CONTROLS
KITS AND ACCESSORIES

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3/2021
Supersedes 506693-02

LonTalk® Module Kit

INSTALLATION INSTRUCTIONS FOR LonTalk® MODULE (54W27) USED WITH COMPATIBLE ROOFTOP UNITS

Table of Contents

⚠ 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.

⚠ IMPORTANT

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.

⚠ IMPORTANT

When adding this module to an existing M2 Unit Controller, the M2 firmware must be v7.07 or higher.

Look on LennoxPros.com for the latest firmware, or call Lennox technical support at 800-453-6669 for firmware update information.

General

The LonTalk® module allows communication between the Lennox M2, M3 and M4 unit controllers and a LonWorks® network. The module is LonMark® certified to design guidelines version 3.4.

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

Installation

⚠ IMPORTANT

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 onto the M2, M3 or CORE Unit Controller (M4). Guide pins will align the module with the Unit Controller connector.
4. Connect the LonTalk SmartWire connector.

5. Upon powering up the unit controller, the following is applicable:

Prodigy M2 Unit Controller

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

To **configure** the LonTalk Network, go to:

SETTINGS > CONTROL = LONTALK

Prodigy M3 Unit Controller

To **enable** the LonTalk module, go to:

SETUP > INSTALL and run the setup wizard.

When Configuration ID 1 appears on the screen, configure position 5 as **L**. This will enable the LonTalk module.

To **configure** the LonTalk Network, go to:

SETUP > NETWORK INTEGRATION = LONTALK

Lennox® CORE Unit Controller (M4)

To enable the LonTalk module,

1. Go to **RTU MENU** > **SETUP** > **INSTALL**
2. When **CONFIGURATION ID 1** appears on the screen, configure position **5** as **L**. This will enable the LonTalk module.
3. To configure the LonTalk Network
   Go to **RTU MENU** > **NETWORK INTEGRATION** > **NETWORK SETUP WIZARD** = **LONTALK**

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 131ºF (55ºC).

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 is1640 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.

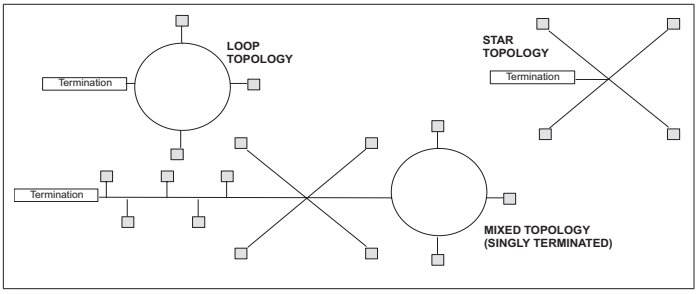

Figure 1. Free Topology Networks

Networks 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 feet (1524 meters) 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.

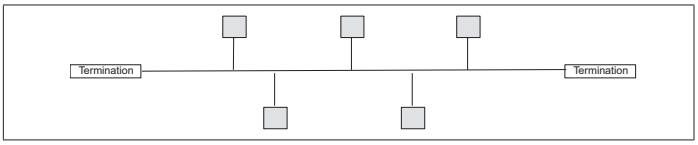

Figure 2. Doubly-Terminated Topology

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. 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 Zone Temperature 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 - 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).

CORE Unit Controller (M4) Room Sensor Control Configuration Procedure

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

Go to the LENNOX® CORE SERVICE APP.

1. Go to **RTU MENU** > **INSTALL** > **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.

NVI Duplication

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.

