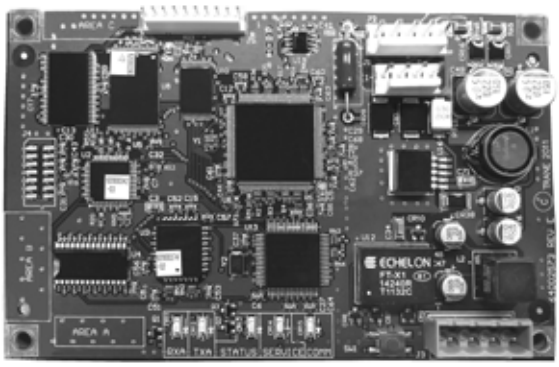
Programming Guide

Tracer™ LonTalk® Communication Interface

for ReliaTel™ Controls for light and large commercial units with a ReliaTel™ control platform



BAYLTCI002*	3 to 10 Tons Packaged Rooftop units with ReliaTel™ Communications Module, 6 to 25 Tons Split System units with ReliaTel™ Communications Module
BAYLTCI003*	12.5 to 25 Tons Packaged Rooftop units with ReliaTel™ Communications Module, 27.5 to 50 Tons Packaged Rooftop units with ReliaTel™ Communications Module
BAYLTCI004*	27.5 to 50 Tons Variable Air Volume (VAV) Packaged Rooftop Air Conditioners (YC, TC, TE) with ReliaTel™ Communications Module

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

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Ingersoll Rand

Warnings, Cautions and Notices

Warnings, Cautions and Notices. Note that warnings, cautions and notices appear at appropriate intervals throughout this manual. Warnings are provided to alert installing contractors to potential hazards that could result in death or personal injury. Cautions are designed to alert personnel to hazardous situations that could result in personal injury, while notices indicate a situation that could result in equipment or property-damage-only accidents.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

Read this manual thoroughly before operating or servicing this unit.

ATTENTION: Warnings, Cautions, and Notices appear at appropriate sections throughout this literature. Read these carefully:

⚠WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

NOTICE: Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns!

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants-including industry replacements for CFCs such as HCFCs and HFCs.

Responsible Refrigerant Practices!

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified. The Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠WARNING

Proper Field Wiring and Grounding Required!

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. Failure to follow code could result in death or serious injury.

⚠WARNING

Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards.

- **Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate MSDS sheets and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate MSDS sheets and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.**
- **If there is a risk of arc or flash, technicians MUST put on all Personal Protective Equipment (PPE) in accordance with NFPA 70E or other country-specific requirements for arc flash protection, PRIOR to servicing the unit.**

Failure to follow recommendations could result in death or serious injury.

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Overview

The LonTalk® Communications Interface for ReliaTel™ (LCI-R) unitary systems provides a communication interface between a LonTalk® network and a unit control system. The LCI-R uses an FTT-10A free-topology transceiver, which allows star, bus, and loop wiring architectures.

The interface can operate in any of the following ways:

- In stand-alone mode
- In peer-to-peer mode with one or more units
- On a Tracer™ Summit or third-party building automation system (BAS)

In addition, it is available as a factory-installed option or a field-installed kit. The features and functions described in this manual apply to either option.

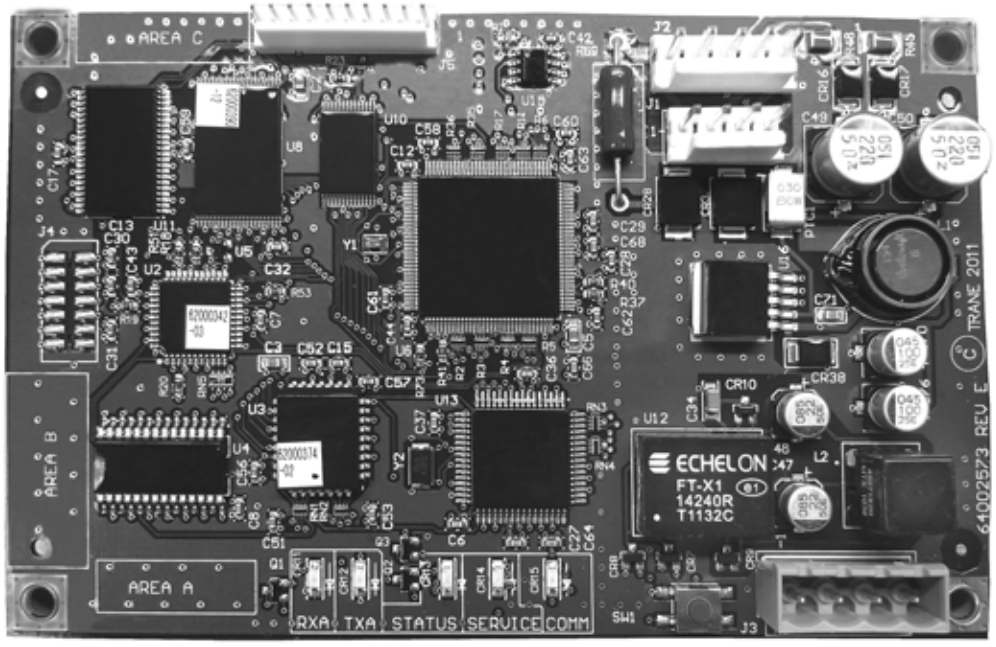
Note: *Some unit features or functions described may not be available on all products or are defined by the manufacturer according to the LonMark™ specification. In addition, they are not available to a third-party building automation system or service tool. (Refer to Table 1, p. 8) Certain network variables may require additional optional modules. Refer to the section, ";" p. 10 and other appropriate product literature for more information.*

This programming guide provides the following information:

- Specifications and controller board
- LonMark product details
- Supporting units/software and configuration
- Communication link and setup
- Network variable input/output definitions
- Configuration property definitions
- Configuration and configuration definitions
- Operation modes and general information
- Troubleshooting
- Appendix
- Glossary

Important: *The LCI-R is not polarity sensitive. This interface should be installed by a qualified technician who is properly trained and experienced with LonTalk® networks.*

Specifications and Dimensions

Storage	
Temperature:	**-40°F to 185°F (-40°C to 85°C)**
Relative Humidity:	**Between 5% to 95% *(non-condensing)***
Operating	
Temperature:	**-40°F to 185°F (-40°C to 85°C)**
Relative Humidity:	**Between 5% to 95% *(non-condensing)***
Board Dimensions:	5.5 in. x 3.5 in x 2.0 in (139.7 mm x 88.9 mm x 50.8 mm) 
Power:	**18–32 Vac (24 Vac nominal), maximum 3.3 VA, 50 or 60 Hz**
Agency Compliance	
• U.L. unlisted component • U.L. 873, Temperature Indicating and Regulating Equipment • C.U.L. C22.2, No. 24-93, Temperature Indicating and Regulating Equipment	
LonMark Certification	
LonMark Application Layer Interoperability Guidelines, Version 3.2	

LonMark™ Product Details

Table 1. LonMark™ product details

Manufacturer:	Trane
Product Data Sheet:	• RT-PRG001-EN *(Rooftop)*
Device Class:	Discharge Air Controller
Communication Channel:	TP/FT-10 *(ANSI/EIA-709.3)*
Usage:	Commercial
LonMark Version:	Version 3.4
Supported LonMark Objects:	• 0000; Node Object • 8500; Space Comfort Controller • 8610; Discharge Air Controller • 8 0002A 560a 03 04 05 • 3.4 @0, 8500, 8610 Tracer™ LCI-R • 80002A560A030405.XIF **Note:** Network Variables that are applicable to both supported profiles *(SCC and DAC)* may be listed twice in the XIF, but only one will be active, based on unit configuration. To determine which variable is active for a particular profile, refer to the variable self-doc string *(third line for each variable in the XIF)*. For example: VAR nviOccSchedule **113** 0 0 0 *(113 represents the network variable index for this device)* 0 1 63 0 2 1 0 1 0 0 0 0 0 "@**2**|**1**;nviOccSchedule *(2 represents the DAC object and 1 represents the DAC profile index 1)* VAR nviOccSchedule **114** 0 0 0 *(114 represents the network variable index for this device)* 0 1 63 0 2 1 0 1 0 0 0 0 0 "@**1**|**5**;nviOccSchedule *(1 represents the SCC object and 5 represents the SCC profile index 5)*
Note: For more details on information contained in this table, refer to www.lonmark.org	

Supporting Units

Figure 1 through Figure 4 illustrate the supporting units for the LCI-R.

Figure 1. Voyager™ 12.5 to 25 tons

Figure 2. Voyager™ Commercial 27.5 to 50 tons

Figure 3. Odyssey™ 6 to 25 tons

Figure 4. Precedent™ 3 to 10 tons

Communication Link and Setup

The Tracer™ LCI-R controller communicates using the LonTalk® protocol. Typically, a communication link is applied between unit controllers and a BAS. However, a communication link can be made by means of the Rover™ service tool or by peer-to-peer communication across controllers when a building automation system is not present.

The LonTalk® communication protocol allows peer-to-peer communications between controllers. A communicated variable input *(such as a setpoint, space temperature, or outdoor air temperature)* has priority over a locally wired input to the controller. For example, if the LCI-R controller has a wired outdoor air temperature sensor, and Tracer™ Summit or another LonTalk® controller sends it a communicated outdoor air temperature, the communicated value is used by the LCI-R controller. If a communicated input value is lost, the LCI-R controller reverts to using the locally wired sensor input.

Note: *Observe polarity for LonTalk® communication links.*

The controller provides four terminals for the LonTalk® communication link connections, as follows:

- Two terminals for communication to the board
- Two terminals for communication from the board to the next unit *(daisy chain)*

LonTalk® Communication Link Wiring Requirements

The LonTalk® communication link is used for connection to a LonTalk® building network. The communication link wiring is dependent on the network architecture.

Note: *For proper wiring recommendations, refer to the LonWorks FTT-10A Free Topology Transceiver User's Guide at* ***www.echelon.com****. For Trane BAS installations, refer to the Comm5 Wiring Installation (BAS-SVN01) for wiring recommendations.*

Setup

Human Interface Setup

The unit must be changed from **LOCAL** to **BAS/NETWORK** *(remote)* control in the human interface **Setup** menu. To change to **BAS/NETWORK**:

1. Press the **Setup** menu button on the human interface and then press **Next**.
2. When the next screen displays, press the **+** button until the unit control is set to **BAS/NETWORK**.
3. Press **Enter**.

Device Addressing

LonTalk® devices are given a unique Neuron ID address *(such as 00-01-64-1C-2B-00)* by the manufacturer. Each LCI-R controller can be identified by its unique Neuron ID and this ID is located on a label of each controller. The Neuron ID is also displayed when communication is established using Tracer™ Summit or Rover service tool.

Network Variable Summary for Space Comfort Control (SCC) and Discharge Air Control (DAC)

Table 2, p. 11 through Table 9, p. 14 provide information about nodes, input/output variables, and configuration properties. For more details, refer to www.lonmark.org.

Network Variable Summary – SCC

Table 2. Node information

Information	NV#	NV Profile Index	SCPT / UCPT	Name	Recv HrtBt	SNVT Type	Description	Product	
								RT	CSC
Node Network Variable Inputs	122	1		nviRequest	No	SNVT_obj_request	Status Request Input	X	X
Node Network Variable Outputs	244	2		nvoStatus	No	SNVT_obj_status	Status Request Output	X	X
Node Configuration Properties	21	3	165	nciDevMajVer	165	SCPTdevMajVer	Device Major Version Number	X	X
	22	4	166	nciDevMinVer	166	SCPTdevMinVer	Device Minor Version Number	X	X
Node Extension Network Variable Outputs	137			nvoAlarmMessage	No	SNVT_str_asc	Diagnostic Message	X	X
	141			nvoClusterConfig	No	U16	master_slave_t	X	X
Node Extension Configuration Properties	19	3	3	nciDevBuildNum	No	U16	Software Build Number	X	X

Table 3. SCC network variable inputs

Index	Name	Profile ♥	Self doc string
62	nviTraneVar2	Node Ex	$0#3001;nviTraneVar2
63	nviApplicMode	DAC	@2|3;nviApplicMode
64	nviApplicMode	SCC	@1|8;nviApplicMode
65	nviAuxHeatEnable	SCC	@1|12;nviAuxHeatEnable
66	nviBldgStaticSP	DAC	@2|14;nviBldgStaticSP
67	nviBldgStaticSP	SCCX	@1#4043;nviBldgStaticSP
68	nviBldgStatPress	DAC	@2|13;nviBldgStatPress
69	nviBldgStatPress	SCCX	@1#4009;nviBldgStatPress
70	nviComprEnable	SCC	@1|11;nviComprEnable
71	nviDAClSP	DAC	@2|7;nviDAClSP
72	nviDAClSP	SCCX	@1#4067;nviDAClSP
73	nviDAHtSP	DAC	@2|8;nviDAHtSP
74	nviDAHtSP	SCCX	@1#4068;nviDAHtSP
75	nviDAReheatSP	DACX	@2#4013;nviDAReheatSP
76	nviDAReheatSP	SCCX	@1#4044;nviDAReheatSP
77	nviDehumEnable	DAC	@2|30;nviDehumEnable
78	nviDehumEnable	SCCX	@1#4045;nviDehumEnable
79	nviDuctStaticSP	DAC	@2|6;nviDuctStaticSP
80	nviEconEnable	DAC	@2|17;nviEconEnable
81	nviEconEnable	SCC	@1|13;nviEconEnable
82	nviEmergOverride	DAC	@2|4;nviEmergOverride
83	nviEmergOverride	SCC	@1|17;nviEmergOverride
84	nviFanModeCmd	Prod Ex	$0#6002;nviFanModeCmd
85	nviHeatCool	SCC	@1|9;nviHeatCool
86	nviMinOAFlowSP	DAC	@2|19;nviMinOAFlowSP
87	nviOAMinPos	DAC	@2|18;nviOAMinPos
88	nviOAMinPos	SCC	@1|59;nviOAMinPos
89	nviOccManCmd	DAC	@2|2;nviOccManCmd
90	nviOccManCmd	SCC	@1|6;nviOccManCmd
91	nviOccSchedule	DAC	@2|1;nviOccSchedule
92	nviOccSchedule	SCC	@1|5;nviOccSchedule
93	nviOccSensor	SCC	@1|7;nviOccSensor

Table 3. SCC network variable inputs (continued)

Index	Name	Profile ♥	Self doc string
94	nviOutdoorRH	DAC	@2|21;nviOutdoorRH
95	nviOutdoorRH	SCC	@1|21;nviOutdoorRH
96	nviOutdoorTemp	DAC	@2|20;nviOutdoorTemp
97	nviOutdoorTemp	SCC	@1|19;nviOutdoorTemp
98	nviPriCoolEnable	DAC	@2|15;nviPriCoolEnable
99	nviPriHeatEnable	DAC	@2|16;nviPriHeatEnable
100	nviRequest	Node	@0|1;nviRequest
101	nviServiceTest	Prod Ex	$0#6004;nviServiceTest
102	nviSetpoint	SCC	@1|2;nviSetpoint
103	nviSetptOffset	SCC	@1|3;nviSetptOffset
104	nviSpaceCO2	DACX	@2#4006;nviSpaceCO2
105	nviSpaceCO2	SCC	@1|22;nviSpaceCO2
106	nviSpaceDehumSP	DAC	@2|31;nviSpaceDehumSP
107	nviSpaceDehumSP	SCCX	@1#4047;nviSpaceDehumSP
108	nviSpaceRH	DAC	@2|27;nviSpaceRH
109	nviSpaceRH	SCC	@1|20;nviSpaceRH
110	nviSpaceTemp	DAC	@2|26;nviSpaceTemp
111	nviSpaceTemp	SCC	@1|1;nviSpaceTemp
112	nviTraneVar1	SCCX	$1#4001;nviTraneVar1

Table 4. SCC network variable outputs

113	nvoAlarmMessage	Node Ex		@0#3003;nvoAlarmMessage
114	nvoApplicMode	DAC	♥	@2|41;nvoApplicMode
115	nvoBldgStatPress	DAC	♥	@2|54;nvoBldgStatPress
116	nvoBldgStatPress	SCCX	♥	@1#4012;nvoBldgStatPress
117	nvoDAReheatSP	DACX	♥	@2#4011;nvoDAReheatSP
118	nvoDAReheatSP	SCCX	♥	@1#4050;nvoDAReheatSP
119	nvoDehumidifier	DAC	♥	@2|73;nvoDehumidifier
120	nvoDehumidifier	SCCX	♥	@1#4051;nvoDehumidifier
121	nvoDischAirTemp	DAC	♥	@2|35;nvoDischAirTemp
122	nvoDischAirTemp	SCC	♥	@1|34;nvoDischAirTemp
123	nvoDuctStatPress	DAC	♥	@2|38;nvoDuctStatPress

Table 4. SCC network variable outputs (continued)

124	nvoEconEnabled	DAC	♥	@2|55;nvoEconEnabled
125	nvoEffDATempSP	DAC	♥	@2|37;nvoEffDATempSP
126	nvoEffDATempSP	SCCX	♥	@1#4069;nvoEffDATempSP
127	nvoEffDuctStatSP	DAC	♥	@2|39;nvoEffDuctStatSP
128	nvoEffectOccup	DAC	♥	@2|42;nvoEffectOccup
129	nvoEffectOccup	SCC	♥	@1|29;nvoEffectOccup
130	nvoEffectSetpt	SCC	♥	@1|28;nvoEffectSetpt
131	nvoEffSpaceDHSP	DAC	♥	@2|72;nvoEffSpaceDHSP
132	nvoEffSpaceDHSP	SCCX	♥	@1#4052;nvoEffSpaceDHSP
133	nvoExhFanStatus	DAC	♥	@2|46;nvoExhFanStatus
134	nvoExhFanStatus	SCCX	♥	@1#4011;nvoExhFanStatus
135	nvoFanSpeed	SCC	♥	@1|33;nvoFanSpeed
136	nvoHeatCool	DAC	♥	@2|40;nvoHeatCool
137	nvoHeatCool	SCC	♥	@1|30;nvoHeatCool
138	nvoLoadAbsK	SCC	♥	@1|36;nvoLoadAbsK
139	nvoMATemp	DAC	♥	@2|65;nvoMATemp
140	nvoMATemp	SCCX	♥	@1#4008;nvoMATemp
141	nvoMixedAirTemp	SCC	♥	@1|64;nvoMixedAirTemp
142	nvoOADamper	DAC	♥	@2|56;nvoOADamper
143	nvoOADamper	SCC	♥	@1|42;nvoOADamper
144	nvoOAFlow	DAC	♥	@2|57;nvoOAFlow
145	nvoOutdoorRH	DAC	♥	@2|61;nvoOutdoorRH
146	nvoOutdoorRH	SCC	♥	@1|44;nvoOutdoorRH
147	nvoOutdoorTemp	DAC	♥	@2|59;nvoOutdoorTemp
148	nvoOutdoorTemp	SCC	♥	@1|45;nvoOutdoorTemp
149	nvoRATemp	DAC	♥	@2|67;nvoRATemp
150	nvoRATemp	SCCX	♥	@1#4019;nvoRATemp
151	nvoServiceTest	Prod Ex	♥	$0#6032;nvoServiceTest
152	nvoSetpoint	SCC	♥	@1|31;nvoSetpoint
153	nvoSpaceCO2	DACX	♥	@2#4007;nvoSpaceCO2
154	nvoSpaceCO2	SCC	♥	@1|46;nvoSpaceCO2
155	nvoSpaceRH	DAC	♥	@2|68;nvoSpaceRH
156	nvoSpaceRH	SCC	♥	@1|43;nvoSpaceRH
157	nvoSpaceTemp	DAC	♥	@2|66;nvoSpaceTemp
158	nvoSpaceTemp	SCC	♥	@1|26;nvoSpaceTemp
159	nvoStatus	Node	♥	@0|2;nvoStatus
160	nvoSupFanStatus	DAC	♥	@2|43;nvoSupFanStatus
161	nvoTerminalLoad	SCC	♥	@1|37;nvoTerminalLoad
162	nvoTraneVar7	DACX	♥	$2#4002;nvoTraneVar7
163	nvoTraneVar7	SCCX	♥	$1#4003;nvoTraneVar7
164	nvoTraneVar9	Node Ex		$0#3002;nvoTraneVar9
165	nvoUnitStatus	DAC	♥	@2|36;nvoUnitStatus
166	nvoUnitStatus	SCC	♥	@1|27;nvoUnitStatus
167	nvoTraneVar1702	Prod Ex		$0#6005;nvoTraneVar1702

Table 5. SCC inputs

Index	Name	Profile ♥	Self doc string
0	nciApplication	DACX	~1,2,4\xA4,2;nciApplication
1	nciApplication	SCCX	~1,1,4\xA4,3;nciApplication
2	nciBldgStaticSP	DAC	&1,2,0\x80,193;nciBldgStaticSP
3	nciBldgStaticSP	SCCX	&1,1,4\x80,193;nciBldgStaticSP
4	nciBypassTime	DAC	&1,2,0\x80,34;nciBypassTime
5	nciBypassTime	SCC	&1,1,0\x80,34;nciBypassTime
6	nciCool	DACX	~1,2,4\xA4,9;nciCool
7	nciCool	SCCX	~1,1,4\xA4,15;nciCool
8	nciCRC	Node Ex	~0,,3\x88,1;nciCRC
9	nciDAClSP	DAC	&1,2,0\x80,183;nciDAClSP
10	nciDAClSP	SCCX	~1,1,0\x80,183;nciDAClSP
11	nciDAHtSP	DAC	&1,2,0\x80,184;nciDAHtSP
12	nciDAHtSP	SCCX	~1,1,0\x80,184;nciDAHtSP
13	nciDAReheatSP	DACX	~1,2,4\x80,17;nciDAReheatSP
14	nciDAReheatSP	SCCX	~1,1,4\x80,34;nciDAReheatSP
15	nciDaytime	DACX	~1,2,4\x80,6;nciDaytime
16	nciDaytimeTerm	DACX	~1,2,4\x80,15;nciDaytimeTerm
17	nciDevBuildNum	Node Ex	~0,,3\xA4,3;nciDevBuildNum
18	nciDeviceConfig	Node Ex	~0,,3\x80,2;nciDeviceConfig
19	nciDevMajVer	Node	&1,0,0\x84,165;nciDevMajVer
20	nciDevMinVer	Node	&1,0,0\xA4,166;nciDevMinVer
21	nciDuctStatSP	DAC	&1,2,0\x80,189;nciDuctStatSP
22	nciEconVent	DACX	~1,2,4\xA4,11;nciEconVent
23	nciEconVent	SCCX	~1,1,4\xA4,17;nciEconVent
24	nciExhaustConfig	SCCX	~1,1,4\x80,8;nciExhaustConfig
25	nciExhRet	DACX	~1,2,4\xA4,12;nciExhRet
26	nciExhRet	SCCX	~1,1,4\xA4,18;nciExhRet
27	nciExhStartPos	DAC	&1,2,0\x80,202;nciExhStartPos
28	nciFanConfig	SCCX	~1,1,4\x80,4;nciFanConfig
29	nciHvacType	DACX	&1,2,0\xA4,169;nciHvacType
30	nciHvacType	SCC	&1,1,0\xA4,169;nciHvacType
31	nciLocation	DAC	&1,2,0\x80,17;nciLocation
32	nciLocation	SCC	&1,1,0\x80,17;nciLocation
33	nciMinOAFlowSP	DAC	&1,2,0\x80,198;nciMinOAFlowSP
34	nciMinOAFlowSP	SCCX	&1,1,4\x80,198;nciMinOAFlowSP
35	nciMinOutTm	DAC	&1,2,0\x80,52;nciMinOutTm
36	nciMinOutTm	SCC	&1,1,0\x80,52;nciMinOutTm
37	nciModuleVersion	Node Ex	~0,,6\xA4,4;nciModuleVersion
38	nciOAFlowCalib	DAC	&1,2,0\x80,67;nciOAFlowCalib
39	nciOAFlowCalib	SCCX	&1,1,4\x80,67;nciOAFlowCalib
40	nciOAMinPos	DAC	&2,215,0\x80,23;nciOAMinPos
41	nciOAMinPos	SCC	&2,216,0\x80,23;nciOAMinPos
42	nciPersonality2	DACX	~1,2,4\x80,3;nciPersonality2
43	nciPersonality2	SCCX	~1,1,4\x80,5;nciPersonality2
44	nciPreheat	DACX	~1,2,4\xA4,8;nciPreheat
45	nciPreheat	SCCX	~1,1,4\xA4,14;nciPreheat
46	nciRcvHrtBt	DAC	&1,2,0\x80,48;nciRcvHrtBt
47	nciRcvHrtBt	SCC	&1,1,0\x80,48;nciRcvHrtBt

