

**INSTALLATION INSTRUCTIONS FOR LONTALK® MODULE KIT (54W27)
USED WITH ENERGENCE® ROOFTOP UNITS**

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hand and all tools on an unpainted unit surface before performing any service procedure

ELECTROSTATIC
DISCHARGE (ESD)
Precautions and
Procedures

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General

PRODUCT NAME

LonTalk® Control Kit, COCTRL65FF1 - Cat No. 54W27.

VERSION REQUIRED

This module requires either the Prodigy M2 Unit Controller version 7.07 or higher or Prodigy 2.0 M3 Unit controller.

The LonTalk module allows communication between the Lennox Prodigy or Prodigy 2.0 unit controller and a LonWorks® network. The module is LonMark certified to design guidelines version 3.4.

TECHNICAL ASSISTANCE

For assistance, contact Lennox Technical Support at 800-453-6669.

Installation

NOTE - a small flat-head screw driver is required to connect the communication wire to the SmartWire™ connector.

1. Remove power to the unit.
2. Open the compressor access doors.
3. Plug the LonTalk module (see LonTalk module in figure 1) onto the M2 or M3 Unit Controller. Guide pins will align the module with the M2 or M3 unit controller connector.
4. Connect the LonTalk SmartWire™ connector as shown in figures 1 or 2.

M2 UNIT CONTROLLER

This controller will automatically recognize the LonTalk® module and begin communications provided the network has been correctly configured.

To configure the LonTalk network, go to:

SETTINGS > CONTROL = LONTALK

M3 UNIT CONTROLLER

To enable the LonTalk module, go to:

1. **SETUP > INSTALL** and run the setup wizard. When **Configuration ID 1** appears on the screen, configure position **5** as **L**.
2. To configure the LonTalk Network, go to:

SETUP > NETWORK INTEGRATION = LONTALK

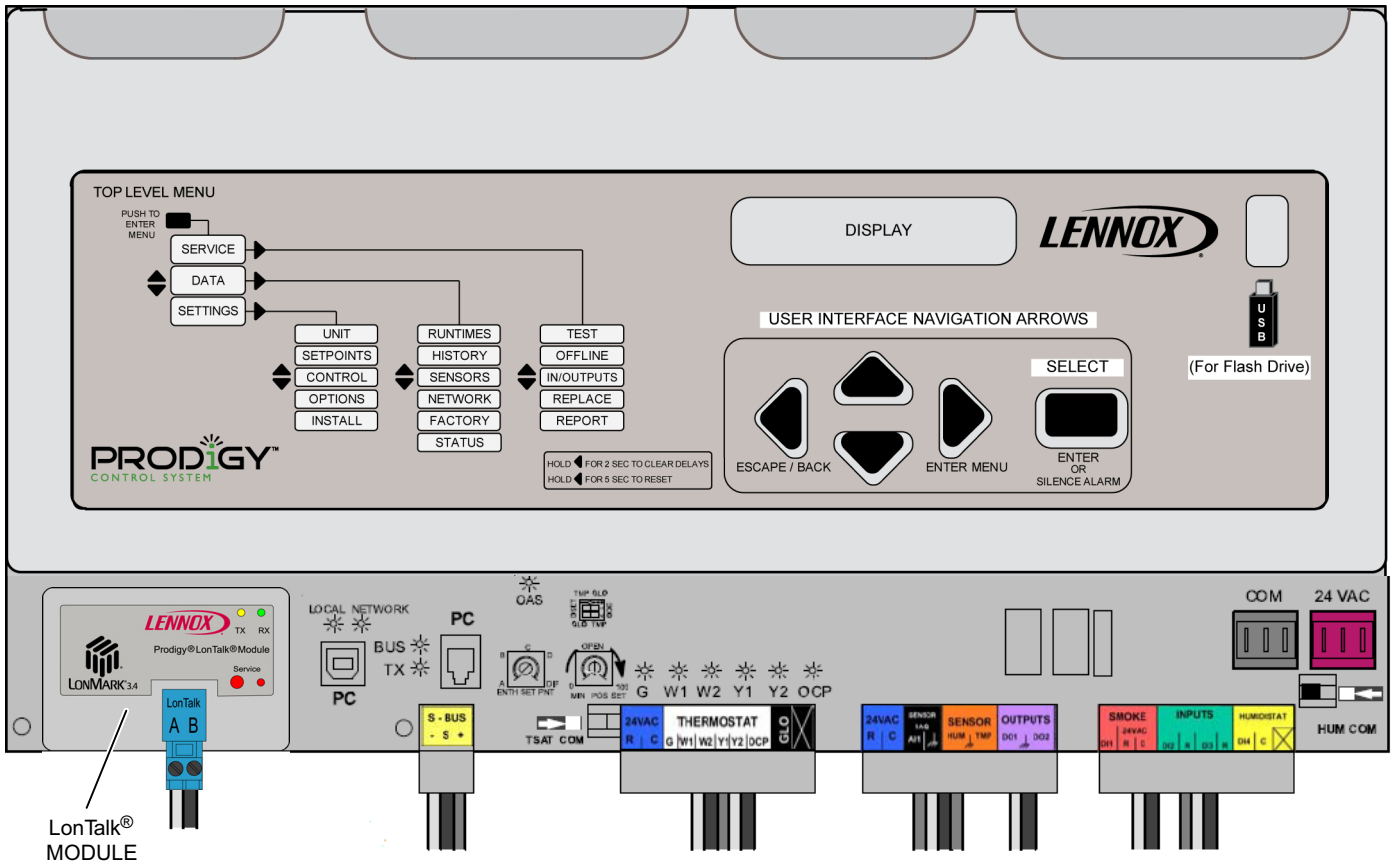


Figure 1. LonTalk® Control Module Installed on Prodigy® M2 Unit Controller

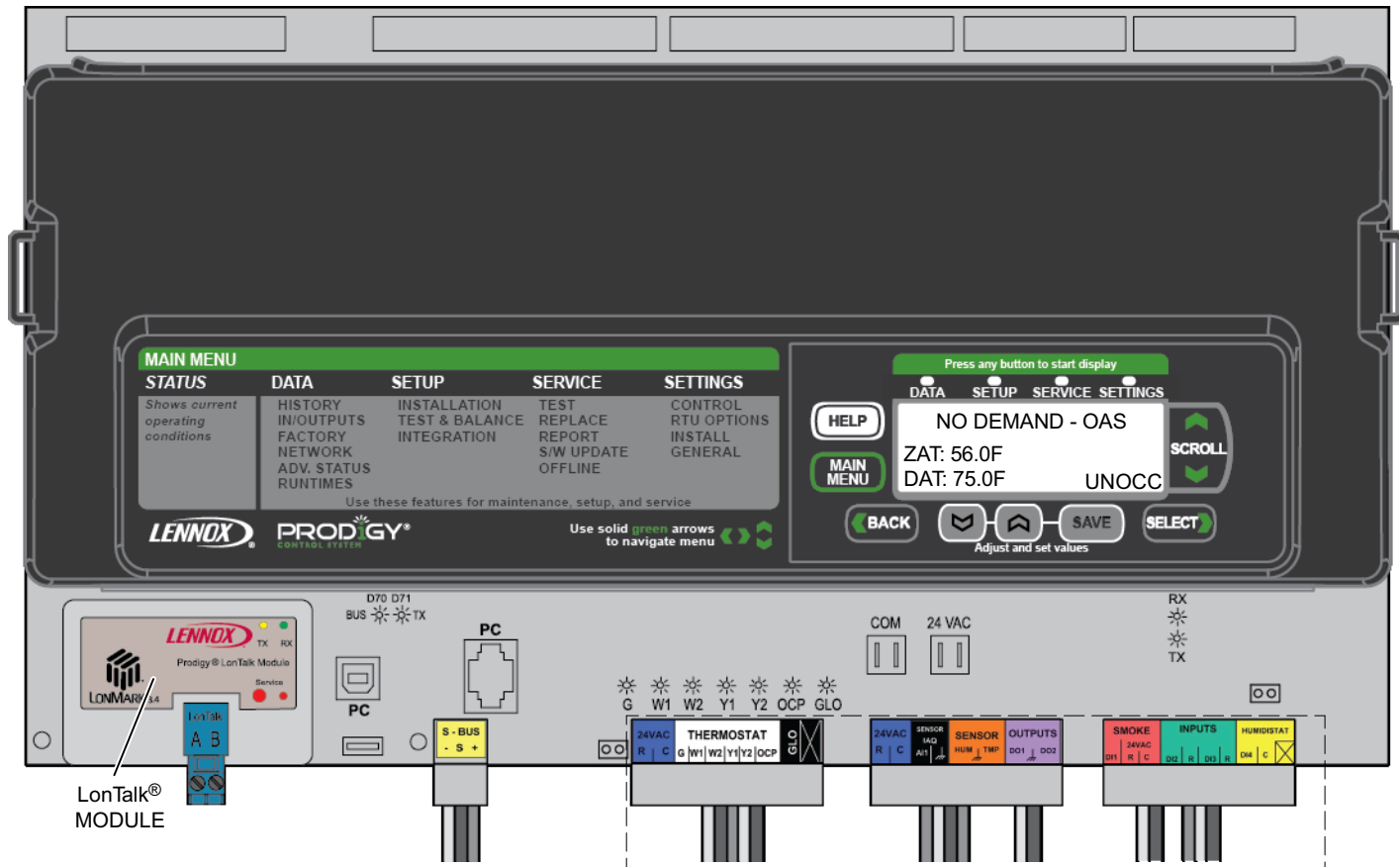


Figure 2. LonTalk® Control Module Installed on Prodigy® 2.0 M3 Unit Controller

Operation and Functional Description

LONWORKS® NETWORK CONNECTION

The LonTalk® module has an FTT-10A Free Topology Transceiver for network communication. The FTT-10A transceiver network supports free topology wiring and will accommodate bus, star, loop, or any combination of these topologies. The module can be located at any point along the network wiring. This capability simplifies system installation and makes it easier to add nodes when required.

LONWORKS® NETWORK CABLE

The LonWorks TP/FT-10 network requires Echelon qualified twisted-pair communication cables such as Belden 8471 or NEMA Level 4 cables. Other Echelon approved equivalent cables may also be used depending on the application. The Belden 8471 or NEMA Level 4 cables are rated for plenum use.

The network cable should be routed using best practices to avoid induced noise. Do not route alongside power lines, or in proximity to high voltage or high frequency devices, such as ignition controls and variable frequency drives. The average temperature of the wire must not exceed 131°F (55°C).

NETWORK LIMITS (FREE TOPOLOGY)

The LonWorks TP/FT-10 free topology network is limited to

a maximum of 64 nodes per segment. The maximum total bus length and the maximum node-to-node length is 1640 ft. (500 m) for Belden 8471 or NEMA Level 4. Maximum lengths are less for other smaller wire size cables. Only one termination circuit module is required at any location along the network. Refer to Echelon LonWorks FTT- Transceiver User's Guide for additional details.

FREE TOPOLOGY NETWORKS

Free topology segments require a termination circuit for proper performance. Only one termination circuit module is required at any location along the network (see figure 3).

NETWORK LIMITS (DOUBLY-TERMINATED TOPOLOGY)

The LonWorks TP/FT-10 Doubly-Terminated topology network is limited to a maximum of 64 nodes per segment. The maximum total bus length is 5000 ft. (1524 m) for Belden 8471 or NEMA Level 4. Maximum bus lengths are less for other smaller wire size cables. The maximum stub length is 9.8 ft. (3 m). In many cases, this bus network is connected in a daisy chain manner where the bus is wired directly to each node, so stub length is zero.

Two field-provided termination circuit modules are required for each segment. One must be located at each end of the network (see figure 4).

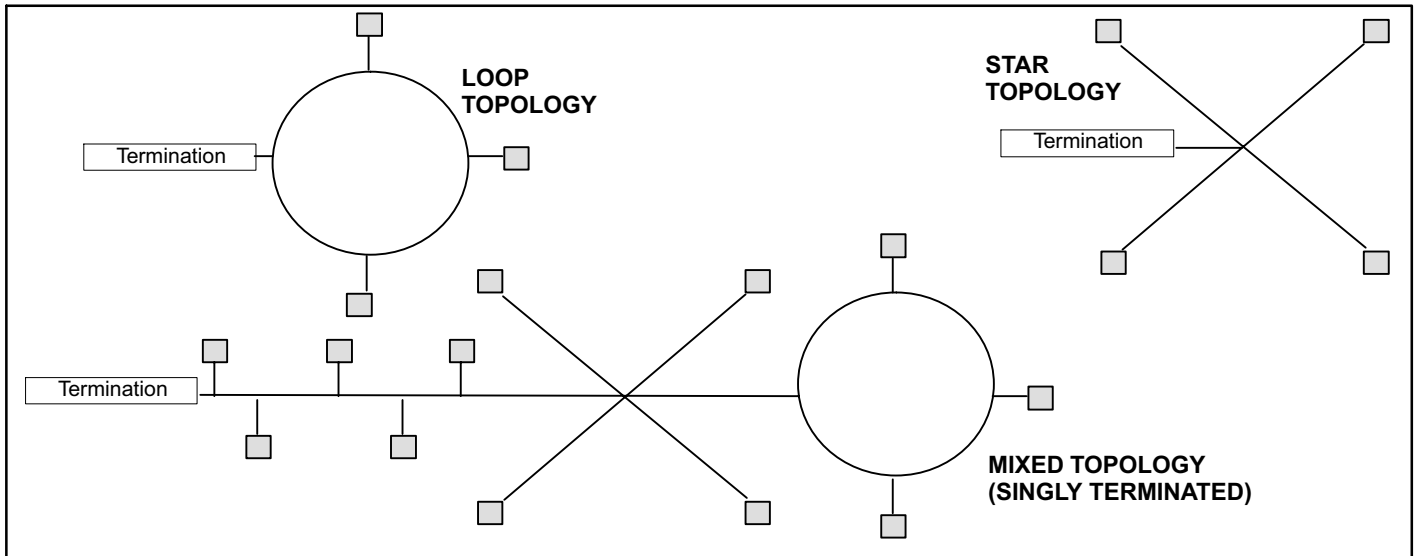


Figure 3. Free Topology Networks

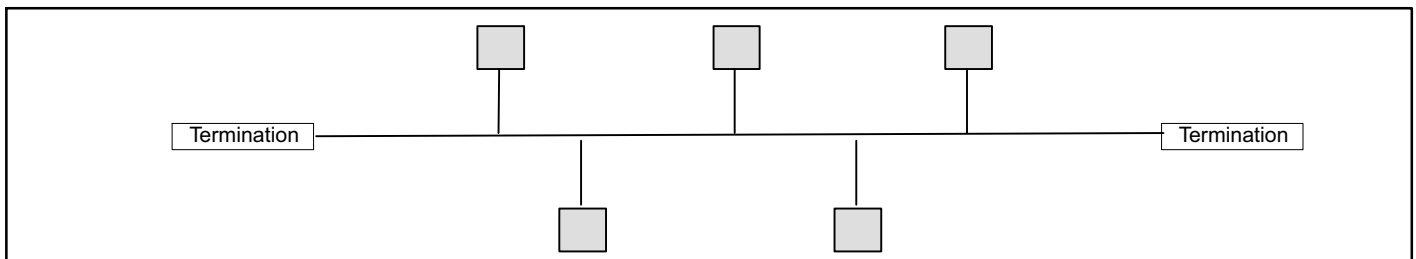


Figure 4. Doubly-Terminated Topology

NETWORK BUS TERMINATION

To install the network bus terminal module 37X75, connect the brown and yellow wires to the network bus that requires single termination and connect the brown and orange wire to the network bus that requires double termination. See figure 7. The unused termination module wire must be covered with a wire nut to prevent potential grounding problems.