Device Function Blocks

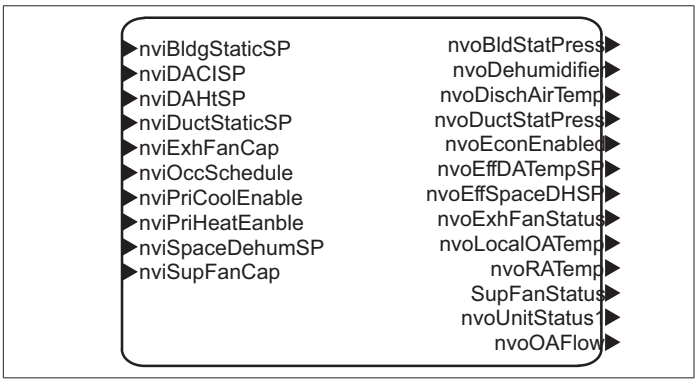

Figure 3. dischargeAirCont

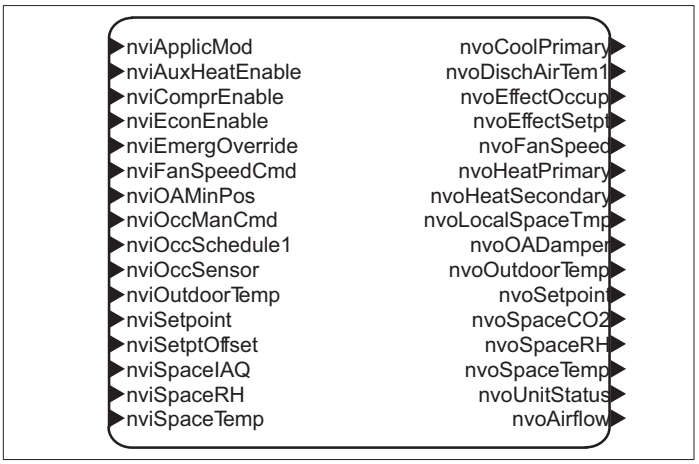

Figure 4. sccRooftop

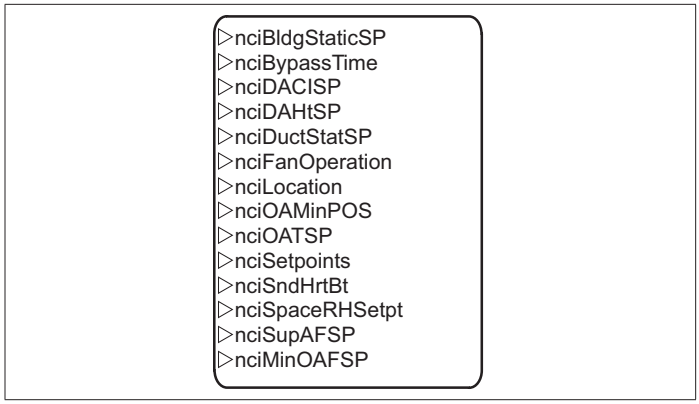

Figure 5. Virtual Functional Blocks

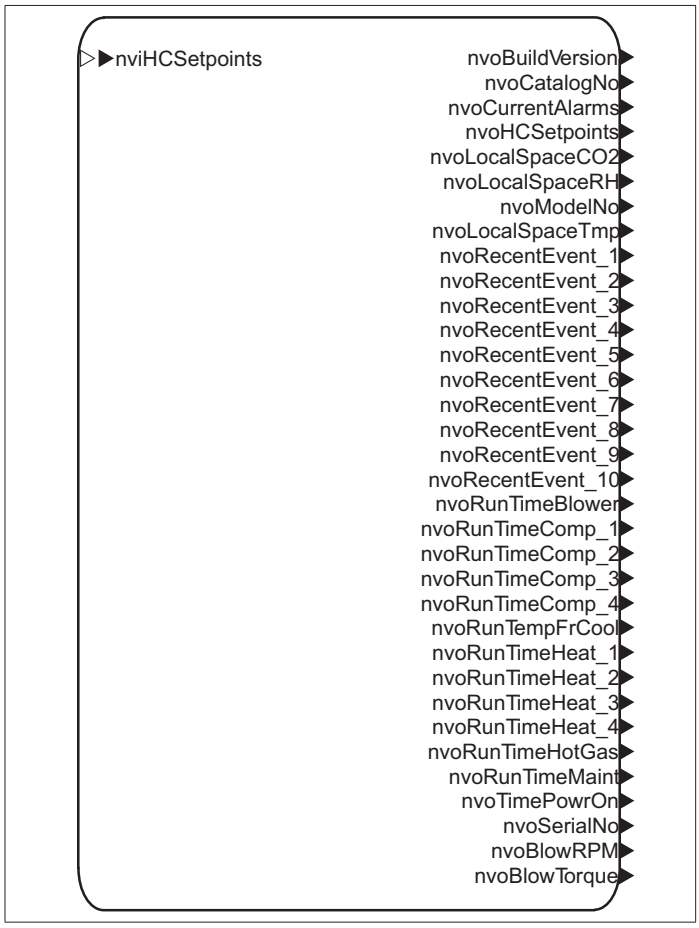

Figure 6. lennox

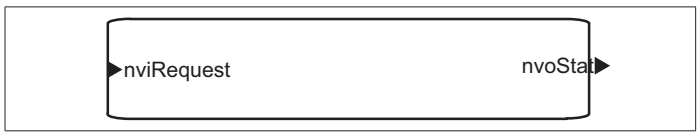

Figure 7. NodeObject

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	—	• A value of 0 (zero), turns off the send heart beat 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	—	• 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	—	• 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	—	• 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	—	• Defines a dehumidification setpoint for the controlled space. • Not used when nviSpaceDehumidSP is valid.
7	nviSpaceTemp	SNVT_temp_p	sccRooftop	—	• 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	—	• Used to set the temperature setpoints for the occupied mode. ***NOTE:*** *The unoccupied setpoints are not changed.* • 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 oc cupied 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)
9	nviSetptOffset	SNVT_temp_p	sccRooftop	—	Used to shift the effective occupied temperature setpoints by adding nviSetptOffset to the cur rent setpoints.
10*	nviOccSchedule1	SNVT_tod_event	sccRooftop	—	Only current state occupancy mode is supported.
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	—	• 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	—	• Supported range: -30.6 to 131.6°F. • Input must be updated within 5 minutes.
19	nviSpaceRH	SNVT_lev_percent	sccRooftop	—	• Input must be updated within 5 minutes. • Must be enabled with ECTO 5.27
20	nviSpaceIAQ	SNVT_ppm	sccRooftop	—	• 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	—	• 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	—	• 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.

Table 2. Network Variable Definitions

Index	SNVT Name	SNVT Type	Functional Block	Send Heartbeat	Application Description
23	nvoSpaceTemp	SNVT_temp_p	sccRooftop	Yes	• 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.
