↻ LINKS XPS

Nortec GSTC / SETC B+ Models

Installation and Operation Manual

Includes installation, operation maintenance and troubleshooting information for your GSTC / Nortec SETC B+ Links XPS Options.

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INSTALLATION DATE (MM/DD/YYYY)

MODEL #

SERIAL #

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Contents

Overview

The GS/SE Links XPS Option allows for the integration of a Nortec GSTC/ SETC Series humidifier within a BACnet, Johnson N2 or LonWorks network. This option features a gateway that has the capability of converting information from the host Modbus protocol to a specified secondary protocol.

The following protocol options are available, and must be specified at time of order:

Table 1: Protocol Options

Protocol
BACnet MS/TP
BACnet / IP
Johnson N2
LonWorks

Multi-Unit Systems ("Master/Slave")

Up to 8 humidifiers can be chained and monitored through a single Links XPS package. In this configuration, the unit with the Links XPS package is designated the "Master Unit", while the remaining 7 humidifiers are configured as "Slaves". The master unit is connected to the Building Management Systems (BMS). Each unit is separately addressed, it is possible to monitor and control each unit individually.

Different networking configurations may be achieved depending on the type of network being used. One networking example could have a Gateway installed inside the lead unit, which could then be daisy-chained to successive units. In turn, the lead unit would connect to a Building Management System (BMS) network via a shielded, twisted-pair connection. Please see wiring section for additional detail. A second example could have a series of units directly connected to an Ethernet network. This is only possible for BACnet communication and is essentially referred to as a BACnet/IP configuration.

Field Installation or Retrofit Instructions

BACnet, LonWorks and N2 Modules:

Caution: Disconnect power before performing work inside cabinet.

Remove the Humidifiers front access panel. Install the bracket assembly using 8-32x ½" hex-drive screws. Notice, 4 screws are used for the hinges, and the 5th screw for fastening the bracket in place.

Links XPS
Mounting
Bracket

Links XPS Module
(Protocessor)

Links XPS
Terminal Strip
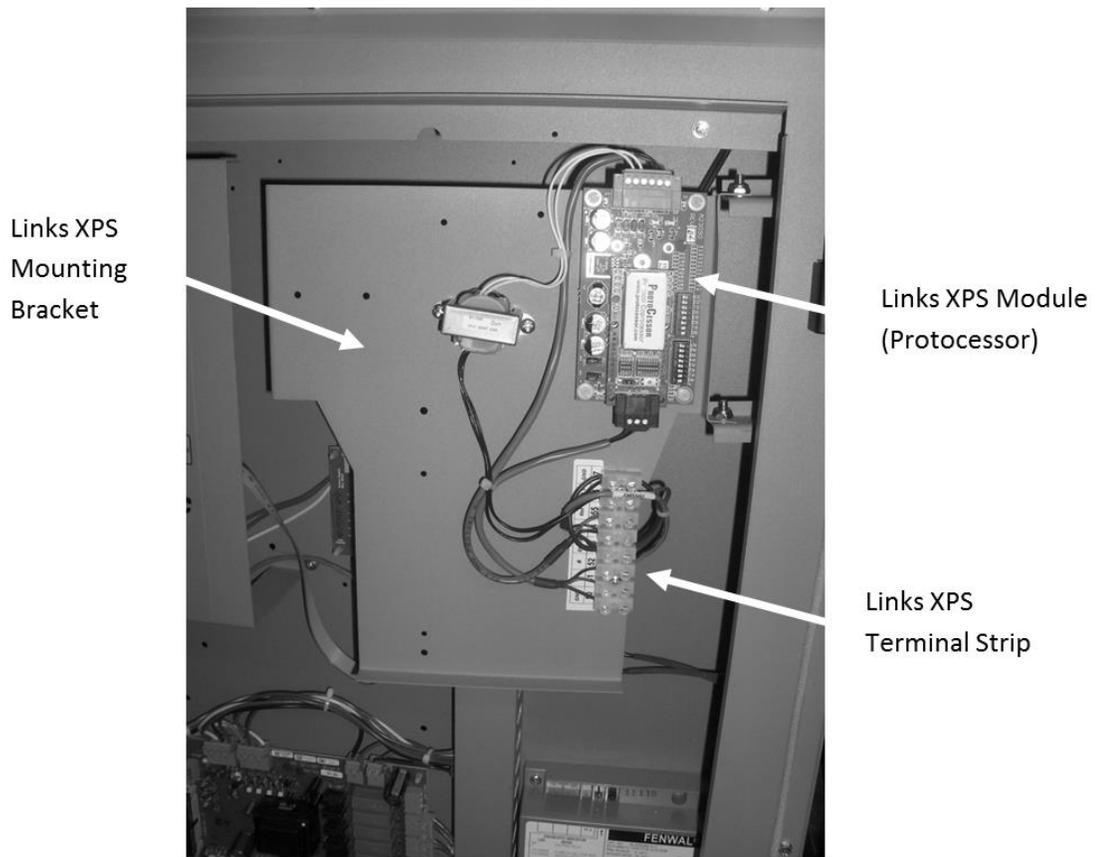
Figure 1: Nortec GSTC/ SETC with Links XPS Installed
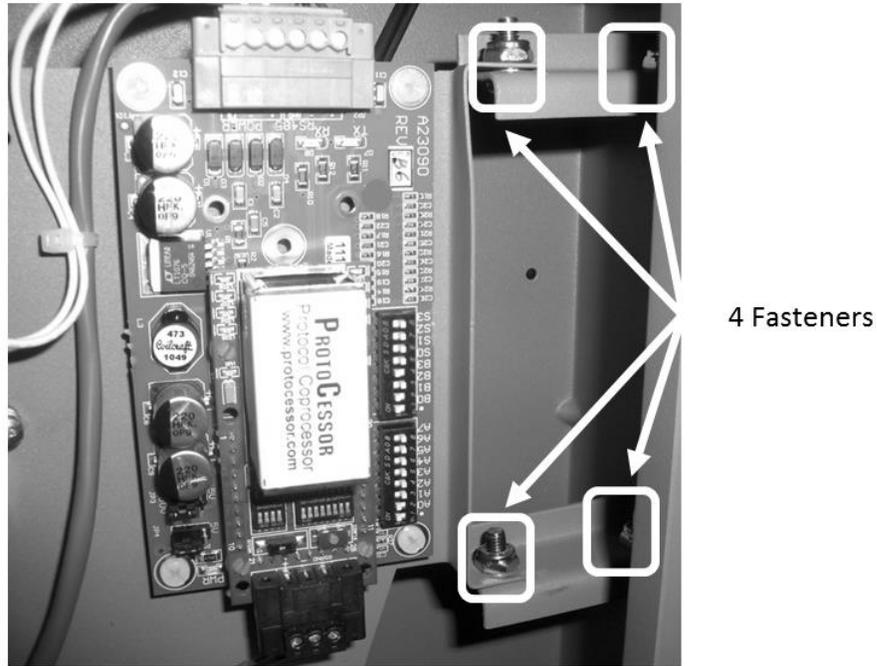
Figure 2: Detail of Hinge

4 Fasteners

Wiring the Links XPS Module

Most of the wiring connections for the new Links XPS module will have already been finished at the factory, however, there are a few connections that will need to be made to connect the unit the Nortec GSTC/ SETC series humidifier. Refer the LINKS XPS wiring diagram included in the package for details.

Module Power Connections: There will be a wire harness provided that will consist of a red and blue wire. Both red and blue wires are terminated with a ring terminal.
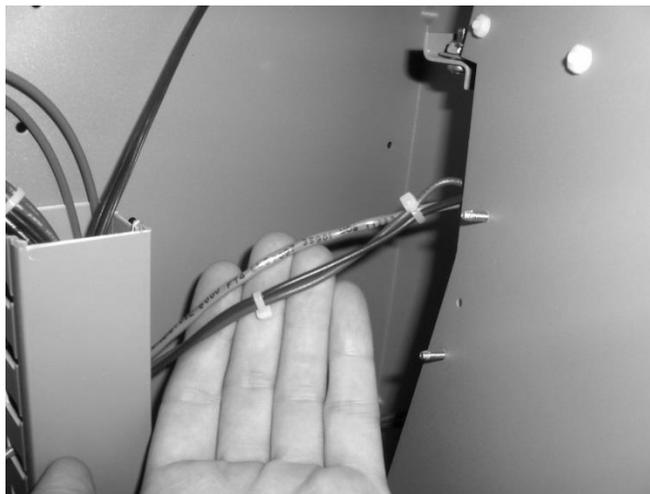
Figure 3: Wires from Links XPS Bracket

a. The ring terminal of the red wire is to be connected to the power terminal on the 24V side of the transformer located at the bottom, left of the electrical compartment.

b. The ring terminal of the blue wire is to be connected to the ground terminal on the 24V side of the transformer.

Humidifier Communication Connection: On the Links XPS assembly there will be a CAT5 cable with RJ45 connector.

This connector is to be plugged into the jack on the bottom right side of the humidifier main PCB processor board (Keypad chip).

Rear of GS/SE PCB Processor

RJ-45
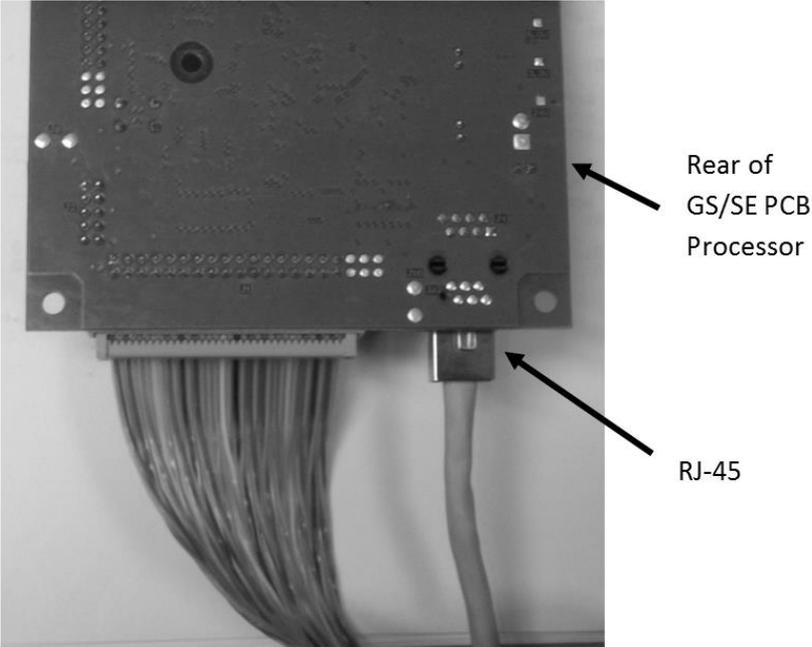
Figure 4: Backside View of Humidifier PCB Board

Configuring the Humidifiers

The PCB processor board will need to be configured to work with the Links XPS modules. Since Links XPS can connect to a maximum of 8 units, it will be necessary to set the unit address for each humidifier. The lead unit can be determined by the presence of the Links XPS module. The slave humidifiers can be given a unit address according to the number the unit will have on the networked chain.

Links XPS can be used for control, monitoring, or both. To set the control mode on the humidifier, on the humidifier refer to the procedure in the Nortec GSTC/ SETC Installation and Operation Manual to enter the controls menu.

If you would like to control the humidifier directly by signal writing values over the Links XPS package set the **Signal Source** to *digital.* The humidifier will now look for values to be written to the humidifier.

If you would like to use an analog control signal (from a wall humidistat or building automation system) leave the **Signal Source** to *Analog* and then set **REG mode**, **MOD mode** and **CNT type** to match the type of controls being used. Ensure that controls are physically wired to terminals 3 and 4 on the low voltage terminal strip.

To set the humidifier to recognize the Links XPS package:

1. On the humidifier keypad, Press the **Menu** button on the keypad and enter the password **0335**.

2. Select **Control Settings**

3. Select **Modbus Parameters**.

4. Set the communication **parity** to "None1".

5. Set the appropriate Modbus address according to the unit ordering

6. Place the appropriate Unit Identifier label on each humidifier. These labels should be placed on the unit where the electrical control punch-outs are located at the top of the humidifier.

7. Connect the slave humidifiers (if applicable) to the Links Module. A twisted pair cable should be used so that the Net (+) terminal on the Links module should connect to the Net (+) terminal on the slave unit (NHTC). The Net (−) terminal on the module should be connected to the Net (−) terminal on the slave unit. Refer to the Links XPS wiring diagram for more information.

8. Ensure shield wiring matches the following pattern if distances between humidifiers is significant(2200 ft):

50	51	52	53	54	55	56	57
	A	B		NET -	NET +		

Humidifier 1 (master)

To Units 5-8

53	54	55
	NET -	NET +

Unit 2

53	54	55
	NET -	NET +

Unit 3

53	54	55
	NET -	NET +

Unit 4
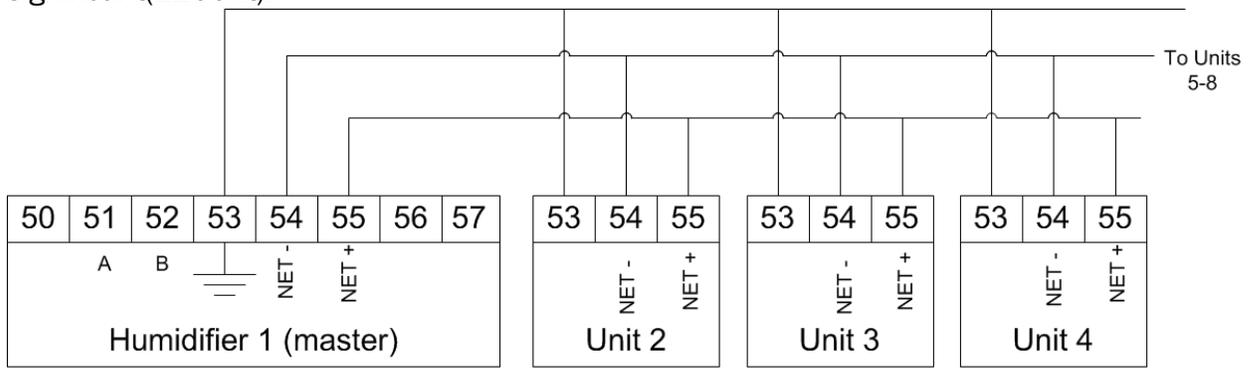
NOTICE: internal ground removed on units 2, 3, 4...to create one ground reference for entire slave chain.

Figure 5: Multiple Slave Humidifiers

Wiring

BACnet MS/TP, Johnson N2, and LonWorks

Links XPS is pre-installed and factory wired, except for the Nortec SETC-050 which is provided in its own separate enclosure. Connections must be made between the master humidifier and the Building Management System (BMS), and the master humidifier and any slaves that may be present.

Up to 8 units (1 master, 7 slaves) may be connected to a BMS through a single gateway in the master unit. The units are daisy chained via the Links XPS terminal strip. The wire shield should only be connected at one end per pair of units when "daisy chaining". Older A and B style units use a different connection method, please refer to revision C of this manual.