NETWORK INTEGRATION

A network configuration tool such as LonMaker® is required to commission the LonWorks network. Press the service button on the LonTalk® module to generate a service message that contains the Neuron ID.

Other commissioning methods may be used. The Neuron address is located on the LonTalk module. An external Interface File (XIF) is available for configuration prior to installation.

PRODIGY® RESET


The Prodigy unit controller may be reset using nviRequest with enumeration RQ_RESET sent to NodeObject function block.

ZONE OR ROOM SENSOR CONTROL

In order to use room temperature setpoints, the Prodigy unit controller must be configured for ZoneTemperature control mode. This may be done through the Prodigy display.

Prodigy - M2 Zone Sensor Control Configuration Procedure:

In order to use nviSpaceIAQ, nviSpaceRH or nviSpaceTemp, the Prodigy M2 unit controller must be configured.

1. Go to the M2 Unit Controller user interface.
2. Use the select button  to enter the menu, and use the up/down buttons to scroll through the options.
3. Go to:

SETTINGS > CONTROL > LONTALK > CONTROL MODE and select **ZONE** for the Zone Temperature control mode.

This is the same as setting the Prodigy ECTO (Electronic Config To Order) parameter 6.01 to a value of 1.

Prodigy 2.0 - M3 Room Sensor Control Configuration Procedure:

In order to use nviSpaceIAQ, nviSpaceRH or nviSpaceTemp, the Prodigy M3 unit controller must be configured.

Go to the M3 Unit Controller user interface.

1. Go to:
SETTINGS > GENERAL > CONFIGURATION ID 1 and verify or change position 5 is set to **L**.
2. Go to:
SETUP > NETWORK INTEGRATION and set to **LONTALK**.
3. Set **CONTROL MODE** to either **MONITOR ONLY** or **ROOM SENSOR**.

If **ROOM SENSOR** is selected, then enabled the applicable sensors (CO2, RH or TEMP).

DATA UPDATE RATE

If nviSpaceTemp, nviOutdoorTemp, nviSpaceRH or nviSpaceIAQ are used, the data needs to be updated within five minutes to be valid.

LONMARK FUNCTION PROFILES

The Prodigy LonTalk module contains two LonMark® functional profile function blocks, space comfort controller-rooftop and discharge air controller. It also contains a Lennox specified functional block, a virtual function block containing the network configuration variables and a node object. See figure 5.

NVI DUPLICATIONS

nviOccSchedule1, (in sccRooftop), and nviOccSchedule, (in dischargeAirCont), are duplicate network variable inputs and only one should be used.

Also, nviFanSpeedCmd and nviSupFanCap have the same functionality and only one should be used.

Both nviSetpoint and nviHCSetpoints change the effective temperature setpoints and only one of them should be used.

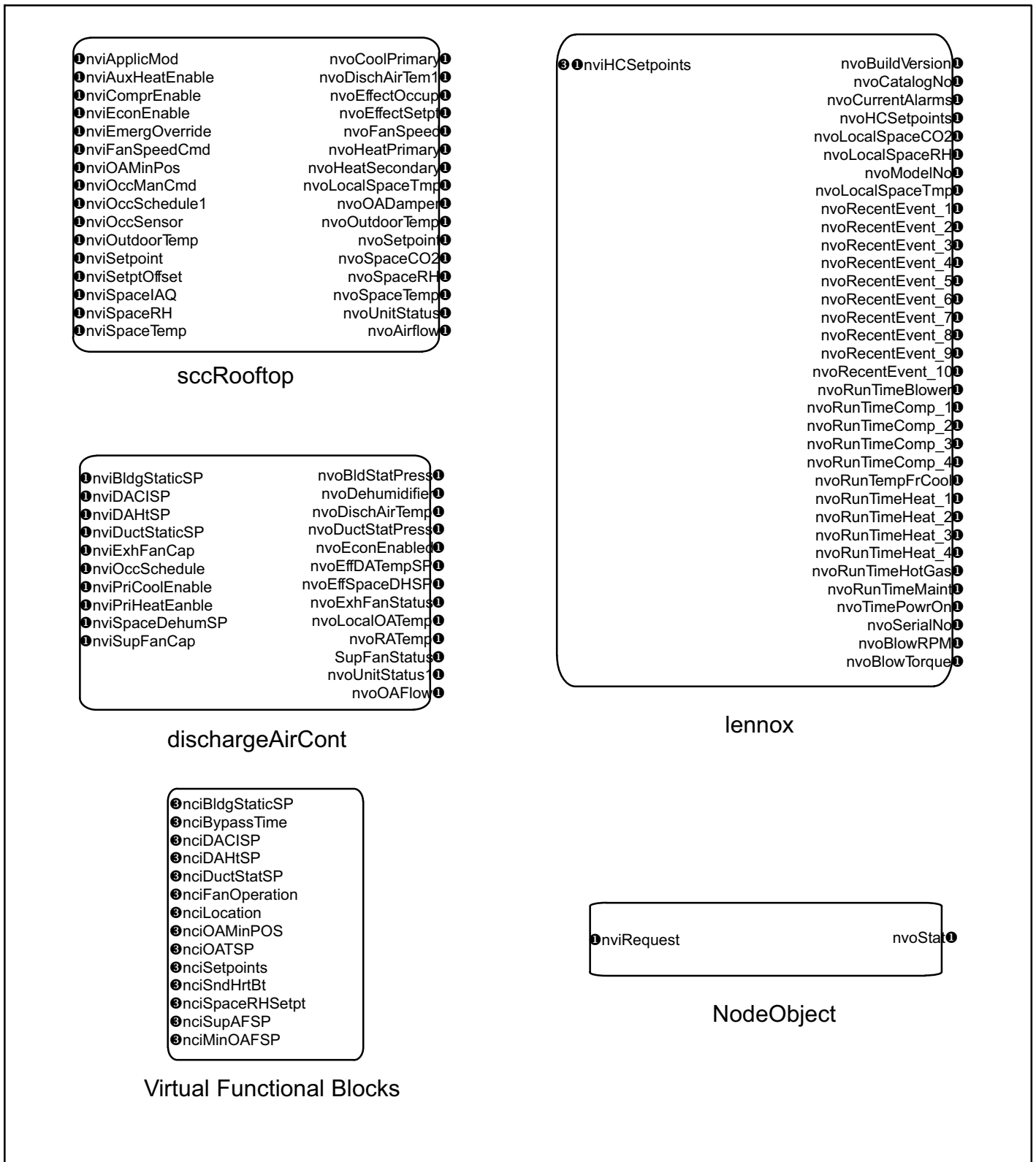


Figure 5. Device Function Blocks

Table 1. Network Variables (sorted alphabetically)