Table 5. SCC inputs (continued)

Index	Name	Profile ♥	Self doc string
48	nciReheat	DACX	~1,2,4\xA4,10;nciReheat
49	nciReheat	SCCX	~1,1,4\xA4,16;nciReheat
50	nciSetpoints	DAC	&1,2,0\x80,60;nciSetpoints
51	nciSetpoints	SCC	&1,1,0\x80,60;nciSetpoints
52	nciSndHrtBt	DAC	&1,2,0\x80,49;nciSndHrtBt
53	nciSndHrtBt	SCC	&1,1,0\x80,49;nciSndHrtBt
54	nciSpaceCO2Lim	DACX	&1,2,4\x80,42;nciSpaceCO2Lim
55	nciSpaceCO2Lim	SCC	&1,1,0\x80,42;nciSpaceCO2Lim
56	nciSpaceCO2LowLm	DACX	~1,2,4\x80,18;nciSpaceCO2LowLm
57	nciSpaceCO2LowLm	SCCX	~1,1,4\x80,29;nciSpaceCO2LowLm
58	nciSpaceDehumSP	DAC	&1,2,0\x80,36;nciSpaceDehumSP
59	nciSpaceRHSetpt	SCC	&1,1,0\x80,36;nciSpaceRHSetpt
60	nciSupplyFan	DACX	~1,2,4\xA4,7;nciSupplyFan
61	nciSupplyFan	SCCX	~1,1,4\xA4,13;nciSupplyFan

Network Variable Summary– DAC

Table 6. DAC extension network variable inputs

NV#	Name	Recv HrtBt	SNVT Type	Description	Product	
					RT	CSC
93	nviDAReheatSP	Yes	SNVT_temp_p	Discharge Air Reheat Setpoint	X	
126	nviSpaceCO2	Yes	SNVT_ppm	Space CO_2 Sensor Input	X	

Table 7. DAC extension network variable outputs

NV#	Name	Send HrtBt	SNVT Type	Description	Product	
					RT	CSC
247	nvoTerminalLoad	Yes	SNVT_lev_percent	Terminal Load output	X	X
206	nvoLocalDSPress	Yes	SNVT_press_p	Local Duct Static Pressure Output	X	X
236	nvoSpaceCO2	Yes	SNVT_ppm	Space CO2 Sensor Output	X	X
173	nvoEnterWaterTmp	Yes	SNVT_temp_p	Entering Water Temperature Output		X
155	nvoDAReheatSP	Yes	SNVT_temp_p	Discharge Air Reheat Setpoint		
217	nvoOADewpoint	Yes	SNVT_temp_p	Outdoor Air Dewpoint		
175	nvoEREABPDamper	Yes	SNVT_lev_percent	Energy Recovery Exhaust Air Bypass Damper Position Output	X	
177	nvoERFrostAvoid	Yes	SNVT_switch	Energy Recovery Frost Avoidance State	X	
179	nvoERLvgExhTemp	Yes	SNVT_temp_p	Energy Recovery Leaving Exhaust Temp Output	X	
181	nvoEROABPDamper	Yes	SNVT_lev_percent	Energy Recovery Outside Air Bypass Damper Position Output	X	
183	nvoERPreheat	Yes	SNVT_switch	Energy Recovery Preheat On/Off Control Output	X	
185	nvoERStatus	Yes	SNVT_switch	Energy Recovery Status Output	X	
200	nvoHeatSecondary	Yes	SNVT_lev_percent	Secondary Heat Output	X	

Table 8. Product extension network variable outputs

NV#	Name	Recv HrtBt	Description	Product	
				RT	CSC
210	nvoMasterSlave1	Yes	Master Slave Output #1 (bound on cluster slaves)	X	
211	nvoMasterSlave2	Yes	Master Slave Output #2 (bound on cluster slaves)	X	

Table 9. DAC extension configuration properties

NV#	Name	SCPT / UCPT Index	SNVT Type	Description	Product	
					RT	CSC
38	nciHvacType	169	SNVT_hvac_type	HVAC Unit Type Identifier	X	X
17	nciDaytime	6	SNVT_Temp_p	Daytime Warm-up Initiate Setpoint	X	X
18	nciDaytimeTerm	15	SNVT_Temp_p	Daytime Warm-up Terminate Setpoint	X	X
15	nciDAReheatSP	17	SNVT_Temp_p	Discharge Air Reheat Setpoint	X	
29	nciERFrostAvoidSP	20	SNVT_Temp_p	Energy Recovery Frost Avoidance Setpoint	X	
67	nciSpaceCO2Lim	42	SNVT_ppm	Space CO_2 High Limit Setpoint	X	X

Network Variable Input Definitions

The network variable input definitions in this section are listed alphabetically by the *nviName*, such as *nviApplicMode*. When an nvi is invalid, the unit will decide proper operation based on its local inputs.

Application Mode Input: nviApplicMode

Network Input: SNVT_hvac_mode nviApplicMode (SCC and DAC profile)

Used to coordinate the controller with any supervisory controller. The default value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Refer to the tables in the "Appendix," p. 54 for details about Application Mode Input. Default service type = unacknowledged.

ReliaTel products will only use HVAC_AUTO, HVAC_HEAT, HVAC_MRNG_WRMUP, HVAC_COOL, HVAC_NIGHT_PURGE, HVAC_PRE_COOL, HVAC_OFF, HVAC_EMERG_HEAT, HVAC_FAN_ONLY and HVAC_NUL. HVAC_NUL is treated the same as HVAC_AUTO. EMERG_HEAT is treated the same as HVAC_AUTO for non heat pump products. All other enumerations are defined as HVAC_AUTO for ReliaTel™ products.

For the HVAC_FAN_ONLY enumeration, heating and cooling are locked out and will override nviAuxHeatEnable, nviComprEnable, nviPriCoolEnable, and nviPriHeatEnable. HVAC_DEHUMIDIFICATION (14) is not supported in nviApplicMode by IntelliPak products because dehumidification is activated only by setpoints and space conditions. The unit should be unoccupied before sending the HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_PRE_COOL.

Table 10. Application mode input valid ranges

Type	RT/CSC Ranges	Invalid Values
U08	0 = HVAC_AUTO 1 = HVAC_HEAT 2 = HVAC_MRNG_WRMUP 3 = HVAC_COOL 4 = HVAC_NIGHT_PURGE 5 = HVAC_PRE_COOL 6 = HVAC_OFF 7 = HVAC_TEST (HVAC_AUTO) 8 = HVAC_EMERG_HEAT (HVAC_AUTO) 9 = HVAC_FAN_ONLY 10 = HVAC_FREE_COOL (HVAC_AUTO) 11 = HVAC_ICE (HVAC_AUTO) 12 = HVAC_MAX_HEAT (HVAC_AUTO) 13 = HVAC_ECONOMIZING (HVAC_AUTO) 14 = HVAC_DEHUMIDIFICATION (HVAC_AUTO) 15 = HVAC_CALIBRATE (HVAC_AUTO) 16 to 255 = HVAC_NUL	0xFF = HVAC_NUL

Auxiliary Heat Enable Input: nviAuxHeatEnable

Network Input: SNVT_switch nviAuxHeatEnable (SCC profile; refer to "Primary Heat Enable Input: nviPriHeatEnable")

A structure used by space temp controllers to enable or disable or limit any type of mechanical heat on the heat output. A discharge air controller uses nviPriHeatEnable. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

For ReliaTel™ products, the action initiated by this input depends upon what type of heater (gas, electric, or heat pump) is present and the number of heat stages. For heat pumps, nviAuxHeatEnable only controls auxiliary heat (not compressors), whether it comes on first or not. nviAuxHeatEnable is overridden if nviApplicMode = HVAC_NIGHT_PURGE, HVAC_PRE_COOL, or HVAC_FAN_ONLY (or nviApplicMode = HVAC_AUTO or HVAC_NUL and nviHeatCool = HVAC_NIGHT_PURGE, HVAC_PRE_COOL, or HVAC_FAN_ONLY) which disables heating.

Table 11. Network heat enable input valid ranges

State	Value	Equivalent	Heat Output Operation
0	Any value	0.0%	Disabled
1	0	0.0%	Disabled
1	1 to 199	0.5% to 99.5%	Enabled, 1% to 100%

Table 11. Network heat enable input valid ranges (continued)

State	Value	Equivalent	Heat Output Operation
1	200 to 255	100.0%	Enabled, no limit
• 0xFF (invalid value) • 2 to 127 • -128 to -2	Any value	100.0%	Enabled, No limit (invalid)

Building Static Pressure Setpoint Input: nviBldgStaticSP

Network Input: SNVT_press_p nviBldgStaticSP (SCCX and DAC profile)

Used to connect a network output from another controller to provide the building Static Pressure Setpoint. When valid, this input will have priority over any locally provided building static pressure setpoint. An invalid value is adopted at power-up until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

Tracer™ Summit, nviBldgStaticSP *(if present)* may be overridden by a Trane proprietary profile extension variable.

- Range:
  - -49 Pa to 74 Pa
- Invalid Value: 0x7FFF = 32767 Pa

Building Static Pressure Input: nviBldgStatPress

Network Input: SNVT_press_p nviBldgStatPress (SCCX and DAC profile)

Used to connect a network building static pressure sensor network output from another controller. When a building static pressure sensor is locally wired to the controller, nviBldgStatPress has priority if a valid value is present. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

- Range:
  - -170 Pa to 170 Pa
  - -0.68 to 0.68 IWC
- Invalid Value: 0x7FFF = 32767 Pa

Compressor Enable Input: nviComprEnable

Network Input: SNVT_switch nviComprEnable (SCC profile; refer to "Primary Cool Enable Input: nviPriCoolEnable")

A structure used by space temp controllers to enable or disable or limit any type of mechanical cooling on the cool output. A discharge air controller uses nviPriCoolEnable. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

The action initiated by this input depends upon the number of compressors in the system. nviComprEnable is overridden if nviApplicMode = HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_FAN_ONLY (or nviApplicMode = HVAC_AUTO or HVAC_NUL and nviHeatCool = HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_FAN_ONLY) which disables cooling.

Table 12. Compressor enable input valid ranges

State	Value	Equivalent	Heat Output Operation
0	Any value	0.0%	Disabled
1	0	0.0%	Disabled
1	1 to 199	0.5% to 99.5%	Enabled, 1% to 100%
1	200 to 255	100.0%	Enabled, no limit
• 0xFF (invalid value) • 2 to 127 • -128 to -2	Any value	100.0%	Enabled, no limit (invalid)

Network Input: SNVT_switch nviCWFlow (SCCX and DAC profile)

Indicates the system condenser water flow status provided by a network sensor or network output from another controller. When valid, nviCWFlow will have priority over any locally provided condenser water flow status. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time.

Default service type = unacknowledged.

Note: *Only IntelliPak™ products with water-cooled condenser and/or water-side economizer utilize nviCWFlow.*

Discharge Air Cooling Setpoint Input: nviDAClSP

Network Input: SNVT_temp_p nviDAClSP (DAC profile)

Used to set the discharge air cooling setpoint of the controller. An invalid value is adopted at power-up until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

- Range: 4.44 °C to 26.67 °C (40 °F to 80 °F)
- Invalid Value: 0x7FFF = 327.67°C

Discharge Air Heating Setpoint Input: nviDAHtSP

Network Input: SNVT_temp_p nviDAHtSP (DAC profile)

This input network variable is used to set the discharge air reheat setpoint. Default service type = unacknowledged.

- Range: 10 °C to 70 °C (50 °F to 158 °F)
- Default: 0x7FFF = 327.67°C
- Invalid Value: 0x7FFF = 327.67°C

Discharge Air Reheat Setpoint Input: nviDAReheatSP

Network Input: SNVT_temp_p nviDAReheatSP (SCCX and DACX profile)

This input network variable is used to set the discharge air reheat setpoint. Default service type = unacknowledged. Only IntelliPak Rooftop products with a modulating dehumidification option utilize nviDAReheatSP.

- Range: 18.44°C to 26.66°C (65°F to 80°F)
- Default: 0x7FFF = 327.67°C
- Invalid Value: 0x7FFF = 327.67°C

Duct Static Pressure Setpoint Input: nviDuctStaticSP

Network Input: SNVT_press_p nviDuctStaticSP (DAC profile)

Used to set the duct static pressure setpoint of the controller. An invalid value is adopted at power-up until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

- Range:
  - 0 Pa to 625 Pa (0.0 to 2.5 IWC)
- Default: 0x7FFF = 32,767 Pa
- Invalid Value: 0x7FFF = 32,767 Pa

Used to enable the dehumidification function in the controller. It is typically set by a supervisory node. Default value will be adopted at power-up and in case of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

ReliaTel™ products with a dehumidification option utilize nviDehumEnable and only to enable/disable dehumidification. Enabling dehumidification does not force the unit to actively dehumidify, since dehumidification is activated by setpoint and space conditions.

Economizer Enable Input: nviEconEnable

Network input: SNVT_switch nviEconEnable (SCC and DAC profile)

A structure used to enable and disable economizer operation. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

Table 13. Economizer enable input valid ranges

State	Value	Humidification	Meaning
0	Any value	Disabled	No economizing.
1	0	Disabled	No economizing.
1	1 to 255	Enabled	Economizing in the first stage of cooling.
• 0xFF (invalid value) • 2 to 127 • -128 to -2	00 (invalid value)	Auto (invalid)	Unit controller decision as to whether economizing is possible.

Emergency Override Input: nviEmergOverride

Network Input: SNVT_hvac_emerg nviEmergOverride (SCC and DAC profile)

Used to command the device into different emergency modes. an invalid value is adopted at power-up until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

Type Range Invalid Value

U08 0 = EMERG_NORMAL: Normal operation

1 = EMERG_PRESSURIZE: Start the PRESSURIZE operation

2 = EMERG_DEPRESSURIZE: Start the DEPRESSURIZE operation

3 = EMERG_PURGE: Start the PURGE operation

4 = EMERG_SHUTDOWN: SHUTDOWN all unit functions

5 = EMERG_FIRE: Input from fire pull box/system. SHUTDOWN all unit functions

6 to 255 = EMERG_NUL: Invalid mode (same as EMERG_NORMAL) 0 = EMERG_NORMAL

Fan Mode Command Input:

A structure used to control the fan mode. The unit controller can override this command when required for equipment protection. Default value will be adopted at power-up, until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

Table 14. Fan mode command input valid ranges

State	Value	Equivalent Percent	Requested Mode
0	any value	any value	Auto
1	0	0%	Auto
1	1 to 200	0.5% to 100.0%	On
1	201 to 255	100.0%	On
0xFF (default)	any value	any value	Auto (invalid)

Heat/Cool Mode Input: nviHeatCool

Network input; SNVT_hvac_mode nviHeatCool (SCC profile)

Used to coordinate the space temp controller with any node that may need to control the heat/cool changeover of the unit. This input is overridden by nviApplicMode unless nviApplicMode is HVAC_AUTO, HVAC_TEST, or HVAC_NUL. If nviApplicMode is HVAC_AUTO or HVAC_NUL, then nviHeatCool determines the Effective Mode of the Unit. Refer to "Appendix," p. 54 for detailed information about the utilization of nviHeatCool.

The default value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

Type Range Invalid Value

U08 0 = HVAC_AUTO

1 = HVAC_HEAT

2 = HVAC_MRNG_WRMUP

3 = HVAC_COOL

4 = HVAC_NIGHT_PURGE

5 = HVAC_PRE_COOL

6 = HVAC_OFF

7 = HVAC_TEST

8 = HVAC_EMERG_HEAT

9 = HVAC_FAN_ONLY

10 = HVAC_FREE_COOL (HVAC_AUTO)

11 = HVAC_ICE (HVAC_AUTO)

12 = HVAC_MAX_HEAT

13 = HVAC_ECONOMIZING (HVAC_AUTO)

14 = HVAC_DEHUMIDIFICATION (HVAC_AUTO)

15 = HVAC_CALIBRATE (HVAC_AUTO)

16 to 255 = HVAC_NUL 255 = HVAC_NUL

Minimum Outdoor Air Flow Setpoint Input: nviMinOAFlowSP

Network Input: SNVT_flow nviMinOAFlowSP (DAC profile)

Used to set the minimum outdoor air flow rate setpoint from the network. When a valid value is present, this input has priority over any local minimum outdoor air flow setpoint. An invalid value is adopted at power-up until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

- Range: 0 to 18,877 liters/second
- Invalid Value: 0xFFFF = 65,535 liters/second

Outdoor Air Minimum Position Input: nviOAMinPos

Network Input: SNVT_lev_percent nviOAMinPos (SCC and DAC profile; see nviTraneVar1)

Used to set the minimum outdoor air damper position. When a valid value is present, this input has priority over any local minimum outdoor air damper position setpoint. An invalid value is adopted at power-up until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

Input nviOAMinPos is overridden when nviApplicMode or nviHeatCool (SCC) is set to HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_PRE_COOL.

nviOAMinPos can be overridden by Trane® proprietary profile extension variables.

For SCC units controlled by Tracer™ Summit, nviOAMinPos (if present) may be overwritten by a Trane proprietary profile extension variable (last one received is utilized.) nviOAMinPos is overridden if nviApplicMode = HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_PRE_COOL (or nviApplicMode = HVAC_AUTO or HVAC_NUL and nviHeatCool = HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_PRE_COOL) which closes the outside air damper.

- Range: 0% to 100%
- Invalid Value: 0x7FFF = +163.835%

Occupancy Override Input: nviOccManCmd

Network Input: SNVT_occupancy nviOccManCmd (SCC and DAC profile)

Used to manually command the controller into different occupancy modes. This input is used in conjunction with nviOccSchedule and nviOccSensor *(if installed)* to determine the effective occupancy mode. nviOccSchedule appears in both SCC and DAC profiles, nviOccSensor in SCC profile only. The default value will be adopted at power-up and it does not use the receive heartbeat function. Should not be bound to a send heartbeat nvo. Refer to Table 69, p. 48 for more details about the utilization of nviOccManCmd. Default service type = unacknowledged.

For ReliaTel™ products, there is no time-out for nviOccManCmd, it is not heartbeated, and the value is not preserved when power is lost (it is always initialized to OCC_NUL on power-up.) nviOccManCmd enumerations of OC_UNOCCUPIED and OC_STANDBY are bypassable. Pressing the zone sensor module *Timed Override On* button (if installed) can change the effective occupancy from unoccupied to standby or bypass. The bypass timer is set to the value in nciBypassTime whenever nviOccManCmd equals OC_BYPASS or the local zone sensor *Timed Override On* request is received. After the bypass timer is set to nciBypassTime, the controller begins counting down to zero. The bypass timer is cleared to zero whenever nviOccManCmd does not equal OC_BYPASS or the local zone sensor with *Timed Override Cancel* request is received. If nciBypassTime is set to zero, it disables the OC_BYPASS enumeration for nviOccManCmd and nviOccSchedule.

Table 15. Occupancy override input valid ranges

Type	Ranges	Default
U08	0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 2 = OC_BYPASS 3 = OC_STANDBY 4 to 255 = OC_NUL	255 = OC_NUL (value not available)

Occupancy Scheduler Input: nviOccSchedule

Network Input: SNVT_tod_event nviOccSchedule (SCC and DAC profile)

A structure used to command the controller into different occupancy modes on schedule. This input is used in conjunction with nviOccSensor and nviOccManCmd *(if installed)* to determine the effective occupancy mode. The input nviOccManCmd appears in both SCC and DAC profiles, nviOccSensor in SCC profile only. An invalid values is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Refer to Table 69, p. 48 for more details about the utilization of nviOccSchedule. Default service type = unacknowledged.

For ReliaTel™ products, there is no time-out for nviOccManCmd, it is not heartbeated, and the value is not preserved when power is lost (it is always initialized to OCC_NUL on power-up.) nviOccManCmd enumerations of OC_UNOCCUPIED and OC_STANDBY are bypassable. Pressing the zone sensor module Timed Override On button (if installed) can change the effective occupancy from unoccupied to standby or bypass. The bypass timer is set to the value in nciBypassTime whenever nviOccManCmd equals OC_BYPASS or the local zone sensor Timed Override On request is received. After the bypass timer is set to nciBypassTime, the controller begins counting down to zero. The bypass timer is cleared to zero whenever nviOccManCmd does not equal OC_BYPASS or the local zone sensor with Timed Override Cancel request is received. If nciBypassTime is set to zero, it disables the OC_BYPASS enumeration for nviOccManCmd and nviOccSchedule.

Refer to "Effective Occupancy Output, nvoEffectOccup," p. 28 for more details about how unit occupancy is determined.

The input nviOccSchedule is overridden when nviApplicMode or nviHeatCool (SCC) is set to HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_PRE_COOL.

Table 16. Occupancy override input valid ranges

Type	Range	Description	Invalid Values	Require / Optional
U08	0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 3 = OC_STANDBY 2, 4 to 255 = OC_NUL	Current State	FF = 255 = OC_NUL (value not available)	Required
U08	0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 3 = OC_STANDBY 2, 4 to 255 = OC_NUL	Next State	FF = 255 = OC_NUL (value not available)	Optional

Occupancy Sensor Input: nviOccSensor

Network Input: SNVT_occupancy nviOccSensor (SCC profile)

Used to indicate the presence of occupants in the controlled space. This input is used in conjunction with nviOccSchedule and nviOccManCmd *(if installed)* to determine the effective occupancy mode. Invalid value will be adopted at power-up and in case of not receiving an update within the specified receive heartbeat time. Refer to Table 69, p. 48 for more details about the utilization of nviOccSensor. Default service type = unacknowledged.