28	nvoFanSpeed	SNVT_switch	sccRooftop	Yes	Reports the current unit blower speed
29	nvoDischAirTemp	SNVT_temp_p	sccRooftop	No	• 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	• Reports the effective outdoor temperature value. • Supported range, -30 to +130°F.
36	nvoSpaceCO2	SNVT_ppm	sccRooftop	Yes	• Reports the effective space carbon dioxide value. • Supported range, 0 to 2,000 ppm.
37	nvoLocalSpaceTmp	SNVT_temp_p	sccRooftop	Yes	• Reports the space temperature measured by the locally wire sensor. • Supported range, 36 to 100°F.
38	nciDACISP	SNVT_temp_p	Virtual Functional Block	—	• Sets the default discharge air cooling temperature setpoint. • Supported range: 40 to 100°F.
39	nciDAHtSP	SNVT_temp_p	Virtual Functional Block	—	• Sets the default discharge air heating temperature setpoint. • Supported range: 60 to 140°F.
40	nciDuctStatSP	SNVT_press_p	Virtual Functional Block	—	• Sets the default duct static pressure set point. • Supported range: 0 to 1245 Pa.
41	nciOATSP	SNVT_temp_p	Virtual Functional Block	—	• Sets the outdoor air temperature setpoint to enable free-cooling for units with economizers. • Supported range: 40 to 75°F.
42	nciBldgStaticSP	SNVT_press_p	Virtual Functional Block	—	• Sets the default building static pressure set point for exhaust control. • Supported range -124.5 to 124.5 Pa.
43	nciMinOAFlowSP	SNVT_flow	Virtual Functional Block	—	• Set the default outdoor airflow for SmartAirflow™ 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	—	• Sets the duct static pressure setpoint. • Supported range: 0 to 1245 Pa.
46	nviDACISP	SNVT_temp_p	dischargeAirCont	—	• Sets the discharge air cooling temperature setpoint. • Supported range: 40 to 100°F.
47	nviDAHtSP	SNVT_temp_p	dischargeAirCont	—	• Sets the discharge air heating temperature setpoint. • Supported range: 60 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	—	– 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	• 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	• 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.