| SNVT Name | SNVT Index | SNVT Name | SNVT Index | SNVT Name | SNVT Index |
|------------------|-------------------|------------------|-------------------|------------------|-------------------|
| nciBldgStaticSP | 40 | nviSetpoint | 8 | nvoOAFlow | 101 |
| nciBypassTime | 104 | nviSetptOffset | 9 | nvoOutdoorTemp | 35 |
| nciDACISP | 38 | nviSpaceDehumSP | 53 | nvoRATemp | 63 |
| nciDAHtSP | 39 | nviSpaceIAQ | 20 | nvoRecentEvent_1 | 71 |
| nciDuctStatSP | 41 | nviSpaceRH | 19 | nvoRecentEvent_2 | 72 |
| nciFanOperation | 66 | nviSpaceTemp | 7 | nvoRecentEvent_3 | 73 |
| nciLocation | 1 | nviSupFanCap | 48 | nvoRecentEvent_4 | 74 |
| nciMinOAFlowSP | 43 | nvoAirflow | 100 | nvoRecentEvent_5 | 75 |
| nciOAMinPos | 5 | nvoBldgStatPress | 60 | nvoRecentEvent_6 | 76 |
| nciOATSP | 42 | nvoBlowRPM | 102 | nvoRecentEvent_7 | 77 |
| nciSetpoints | 4 | nvoBlowTorque | 103 | nvoRecentEvent_8 | 78 |
| nciSndHrtBt | 0 | nvoBuildVersion | 86 | nvoRecentEvent_9 | 79 |
| nciSpaceRHSetpt | 6 | nvoCatalogNo | 85 | nvoRecentEvent10 | 80 |
| nciSupAFSP | 67 | nvoCoolPrimary | 32 | nvoRunTimeBlower | 99 |
| nviApplicMode | 22 | nvoCurrentAlarms | 70 | nvoRunTimeComp_1 | 88 |
| nviAuxHeatEnable | 15 | nvoDehumidifier | 65 | nvoRunTimeComp_2 | 89 |
| nviBldgStaticSP | 50 | nvoDischAirTem1 | 29 | nvoRunTimeComp_3 | 90 |
| nviComprEnable | 14 | nvoDischAirTemp | 54 | nvoRunTimeComp_4 | 91 |
| nviDACISP | 46 | nvoDuctStatPress | 57 | nvoRunTimeFrCool | 92 |
| nviDAHtSP | 47 | nvoEconEnabled | 61 | nvoRunTimeHeat_1 | 95 |
| nviDuctStaticSP | 45 | nvoEffDATempSP | 56 | nvoRunTimeHeat_2 | 96 |
| nviEconEnable | 16 | nvoEffectOccup | 26 | nvoRunTimeHeat_3 | 97 |
| nviEmergOverride | 17 | nvoEffectSetpt | 25 | nvoRunTimeHeat_4 | 98 |
| nviExhFanCap | 49 | nvoEffSpaceDHSP | 64 | nvoRunTimeHotGas | 93 |
| nviFanSpeedCmd | 13 | nvoExhFanStatus | 59 | nvoRunTimeMaint | 87 |
| nviHCSetpoints | 68 | nvoFanSpeed | 28 | nvoRunTimePowrOn | 94 |
| nviOAMinPos | 21 | nvoHCSetpoints | 69 | nvoSerialNo | 84 |
| nviOccManCmd | 11 | nvoHeatPrimary | 30 | nvoSetpoint | 27 |
| nviOccSchedule | 44 | nvoHeatSecondary | 31 | nvoSpaceCO2 | 36 |
| nviOccSchedule1 | 10 | nvoLocalOATemp | 62 | nvoSpaceRH | 34 |
| nviOccSensor | 12 | nvoLocalSpaceCO2 | 81 | nvoSpaceTemp | 23 |
| nviOutdoorTemp | 18 | nvoLocalSpaceRH | 82 | nvoStatus | 3 |
| nviPriCoolEnable | 51 | nvoLocalSpaceTmp | 37 | nvoSupFanStatus | 58 |
| nviPriHeatEnable | 52 | nvoModelNo | 83 | nvoUnitStatus | 24 |
| nviRequest | 2 | nvoOADamper | 33 | nvoUnitStatus1 | 55 |

Table 2. Network Variable Definitions

| Index | SNVT Name | SNVT Type | Functional Block | Send Heartbeat | Application Description |
|-------|-----------------|------------------|--------------------------|----------------|--|
| 0 | nciSndHrtBt | SNVT_time_sec | Virtual Functional Block | — | <ul style="list-style-type: none"> A value of 0 (zero), turns off the send heartbeat function. Values between .01 seconds and 10 are treated as 10 seconds. Ten (10) seconds is the minimum heartbeat supported rate.) |
| 1 | nciLocation | SNVT_str_asc | Virtual Functional Block | — | Location label string. |
| 2 | nviRequest | SNVT_obj_request | NodeObject | — | <ul style="list-style-type: none"> Request an operation or a mode for a functional block within a device. Supported requests are: RQ_NORMAL, RQ_UPDATE_STATUS, RQ_REPORT_MASK. RQ_RESET and RQ_CLEAR_RESET are supported for the NodeObject function block to reset the Prodigy controller. |
| 3 | nvoStatus | SNVT_obj_status | NodeObject | No | Reports the status for a functional block . |
| 4 | nciSetpoints | SNVT_temp_setpt | Virtual Functional Block | — | <ul style="list-style-type: none"> Sets default zone temperature setpoints for the unit. Valid ranges are 40-95°F. The cooling setpoints must be above the corresponding heating setpoint by the unit's auto-changeover dead-band (3°F default). The standby setpoints are not used by the Application |
| 5 | nciOAMinPos | SNVT_lev_percent | Virtual Functional Block | — | <ul style="list-style-type: none"> Sets the outdoor air damper minimum position. Used in modes where outdoor air ventilation is required, except when nviOAMinPos is valid. |
| 6 | nciSpaceRHSetpt | SNVT_lev_percent | Virtual Functional Block | — | <ul style="list-style-type: none"> Defines a dehumidification setpoint for the controlled space. Not used when nviSpaceDehumidSP is valid. |
| 7 | nviSpaceTemp | SNVT_temp_p | sccRooftop | — | <ul style="list-style-type: none"> Supported range: 36.25-to-100°F. Input must be updated within 5 minutes. Must be enabled with ECTO 5.27 (Feature not available in Prodigy 2.0 initial release). |
| 8 | nviSetpoint | SNVT_temp_p | sccRooftop | — | <ul style="list-style-type: none"> Used to set the temperature setpoints for the occupied mode. <i>Note: The unoccupied setpoints are not changed.</i> If a valid value is not present, the appropriate setpoint as configured in nciSetpoints will be used. The "symmetrical method" is used. The effective heat/cool setpoints for the occupied mode are derived from nviSetpoint plus / minus half the occupied deadbands set in the Prodigy ECTO 6.15 (3°F default) or Prodigy 2.0 Parameter 152: effective_occupied_cool = nviSetpoint + 0.5 (changeover_deadband) effective_occupied_heat = nviSetpoint - 0.5 (changeover_deadband) |

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|---|------------------|------------------|------------------|----------------|---|
| 9 | nviSetptOffset | SNVT_temp_p | sccRooftop | — | Used to shift the effective occupied temperature setpoints by adding nviSetptOffset to the current setpoints. |
| 10* | nviOccSchedule1 | SNVT_tod_event | sccRooftop | — | Only current state occupancy mode is supported. |
| * See Appendix B for further information. | | | | | |
| 11* | nviOccManCmd | SNVT_occupancy | sccRooftop | — | Used to command the Space Comfort Controller into different occupancy mode |
| 12* | nviOccSensor | SNVT_occupancy | sccRooftop | — | Used to indicate the presence of occupants in the controlled space . |
| 13 | nviFanSpeedCmd | SNVT_switch | sccRooftop | — | Used to set the unit's blower speed. |
| 14 | nviComprEnable | SNVT_switch | sccRooftop | — | Used to disable compressor operation. |
| 15 | nviAuxHeatEnable | SNVT_switch | sccRooftop | — | Used to disable auxiliary heat operation. |
| 16 | nviEconEnable | SNVT_switch | sccRooftop | — | Used to enable and disable economizer operation. |
| 17 | nviEmergOverride | SNVT_hvac_emerg | sccRooftop | — | <ul style="list-style-type: none"> Used to command the device into different emergency modes. Supported enumerations: EMERG_NORMAL EMERG_PRESSURIZE EMERG_DEPRESSURIZE EMERG_PURGE EMERG_SHUTDOWN EMERG_NUL |
| 18 | nviOutdoorTemp | SNVT_temp_p | sccRooftop | — | <ul style="list-style-type: none"> Supported range: -30.6 to 131.6°F. Input must be updated within 5 minutes. |
| 19 | nviSpaceRH | SNVT_lev_percent | sccRooftop | — | <ul style="list-style-type: none"> Input must be updated within 5 minutes. Must be enabled with ECTO 5.27 |
| 20 | nviSpaceIAQ | SNVT_ppm | sccRooftop | — | <ul style="list-style-type: none"> Supported range: 0 to 2,000 ppm. Input must be updated within 5 minutes. Must be enabled with ECTO 5.27 (Feature not available in Prodigy 2.0 initial release). |
| 21 | nviOAMinPos | SNVT_lev_percent | sccRooftop | — | <ul style="list-style-type: none"> Used to provide a dynamic minimum position setpoint for an outdoor air damper. When valid it will supersede nciOAMinPos. |
| 22 | nviApplicMode | SNVT_hvac_mode | sccRooftop | — | <ul style="list-style-type: none"> Used to set the unit's operating mode. Supported values: AUTO, HEAT ONLY, COOL ONLY, FAN ONLY, OFF Must be updated within 120 minutes, if used. |
| 23 | nvoSpaceTemp | SNVT_temp_p | sccRooftop | Yes | <ul style="list-style-type: none"> This output is the effective space temperature value that the control is using. The support range is 36 to 100°F. |
| 24 | nvoUnitStatus | SNVT_hvac_status | sccRooftop | Yes | Reports the controller status. |
| 25 | nvoEffectSetpt | SNVT_temp_p | sccRooftop | Yes | Reports the current effective space temperature setpoint. |
| 26* | nvoEffectOccup | SNVT_occupancy | sccRooftop | No | Reports the effective occupancy state (see Appendix B). |
| 27 | nvoSetpoint | SNVT_temp_p | sccRooftop | No | Reports the current setpoint without the application of nviSetptOffset. |