For ReliaTel™ products, there is no time-out for nviOccManCmd, it is not heartbeated, and the value is not preserved when power is lost (it is always initialized to OCC_NUL on power-up.) nviOccManCmd enumerations of OC_UNOCCUPIED and OC_STANDBY are bypassable. Pressing the zone sensor module *Timed Override On* button (if installed) can change the effective occupancy from unoccupied to standby or bypass. The bypass timer is set to the value in nciBypassTime whenever nviOccManCmd equals OC_BYPASS or the local zone sensor *Timed Override On* request is received. After the bypass timer is set to nciBypassTime, the controller begins counting down to zero. The bypass timer is cleared to zero whenever nviOccManCmd does not equal OC_BYPASS or the local zone sensor with *Timed Override Cancel* request is received. If nciBypassTime is set to zero, it disables the OC_BYPASS enumeration for nviOccManCmd and nviOccSchedule.

Refer to "Effective Occupancy Output, nvoEffectOccup," p. 28 for more details about how unit occupancy is determined.

The input nviOccSensor is overridden when nviApplicMode or nviHeatCool (SCC) is set to

HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_PRE_COOL.

Table 17. Occupancy sensor input valid ranges

Type	Ranges	Default
U08	0 = OC_OCCUPIED 1 = OC_UNOCCUPIED 2 to 255 = OC_NUL	255 = OC_NUL (value not available)

Outdoor Air Humidity Input: nviOutdoorRH

Network Input: SNVT_lev_percent nviOutdoorRH (SCC and DAC profile)

The outdoor air humidity in percent. Typically provided by either a network sensor or a supervisory controller. When an outdoor air humidity sensor is locally wired to the controller, the nviOutdoorRH has priority if a valid value is present. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

For IntelliPak™ products, the outdoor air humidity input is limited to between 10 - 90%.

- Range: 0% to100%
- Invalid Value: 0x7FFF = 163.835%

Outdoor Air Temperature Input: nviOutdoorTemp

network input SNVT_temp_p nviOutdoorTemp (SCC and DAC profile)

The outdoor air dry bulb temperature is provided by either a network outdoor air temperature sensor or another controller. When an outdoor air temperature sensor is locally wired to the controller, the nviOutdoorTemp has priority if a valid value is present. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

- Range: -40.0 °C to 70.0 °C, -40.0 °F to 158.0 °F
- Invalid Value: 0x7FFF = 327.67°C

Primary Cool Enable Input: nviPriCoolEnable

network input SNVT_switch nviPriCoolEnable (DAC profile; refer to "Compressor Enable Input: nviComprEnable")

A structure used by a discharge air controller to enable or disable or limit mechanical cooling on the cool output. A space temp controller uses nviComprEnable. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

Table 18. Primary cool enable input valid ranges

State	Value	Equivalent Percent	Cool Output Operation
0	Any value	0.0%	Disabled
1	0	0.0%	Disabled
1	1 to 199	0.5% to 99.5%	Enabled; 1% to 100%
1	200 to 255	100.0%	Enabled; no limit
• 0xFF (invalid value) • 2 to 127 • -128 to -2	00 (invalid value)	100.0%	Enabled; no limit (invalid)

Primary Heat Enable Input: nviPriHeatEnable

Network Input: SNVT_switch nviPriHeatEnable (DAC profile; refer to "Auxiliary Heat Enable Input: nviAuxHeatEnable")

A structure used by a discharge air controller to enable or disable or limit mechanical heat on the heat output. A space temp controller uses nviAuxHeatEnable.The default value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

For all ReliaTel™ products, the action initiated by this input depends upon what type of heater (gas, electric, or heat pump) is present and the number of heat stages. For heat pumps, nviPriHeatEnable only controls auxiliary heat (not compressors), whether it comes on first or not. nviPriHeatEnable is overridden if nviApplicMode = HVAC_NIGHT_PURGE, HVAC_PRE_COOL, or HVAC_FAN_ONLY which disables heating.

Table 19. Primary heat enable input valid ranges

State	Value	Equivalent Percent	Cool Output Operation
0	Any value	0.0%	Disabled
1	0	0.0%	Disabled
1	1 to 199	0.5% to 99.5%	Enabled; 1% to 100%
1	200 to 255	100.0%	Enabled; no limit
• 0xFF (invalid value) • 2 to 127 • -128 to -2	Any value	100.0%	Enabled; no limit (invalid)

Service Test Command:

Command the unit to step through service test. It is typically set by a service tool. Default value will be adopted at power-up and in case of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

Each time nviServiceTest is enabled, the unit transitions to the next service test mode and performs a different function. After nvoServiceTest reflects the next service test mode, nviServiceTest reverts to disabled. Once nviServiceTest exceeds the last service test step mode, the unit will reset and leave service test. An internal unit "Service Test Timer" (not configurable and not communicated) will be reset to 60 minutes each time nviServiceTest transitions from disabled to enabled. If the timer counts down to zero, the unit will reset and leave service test mode.

Status Request Input: nviRequest

Network Input: SNVT_obj_request nviRequest (node profile)

Provides the mechanism to request a particular mode for a particular object within a node. An invalid value is adopted at power-up or until an update is received. Does not use the receive heartbeat function. Responses are set via nvoStatus. Default service type = unacknowledged.

Table 20. Primary heat enable input valid ranges and object request field enumeration definitions

Type	Range	Description	Invalid Value	Bytes	Valid	Meaning
U16	0 to 65535	Object ID	65535	2	• 0 • 1 • 2 • 3 to 65535	• Node object • SCC object • DAC object • Invalid
U08 Enum	0 to 255	Object request	255	1	See below	See below
Length				3		

Enum	Object Request Mode	Meaning	Controller Interpretation
0	RQ_NORMAL	Enable object and remove override.	Report object status.
1	RQ_DISABLED[(a)]	Disable object.	Ignore object request, invalid request.
2	RQ_UDATE_STATUS	Just report object status.	Report object status.
3	RQ_SELF_TEST	Perform object self-test.	Ignore object request, invalid request.
4	RQ_UPDATE_ALARM	Update alarm status.	Ignore object request, invalid request.
5	RQ_REPORT_MASK	Report status bit mask.	Report status bit mask.
6	RQ_OVERRIDE	Override object.	Ignore object request, invalid request.
7	RQ_ENABLE	Enable object.	Ignore object request, invalid request.
8	RQ_RMV_OVERRIDE	Remove object override.	Ignore object request, invalid request.
9	RQ_CLEAR_STATUS	Clear object status.	Report object status.
10	RQ_CLEAR_ALARM	Clear object alarm.	Clear diagnostic alarm.
11	RQ_ALARM_NOTIFY_ENABLE	Enable alarm notification.	Ignore object request, invalid request.
12	RQ_ALARM_NOTIFY_DISABLE	Disable alarm notification.	Ignore object request, invalid request.
13	RQ_MANUAL_CTRL	Enable object for manual control.	Ignore object request, invalid request.
14	RQ_REMOTE_CTRL	Enable object for remote control.	Ignore object request, invalid request.
15	RQ_PROGRAM	Enable programming of special configuration properties.	Ignore object request, invalid request.
16	RQ_CLEAR_RESET	Clear reset notification flag.	Ignore object request, invalid request.
17	RQ_RESET	Execute reset sequence of object.	Ignore object request, invalid request.
18 to 255	RQ_NUL	Value not available.	Ignore object request, invalid request.

(a) Highlighted entries under **Object Request Mode** column **are not** supported by the controller. Instead, these entries will generate an **nvoStatus** transmission with the **Invalid_Request** bit set.

Table 21. Node object behavior in response to object request

Request Code	Node Object Behavior
Normal	The Request does not change the state of the object. The Status of the object is sent via nvoStatus. See nciApplication for a description of how to determine the unit type and which profile is supported.
Update status	Status of the node object is sent via nvoStatus. The status bits of the node object (with the exception of invalid_request and invalid_id) are defined to be the inclusive OR of the status bits of all the other objects in the node, SCC and DAC in this case.
Report mask	Send a mask of supported status bits via nvoStatus. A one bit in the mask means that the node may set the corresponding bit in nvoStatus when the condition defined for that bit occurs. A zero means that the bit will never be set by the node.
Clear status	No status bits cleared. Status of the object is sent via nvoStatus.
Clear alarm	Clears most latching diagnostics. Re-sends automatically resetting diagnostics if no latching diagnostics are present.
NUL	Ignore object request.

Table 22. SCC/DAC object behavior in response to object request

Request Code	Node Object Behavior
Normal	The Request does not change the state of the object. The Status of the object is sent via nvoStatus. The out-of-service object sets the out-of-service and disabled bits. See nciApplication for a description of how to determine the unit type and which profile is supported.
Update status	Status of the object is sent via nvoStatus. The out-of-service object sets the out-of-service and disabled bits.
Report mask	Send a mask of supported status bits via nvoStatus. A one bit in the mask means that the node may set the corresponding bit in nvoStatus when the condition defined for that bit occurs. A zero means that the bit will never be set by the node. The out-of-service object sets the out-of-service and disabled bits.
Clear status	No status cleared. Status of the object is sent via nvoStatus. The out-of-service object sets the out-of-service and disabled bits.
Clear alarm	Clears most latching diagnostics. Re-sends automatically resetting diagnostics if no latching diagnostics are present.
NUL	Ignore object request.

Temperature Setpoint Input (Absolute): nviSetpoint

Network Input: SNVT_temp_p nviSetpoint (SCC profile)

Used to allow the space setpoints for the occupied and standby modes to be changed. If nviSetpoint, nviSetptOffSet and/or nviSetptShift are used together, the result on the effective setpoints is additive. The default value is adopted at power-up until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

Refer to Table 76, p. 63 for more details about the utilization of nviSetpoint by IntelliPak products.

- Range: 10°C to 35°C (50°F to 95°F)
- Default: 0x7FFF = 327.67°C
- Invalid Value: 0x7FFF = 327.67°C

Setpoint Offset Input: nviSetptOffset

Network Input: SNVT_temp_p nviSetptOffset (SCC profile)

Used to shift the effective occupied and standby temperature setpoints. All occupied and standby setpoints will be shifted upward (+) or downward (-) by the value of nviSetptOffset. If nviSetpoint, nviSetptOffSet, and/or nviSetptShift are used together, the result on the effective setpoints is additive.

An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

Refer to Table 76, p. 63 for more details about the utilization of nviSetptOffset by IntelliPak products.

- Range: -10°C to +10°C (-18°F to 18°F)
- Invalid Value: 0x7FFF = 327.67°C (Default)

Space CO_2 Sensor Input: nviSpaceCO_2 (nviSpaceIAQ)

Network Input: SNVT_ppm nviSpaceCO_2 (SCC and DACX profile)

Used to measure the space CO_2 in PPM. The unit can also have a locally wired CO_2 sensor. When a local space CO_2 value is available to the controller, the nviSpaceCO_2 has priority, if a valid value is present. The default value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

- Range: 0 to 2,000 PPM
- Default: 0xFFFF = 65,535 PPM
- Invalid Value: 0xFFFF = 65,535 PPM

Space Dehumidification Setpoint Input: nviSpaceDehumSP

Network Input: SNVT_lev_percent nviSpaceDehumSP (SCCX and DAC profile)

Used to connect a network space dehumidification setpoint or network output from another controller. When a local space dehumidification setpoint is available to the controller, the nviSpaceDehumSP has priority if a valid value is present. An invalid value is adopted at power-up until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

Only ReliaTel™ products with the dehumidification option utilize nviSpaceDehumSP.

- 40% to 65%
- 0x7FFF = 163.835%

Space Humidity Input: nviSpaceRH

Network Input: SNVT_lev_percent nviSpaceRH (SCC and DAC profile)

Used to connect a network return air or space relative humidity sensor or network output from another controller. When a return air or space relative humidity sensor is locally wired to the controller, the nviSpaceRH has priority, if a valid value is present. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

- Range: 0% to 100%
- Default: 0x7FFF = 163.835%
- Invalid Value: 0x7FFF = 163.835%

Space Temperature Input: nviSpaceTemp

Network Input: SNVT_temp_p nviSpaceTemp (SCC and DAC profile)

Used to connect a network space temperature sensor or network output from another controller. If nviSpaceTemp has a valid value, it will have priority over a locally wired space temperature sensor. An invalid value is adopted at power-up and in the event of not receiving an update within the specified receive heartbeat time. Default service type = unacknowledged.

- Range: -40.0°C to 65.55°C, -40.0°F to 149.9°F
- Invalid Value: 0x7FFF = 327.67°C

Device Control Input

A structure used by a space temp controller to set the occupied OA damper minimum position setpoint. A discharge air controller uses nviMinOAFlowSP, nviOAMinPos, and nviBldgStaticSP. Default service type = unacknowledged.

For SCC units, nviTraneVar1.OAMinPosSetpoint may be overwritten by nviOAMinPos and nviTraneVar1.BldgStaticSetpoint may be overwritten by nviBldgStaticSP (last received is utilized.) OAMinPosSetpoint is overridden when nviApplicMode or nviHeatCool (SCC) is set to HVAC_MRNG_WRMUP, HVAC_NIGHT_PURGE, or HVAC_PRE_COOL.

Description Type bytes Invalid Value Tracer™ SCC uses Tracer™ DAC uses

Output Request 1 SNVT_switch 2 0x00FF

Output Request 2 SNVT_switch 2 0x00FF

OA Flow Setpoint SNVT_flow 2 0xFFFF SCCX nviTraneVar1 DAC nviMinOAFlowSP

OA Min Pos Setpoint SNVT_lev_percent 2 0x7FFF SCCX nviTraneVar1 DAC nviOAMinPos

Flow Multiplier SNVT_multiplier 2 0x0000

Heat Enable SNVT_switch 2 0x00FF

Cool Enable SNVT_switch 2 0x00FF

Bldg Static Setpoint SNVT_press_p 2 0x7FFF SCCX nviTraneVar1 DAC nviBldgStaticSP

Boost SNVT_switch 2 0x00FF

Energy Limit SNVT_switch 2 0x00FF

Total Length 20

Field Override Input

This input network variable is used to perform service test. The use of this network variable supersedes normal control of the outputs. This variable is designed to be sent by Rover. With the use of this variable the controller continues to react to any/all diagnostics, both hardwired and logical, just as it does during normal operation. Invalid value will be adopted at power-up or until an update is received. Does not use the receive heartbeat function. Default service type = unacknowledged.

This variable is functionally the same as installing a resistor on the Test input on the controller with one primary distinction. The communication of nviTraneVar1401 is based on a communicated enumeration to define the test step. It is the responsibility of the sender (i.e. Rover) to send the test steps in the proper sequence.

Note: When this variable is being sent to the controller, nviApplicMode should be sent at the same time with an enumerated value representing "TEST" (enumeration 7 = HVAC_TEST). As a result, the controller will reflect a unit status of TEST in the variable nvoUnitStatus.

A manual override timer expiration is used to cancel the override request. This timer is set to 60 minutes at the start of manual test, and reset to 60 minutes each time manual test is advanced to the next step.

All minimum output timers (compressor on/off minimum timers, fan off delays, etc.) are IGNORED during this output override (as well as during the Service Test).

Comm5 Command

This network variable is Trane proprietary and should not show up in any literature. Used to return a status for a Comm 5 command. Note that no status is returned when a node is unlocked. The Comm 5 Status command type field will be the same as the Comm 5 Command type field except for the asynchronous Comm 5 Status enumeration. Kirk Johnson defined this network variable.

Network Variable Output Definitions

The network variable output definitions in this section are listed alphabetically by the nvoName. For example nvoAlarmMessage.

Alarm Message Text Output: nvoAlarmMessage

Network Output: SNVT_str_asc nvoAlarmMessage (node extension profile)

Used to communicate the diagnostics in the controller as they occur. The alarm message code format is displayed as, ***s_nnnnnnnnnnnnnnnnnnnnnnnnnnnnnn***, with a Space between the ***s*** and the ***first ASCII character***. The following explains this alarm message coding:

- s; indicates diagnostic severity with five types of diagnostics:
  - P= normal, last reset resulted from a power up
  - 0= normal, last reset was not from power up
  - 1= informational message (handle at next scheduled routine maintenance)
  - 2= service required (handle at normal rates during normal working hours)
  - 3= critical alarm (handle now, cost is no object)
- n; represents 29 ASCII characters that displays a deciphered message. The last ***n*** must be null (**0x00**), can be 29 characters or less.

Application Mode Output: nvoApplicMode

Network Output: SNVT_hvac_mode nvoApplicMode (DAC profile)

Used to control the mode of other controllers, such as a VAV box controller. Will typically send a value of HVAC_AUTO except in certain modes where an override of other controllers is required.

Table 23. Application mode output

Range	Meaning	When Transmitted	Update Rate	Default Service Type
0 = HVAC_AUTO	Fully automatic	Significant change or heartbeat.	No faster than config minimum send time send heartbeat time.	Unacknowledged.
1 = HVAC_HEAT	Heating *only*			
2 = HVAC_MRNG_WRMUP	Morning warm-up			
3 = HVAC_COOL	Cooling *only*			
4 = HVAC_NIGHT_PURGE	Free cooling			
5 = HVAC_PRE_COOL	Morning cool-down			
6 = HVAC_OFF	No operation allowed			
7 = HVAC_TEST	Special test mode, manufacturer defined			
8 = HVAC_EMERG_HEAT[a]				
9 = HVAC_FAN_ONLY	No heat/cool functions Operate			
10 = HVAC_FREE_COOL[a]				
11 = HVAC_ICE[a]				
12 = HVAC_MAX_HEAT	Maximum flow heating			
13 = HVAC_ECONOMY[a]				
14 = HVAC_DEHUMIDIFICATION[a]				
15 = HVAC_CALIBRATE[a]				
255 = HVAC_NUL	Invalid			

(a) Enumeration not sent by the controller.

Building Static Pressure Output: nvoBldgStatPress

Network Output: SNVT_press_p nvoBldgStatPress (SCCX and DAC profile)

Used for monitoring the current value of building static pressure that the controller is using.

ReliaTel™ products must have the 100% power exhaust with StatiTrac™ option for nvoBldgStatPress to be valid.

Table 24. Building static pressure output valid ranges

Range	Invalid	When Transmitted	Update Rate	Default Service Type
• -167 Pa to 167 Pa • -0.67 to 0.67 inches WC	0x7FFF =32.767 Pa	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Discharge Air Reheat Setpoint Output, nvoDAReheatSP

Only ReliaTel™ products with the dehumidification option transmit nvoDAReheatSP.

Network Output: SNVT_temp_p nvoDAReheatSP (SCCX and DACX profile)

This output network variable indicates the current value of the discharge air reheat setpoint in Celsius (ºC).

Table 25. Discharge air reheat setpoint output valid ranges

Range	Invalid	When Transmitted	Update Rate	Default Service Type
18.33 °C to 26.66 °C, 65 °F to 80 °F	0x7FFF = 327.67°C	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Dehumidification Status Output, nvoDehumidifier

Network Output: SNVT_switch nvoDehumidifier (SCCX and DAC profile)

Reflects the current status of dehumidification control for monitoring.

Table 26. Dehumidification status output valid ranges

State	Value	Equivalent Percent	Condenser Waterflow Status
0	0	0%	Disabled.
1	200	0.5% to 100%	Enabled and active.
0xFF	0	0%	Invalid.
When Transmitted	**Update Rate**		**Default Service Type**
• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.		Unacknowledged.

Discharge Air Temperature Output, nvoDischAirTemp

Network Output: SNVT_temp_p nvoDischAirTemp (SCC and DAC profile)

Used to monitor the unit discharge air temperature.

Table 27. Discharge air temperature output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
-40.00 °C to 70.00 °C -40.00 °F to 158 °F	0x7FFF = 327.67°C	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Duct Static Pressure Output, nvoDuctStatPress

network output SNVT_press_p nvoDuctStatPress; DAC profile

Used for monitoring the effective duct static pressure that the controller is using for control. This value will reflect either the network input nviDuctStatPress or the value from the locally wired duct static pressure sensor, as defined by the manufacturer.

Table 28. Duct static pressure output valid ranges

Range	Invalid	When Transmitted	Update Rate	Default Service Type
• 0 Pa to 1,245 Pa with 0 to 5 inches WC (CSC, RT1) • 0 to 1,990 Pa with 0 to 7.99 inches WC (RT2)	0x7FFF = 32,767 Pa	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Economizer Enabled Output, nvoEconEnabled

Network Output: SNVT_switch nvoEconEnabled (DAC profile; see SCCX and DACX nvoTraneVar7)

A structure used to report the current Enable/Disable status of the discharge air controller economizer. A space temp controller uses nvoTraneVar7. Refer to the specification for a complete description of when the economizer is enabled and disabled.

The nvoEconEnabled is the enable/disable status of the economizer. It is defined in the profile as *binary*. If the economizer is enabled, it reports (1, 200). If the economizer is disabled, it reports (0, 0). If there is no economizer, it reports (0xFF, 0). Commentary: It does not match nvoUnitStatus.econ_output. It does not show position in percent.

ReliaTel™ rooftop products that have a 0-25% motorized OA damper always report disabled.

Table 29. Economizer enabled output valid ranges

State	Value	Equivalent Percent	Condenser Waterflow Status
0	Any	0%	Disabled.
1	200	100%	Enabled.
0xFF	Any	NA	Invalid or not installed.
When Transmitted	**Update Rate**		**Default Service Type**
• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.		Unacknowledged.

Effective Discharge Air Temperature Setpoint Output, nvoEffDATempSP

Network Output: SNVT_temp_p nvoEffDATempSP (DAC profile)

Used to monitor the effective discharge air temperature setpoint that the controller is using for control. It may come from nviDAHtSP, nviDAClSP, nciDAHtSP, nciDAClSP, or a locally wired setpoint input.

All ReliaTel™ products report the currently or last utilized cooling or heating setpoint. ReliaTel™ products with the dehumidification option report the Active Supply Air Reheat Setpoint during dehumidification.

Table 30. Effective discharge air setpoint output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
4.44 °C to 65.55 °C 40 °F to 150 °F	0x7FFF = 327.67°C	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Effective Duct Static Pressure Setpoint Output, nvoEffDuctStatSP

Network Output: SNVT_press_p nvoEffDuctStatSP (DAC profile)

Used to monitor the effective duct static pressure setpoint that the controller is using for control. This value may come from nviDuctStaticSP, nciDuctStatSP, or a locally wired setpoint input.

