Replacing UNT Unitary Controllers

UNT Unitary Controllers were used extensively for controlling packaged rooftop and heat pump units, small air handling units, unit ventilators, fan coils, and other terminal units serving a single zone or room. They were also frequently used as I/O devices for generic monitoring and control.

Various UNT models were offered, and they were applied to a wide range of applications. To replace a UNT controller in an application where only a few of its inputs are being used, we recommend using the **FEC1611** controller. To replace a UNT controller in an application where most or all of its inputs are being used, we recommend using the **FEC2611** controller. If the FEC controller does not have enough onboard I/O to meet the replacement application requirements, then add IOM Expansion I/O Modules. Make note of any special application controllers such as for use in low or extended temperature applications. Contact your Johnson Controls representative or technical support group for recommendations.

Footprint Considerations

All models of UNT controllers have a footprint slightly larger than an FEC1611 controller, so replacing a UNT with an FEC1611 using the same enclosure space is highly probable. The FEC2611 is approximately 1 in. (2.5 cm) wider than a UNT. As a result, if you use an FEC2611 to replace a UNT, be sure to verify that enough space is available in the enclosure.

Figure 10: Dimensional Comparison of UNT versus FEC1611

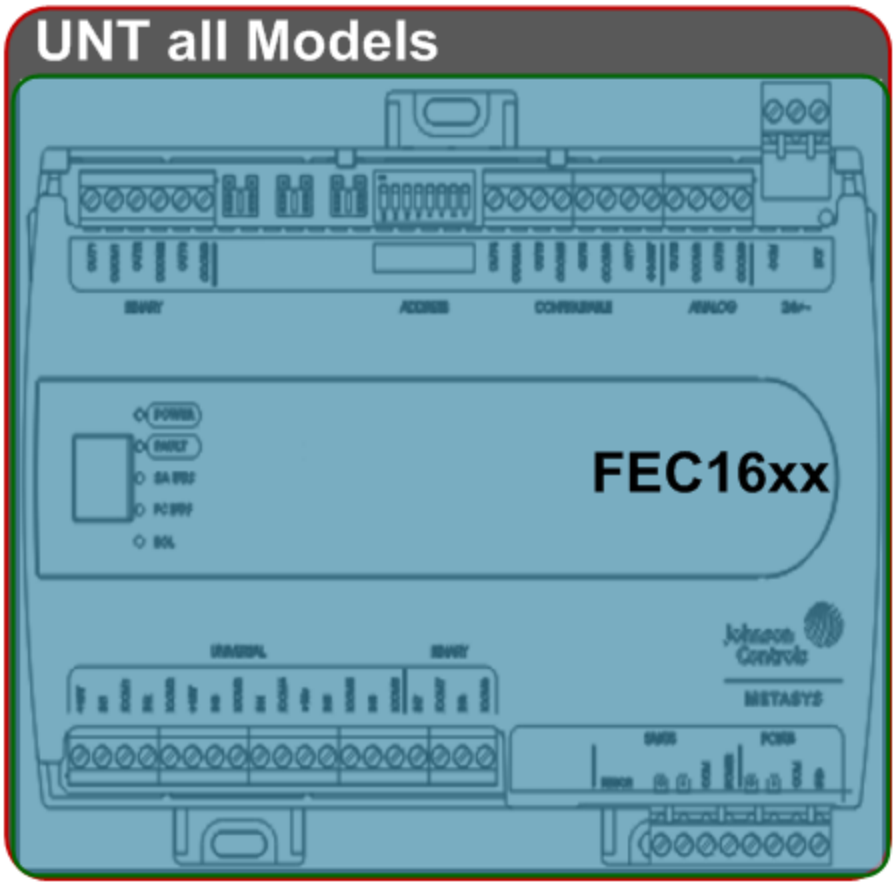


Figure 11: Dimension Comparison of UNT versus FEC2611

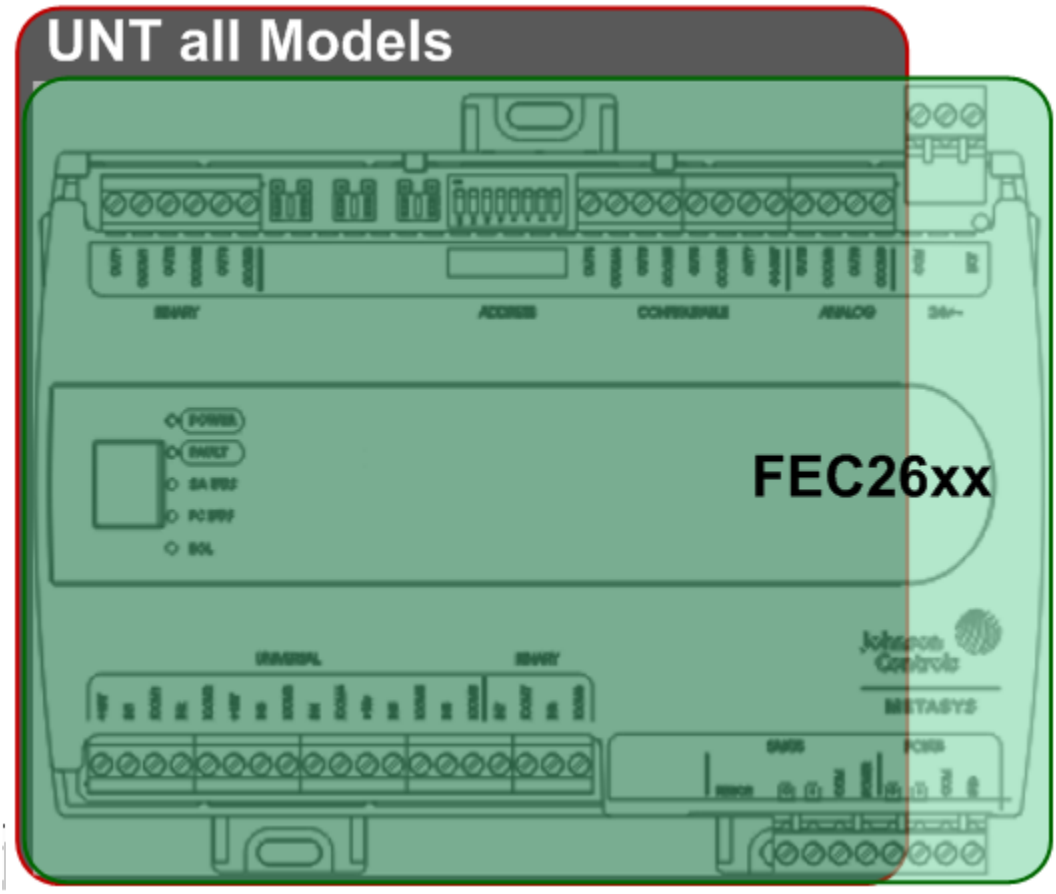


Table 15: Dimensional Comparison of UNT versus FEC1611 and FEC2611

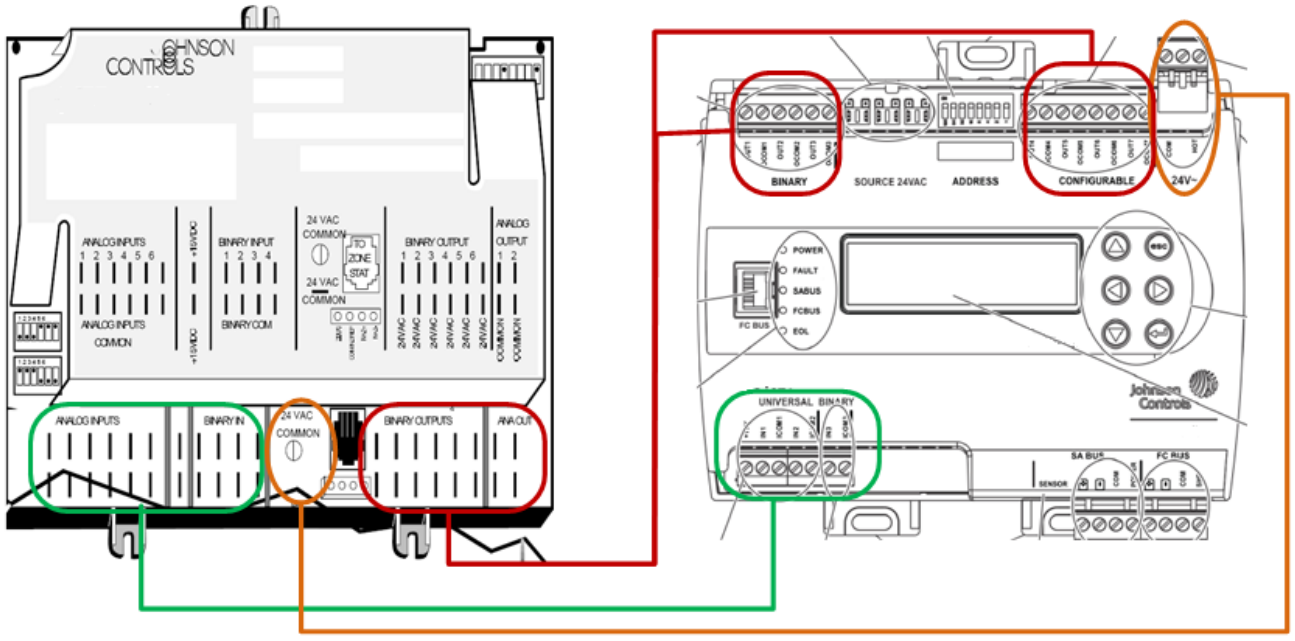
Dimension	UNT (All Models)	FEC1611	FEC2611
Height	165 mm (6.5 in.)	150 mm (5 9 in.)	150 mm (5 9 in.)
Width	163 mm (6.4 in.)	164 mm (6.5 in.)	190 mm (7.5 in.)
Depth	56 mm (2.2 in.)	54 mm (2.1 in.)	54 mm (2.1 in.)

Wiring Connections Comparison

Table 16: Wiring Connection Similarities, Differences and Implications

Attribute	UNT	FEC	Implication
I/O Wiring			
Connection Location	See *Figure 12*.	See *Figure 12*.	You can reuse the existing I/O wiring if the existing wiring is long enough to reach the FEC I/O wiring connection points. If not, you need to lengthen the wiring.
Connection Type	Spade lug connectors	Fixed screw terminal connectors	Remove spade lug connectors from I/O wiring.
N2 Wiring			
Connection Location	See *Figure 12*.	See *Figure 12*.	You can reuse the existing I/O wiring if the existing wiring is long enough to reach the FEC N2 connection point. If not, you need to lengthen the wiring.