Table 2 refers to the recommended wire types and maximum recommended lengths from the Links XPS module to the front-end of the Building Management System. Since communication between the humidifiers and Links XPS occurs via an EIA-485 signal type, Condair recommends using an 18-24 AWG shielded, 120 Ω twisted pair wire between the lead humidifier and each of the slave humidifiers. Total cable length runs between the Links XPS module and the furthest slave humidifier should not exceed 2,000 feet. Signal boosters or repeaters may be necessary for longer wire runs or where electrical noise interference is prevalent.

Table 2: Recommended Wire Types and Lengths

Protocol	Signal Type	Polarity		Recommended Cable	Maximum Recommended Distance from Module
		A	B		
BACnet MS/TP	EIA-485, 2-wire	Net +	Net -	18-24 AWG Shielded, Twisted Pair	2000 ft at 9,600 bps 2000 ft at 38,400 kbps
Johnson N2					
BACnet/IP	LAN standard	N/A	N/A	CAT.5E cable with RJ-45 termination	Depends on cable manufacturer
LonWorks	FTT-10, 2-wire	Tx	Rx	18-24 AWG Twisted Pair	Should not exceed 50 ft.

BACnet/IP

A standard CAT-5E cable with an RJ-45 (Ethernet) jack is to be connected to the Ethernet port on the Links XPS module. Refer to wiring diagrams in this manual.

Cable Shielding

The cable's shield should be connected to the shield terminal at the BMS system only, and not the Links XPS module.

As well the cable shield should be connected at the lead unit only and not at subsequent units.

For long chains the shield would appear as:

Unit 2 to Master - Shield connected at master only.

Unit 3 to Unit 2 - Shield connected at unit 2 only.

Unit 4 to Unit 3 - Shield connected at unit 3 only.

And so forth.

Gateway Configuration

Protocol configuration is completed at the factory, prior to final testing. If configuration information was supplied at the time of order, the units will be configured for plug-and-play installation with no further configuration required. If this information was unavailable, it will be necessary to configure the address parameters.

- BACnet IP systems will require a static IP address to communicate on the network, and may require a device instance and MAC address
- BACnet MS/TP and Johnson N2 systems require both a device instance, MAC address and a baud rate to be set.
- LonWorks systems automatically detect network address parameters and do not require configuration.

Changing Unit Device Instance and BACnet MAC Address

The initial step is to determine if both BACnet Device Instance and MAC address can be the same value. If not, skip to Part B. If yes, continue with Part A using solely the small dipswitches.

Part A: Device Instance and MAC address same value

The device instance and BACnet MAC address can be easily changed to the same value using the dip switches (SW3 Bank 1 through 8) highlighted on figure 8. Notice these are the smaller dipswitches, not the larger ones.
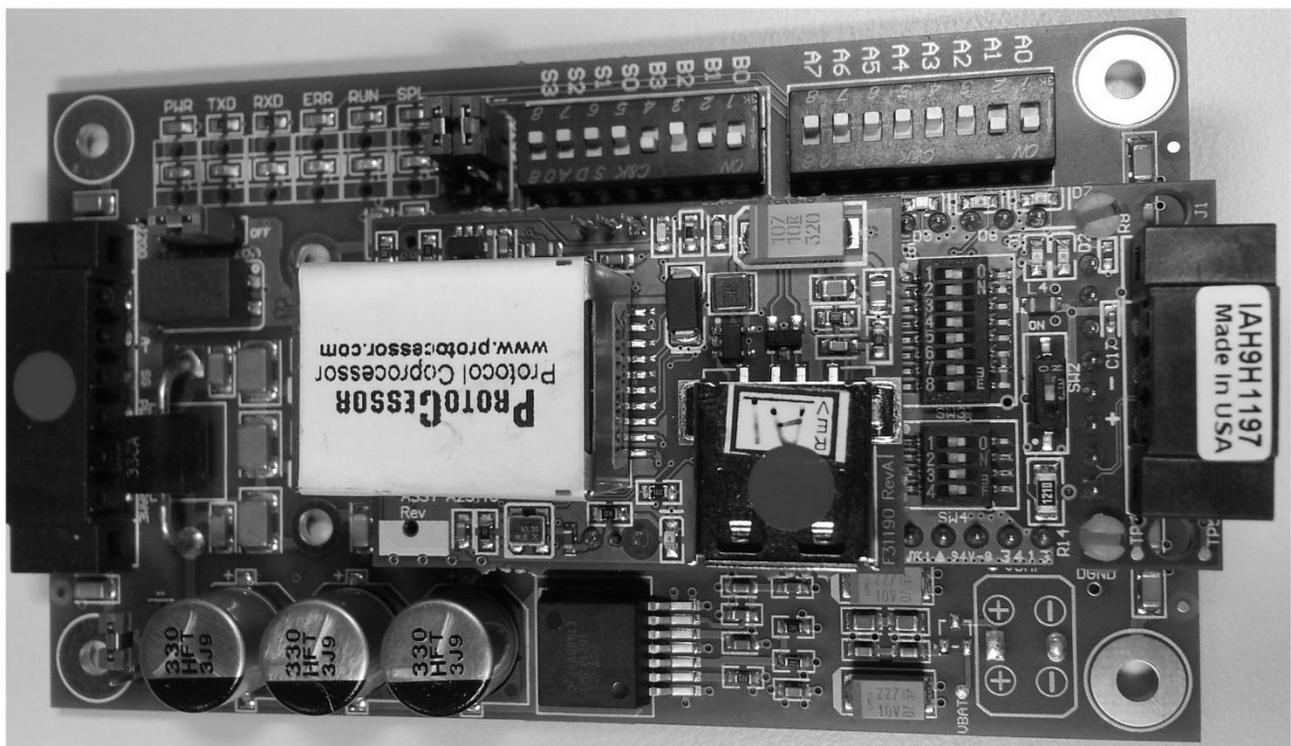
Figure 6: Dipswitches for BACnet Address Changes
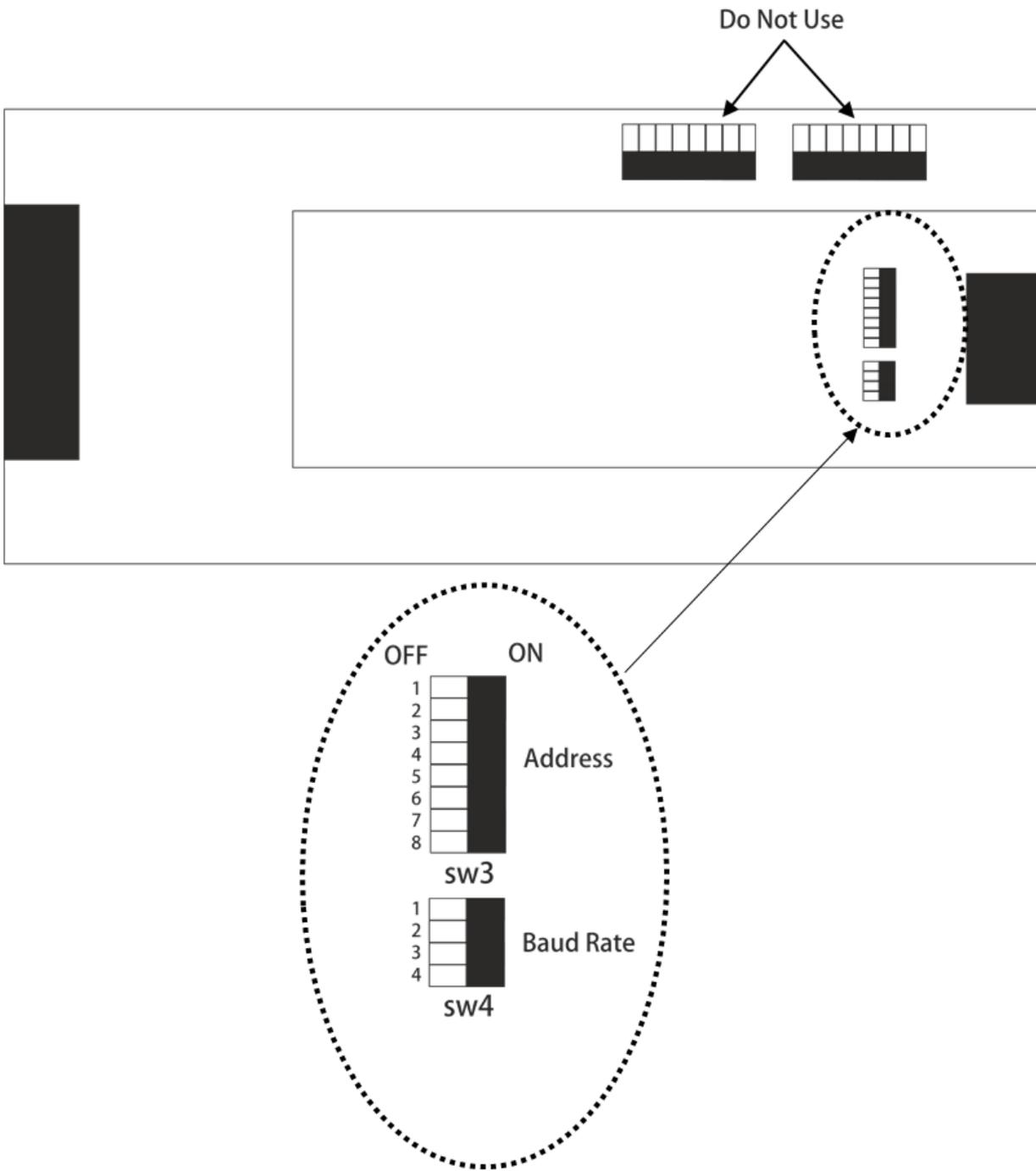
Figure 7: Respective Address and Baudrate Dipswitches

These switches allow you to set a binary value for the device instance between 1 and 127 inclusive. To set the device instance to value outside of this range, skip to PART B. The methodology for converting numbers to binary is presented in the example below. In this example, a value of 78 is converted to binary and set as the device instance:

Switch	A8	A7	A6	A5	A4	A3	A2	A1
Setting	Off	On	Off	Off	On	On	On	Off
Binary	0	1	0	0	1	1	1	0
Exponential Meaning	$2^7 \times 0$	$2^6 \times 1$	$2^5 \times 0$	$2^4 \times 0$	$2^3 \times 1$	$2^2 \times 1$	$2^1 \times 1$	$2^0 \times 0$
Simplified Meaning	128 x 0	64 x 1	32 x 0	16 x 0	8 x 1	4 x 1	2 x 1	1 x 0
Numerical Meaning	0	64	0	0	8	4	2	0
Result	64 + 8 + 4 + 2 = **78**							

When adjusting switches be sure to adjust only the switches highlighted in the box in Table 3 above. Also, switches may be in presented reverse order (compared with the table below) on the physical hardware itself. Take care when adjusting switches to ensure the settings are entered as intended. Common settings are tabulated below:

Table 4: Common Settings

Value	A8	A7	A6	A5	A4	A3	A2	A1
0 (cannot be used)	Off	Off	Off	Off	Off	Off	Off	Off
1	Off	Off	Off	Off	Off	Off	Off	On
10	Off	Off	Off	Off	On	Off	On	Off
25	Off	Off	Off	On	On	Off	Off	On
40	Off	Off	On	Off	On	Off	Off	Off
50	Off	Off	On	On	Off	Off	On	Off
75	Off	On	Off	Off	On	Off	On	On
78	Off	On	Off	Off	On	On	On	Off
100	Off	On	On	Off	Off	Off	On	Off
125	Off	On	On	On	On	On	Off	On
127	Off	On	On	On	On	On	On	On

After an address change has been made the Links XPS module must be power cycled for the change to take effect. The module may take up to 60 seconds to restart after a power cycle.

Changing Baud Rate (BACnet MSTP, Johnson N2, LonWorks)

The baud rate for communications **must** be changed through dipswitches (SW4 Bank, 1 through 4). Refer to figure 7 for location of the dipswitches.

By adjusting the settings according to the table 5, the baud rate can be changed. The Baud rate must be set to exactly the same baud rate as your Building Management System. Communication performance varies with building automation system manufacturer and some experimentation with other baud rates may be required to obtain the best performance.

Table 5: Common Settings

Setting	B4	B3	B2	B1
110	Off	Off	Off	On
300	Off	Off	On	Off
600	Off	Off	On	On
1200	Off	On	Off	Off
2400	Off	On	Off	On
4800	Off	On	On	Off
9600	Off	On	On	On
19200	On	Off	Off	Off
20833	On	Off	Off	On
28800	On	Off	On	Off
38400	On	Off	On	On
57600	On	On	Off	Off
76800	On	On	Off	On
115200	On	On	On	Off

After an address change has been made the Links XPS module must be power cycled for the change to take effect. The module may take up to 60 seconds to restart after a power cycle.

Part B: Device Instance and MAC address different values

First, ensure the addressing dipswitches (mentioned in Part A) for Bank SW3 are all set to OFF or are set to 128 or higher. Also ensure your Baud rate dipswitches are properly set (Bank SW4) see previous chapter for details.