Table 2. Network Variable Definitions

| Index | SNVT Name | SNVT Type | Functional Block | Send Heartbeat | Application Description |
|-------|------------------|------------------|--------------------------|----------------|---|
| 28 | nvoFanSpeed | SNVT_switch | sccRooftop | Yes | Reports the current unit blower speed |
| 29 | nvoDischAirTemp | SNVT_temp_p | sccRooftop | No | <ul style="list-style-type: none"> • Reports the discharge temperature value. • Supported range, -8 to +163°F. |
| 30 | nvoHeatPrimary | SNVT_lev_percent | sccRooftop | Yes | Reports the current primary heat output value. |
| 31 | nvoHeatSecondary | SNVT_lev_percent | sccRooftop | Yes | Reports the current secondary heat output value, (heat pumps only). |
| 32 | nvoCoolPrimary | SNVT_lev_percent | sccRooftop | Yes | Reports the current cooling output value. |
| 33 | nvoOADamper | SNVT_lev_percent | sccRooftop | Yes | Reports the current outdoor air damper position. |
| 34 | nvoSpaceRH | SNVT_lev_percent | sccRooftop | Yes | Reports the effective space relative humidity value. |
| 35 | nvoOutdoorTemp | SNVT_temp_p | sccRooftop | Yes | <ul style="list-style-type: none"> • Reports the effective outdoor temperature value. • Supported range, -30 to +130°F. |
| 36 | nvoSpaceCO2 | SNVT_ppm | sccRooftop | Yes | <ul style="list-style-type: none"> • Reports the effective space carbon dioxide value. • Supported range, 0 to 2,000 ppm. |
| 37 | nvoLocalSpaceTmp | SNVT_temp_p | sccRooftop | Yes | <ul style="list-style-type: none"> • Reports the space temperature measured by the locally wire sensor. • Supported range, 36 to 100°F. |
| 38 | nciDACISP | SNVT_temp_p | Virtual Functional Block | — | <ul style="list-style-type: none"> • Sets the default discharge air cooling temperature setpoint. • Supported range: 40 to 80°F. |
| 39 | nciDAHTSP | SNVT_temp_p | Virtual Functional Block | — | <ul style="list-style-type: none"> • Sets the default discharge air heating temperature setpoint. • Supported range: 80 to 140°F. |
| 40 | nciDuctStatSP | SNVT_press_p | Virtual Functional Block | — | <ul style="list-style-type: none"> • Sets the default duct static pressure set point. • Supported range: 0 to 1245 Pa. |
| 41 | nciOATSP | SNVT_temp_p | Virtual Functional Block | — | <ul style="list-style-type: none"> • Sets the outdoor air temperature setpoint to enable free-cooling for units with economizers. • Supported range: 40 to 70°F. |
| 42 | nciBldgStaticSP | SNVT_press_p | Virtual Functional Block | — | <ul style="list-style-type: none"> • Sets the default building static pressure setpoint for exhaust control. • Supported range -124.5 to 124.5 Pa. |
| 43 | nciMinOAFflowSP | SNVT_flow | Virtual Functional Block | — | <ul style="list-style-type: none"> • Set the default outdoor airflow for EP enabled roof top units. • Supported range – 0 to 150 cfm/ton • Multiply the CFM/ton value with tonnage of the unit to derive the value in CFM. |
| 44 | nviOccSchedule | SNVT_tod_event | dischargeAirCont | — | Only current state is supported. |
| 45 | nviDuctStaticSP | SNVT_press_p | dischargeAirCont | — | <ul style="list-style-type: none"> • Sets the duct static pressure setpoint. • Supported range: 0 to 1245 Pa. |
| 46 | nviDACISP | SNVT_temp_p | dischargeAirCont | — | <ul style="list-style-type: none"> • Sets the discharge air cooling temperature setpoint. • Supported range: 40 to 80°F. |

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|-------|------------------|------------------|--------------------------|----------------|---|
| 47 | nviDAHTSP | SNVT_temp_p | dischargeAirCont | — | <ul style="list-style-type: none"> Sets the discharge air heating temperature setpoint. Supported range: 80 to 140°F. |
| 48 | nviSupFanCap | SNVT_lev_percent | dischargeAirCont | — | Sets the unit's blower speed. |
| 49 | nviExhFanCap | SNVT_lev_percent | dischargeAirCont | — | Sets the unit's exhaust fan speed. |
| 50 | nviBldgStaticSP | SNVT_press_p | dischargeAirCont | — | <ul style="list-style-type: none"> Sets the building static pressure setpoint for exhaust control. Supported range -124.5 to 124.5 Pa. |
| 51 | nviPriCoolEnable | SNVT_switch | dischargeAirCont | — | Used to disable compressor operation. |
| 52 | nviPriHeatEnable | SNVT_switch | dischargeAirCont | — | Used to disable primary heating operation. |
| 53 | nviSpaceDehumSP | SNVT_lev_percent | dischargeAirCont | — | Sets the dehumidification RH setpoint. |
| 54 | nvoDischAirTemp | SNVT_temp_p | sccRooftop | No | <ul style="list-style-type: none"> Reports the discharge air temperature. Supported range: -8 to 131°F. |
| 55 | nvoUnitStatus1 | SNVT_hvac_status | dischargeAirCont | Yes | Reports the controller status. Same as nvoUnitStatus in sccRooftop function block. |
| 56 | nvoEffDATempSP | SNVT_temp_p | dischargeAirCont | Yes | Reports the effective discharge air temperature setpoint. |
| 57 | nvoDuctStatPress | SNVT_press_p | dischargeAirCont | Yes | <ul style="list-style-type: none"> Reports the duct static pressure. Supported range: 0 to 1245 Pa. |
| 58 | nvoSupFanStatus | SNVT_switch | dischargeAirCont | Yes | Reports unit blower speed. |
| 59 | nvoExhFanStatus | SNVT_switch | dischargeAirCont | Yes | Reports exhaust fan speed. |
| 60 | nvoEconEnabled | SNVT_switch | dischargeAirCont | Yes | Reports free-cooling status of economizer. |
| 61 | nvoBldgStatPress | SNVT_press_p | dischargeAirCont | Yes | <ul style="list-style-type: none"> Reports the building static pressure. Supported range: -124.5 to +124.5 Pa. |
| 62 | nvoLocalOATemp | SNVT_temp_p | dischargeAirCont | Yes | <ul style="list-style-type: none"> Reports locally measured outdoor temperature. Supported range: -30 to +130°F. |
| 63 | nvoRATemp | SNVT_temp_p | dischargeAirCont | Yes | <ul style="list-style-type: none"> Reports effective return air temperature. Supported range: -8 to +163°F. |
| 64 | nvoEffSpaceDHSP | SNVT_press_p | dischargeAirCont | Yes | Reports effective relative humidity setpoint for dehumidification. |
| 65 | nvoDehumidifier | SNVT_switch | dischargeAirCont | Yes | Reports status of dehumidification operation. |
| 66 | nciFanOperation | SCPTfanOperation | Virtual Functional Block | — | Sets the operation mode for the unit blower during occupied state. |
| 67 | nciSupAFSP | UNVT_SupAF_Stps | Virtual Functional Block | — | <ul style="list-style-type: none"> Sets the default Airflow settings for a SmartAirflow™ enabled roof top units in lit/sec units. For valid ranges please refer to the Appendix A. |
| 68 | nviHCSetpoints | SNVT_temp_setpt | lennox | — | <ul style="list-style-type: none"> Valid ranges are 40-to-95°F (cooling). The cooling setpoints must be above the corresponding heating setpoint by the unit's Autochangeover Deadband (ECTO 6.15, 3°F default or Prodigy 2.0 Parameter 152). The standby set points are not used by the Application |