Connection Type	Removable, 3-wire screw terminal connector	Removable, 4-wire screw terminal connector	Replace the UNT's N2 wiring connector with the FECs.
Power Supply Wiring			
Connection Location	See *Figure 12*.	See *Figure 12*.	You can reuse the existing power supply wiring if the existing wiring is long enough to reach the FEC power supply connection point. If not, you need to lengthen the wiring.
Connection Type	Spade lug with removable 2-wire screw terminal connector	Removable, 3-wire screw terminal connector	Remove existing connectors from power.

Figure 12: Wiring Layout Comparison of UNT versus FEC



Point Comparison

Table 17: UNT Point Comparison

Code Number	Termination Type	AI	BI	AO	BO	RO
UNT110/120	Spade Lug	6	4	—	8	—
UNT112/113						
UNT111/121				2	6	
UNT140	Screw Terminal	6	4	—	8	
UNT141				2	6	
UNT1108	Spade Lug with Removable Screw Terminal Option	6	4	—	—	8
UNT1126				2	—	6
UNT1144				4	—	4

Table 18: FEC2611 Point Comparison

Code Number[1]	Termination Type	Universal Inputs (UI)	BI	AO	BO	Configurable Outputs (CO)	Universal Outputs (UO)	RO
FEC1611	Screw Terminal	2	1	—	3	—	4	—
FEC2611		6	2	2		—		2
FEC2711	Screw Terminal	2	—	—	—	2	—	—
FEC2721		8		2		—		
IOM3711		4		—		4		4