The device instance and BACnet MAC address can now be changed to be different values using a free software tool. To obtain this program, visit the link below, and then download and install the latest version of the "Utility Software" (8 MB file called *Install.zip*).

www.protocessor.com/tech-support/utilities-and-design-documents.php

Figure 8: Retrieval of Protocessor Software Tool

Once the free tool has been downloaded to a computer (preferably a laptop), extract and install it. NOTE: you will require administrative privileges on the computer to perform the installation, contact your network administrator for assistance. Once completed, use the following steps to perform the addressing changes:

To change the Device Instance and MAC Address:

1. Connect the computer to the ethernet port of the Links XPS module. (you will need a Category 5 or better cable (CAT5)
2. Power up the Links XPS module. During the boot process 8 multi-colored LED's may illuminate.
3. On the computer navigate to *Start > Programs > Fieldserver Utilities > Remote User Interface*.
4. A blue window will launch, running a program named "Remote User Interface". Any Links XPS models detected will be listed as "Fieldservers discovered on the network". If no modules are detected you will receive the following screen:
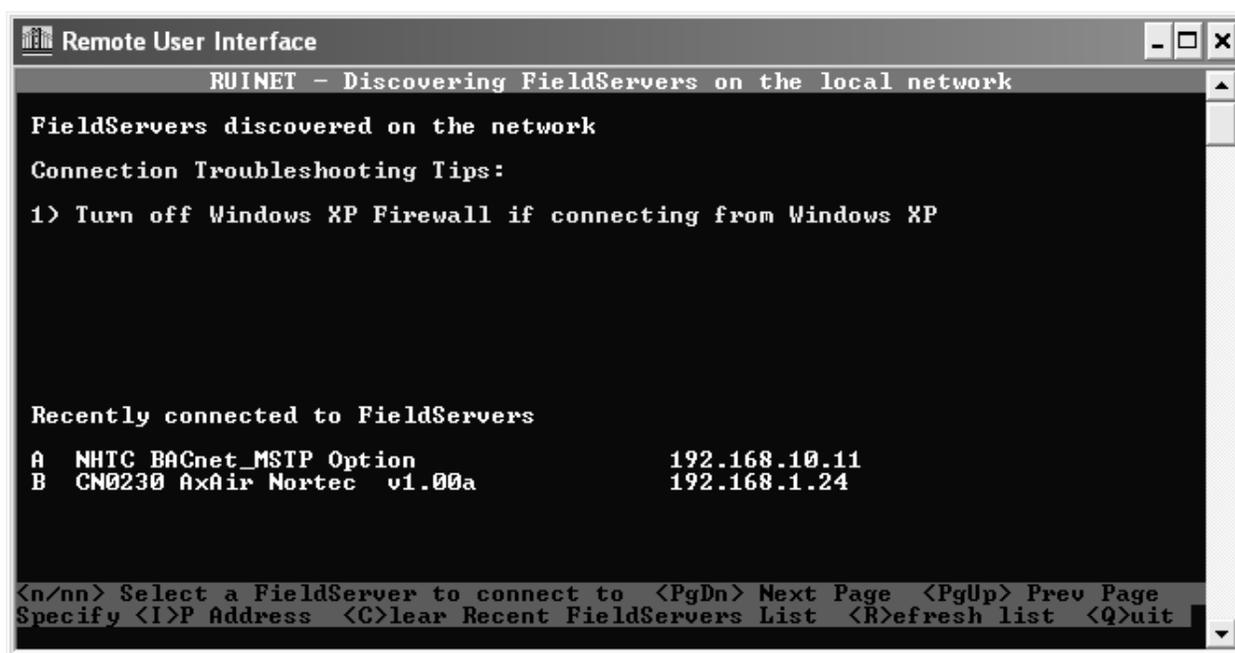
Figure 9: Screen for No Modules Detected

This error is most likely due to the network configuration of the computer. By default, the Links XPS modules ship with an address of 192.168.10.11. If your computer is not already on the 192.168.10.0 domain, you will need to set your computer IP address to a unique address within this range. You may need to turn off or disable any wireless connections before beginning to avoid conflicts. For Windows systems, this setting is located in:

Windows XP: *Start > Control Panel > Network Connections*
Windows Vista, 7: *Start > Control Panel > Network and Sharing Center*
Windows 8.1: *Desktop Start (right click) > Control Panel > Network and Sharing Center*

Select your *Ethernet* or *Local Area Connection,* right click, and select *Properties.* In the Window that pops up, locate the *Internet Protocol (TCP/IPv4)* and click it to highlight it. Next click the *Properties* button. Take note of your existing settings as will need to re-enter them later, then enter the settings below: (IP= 192.168.10.99, subnet=255.255.255.0, gateway=192.168.10.1)
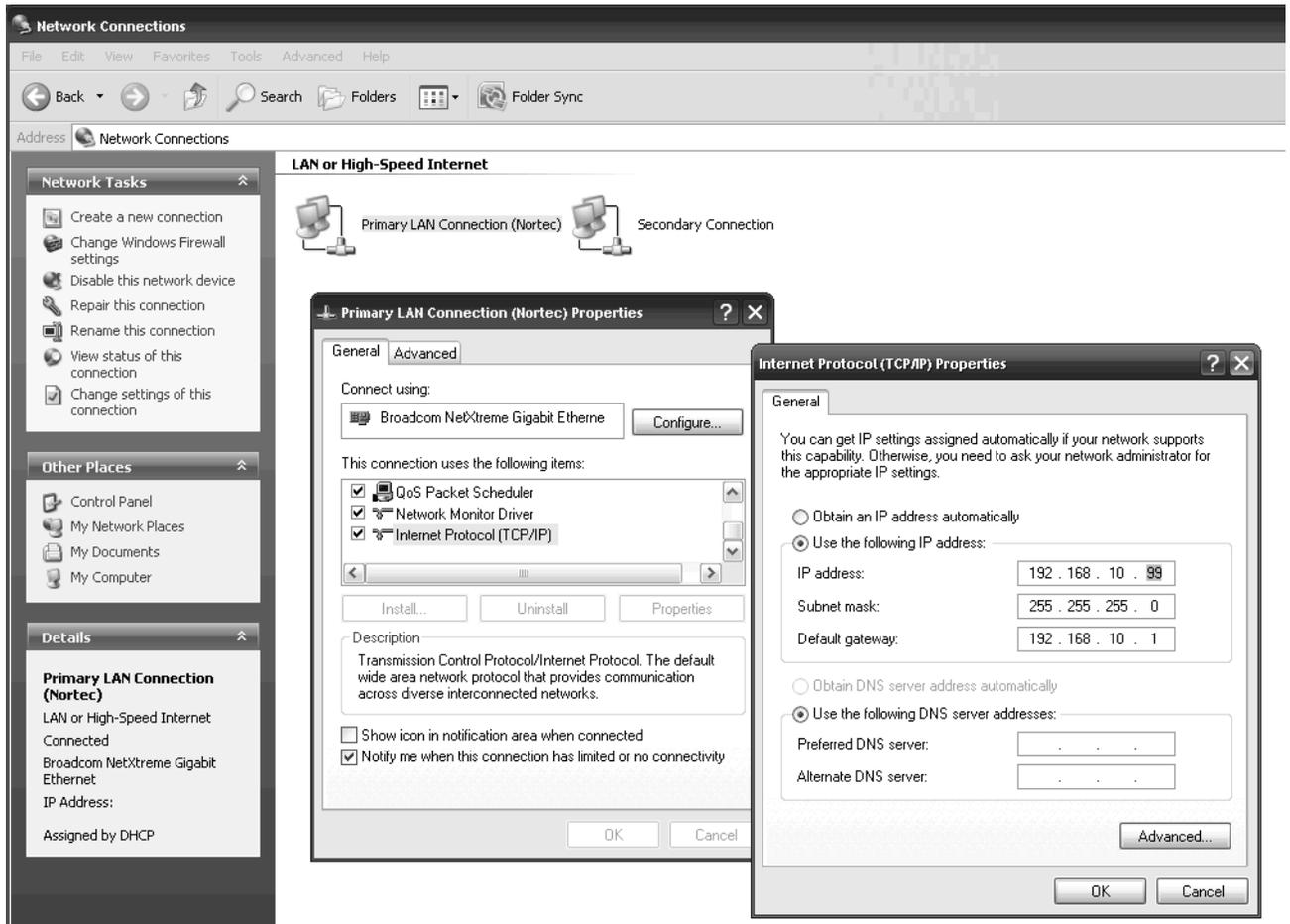
Figure 10: Internet Protocol Properties Screen

Click *OK* on both of the open windows, and your connection will reset with the new settings. After about 30 seconds, it will be ready to use.

When the Remote User Interface successfully detects a Links Module you should see a screen similar to below:

Figure 11: Remote User Interface Successfully Detects Links XPS Module

When the device has been detected and appears in the list, press the number listed to the left of it (usually **1**) to select it. This will bring up a prompt to reset the time. Type **Y** to continue, you will next be greeted with the main menu
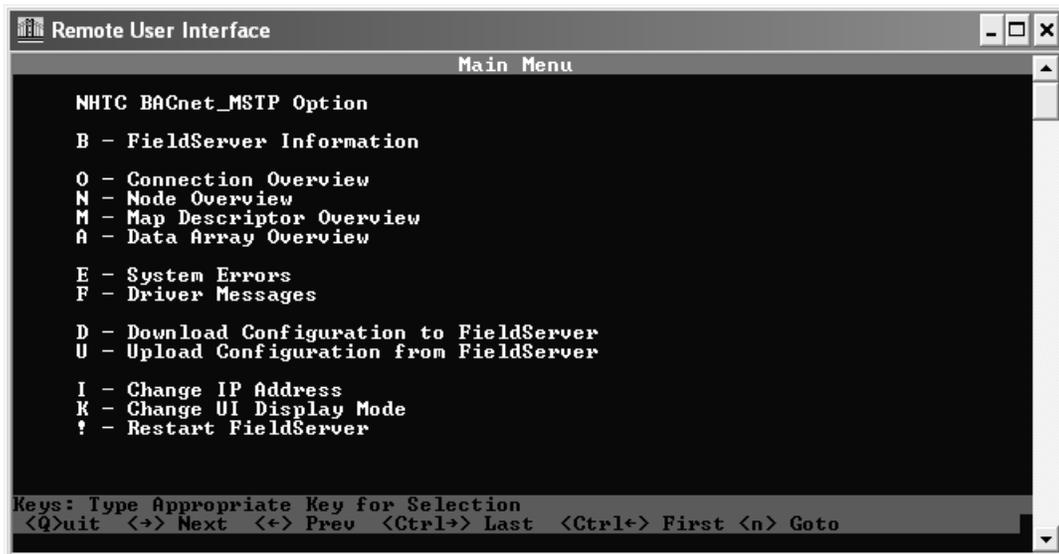
Figure 12: Main Menu Screen

From the Main Menu, type **U** for Upload. You will be prompted with the following screen:
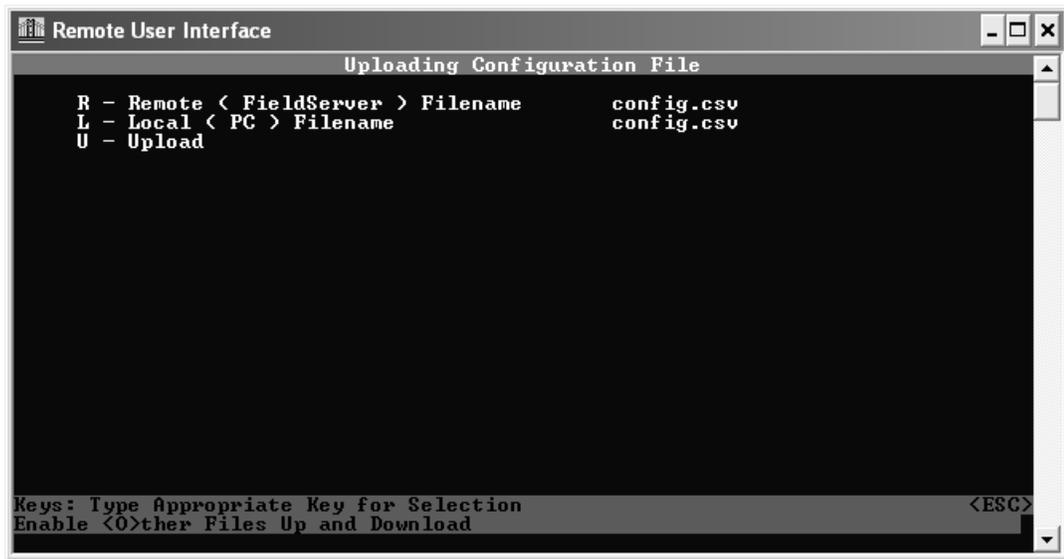
Figure 13: Retrieving The Configuration File

Type **U** once more to initiate retrieval of the configuration file.
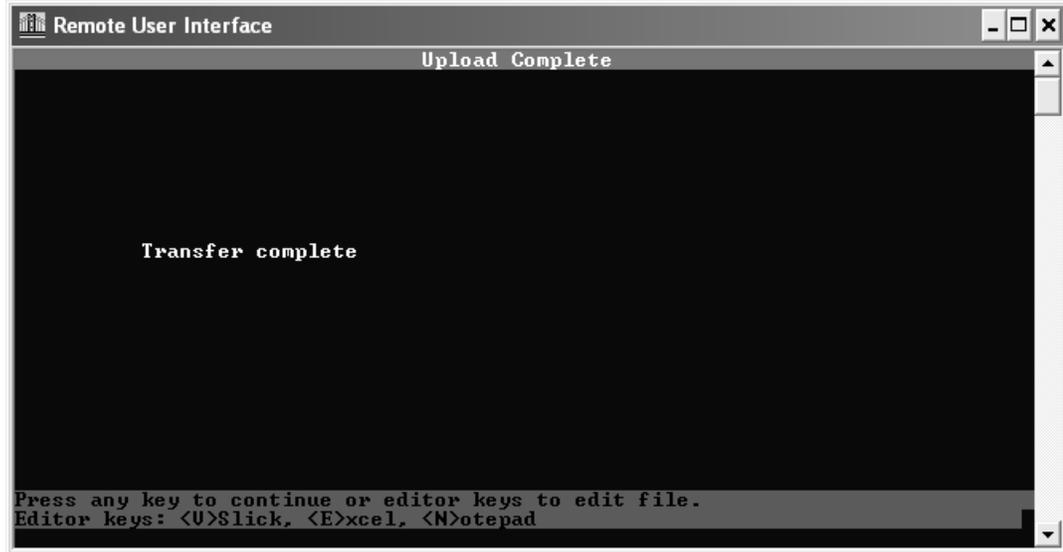
Figure 14: Retrieval Complete

Once transfer is complete you may type **N** which automatically opens the retrieved file into Notepad . Note: file is named config.csv and is located in configuration File Folder (Start>Programs>Fieldserver Utitlities>Configuration File Folder). Do not open the file in Microsoft Excel, you may accidentally corrupt it.

Once the configuration file is open in Notepad, you will have to change addressing at two locations.

Modifying MAC address:

Use the **Ctrl** and **F** key to bring up the find command. Type in the find command, the words "**common information**". The following screen should appear:

Figure 15: Changing the MAC Address

Below the words *Common Information*, you will see the number **79**, this is the default MAC address, change as desired. Note: MAC address must be between 1-254 Inclusive.

