damage caused by operating the product outside the permitted or intended uses described by Touch-Plate;
- h. -or- Specific plans or Specific application requirements, unless the plans and specifications have been forwarded to Touch-Plate and Touch-Plate has approved and accepted the plans in writing.

EXCEPT AS PROVIDED IN THIS WARRANTY, TOUCH-PLATE IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, INCLUDING BUT NOT LIMITED TO, INSTALLATION OR REPLACEMENT LABOR COSTS.



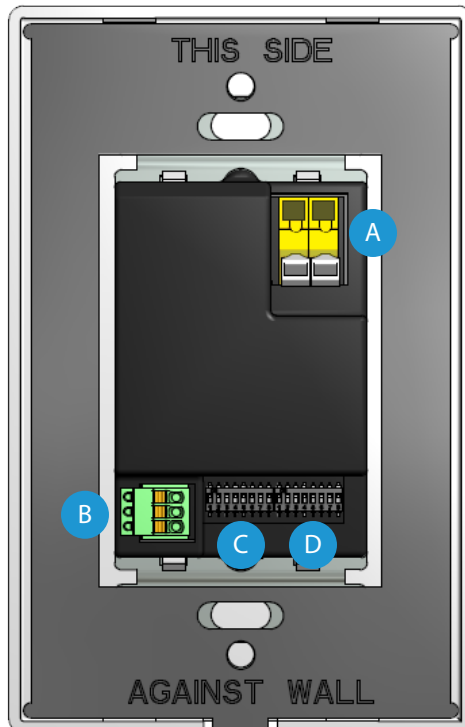
Consensio BACnet Overview

The Consensio BACnet is a powerful and versatile smart control station with the capability to control both relays and dimmers in either a standalone or BACnet integrated system.

The Consensio BACnet can run at the fastest time possible when the MS/TP network is optimized for speed. To ensure that there is not increased latency and/or delay in loads turning on after a command is issued, use the following to allow for the fastest response time possible.

- Place 10 or fewer smart control stations on each MS/TP network. There can be up to 127 smart control stations on a single MS/TP network, but latency will increase.
- Do not combine lighting with other types of devices, such as HVAC, security, access control, fire and safety, on the same MS/TP network. When possible, isolate the lighting system onto its own MS/TP network.
- If multiple Consensio's are on one MS/TP network, place the controller on the same MS/TP network for optimal performance.

Board Items	Options	Board Position	Page #
Low Voltage Connections	18-24VDC Power Connection	A	4
	MS/TP RS485 Connection	B	5
Dip Switches	RS485 Terminations / Baud Rate	C	6
	MS/TP Address	D	7