Table 31. Effective duct static pressure setpoint output valid ranges

Range	Invalid	When Transmitted	Update Rate	Default Service Type
0 Pa to 622 Pa, 0.0 to 2.5 IWC	0x7FFF = 32,767%	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Effective Occupancy Output, nvoEffectOccup

Network Output: SNVT_occupancy nvoEffectOccup (SCC and DAC profile)

Used to indicate the current occupancy of the controller. This information is typically reported to a supervisory controller, or provided to another controller to coordinate the operation of multiple units. The occupancy mode is determined by a combination of optional input network variables and logic in the controller, as defined by the controller manufacturer. The network variables which can impact the occupancy state of the controller are; nviOccManCmd *(SCC/DAC)*, nviOccSchedule (SCC/DAC), and nviOccSensor *(only SCC)*. The unit is always in one of the four possible occupancy states. Refer to Table 69, p. 48 for more details about the utilization of nvoEffectOccup.

For ReliaTel™ products, there is no time-out for nviOccManCmd, it is not heartbeated, and the value is not preserved when power is lost (it is always initialized to OCC_NUL on power-up.) nviOccManCmd enumerations of OC_UNOCCUPIED and OC_STANDBY are bypassable. Pressing the zone sensor module *Timed Override On* button (if installed) for less than 8 seconds can change the effective occupancy from unoccupied or standby to bypass. The bypass timer is set to the value in nciBypassTime whenever nviOccManCmd equals OC_BYPASS or the local zone sensor *Timed Override On* request is received. After the bypass timer is set to nciBypassTime, the controller begins counting down to zero. The bypass timer is cleared to zero whenever nviOccManCmd does not equal OC_BYPASS or the local zone sensor with Timed Override Cancel request is received. If nciBypassTime is set to zero, it disables the OC_BYPASS enumeration for nviOccManCmd and nviOccSchedule. If nciBypassTime is set to zero, it does not disable the TOV Request or TOV Cancel Request in nvoTraneVar7. Pressing the zone sensor module *Timed Override On* button for more than 8 seconds will cause the LCI-R controller to broadcast a Service Pin Message (Neuron ID and Program ID.)

Table 32. Effective occupancy output valid ranges

Range	Invalid	When Transmitted	Update Rate	Default Service Type
0 = OC_OCCUPIED	Always valid.	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.
1 = OC_UNOCCUPIED				
2 = OC_BYPASS				
3 = OC_STANDBT				
4 to 255 not used				

Effective Setpoint Output, nvoEffectSetpt

Network Output: SNVT_temp_p nvoEffectSetpt (SCC profile)

Used to monitor the effective space temperature setpoint which may depend on nciSetpoints, nvoEffectOccup, nviSetpoint, nviSetpointOffset, nviSetptShift, nciPersonality2, nvoHeatCool, and any local setpoint adjustment. For example, if the occupancy state is unoccupied and the heat/cool state is heat, then the effective setpoint would be equal to the unoccupied heating setpoint defined in nciSetpoints.

Refer to Table 76, p. 63 for more details.

Table 33. Effective setpoint output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
10.00°C to 32.33°C (50°F to 90°F)	0x7FFF	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • send heartbeat time.	Unacknowledged.

Effective Space Dehumidification Setpoint Output, nvoEffSpaceDHSP

Network Output: SNVT_lev_percent nvoEffSpaceDHSP (SCCX and DAC profile)

Reflects the effective Space High Limit Humidity Setpoint for monitoring.

Table 34. Effective space dehumidification setpoint output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
40% to 65%	0x7FFF = 163.835% (not present)	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Exhaust Fan Status Output, nvoExhFanStatus

Network Output: SNVT_switch nvoExhFanStatus (SCCX and DAC profile; see SCCX and DACX nvoTraneVar7)

A structure used to report the current status of the exhaust fan.

Table 35. Exhaust fan status control output valid ranges

State	Value	Equivalent Percent	Requested Fan State	Requested Fan Capacity
0	0	NA	OFF	NA
1	0	0.0%	OFF	NA
1	1-199	0.5% to 99.5%	ON	0.5% to 99.5%
1	200	100%	ON	100%
0xFF	0	NA	Invalid.	Invalid.
When Transmitted	**Update Rate**		**Default Service Type**	
• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.		Unacknowledged.	

For ReliaTel™ units that do not have StatiTrac™ installed, when State is 1, Value will always be 0% or 100%.

Fan Speed Output, nvoFanSpeed

Network Output: SNVT_switch nvoFanSpeed (SCC profile; refer to "Supply Fan Status Output, nvoSupFanStatus," p. 35)

A structure used by a space temp controller to report the current supply fan speed. A discharge air controller uses nvoSupFanOnOff and nvoSupFanStatus.

Table 36. Fan speed output valid ranges

State	Value	Equivalent Percent	Requested Fan State	Requested Fan Capacity
0	NA	NA	OFF	NA
1	0	0.0%	OFF	0%
1	200	100%	ON	High or 100%.
0xFF	NA	NA	Invalid.	Invalid.
When Transmitted	**Update Rate**		**Default Service Type**	
• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.		Unacknowledged.	

Effective Heat/Cool Output, nvoHeatCool

Network Output: SNVT_hvac_mode nvoHeatCool (SCC and DAC profile)

Used to indicate the current heat/cool mode of the controller.Typically reported to a supervisory controller or another controller. May be used to coordinate the operation of multiple units.

Table 37. Effective heat/cool output

Range	Invalid	When Transmitted	Update Rate	Default Service Type
0 = HVAC_AUTO	Always invalid.	Significant change or heartbeat.	No faster than config minimum send time send heartbeat time.	Unacknowledged.
1 = HVAC_HEAT				
2 = HVAC_MRNG_WRMUP				
3 = HVAC_COOL				
4 = HVAC_NIGHT_PURGE				
5 = HVAC_PRE_COOL				
6 = HVAC_OFF				
7 = HVAC_TEST				
8 = HVAC_EMERG_HEAT[(a)]				
9 = HVAC_FAN_ONLY				
10 = HVAC_FREE_COOL[(a)]				
11 = HVAC_ICE[(a)]				
12 = HVAC_MAX_HEAT				
13 = HVAC_ECONOMY[(a)]				
14 = HVAC_DEHUMIDIFICATION[(a)]				
15 = HVAC_CALIBRATE[(a)]				
0xFF = HVAC_NUL				

(a) Enumeration item not sent by the controller.

Mixed Air Temperature Output, nvoMATemp

Network Output: SNVT_temp_p nvoMATemp (SCCX and DAC profile; refer to nvoTraneVar7 and "Mixed Air Temperature Output, nvoMixedAirTemp")

Used to monitor the mixed air temp being used by the controller. Also reported as part of the nvoTraneVar7 structure.

Table 38. Mixed air temperature output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
-40.00 °C to 65.55 °C, -40.00 °F to 150.0 °F	0x7FFF = 327.67°C	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Mixed Air Temperature Output, nvoMixedAirTemp

Network Output: SNVT_temp_p nvoMixedAirTemp (SCC profile; refer to nvoTraneVar7 and "Mixed Air Temperature Output, nvoMATemp")

Used to monitor the mixed air temp being used by the controller. Also reported as part of the nvoTraneVar7 structure.

Table 39. Mixed air temperature output valid ranges

Range	Invalid	When Transmitted	Update Rate	Default Service Type
40.00 °C to 65.55 °C, -40.00 °F to 150.0 °F	0x7FFF = 327.67°C	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Outdoor Air Damper Output, nvoOADamper

Network Output: SNVT_lev_percent nvoOADamper (SCC and DAC profile)

Reflects the current position of the outdoor air damper *(if hard wired)* or as a request to a remote outdoor air damper.

Table 40. Outdoor air damper output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
0% to 100.0%	0x7FFF = 163.835% (not present)	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Outdoor Airflow Output, nvoOAFlow

Network Output: SNVT_flow nvoOAFlow (DAC profile)

Indicates the current value of the outdoor Airflow for monitoring. This value will reflect the network input nviOAFlow *(if valid)* or the value from a locally wired air flow sensor. Only IntelliPak products with a Ventilation Control Module (VCM) transmit nvoOAFlow.

Table 41. Outdoor airflow output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
0 to 30,677 liters/sec 0 to 65,000 cfm	0xFFFF = 65,535 liters/sec	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Absolute Power Consumption

Used to indicate the current power consumption of the unit. Since this value is unsigned, the Terminal Load output (nvoTerminalLoad) must be used to determine if the power consumption is currently being used for heating or cooling. The determination of this value is manufacturer-defined, based on the type of unit and its application. A manufacturer can choose to provide either nvoLoadAbs or nvoLoadAbsK (or both), based on the range required for the application.

nvoLoadAbsK is calculated using nciApplication.CoolingSourceSize and nciApplication.HeatingSourceSize, which must be configured by an external service tool. The default for both is zero, so if it is not modified, nvoLoadAbsK will report zero.

Range: 0.0 to 200.0 kilowatts

Outdoor Air Humidity Output, nvoOutdoorRH

Network Output: SNVT_lev_percent nvoOutdoorRH (SCC and DAC profile)

Indicates the current value of the outdoor air relative humidity for monitoring. This value will reflect the network input nviOutdoorRH *(if valid)* or the value from a locally wired sensor.

Table 42. Outdoor air humidity output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
10% to 90.0%	0x7FFF = 163.835% (not present)	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Outdoor Air Temperature Output, nvoOutdoorTemp

Network Output: SNVT_temp_p nvoOutdoorTemp (SCC and DAC profile)

Used to monitor the outdoor air temperature being used by the controller. This value will reflect the network input nviOutdoorTemp *(if valid)* or the value from a locally wired sensor.

Table 43. Outdoor air temperature output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
-40.00 °C to 70.00 °C, -40.00 °F to 158.00 °F	0x7FFF = 327.67 °C	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Return Air Temperature Output, nvoRATemp

Network Output: SNVT_temp_p nvoRATemp (SCCX and DAC profile)

Indicates the current value of the return air temperature for monitoring. This value will reflect the network input nviRATemp *(if valid)* or the value from a locally wired sensor.

Table 44. Return air temperature output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
0.00 °C to 98.33 °C, 32.00 °F to 209.00 °F	0x7FFF = 327.67 °C	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Service Test Status

Indicates the current Service Test state.

Local Setpoint Output, nvoSetpoint

Network Output: SNVT_temp_p nvoSetpoint (SCC profile)

Used to monitor the locally wired space temperature setpoint. If this setpoint is not locally wired, the output will send the invalid value.

Refer to Table 76, p. 63 for more details.

Table 45. Local setpoint output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
10 °C to 29.4 °C, 50 °F to 90 °F	0x7FFF = 327.67 °C	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Space CO_2 Sensor Output, nvoSpaceCO2

Network Output: SNVT_ppm nvoSpaceCO2 (SCC and DACX profile)

Used to indicate the space CO_2 concentration in ppm from a locally wired CO_2 sensor.

Only ReliaTel™ products with Demand Controlled Ventilation enabled will transmit nvoSpaceCO_2.

Table 46. Space CO_2 sensor output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
0 to 2,000 ppm	0x7FFF = 65,535	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Space Humidity Output, nvoSpaceRH

Network Output: SNVT_lev_percent nvoSpaceRH (SCC and DAC profile)

Indicates the current value of the space relative humidity for monitoring. This value will reflect the network input nviSpaceRH *(if valid)* or the value from a locally wired sensor.

If nviSpaceRH is invalid, ReliaTel™ products will transmit valid values for nvoSpaceRH even if Dehumidification/ Reheat Option or air-side economizer with comparative enthalpy is installed or not. It both options are installed, the space humidity sensor used with dehumidification is reported.

Table 47. Space humidity output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
0% to 100.0%	0x7FFF = 163.835% (not present)	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Effective Space Temperature Output, nvoSpaceTemp

Network Output: SNVT_temp_p nvoSpaceTemp (SCC and DAC profile)

Used to monitor the effective space temperature that the controller is using. If input nviSpaceTemp has a valid value, this output will echo the value of the input. If a valid value for nviSpaceTemp does not exist, the locally wired sensor value is used. However, if neither value is available, the output will send the invalid value.

Table 48. Effective space temperature output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
-40 °C to 65.5 °C, -40 °F to 150 °F	0x7FFF = 327.67 °F	• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.	Unacknowledged.

Status Request Output, nvoStatus

Network Output: SNVT_obj_status nvoStatus (Node profile)

This nvo output is a list of bit fields that indicate the status of the objects in the node. Sent in response to nviRequest or poll or heartbeat. Poll does not update nvoStatus, and as an example, the user will not see a change in the alarm bit. Only nviRequest and heartbeat update nvoStatus.

When Transmitted

Output nvoStatus is transmitted whenever a request is received on the nviRequest input and as one of the nvo with heartbeat. The node object status is sent during the first heartbeat nvoStatus transmission. Then, either the SCC object status or the DAC object status is sent during the second heartbeat nvoStatus transmission (depending on which profile is being used) and the cycle repeats.

Update Rule

The application must update the status such that a poll of the status following the request returns a reasonable value.

- Update Rate: send heartbeat time
- Default Service Type: acknowledged

Table 49. Status request output structure definitions, 6 bytes

Type	Description	Report Mask	Byte	Bit	Meaning
U16	Object_ID	NA	0, 1	NA	• Node object • SCC object • DAC object • 3 to 65,535 = Undefined object
Bit	Invalid_ID	0	2	7	A status of invalid_id is reported whenever an nviRequest is received for an object id that is not implemented in the node. Invalid_id is mandatory and is always present and is not set in the report mask.
Bit	Invalid_Request	0	2	6	A status of invalid_request is reported whenever an nviRequest is received for an non-implemented function. Invalid_request is mandatory and is always present and is not set in the report mask.
Bit	Disabled	1	2	5	A status of disabled is reported if a valid object request code is received for the disabled object. The node object is never disabled. The SCC object is disabled when the LCI unit type is FAU, CSC DAC, or RT DAC. The DAC object is disabled when the LCI unit type is CSC SCC or RT SCC. See nciApplication for details on how the LCI unit type and supported profile is determined. The disabled and the out-of-service bits are always both set at the same time in the IntelliPak unit.
Bit	Out_Of_Limits	0	2	4	Object exceeded alarm limits.
Bit	Open_Circuit	0	2	3	Open circuit detected.
Bit	Out_Of_Service	1	2	2	A status of out-of-service is reported if a valid object request code is received for the out_of_service object. The node object is never out-of-service. The SCC object is out-of-service when the LCI unit type is FAU, CSC DAC, or RT DAC. The DAC object is out-of-service when the LCI unit type is CSC SCC or RT SCC. See nciApplication for details on how the LCI unit type and supported profile is determined.
Bit	Mechanical_Fault	0	2	1	Mechanical fault detected.
Bit	Feedback_Failrure	0	20		Feedback signals not received.

Table 49. Status request output structure definitions, 6 bytes (continued)

Type	Description	Report Mask	Byte	Bit	Meaning
Bit	Over_Range	0	3	7	Maximum range exceeded.
Bit	Under_Range	0	3	6	Minimum range exceeded.
Bit	Electrical_Fault	0	3	5	Electrical fault detected.
Bit	Unable_To_Measure	0	3	4	I/O line failure.
Bit	Comm_Failure	0	3	3	Network communications failure.
Bit	Fail_Self_Test	0	3	2	Self-test failure.
Bit	Self_Test_In_Progress	0	3	1	Self-test in progress.
Bit	Locked_Out	1	3	0	A status of locked out is reported if a valid object request code is received for the locked out object. The node object is never locked out. The DAC and SCC objects are locked out when one or more circuits are locked out due to 1) Demand Limit, 2) Frost Protection, 3) Low Ambient, or 4) Low Condenser Water temp (CSC water-cooled condenser or Rooftop evaporative condenser only). See nciApplication for details on how the LCI unit type and supported profile is determined.
Bit	Manual_Control	1	4	7	A value of TRUE is reported if the controller is under local control. Tracer Summit will use this bit to indicate whether the IntelliPak unit is in local or remote control.
Bit	In_Alarm	1	4	6	A value of TRUE is reported if the controller has a diagnostic condition. See nvoAlarmMessage for the list of IntelliPak diagnostics that set this bit and nvoUnitStatus in_alarm bit.
Bit	In_Override	0	4	5	Object overridden.
Bit	Report_Mask	1	4	4	Report_mask status is used to document the optional status bits that are supported by the object. The obj_request code RQ_REPORT_MASK causes the object to respond with a mask of supported optional status bits via nvoStatus. A ONE in the mask means that the object may set the corresponding optional bit in the object status when the condition defined for that optional bit occurs. A ZERO means that the optional bit will never be set by the object. When reporting status in response to a RQ_REPORT_MASK, the report_mask bit will be set to distinguish this from other forms of status. The invalid_id and invalid_request bits are mandatory and are not set in the report_mask status.
Bit	Programming_Mode	0	4	3	Object in programming mode.
Bit	Programming_Fail	0	4	2	Object in programming failure.
Bit	Alarm_Notify_Disable	0	4	1	Object alarm disabled.
Bit	Reserved1	0	4	0	Not defined.
8 Bit	Reserved2	00	5	All	Not defined.

Supply Fan Status Output, nvoSupFanStatus

Network Output: SNVT_switch nvoSupFanStatus (DAC profile; refer to "Fan Speed Output, nvoFanSpeed," p. 30)

A structure used to report the current supply fan speed of a discharge air controller. A space temp controller uses nvoFanSpeed.

Table 50. Supply fan status output valid ranges

State	Value	Equivalent Percent	Actual Fan State	Actual Fan Capacity
0	NA	NA	OFF	NA
1	0	0.0%	OFF	0%
1	1-199	0.5% to 99.5%	ON	0.5% to 99.5%
1	200	100%	ON	100%
0xFF	NA	NA	Invalid	Invalid

Table 50. Supply fan status output valid ranges (continued)

State	Value	Equivalent Percent	Actual Fan State	Actual Fan Capacity
When Transmitted	**Update Rate**		**Default Service Type**	
• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.		Unacknowledged.	

Terminal Load Output, nvoTerminalLoad

Network Output: SNVT_lev_percent nvoTerminalLoad (SCC and DACX profile)

Indicates the current heat/cool energy demand of the unit. Positive values indicate that cooling energy is required *(or in use)* by the controller, while negative values indicate that heating energy is required *(or in use)* by the controller. The actual determination of the value of nvoTerminalLoad is manufacturer-defined. One method is to typically report the output of the heating/cooling control algorithm. Another method is to report only the heating/cooling energy required from a central source, such as a water loop or air handling unit.

Table 51. Terminal load output valid range

Range	Invalid	When Transmitted	Update Rate	Default Service Type
-100-0% to 100.0 heating to cooling	Always invalid.	Significant change.	No faster than configured minimum send time.	Unacknowledged.

Unit Status Output, nvoUnitStatus

Network Output: SNVT_hvac_status nvoUnitStatus (SCC and DAC profile)

A structure used to report controller status.

For ReliaTel™ products, the electric heat capacity reported in the “heat_output_primary” field is divided equally between the number of stages available. This may or may not reflect the actual capacity step for a given stage. This was done because of the number of variations in capacity steps due to model number variations, line voltage, wiring, and sizes/number of heater elements. For heat pumps, heat_output_primary always reports compressors and heat_output_secondary always reports auxiliary heat, whether auxiliary heat comes on first or not. Unlike nvoEconEnabled, nvoUnitStatus.econ_output shows percent open (like HYPERLINK \l "nvoOADamper" nvoOADamper.) nvoEconEnabled is the enable/disable status of the economizer and is defined in the profile as "binary" (does not show percent.) If the economizer is enabled, it reports (1, 200). If the economizer is disabled, it reports (0, 0). If there is no economizer, it reports (0xFF, 0).

Unlike nvoEconEnabled, nvoUnitStatus.econ_output shows percent open. Output nvoEconEnabled is the enable/disable status of the economizer and is defined in the profile as *binary* (*does not show percent*). If the economizer is enabled, it reports (1, 200). If the economizer is disabled, it reports (0, 0). If there is no economizer, it reports (0xFF, 0). IntelliPak Rooftop products with a 0-25% motorized OA damper always report disabled.

Table 52. Unit status output valid ranges

Type	Range	Description	Bytes	Meaning
SNVT_hvac_mode	0 = HVAC_AUTO[a] 1 = HVAC_HEAT 2 = HVAC_MRNG_WRMUP 3 = HVAC_COOL 4 = HVAC_NIGHT_PURGE 5 = HVAC_PRE_COOL 6 = HVAC_OFF 7 = HVAC_TEST 8 = HVAC_EMERG_HEAT[a] 9 = HVAC_FAN_ONLY 10 = HVAC_FREE_COOL[a] 11 = HVAC_ICE 12 = HVAC_MAX_HEAT 13 = HVAC_ECONOMY[a] 14 = HVAC_DEHUMID 15 = HVAC_CALIBRATE[a] 0xFF = HVAC_NUL	Mode (nvoHeatCool)	1	This field reports the same value as nvoHeatCool.
SNVT_lev_percent	0% to 100%, 0x7FFF = invalid	Heat_Output_Primary	2	Status position of heat output.

Table 52. Unit status output valid ranges

Type	Range	Description	Bytes	Meaning
SNVT_lev_percent	0% to 100%, 0x7FFF = invalid	Heat_Output_Secondary	2	Status position of secondary heat (condenser reheat status).
SNVT_lev_percent	0% to 100%, 0x7FFF = invalid	Cool_Output	2	Status position of cool output.
SNVT_lev_percent	0% to 100%, 0x7FFF = invalid	Econ_Output (nvoOADamper or nvoEconEnabled)	2	Status position of installed economizer. Report WS Econ cmd if WSE only installed. Report AS Econ if only ASE or both ASE and WSE installed. Report invalid (0x7FFF) if no economizer installed.
SNVT_lev_percent	0% to 100%, 0x7FFF = invalid	Fan_Output	2	Status supply fan speed.
U08	0 = No alarm 1 to 254 = Alarm present 255 = Alarm disabled	In_Alarm (nvoStatus)	1	Refer to nvoAlarmMessage for the alarm that sets bits. The alarm bit is nvoStatus.
Length	NA	NA	12	NA
When Transmitted	**Update Rate**		**Default Service Type**	
• Significant change. • Send heartbeat time.	• No faster than configured minimum send time. • Send heartbeat time.		Unacknowledged.	

(a) Not used by controller and is always invalid.

Device Status Output

A structure used to report controller status. See below for a definition of each supported field

Comm5 Status Output

This network variable is Trane proprietary and should not show up in any literature. Used to return a status for a Comm 5 command. Note that no status is returned when a node is unlocked. The Comm 5 Status command type field will be the same as the Comm 5 Command type field except for the asynchronous Comm 5 Status enumeration. Kirk Johnson defined this network variable.

Configuration

The Tracer™ LCI-R is factory configured and commissioned with fixed sequences of operation. All of the configuration parameters are predefined and loaded based upon the configuration of the unit. Some *as-built* configuration parameters are adjustable at the human interface. Both Tracer™ Summit systems and the Trane Rover Service Tool allow access to these parameters to make adjustments to controller operation.

The configuration parameters in the Tracer™ LCI-R match the unit type with the control mode, cooling and heating sources, and outdoor air damper. The control mode selects the desired unit operation. Refer to Table 53.