1 Add IOMs as required to match point count need.

Table 19: UNT to FEC/IOM Controller Point Comparison

UNT Point Type	Characteristic	FEC/IOM Point Type	Characteristic
AI	RTD Temp. Elem. (NI, SI or PT) 0-10 VDC Transducer 2k ohm Setpoint Potentiometers	UI	Resistance temperature detector (RTD) (1k NI, 1k PT, A99B SI) Negative temperature coefficient (NTC) (10k Type L, 2.252k Type 2) Voltage Mode, 0–10 VDC Current Mode, 4–20 mA Resistive Mode, 0–2k ohm
BI	4-Dry Contacts BI4-Accum. Input	UI	Dry Contact Maintained Mode
		BI	Dry Contact Maintained Mode Pulse Counter/Accumulator Mode (High Speed), 100 Hz
AO	0 to 10 VDC at 10 mA	AO	Voltage Mode, 0–10 VDC Current Mode, 4–20 mA
		CO	Voltage Mode, 0–10 VDC
		UO	Voltage Mode, 0–10 VDC

Table 19: UNT to FEC/IOM Controller Point Comparison

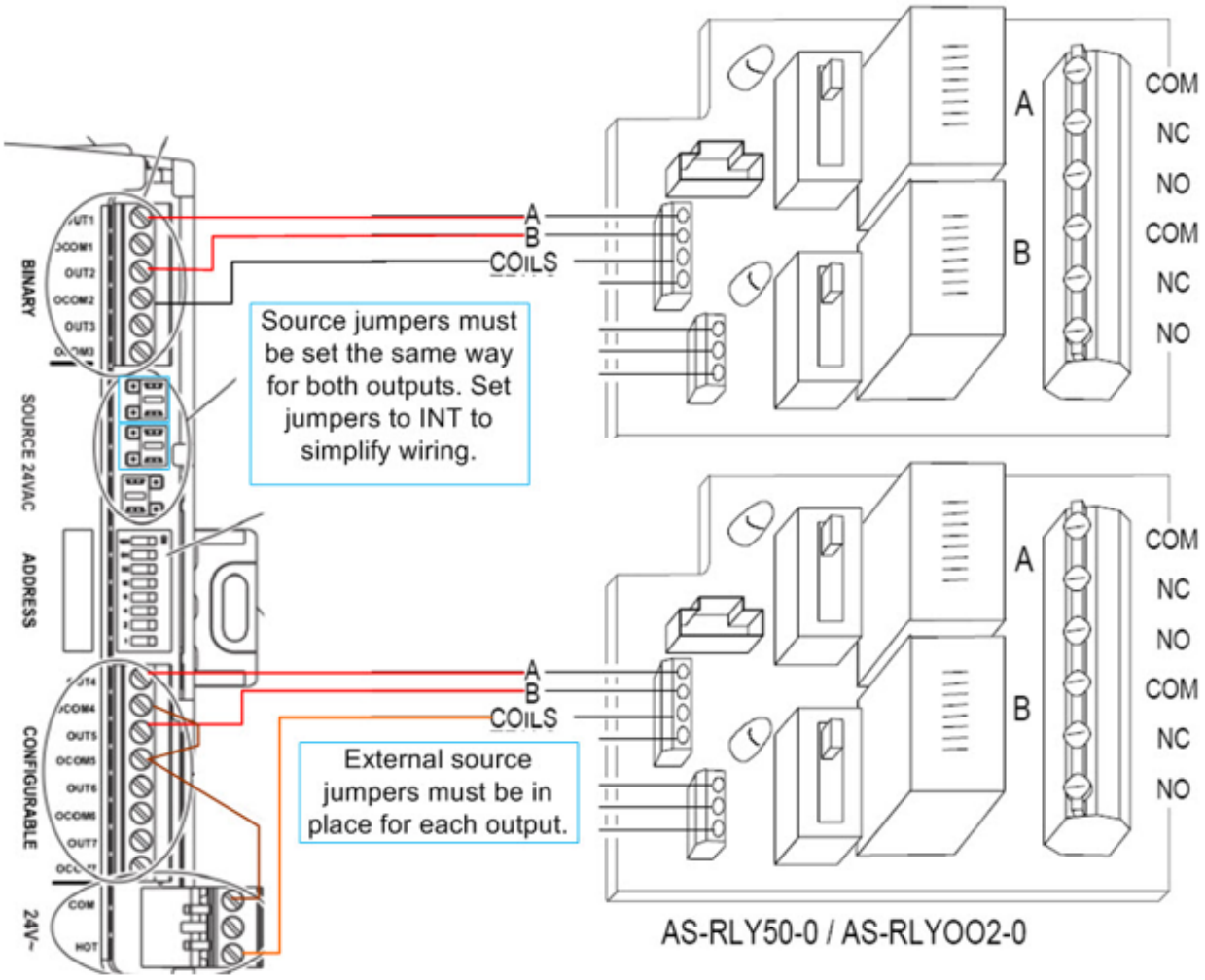
UNT Point Type	Characteristic	FEC/IOM Point Type	Characteristic
BO	24 VAC Triac at 0.5 A[1]	BO	24 VAC Triac[2]
		CO	
RO	24 VAC Relays at 2 A, 13A Inrush (Class 2)[3]	RO[4]	(Single-Pole, Single-Throw: UL 916:1/4 hp 120 VAC 1/2 hp 240 VAC; 360 VA Pilot Duty at 120/240 VAC (B300); 3 A Non-inductive 24-240 VAC; EN 60730: 6 (4) A N.O. or N.C. only