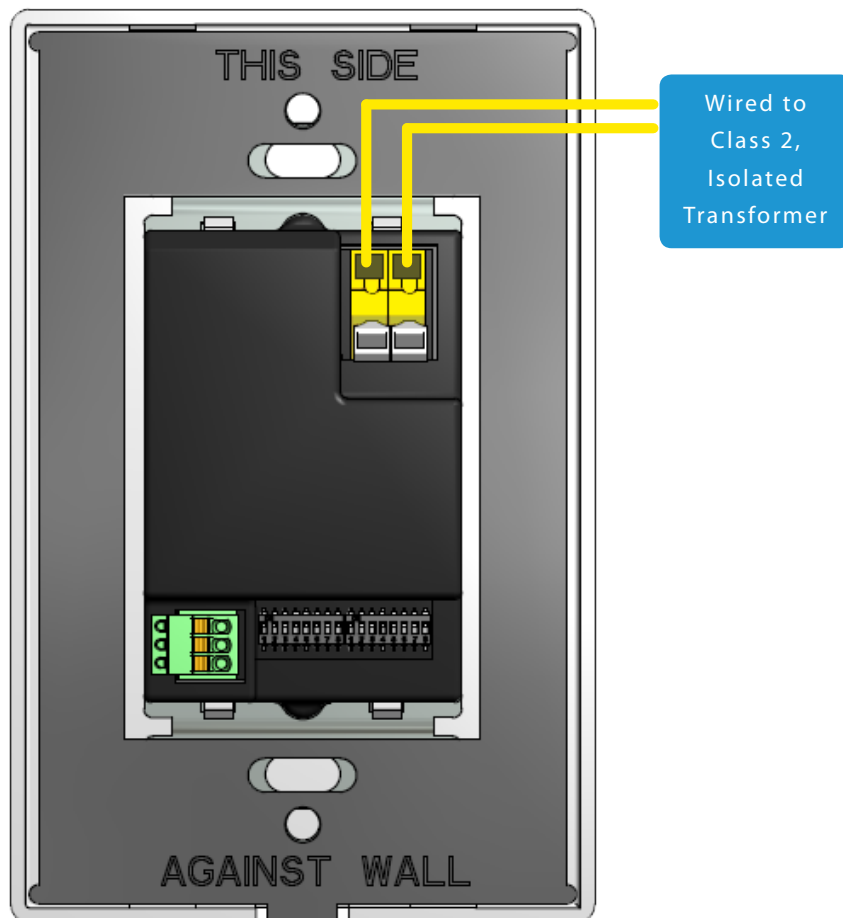


Consensio BACnet Power Wiring

To correctly bring power to the Consensio Station, use the wiring diagram below.

Power must be a Class 2, Isolated Transformer, with a rating of 12 - 24 VAC/VDC.

Wire must be Axlink 22/01PSH + 18/2C or an equivalent wire.

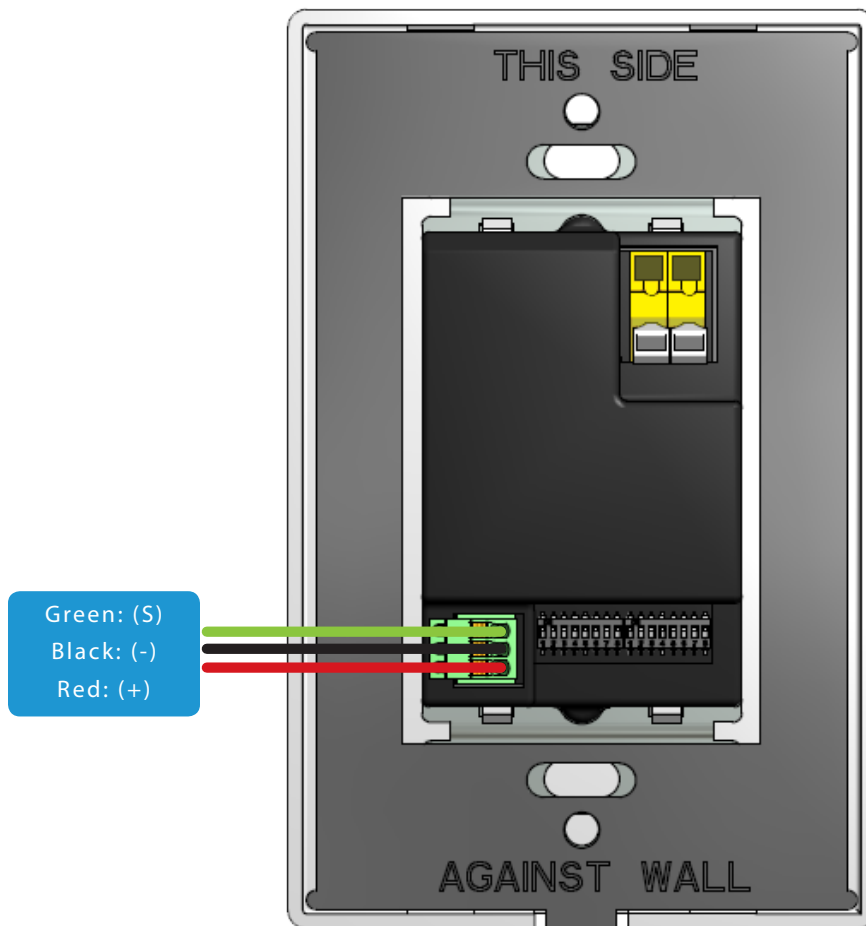


Consensio BACnet MS/TP RS485 Wiring

To correctly wire the MS/TP RS485 connection to the Consensio Station, use the wiring diagram below.