Table 53. Tracer™ LCI-R unit type configuration parameters

Control Mode	Temperature Control
• Constant-volume	• Space temperature
• Constant-volume	• Discharge air
• VAV	• Discharge air

Table 54. Heating and cooling source

Cooling Source	Heat Source	Heat Type	Outdoor Air Damper
None	Gas	Staged	None
Hydronic	Electric	Modulating	Outdoor air damper
DX coil	Hot water		
	Steam		

Table 55. Outdoor air damper

Parameter	Valid range	Default Value
Occupied outdoor damper minimum position	0 to 100%	15%
Occupied standby damper minimum position	0 to 100%	15%
Economizer enable temperature (dry bulb)	50°F to 140°F (10°C to 60°C)	75°F (23.9°C)

Table 56. Exhaust fan or damper

Parameter	Valid Range	Default Value
Exhaust fan enable setpoint (Note 1)	0 to 100%	25%

Note: The exhaust fan is energized when the outdoor air damper is equal to or greater than the exhaust fan enable setpoint. The exhaust fan is turned off when the outdoor air damper is less than the exhaust fan enable setpoint.

Table 57. Local zone sensor switch

Parameter	Valid Range	Default Value
Local fan/system switch	Enable or disable	Disable

Table 58. Space temperature setpoints

Default Setpoint	Valid Range	Default Value
Occupied heating setpoint	50°F to 90°F (10°C to 32.22°C)	71°F (21.67°C)
Occupied cooling setpoint	50°F to 90°F (10°C to 32.22°C)	74°F (23.33°C)
Occupied standby heating setpoint	50°F to 90°F (10°C to 32.22°C)	67°F (19.44°C)
Occupied standby cooling setpoint	50°F to 90°F (10°C to 32.22°C)	78°F (25.56°C)
Unoccupied heating setpoint	50°F to 90°F (10°C to 32.22°C)	60°F (15.56°C)
Unoccupied cooling setpoint	50°F to 90°F (10°C to 32.22°C)	85°F (29.44°C)
Heating setpoint low limit[a]	40°F to 115°F (4.44°C to 46.11°C)	40°F (4.44°C)
Cooling setpoint low limit	40°F to 115°F (4.44°C to 46.11°C)	40°F (4.44°C)
Heating setpoint high limit	40°F to 115°F (4.44°C to 46.11°C)	104°F (40°C)

Table 58. Space temperature setpoints (continued)

Default Setpoint	Valid Range	Default Value
Cooling setpoint high limit	40°F to 115°F (4.44°C to 46.11°C)	104°F (40°C)
Local setpoint	Disable or enable.	Enable

(a) The heating/cooling setpoint low/high limits apply only to the occupied and occupied standby setpoints. They are never applied to the unoccupied setpoints.

Table 59. Discharge air temperature control setpoints and setpoint limits

Setpoint	Valid Range	Default Value
Discharge air cooling setpoint	40°F to 90°F (4.4°C to 32.2°C)	55°F (12.9°C)
Discharge air heating setpoint	40°F to 180°F (4.4°C to 82.2°C)	100°F (37.8°C)

Table 60. Daytime warm-up differential temperature

Setpoint	Valid Range	Default Value
Daytime warm-up initiate setpoint[a]	50°F to 87°F (10°C to 30.56°C)	67°F (19.44°C)
Daytime warm-up terminate setpoint[b]	53°F to 90°F (11.67°C to 32.22°C)	71°F (21.67°C)

(a) When the space temperature is below the daytime warm-up initiate setpoint, the daytime warm-up sequence is initiated.
(b) When the space temperature is above the daytime warm-up terminate setpoint, the daytime warm-up sequence is terminated.

Table 61. Duct static pressure

Parameter	Valid Range	Default Value
Duct static pressure setpoint (RT2)	0.7 to 5.1 inches WC (175 to 1270 Pa)	2.0 inches WC (500 Pa)
Duct static pressure setpoint (RT1, CSC)	1 to 4.3 inches WC (250 to 1071 Pa)	1.5 inches WC (375 Pa) if CSC, 2.0 inches WC (500 Pa) if RT1.

Table 62. Timers

Parameter	Valid Range	Default Value
Power-up control wait.	0 to 6,553.4 seconds	0 seconds
Maintenance required time setpoint (based on fan run hours).	0 to 10,000 hours	0 hours
Occupancy bypass timer.[a]	0 to 240 minutes (1 minute resolution)	• 120 minutes (SCC) • 0 minutes (DAC)

(a) Occupied bypass timer is used for timed override applications when a building automation system (BAS) is not present or when the BAS does not send the occupied (override) request. The timed override timer is maintained in t he LCI-R controller. When the timed override is applicable, the controller reports occupied bypass as it effective occupancy mode.

Table 63. Diagnostic alarm level

Parameter	Valid Range	Default Value
Diagnostic alarm level.[a]	Service required; critical alarm	Service required
Maintenance required time setpoint (based on fan run hours).	0 to 10,000 hours	0 hours
Occupancy bypass timer.	0 to 240 minutes (1 minute resolution)	• 120 minutes (SCC) • 0 minutes (DAC)

(a) Refer to table 21 for a list of alarm messages that can be configured as service required or critical alarm diagnostics. Diagnostics cannot be individually configured.

Configuration Property Definitions

Configuration property definitions are implemented as configuration network variables. They are listed alphabetically in this section by their nciName. For example, nciBldgStatisSP.

Building Static Pressure Setpoint, nciBldgStaticSP

Network Input Configuration: SNVT_press_p nciBldgStaticSP (Type 3, Level 1 DAC profile)

This configuration property defines the Default Building Static Pressure setpoint for the Discharge Air Controller.

- Range:
  - -49 to 74 Pa (-0.20 to 0.30 IWC)
- Default Value: 20 Pa, 0.08 inches WC
- SCPT Reference: SCPTbuildingStaticPressureSetpoint (193)

Local Bypass Time, nciBypassTime

Network Input Configuration: SNVT_time_min nciBypassTime (Type 2, Level 1 SCC and DAC profile)

Maximum time that the controller can be in occupied bypass mode following a single Bypass request from either a local switch or nviOccManCmd.

- Range: 0 to 240 minutes *(0 disables)*
- SCC Default: 120 minutes
- DAC Default: 0 minutes
- SCPT Reference: SCPT bypassTime (34)

Discharge Air Cooling Setpoint, nciDAClSP

Network Input Configuration: SNVT_temp_p nciDAClSP (Type 3, Level 1, DAC profile)

This configuration property defines a default Discharge Air Cooling setpoint for the Discharge Air Controller.

- Range: 4.44 °C to 26.67 °C (40 °F to 80 °F)
- Default Value: 0x7FFF = 327.67 °C (Invalid)
- SCPT Reference: SCPTdischargeAirCoolingSetpoint (183)

Discharge Air Heating Setpoint, nciDAHtSP

Network Input Configuration: SNVT_temp_p nciDAHtSP (Type 3, Level 1, DAC profile)

This configuration property defines a default Discharge Air Heating setpoint for the Discharge Air Controller.

- Range: 10 °C to 70 °C, 50 °F to 158 °F
- Default Value: 0x7FFF = 327.67 °C (Invalid)
- SCPT Reference: SCPTdischargeAirHeatingSetpoint (184)

Discharge Air Reheat Setpoint, nciDAReheatSP

Network Input Configuration: SNVT_temp_p nciDAReheatSP (Type 3, Level 1, SCCX and DACX profile)

The discharge air reheat sequence will start when the discharge air temp falls below the nciDAReheatSP setpoint. The value of nciDAReheatSP must be greater than the value of nciDADewPointSP by at least 3 F.

- Valid Range: 18.34 °C to 26.66 °C, 65 °F to 80 °F
- Default Value: 21.11°C (70°F)
- UCPT Reference: UCPT_DAReheatSP

Daytime Warm Up Initiate Setpoint, nciDaytime

Network Input Configuration: SNVT_temp_p nciDaytime (Type 3, Level 1, DACX profile)

When the space temperature gets below the daytime warm-up initiate setpoint, the daytime warm- up sequence will start. The value of nciDaytime will always be at least 1.67°C (3°F) below the value of nciDaytimeTerm.

The Trane DACX profile extension specifies Level 2, implemented as Level 1 for ReliaTel™ units. See nciDaytimeTerm.

- Valid Range: 10 °C to 30.56 °C (50 °F to 87 °F)
- Default Value: 20.56 °C, 69 °F
- UCPT Reference: UCPT_Daytime

Daytime Warm Up Termination Setpoint, nciDaytimeTerm

Network Input Configuration: SNVT_temp_p nciDaytimeTerm (Type 3, Level 1, DACX profile)

When the space temperature gets above the daytime warm-up termination setpoint, the daytime warm-up sequence will end. The value of nciDaytimeTerm will always be at least 1.67°C (3°F) above the value of nciDaytime.

- Valid Range: 4.44°C, 10°C to 30.56°C, 40°F, 50°F to 87°F
- Default Value: 20.56 °C, 69 °F
- UCPT Reference: UCPT_DaytimeTerm

Device Build Version Number, nciDevBuildNum

Network Input Configuration: unsigned int nciDevBuildNum (Type 1, Level 1, Node Ex profile)

This configuration property defines the build version number for the device and is read-only. It cannot be written.

- SCPT: UCPTdevBuildNum
- SCPT Index: U16
- Valid Range: 0 - 65536
- Default Value: 2

Device Major Version Number, nciDevMajVer

Network Input Configuration: unsigned short nciDevMajVer (Type 1, Level 1, Node profile)

This configuration property defines the major version number for the device and is read-only. It cannot be written. This number stays in sync with the SPID. This number is the same for all nodes with the same SPID.

- SCPT: UCPTdevMajVer
- SCPT Index: 165
- Valid Range: 0 - 255
- Default Value: 6

Device Config Choices

A structure used to define the Trane Node Object. Not all of the fields in this structure are defined. One two bit enumeration field is defined and it is used to configure the Trane alarm level on diagnostics that support alarm level configuration. Diagnostics that support alarm level configuration are treated as a group and not individually. This does not change the controllers reaction to a diagnostic, only the ASCII string in nvoAlarmMessage.

Device Minor Version Number, nciDevMinVer

Network Input Configuration: unsigned short nciDevMinVer (Type 1, Level 1, Node profile)

This configuration property defines the minor version number for the device and is read-only. It cannot be written. It matches the application software part number extension.

- Valid Range: 0 - 255
- Default Value: 0
- SCPT: UCPTdevMinVer
- SCPT Index: 166

Duct Static Pressure Setpoint, nciDuctStatSP

Network Input Configuration: SNVT_press_p nciDuctStatSP (Type 3, Level 1, DAC profile)

This configuration property defines a default Duct Static Pressure setpoint for the Discharge Air Controller.

- Range:
  - 0 Pa to 625 Pa, 0.0 to 2.5 IWC
  - Default: 375 Pa, 1.5 IWC
- SCPT Reference: SCPTductStaticPressureSetpoint (189)

Econ and Ventilation Type

This configuration property is not used by the controller for any purpose. It is used to identify the type of economizer or ventilation system that is being controlled. The Economizer Ventilation Type can be polled by a tool or an operator interface device, to help the user identify the type of equipment.

UCPT Reference, UCPT_OA_type

Valid Range The following economizer or ventilation systems can be selected.

Table 64. enumerations and descriptions

enum	Description
0	none or not supported (default)
1	2 position ventilation
2	airside (modulating) economizer
3	2 position ventilation and waterside economizer
4	waterside economizer
5	airside and waterside economizer
6	TRAQ damper/sensor

Table 64. enumerations and descriptions (continued)

enum	Description
7	airside economizer and TRAQ damper/sensor
8	TRAQ damper/sensor and waterside economizer
9	airside economizer, TRAQ damper/sensor and waterside economizer
10 to 255	None

Note: *Highlighted enumerations are not used by the controller. This configuration property is initially loaded with the correct value and no further updates are made by the controller. Its value is ignored by the controller and has no effect on its operation. It cannot be written, but can be polled.*

Exhaust Enable Position, nciExhaustConfig

Network Input Configuration: SNVT_lev_percent nciExhaustConfig (Type 3, Level 1, SCCX profile; refer to "Exhaust Enable Position, nciExhStartPos")

Defines the exhaust enable outdoor air damper position setpoint for a space temp controller. A discharge air controller uses nciExhStartPos.

IntelliPak products ignore values greater than 100% *(101% does not disable exhaust)*

- Typical Range: 0% to 101%, *101% disables*
- Default Value: 25%
- UCPT Reference: UCPT_exhaust_cfg

Exhaust Enable Position, nciExhStartPos

Network Input Configuration: SNVT_lev_percent nciExhStartPos (Type 3, Level 1, DAC profile; refer to "Exhaust Enable Position, nciExhaustConfig")

Defines the exhaust enable outdoor air damper position setpoint for a discharge air controller. A space temp controller uses nciExhaustConfig

IntelliPak products ignore values greater than 100% *(101% does not disable exhaust)*

- Range: 0% to 101% *(101% disables)*
- Default Value: 25%
- SCPT Reference: SCPTexhaustEnablePosition (202)

Exhaust AND/OR Return Fan/ Damper Identifier

This configuration property is not used by the controller for any purpose. It is used to identify the type of exhaust or return system that is being controlled. The Exhaust and/ or Return Fan/Damper Type can be polled by a tool or an operator interface device, to help the user identify the type of equipment.

For ReliaTel™ products with modulating exhaust, a modulating damper enumeration is always reported because the same analog output is used to control either a modulating damper or a VFD and the controls were not designed to differentiate between the two. If an economizer is installed, an exhaust fan output is present, but there is not enough configuration information to determine if an exhaust fan is installed. Generally, Precedent products do not have an exhaust fan. The user can change this with a service tool (Rover), if desired. Changing this variable affects HYPERLINK \l "nvoExhFanStatus" nvoExhFanStatus.

If an economizer is not installed, then nciExhRet reports none, and the user cannot modify. If an economizer is installed and power exhaust is not installed, the user may select none or 1 speed exhaust fan. If an economizer and power exhaust are installed, then nciExhRet reports 1 speed exhaust fan with modulating exaust damper and the user cannot modify.

Fan Configuration Input

This configuration variable is a structure used to define the fan configuration. Separate configuration exists for the supply fan during heating and the supply fan during cooling.

HVAC Unit Type Identifier, nciHvacType

Network Input Configuration: SNVT_hvac_type nciHvacType (Type 1, Level 255, SCC and DACX profile)

This configuration property is not used by the controller for any purpose. It is used to identify the type of HVAC unit that is being controlled. Although the HVAC Unit Type can be read via the network, typically, it should not be changed. The configuration property SCPThvacType should be declared using the device_specific_flg so that it can be protected by the network configuration tool to avoid inadvertent modification in the field by the installer. In addition, the use of device_specific_flg allows devices to have a common *.XIF file, where the only network interface difference is the value of this configuration property. If it is changed, the user must verify the application for the selected HVAC Unit Type.

Table 65. HVAC unit type identifier valid ranges

Range	Default Value	SCPT Reference
0 = HVT_GENERIC = Generic. 1 = HVT_FAN_COIL= Fan coil. 2 = HVT_VAV = Variable-air-volume terminal. 3 = HVT_HEAT_PUMP = Heat pump. 4 = HVT_ROOFTOP = Rooftop unit. 5 = HVT_UNIT_VENT = Unit ventilation. 6 = HVT_CHILL_CEIL = Chiller ceiling. 7 = HVT_RADIATOR = Radiator. 8 = HVT_AHU = Air handler. 9 = HVT_SELF_CONT = Self-contained unit.	4 = Rooftop unit.	SCPThvacType (169)

Location Label, nciLocation

Network Input Configuration: SNVT_str_asc nciLocation (Type 2, Level 1, SCC and DAC profile)

Can be used to provide more descriptive physical location information than can be provided by the Neuron Chip 6 byte location string.

For IntelliPak products:

- Range: Any NULL terminated ASCII string of 31 bytes total length
- Default Value: LCI-R ReliaTel™
- SCPT Reference: SCPTlocation (17)

Minimum Outdoor Airflow Setpoint, nciMinOAFlowSP

Network Input Configuration: SNVT_flow nciMinOAFlowSP (Type 3, Level 1, SCCX and DAC profile)

This configuration property defines the default minimum outdoor airflow setpoint for the Discharge Air Controller.

- Range:
  - 0 to 18,877 liters/sec
  - 0 to 40,000 cfm
- Default Value:
  - 0xFFFF = 65535 liter/sec (invalid)
- SCPT Reference: SCPTminOutdoorAirFlowSetpoint (198)

Minimum Send Time, nciMinOutTm

Network Input Configuration: SNVT_time_sec nciMinOutTm (Type 2, Level 1, SCC and DAC profile)

This is the minimum period of time between any two send-on-delta nvo transmissions. Input nciMinOutTm is used only by send on delta. Input nciMinOutTm is not used by the send-on heartbeat function. If nciMinOutTm = 0xFFFF (6,553.5 seconds), the invalid value, the controller will use the default value, 2.5 seconds, for the minimum send time. If nciMinOutTm = 0, there is no minimum time requirement between send-on-delta transmissions. Send-on-delta transmissions happen as fast as possible when nciMinOutTm = 0.

- Range: 0 to 6,553.4 seconds
- Default Value: 2.5 seconds
- SCPT Reference: SCPTminSendTime (52)

Module Software Version

This configuration property is used to report the software versions of unit modules.

Outdoor Airflow Calibration, nciOAFlowCalib

Network Input Configuration: SNVT_multiplier nciOAFlowCalib (Type 3, Level 1, DAC profile)

This configuration property defines the gain for the outdoor airflow calibration for the Discharge Air Controller.

- Range: 0.000 to 2.000
- Default Value: 1.000
- SCPT Reference: SCPTsensConstVAV (67)

Outdoor Air Damper Minimum Position, nciOAMinPos

Network Input Configuration: SNVT_lev_percent nciOAMinPos (Type 3, Level 1, SCC and DAC profile)

Defines a default Minimum Outdoor Air Damper Position setpoint for the controller. This input is overridden by nviOAMinPos, if valid.

- Range: 0% to 100%

- Default Values: 0x7FFF = 163.835% (invalid)
- SCPT Reference: SCPTminRnge (23)

Receive Heartbeat, nciRcvHrtBt

Network Input Configuration: SNVT_time_sec nciRcvHrtBt (Type 2, Level 1, SCC and DAC profile)

Used to control the maximum time that elapses after the last update to an nvi before the controller starts to use its default values. If nciRcvHrtBt = 0xFFFF *(invalid)*, the controller will use the default value *(900 seconds)* for the receive heartbeat time. A heartbeat nvi will revert to its invalid value in one to two receive heartbeat times after its last valid reception. There is one receive heartbeat timer to handle all of the heartbeat NVIs. If nciRcvHrtBt = 0 *(disable)*, then the heartbeat nvi will never revert to their *invalid* values.

- Range: 0 to 6,553.4 sec, 0 disables
- Default Value: 900 seconds
- SCPT Reference: SCPTmaxRcvTime (48)

Table 66. Receive heartbeat valid ranges

Network Variable Input	Specified to Receive Heartbeat in Table?	Bound?	Result: Use Receive Heartbeat?
Category 1	Yes	Yes	Yes
Category 2	Yes	No	Yes
Category 3	No	Don't Care	No

Occupancy Temperature Setpoints, nciSetpoints

Network Input Configuration: SNVT_temp_setpt nciSetpoints (Type 4, Level 1, SCC and DAC profile)

A structure to define the space temperature setpoints. The values of the individual setpoints within nciSetpoints must be kept in ascending order as follows: *unoccupied_heat*, *standby_heat*, *occupied_heat*, *occupied_cool*, *standby_cool*, *unoccupied_cool*.

Table 67. Occupancy temperature setpoint structure definition, SCPT reference, and SCPTsetPnts (60)

Type	Description	nci Type	Range	Default	Bytes
SNVT_temp_p	Occupied cooling setpoint	3	10°C to 32.22°C (50°F to 90°F)	23.33°C (74°F)	2
SNVT_temp_p	Occupied standby cooling setpoint	2	10°C to 32.22°C (50°F to 90°F)	25.56°C (78°F)	2
SNVT_temp_p	Unoccupied cooling setpoint	3	10°C to 32.22°C (50°F to 90°F)	29.44°C (85°F)	2
SNVT_temp_p	Occupied heating setpoint	3	10°C to 32.22°C (50°F to 90°F)	21.67°C (71°F)	2
SNVT_temp_p	Occupied standby heating setpoint	2	10°C to 32.22°C (50°F to 90°F)	19.44°C (67°F)	2
SNVT_temp_p	Unoccupied heating setpoint	3	10°C to 32.22°C (50°F to 90°F)	15.56°C (60°F)	2
Length					12

Send Heartbeat, nciSndHrtBt

Network Input Configuration: SNVT_time_sec nciSndHrtBt (Type 2, Level 1, SCC and DAC profiles)

This is the maximum period of time that will expire before each bound heartbeated nvo will be automatically updated once. The controller will divide the number of heartbeated nvos into the configured send heartbeat time to determine how often to send one heartbeated nvo. The heartbeated nvos will be sent in a round robin fashion. Only the bound network variable outputs will actually be transmitted on the Comm5 link. The configured minimum send time *(nciMinOutTm)* is ignored. If nciSndHrtBt = 0x7FFF *(6,553.5 seconds)*, the invalid value, the controller will use the default value, 300 seconds, for the send heartbeat time.

- Range: 0 to 6,553.4 seconds (0 disables)
- Default Value: 300 seconds
- SCPT Reference: SCPTmaxSendTime (49)

Table 68. Send heartbeat valid ranges

Network Variable Output	Specified to Receive Heartbeat in Table?	Result: Use Receive Heartbeat?
Category 1	Yes	Yes
Category 2	No	No

Space CO_2 Limit, nciSpaceCO_2Lim

Network Input Configuration: SNVT_ppm nciSpaceCO_2Lim (Type 3, Level 1, SCC profile)

Defines a high limit CO_2 setpoint for the controlled space. The controller ventilation functions, in response to this limit, are manufacturer defined.

For ReliaTel™ products that provide a Demand Control Ventilation function, nciSpaceCO2Lim correlates to the Default Design Minimum CO2 Setpoint, which defines the CO2 level which opens the TRAQ dampers to the Design Minimum OA Flow Setpoint (for units with TRAQs) or opens the OA Damper to the Design Minimum OA Damper Setpoint (for units without TRAQs.)

Except for zero, which disables DCV, nciSpaceCO2Lim cannot be set lower than 500 ppm, or lower than nciSpaceCO2LowLm + 100 ppm or greater than 2000 ppm.

- Range: 150 to 2,000 ppm (0 disables)
- Default Value: 1,000 ppm
- SCPT Reference: SCPTlimitCO_2 (42)

Device Personality

A structure to define the general application.

For ReliaTel™ products, the language identifier controls the language of the string returned in nvoAlarmMessage.

Preheat Type Identifier

This configuration property is not used by the controller for any purpose. It is used to identify the type of primary heat that is being controlled. The Preheat Type can be polled by a tool or an operator interface device, to help the user identify the type of equipment.

For ReliaTel™ heat pump products, modulating electric, modulating gas and modulating hydronic heat can be configured as the first stage of heat. In these configurations, DX heating is considered secondary heat.