Modifying Device Instance:

Once again, use the **Ctrl** and **F** key to bring up the find command. Type in the find command, the words "**server side nodes**". The following screen should appear:
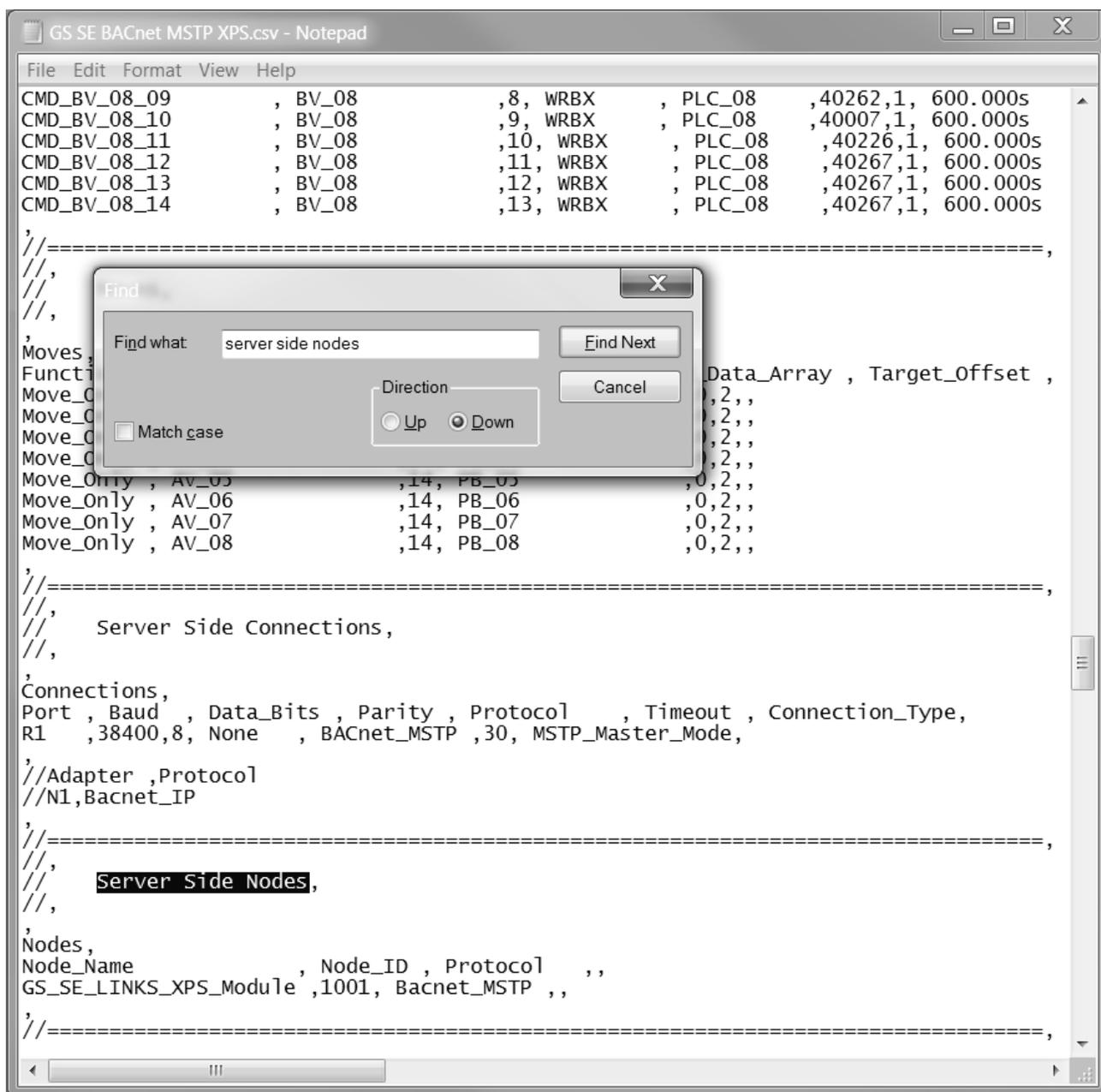
Figure 16: Changing The Device Instance

Below the words *Server Side Nodes*, you will see the number **1001**, this is the default Device Instance, change as desired. Note: Device Instance must be between 1-16'777'215 Inclusive.

Once complete, save the notepad file and close it. Return to the Remote User Interface program and press **Esc** until you return to the Main Menu.

Type **D** for download, you will be prompted with the following screen:
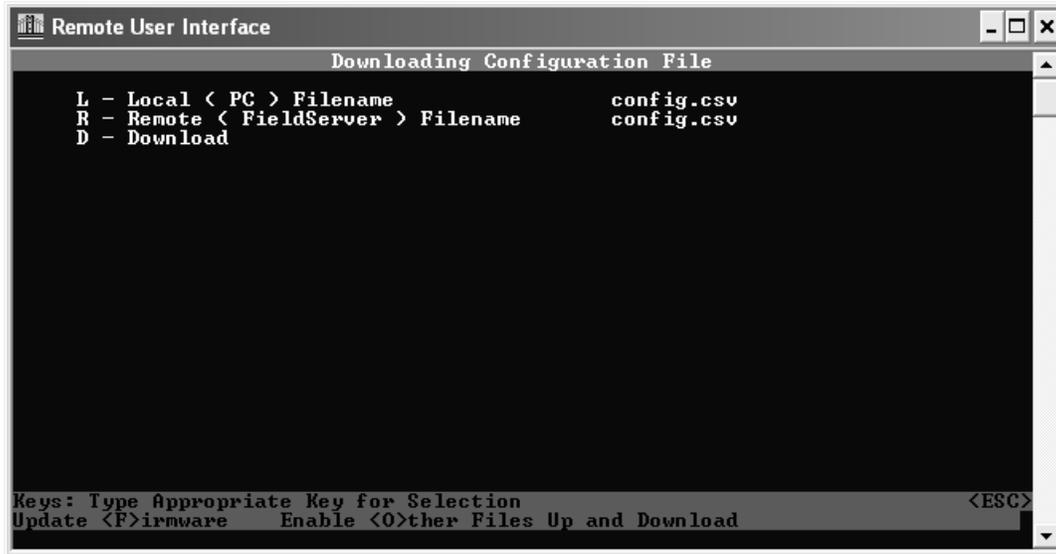
Figure 17: Returning The Configuration File Back To Links XPS Module

Type **D** once more to return the configuration file back to the Links XPS module. Once download is completed, you can type the "Esc" key until you return to the main menu. Next select ! (Hold the **Shift** key and press the **1** key simultaneously) to restart the module causing the changes to take effect.

The following screen will appear:

Figure 18: Restarting The XPS Module
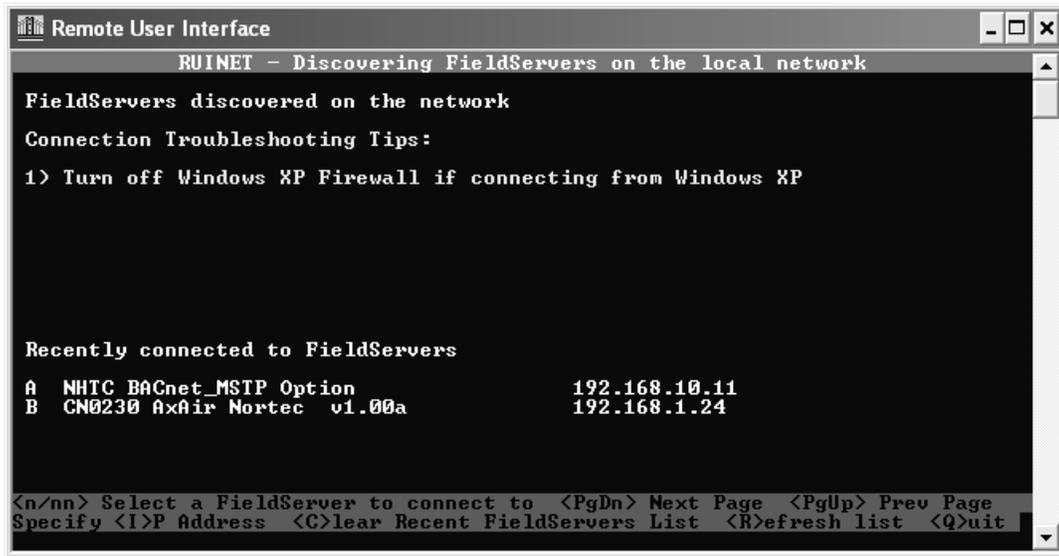
Figure 19: Awaiting Reboot of XPS Module

Press the **Esc** key to return to the discovery screen. The screen will remain in discovery mode until the Links XPS module has successfully completed the reboot. Once reboot complete, you may disconnect your laptop from the Links XPS module and verify that your BMS can discover the humidifier

Changing the IP Address (BACnet IP)

The IP address of the module can also be configured for BACnet IP networks. To configure the IP address, a freely downloadable configuration program is required as mentioned in the previous chapter.

To change the IP Address:

1. Connect the computer to the ethernet port of the Links XPS module.
2. Power up the module. During the boot process 8 multi-colored LED's will illuminate and remain steady. The module is ready when most of these LED's have turned off.
3. On the computer navigate to *Start > Programs > Fieldserver Utilities > Remote User Interface*.
4. A blue window will launch, any Links XPS models detected will be listed as "Fieldservers discovered on the network". If no modules are detected you will receive the following screen:

Figure 20: No Links XPS Modules Detected

This error is most likely due to the network configuration of the computer. By default, the Links XPS modules ship with an address of 192.168.10.11. If your computer is not already on the 192.168.10.0 domain, you will need to set your computer IP address to a unique address within this range. You may need to turn off or disable any wireless connections before beginning to avoid conflicts. For Windows systems, this setting is located in:

<u>Windows XP</u>: *Start > Control Panel > Network Connections*
<u>Windows Vista, 7:</u> *Start > Control Panel > Network and Sharing Center*
<u>Windows 8.1:</u> *Desktop Start (right click) > Control Panel > Network and Sharing Center*

Select your *Ethernet* or *Local Area Connection,* right click, and select *Properties.* In the Window that pops up, locate the *Internet Protocol (TCP/IPv4)* and click it to highlight it. Next click the *Properties* button. Take note of your existing settings as will need to renter them later, then enter the settings below: (IP= 192.168.10.99, subnet=255.255.255.0, gateway=192.168.10.1)

Figure 21: Internet Protocol Properties Screen

Click *OK* on both of the open windows, and your connection will reset with the new settings. After about 30 seconds, it will be ready to use.

When Remote User Interface successfully detects a Links Module you should see a screen similar to below:

Figure 22: XPS Module Detected

When the device has been detected and appears in the list, press the number listed to the left of it (usually 1) to select it. This will bring up the main menu.
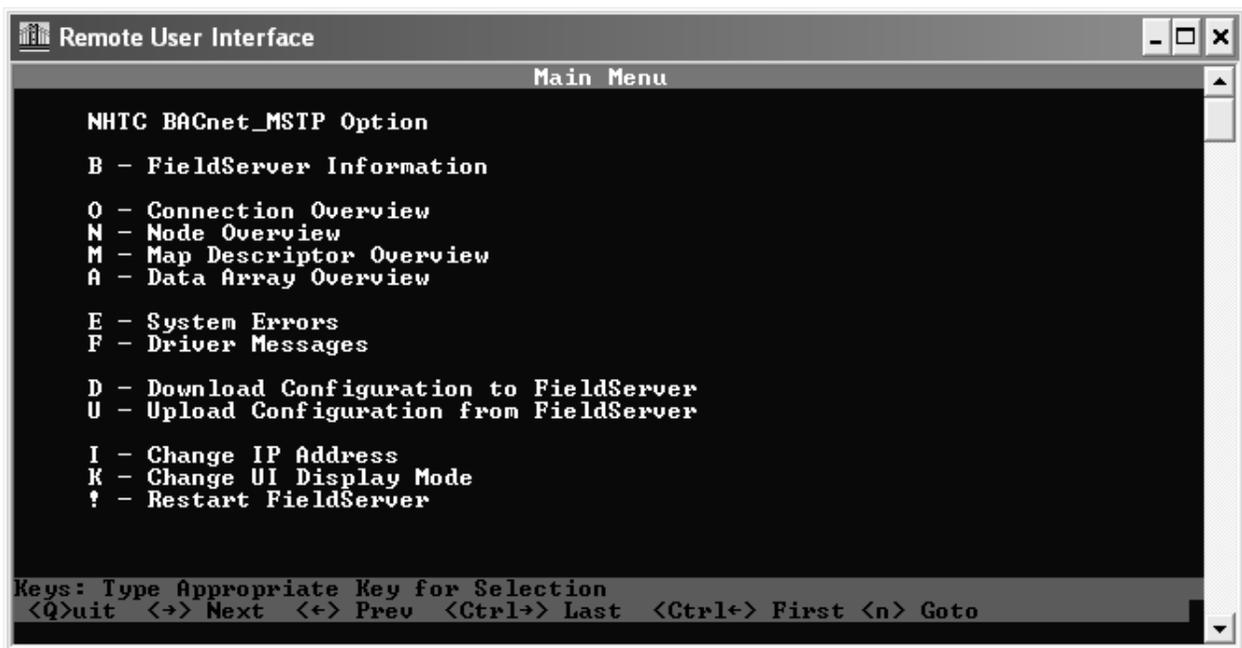
Figure 23: Main Menu

Press **I** to change the IP address. This will bring up the IP address settings.


```
Remote User Interface                                           _ □ ×
                    Edit IP Address Settings                        ▲
    1 - N1 IP Address                        192.168.10.11
    2 - N1 Netmask                           255.255.255.0
    3 - N1 Gateway 1                          192.168.10.1
    4 - N1 DHCP Client State                      DISABLED
    5 - N1 DHCP Server State                      DISABLED




Keys: Type Appropriate Key for Selection                      <ESC>
                                                                   ▼
```

Figure 24: Changing IP Address

To edit the IP address, press the **1** key, type in the desired address, and then press **Enter** once. Repeat the process for the Netmask (selection **2**), and the Gateway (selection **3**). For most reliable performance, activating DHCP is not recommended.

When the IP address change is completed press **Esc** to return to the main menu. Next select **!** (Hold the **Shift** key and press the **1** key simultaneously) to restart the module causing the changes to take effect.

Figure 25: Restarting XPS Module

Press any key to exit this screen. The module will reboot and may take up to 1 minute to fully restart. If you changed the IP address significantly, the module may no longer be reachable with your IP address settings resulting in the same error described in step 4.

To rectify this, change your IP address to a unique address in the same domain as the one you entered for the Fieldserver by following the instructions in step 4. Once communication has been reestablished, you can quickly verify the change was successful by noting the address displayed under "Fieldservers discovered on the network".

When completed, be sure to restore your existing IP address settings for your computer following the instructions in step 4 and substituting the settings you had noted originally.

Network Integration

LonWorks.xif file

To facilitate the integration of a LonWorks unit within a network, it may be desirable to obtain an External Interface File (XIF). Files of type .xif are used to convey the resources, specific objects and data types which a LonWorks device possesses. The .xif file allows a network integrator to simulate the presence of a networked humidifier even if it is not yet physically connected to the network. In fact, if the integrator has the .xif files of all network devices, a complete system could be simulated and configured off-line. Once the configuration is done, the integrator's software tool can be connected to the actual system and the configuration information can be downloaded.

Retrieving XIF file instructions

The XIF file can be retrieved directly from the Links package. A Windows based laptop and an Ethernet cable are required for this process. This process requires the "Remote User Interface" tool from Fieldserver. It is available by visiting www.protocessor.com/tech-support/utilities-and-design-documents.php and download and install the "Utility" software.

Once this software has been installed, follow the following procedure:

1. Locate desired MASTER humidifier that contains the Links package. Ensure unit is powered on and remove the panel on the RIGHT side of the humidifier. Locate the Links package inside of the unit.

2. For LINKS XPS packages (gateway device on its own), connect the CAT5 cable directly into the Ethernet port on the gateway.

3. Connect other end of CAT5 cable to the Ethernet port on the laptop.

4. Run the "Remote User Interface" utility by double clicking the shortcut on your desktop (or *Start>Programs>Fieldserver Utilities>Remote User Interface*)

5. The program should automatically recognize connected humidifier and bring you to the "Main Menu". If it does not, contact Condair Technical Services at the number on the back cover of this manual.