- **Shield or Ground for MS/TP RS485 connection must be isolated from the ground on the power supply. Using the same ground will create a direct short across the diode bridge and damage the unit!**

Wire must be Axlink 22/01PSH + 18/2C or an equivalent wire.



Consensio BACnet RS-485 Termination and Baud Rate Dip Switches

Dip Switches 1-3 set the RS485 Terminations.

Dip Switches 4-5 set the Baud Rate.

Option	1	2	3	4	5	6	7	8
RS485 Termination (Non-Inverting Input Pull Up; 510 Ohms)	ON	OFF	OFF	--	--	--	--	--
RS485 Termination (Inverting Input Pull Up; 510 Ohms)	OFF	ON	OFF	--	--	--	--	--
RS485 Termination (Line to Line Termination; 120 Ohms)	OFF	OFF	ON	--	--	--	--	--
Baud Rate - 9600	--	--	--	OFF	OFF	--	--	--
Baud Rate - 19200	--	--	--	OFF	ON	--	--	--
Baud Rate - 38400	--	--	--	ON	OFF	--	--	--
Baud Rate - 76800	--	--	--	ON	ON	--	--	--



Setting the BACnet MS/TP Address (MAC)

The Address Dip Switches are used to set the BACnet MS/TP Address.

Normally, these Dip Switches come from the factory pre-programmed to Address #1.

Use the setting diagram to change the Address if needed. Note that for the address changes to take effect, a power cycle needs to occur.

Address	1	2	3	4	5	6	7	8
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	--
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	--
3	ON	ON	OFF	OFF	OFF	OFF	OFF	--
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	--
5	ON	OFF	ON	OFF	OFF	OFF	OFF	--
6	OFF	ON	ON	OFF	OFF	OFF	OFF	--
7	ON	ON	ON	OFF	OFF	OFF	OFF	--
8	OFF	OFF	OFF	ON	OFF	OFF	OFF	--
9	ON	OFF	OFF	ON	OFF	OFF	OFF	--
10	OFF	ON	OFF	ON	OFF	OFF	OFF	--
11	ON	ON	OFF	ON	OFF	OFF	OFF	--
12	OFF	OFF	ON	ON	OFF	OFF	OFF	--
13	ON	OFF	ON	ON	OFF	OFF	OFF	--
14	OFF	ON	ON	ON	OFF	OFF	OFF	--
15	ON	ON	ON	ON	OFF	OFF	OFF	--
16	OFF	OFF	OFF	OFF	ON	OFF	OFF	--
17	ON	OFF	OFF	OFF	ON	OFF	OFF	--
18	OFF	ON	OFF	OFF	ON	OFF	OFF	--
19	ON	ON	OFF	OFF	ON	OFF	OFF	--
20	OFF	OFF	ON	OFF	ON	OFF	OFF	--
Through Address 127 - Use the table below to calculate the MS/TP Address								

Valid addresses are from 1 to 127. Addresses are set using the seven Address Dip Switches, which each have a value noted in the chart below.

Address Dip Switch	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	64	--

The values of all switches in the ON position are added together and the total is equal to the address. See the examples below:

MS/TP Address 1: Turn on switch 1 only, and leave all other Address switches off.

MS/TP Address 13: Turn on switches 1, 3 and 4. The value of those switches are $1 + 4 + 8 = 13$.



Choosing Objects

These explanations will help to learn what objects are available and what each object does. Use your operator work station to do object discovery.