1 UNT11n - Low Side Switching only - UNT14n - Low or High Side Common Selectable
2 FECx611 - Low or High Side switching
3 UNT11nn Source sinking or dry contact (jumper selectable per output)
4 RO available on IOM2711, IOM3711

RLY Relay Module Considerations

RLY relay modules were frequently added to the UNT controller's binary outputs. You can reuse RLY relay modules when you replace the UNT with an FEC. Each RLY relay module must be wired to one FEC binary or to one configurable output (configured for binary output mode). If both relays on one RLY relay module are used, the FEC controller outputs must be configured identically. Alternatively, you can replace RLY relay modules with IOM models with onboard relay outputs.

Figure 13: Connecting RLY Relay Modules to FEC Controller



Zone Bus Considerations

UNT controllers support a Zone Bus for optionally connecting TMZ Series network room sensors, TE-77 Series wireless temperature sensor or receivers, a ZTU Zone Terminal Unit, and M100C Series networked actuators. FEC controllers do not support the Zone Bus, and accordingly do not support these devices. Instead, FEC controllers feature a Sensor Actuator (SA) bus for connecting NS Series Network Sensors, DIS Local Display/Keypad, and IOM Series Expansion I/O Modules.

When using an FEC controller to replace a UNT controller that uses a TMZ sensor, you must also replace the TMZ sensor with an NS Series Network Sensor. The NS sensor provides many of the same functions as the TMZ sensor, including zone temperature sensing, zone temperature setpoint adjustment, and LCD display. However, the NS sensor is housed in an enclosure that has a different user interface. For example, the NS sensor features a dial to adjust the zone temperature setpoint, whereas the TMZ features a pushbutton keypad. As a result, we recommend you work with your customer to help them and their building's occupants understand how to use the adjustment features of the new NS sensor.

When using an FEC controller to replace a UNT controller that uses a TE-77xx wireless transmitter/receiver, you must also replace the TE-77xx with the Facility Explorer One-to-One Wireless Room Sensing System. For more information, refer to the *WRZ-7840 One-to-One Wireless Room Temperature Sensing System Product Bulletin (LIT-12011410)*.

When using an FEC controller to replace a UNT controller that uses a ZTU Zone Terminal Unit, you must replace the ZTU with a DIS1710 Local Display/Keypad. You can partially duplicate the Zone Terminal Unit functionality with the DIS1710. However, the DIS1710 does not provide access to real-time clock functions such as scheduling, trending, and alarming.

When using an FEC controller to replace a UNT controller that uses an M100C zone bus actuator, you must replace the actuator with a non-networked actuator. For dampers, use the M9100/M9200 Series. For valves, use the VA7800/VA-7150 Series.

To control the new actuator, use the available analog output or configurable output interfaces on the FEC controller. If none are available, add an IOM Expansion I/O Module.