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| Index | SNVT Name | SNVT Type | Functional Block | Send Heartbeat | Application Description |
|-------|------------------|---------------------|------------------|----------------|--|
| 69 | nvoHCSetpoints | SNVT_temp_setpt | lennox | No | <ul style="list-style-type: none"> Reports zone temperature setpoints. Standby setpoints are not used and are returned with the unoccupied values. |
| 70 | nvoCurrentAlarms | UNVT_currentAlarms | lennox | Yes | Reports currently active alarms codes. |
| 71 | nvoRecentEvent_1 | UNVT_event | lennox | Yes | Reports most recent alarm code with time of occurrence. |
| 72 | nvoRecentEvent_2 | UNVT_event | lennox | No | Reports second most recent alarm with time of occurrence. |
| 73 | nvoRecentEvent_3 | UNVT_event | lennox | No | Reports alarm with time of occurrence. |
| 74 | nvoRecentEvent_4 | UNVT_event | lennox | No | |
| 75 | nvoRecentEvent_5 | UNVT_event | lennox | No | |
| 76 | nvoRecentEvent_6 | UNVT_event | lennox | No | |
| 77 | nvoRecentEvent_7 | UNVT_event | lennox | No | |
| 78 | nvoRecentEvent_8 | UNVT_event | lennox | No | |
| 79 | nvoRecentEvent_9 | UNVT_event | lennox | No | |
| 80 | nvoRecentEvent10 | UNVT_event | lennox | No | |
| 81 | nvoLocalSpaceCO2 | SNVT_ppm | lennox | No | <ul style="list-style-type: none"> Reports locally measured space carbon dioxide level. Supported range: 0 to 2,000 ppm. |
| 82 | nvoLocalSpaceRH | SNVT_lev_percent | lennox | No | Reports locally measured space relative humidity level. |
| 83 | nvoModelNo | SNVT_str_asc | lennox | No | Reports unit model number. |
| 84 | nvoSerialNo | SNVT_str_asc | lennox | No | Reports unit serial number. |
| 85 | nvoCatalogNo | SNVT_str_asc | lennox | No | Report unit catalog number. |
| 86 | nvoBuildVersion | SNVT_str_asc | lennox | No | Reports firmware version string. |
| 87 | nvoRunTimeMaint | UNVT_maint_runtimes | lennox | No | Reports air filter, blower belt and UV lamp run-times. |
| 88 | nvoRunTimeComp_1 | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for compressor 1. |
| 89 | nvoRunTimeComp_2 | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for compressor 2. |
| 90 | nvoRunTimeComp_3 | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for compressor 3. |
| 91 | nvoRunTimeComp_4 | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for compressor 4. |
| 92 | nvoRunTimeFrCool | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for free cooling operation. |
| 93 | nvoRunTimeHotGas | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for hot gas bypass dehumidification. |
| 94 | nvoRunTimePowrOn | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for unit power on. |
| 95 | nvoRunTimeHeat_1 | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for heat stage 1. |
| 96 | nvoRunTimeHeat_2 | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for heat stage 2. |
| 97 | nvoRunTimeHeat_3 | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for heat stage 3. |
| 98 | nvoRunTimeHeat_4 | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for heat stage 4. |

Table 2. Network Variable Definitions

| Index | SNVT Name | SNVT Type | Functional Block | Send Heartbeat | Application Description |
|-------|------------------|---------------------|------------------------|----------------|---|
| 99 | nvoRunTimeBlower | UNVT_minutes_cycles | lennox | No | Reports run-time and cycle count for blower. |
| 100 | nvoAirflow | SNVT_flow | ssRooftop | Yes | <ul style="list-style-type: none"> • Reports the amount of current supply airflow. • Supported range: 0-480 cfm/ton |
| 101 | nvoOAFflow | SNVT_flow | dischargeAirCont | Yes | <ul style="list-style-type: none"> • Reports the amount of outdoor airflow. • Supported range: 0-480 cfm/ton |
| 102 | nvoBlowRPM | SNVT_rpm | lennox | Yes | <ul style="list-style-type: none"> • Reports the blower motor speed. • Supported range: 0-1500 rpm |
| 103 | nvoBlowTorque | SNVTlev_percent | lennox | Yes | <ul style="list-style-type: none"> • Reports the PWM of an ECM blower motor. • Supported range: 0 – 100 % |
| 104 | nciBypassTime | SNVT_time_min | Virtual Function Block | — | <ul style="list-style-type: none"> • This configuration defines the maximum amount of time that the controller can be in the bypass (occupancy) mode following a single bypass request from either a local (hardwired) bypass switch or nviOccManCmd. • Additional Bypass requests can restart the timer. |

* See Appendix B for further information.