OBJECT EXPLANATION					
Table No.	Object	Object Type	Value	Object ID	Used For
BI1	Momentary Switch Inputs	Binary Input	0 = Off, 1 = On	BI1 - BI5	To report button presses of Control Stations
BI2	Maintain Switch Inputs	Binary Input	0 = Off, 1 = On	BI101 - BI105	To report button holds of Control Stations
AV1	Control Station LED Modes	Analog Value	See chart in appendix for values.	AV1 -AV5	To control flash, color, and intensity of LED lights
AV2	Device Options	Analog Value	1 = Infinite COV's On 0 = Infinite COV's Off	AV100	To resubscribe to COVs with no expiration of the subscription Write a 0 value for lifetime when subscribing
AV3	Light Sensor	Analog Value	1 to 19922.64	AV101	To read the light sensor level; value is given in Lux
AV4	Device Instance	Analog Value	1 to 4194300 Default: 68501 - 68999	AV1003	To read or change the Device ID or Device Instance
DO1	Device Object	Device Object	0 to 4194303	DEV68501 - DEV68999	Describing properties of the device to the BACnet network



Binary Inputs - Momentary Switch Inputs

Object ID: B11 – B15

Used for: Smart control stations

Momentary BI Objects (B11 - B15) will toggle between 0 and 1 between each button press. When the system is first powered up, the input defaults to 0. COVs (if subscribed) will be generated by each button press. Button release events are ignored on these objects.

For example, if B11 = 0 and button 1 is pressed, B11 will now be 1. The next time the button is pressed, it will read 0.

COV Operation: When an input has had a COV subscription, the controller will report the following properties when a COV event occurs:

- Present_Value = Level of the input (0 or 1)
- Status_Flags = Always false

Table B11

BINARY INPUT OBJECT PROPERTIES FOR MOMENTARY INPUTS	
Binary Input Property	Value
Object_Identifier	BI# Where # = Input Button Number(Range 1 to 5)
Object_Type	3
Object_Name	"Momentary0#" Where # = Input Button Number(Range 1 to 5)
Present_Value	This value toggles between 1 and 0 with each button press.
Device_Type	"Momentary Contact"
Status_Flags	All flags are false.
Event_State	0
Reliability	0 = No fault
Out_Of_Service	0
Polarity	0 = Normal
Inactive_Text	"Off"
Active_Text	"On"



Binary Inputs - Maintain Switch Inputs

Object ID: BI101 – BI105

Used for: Smart control stations

Values: Button press = 1, Button release = 0 Relay control and monitoring

Maintain BI Objects (BI101 - BI105) will go to 1 when a button is pressed and then to 0 when the button is released. COVs (if subscribed) will be generated by each button press and release.

COV Operation: When an input has had a COV subscription, the controller will report the following properties when a COV event occurs:

- Present_Value = Level of the input (0 or 1)
- Status_Flags = Always false

Table BI2

BINARY INPUT OBJECT PROPERTIES FOR MAINTAIN INPUTS	
Binary Input Property	Value
Object_Identifier	BI10# Where # = Input Button Number(Range 1 to 5)
Object_Type	3
Object_Name	"Maintained0#" Where # = Input Button Number(Range 1 to 5)
Present_Value	1 = Button Press or Contact Closed 0 = Button Release or Contact Open
Device_Type	"Maintain Contact"
Status_Flags	All flags are false.
Event_State	0
Reliability	0 = No fault
Out_Of_Service	0
Polarity	0 = Normal
Inactive_Text	"Off"
Active_Text	"On"



Analog Value - Control Station LED Mode

Object ID: AV1 – AV5

Used for: LED lights (pilots) on control stations.

Values: The assigned value for this object sets the color and intensity for the LED. See Appendix II (Page 17) for a chart of color and intensity values.

The Control Station LED Mode can be controlled by writing to the Present_Value. LED intensity is common to all LEDs. The last intensity written to any LED will set the intensity for all LEDs.