Space CO_2 Low Limit

Defines a low limit CO_2 setpoint for the controlled space. The controller ventilation functions, in response to this limit, are manufacturer defined.

For ReliaTel™ products, with TRAQ sensors, that provide a CO_2 Reset function, nciSpaceCO2LowLm correlates to the CO_2 Reset Start setpoint, which defines the CO_2 level which provides no reset (increase) to the Minimum OA CFM setpoint.

For ReliaTel™ products that provide a Demand Control Ventilation function, nciSpaceCO2LowLm correlates to the Default DCV Minimum CO2 Setpoint, which defines the CO_2 level which closes the TRAQ dampers to the DCV Minimum OA Flow Setpoint (for units with TRAQs) or closes the OA Damper to the DCV Minimum OA Damper Setpoint (for units without TRAQs.)

nciSpaceCO2LowLm can not be set lower than 300 ppm, or greater than nciSpaceCO2Lim - 100 ppm or greater than 1900 ppm.

- Range: 50 to 1900 ppm
- Default Value: 800 ppm
- SCPT Reference: SCPTlimitCO2 (42)

Occupancy Temp Setpoint

A structure to define the space temperature setpoints. The values of the individual setpoints within nciSetpoints must be kept in ascending order as follows: unoccupied_heat £ standby_heat £ occupied_heat £ occupied_cool £ standby_cool £ unoccupied_cool.

See HYPERLINK \l "nvoEffectSetpt" nvoEffectSetpt for SCC implementation details.

Reheat Type Identifier

This configuration property is not used by the controller for any purpose. It is used to identify the type of secondary heat that is being controlled. The Reheat Type can be polled by a tool or an operator interface device, to help the user identify the type of equipment.

For ReliaTel™ heat pump products, modulating electric, modulating gas and modulating hydronic heat can be configured as the first stage of heat. In these configurations, DX heating is considered secondary heat.

Valid Range

The following reheat types can be selected. Enumerations less than 128 are upstream of the supply fan, draw through. Enumerations greater than 128 are down stream of the supply fan, blow through.

Space Dehumidification Setpoint, nciSpaceDehumSP

Network Input Configuration: SNVT_lev_percent nciSpaceDehumSP (Type 3, Level 1, DAC profile; see nciSpaceRHSetpt)

This configuration property defines the default space dehumidification setpoint for the Discharge Air Controller.

- Range: 40% to 65% (RT)
- Default Value: 60%
- SCPT Reference: SCPThumSetpt (36)

Space Humidity Setpoint, nciSpaceRHSetpt

Network Input Configuration: SNVT_lev_percent nciSpaceRHSetpt (Type 3, Level 1, SCC profile; see nciSpaceDehumSP)

This configuration property defines a high humidity setpoint for the controlled space. The controller dehumidification functions, in response to this limit, are defined by the manufacturer.

- Range: 40 to 65%
- Default Value: 60%
- SCPT Reference: SCPThumSetpt (36)

Supply Fan Type Identifier

This configuration property is not used by the controller for any purpose. It is used to identify the type of supply fan that is being controlled. The Supply Fan Type can be polled by a tool or an operator interface device, to help the user identify the type of equipment.

Operation Modes and General Information

This section provides operation modes and general information about the Tracer™ LCI-R.

Operation Modes

Temperature Control Modes

The Tracer™ LCI-R can be configured to operate in the following temperature control modes:

- Constant-volume (CV) space temperature control (SCC)
- Constant-volume (CV) discharge air temperature control (DAC)
- Variable-air-volume (VAV) discharge air temperature control (DAC)

Constant-Volume Space Temperature Control (Cascade Control) (SCC)

For this type of control, the Tracer™ LCI-R requires both a space-temperature and discharge-air-temperature sensor. In this control mode, the controller compares the space temperature to the space heat/cool setpoint to generate a discharge air temperature setpoint. The controller modulates its heating or cooling outputs to control the discharge air temperature to the discharge air temperature setpoint. This calculated discharge air temperature setpoint is the desired discharge air temperature *(supply air temperature)* that the unit must deliver to maintain space temperature at the space heating or cooling setpoint.

The space temperature can be hard wired to the RTRM module ZoneTemp input *(only 10 kW thermistor)* or can be communicated to the controller using LonTalk®. Similarly, cooling and/or heating setpoint(s) can be provided by a hard wired zone sensor, a night setback panel, a LonTalk® communicated value, or by using the stored default setpoints in the controller.

The discharge air temperature must be a hard wired analog input to the RTRM module *(only 10 kW thermistor)*.

Constant-Volume Discharge Air Temperature Control (DAC)

For this type of control, the Tracer™ LCI-R requires only a discharge air sensor *(only 10 kW thermistor)* to operate. This control mode modulates the heating or cooling outputs to maintain the discharge air temperature at the discharge air temperature setpoint.

Variable-Air-Volume (VAV) Discharge Air Control (DAC)

For this type of control, the Tracer™ LCI-R maintains a discharge air temperature according to the cool/heat discharge air setpoint, and duct static pressure at the duct static pressure setpoint. The controller maintains duct static pressure by modulating the supply fan inlet guide vanes (IGV) or the variable frequency drive (VFD).

Occupancy Modes

Active heating and cooling setpoints are affected by the occupancy mode of the controller. The controller occupancy mode is determined by either a hard wired input *(such as a zone sensor, night setback panel, or changeover switch)* or by a communicated request *(such as from a system-level controller or another peer controller)*.

A stand-alone controller uses the binary input to switch between occupied and unoccupied. For peer-to-peer applications, refer to the section, "Peer-to-peer Communication," p. 51.

Valid Occupancy Modes

The valid occupancy modes of the Tracer™ LCI-R are:

Occupied

Normal operating mode for occupied spaces or daytime operation.

Unoccupied

Normal operating mode for unoccupied spaces or nighttime operation.

Occupied Standby

Constant-volume mode used to reduce the heating and cooling demands during the occupied hours when the space is vacant or unoccupied. For example, the controller may use occupied standby mode for a classroom while the students are out of the room.

Occupied Bypass

The mode used for timed override conditions. For example, if the controller is in unoccupied mode and someone presses the **ON** button on the zone sensor or night setback panel, the controller is placed in occupied bypass mode for 120 minutes *(adjustable)* or until someone presses the **Cancel** button on the zone sensor.

Determining the Occupancy Mode

The occupancy of the controller is determined by evaluating the combination of three potential communicating inputs, as well as the hard wired occupancy input and the occupied bypass timer. The following three communicating inputs affect the controller occupancy mode. Maximum flexibility is provided by having all three of these inputs; however, the number that you use varies with the application and the features available in your building automation system. Refer to Table 69, p. 48.

Manual Command Occupancy Input

Some communicating devices may request occupancy based on the information communicated in the network variable nvoOccManCmd. Trane systems and zone sensors do not communicate this information to the controller, but the Tracer™ LCI-R accepts this network variable as communicated input nviOccManCmd.

Schedule Occupancy Input

Building automation systems normally communicate an occupancy request using the occupancy—schedule input. The Tracer™ LCI-R accepts communicated occupancy schedule as a network variable input nviOccSchedule.

Sensor Occupancy Input

Some occupancy sensors may be equipped with the ability to communicate an occupancy mode to the controller. In such devices, the network variable input nviOccSensor is used to communicate occupancy to the controller. Trane® systems and zone sensors do not currently send this variable. The hard wired occupancy input of this controller is handled as if it is a communicated occupancy sensor input. When both a hard wired input and a communicated input exist, the communicated input is used.

Table 69. Effect of occupancy commands on the controller[a]

Local/ Remote Control	Local Timed Override	Local OCC Command	Unit Type	nviApplicMode[b]	nviHeatCool (SCC) [b]	OCC Man Command nviOccManCmd[c]	OCC Sched nviOccSchedule	NSB Panel Input status	NSB OCC Request	OCC Sensor nviOcc Sensor (only SCC)[d]	RTRM OCC Binary Input	LCI Internal Bypass Timer [e]	Controller Effect OCC	Unit OCC Mode
Local	Yes	X	X	X	X	X	X	X	X	X	X	X	Bypass	Occ
Local	No	Occ	X	X	X	X	X	X	X	X	X	X	Occ	Occ
Local	No	Unocc	X	X	X	X	X	X	X	X	X	X	Unocc	Unocc
Remote	X	X	RT or CSC	MRNG WRMUP	X	X	X	X	X	X	X	X	Occ	Occ
Remote	X	X	RT or CSC	NIGHT PURGE	X	X	X	X	X	X	X	X	Unocc	Occ[5]
Remote	X	X	RT or CSC	PRE-COOL	X	X	X	X	X	X	X	X	Occ	Occ
Remote	X	X	RT or CSC (SCC)	AUTO or NUL	MRNG WRMUP	X	X	X	X	X	X	X	Occ	Occ
Remote	X	X	RT or CSC (SCC)	AUTO or NUL	NIGHT PURGE	X	X	X	X	X	X	X	Unocc	Occ[f]
Remote	X	X	RT or CSC (SCC)	AUTO or NUL	PRE-COOL	X	X	X	X	X	X	X	Occ	Occ
Remote	X	X	X	X	X	Occ[e]	X	X	X	X	X	X	Occ	Occ
Remote	X	X	X	X	X	Unocc[e]	X	X	X	X	X	Zero	Unocc	Unocc
Remote	X	X	X	X	X	Unocc[e]	X	X	X	X	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	Byp[e]	Occ	X	X	X	X	X	Occ	Occ
Remote	X	X	X	X	X	Byp[e]	Unocc	X	X	X	X	Zero	Unocc	Unocc
Remote	X	X	X	X	X	Byp[e]	Unocc	X	X	X	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	Byp[e]	Standby	X	X	X	X	Zero	Standby	Occ
Remote	X	X	X	X	X	Byp[e]	Standby	X	X	X	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	Byp[e]	NUL	Valid	Occ	X	X	X	Occ	Occ
Remote	X	X	X	X	X	Byp[e]	NUL	Valid	Unocc	X	X	Zero	Unocc	Unocc
Remote	X	X	X	X	X	Byp[e]	NUL	Valid	Unocc	X	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	Byp[e]	NUL	Invalid	X	Occ	X	X	Occ	Occ
Remote	X	X	X	X	X	Byp[e]	NUL	Invalid	X	Unocc	X	Zero	Unocc	Unocc
Remote	X	X	X	X	X	Byp[e]	NUL	Invalid	X	Unocc	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	Byp[e]	NUL	Invalid	X	NUL	Occ	X	Occ	Occ
Remote	X	X	X	X	X	Byp[e]	NUL	Invalid	X	NUL	Unocc	Zero	Unocc	Unocc
Remote	X	X	X	X	X	Byp[e]	NUL	Invalid	X	NUL	Unocc	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	Stdby[e]	X	X	X	X	X	Zero	Standby	Occ
Remote	X	X	X	X	X	Stdby[e]	X	X	X	X	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	NUL[e]	Occ	X	X	Occ	X	X	Occ	Occ
Remote	X	X	X	X	X	NUL[e]	Occ	X	X	Unocc	X	Zero	Standby	Occ
Remote	X	X	X	X	X	NUL[e]	Occ	X	X	Unocc	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	NUL[e]	Occ	X	X	NUL	Occ	X	Occ	Occ
Remote	X	X	X	X	X	NUL[e]	Occ	X	X	NUL	Unocc	Zero	Standby	Occ
Remote	X	X	X	X	X	NUL[e]	Occ	X	X	NUL	Unocc	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	NUL[e]	Unocc	X	X	X	X	Zero	Unocc	Unocc
Remote	X	X	X	X	X	NUL[e]	Unocc	X	X	X	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	NUL[e]	Standby	X	X	X	X	Zero	Standby	Occ
Remote	X	X	X	X	X	NUL[e]	Standby	X	X	X	X	Not Zero	Bypass	Occ

Table 69. Effect of occupancy commands on the controller[a] (continued)

Local/ Remote Control	Local Timed Override	Local OCC Command	Unit Type	nviApplicMode[b]	nviHeatCool (SCC) [b]	OCC Man Command nviOccManCmd[c]	OCC Sched nviOccSchedule	NSB Panel Input status	NSB OCC Request	OCC Sensor nviOcc Sensor (only SCC)[d]	RTRM OCC Binary Input	LCI Internal Bypass Timer [e]	Controller Effect OCC	Unit OCC Mode
Remote	X	X	X	X	X	NUL[e]	NUL	Valid	Occ	Occ	X	X	Occ	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Valid	Occ	Unocc	X	Zero	Standby	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Valid	Occ	Unocc	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Valid	Occ	NUL	Occ	X	Occ	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Valid	Occ	NUL	Unocc	Zero	Standby	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Valid	Occ	NUL	Unocc	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Valid	Unocc	X	X	Zero	Unocc	Unocc
Remote	X	X	X	X	X	NUL[e]	NUL	Valid	Unocc	X	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Invalid	X	Occ	X	X	Occ	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Invalid	X	Unocc	X	Zero	Unocc	Unocc
Remote	X	X	X	X	X	NUL[e]	NUL	Invalid	X	Unocc	X	Not Zero	Bypass	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Invalid	X	NUL	Occ	X	Occ	Occ
Remote	X	X	X	X	X	NUL[e]	NUL	Invalid	X	NUL	Unocc	Zero	Unocc	Unocc
Remote	X	X	X	X	X	NUL[e]	NUL	Invalid	X	NUL	Unocc	Not Zero	Bypass	Occ

(a) **X** in any of the table fields denotes any state.
(b) If **nviApplicMode** or **nviHeatCool** equals **HVAC_MRNG_WRMUP**, **HVAC_NIGHT_PURGE**, or **HVAC_PRE_COOL**, each has higher priority than **nviOccManCmd**, **nviOccSchedule**, **nviOccSensor** or any local unit occupancy input. This is because the unit must be in occupied mode to perform the desired functions (such as space pressure control).
(c) There is no time out for **nviOccManCmd**. It is not heartbeated. The value of **nviOccManCmd** is lost when power is lost, **nviOccManCmd = NUL** when power returns. The **nviOccManCmd** enumerations of unoccupied and standby can be bypassed. Pushing the zone sensor module timed override ON button can change the effective occupancy from unoccupied or standby to bypass.
(d) The **nviOccSensor** is *only* SCC. The DAC profile uses the NUL rows in this column.
(e) The bypass timer is set to the value in **nciBypassTime** every time one of the following occurs:
1) Receive nviOccManCmd = bypass
2) Receive timed override ON request from the local zone sensor module
After the bypass timer is set to **nciBypassTime**, it counts down to zero.
The bypass timer is cleared to zero every time one of the following occurs:
1) Receive **nviOccManCmd** = **occupied**, **unoccupied**, **standby**, **NUL**, or **undefined**
2) Receive timed override **CANCEL** request from the local zone sensor module
To disable the network bypass timer, set **nciBypassTime** to zero. This disables the **nviOccManCmd** and **nviOccSchedule OC_BYPASS** enumeration. This *does not* disable the local bypass timer that is used by the zone sensor with timed override button, which is hard-coded to be three hours. However, if **nciBypassTime** is set to zero and either **nviOccManCmd** or **nviOccSchedule** are set to **OC_BYPASS**, the local zone sensor timed override button is disabled. If **nciBypassTime** is set to zero, it does not disable the TOV Request or TOV Cancel Request in **nvoTraneVar7**.
(f) When **nviApplicMode = HVAC_NIGHT_PURGE**, **nviOccSchedule**, and **nviOccSensor** are ignored, **nvoEffectOccup** reports **OC_UNOCCUPIED**, and the human interface reports occupied. This was necessary because all Intellipak DAC products must be in occupied mode to do discharge air control with duct static pressure control.

Timed Override Control Mode

The range for the timed override bypass time is 0 to 240 minutes *(configurable, nciBypassTime)*. The default value for the bypass time is 120 minutes for SCC units and 0 minutes for DAC units.

The space temperature analog input generates timed override **ON** and **Cancel** requests in the following manner. The controller interprets a momentary short *(greater than 3 seconds)* on the space temperature analog input as a timed override **ON** request. The controller always accepts this timed override **ON** request and resets the bypass time. The controller changes to occupied bypass mode only if the controller is in either the unoccupied or occupied standby mode. The controller stays in the occupied bypass mode for the occupied bypass time or until someone presses the Cancel button on the zone sensor.

The controller interprets a momentary fixed resistance *(greater than 3 seconds)* of 1.5 kΩ on the space temperature analog input as a timed override **Cancel** request. The controller accepts the **Cancel** request and sets the bypass time to zero. During occupied bypass mode, the controller uses a **Cancel** request to return the controller to unoccupied mode.

Occupancy data can be shared between controllers that are bound as peers. **ON** and **Cancel** requests are generated by the zone sensor of the master controller. Refer to the section, "Peer-to-peer Communication," p. 51.

Emergency Override Mode

The Tracer™ LCI-R controller can be placed into emergency override using the communication link. Emergency override allows a building automation system to pressurize, depressurize, or purge the air from a building space. It can also be used to shut down the controller operation of the unit.

The emergency override command influences the controller supply fan, inlet guide vanes, exhaust fan, exhaust dampers, outdoor air damper, heat, occupancy/unoccupancy relay, ventilation override relay, and outdoor air pre-heater state to create the desired condition (refer to Table 70).

Table 70. Emergency override commands

Command	Supply Fan	Inlet Vanes	Exhaust Fan	Exhaust Dampers	Outside Air Damper	Heat	Unoccupied Relay	Ventilation Override Relay	Outside Air Preheat
Pressurize	ON	Open	OFF	Closed	Open	OFF	ON	ON	OFF
Depressurize	OFF	Closed	ON	Open	Closed	OFF	ON	ON	OFF
Purge	ON	Open	ON	Open	Open	OFF	ON	ON	OFF
Shutdown	OFF	Closed	OFF	Closed	Closed	OFF	ON	ON	OFF
Fire	OFF	Closed	OFF	Closed	Closed	OFF	ON	ON	OFF

Setpoint Operation Mode

Peer-to-peer applications can share the heating/cooling setpoint *(communicated from a master to a slave)*. To ensure the peer-to-peer setpoint application results in identical setpoints for each communicating controller, each controller must have exactly the same default setpoints.

Peer-to-peer applications often require the use of one hard wired setpoint to be shared across two or more controllers. This is achieved by wiring the adjustable setpoint *(typically included as a part of the zone sensor module)* to the controller that has been designated as the master. Refer to the section, "Peer-to-peer Communication," p. 51.

Input Duct Static Pressure

The duct static pressure input can either be hard wired or communicated to the controller by means of LonTalk®. If both a communicated value and a hard wired duct static pressure value exist, the communicated value has precedence. Similarly, the duct static pressure setpoint can either be configured *(default)* or communicated. If a communicated duct static pressure setpoint value exists, the communicated value has precedence.

Morning or Daytime Warm-Up

If a space temperature input is provided to the controller when configured as CV discharge air control or VAV control, the controller can be configured to use the space temperature to perform morning warm-up and daytime warm-up functions. Morning or daytime warm-up functions allow the controller to automatically change to heating if space temperature is less than the heating setpoint. The daytime warm-up function cannot be initiated through a communicated request.

Discharge Air Temperature Control

In heating mode, the controller creates a supply air temperature according to the configured discharge air heating setpoint or communicated discharge air heating setpoint input. In cooling mode, the controller maintains a supply air temperature according to the configured discharge air cooling setpoint or communicated discharge air cooling setpoint input. If a valid communicated discharge air setpoint exists, the controller uses the communicated value.

Mixed Air and Outdoor Air Temperature Inputs

Temperature inputs such as mixed air temperature or outdoor air temperature aid the ability of the LCI-R to maintain comfort and protect the unit.

General Information

This section provides general information about the following:

- Location identifier
- Power-up sequence
- Peer-to-peer communication

Location Identifier

The Tracer™ LCI-R includes unit configuration for a location identifier. The maximum length of the location identifier is 30 characters. The identifier can be modified for easy identification of the unit based on its physical location.

Power-up Sequence

When 24 Vac power is initially applied to the Tracer™ LCI-R and the unit controller, the following sequence occurs (refer to the section, "LED Activity," p. 52):

- Red Service LED and green Status LED blink intermittently.
- Internal unit communications begins *(TXA and RXA LEDs blink)*.
- Green Status LED turns on solid.
- Unit will remain in local *(stand-alone)* control until LonTalk® control data is received.
- Power-up control wait feature is applied. The controller waits 300 seconds to allow ample time for the communicated control data to arrive. If after 300 seconds, the controller has not received any communicated control data, the unit assumes local *(stand-alone)* operation.
- Normal operation begins.

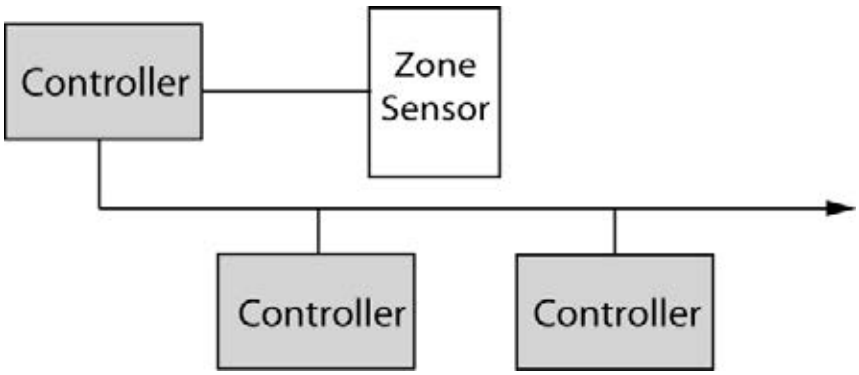
A service test cannot be initiated until the power-up sequence has completed. Refer to the section, "Service Test," p. 52.

Peer-to-peer Communication

Tracer™ LCI-R controllers allow peer-to-peer *(or master/slave)* data communication. Data such as space temperature, setpoint, and occupancy can be shared from a master control to a peer control with or without the presence of a Tracer™ Summit system (refer to Figure 5).

For peer-to-peer applications, the controllers must be bound as peers using the Rover service tool. Refer to the Rover service tool product literature for more information.

Figure 5. Peer-to-peer communication



Troubleshooting

This section provides information about the following:

- LED activity
- Service test and input requirements
- Diagnostics

LED Activity

Red Service LED

Activity	Description
LED OFF continuously after power is applied.	Normal operation.
LED ON continuously, even when power is first applied.	Service button[a] is being pushed or there is controller failure.
LED flashes approximately once every second.	LCI-R is un-configured. Use Rover Service tool to restore the unit to Normal operation.[b]

(a) The Service button (*or Service Pin*) is located on the left center board edge of the Tracer™ LCI-R controller. It can be used to install the controller in a communication network. Pressing the Service button will cause the LCI-R controller to broadcast its Neuron ID and Program ID. Refer to Rover Service tool product literature for more information.

(b) If the Service button is held down for more than 15 seconds, the controller will un-install from the communication network (*un-configured state*) and will no longer control the unit. This mode is indicated by the red service LED flashing once every second. Refer to the previous section on Red service LED for more information. Use the Rover service tool or another network management tool to restore the unit to normal operation. Refer to the Rover product literature for more information.