Room Sensor Comparisons

Table 20: Room Sensor Comparisons

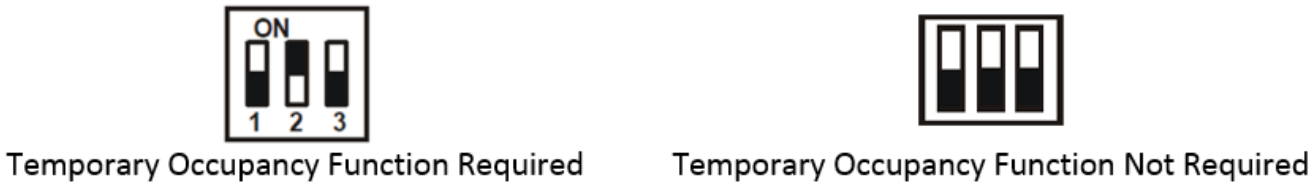
Attribute	UNT	FEC Controller	Implication
Network Sensors Supported	TMZ Series Zone Sensors	NS Series Network Sensors	Replace TMZ with NS sensor.
Wireless Sensors Supported	TE-77 Wireless Room Sensor Transmitter/Receiver	WRZ7860 One-to-One Wireless Sensing System	Replace TE-77 with WRZ7860 One-to-One Wireless Sensing System.
	WRS-TTxx	WRZ7860 One-to-One Wireless Sensing System	Replace WRS-TTxx with WRZ7860 One-to-One Wireless Sensing System.
Analog Sensors Supported	TE-77 and TE-78 Series	TE-77 and TE-78 Series	Reusing sensors is possible.[1]

1 Some room sensors (TE-6100-11 and -12, TE-67xx, and TE-67xx) featured modular (phone) jack connections and require adaptation for use with the FEC controllers.

If you reuse a TE-67xx or TE-68xx series sensor, be aware that the single setpoint or no setpoint models feature an LED, but the FEC controller does not support the LED. As a result, you need to change the sensor's DIP switch settings as follows:

- If Temporary Occupied function is required for the application, set the DIP switch positions on the back of the sensor to down, up, and down (LED disabled, but Sensor and Push Button enabled). The FEC controllers do not support the shorting of AI-1 to sense the Temp Occ button.
- If Temporary Occupied function is **not** required, set the DIP switch positions to down, down, and down (LED and PB disabled).

Figure 14: TE-67xx and TE-68xx Sensor DIP Switch Setting



Dual setpoint sensor models do not feature an LED. Therefore, you do not need to change the DIP switch settings.