Table AV1

ANALOG VALUE OBJECT PROPERTIES FOR LED MODES	
Analog Value Property	Value
Object_Identifier	AV# Where # = LED Number(Range 1 to 5)
Object_Type	2
Object_Name	"Pilot0#" Where # = LED Number (Range 1 to 5)
Present_Value	This value is used to set the 1. Intensity 2. Color See LED Modes in the Appendix for details on setting these values.
Status_Flags	All flags are false.
Event_State	0
Out_Of_Service	0
Priority_Array	BACnet Priority Array



Analog Value - Device Options

Object ID: AV100

Values: 1 = Enables the user to write 0 to the COV lifetime, which enables indefinite COV mode, in which the subscriptions will not expire.
0 = All COV subscriptions will expire according to the lifetime that was written to them when they were initially set up.

Device Options are useful for operator workstations that do not resubscribe before the current COV expires. By default, all COV values expire. If it is desired to continue to receive messages that buttons were pressed, either resubscribe before the current COV expires or enable indefinite COVs. This object affects all subscription objects within that device.

COV Lifetime: When a COV operation is performed, the COV lifetime has to be set (the time for which the subscription will continue).

COV Lifetime Value > 0: The subscription will expire after the set time, according to the lifetime that was written to them when they were set up.

COV Lifetime Value = 0: Subscriptions do not expire. Before the COV lifetime to 0 can be set, first enable the Consensio to accept 0 as a COV lifetime value by writing 1 to the AV100 object.

For further information see table AV2.

To enable indefinite COV mode:

1. Write 1 to the AV100 object.
2. Set the COV lifetime to 0 for each subscription that you want to be infinite.

Table AV2

ANALOG VALUE OBJECT PROPERTIES FOR DEVICE OPTIONS	
Analog Value Property	Value
Object_Identifier	AV100
Object_Type	2
Object_Name	"Device Options"
Present_Value	1 = enabling infinite COVs, else = 0 (Default)
Status_Flags	All flags are false.
Event_State	0
Out_Of_Service	0



Analog Value - Light Sensor

Object ID: AV101

Values: 0 - 19922.64

The Light Sensor is used to read the current light level in lumen output.

The PRESENT_VALUE property is used to read the current light level in lumen output.

Table AV3

ANALOG VALUE OBJECT PROPERTIES FOR INPUT CHANGE BUFFER	
Analog Value Property	Value
Object_Identifier	AV101
Object_Type	2
Object_Name	"Light Sensor"
Present_Value	0-19922.64
Status_Flags	All flags are false.
Event_State	0
Out_Of_Service	0
Priority_Array	BACnet Priority Array



Analog Value - Device Instance

Object ID: AV1003

Used For: Is a BACnet system-wide unique identifier that is pre-set by the factory to a unique ID of 68501 - 68999 when ordered with the device instance assigned on a label located on the top left of the Consensio.

You can use this object to read the current device instance or to change it.

If you change the device instance, the Device Object ID will change from DEV68XXX. If you change the device instance AV1003 to a value of 70000, then the Device Object ID will be DEV70000.

Table AV4

ANALOG VALUE OBJECT PROPERTIES FOR DEVICE INSTANCE	
Analog Value Property	Value
Object_Identifier	AV1003
Object_Type	2
Object_Name	"Device Instance"
Present_Value	Device instance value
Status_Flags	All flags are false.
Event_State	0
Out_Of_Service	0



Device Object - Device Object

Object ID: DEV68XXX

Used For: The Device Object states the capabilities of the Consensio

If you change the device instance, the Device Object ID will change from its default of DEV68XXX. If you change the device instance AV1003 to a value of 70000, then the Device Object ID will be DEV70000.