6. Type "u" for upload.

7. Type "o" for other. (A warning will appear, press any key to continue.)

8. Type "r" for remote.

9. Enter "fserver.xif"' and hit the 'enter' key.

10. Type "u" to initiate upload from the gateway to the laptop.

11. The .xif file will be saved in the folder "Configuration File Folder" located at *Start>Programs>Fieldserver Utilities>Configuration File Folder.*

12. Type 'q' twice to exit out of the program

13. Locate file in Configuration File Folder and change name to corresponding humidifier, (ex, "fserverH1.xif" for Humidifier 1)

14. Repeat this procedure for <u>all Master </u>humidifiers changing the name of the .xif once saved to correspond with the tag of the appropriate humidifier.

BACnet Pics and Bibs

The Protocol Implementation Conformance Statement or "PICS" describes the BACnet capabilities of a particular BACnet implementation. It is a written document, created by the manufacturer of a device, which identifies the particular options specified by BACnet that are implemented in the device. Please refer to the wiring diagram section for a PICS statement.

BACnet Interoperability Building Blocks (BIBBs) describe a list of services a BACnet device provides. The main areas that the building blocks are concerned with include: data sharing, trends, schedules, device and system management. BIBBs help specify the interoperability capabilities of a BACnet device. Please contact the factory to obtain a PICS statement or BIBBs profile.

Variable Definition

In the variable name, "_x" denotes the humidifier number. If there is only one humidifier, all variable names will end in "_1". If two units are networked together, see Figure 4, the second unit's variable names will end in "_2". For 3 networked units, "_3" and so on. If unsure of the unit number, each unit will have a label, in the electrical compartment close to the terminal strip, indicating the device instance of each humidifier.

Links XPS is capable of communicating a variety of variables for each unit that is connected to it. For a variable listing and definition refer to Table 6. Network variable addresses for the humidifiers may be seen in Table 7 to Table 14.

Table 6: Variable Definitions

Variable Name	R=Read W=Write	Description	LonWorks SNVT
nvoRHDem1_*x*	R Analog Value	Reads %RH in space or %demand to humidifier. (0%-100%) Choice determined by *nviInputType_x.*	SNVT_lev_percent
nvoSet1_*x*	R Analog Value	Reads setpoint for relative humidity in space. (0%-100%)	SNVT_lev_percent
nvoRHDem2_*x*	R Analog Value	Reads duct %RH or secondary space %RH, or secondary %demand to humidifier. (0%-100%) Choice determined by *nviInputType_x.*	SNVT_lev_percent
nvoSet2_*x*	R Analog Value	Reads setpoint for duct hi-limit relative humidity, or setpoint for secondary space relative humidity. (0%-100%)	SNVT_lev_percent
nvoSysDemand_*x*	R Analog Value	Reads humidifier system demand. (0%-100%)	SNVT_lev_percent
nvoHourOpt_x	R Analog Value	Indicates the number of hours the humidifier has been in operation.	SNVT_time_hour
nvoServHours_x	R Analog Value	Indicates the number of hours remaining before the next service interval.	SNVT_time_hour
nviRHDem1_*x*	W Analog Value	Writes %RH in space or %demand to humidifier. Choice determined by *nviInputType_x.* (0%-100%)	SNVT_lev_percent
nviRHDem2_*x*	W Analog Value	Writes duct %RH or secondary space %RH, or secondary %demand to humidifier. (0%-100%) Choice determined by *nviInputType_x.*	SNVT_lev_percent
nviSet1_*x*	W Analog Value	Writes setpoint for relative humidity in space. (0%-100%).	SNVT_lev_percent
nviSet2_*x*	W Analog Value	Writes setpoint for duct hi-limit %RH, or setpoint for secondary space %RH. (0%-100%)	SNVT_lev_percent
nvoRHDem1_*x*	R Analog Value	Reads %RH in space or %demand to humidifier. (0%-100%) Choice determined by *nviInputType_x.*	SNVT_lev_percent

Variable Name	R=Read W=Write	Description	LonWorks SNVT
nvoSet1_*x*	R Analog Value	Reads setpoint for relative humidity in space. (0%-100%).	SNVT_lev_percent
nvoRHDem2_*x*	R Analog Value	Reads duct %RH or secondary space %RH, or secondary %demand to humidifier. (0%-100%) Choice determined by *nviInputType_x.*	SNVT_lev_percent
nvoDisable_*x*	R Binary Value	Reads remote disable status. 0=humidifier enabled, 1=humidifier disabled by network	SNVT_switch
nvoService_*x*	R Binary Value	Reads service requirement status. 0=no service required, 1=service required	SNVT_switch
nvoStatus_*x*	R Binary Value	Reads humidifier status. 0=standby, 1=humidifying	SNVT_switch
nvoConnection_x	R Binary Value	Indicates that the Links module is communicating with the humidifier	SNVT_switch
nvoKeepWarm_x	R Binary Value	Indicates that the KeepWarm feature has been enabled	SNVT_switch
nvo3DayDrain_x	R Binary Value	Indicates that the 3 day drain feature has been enabled	SNVT_switch
nviDisable_*x*	W Binary Value	Writes remote disable status. 0=humidifier enabled, 1=humidifier disabled from network	SNVT_switch
nviInputType_*x*	W Binary Value	Writes the input type status. 0=unit accepts a %demand signal 1=unit is configured for on/off control	SNVT_switch
nviNetSensor _*x*	W Binary Value	Writes configuration status for network-enabled sensing or control. 0=%RH or %demand input is not from the network 1=%RH or %demand input is from the network	SNVT_switch

Table 7: Humidifier Variable Addresses – Unit #1

Nortec GSTC/ SETC LINKS XPS Variable Listing and Default Settings
Default BACnet/IP Address: 192.168.10.11; Subnet: 255.255.255.0
Default BACnet/MSTP: MAC Address = 79, Device Instance = 1001
Default Johnson N2 Address: 175

Unit #1	BACnet		Lonworks				N2	
Variable Name	Type	Instance	SNVT	SNVT #	NV Index	Element	Type	Instance
nvoHourOpt_1	AV	1	SNVT_time_hour	124	1	1	AI	1
nvoRHDem1_1	AV	2	SNVT_lev_percent	81	2	1	AI	2
nvoSet1_1	AV	3	SNVT_lev_percent	81	3	1	AI	3
nvoRHDem2_1	AV	4	SNVT_lev_percent	81	4	1	AI	4
nvoSet2_1	AV	5	SNVT_lev_percent	81	5	1	AI	5
nvoSysDemand_1	AV	6	SNVT_lev_percent	81	6	1	AI	6
nvoServHours_1	AV	7	SNVT_time_hour	124	7	1	AI	7
nviRHDem1_1	AV	8	SNVT_lev_percent	81	8	1	AO	8
nviRHDem2_1	AV	9	SNVT_lev_percent	81	9	1	AO	9
nviSet1_1	AV	10	SNVT_lev_percent	81	10	1	AO	10
nviSet2_1	AV	11	SNVT_lev_percent	81	11	1	AO	11
Analog Expansion	AV	12	N/A	N/A	N/A	N/A	N/A	N/A
Analog Expansion	AV	13	N/A	N/A	N/A	N/A	N/A	N/A
nviDisable_1	AV	14	SNVT_switch	95	20	2	AO	14
nvoInputType_1	BV	1	SNVT_switch	95	12	2	BI	1
nvoFault_1	BV	2	SNVT_switch	95	13	2	BI	2
nvoNetSensor_1	BV	3	SNVT_switch	95	14	2	BI	3
nvoDisable_1	BV	4	SNVT_switch	95	15	2	BI	4
nvoService_1	BV	5	SNVT_switch	95	16	2	BI	5
nvoStatus_1	BV	6	SNVT_switch	95	17	2	BI	6
nvoKeepWarm_1	BV	7	SNVT_switch	95	18	2	BI	7
nvo3DayDrain_1	BV	8	SNVT_switch	95	19	2	BI	8
Expansion1_1	BV	9	N/A	N/A		N/A	N/A	N/A
nviInputType	BV	10	SNVT_switch	95	21	2	BO	10
nviNetSensor	BV	11	SNVT_switch	95	22	2	BO	11
nvoConnection	BV	12	SNVT_switch	95	23	2	BO	12
Expansion2_1	BV	13	N/A	N/A		N/A	N/A	N/A
Expansion3_1	BV	14	N/A	N/A		N/A	N/A	N/A

Table 8: Humidifier Variable Addresses - Unit #2

Unit #2	BACnet		Lonworks				N2	
Variable Name	Type	Instance	SNVT	SNVT #	NV Index	Element	Type	Instance
nvoHourOpt_2	AV	15	SNVT_time_hour	124	24	1	AI	15
nvoRHDem1_2	AV	16	SNVT_lev_percent	81	25	1	AI	16
nvoSet1_2	AV	17	SNVT_lev_percent	81	26	1	AI	17
nvoRHDem2_2	AV	18	SNVT_lev_percent	81	27	1	AI	18
nvoSet2_2	AV	19	SNVT_lev_percent	81	28	1	AI	19
nvoSysDemand_2	AV	20	SNVT_lev_percent	81	29	1	AI	20
nvoServHours_2	AV	21	SNVT_time_hour	124	30	1	AI	21
nviRHDem1_2	AV	22	SNVT_lev_percent	81	31	1	AO	22
nviRHDem2_2	AV	23	SNVT_lev_percent	81	32	1	AO	23
nviSet1_2	AV	24	SNVT_lev_percent	81	33	1	AO	24
nviSet2_2	AV	25	SNVT_lev_percent	81	34	1	AO	25
Analog Expansion_2	AV	26	N/A	N/A	N/A	N/A	N/A	N/A
Analog Expansion_2	AV	27	N/A	N/A	N/A	N/A	N/A	N/A
nviDisable_2	AV	28	SNVT_switch	95	43	1	AO	28
nvoInputType_2	BV	15	SNVT_switch	95	35	2	BI	15
nvoFault_2	BV	16	SNVT_switch	95	36	2	BI	16
nvoNetSensor_2	BV	17	SNVT_switch	95	37	2	BI	17
nvoDisable_2	BV	18	SNVT_switch	95	38	2	BI	18
nvoService_2	BV	19	SNVT_switch	95	39	2	BI	19
nvoStatus_2	BV	20	SNVT_switch	95	40	2	BI	20
nvoKeepWarm_2	BV	21	SNVT_switch	95	41	2	BI	21
nvo3DayDrain_2	BV	22	SNVT_switch	95	42	2	BI	22
Expansion1_2	BV	23	N/A	N/A	N/A	N/A	N/A	N/A
nviInputType_2	BV	24	SNVT_switch	95	44	2	BO	24
nviNetSensor_2	BV	25	SNVT_switch	95	45	2	BO	25
nvoConnection	BV	26	SNVT_switch	95	46	2	BO	26
Expansion2_2	BV	27	N/A	N/A	N/A	N/A	N/A	N/A
Expansion3_2	BV	28	N/A	N/A	N/A	N/A	N/A	N/A

Table 9: Humidifier Variable Addresses - Unit #3

Unit #3	BACnet		Lonworks				N2	
Variable Name	Type	Instance	SNVT	SNVT #	NV Index	Element	Type	Instance
nvoHourOpt_3	AV	29	SNVT_time_hour	124	47	1	AI	29
nvoRHDem1_3	AV	30	SNVT_lev_percent	81	48	1	AI	30
nvoSet1_3	AV	31	SNVT_lev_percent	81	49	1	AI	31
nvoRHDem2_3	AV	32	SNVT_lev_percent	81	50	1	AI	32
nvoSet2_3	AV	33	SNVT_lev_percent	81	51	1	AI	33
nvoSysDemand_3	AV	34	SNVT_lev_percent	81	52	1	AI	34
nvoServHours_3	AV	35	SNVT_time_hour	124	53	1	AI	35
nviRHDem1_3	AV	36	SNVT_lev_percent	81	54	1	AO	36
nviRhDem2_3	AV	37	SNVT_lev_percent	81	55	1	AO	37
nviSet1_3	AV	38	SNVT_lev_percent	81	56	1	AO	38
nviSet2_3	AV	39	SNVT_lev_percent	81	57	1	AO	39
Analog Expansion_3	AV	40	N/A	N/A	N/A	N/A	N/A	N/A
Analog Expansion_3	AV	41	N/A	N/A	N/A	N/A	N/A	N/A
nviDisable_3	AV	42	SNVT_switch	95	66	N/A	AO	42
nvoInputType_3	BV	29	SNVT_switch	95	58	2	BI	29
nvoFault_3	BV	30	SNVT_switch	95	59	2	BI	30
nvoNetSensor_3	BV	31	SNVT_switch	95	60	2	BI	31
nvoDisable_3	BV	32	SNVT_switch	95	61	2	BI	32
nvoService_3	BV	33	SNVT_switch	95	62	2	BI	33
nvoStatus_3	BV	34	SNVT_switch	95	63	2	BI	34
nvoKeepWarm_3	BV	35	SNVT_switch	95	64	2	BI	35
nvo3DayDrain_3	BV	36	SNVT_switch	95	65	2	BI	36
Expansion1_3	BV	37	N/A	N/A	N/A	N/A	N/A	N/A
nviInputType_3	BV	38	SNVT_switch	95	67	2	BO	38
nviNetSensor_3	BV	39	SNVT_switch	95	68	2	BO	39
nvoConnection	BV	40	SNVT_switch	95	69	2	BO	40
Expansion2_3	BV	41	N/A	N/A	N/A	N/A	N/A	N/A
Expansion3_3	BV	42	N/A	N/A	N/A	N/A	N/A	N/A

Unit #4	BACnet		Lonworks				N2	
Variable Name	Type	Instance	SNVT	SNVT #	NV Index	Element	Type	Instance
nvoHourOpt_4	AV	43	SNVT_time_hour	124	70	1	AI	43
nvoRHDem1_4	AV	44	SNVT_lev_percent	81	71	1	AI	44
nvoSet1_4	AV	45	SNVT_lev_percent	81	72	1	AI	45
nvoRHDem2_4	AV	46	SNVT_lev_percent	81	73	1	AI	46
nvoSet2_4	AV	47	SNVT_lev_percent	81	74	1	AI	47
nvoSysDemand_4	AV	48	SNVT_lev_percent	81	75	1	AI	48
nvoServHours_4	AV	49	SNVT_time_hour	124	76	1	AI	49
nviRHDem1_4	AV	50	SNVT_lev_percent	81	77	1	AO	50
nviRHDem2_4	AV	51	SNVT_lev_percent	81	78	1	AO	51
nviSet1_4	AV	52	SNVT_lev_percent	81	79	1	AO	52
nviSet2_4	AV	53	SNVT_lev_percent	81	80	1	AO	53
Analog Expansion_4	AV	54	N/A	N/A	N/A	N/A	N/A	N/A
Analog Expansion_4	AV	55	N/A	N/A	N/A	N/A	N/A	N/A
nviDisable_4	AV	56	SNVT_switch	95	89	N/A	AO	56
nvoInputType_4	BV	43	SNVT_switch	95	81	2	BI	43
nvoFault_4	BV	44	SNVT_switch	95	82	2	BI	44
nvoNetSensor_4	BV	45	SNVT_switch	95	83	2	BI	45
nvoDisable_4	BV	46	SNVT_switch	95	84	2	BI	46
nvoService_4	BV	47	SNVT_switch	95	85	2	BI	47
nvoStatus_4	BV	48	SNVT_switch	95	86	2	BI	48
nvoKeepWarm_4	BV	49	SNVT_switch	95	87	2	BI	49
nvo3DayDrain__4	BV	50	SNVT_switch	95	88	2	BI	50
Expansion1_4	BV	51	N/A	N/A	N/A	N/A	N/A	N/A
nviInputType_4	BV	52	SNVT_switch	95	90	2	BO	52
nviNetSensor_4	BV	53	SNVT_switch	95	91	2	BO	53
nvoConnection	BV	54	SNVT_switch	95	92	2	BO	54
Expansion2_4	BV	55	N/A	N/A	N/A	N/A	N/A	N/A
Expansion3_4	BV	56	N/A	N/A	N/A	N/A	N/A	N/A