Green Status LED

Activity	Description
LED ON continuously.	Power on, normal operation.
LED blinks once (¼ second ON and 2 seconds OFF continuously.	Controller has lost IPC communication for more than 3 minutes.
LED blinks twice (¼ second ON, ¼ OFF, ¼ second ON, 2-½ seconds OFF continuously.	Controller needs application code or is waiting for application code to download.
LED blinks (¼ second ON, ¼ second OFF for 10 minutes.	Wink mode[a].

(a) Wink mode identifies a controller. By sending a request from Rover Service tool, the controller is requested to wink (*blink **ON** and **OFF** as a notification that the controller received the signal*). The green LED blinks (*1/4 second **ON**, 1/4 second **OFF** for 10 seconds*) during Wink mode. This Wink response is available when the LCI-R node is either configured or not configured.

Yellow Comm LED

Activity	Description
LED OFF continuously.	Controller not detecting communication (normal for standalone applications).
LED blinks or flickers.	Controller detecting communication (normal for communicating applications, including data sharing).
LED ON continuously.	Abnormal conditional or extreme high traffic on the link.
LED does not blink.	Controller is transmitting communication data.

Yellow IPC RXA (Receives)/IPC TXA (Transmits) LED

Activity	Description
LED OFF continuously.	Controller not detecting communication (abnormal for any application).
LED blinks or flickers.	Controller receiving/transmitting communication (normal for any application).
LED ON continuously.	Abnormal conditional or controller failure.
LED does not blink.	Controller is receiving/transmitting communication data.

Service Test and Input Requirements

Service Test

Service test mode allows the operator or technician to designate the state of various unit components, which may be turned **ON** or **OFF** or set to a percent and the start time delay for the test. The service test can be initiated only at the local (unit-mounted) human interface.

Required Inputs for Unit Operation

The following table lists the required locally wired sensor or communicated inputs for each listed control function. If

any one of the sensors does not exist, the controller operates the control function.

Table 71. Required Sensors

Control Function	Sensor(s) Required To Be Present: Wired Sensor or Communicated Value	Controller Operation If Input Is not Present
VAV control	• Duct static pressure • Discharge air temperature	• Diagnostic shutdown • Diagnostic shutdown
Discharge air temperature	• Discharge air temperature	• Diagnostic shutdown
Space temperature control	• Space temperature • Discharge air temperature	• Diagnostic shutdown • Diagnostic
Economizer operation	• Outdoor air temperature	• Economizer disabled

Diagnostics

Three different types of diagnostics are generated by the LCI-R controller that are used to troubleshoot abnormal unit operation.

Table 72. Diagnostics

Diagnostic	Description
Alarm	The controller shuts down the unit to protect the unit and deter possible equipment damage or the controller cannot operate until the diagnostic condition is corrected.
Service required	The controller disables only sequences of operation and attempts to maintain unit operation. For example, if the outdoor air temperature fails or is not wired, the LCI-R controller disables the economizer operation.
Informational	This type of diagnostic *does not* affect controller operation.

General Notes

- When a local temperature/pressure sensor or setpoint has failed after being valid, the controller generates a diagnostic to indicate the sensor or setpoint loss condition. The controller automatically clears the diagnostic once a valid sensor or setpoint value is present (non-latching diagnostic).
- If the local outdoor air temperature sensor fails and a communicated value is not present, the outdoor air damper is opened to minimum position and economizer operation is disabled.
- A space temperature failure diagnostic disables morning and daytime warm-up sequence of operation when the controller is configured for constant-volume discharge air control or VAV control.
- Some diagnostic messages can be configured as a service required or critical alarm using Tracer™ Summit or Rover service tool.
- See nvoAlarmMessage for a list of diagnostic messages.

Translating Multiple Diagnostics

The controller senses and records each diagnostic independently of other diagnostics. It is possible to have multiple diagnostics present simultaneously. The diagnostics are reported in the order they occur. Non-latching diagnostics automatically reset when the input is present and valid.

Resetting Diagnostics

A reset clears any latching diagnostics and allows the controller to try to run the unit normally. If the latching condition is still present, the controller immediately shuts down the unit. A reset will reset a unit that is running normally and is similar to cycling power to the unit. Unit diagnostics can be reset from the local or remote human interface by cycling power to the unit or by sending a request through the LCI-R controller.

Unit diagnostics can be reset in the following ways:

1. Using the local human interface.
2. Using the remote human interface.
3. By cycling power to the controller.

   When 24 Vac power is cycled to the controller, the unit cycles through a power-up sequence. By default, the controller attempts to reset all diagnostics at power up. Diagnostics present at power-up, and those that occur after power-up, are handled according to the defined unit diagnostics sequences (refer to Table 72).
4. By sending a reset request through the LCI-R controller via nviRequest enumeration 10 to the correct DAC/SCC object or node.

Appendix

Refer to the following tables about the following:

- Effects of modes on unit operation
- Determining heat/cool mode, fan request, and run request
- Arbitration logic

Table 73. Effect of application mode and heat/cool mode on unit operation[a]

Input													Output		
VAV Box Cmd	Platform ID	Unit_State	Main State	Primary Control State	nviApplicMode (SCC/DAC)	nviHeatCool (SCC)	Supply Fan Status	Gas Heat Type	Drying Mode	Heat Type	System Control	Heat/Cool Mode	nvoHeatCool nvoUnitStatus.mode (DAC/SCC)	nvoApplicMode (only DAC)	Unit Operation[b]1
Open	X	X	X	X	X	X	X	X	X	X	VAV with IGV or VAV w/o IGV	X	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heat Enabled Cooling Enabled Damper Enabled
X	X	Reset	X	X	X	X	X	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Check config	X	X	X	X	X	X	X	X	X	X	HVAC_NUL	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Emerg stop	X	X	X	X	X	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Mfg override	X	X	X	X	X	X	X	X	X	X	HVAC_TEST	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Reset	X	X	X	X	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Unused	X	X	X	X	X	X	X	X	X	HVAC_NUL	HVAC_NUL	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Service test	X	X	X	X	X	X	X	X	X	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Dependent on test Configuration
X	X	Main	Ventilation override	X	X	X	Not requested	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Enabled Heat Enabled Cooling Enabled Damper Enabled
X	X	Main	Ventilation override	X	X	X	X	Staged	X	Gas	VAV with IGV or VAV w/o IGV	Heat	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heat Enabled Cooling Enabled Damper Enabled
X	X	Main	Ventilation override	X	X	X	X	Staged	X	Gas	CV	Heat	HVAC_HEAT	not applicable	Fan Enabled Heat Enabled Cooling Enabled Damper Enabled
X	X	Main	Ventilation override	X	X	X	X	Modulated	X	Gas	X	Heat	HVAC_HEAT	HVAC_HEAT	Fan Enabled Heat Enabled Cooling Enabled Damper Enabled
X	X	Main	Ventilation override	X	X	X	X	X	X	Electric	VAV with IGV orVAV w/o IGV	Heat	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heat Enabled Cooling Enabled Damper Enabled
X	X	Main	Ventilation override	X	X	X	X	X	X	Electric	1=CV	Heat	HVAC_HEAT	not applicable	Fan Enabled Heat Enabled Cooling Enabled Damper Enabled
X	X	Main	Ventilation override	X	X	X	X	X	X	Hydronic external heat or heat pump	X	Heat	HVAC_HEAT	HVAC_HEAT	Fan Enabled Heat Enabled Cooling Enabled Damper Enabled

Table 73. Effect of application mode and heat/cool mode on unit operation[a] (continued)

Input													Output	
VAV Box Cmd	Platform ID	Unit_State	Main State	Primary Control State	nviApplicMode (SCC/DAC)	nviHeatCool (SCC)	Supply Fan Status	Gas Heat Type	Drying Mode	Heat Type	System Control	Heat/Cool Mode	nvoHeatCool nvoUnitStatus.mode (DAC/SCC)	nvoApplicMode (only DAC)	Unit Operation[b]1
X	X	Main	Primary control	start delay	X	X	X	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Primary controlP	unit stop	X	X	X	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Primary control	mode off	X	X	X	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	MWU	X	X	X	X	X	CV	X	HVAC_MRNG_WRMUP [2]	not applicable	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	MWU	X	X	X	X	X	VAV w/o IGV	X	HVAC_MRNG_WRMUP [2]	HVAC_MRNG_WRMUP [2]	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	MWU	X	X	Staged	X	Gas	VAV w/IGV	X	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	MWU	X	X	Modulating	X	Gas	VAV w/IGV	X	HVAC_MRNG_WRMUP	HVAC_MRNG_WRMUP	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	MWU	X	X	X	X	Hydronic external heat or heat pump	VAV w/IGV	X	HVAC_MRNG_WRMUP	HVAC_MRNG_WRMUP	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	IPak I	X	Primary control	X	MWU	X	X	X	X	Electric	VAV w/IGV	X	HVAC_MRNG_WRMUP [1]	HVAC_MRNG_WRMUP [1]	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	IPak II	X	Primary control	X	MWU	X	X	X	X	Electric	VAV w/IGV	X	HVAC_MRNG_WRMUP [1]	HVAC_MRNG_WRMUP [1]	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	Purge	X	X	X	X	X	X	X	HVAC_NIGHT_PURGE	HVAC_NIGHT_PURGE	Fan Enabled Heating Disabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	Pre-Cool	X	X	X	X	X	X	X	HVAC_PRE_COOL	HVAC_PRE_COOL	Fan Enabled Heating Disabled Cooling Enabled Damper Disabled
X	X	X	Primary control	X	Auto or NUL	MWU	X	X	X	X	CV	X	HVAC_MRNG_WRMUP	Not applicable	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	Auto or NUL	Purge	X	X	X	X	CV	X	HVAC_NIGHT_PURGE	Not applicable	Fan Enabled Heating Disabled Cooling Disabled Damper Disabled
X	X	X	Primary control	X	Auto or NUL	Pre-Cool	X	X	X	X	CV	X	HVAC_PRE_COOL	Not applicable	Fan Enabled Heating Disabled Cooling Enabled Damper Disabled
X	X	Main	Primary control	Not Start Delay, Unit Stop, or Mode Off	Fan Only	X	X	X	X	X	X	X	HVAC_FAN_ONLY	HVAC_AUTO	Fan Enabled Heating Disabled Cooling Disabled Damper Disabled

Table 73. Effect of application mode and heat/cool mode on unit operation[a] (continued)

Input													Output		
VAV Box Cmd	Platform ID	Unit_State	Main State	Primary Control State	nviApplicMode (SCC/DAC)	nviHeatCool (SCC)	Supply Fan Status	Gas Heat Type	Drying Mode	Heat Type	System Control	Heat/Cool Mode	nvoHeatCool nvoUnitStatus.mode (DAC/SCC)	nvoApplicMode (only DAC)	Unit Operation[b]1
X	X	Main	Primary control	Not Start Delay, Unit Stop, or Mode Off	Auto or NUL	Fan only	X	X	X	X	X	X	HVAC_FAN_ONLY	Not applicable	Fan Enabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Primary control	mwu	X	X	X	X	X	X	CV	X	HVAC_MRNG_WRMUP	Not applicable	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	X	Main	Primary control	mwu	X	X	X	X	X	X	VAV w/IGV or VAV w/o IGV	X	HVAC_MRNG_WRMUP	Not applicable	Fan Enabled Heating Enabled Cooling Disabled Damper Disabled
X	X	Main	Primary control	dwu	X	X	X	X	X	X	VAV w/IGV or VAV w/o IGV	X	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heating Enabled Cooling Disabled Damper Enabled
X	X	Main	Primary control	sys-tem diag	X	X	X	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Primary control	Unoc-cupied	X	X	Not requested	X	X	X	X	X	HVAC_OFF	HVAC_AUTO	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Primary control	Unoc-cupied	X	X	X	X	Drying	X	CV	X	HVAC_DEHUMID	HVAC_DEHUMID	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	Unoc-cupied	X	X	X	X	X	X	CV	Heat	HVAC_HEAT	Not applicable	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	Unoc-cupied	X	X	X	X	X	X	CV	Cool	HVAC_COOL	Not applicable	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	Unoc-cupied	X	X	X	X	X	X	VAV w/IGV or VAV w/o IGV	X	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	VAV Occu-pied	X	X	X	X	Drying	X	X	X	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	VAV Occu-pied	X	X	X	staged	X	Gas	X	Heat	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	VAV Occu-pied	X	X	X	modu-lated	X	Gas	X	Heat	HVAC_HEAT	HVAC_HEAT	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	VAV Occu-pied	X	X	X	X	X	Electric	X	Heat	HVAC_MAX_HEAT	HVAC_MAX_HEAT	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	VAV Occu-pied	X	X	X	X	X	hydronic external heat or heat pump	X	Heat	HVAC_HEAT	HVAC_HEAT	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	VAV Ooccu-pied	X	X	X	X	X	X	X	Cool	HVAC_COOL	HVAC_COOL	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled

Table 73. Effect of application mode and heat/cool mode on unit operation[a] (continued)

Input													Output		
VAV Box Cmd	Platform ID	Unit_State	Main State	Primary Control State	nviApplicMode (SCC/DAC)	nviHeatCool (SCC)	Supply Fan Status	Gas Heat Type	Drying Mode	Heat Type	System Control	Heat/Cool Mode	nvoHeatCool nvoUnitStatus.mode (DAC/SCC)	nvoApplicMode (only DAC)	Unit Operation[b]1
X	X	Main	Primary control	CV Occu-pied	X	X	Not Requested	X	X	X	X	X	HVAC_OFF	Not applicable	Fan Disabled Heating Disabled Cooling Disabled Damper Disabled
X	X	Main	Primary control	CV Occu-pied	X	X	X	X	drying	X	X	X	HVAC_DEHUMID	not applicable	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	CV Occu-pied	X	X	X	Staged	X	Gas	X	Heat	HVAC_HEAT	not applicable	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	CV Occu-pied	X	X	X	Modu-lated	X	Gas	X	Heat	HVAC_HEAT	not applicable	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	CV Ocu-pied	X	X	X	X	X	Electric	X	Heat	HVAC_HEAT	not applicable	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	primary controlP	CV Occu-pied	X	X	X	X	X	Hydronic external heat or heat pump	X	Heat	HVAC_HEAT	not applicable	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled
X	X	Main	Primary control	CV Occu-pied	X	X	X	X	X	X	X	Cool	HVAC_COOL	not applicable	Fan Enabled Heating Enabled Cooling Enabled Damper Enabled

(a) **X** in any of the table fields denotes any state.
(b) The outputs in the **Unit Operation** column are based on the inputs of **nviApplicMode** and **nviHeatCool**. Though the output may say Enabled, the actual function may be disabled by various **Ventilation Override Modes** or lockout sources (for example, low ambient lockout, supply air low limit, fan proving, demand limit).

General Notes for Table 74, p. 58.

- Refer to Table 75, p. 62 for more information on determining local fan mode arbitration.
- Per the SCC profile, nviApplicMode overrides nviHeatCool, unless nviApplicMode is HVAC_AUTO, HVAC_TEST, or HVAC_NUL *(for IntelliPak units, HVAC_TEST and HVAC_NUL are treated as HVAC_AUTO).* If nviApplicMode is HVAC_AUTO, then nviHeatCool determines the effective mode of the unit.
- nviApplicMode *(and/or nviHeatCool)* with an unsupported enumeration *(other than 0, 6 or 9 for FAU and other than 0, 1, 3, 6 or 9 for RT/CSC)* is treated as HVAC_AUTO.

Table 74. Determination of heat/cool mode, fan request, and run request

Input										Output			
Power up Control Wait Time	Local Switch Enable	Local Fan Mode	Unit Type	Profile	nviApplicMode	nviHeatCool (SCC)	nvoHeatCool	Fan Config Cooling	Fan Config Heating	Local/ Remote Heat/Cool Arbitration	Remote Heat/ Cool Request	Remote Auto/ Stop Request	Remote Fan Mode Request
>0	X	X	X	X	X	X	X	X	X	Local	Heat	Stop	Auto
0	Enable	Auto	FAU	DAC	AUTO	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Enable	Auto	FAU	DAC	OFF	N/A	X	N/A	N/A	Local	Heat	Stop	Auto
0	Enable	Auto	FAU	DAC	FAN_ONLY[(a)]	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Enable	Auto	FAU	DAC	X	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	DAC	AUTO	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	DAC	Heat	N/A	X	N/A	N/A	Remote	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	DAC	MWU	N/A	X	N/A	N/A	Remote	Heat	Auto	On
0	Enable	Auto	RT/CSC	DAC	COOL	N/A	X	N/A	N/A	Remote	Cool	Auto	Auto
0	Enable	Auto	RT/CSC	DAC	PURGE	N/A	X	N/A	N/A	Remote	Cool	Auto	On
0	Enable	Auto	RT/CSC	DAC	PRECOOL	N/A	X	N/A	N/A	Remote	Cool	Auto	On
0	Enable	Auto	RT/CSC	DAC	OFF	N/A	X	N/A	N/A	Local	Heat	Stop	Auto
0	Enable	Auto	RT/CSC	DAC	FAN_ONLY[(a)]	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	DAC	X	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	AUTO	Auto	X	X	X	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	AUTO	Heat or MAX HT	X	X	X	Remote	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	AUTO	MWU	X	X	X	Remote	Heat	Auto	On
0	Enable	Auto	RT/CSC	SCC	AUTO	COOL	X	X	X	Remote	Cool	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	AUTO	PURGE	X	X	X	Remote	Cool	Auto	On
0	Enable	Auto	RT/CSC	SCC	AUTO	PRECOOL	X	X	X	Remote	Cool	Auto	On
0	Enable	Auto	RT/CSC	SCC	AUTO	OFF	X	X	X	Local	Heat	Stop	Auto
0	Enable	Auto	RT/CSC	SCC	AUTO	FAN_ONLY[(a)]	X	X	X	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	AUTO	X	X	X	X	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	HEAT	X	X	X	X	Remote	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	MWU	X	X	X	X	Remote	Heat	Auto	On
0	Enable	Auto	RT/CSC	SCC	COOL	X	X	X	X	Remote	Cool	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	PURGE	X	X	X	X	Remote	Cool	Auto	On
0	Enable	Auto	RT/CSC	SCC	PRECOOL	X	X	X	X	Remote	Cool	Auto	On
0	Enable	Auto	RT/CSC	SCC	OFF	X	X	X	X	Local	Heat	Stop	Auto
0	Enable	Auto	RT/CSC	SCC	FAN_ONLY[(a)]	X	X	X	X	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	X	Auto	X	X	X	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	X	Heat or MAX HT	X	X	X	Remote	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	X	MWU	X	X	X	Remote	Heat	Auto	On
0	Enable	Auto	RT/CSC	SCC	X	COOL	X	X	X	Remote	Cool	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	X	PURGE	X	X	X	Remote	Cool	Auto	On
0	Enable	Auto	RT/CSC	SCC	X	PRECOOL	X	X	X	Remote	Cool	Auto	On
0	Enable	Auto	RT/CSC	SCC	X	OFF	X	X	X	Local	Heat	Stop	Auto
0	Enable	Auto	RT/CSC	SCC	X	FAN_ONLY[4]	X	X	X	Local	Heat	Auto	Auto
0	Enable	Auto	RT/CSC	SCC	X	X	X	X	X	Local	Heat	Auto	Auto
0	Enable	On	FAU	DAC	AUTO	N/A	X	N/A	N/A	Local	Heat	Auto	On
0	Enable	On	FAU	DAC	OFF	N/A	X	N/A	N/A	Local	Heat	Stop	On
0	Enable	On	FAU	DAC	FAN_ONLY[(a)]	N/A	X	N/A	N/A	Local	Heat	Auto	On
0	Enable	On	FAU	DAC	X	N/A	X	N/A	N/A	Local	Heat	Auto	On

Table 74. Determination of heat/cool mode, fan request, and run request (continued)

Input										Output			
Power up Control Wait Time	Local Switch Enable	Local Fan Mode	Unit Type	Profile	nviApplicMode	nviHeatCool (SCC)	nvoHeatCool	Fan Config Cooling	Fan Config Heating	Local/ Remote Heat/Cool Arbitration	Remote Heat/ Cool Request	Remote Auto/ Stop Request	Remote Fan Mode Request
0	Enable	On	RT/CSC	SCC	AUTO	AUTO	X	X	X	Local	Heat	Auto	On
0	Enable	On	RT/CSC	SCC	AUTO	Heat or MAX HT	X	X	X	Remote	Heat	Auto	On
0	Enable	On	RT/CSC	SCC	AUTO	MWU	X	X	X	Remote	Heat	Auto	On
0	Enable	On	RT/CSC	SCC	AUTO	COOL	X	X	X	Remote	Cool	Auto	On
0	Enable	On	RT/CSC	SCC	AUTO	PURGE	X	X	X	Remote	Cool	Auto	On
0	Enable	On	RT/CSC	SCC	AUTO	PRECOOL	X	X	X	Remote	Cool	Auto	On
0	Enable	On	RT/CSC	SCC	AUTO	OFF	X	X	X	Local	Heat	Stop	On
0	Enable	On	RT/CSC	SCC	AUTO	FAN_ONLY[a]	X	X	X	Local	Heat	Auto	On
0	Enable	On	RT/CSC	SCC	AUTO	X	X	X	X	Local	Heat	Auto	On
0	Enable	On	RT/CSC	SCC	Heat	X	X	X	X	Remote	Heat	Auto	On
0	Enable	On	RT/CSC	SCC	MWU	X	X	X	X	Remote	Heat	Auto	On
0	Enable	On	RT/CSC	SCC	COOL	X	X	X	X	Remote	Cool	Auto	On
0	Enable	On	RT/CSC	SCC	PURGE	X	X	X	X	Remote	Cool	Auto	On
0	Enable	On	RT/CSC	SCC	PRECOOL	X	X	X	X	Remote	Cool	Auto	On
0	Enable	On	RT/CSC	SCC	OFF	X	X	X	X	Local	Heat	Stop	On
0	Enable	On	RT/CSC	SCC	FAN_ONLY[a]	X	X	X	X	Local	Heat	Auto	On
0	Enable	On	RT/CSC	SCC	X	X	X	X	X	Local	Heat	Auto	On
0	Disable	X	FAU	DAC	AUTO	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Disable	X	FAU	DAC	OFF	N/A	X	N/A	N/A	Local	Heat	Stop	Auto
0	Disable	X	FAU	DAC	FAN_ONLY[a]	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Disable	X	FAU	DAC	X	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	DAC	AUTO	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	DAC	HEAT	N/A	X	N/A	N/A	Remote	Heat	Auto	Auto
0	Disable	X	RT/CSC	DAC	MWU	N/A	X	N/A	N/A	Remote	Heat	Auto	On
0	Disable	X	RT/CSC	DAC	COOL	N/A	X	N/A	N/A	Remote	Cool	Auto	Auto
0	Disable	X	RT/CSC	DAC	PURGE	N/A	X	N/A	N/A	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	DAC	PRECOOL	N/A	X	N/A	N/A	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	DAC	OFF	N/A	X	N/A	N/A	Local	Heat	Stop	Auto
0	Disable	X	RT/CSC	DAC	FAN_ONLY[a]	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	DAC	X	N/A	X	N/A	N/A	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	AUTO	Heat or MWU or Max HT	X	Cycling	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	AUTO	Heat or MWU or Max HT	X	Cont	Local	Heat	Auto	OnOn
0	Disable	X	RT/CSC	SCC	AUTO	AUTO	Cool	Cycling	X	local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	AUTO	Cool	Cont	X	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	AUTO	purge	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	AUTO	Precool	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	AUTO	Off or test or nul	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	AUTO	FAN_ONLY[a]	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	Heat or MAX HT	X	X	Cycling	Remote	Heat	Auto	Auto