Table DO1

DEVICE OBJECT PROPERTIES	
Device Object Properties	Value
Object_Identifier	Default = DEV68XXX Where XXX = 501-999
Object_Name	"BAC10023XXXXXXXXX"*
Object_Type	8
System_Status	0 = Normal
Vendor_Name	"Touch-Plate Lighting Controls"
Vendor_Identifier	68
Model_Name	"Consensio Smart Control Station"
Firmware_Revision	"2.47"
Application_Software_Version	"1.5c"
Protocol_Version	1
Protocol_Revision	2
Protocol_Services_Supported	SubscribeCOV, readProperty, readPropertyMultiple, writeProperty, writePropertyMultiple, deviceCommunicationControl, reinitializeDevice i-Am, who-Is
Protocol_Object_Types_Supported	Analog_Value Binary_Input Binary_Output Device
Object_List	List all the objects in the Object Database
Max_APDU_Length_Accepted	244
Segmentation_Supported	3 = no-segmentation
Max_Segments_Accepted	1
APDU_Timeout	3000
Number_Of_APDU_Retries	0
Device_Address_Binding	List is always empty
Database_Revision	1
Max_Master	Range is 1 to 127

* The XXXXXXXX stands for the Device Instance



Appendix I - PIC Statement

Vendor Name: Touch-Plate® Lighting Controls
 Product Name: Consensio BACnet Smart Control Station
 Product Model Number: CSN-B
 Applications Software Version: 1.5c
 Firmware Revision: 2.47
 BACnet Protocol Revision: 4 (135-2004)

Product Description:

This unit is a wall station with 5 buttons that are mapped to binary inputs objects. Each button can be read as a momentary and maintain input. In addition, the buttons can be mapped to a IR transmitter for remote operation using the RC5 standard. Each button has a 3 color pilot LED that can be controlled via analog value object. Each pilot can support 7 colors with 3 intensity levels. A light sensor is also available and is mapped to a analog value object. Various device options can also be supported via an analog object. MS/TP MAC address, baud rate, termination and biasing may be set using DIP switches. The inputs support subscribed Change Of Value (COV) operation.

BACnet Standardized Device Profile (Annex L): BACnet Application Specific Controller (B-ASC)

BACnet Interoperability Building Blocks Supported (Annex K):

DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B

Segmentation Capability: Not supported

Standard Object Types Supported:

STANDARD OBJECT TYPES SUPPORTED				
Object	Create	Delete	Optional Properties	Custom Properties
Binary Input	N	N	DEVICE_TYPE, RELIABILITY, INACTIVE_TEXT, ACTIVE_TEXT	---
Analog Value	N	N	---	---

DataLink Layer Options: MS/TP master, baud rate(s): 9600, 19200, 38400, 76800

Device Address Binding: Is static device binding supported? No

Networking Options: No routing or BBMD functions are supported.

Character Sets Supported: ANSI X3.4



Appendix II - LED Modes

This chart shows the values to write to the Present_Value property of AV1-5 object. These values allow you to set the control station LEDs to the desired intensity and color.

Color	High Brightness	Medium Brightness	Low Brightness
Red	241	49	17
Green	242	50	18
Blue	243	51	19
Yellow	244	52	20
Purple	245	53	21
Cyan	246	54	22
White	247	55	23



Troubleshooting Guide

1. If the LEDs on the control stations do not flash.
 - a. Verify that the wiring is correct.
 - b. Verify that all devices are connected to power.
 - c. Verify the baud rate on the Consensio.

2. If there are communication problems with a remote panel far away, use the following steps to solve the problem.
 - a. Verify that the baud rate is correctly set.
 - b. If this doesn't solve the problem, slow down the baud rate to improve communication.
 - c. All devices have to run at the same baud rate. If the baud rate is changed on the Consensio, all devices on the system have to have their baud rates changed.



Frequently Asked Questions

1. What is the Device ID?
 - a. The Device ID is a value that ranges from 0 to 4194302 to uniquely identify a BACnet device on a network. Touch-Plate sets the Device ID between 68000 to 68999. This is based on Touch-Plate's BACnet ID of 68.
 - b. Although this is not a required practice, it will help create a unique ID when other manufacturers use this method. This value can be changed to any of the valid values.
2. What if there is no response from the main controller?
 - a. Verify that there are not conflicts with the MS/TP MAC addresses. Each device on a MS/TP network must have unique MS/TP MAC address.





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Revision: 1.0a



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