Table 2. Network Variable Definitions

Index	SNVT Name	SNVT Type	Functional Block	Send Heartbeat	Application Description
61	nvoBldgStatPress	SNVT_press_p	dischargeAirCont	Yes	• Reports the building static pressure. • Supported range: -124.5 to +124.5 Pa.
62	nvoLocalOATemp	SNVT_temp_p	dischargeAirCont	Yes	• Reports locally measured outdoor temperature. • Supported range: -30 to +130°F.
63	nvoRATemp	SNVT_temp_p	dischargeAirCont	Yes	• 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	—	• 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	—	• 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
69	nvoHCSetpoints	SNVT_temp_setpt	lennox	No	• 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.
72	nvoRecentEvent_2	UNVT_event	lennox	No	Reports second most recent alarm.
73	nvoRecentEvent_3	UNVT_event	lennox	No	Reports alarm.
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	• 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.
99	nvoRunTimeBlower	UNVT_minutes_cycles	lennox	No	Reports run-time and cycle count for blower.
100	nvoAirflow	SNVT_flow	ssRooftop	Yes	• Reports the amount of current supply air low. • Supported range: 0480 cfm/ton
101	nvoOAFlow	SNVT_flow	dischargeAirCont	Yes	• Reports the amount of outdoor airflow. • Supported range: 0480 cfm/ton
102	nvoBlowRPM	SNVT_rpm	lennox	Yes	• Reports the blower motor speed. • Supported range: 01500 rpm

Table 2. Network Variable Definitions

Index	SNVT Name	SNVT Type	Functional Block	Send Heartbeat	Application Description
103	nvoBlowTorque	SNVTlev_percent	lennox	Yes	• Reports the PWM of an ECM blower motor. • Supported range: 0 – 100 %
104	nciBypassTime	SNVT_time_min	Virtual Function Block	—	• 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.

Table 3. Variable Type Definitions

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 occu pied, cycles in occupied standby
SNVT_hvac_emerg	emerg_t Enumeration, 1 byte
SNVT_hvac_mode	hvac_t Enumeration, 1 byte
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_lev_percent	Signed Long, 2 bytes Valid Type Range: -163.840 .. 163.830 Type Resolution: 0.005 Invalid Value: 32,767 (0x7FFF)
SNVT_occupancy	occup_t Enumeration, 1 byte
SNVT_ppm	Unsigned Long, 2 bytes Valid Range: 0 .. 65,535 Parts per Million (ppm)
SNVT_press_p	Signed Long, 2 bytes Valid Type -32768 .. 32,766 Pascals Invalid Value 32,767 (0x7FFF)
SNVT_str_asc	ASCII character string with NUL terminator 30 characters max, 31 bytes
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
SNVT_time_min	Elapsed Time Signed Long, 2 bytes Valid Range: 0 .. 65,535 Minutes Resolution: 1 Minute

Table 3. Variable Type Definitions

SNVT Type	Definition
SNVT_time_sec	Elapsed Time Signed Long, 2 bytes Valid Range: 0 .. 6,5535 Seconds Resolution: .01 Seconds
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_tod_event	typedef struct { occup_t current_state; occup_t next_state; unsigned long time_to_next_state; }SNVT_tod_event
UNVT_currentA larms	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;

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

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;
UNVT_min utes_cycles	typedef struct { signed quad minutes; signed quad cycles; }UNVT_minutes_cycles;
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.

Network Configuration Parameter Implementation

The following table show 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
nciFanOperation	6.17
nciMinOAFlowSp	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

The following table 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 M3 and CORE (M4) Parameter Relationships

nci	Parameter
nciBldgStaticSP	215
nciBypassTime	141
nciDACISP	180
nciDAHtSP	174
nciDuctStatSP	37
nciFanOperation	154
nciMinOAFlowSp	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

Supply Airflow Targets

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

Table 6. Energence® A Standard and High Efficiency 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	1200
Minimum Heat Mode Target High Gas Modulating Heat W1 (D)	N/A	N/A	1300
Minimum Heat Mode Target High Gas Modulating Heat W2 (D)	N/A	N/A	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.

Table 7. Energence® A Standard and High Efficiency Box Supply Airflow Targets

UNIT SIZE (A Boxes)	36	48	60	74
Maximum High Speed Target and Heat Mode Target (470 CFM/ton 36-60; 390 CFM/ton 74)	1400	1875	2350	2350
Minimum High Speed Target (300 CFM/ton)	900	1200	1500	1800
Maximum Low Speed Target (280 CFM/ton)	850	1125	1400	1675
Minimum Low Speed Target (170 CFM/ton 36-60; 140 CFM/ton 74)	500	675	850	850
Minimum Ventilation Target (170 CFM/ton)	500	675	850	1025
Minimum Heat Mode Target Standard Gas Heat (B, S, W)	975	975	975	975
Minimum Heat Mode Target Medium Gas Heat (M, Q, U, Y)	1125	1125	1125	1125
Minimum Heat Mode Target High Gas Heat Minimum H, T, X, Z)	N/A	1300	1300	1300
Minimum Heat Mode Target High Gas Modulating Heat W1 (D)	N/A	1250	1250	1250
Minimum Heat Mode Target High Gas Modulating heat W2 (D)	N/A	1500	1500	1500
Minimum Heat Mode Target Electric Heat	1075	1275	1600	1600
Maximum Outdoor Airflow (150 cfm/ton)	450	600	750	900

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.