Table 11: Humidifier Variable Addresses - Unit #5

Unit #5	BACnet		Lonworks				N2	
Variable Name	Type	Instance	SNVT	SNVT #	NV Index	Element	Type	Instance
nvoHourOpt_5	AV	57	SNVT_time_hour	124	93	1	AI	57
nvoRHDem1_5	AV	58	SNVT_lev_percent	81	94	1	AI	58
nvoSet1_5	AV	59	SNVT_lev_percent	81	95	1	AI	59
nvoRHDem2_5	AV	60	SNVT_lev_percent	81	96	1	AI	60
nvoSet2_5	AV	61	SNVT_lev_percent	81	97	1	AI	61
nvoSysDemand_5	AV	62	SNVT_lev_percent	81	98	1	AI	62
nvoServHours_5	AV	63	SNVT_time_hour	124	99	1	AI	63
nviRHDem1_5	AV	64	SNVT_lev_percent	81	100	1	AO	64
nviRHDem2_5	AV	65	SNVT_lev_percent	81	101	1	AO	65
nviSet1_5	AV	66	SNVT_lev_percent	81	102	1	AO	66
nviSet2_5	AV	67	SNVT_lev_percent	81	103	1	AO	67
Analog Expansion_5	AV	68	N/A	N/A	N/A	N/A	N/A	N/A
Analog Expansion_5	AV	69	N/A	N/A	N/A	N/A	N/A	N/A
nviDisable_5	AV	70	SNVT_switch	95	112	1	AO	70
nvoInputType_5	BV	57	SNVT_switch	95	104	2	BI	57
nvoFault_5	BV	58	SNVT_switch	95	105	2	BI	58
nvoNetSensor_5	BV	59	SNVT_switch	95	106	2	BI	59
nvoDisable_5	BV	60	SNVT_switch	95	107	2	BI	60
nvoService_5	BV	61	SNVT_switch	95	108	2	BI	61
nvoStatus_5	BV	62	SNVT_switch	95	109	2	BI	62
nvoKeepWarm_5	BV	63	SNVT_switch	95	110	2	BI	63
nvo3DayDrain__5	BV	64	SNVT_switch	95	111	2	BI	64
Expansion1_5	BV	65	N/A	N/A	N/A	N/A	N/A	N/A
nviInputType_5	BV	66	SNVT_switch	95	113	2	BO	66
nviNetSensor_5	BV	67	SNVT_switch	95	114	2	BO	67
nvoConnection	BV	68	SNVT_switch	95	115	2	BO	68
Expansion2_5	BV	69	N/A	N/A	N/A	N/A	N/A	N/A
Expansion3_5	BV	70	N/A	N/A	N/A	N/A	N/A	N/A

Table 12: Humidifier Variable Addresses - Unit #6

Unit #6	BACnet		Lonworks				N2	
Variable Name	Type	Instance	SNVT	SNVT #	NV Index	Element	Type	Instance
nvoHourOpt_6	AV	71	SNVT_time_hour	124	116	1	AI	71
nvoRHDem1_6	AV	72	SNVT_lev_percent	81	117	1	AI	72
nvoSet1_6	AV	73	SNVT_lev_percent	81	118	1	AI	73
nvoRHDem2_6	AV	74	SNVT_lev_percent	81	119	1	AI	74
nvoSet2_6	AV	75	SNVT_lev_percent	81	120	1	AI	75
nvoSysDemand_6	AV	76	SNVT_lev_percent	81	121	1	AI	76
nvoServHours_6	AV	77	SNVT_time_hour	124	122	1	AI	77
nviRHDem1_6	AV	78	SNVT_lev_percent	81	123	1	AO	78
nviRHDem2_6	AV	79	SNVT_lev_percent	81	124	1	AO	79
nviSet1_6	AV	80	SNVT_lev_percent	81	125	1	AO	80
nviSet2_6	AV	81	SNVT_lev_percent	81	126	1	AO	81
Analog Expansion_6	AV	82	N/A	N/A	N/A	N/A	N/A	N/A
Analog Expansion_6	AV	83	N/A	N/A	N/A	N/A	N/A	N/A
nviDisable_6	AV	84	SNVT_switch	95	135	1	AO	84
nvoInputType_6	BV	71	SNVT_switch	95	127	2	BI	71
nvoFault_6	BV	72	SNVT_switch	95	128	2	BI	72
nvoNetSensor_6	BV	73	SNVT_switch	95	129	2	BI	73
nvoDisable_6	BV	74	SNVT_switch	95	130	2	BI	74
nvoService_6	BV	75	SNVT_switch	95	131	2	BI	75
nvoStatus_6	BV	76	SNVT_switch	95	132	2	BI	76
nvoKeepWarm_6	BV	77	SNVT_switch	95	133	2	BI	77
nvo3DayDrain__6	BV	78	SNVT_switch	95	134	2	BI	78
Expansion1_6	BV	79	N/A	N/A	N/A	N/A	N/A	N/A
nviInputType_6	BV	80	SNVT_switch	95	136	2	BO	80
nviNetSensor_6	BV	81	SNVT_switch	95	137	2	BO	81
nvoConnection	BV	82	SNVT_switch	95	138	2	BO	82
Expansion2_6	BV	83	N/A	N/A	N/A	N/A	N/A	N/A
Expansion3_6	BV	84	N/A	N/A	N/A	N/A	N/A	N/A

Table 13: Humidifier Variable Addresses - Unit #7

Unit #7	BACnet		Lonworks				N2	
Variable Name	Type	Instance	SNVT	SNVT #	NV Index	Element	Type	Instance
nvoHourOpt_7	AV	85	SNVT_time_hour	124	139	1	AI	85
nvoRHDem1_7	AV	86	SNVT_lev_percent	81	140	1	AI	86
nvoSet1_7	AV	87	SNVT_lev_percent	81	141	1	AI	87
nvoRHDem2_7	AV	88	SNVT_lev_percent	81	142	1	AI	88
nvoSet2_7	AV	89	SNVT_lev_percent	81	143	1	AI	89
nvoSysDemand_7	AV	90	SNVT_lev_percent	81	144	1	AI	90
nvoServHours_7	AV	91	SNVT_time_hour	124	145	1	AI	91
nviRHDem1_7	AV	92	SNVT_lev_percent	81	146	1	AO	92
nviRHDem2_7	AV	93	SNVT_lev_percent	81	147	1	AO	93
nviSet1_7	AV	94	SNVT_lev_percent	81	148	1	AO	94
nviSet2_7	AV	95	SNVT_lev_percent	81	149	1	AO	95
Analog Expansion_7	AV	96	N/A	N/A	N/A	N/A	N/A	N/A
Analog Expansion_7	AV	97	N/A	N/A	N/A	N/A	N/A	N/A
nviDisable_7	AV	98	SNVT_switch	95	158	2	BO	98
nvoInputType_7	BV	85	SNVT_switch	95	150	2	BI	85
nvoFault_7	BV	86	SNVT_switch	95	151	2	BI	86
nvoNetSensor_7	BV	87	SNVT_switch	95	152	2	BI	87
nvoDisable_7	BV	88	SNVT_switch	95	153	2	BI	88
nvoService_7	BV	89	SNVT_switch	95	154	2	BI	89
nvoStatus_7	BV	90	SNVT_switch	95	155	2	BI	90
nvoKeepWarm_7	BV	91	SNVT_switch	95	156	2	BI	91
nvo3DayDrain_7	BV	92	SNVT_switch	95	157	2	BI	92
Expansion1_7	BV	93	N/A	N/A	N/A	N/A	N/A	N/A
nviInputType_7	BV	94	SNVT_switch	95	159	2	BO	94
nviNetSensor_7	BV	95	SNVT_switch	95	160	2	BO	95
nvoConnection	BV	96	SNVT_switch	95	161	2	BO	96
Expansion2_7	BV	97	N/A	N/A	N/A	N/A	N/A	N/A
Expansion3_7	BV	98	N/A	N/A	N/A	N/A	N/A	N/A

Table 14: Humidifier Variable Addresses - Unit #8

Unit #8	BACnet		Lonworks				N2	
Variable Name	Type	Instance	SNVT	SNVT #	NV Index	Element	Type	Instance
nvoHourOpt_8	AV	99	SNVT_time_hour	124	162	1	AI	99
nvoRHDem1_8	AV	100	SNVT_lev_percent	81	163	1	AI	100
nvoSet1_8	AV	101	SNVT_lev_percent	81	164	1	AI	101
nvoRHDem2_8	AV	102	SNVT_lev_percent	81	165	1	AI	102
nvoSet2_8	AV	103	SNVT_lev_percent	81	166	1	AI	103
nvoSysDemand_8	AV	104	SNVT_lev_percent	81	167	1	AI	104
nvoServHours_8	AV	105	SNVT_time_hour	124	168	1	AI	105
nviRHDem1_8	AV	106	SNVT_lev_percent	81	169	1	AO	106
nviRHDem2_8	AV	107	SNVT_lev_percent	81	170	1	AO	107
nviSet1_8	AV	108	SNVT_lev_percent	81	171	1	AO	108
nviSet2_8	AV	109	SNVT_lev_percent	81	172	1	AO	109
Analog Expansion_8	AV	110	N/A	N/A	N/A	N/A	N/A	N/A
Analog Expansion_8	AV	111	N/A	N/A	N/A	N/A	N/A	N/A
nviDisable_8	AV	112	SNVT_switch	95	181	2	BO	112
nvoInputType_8	BV	99	SNVT_switch	95	173	2	BI	99
nvoFault_8	BV	100	SNVT_switch	95	174	2	BI	100
nvoNetSensor_8	BV	101	SNVT_switch	95	175	2	BI	101
nvoDisable_8	BV	102	SNVT_switch	95	176	2	BI	102
nvoService_8	BV	103	SNVT_switch	95	177	2	BI	103
nvoStatus_8	BV	104	SNVT_switch	95	178	2	BI	104
nvoKeepWarm_8	BV	105	SNVT_switch	95	179	2	BI	105
nvo3DayDrain_8	BV	106	SNVT_switch	95	180	2	BI	106
Expansion1_8	BV	107	N/A	N/A	N/A	N/A	N/A	N/A
nviInputType_8	BV	108	SNVT_switch	95	182	2	BO	108
nviNetSensor_8	BV	109	SNVT_switch	95	183	2	BO	109
nvoConnection	BV	110	SNVT_switch	95	184	2	BO	110
Expansion2_8	BV	111	N/A	N/A	N/A	N/A	N/A	N/A
Expansion3_8	BV	112	N/A	N/A	N/A	N/A	N/A	N/A

Configuration Variables

nviInputType_x = 1
nviNetSensor_x = 1

Control Variables

nviSet1_x   = Room Setpoint (0-100%)
nviSet2_x   = Hi-Limit Setpoint (0-100%)
nviRHDem1_x   = Room %RH (0-100%)
nviRHDem2_x   = Hi-Limit %RH (0-100%)
nviDisable_x   = 1 Unit Disabled
                 = 0 Unit Enabled

Readable Variables

nvoStatus_x   = 1 Humidifying
                 = 0 Standby
nvoService_x   = 1 Service Required
                 = 0 No Service Required
nvoFault_x   = 1 Fault
                 = 0 No Fault
nvoSysDemand_x   = System Demand (0-100%)
nvoDisable_x   = 1 Unit Disabled
                 = 0 Unit Enabled
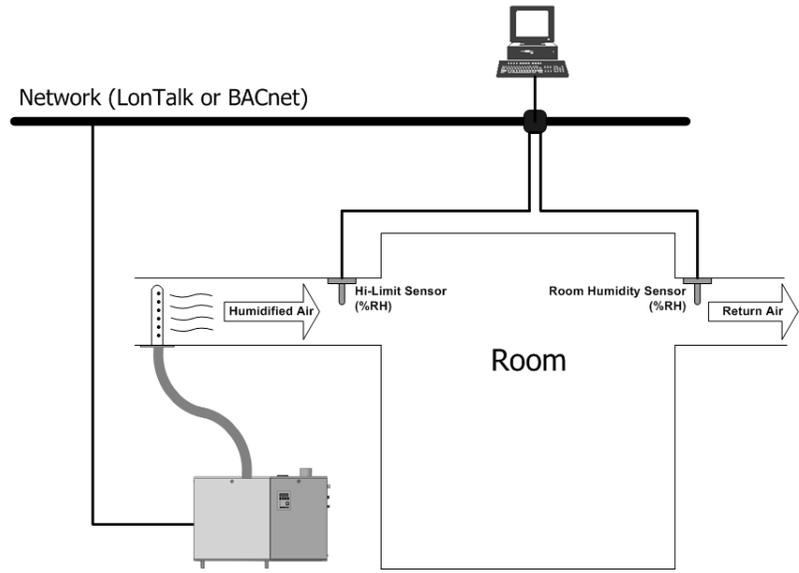
Figure 26: Sample Humidification Applications Room-Sensed %RH Feedback with Duct Hi-Limit Sensing

Configuration Variables

nviInputType_x   = 0
nviNetSensor_x   = 1

Control Variables

nviSet1_x = Room Setpoint (0-100%)
nviSet2_x = Hi-Limit Setpoint (0-100%)
nviRHDem1_x   = Room %RH (0-100%)
nviRHDem2_x   = Hi-Limit %RH (0-100%)
nviDisable_x   = 1 Unit Disabled
                 = 0 Unit Enabled