Table 3. Variable Type Definitions

| SNVT Type | Definition | SNVT Type | Definition |
|------------------|--|----------------------|--|
| SCPTfanOperation | fan_operation_t Enumeration, 1 byte Value Identifier Notes -1 (0xFF) HVF_NUL Invalid Value 1 HVF_CYCLE Fan cycles with heating and cooling 2 HVF_CON_CYCLE Continuous in occupied, cycles in occupied standby | SNVT_time_min | Elapsed Time Signed Long, 2 bytes Valid Range: 0 .. 65,535 Minutes Resolution: 1 Minute |
| SNVT_hvac_emerg | emerg_t Enumeration, 1 byte | SNVT_time_sec | Elapsed Time Signed Long, 2 bytes Valid Range: 0 .. 6,5535 Seconds Resolution: .01 Seconds |
| SNVT_hvac_mode | hvac_t Enumeration, 1 byte | SNVT_time_stamp | typedef struct { signed long year; unsigned short month; unsigned short day; unsigned short hour; unsigned short minute; unsigned short second; } SNVT_time_stamp; |
| SNVT_hvac_status | typedef struct { hvac_t mode; signed long heat_output_primary; signed long heat_output_secondary; signed long cool_output; signed long econ_output; signed long fan_output; unsigned short in_alarm; } SNVT_hvac_status; | SNVT_tod_event | typedef struct { occup_t current_state; occup_t next_state; unsigned long time_to_next_state; }SNVT_tod_event |
| SNVT_lev_percent | Signed Long, 2 bytes Valid Type Range: -163.840 .. 163.830 Type Resolution: 0.005 Invalid Value: 32,767 (0x7FFF) | UNVT_currentAlarms | typedef struct { unsigned short AlarmCount; event_code_t AlarmCode1; event_code_t AlarmCode2; event_code_t AlarmCode3; event_code_t AlarmCode4; event_code_t AlarmCode5; event_code_t AlarmCode6; event_code_t AlarmCode7; }UNVT_currentAlarms; |
| SNVT_occupancy | occup_t Enumeration, 1 byte | UNVT_event | typedef struct { event_code_t Event; struct EventStatus { unsigned reserved :1; unsigned currentlyActiveAlarm :1; unsigned UnitOffOnAlarm :1; unsigned reserved5bits :5; }; SNVT_time_stamp EventTime; };UNVT_event |
| SNVT_ppm | Unsigned Long, 2 bytes Valid Range: 0 .. 65,535 Parts per Million (ppm) | UNVT_maint_run-times | typedef struct { signed quad filter_time_minutes; signed quad belt_time_minutes; signed quad UV_lamp_time_minutes; }UNVT_maint_runtimes; |
| SNVT_press_p | Signed Long, 2 bytes Valid Type -32768 .. 32,766 Pascals Invalid Value 32,767 (0x7FFF) | UNVT_min-utes_cycles | typedef struct { signed quad minutes; signed quad cycles; }UNVT_minutes_cycles; |
| SNVT_str_asc | ASCII character string with NUL terminator 30 characters max, 31 bytes | UNVT_SupAF_Stps | typedef struct { unsigned long HeatSP; unsigned long HiCoolSP; unsigned long MHCoolSP; unsigned long MLCoolSP; unsigned long LoCoolSP; unsigned long VentSP; unsigned long SmokeSP; }UNVT_SupAF_Stps All the above parameters follow the same unit convention as SNVT_flow. |
| SNVT_switch | typedef struct { unsigned value; signed state; } SNVT_switch; value: percentage of full scale, resolution 0.5% state: can either be -1 (NULL), 0 (OFF), or 1 (ON) | | |
| SNVT_temp_p | Temperature Signed Long 2 bytes Valid Range: -273.17 .. 327.66 Resolution: 0.01 Degrees Celsius Invalid Value: 32,767 (0x7FFF) | | |
| SNVT_temp_setpt | typedef struct { signed long occupied_cool; signed long standby_cool; signed long unoccupied_cool; signed long occupied_heat; signed long standby_heat; signed long unoccupied_heat; } SNVT_temp_setpt; | | |
| SNVT_flow | Flow Volume Unsigned Long, 2 bytes Valid Range: 0 .. 65,534 lit/sec Resolution: 1 lit/sec Convert to CFM 1 cfm = 0.4719474432 lit/sec | | |
| SNVT_rpm | Revolutions per minute Unsigned Long, 2 bytes Valid Range: 0 .. 65,534 RPM Resolution: 1 RPM | | |

Network Configuration Parameter Implementation

Table 4 shows which Prodigy ECTO (Electronic Config To Order) parameters are updated with Network Configuration Parameter (nci) parameter updates. Parameters Refer to Prodigy Application Guide for ECTO details.

Table 4. Network Configuration Parameter to Prodigy M2 Electronic-Config-To-Order Parameter Relationships

| nci | ECTO |
|-----------------|------|
| nciBldgStaticSP | 8.20 |
| nciBypassTime | 6.06 |
| nciDACISP | 7.16 |
| nciDAHtSP | 7.10 |
| nciDuctStatSP | 0.16 |

| nci | ECTO |
|-----------------|--|
| nciFanOperation | 6.17 |
| nciMinOAFFlowSp | 10.17 |
| nciSupAFSP | HeatSP – 10.5 HiCoolSP – 10.2 MHCoolSP – 10.4 MLCoolSP – 10.3 LoCoolSP – 10.1 VentSP - 10.6 SmokeSP – 10.7 |
| nciOAMinPos | 5.24 |
| nciOATSP | 6.26 |
| nciSetpoints | 6.02 – 6.05 |
| nciSpaceRHSetpt | 4.25 |

Table 4 shows which Prodigy 2.0 Parameters are updated with Network Configuration Parameter (nci) parameter updates. Parameters Refer to Prodigy 2.0 Application Guide for Parameter details.

Table 5. Network Configuration Parameter to Prodigy 2.0 M3 Parameter Relationships

| nci | Parameter |
|-----------------|-----------|
| nciBldgStaticSP | 215 |
| nciBypassTime | 141 |
| nciDACISP | 180 |
| nciDAHtSP | 174 |
| nciDuctStatSP | 37 |

| nci | Parameter |
|-----------------|--|
| nciFanOperation | 154 |
| nciMinOAFFlowSp | 237 |
| nciSupAFSP | HeatSP – 13 HiCoolSP – 14 MHCoolSP – 15 MLCoolSP – 16 LoCoolSP – 17 VentSP - 18 SmokeSP – 12 |
| nciOAMinPos | 132 |
| nciOATSP | 160, 161, 162, 163 |
| nciSetpoints | 137 - 140 |
| nciSpaceRHSetpt | 106 |

APPENDIX A — SUPPLY AIRFLOW TARGETS

The maximum and minimum values of Supply Airflow Targets in CFM units are as below in CFM.

Table 6. Emergence® A Box Supply Airflow Targets

| UNIT SIZE (A Boxes) | 36 | 48 | 60 |
|--|-----------|-----------|-----------|
| Maximum High Speed Target and Heat Mode Target (480 CFM/ton) | 1450 | 1925 | 2400 |
| Minimum High Speed Target (280 CFM/ton) | 850 | 1125 | 1400 |
| Minimum Low Speed Target (220 CFM/ton) | 650 | 875 | 1100 |
| Minimum Ventilation Target (150 CFM/ton) | 450 | 600 | 750 |
| Minimum Heat Mode Target Standard Gas Heat (S,W) | 975 | 975 | 975 |
| Minimum Heat Mode Target Medium Gas Heat (M, Q, U, Y) | 1125 | 1125 | 1125 |
| Minimum Heat Mode Target High Gas Heat Minimum (H, T, X, Z) | 1300 | 1300 | 1300 |
| Minimum Heat Mode Target Electric Heat | 1075 | 1275 | 1600 |
| Maximum Outdoor Airflow (150 cfm/ton) | 450 | 600 | 750 |

Note:

1. Maximum Ventilation Target should be less than High Speed Target or Heat Mode Target
2. Maximum Low Speed Target should be less than High Speed Target
3. CFM units to liters/sec units conversion factor: 1 CFM = 0.4719474432 lit/sec
4. All CFMs are rounded to the nearest 25 CFM increment.

APPENDIX B — LONTALK® OCCUPANCY SIGNALS AND BLOWER OPERATION

This section describes how LonTalk® occupancy signals are combined to produce effective occupancy along with the applicable unit controller parameter setting.

PRODIGY M2 UNIT CONTROLLER BLOWER OPERATIONS WITH EFFECTIVE OCCUPANCY

This section describes how LonTalk® occupancy signals are combined to produce effective occupancy.

The blower runs to service heat and cool demands, regardless of the space occupancy. But when there is no heating or cooling demand there are options for how the blower should operate in conjunction with occupancy signals to keep the space ventilated, or the air stirred.

In **SETTINGS > CONTROL** menus the option for **BLOWER ON OCP** is selected as **CYCLES** or **ALWAYS ON**. These correspond to ECTO 6.17 settings of 0 or 1, respectively. These settings govern whether the blower runs continuously when the space is considered occupied (=1), or cycles on/off with the heating and cooling demand (=0). ECTO 6.17 only

applies to the room sensor control modes, and not to the local or network thermostat modes. In those modes the blower is controlled by the **G** thermostat or DDC signal.

To comply with the California Energy Commission Title 24 standard there are two additional blower/occupancy settings that are set directly by changing ECTO 6.17 from the **SETTINGS>CONTROL > ECTO** menu. These two additional options are available when using *LonTalk* that supplies a room occupancy signal (in addition to the scheduled occupancy).