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 Operation 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 8.

Table 8. 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 9. Blower Operation Description

ECTO 6.17	Occupancy Blower Duty Description
On	Blower runs continuously
Cycles	Blower cycles on/off with demand.
Cycles with Stir	Blower cycles on/off with demand; during off cycle blower is on 30 minutes of 120.

Table 10. 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 with stir
3-255	1-255	N/A	Unoccupied	0	Cycles
				1	Cycles
				2	Cycles
				3	Cycles

Table 11. LonTak 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	1	space occupied
		2	space unoccupied
		3	space occupied (timed override)

Prodigy M3 Unit Controller Blower Operation 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 13 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 =**.

Table 12. Blower Operation Description

ECTO 6.17	Occupancy Blower Duty Description
On	Blower runs continuously
Cycles	Blower cycles on/off with demand.
Cycles with Stir	Blower cycles on/off with demand; during off cycle blower is on 30 minutes of 120.

Table 13. Blower Operation Description

OCC Blower Mode	Description
AUTO CYCLES	Blower cycles on/off with demand. (Legacy usage.)
ONCONTINUOUS 1	Blower runs when either the occupancy sensor or schedule, or both, indicates occupied. (Legacy usage.)
ONCONTINUOUS 2	Blower runs when both the occupancy sensor and schedule indicate occupied.
ONCONTINUOUS 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 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-CONTINOUS 1	On
				ON-CONTINOUS 2	On
				ON-CONTINOUS 3	On
1	N/A	N/A	Unoccupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	Cycles
				ON-CONTINOUS 2	Cycles
				ON-CONTINOUS 3	Cycles
3-255	0	0, 2-255	Occupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	On
				ON-CONTINOUS 2	On
				ON-CONTINOUS 3	On
3-255	0	1	Occupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	On
				ON-CONTINOUS 2	Cycles
				ON-CONTINOUS 3	Cycles with stir
3-255	1-255	N/A	Unoccupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	Cycles
				ON-CONTINOUS 2	Cycles
				ON-CONTINOUS 3	Cycles

CORE Unit Controller (M4) Blower Operation 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 13 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 **RTU MENU** > **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 =**.

Table 15. Blower Operation Description

ECTO 6.17	Occupancy Blower Duty Description
On	Blower runs continuously
Cycles	Blower cycles on/off with demand.
Cycles with Stir	Blower cycles on/off with demand; during off cycle blower is on 30 minutes of 120.

Table 16. Blower Operation Description

OCC Blower Mode	Description
AUTO CYCLES	Blower cycles on/off with demand. (Legacy usage.)
ONCONTINUOUS 1	Blower runs when either the occupancy sensor or schedule, or both, indicates occupied. (Legacy usage.)
ONCONTINUOUS 2	Blower runs when both the occupancy sensor and schedule indicate occupied.
ONCONTINUOUS 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 17. Blower Operation Schedule

Manual	Schedule	Sensor	Effective Occupancy	OCC Blower Mode	Blower Operation
0, 2	N/A	N/A	Occupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	On
				ON-CONTINOUS 2	On
				ON-CONTINOUS 3	On
1	N/A	N/A	Unoccupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	Cycles
				ON-CONTINOUS 2	Cycles
				ON-CONTINOUS 3	Cycles
3-255	0	0, 2-255	Occupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	On
				ON-CONTINOUS 2	On
				ON-CONTINOUS 3	On
3-255	0	1	Occupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	On
				ON-CONTINOUS 2	Cycles
				ON-CONTINOUS 3	Cycles with stir
3-255	1-255	N/A	Unoccupied	AUTO-CYCLES	Cycles
				ON-CONTINOUS 1	Cycles
				ON-CONTINOUS 2	Cycles
				ON-CONTINOUS 3	Cycles