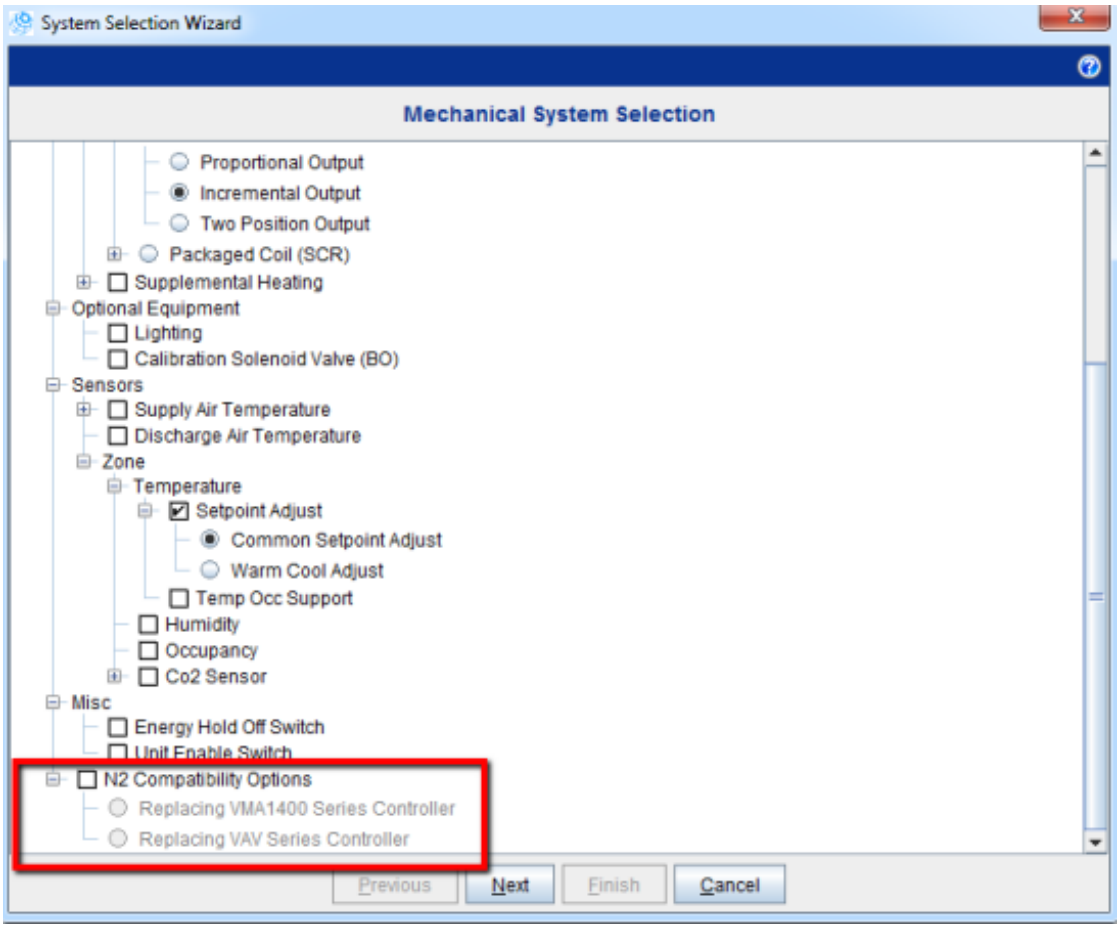
Control Logic Configuration

Recreating a VMA14xx controller's application that was programmed with HVACPro should be straightforward. The CCT System Selection Wizard and Sideloop Wizard provide control logic creation capabilities that are nearly identical to HVACPro's Question and Answer (Q&A) wizard and Sideloop wizard.

At Release 10.0, the VMA1832 controller featured N2 field bus networking (not switchable to BACnet MS/TP). Also at Release 10.0, pre-built, single-duct VAV box control applications files replaced VMA14xx controllers programmed with HVACPro. Those pre-built files contained control logic translators to make the VMA1832 controller's VAV box control application better resemble the VMA14xx controller's application created with HVACPro and minimize reconfiguration of the N2 supervisor.

At Release 10.1, pre-built VAV box control applications are no longer provided. Instead, all control logic translators provided by the pre-built, single-duct VAV box control application files are now options that you can select using the CCT System Selection Wizard. Select the N2 Compatibility Options section of the System Selection Wizard to choose the appropriate replacement application (see *Figure 15*).