There are two new CEC Title 24 settings for ECTO 6.17. Those two options are 2 and 3 and a description of both are provided in table 7.

Table 7. ECTO 6.17 Description

| ECTO 6.17 | Occupancy Blower Duty Description |
|-----------|--|
| 0 | Blower cycles on/off with demand. (Legacy usage.) |
| 1 | Blower runs when either the occupancy sensor or schedule, or both, indicates occupied. (Legacy usage.) |
| 2 | Blower runs when both the occupancy sensor and schedule indicate occupied. |
| 3 | The same as option 2, but blower runs for 30 minutes and is off for 90 minutes when schedule is occupied but the occupancy sensor is not occupied. |

Table 8. Blower Operation Description

| Blower Operation | Description |
|------------------|--|
| On | Blower runs continuously. |
| Cycles | Blower cycles on/off with demand. |
| Cycles w/Stir | Blower cycles on/off with demand; during off cycle blower is on 30 minutes of 120. |

Table 9. Blower Operation Schedule

| Manual | Schedule | Sensor | Effective Occupancy | M2 ECTO 6.17 | Blower Operation |
|--------|----------|----------|---------------------|--------------|------------------|
| 0, 2 | n/a | n/a | OCCUPIED | 0 | Cycles |
| | | | | 1 | On |
| | | | | 2 | On |
| | | | | 3 | On |
| 1 | n/a | n/a | UNOCCUPIED | 0 | Cycles |
| | | | | 1 | Cycles |
| | | | | 2 | Cycles |
| | | | | 3 | Cycles |
| 3-255 | 0 | 0, 2-255 | OCCUPIED | 0 | Cycles |
| | | | | 1 | On |
| | | | | 2 | On |
| | | | | 3 | On |
| 3-255 | 0 | 1 | OCCUPIED | 0 | Cycles |
| | | | | 1 | On |
| | | | | 2 | Cycles |
| | | | | 3 | Cycles w/Stir |
| 3-255 | 1-255 | n/a | UNOCCUPIED | 0 | Cycles |
| | | | | 1 | Cycles |
| | | | | 2 | Cycles |
| | | | | 3 | Cycles |

Table 10. LonTalk® Occupancy Points

| Mode | LonTalk® | Value |
|----------------------------|------------------------------|--|
| Manual | nviOccManCmd Index = 11 | 0: space occupied |
| | | 1: space unoccupied |
| | | 2: refresh space occupied override timer |
| | | 3-255: auto; clear timer and return to scheduler |
| Schedule | nviOccSched1 Index = 10 | 0: space occupied |
| | | 1-255: space unoccupied |
| Sensor | nviOccSensor Index = 12 | 0: space occupied |
| | | 1: space unoccupied |
| | | 2-255: auto; return to occupancy scheduler state |
| Effective Occupancy | nvoEffectOccup Index = 26 | 0: space occupied |
| | | 1: space unoccupied |
| | | 2: space occupied (timed override) |

PRODIGY 2.0 M3 UNIT CONTROLLER BLOWER OPERATIONS WITH EFFECTIVE OCCUPANCY

This section describes how LonTalk® occupancy signals are combined to produce effective occupancy.

The blower runs to service heat and cool demands, regardless of the space occupancy. However when there is no heating or cooling demand there are options for how the blower should operate in conjunction with occupancy signals to keep the space ventilated, or the air stirred.

1. California Energy Commission Title 24

- A. The legacy option settings for **OCC Blower Mode** are **AUTO CYCLES** or **ON-CONTINUOUS 1**. These settings govern whether the blower runs continuously when the space is considered occupied or cycles on/off with the heating and cooling demand.
- B. To comply with the California Energy Commission Title 24 standard there are two additional values for OCC Blower Mode which are **ON-CONTINUOUS 2** and **ON-CONTINUOUS 3**. See table 11 for their descriptions.

C. These two new options are available when using LonTalk that supplies a room occupancy signal (in addition to the scheduled occupancy).

2. Enabling Network Type

To **enable** the network module, go to **SETUP > INSTALL** and run the setup wizard. When **Configuration ID 1** appears on the screen, configure position 5 to **L = LonTalk**.

3. Menu Setup Procedure Method for OCC Blower Mode

These blower control options are handled by the OCC Blower Mode. These setting can be changed using the following menu path:

Go to **SETUP > NETWORK INTEGRATION > NETWORK = LONTALK > (additional prompts concerning network configuration and sensor types will be asked) CONTROL MODE = ROOM SENSOR > ROOM SENSOR OCC BLOWER MODE =** (see table 11).

Table 11. Blower Operation Description

| OCC Blower Mode | Description |
|------------------------|--|
| AUTO CYCLES | Blower cycles on/off with demand. (Legacy usage.) |
| ON-CONTINUOUS 1 | Blower runs when either the occupancy sensor or schedule, or both, indicates occupied. (Legacy usage.) |
| ON-CONTINUOUS 2 | Blower runs when both the occupancy sensor and schedule indicate occupied. |
| ON-CONTINUOUS 3 | The same as option 2, but blower runs for 30 minutes and is off for 90 minutes when schedule is occupied but the occupancy sensor is not occupied. |

Table 12. LonTalk® Occupancy Points

| Mode | LonTalk® | Value |
|----------------------------|------------------------------|--|
| Manual | nviOccManCmd Index = 11 | 0: space occupied |
| | | 1: space unoccupied |
| | | 2: refresh space occupied override timer |
| | | 3-255: auto; clear timer and return to scheduler |
| Schedule | nviOccSched1 Index = 10 | 0: space occupied |
| | | 1-255: space unoccupied |
| Sensor | nviOccSensor Index = 12 | 0: space occupied |
| | | 1: space unoccupied |
| | | 2-255: auto; return to occupancy scheduler state |
| Effective Occupancy | nvoEffectOccup Index = 26 | 0: space occupied |
| | | 1: space unoccupied |
| | | 2: space occupied (timed override) |

Table 13. Blower Operation Description

| Blower Operation | Description |
|-------------------------|--|
| On | Blower runs continuously. |
| Cycles | Blower cycles on/off with demand. |
| Cycles w/Stir | Blower cycles on/off with demand; during off cycle blower is on 30 minutes of 120. |

Table 14. Blower Operation Schedule

| Manual | Schedule | Sensor | Effective Occupancy | OCC Blower Mode | Blower Operation |
|---------------|-----------------|---------------|----------------------------|------------------------|-------------------------|
| 0, 2 | n/a | n/a | OCCUPIED | AUTO-CYCLES | Cycles |
| | | | | ON-CONTINUOUS 1 | On |
| | | | | ON-CONTINUOUS 2 | On |
| | | | | ON-CONTINUOUS 3 | On |
| 1 | n/a | n/a | UNOCCUPIED | AUTO-CYCLES | Cycles |
| | | | | ON-CONTINUOUS 1 | Cycles |
| | | | | ON-CONTINUOUS 2 | Cycles |
| | | | | ON-CONTINUOUS 3 | Cycles |
| 3-255 | 0 | 0, 2-225 | OCCUPIED | AUTO-CYCLES | Cycles |
| | | | | ON-CONTINUOUS 1 | On |
| | | | | ON-CONTINUOUS 2 | On |
| | | | | ON-CONTINUOUS 3 | On |
| 3-255 | 0 | 1 | OCCUPIED | AUTO-CYCLES | Cycles |
| | | | | ON-CONTINUOUS 1 | On |
| | | | | ON-CONTINUOUS 2 | Cycles |
| | | | | ON-CONTINUOUS 3 | Cycles w/Stir |
| 3-255 | 1-255 | n/a | UNOCCUPIED | AUTO-CYCLES | Cycles |
| | | | | ON-CONTINUOUS 1 | Cycles |
| | | | | ON-CONTINUOUS 2 | Cycles |
| | | | | ON-CONTINUOUS 3 | Cycles |