Readable Variables

nvoStatus_x   = 1 Humidifying
                 = 0 Standby
nvoService_x   = 1 Service Required
                 = 0 No Service Required
nvoFault_x   = 1 Fault
                 = 0 No Fault
nvoSysDemand_x   = System Demand (0-100%)
nvoDisable_x   = 1 Unit Disabled
                 = 0 Unit Enabled
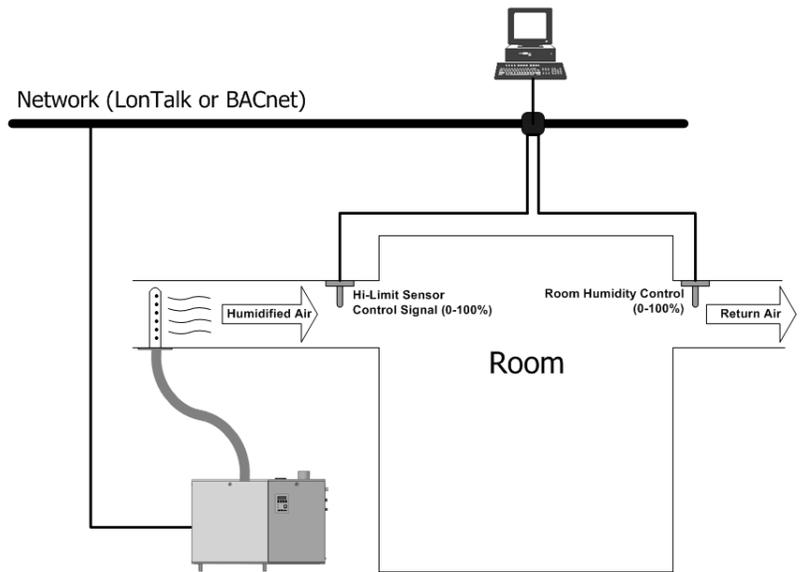
Figure 27: Sample Humidification Applications control Feedback (0-100%) with Duct Hi-Limit Sensing

Configuration Variables
nviInputType_x   = 1
nviNetSensor_x   = 0

Control Variables
nviSet1_x   = Room Setpoint (0-100%)
nviSet2_x   = Hi-Limit Setpoint (0-100%)
nviRHDem1_x   = Room %RH (0-100%)
nviRHDem2_x   = Hi-Limit %RH (0-100%)
nviDisable_X   = 1 Unit Disabled
                 = 0 Unit Enabled

Readable Variables
nvoStatus_x   = 1 Humidifying
                 = 0 Standby
nvoService_x   = 1 Service Required
                 = 0 No Service Required
nvoFault_x   = 1 Fault
                 = 0 No Fault
nvoSysDemand_x   = System Demand(0-100%)
nvoDisable_x   = 1 Unit Disabled
                 = 0 Unit Enabled

Network (LonTalk or BACnet)

Humidified Air   Hi-Limit Sensor (%RH)   Room Humidity Sensor (%RH)   Return Air
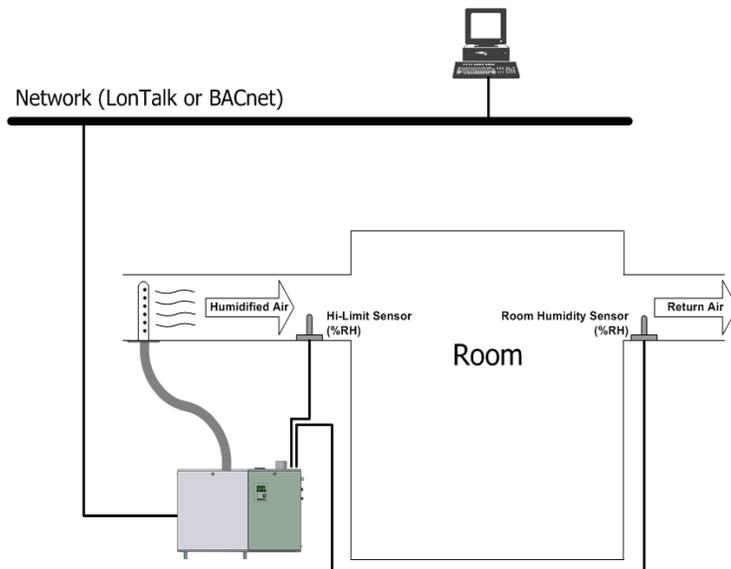
Room

Figure 28: Sample Humidification Applications Room-Sensed %RH Feedback with Duct High-Limit sensing (0-10v signal directly to Humidifier)

Links XPS Start-up Checklist

Wiring

Humidifier-to-Humidifier Connection:

Each individual humidifier linked to lead unit. ☐

Connection must be daisy-chained from the lead unit to the end unit, with shield wire connected only on the lead unit. ☐

Check that each humidifier has a unique modbus address. ☐

BMS Network Connection:

Lead unit wired to BMS system (Twisted Pair or Ethernet). ☐

Network activity verified. ☐

Shields should be connected at BMS end only. ☐

Controls Wired:

Directly to humidifiers or through BMS network. ☐

Start-up Procedure

Ensure power is being supplied to the humidifier, Links Module. For BACnet/IP adjust network IP settings. (If this information is provided, factory will perform necessary IP assignment). ☐

After power-up, verify network communication. ☐

Map desired network variables to BMS. ☐

Verify variable operation after mapping is complete. ☐

Perform regular humidifier start-up check. ☐

Troubleshooting

When troubleshooting the communication process for Links XPS modules should be kept in mind. Humidifier data is received by the Links module using the modbus rtu protocol over the serial port connection. The Links module then translates the data to the desired protocol for connection over the networks.

Indicator Lights

There is a variety of status LEDs on the Links XPS module to aid in the diagnosis of communication problems. Please refer to the following figures for locations and meaning
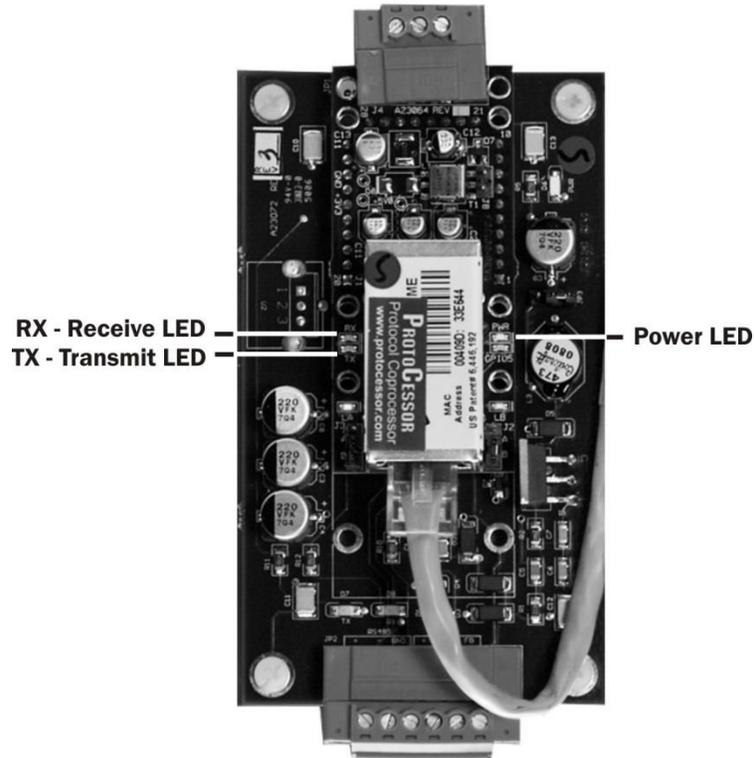
Figure 29: BACnet Module LED

RX - Receive LED

TX - Transmit LED
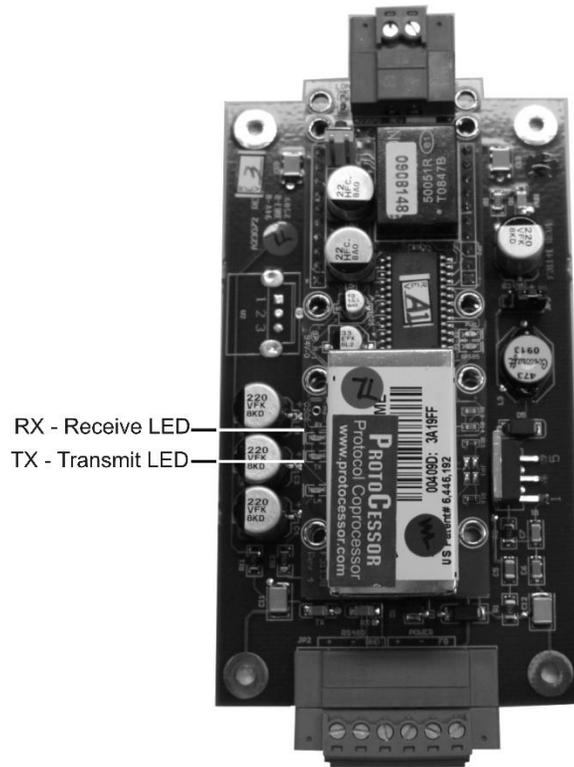
Figure 30: LonWorks Module LED
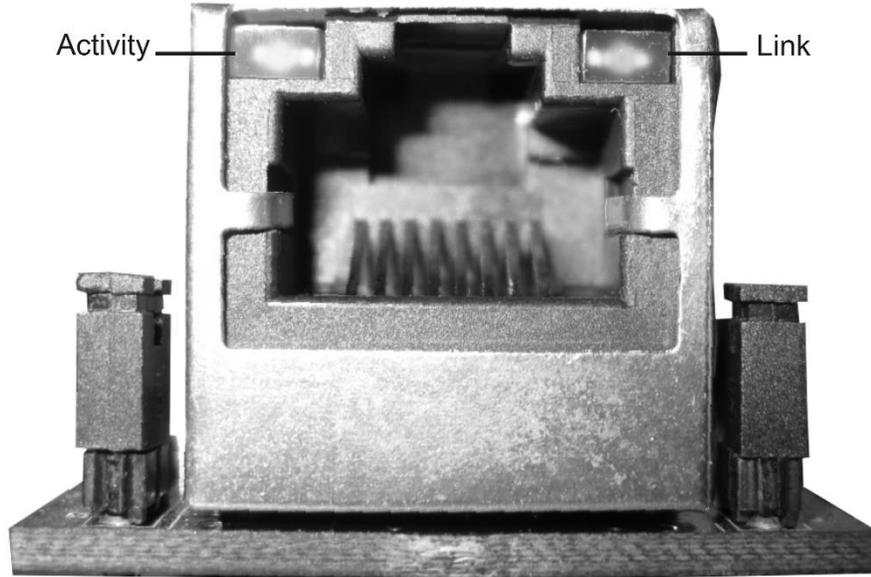
Figure 31: Ethernet Port LED

Table 15: Links XPS Module Diagnostic LEDs

LED Name	Color	Function
Module Power	Off	Indicates that the Links module is not receiving power.
	Green	Indicates the Links module is operating normally.
Receive LED (marked as Rx on processor board)	Flashing Green	Indicates that the Links module is receiving a network packet from a serial connection.
Transmit LED (marked as Tx on processor board)	Flashing Green	Indicates that the Links module is transmitting a network packet on a serial connection.
Ethernet LINK	Off	Indicates no Ethernet connection is present.
	Solid Yellow	Indicates an Ethernet connection has been detected.
Ethernet Activity	Off	No Ethernet network activity.
	Flashing Green	Indicates Ethernet activity.

Table 16: Troubleshooting Communication Problems

Problem	Solution
The BMS network cannot read/write any information to any of the networked humidifiers	Verify that the network connection is made and is connected properly.
	Verify that the correct network settings are being used. The LINKS XPS module may need to be restarted to load the new settings.
	Check the Serial Port Activity LED on the module to ensure proper communication with the humidifiers. Data is first received from the humidifier to the OnLine module. The OnLine module then transmits this data, via the Ethernet port, to the LINKS XPS module.
	Check the Ethernet port activity on the LINKS XPS module to ensure it is receiving data.
	Check the transmit and receive status LEDs to determine if there is any network traffic being sent or being received by the LINKS XPS module from the BMS network
	Verify proper connections to networked humidifiers.
	Turn the LINKS XPS module off for several seconds then switch it back on to reload the control program. Allow for some time for the network variables to be polled.
The BMS network can see some of the networked humidifiers but not others.	Ensure network variables are mapped correctly to the BMS.
	Ensure proper connections to the humidifiers.
	Disconnect all of the humidifiers from the LINKS XPS package except for the unit that is not responding to the network. Turn the LINKS XPS package off and then back on. Check if the humidifier can now be seen by the BMS
The BMS network receives information from the networked humidifier(s) but the information is mismatched or the humidifier responds un-expectedly	Verify that the network variables have been mapped to the BMS network correctly. It is possible that the variables have been cross-linked during the network integration process.
	Connect humidifiers one at a time and test units individually.
After sending the humidifier a network-based demand signal the unit powers down after several minutes. The nviNetSensor variable is switched on and a value has been set for the nviRHDem1 variable.	When a BMS network demand/RH signal is being used the network must refresh the nviRHDem signal at least every 5 minutes otherwise the humidifier will revert to a 0 demand state. This is a safety precaution in case the BMS network connection is lost.