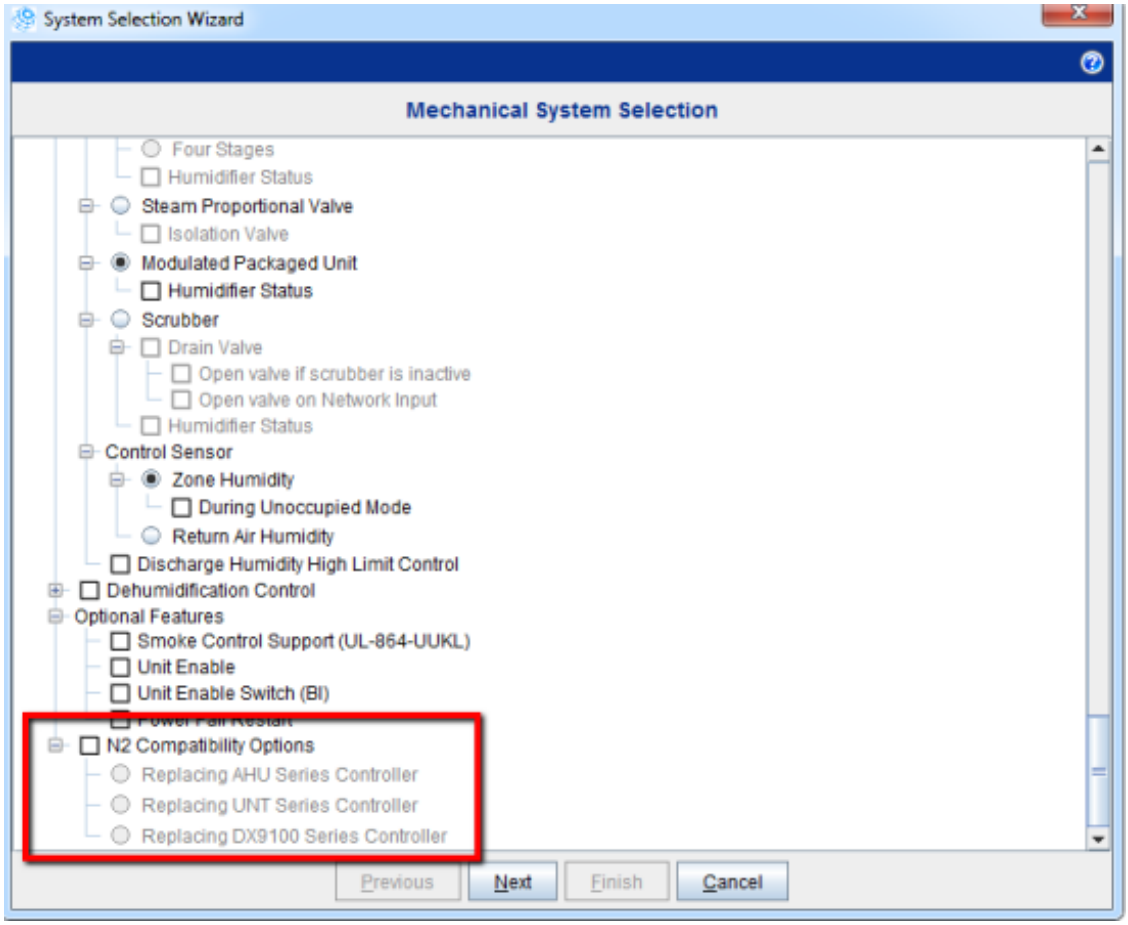
Figure 15: N2 Compatibility Options



N2 Device and Point Configuration

Legacy UNT controllers identify themselves to their N2 supervisor as a **UNT** device type. The FEC supports identifying itself to its N2 supervisor as a UNT device type, which eliminates the need to change this setting in the N2 supervisor's configuration. To configure this capability, use the N2 Mapping feature of CCT as show in *Figure 16*.

Figure 16: Compatibility Options



Additionally, the CCT System Selection Wizard for the Mixed Air Single Duct Air Handling Unit (MASD) application includes an option to automatically define the N2 mapping table to minimize N2 supervisor reconfiguration. All other applications require you to manually create the N2 Mapping Table.

N2 Supervisor Configuration

As described previously, you can configure the FEC controller to identify itself to an N2 supervisor as a UNT device type. If you configure the FEC this way, you do not need to reconfigure the N2 supervisor in this regard.

Also, if you configure the MASD application to automatically generate the N2 mapping table, then you do not need to reconfigure the N2 supervisor in this regard. However, if the FEC N2 point mapping does not exactly match its N2 supervisor's point mapping, then you need to reconfigure the N2 supervisor so that it does. The procedure for performing these changes depends on the type of N2 supervisor.

- For an N30 type N2 supervisor, perform these changes offline using the Project Builder tool. Refer to the *Project Builder User's Guide (LIT-693205)*.
- For an NAE type N2 supervisor, perform these changes offline using the System Configuration Tool (SCT). Refer to *N2 Integration with the NAE Technical Bulletin (LIT-1201683)*.
- For an NCM type N2 supervisor, changing the NCM database requires you to delete the old hardware and define the new hardware. The incremental DDL compile method (@NC+) using the DELETE keyword simplifies the NCM database change. GPL and JC Basic processes may not need to be recompiled. Refer to the *DDL Programmer's Manual (LIT-630010)*.

For replacements that switch to VND Device Type, point mapping is unrestricted. To make the FEC replacement operation as similar as possible to the old UNT device:

- Select a Supervisor Object Type that matches the replaced controller point.
- For multi-state objects, select an appropriate States Text table.
- Use the Supervisor Object Definition to restrict commands.