Table 17: Replacement Parts

Part Number	Description
2559194	Links XPS Replacement Module, BACnet / IP / MSTP / N2
2559145	Links XPS Replacement Module, Lonworks
2558811	Isolation Transformer, 24 VAC, 3A, 50/60 HZ
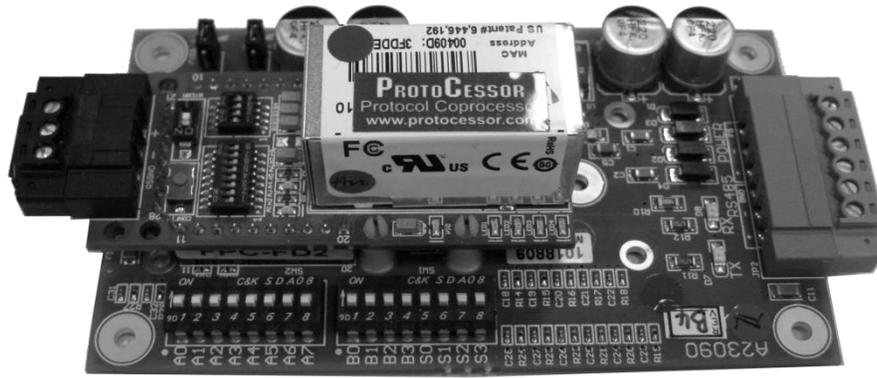
Figure 32: XPS Module BACnet, Johnson N2
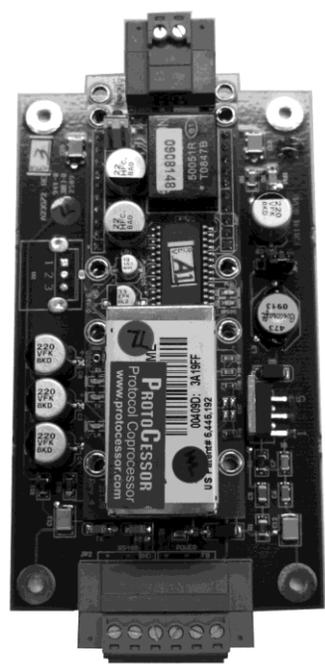
Figure 33: XPS Module, LonWorks

External wiring 'by others'
RS-485 cable recommended:
- -18 to 24 AWG stranded
- -Twisted pair, shielded
- -120 Ohm impedance

To Units
2 to 8

To 24V
Transformer

LINKS XPS
Terminal Strip
(Unit 1)

GND*
A   B
Shield
Net -
Net +
24 V
GND

External

Internal

T

FG   -   +   GND   -   +
Power   RS485

RJ-45

Protocessor
Module

Net +   Net -   GND

J5

J3

Processor
Board

RJ-45
J4   J1   J2
5   4   8

Customer BMS

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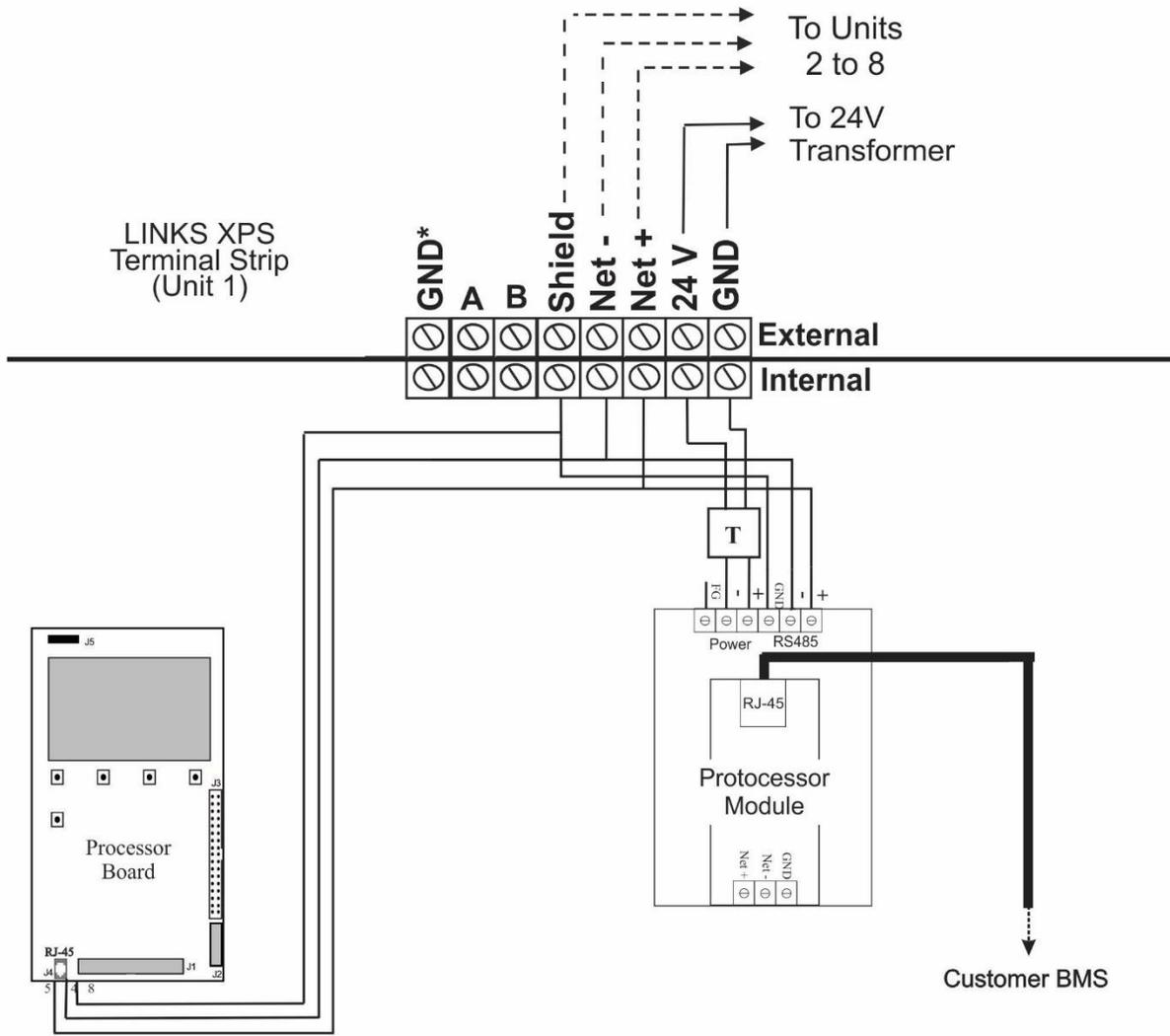
NWD NH/GS/SETC LINKS XPS BACnet/IP
Diagram No. 2559050   Rev. C   30/11/2018

External wiring 'by others'
RS-485 cable recommended:
-18 to 24 AWG stranded
-Twisted pair, shielded
-120 Ohm impedance

To BMS
Network

To Units
2 to 8

To 24V
Transformer

LINKS XPS
Terminal Strip
(Unit 1)

GND* A B Shield Net - Net + 24 V GND

External

Internal

J5

Processor
Board

RJ-45

T

FG - + GND - +
Power   RS485

RJ-45

Protocessor
Module

≋condair
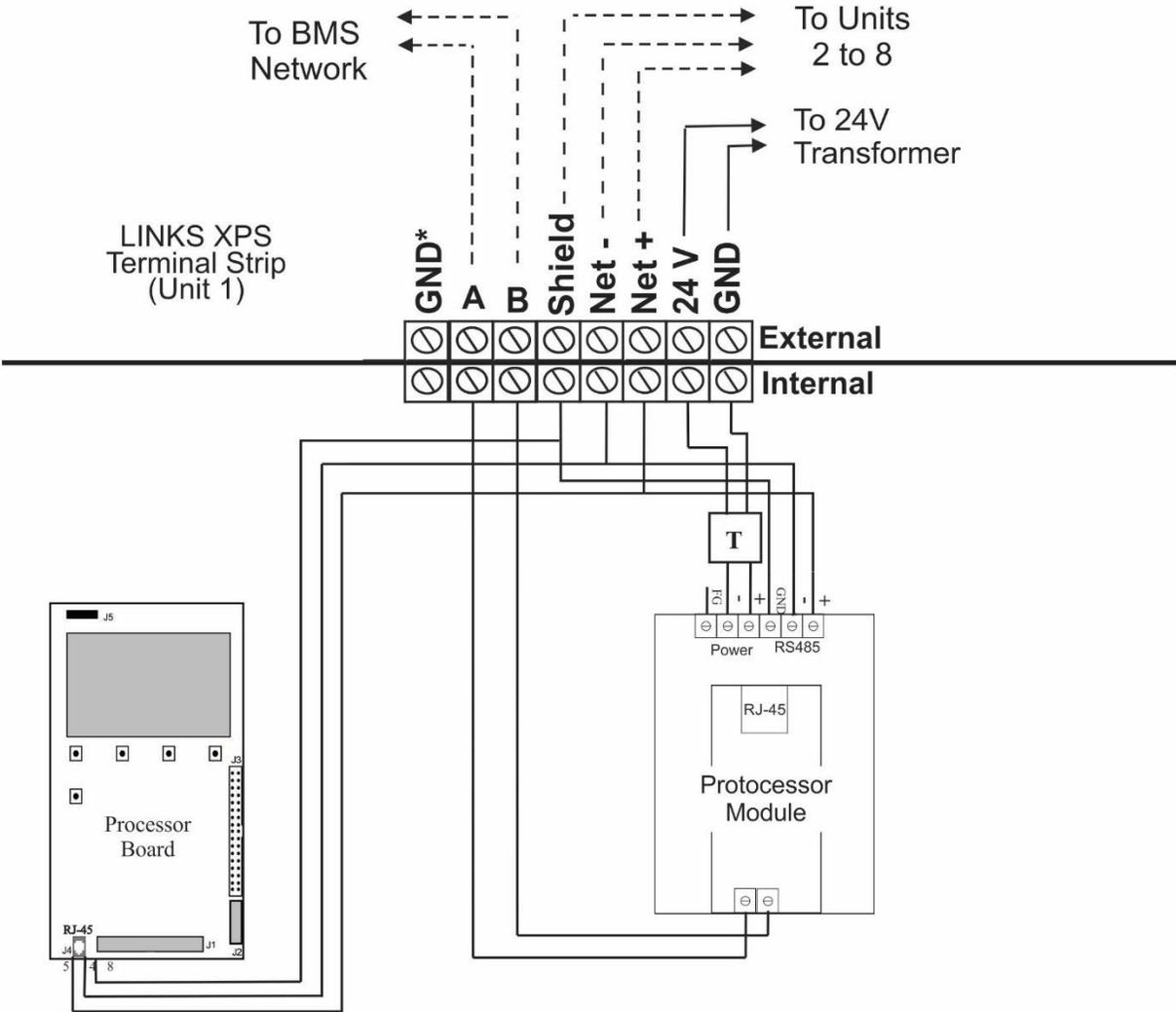
WD NH/MH/GS/SETC LINKS XPS Lonworks
Option Supplemental Wiring Diagram

Diagram No. 2559105   Rev. C   30/11/2018

External wiring 'by others'

RS-485 cable recommended:
- 18 to 24 AWG stranded
- Twisted pair, shielded
- 120 Ohm impedance

To BMS Network

To Units 2 to 8

To 24V Transformer

LINKS XPS Terminal Strip (Unit 1)

GND* A B Shield Net - Net + 24 V GND

External

Internal

T

FG — + GND — +

Power RS485

RJ-45

Protocessor Module

Net + Net - GND

J5

J3

Processor Board

RJ-45
J4
5 4 8
J2 J1
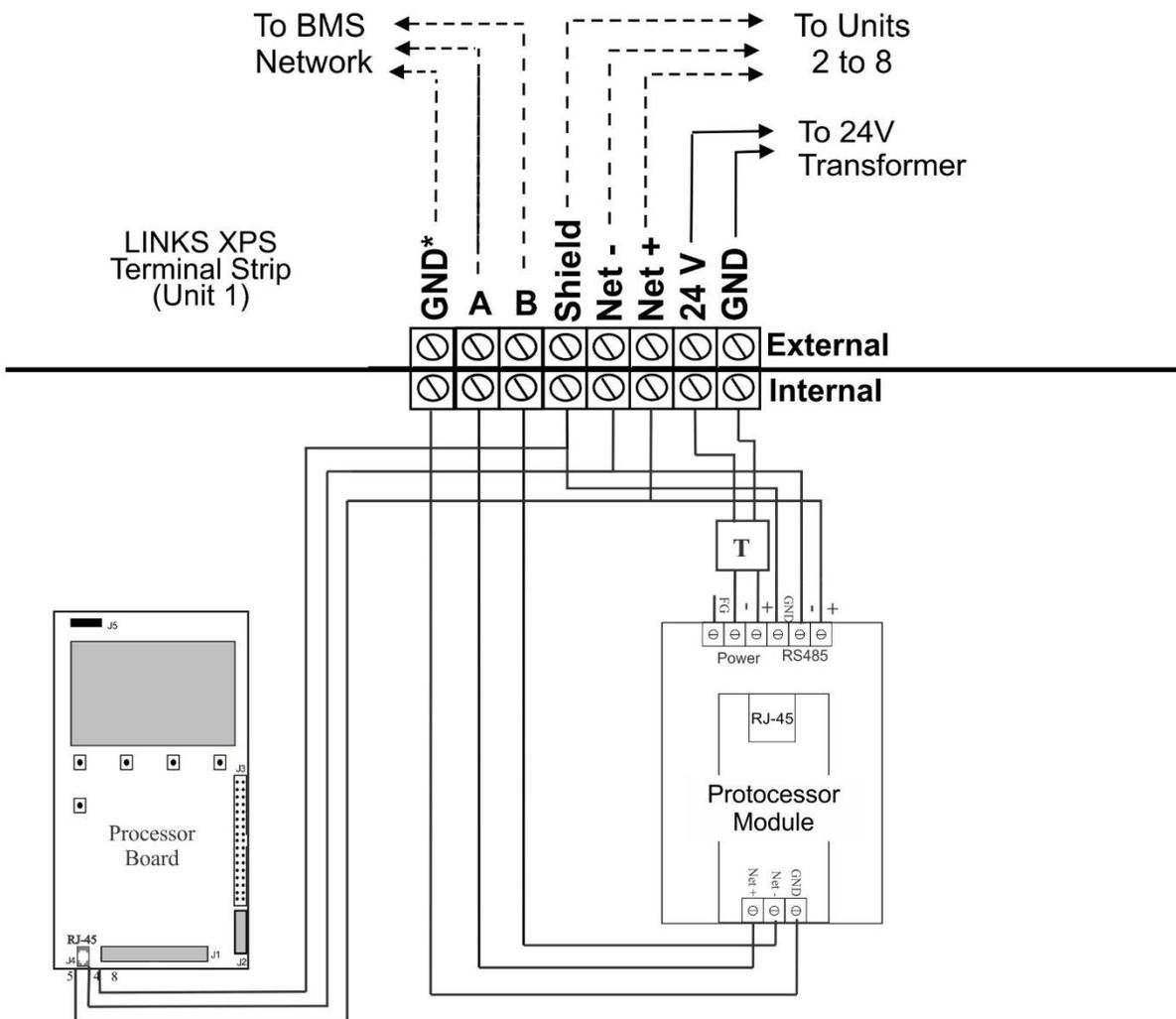
WD NH/MH/GS/SETC LINKS XPS MSTP_N2 Option Supplemental Wiring Diagram

Diagram No. 2559104   Rev. D   30/11/2018

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Warranty

Condair Inc. and/or Condair Ltd. (hereinafter collectively referred to as THE COMPANY), warrant for a period of two years after installation or 30 months from manufacturer's ship date, whichever date is earlier, that THE COMPANY's manufactured and assembled products, not otherwise expressly warranted, are free from defects in material and workmanship. No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulations.

THE COMPANY's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. THE COMPANY's factory, providing the defective part(s) is returned freight prepaid by the customer. Parts used for repairs are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer.

The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to THE COMPANY until said products have been paid for in full and then said liability shall be limited to the original purchase price for the product. Any further warranty must be in writing, signed by an officer of THE COMPANY.

THE COMPANY's limited warranty on accessories, not of the companies manufacture, such as controls, humidistats, pumps, etc. is limited to the warranty of the original equipment manufacturer from date of original shipment of humidifier.

THE COMPANY makes no warranty and assumes no liability unless the equipment is installed in strict accordance with a copy of the catalog and installation manual in effect at the date of purchase and by a contractor approved by THE COMPANY to install such equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for consequential damage or damage resulting directly from misapplication, incorrect sizing or lack of proper maintenance of the equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for damage resulting from freezing of the humidifier, supply lines, drain lines, or steam distribution systems.

THE COMPANY makes no warranty and assumes no liability whatsoever for equipment that has failed due to ambient conditions when installed in locations having climates below 14°F (-10°C) during January or above 104°F (40°C) during July.

THE COMPANY retains the right to change the design, specification and performance criteria of its products without notice or obligation.

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