Table 74. Determination of heat/cool mode, fan request, and run request (continued)

Input										Output			
Power up Control Wait Time	Local Switch Enable	Local Fan Mode	Unit Type	Profile	nviApplicMode	nviHeatCool (SCC)	nvoHeatCool	Fan Config Cooling	Fan Config Heating	Local/ Remote Heat/Cool Arbitration	Remote Heat/ Cool Request	Remote Auto/ Stop Request	Remote Fan Mode Request
0	Disable	X	RT/CSC	SCC	AUTO	Heat or MAX HT	X	X	Cont	Remote	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	MWU	X	X	X	Remote	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	COOL	X	Cycling	X	Remote	Cool	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	COOL	X	Cont	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	PURGE	X	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	PRECOOL	X	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	OFF	X	X	X	Local	Heat	Stop	Auto
0	Disable	X	RT/CSC	SCC	AUTO	FAN_ONLY[a]	Heat or MWU or Max HT	X	Cycling	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	FAN_ONLY[a]	Heat or MWU or Max HT	X	Cont	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	FAN_ONLY[a]	Cool	Cycling	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	FAN_ONLY[a]	Cool	Cont	X	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	FAN_ONLY[a]	Purge	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	FAN_ONLY[a]	Precool	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	FAN_ONLY[a]	Off or test or nul	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	FAN_ONLY[a]	Fan only	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	X	Heat or MWU or Max HT	X	Cycling	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	X	Heat or MWU or Max HT	X	Cont	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	X	Cool	Cycling	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	X	Cool	Cont	X	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	X	Purge	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	X	Precool	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	AUTO	X	Off or test or nul	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	AUTO	X	Fan only	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	HEAT	X	X	X	Cycling	Remote	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	HEAT	X	X	X	Cont	Remote	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	MWU	X	X	X	X	Remote	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	COOL	X	X	Cycling	X	Remote	Cool	Auto	Auto
0	Disable	X	RT/CSC	SCC	COOL	X	X	Cont	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	PURGE	X	X	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	PRECOOL	X	X	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	OFF	X	X	X	X	Local	Heat	Stop	Auto
0	Disable	X	RT/CSC	SCC	FAN_ONLY[a]	X	Heat or MWU or Max HT	X	Cycling	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	FAN_ONLY[a]	X	Heat or MWU or Max HT	X	Cont	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	FAN_ONLY[a]	X	Cool	Cycling	X	Local	Heat	Auto	Auto

Table 74. Determination of heat/cool mode, fan request, and run request (continued)

Input										Output			
Power up Control Wait Time	Local Switch Enable	Local Fan Mode	Unit Type	Profile	nviApplicMode	nviHeatCool (SCC)	nvoHeatCool	Fan Config Cooling	Fan Config Heating	Local/ Remote Heat/Cool Arbitration	Remote Heat/ Cool Request	Remote Auto/ Stop Request	Remote Fan Mode Request
0	Disable	X	RT/CSC	SCC	FAN_ONLY[a]	X	Cool	Cont	X	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	FAN_ONLY[a]	X	Purge	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	FAN_ONLY[a]	X	Precool	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	FAN_ONLY[a]	X	Off or test or nul	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	FAN_ONLY[a]	X	Fan only	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	AUTO	Heat or MWU or Max HT	X	Cycling	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	AUTO	Heat or MWU or Max HT	X	Cont	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	X	AUTO	Cool	Cycling	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	AUTO	Cool	Cont	X	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	X	AUTO	Purge	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	X	AUTO	Precool	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	X	AUTO	Off or test or nul	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	AUTO	Fan only	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	Heat or MAX HT	X	X	Cycling	Remote	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	Heat or MAX HT	X	X	Conti	Remote	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	X	MWU	X	X	X	Remote	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	X	COOL	X	cycling	X	Remote	Cool	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	COOL	X	Cont	X	Remote	Cool	Auto	On
0	disable	X	RT/CSC	SCC	X	PURGE	X	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	X	PRECOOL	X	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	X	OFF	X	X	X	Local	Heat	Stop	Auto
0	Disable	X	RT/CSC	SCC	X	FAN_ONLY[a]	Heat or MWU or Max HT	X	Cycling	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	FAN_ONLY[a]	Heat or MWU or Max HT	X	Cont	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	X	FAN_ONLY[a]	Cool	Cycling	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	FAN_ONLY[a]	Cool	Cont	X	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	X	FAN_ONLY[a]	Purge	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	X	FAN_ONLY[a]	Precool	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	X	FAN_ONLY[a]	Off or test or nul	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	FAN_ONLY[a]	Fan only	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	X	Heat or MWU or Max HT	X	Cycling	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	X	Heat or MWU or Max HT	X	Cont	Local	Heat	Auto	On
0	Disable	X	RT/CSC	SCC	X	X	Cool	Cycling	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	X	Cool	Cont	X	Local	Heat	Auto	On

Table 74. Determination of heat/cool mode, fan request, and run request (continued)

Input										Output			
Power up Control Wait Time	Local Switch Enable	Local Fan Mode	Unit Type	Profile	nviApplicMode	nviHeatCool (SCC)	nvoHeatCool	Fan Config Cooling	Fan Config Heating	Local/ Remote Heat/Cool Arbitration	Remote Heat/ Cool Request	Remote Auto/ Stop Request	Remote Fan Mode Request
0	Disable	X	RT/CSC	SCC	X	X	Purge	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	X	X	Precool	X	X	Remote	Cool	Auto	On
0	Disable	X	RT/CSC	SCC	X	X	Off or test or nul	X	X	Local	Heat	Auto	Auto
0	Disable	X	RT/CSC	SCC	X	X	Fan only	X	X	Local	Heat	Auto	Auto
X	X	X	X	X	X	X	X	X	X	Local	Heat	Auto	Auto

(a) Refer to **nviAuxHeatEnable (SCC)**, **nviComprEnable (SCC)**, **nviPriCoolEnable (DAC)**, and **nviPriHeatEnable (DAC)** for more information on cooling and heating lockout arbitration.

Table 75. Local Fan Mode arbitration[(a)]

Input								Output
Occupancy Command	System Control	Supply Fan Bypass[(b)1]	System On/Off Status	NSB Panel Input Status	NSB Fan Request	Zone Sensor Fan Request	Default Supply Fan Mode	Local Fan Mode Arb
Occ	VAV w/ IGV/VFD or VAV w/o IGV/VFD	Bypass	1 = On	X	X	X	X	On
Occ	VAV w/ IGV/VFD or VAV w/o IGV/VFD	X	X	X	X	X	X	Auto
Occ	CV	X	X	Valid	On	X	X	On
Occ	CV	X	X	Invalid	X	On	X	On
Occ	CV	X	X	Invalid	X	Invalid	On	On
X	X	X	X	X	X	X	X	Auto

(a) **X** in any of the table fields denotes any state.
(b) **Supply Fan Bypass** column is **only** CSC.

Table 76. SCC Space Setpoint arbitration

1. Local Setpoint Arbitration From IPC Bus		
Default Occ Zone Cooling Setpoint Source	⇨	Based on Default OCC Zone Cooling Setpoint Source
Default Occ Zone Heating Setpoint Source		localOccCool = RTM Cooling Setpoint
Default Unocc Zone Cooling Setpoint Source		localOccCool = =NSB Occ Zone Colling Setpoint
Default Unocc Zone Heating Setpoint Source		localOccCool = Default Occ Zone Cooling Setpoint
RTM Cooling Setpoint		localOccCool = GBAS 0–5V Occ Zone Cooling Setpoint
RTM Heating Setpoint		localOccCool = GBAS 0–10V Occ Zone Cooling Setpoint
NSB Occ Zone Cooling Setpoint[(a)]		Based on Default Unocc Zone Cooling Setpoint Source
NSB Occ Zone Heating Setpoint		localUnoccCool = RTM Cooling Setpoint
NSB Unocc Zone Cooling Setpoint		localUnoccCool = NSB Unocc Zone Cooling Setpoint
NSB Unocc Zone Heating Setpoint		localUnoccCool = Default Unocc Zone Cooling Setpoint
Default Occ Zone Cooling Setpoint		localUnoccCool = GBAS 0–5V Unocc Zone Cooling Setpoint
Default Occ Zone Heating Setpoint		localUnoccCool = GBAS 0–10V Unocc Zone Cooling Setpoint
Default Unocc Zone Cooling Setpoint		Based on Default Occ Zone Heating Setpoint Source
Default Unocc Zone Heating Setpoint		localOccHeat = RTM Heating Setpoint
GBAS 0–5V Occ Zone Cooling Setpoint		localOccHeat = NSB Occ Zone Heating Setpoint
GBAS 0–5V Unocc Zone Cooling Setpoint		localOccHeat = Default Occ Zone Heating Setpoint
GBAS 0–5V Occ Zone Heating Setpoint		localOccHeat = GBAS 0–5V Occ Zone Heating Setpoint
GBAS 0–5V Unocc Zone Heating Setpoint		localOccHeat = =GBAS 0–10V Occ Zone Heating Setpoint
GBAS 0–10V Occ Zone Cooling Setpoint		Based on Default Unocc Zone Heating Setpoint Source
GBAS 0–10V Occ Zone Heating Setpoint		localUnoccHeat = RTM Heating Setpoint
GBAS 0–10V Unocc Zone Cooling Setpoint		localUnoccHeat = NSB Unocc Zone Heating Setpoint
GBAS 0–10V Unocc Zone Heating Setpoint		localUnoccHeat = Default Unocc Zone Heating Setpoint
		localUnoccHeat = GBAS 0–5V Unocc Zone Heating Setpoint
		locaUnoccHeat = GBAS 0–10V Unocc Zone Heating Setpoint
2. Calibrate a Valid Local Setpoint (localcal)		
nciSensor1Cal; -10°F to 10°F (±5.56°C)	⇨	localOccCoolCal = localOcccool + nciSensor1Cal
		localUnoccCoolCal = localUnoccColl + nciSensor1Cal
		localOccHeatCal = localOccHeat + nciSensor1Cal
		localUnoccHeatCal = localUnoccHeat + nciSensor1Cal
Based on nvoEffOccupancy Unit Heat/Cool Status		
nvoSetpoint = localOccCoolCal ***OR***	⇦	localOccCoolCal = localOccCool
nvoSetpoint = localUnoccCoolCal ***OR***		locaUnoccCoolCal = localUnoccCool
nvoSetpoint = localOccHeatCal ***OR***		localOccHeatCal = localOccHeat
nvoSetpoint = locaUnoccHeatCal		localUnoccHeatCal = lcaoUnoccHeat
3. Check If OK to Use Valid Local Setpoint		
nciPersonality2 (local setpoint en/dis)	⇨	If nciPersonality2.boolean.local_setpoint = enable
		setpointSource = local ***ELSE***
		setpointSource = none

(a) NSB Occ Zone Cooling Setpoint and NSB Occ Zone Heating Setpoint are not internally communicated by the RTM. Instead, use Default Occ Zone Cooling Setpoint and Default Occ Zone Heating setpoint.

Table 77. SCCSpace Setpoint arbitration (continued)

		4. Setpoint Arbitration
nviSetpoint	☞	If nviSetpoint ! = 7FFF (invalid)
50°F to 90°F (10°C to 35°C); clamp value to range		setpointSource = remote
		5. Calculate Absolute Offset (abs_offset)
Occupancy arbitration (nvoEffectOccup) [occupied, standby, bypass, unoccupied]	☞	If setpointSource = remote ***THEN***
		If nvoEffectOccup = standby ***THEN***
nciSetpoints; uc ³ sc ³ oc ³ oh ³ sh ³ uh		abs_offset = nviSetpoint - ((sc + sh)/2)
occupied standby cool (sc)		ELSE
occupied cool (oc)	☞	abs_offset = nviSetpoint - ((oc + oh)/2) ***ELSE***
occupied heat (oh)		ELSE
occupied standby heat (sh)		abs_offset = 0
		6. Apply abs_offset to Occupied Setpoints
nciSetpoints; uc ³ sc ³ oc ³ oh ³ sh ³ uh	☞	If setpointSource = local
unoccupied cool (uc)	☞	uc = Refer to Table 80, p. 66
occupied standby cool (sc)	☞	scao = Refer to Table 79, p. 66
occupied cool (oc)	☞	ocao = Refer to Table 79, p. 66
occupied heat (oh)	☞	ohao = Refer to Table 79, p. 66
occupied standby heat (sh)	☞	shao = Refer to Table 79, p. 66
unoccupied heat (uh)		uh = Refer to Table 80, p. 66
Order enforced by the Rover Service Tool		***ELSE*** // remote or none
115°F ³ uc ³ sc ³ oc ³ oh ³ sh ³ uh ³ 40°F (46.11°C ³ uc ³ sc ³ oc ³ oh ³ sh ³ uh ³ 4.44°C)		uc = uc
		scao = sc + abs_offset
		ocao = oc + abs_offset
		ohao = oh + abs_offset
		shao = sh + abs_offset
		uh = uh
		Setpoints are not limited.
		7. Apply nviSetptOffset to Occupied Setpoints
		uc = uc
		sco = scao + nviSetptOffset
		oco = ocap + nviSetptOffset
nvoSetptOffset	☞	oho = ohao + nviSetptOffset
10°C ≥ offset ≥ –10°C (±18°F)		uh = uh
		Setpoints are not limited.

Table 78. SCCSpace Setpoint arbitration (continued)

		8. Apply nviSetptShift to All Setpoints
nviSetptShift		
10°C ≥ uc_shift ≥ –10°C (±18°F)	☞	ucs = uc + uc_shift
10°C ≥ sc_shift ≥ –10°C (±18°F)	☞	scs = sco + sc_shift
10°C ≥ oc_shift ≥ –10°C (±18°F)	☞	ocs + oco + oc_shift
10°C ≥ oh_shift ≥ –10°C (±18°F)	☞	ohs = oho + oh_shift
10°C ≥ sh_shift ≥ –10°C (±18°F)	☞	shs = sho + sh_shift
10°C ≥ uh_shift ≥ –10°C (±18°F)	☞	uhs = uh + uh_shift
		Setpoints are not limited.
		9. Limit Occupied Setpoints
nciPersonality2		ucs = ucs
cool setpoint high limit (csphl)	☞	csphl ≥ scl ≥ cspll
cool setpoint low limit (cspll)	☞	csphl ≥ ocl ≥ cspll
heat setpoint high limit (hsphl)	☞	hsphl ≥ ohl ≥ hspll
heat setpoint low limit (hspll)	☞	hsphl ≥ shl ≥ hspll
115°F ≥ range ≥ 40°F (46.11°C to 4.44°C)		uhs = uhs
		10. Six (6) Active Space Setpoints
		ucs = active unoccupied cool setpoint
		sca = active standby cool setpoint
		oca = active occupied cool setpoint
		oha = active occupied heat setpoint
		sha = active standby heat setpoint
		uha = active unoccupied heat setpoint
		11. Determining Two (2) Active Setpoints
		acsp = active cool setpoint
		ahsp = active heat setpoint
Occupancy arbitration (nvoEffectOccup) [occupied, standby, bypass, unoccupied]	☞	If nvoEffectOccup = occupied or bypass ***THEN***
		acsp = oca
		ahsp = oha ***ELSE***
		If nvoEffectOccup = standby ***THEN***
LCI-R reports remote setpoints to RTM controller.	☜	acsp = sca
Remote Occ Unocc Zone Cooling Setpoint = acsp		ahsp = sha ***ELSE***
		Unoccupied
Remote Occ Unocc Zone Heating Setpoint = ahsp	☜	acsp = uca
		ahsp = uha
		12. Determining One (1) Active_Space_Setpoint
Zone demand arbitration (zd) = nvoHeatCool	☞	If zd = cool THEN
		active_space_setpoint = acsp ELSE
		zd ! = cool
nvoEffectSetpt_active_space_setpoint	☜	active_space_setpoint = ahsp

Table 79. Local occupied setpoint arbitration

Input	Input	Input	Input	Output
Default_Occ_Zone_Cooling_Setpoint source	Default_Occ_Zone_Heating_Setpoint source	RTM_Zone_Sensor_Cooling_Setpoint	RTM_Zone_Heating_Setpoint	Local_Occupied_Setpoints[a] [b] [c]
0 = RTM	0 = RTM	OK	No present or failed.	• scao = localOccCoolCal + cso • ocao = localOccCoolCal • ohao = localOccCoolCal - do • shao = localOccCoolCal - do - hso
0 = RTM	0 = RTM	Not present or failed.	OK	• scao = localOccHeatCal + do + cso • ocao = localOccHeatCal + do • ohao = localOccHeatCal • shao = localOccHeatCal - hso
0 = RTM	0 = RTM	Not present or failed.	Not present or failed.	• scao = nciSetpoints.standby_cool • ocao = nciSetpionts.occupied_cool • ohao = nciSetpoints.occupied_heat • shao = nciSetpoints.standby_heat
0 = RTM	0 = RTM	OK	OK	• scao = localOccCoolCal + cso • ocao = localOccCoolCal • ohao = localOccHeatCal • shao = localOccHeatCal - hso
X = Do Not Care	X = Do Not Care	X = Do Not Care	X = Do Not Care	scao = localOccCoolCal

(a) deadband_occupied (do) = nciSetpoints_occupied_cool - nciSetpoints_occupied_heat
(b) heat_standby_offset (hso) = nciSetpoints_occupied_heat - nciSetpoints_standby_heat
(c) cool_standby_offset (cso) = nciSetpoints_standby_cool - nciSetpoint_occupied_cool

Table 80. Local unoccupied setpoint arbitration

Input	Input	Input	Input	Output
Default_Unocc_Zone_Cooling_Setpoint source	Default_Unocc_Zone_Heating_Setpoint source	RTM_Zone_Sensor_Cooling_Setpoint	RTM_Zone_Heating_Setpoint	Local_Unoccupied_Setpoints
RTM	RTM	No present or failed.	No present or failed.	• uc = nciSetpoints.unoccupied • uh = nciSetpoints.unoccupied
X = Do Not Care	X = Do Not Care	X = Do Not Care	X = Do Not Care	• uc = localUnoccCoolCal • uh = localUnoccHeatCal

The following output arbitration logic apples to the following network variables:

- nvoLocalSpaceTmp *(only SCC)*
- nvoSpaceTemp *(SCC and DAC)*

Note: *If nviSpaceTemp isvalid, nvoSpaceTemp is used and if nviSpaceTemp is invalid, refer to the following table.*

Table 81. Local space temperature arbitration

Input	Input	Input	Output
If...	Temp Sensor Source...	...and Temp Sensor is...	Then Resulting Local Space Temperature Arbitration is...
Monitor Temp Source is selected.	Monitor Temp Source = RTM	OK	RTM Zone Temp
		Failed	Invalid
	Monitor Temp Source = NSB	OK	NSB Temp
		Failed	Invalid
	Monitor Temp Source = RTM Aux	OK	RTM Aux Temp
		Failed	Invalid
	Monitor Temp Source = MWU	OK	MWU Temp
		Failed	Invalid
	Monitor Temp Source = ECEM	OK	Return Air Temp
		Failed	Invalid

Table 81. Local space temperature arbitration

Input	Input	Input	Output
• Unit Type = FAU • Drying Mode = Active • Reheat Reset Type = Zone • Unit State = VAV Occupied	Occ Zone Temp Source = RTM	OK	Occ Zone Temp
		Failed	Invalid
	Occ Zone Temp Source = NSB	OK	Occ Zone Temp
		Failed	Invalid
	Occ Zone Temp Source = RTM Aux	OK	Occ Zone Temp
		Failed	Invalid
	Occ Zone Temp Source = MWU	OK	Occ Zone Temp
		Failed	Invalid
	Occ Zone Temp Source = ECEM	OK	Occ Zone Temp
		Failed	Invalid
• Unit Type = FAU • Drying Mode = Active • Reheat Reset Type = Zone • Unit State = VAV Unoccupied	Unocc Zone Temp Source = RTM	OK	Unocc Zone Temp
		Failed	Invalid
	Unocc Zone Temp Source = NSB	OK	Unocc Zone Temp
		Failed	Invalid
	Unocc Zone Temp Source = RTM Aux	OK	Unocc Zone Temp
		Failed	Invalid
	Unocc Zone Temp Source = MWU	OK	Unocc Zone Temp
		Failed	Invalid
	Unocc Zone Temp Source = ECEM	OK	Unocc Zone Temp
		Failed	Invalid
Unit State = MWU	MWU Temp Source = RTM	OK	RTM Zone Temp
		Failed	Invalid
	MWU Temp Source = NSB	OK	NSB Temp
		Failed	Invalid
	MWU Temp Source = RTM Aux	OK	RTM Aux Temp
		Failed	Invalid
	MWU Temp Source = MWU	OK	MWU Temp
		Failed	Invalid
	MWU Temp Source = ECEM	OK	Return Air Temp
		Failed	Invalid
Unit State = DWU	DWU Temp Source = RTM	OK	RTM Zone Temp
		Failed	Invalid
	DWU Temp Source = NSB	OK	NSB Temp
		Failed	Invalid
	DWU Temp Source = RTM Aux	OK	RTM Aux Temp
		Failed	Invalid
	DWU Temp Source = MWU	OK	MWU Temp
		Failed	Invalid
	DWU Temp Source = ECEM	OK	Return Air Temp
		Failed	Invalid

Table 81. Local space temperature arbitration

Input	Input	Input	Output
Unit State = Unoccupied	Unocc Zone Temp Source = RTM	OK	RTM Zone Temp
		Failed	Invalid
	Unocc Zone Temp Source = NSB	OK	NSB Temp
		Failed	Invalid
	Unocc Zone Temp Source = RTM Aux	OK	RTM Aux Temp
		Failed	Invalid
	Unocc Zone Temp Source = MWU	OK	MWU Temp
		Failed	Invalid
	Unocc Zone Temp Source = ECEM	OK	Return Air Temp
		Failed	Invalid
• Unit Control = VAV • Active Cool Reset = Zone • Active Heat Reset Type = Outdoor Air or Zone	Zone Reset Temp Source = RTM	OK	RTM Zone Temp
		Failed	Invalid
	Zone Reset Temp Source = NSB	OK	NSB Temp
		Failed	Invalid
	Zone Reset Temp Source = RTM Aux	OK	RTM Aux Temp
		Failed	Invalid
	Zone Reset Temp Source = MWU	OK	MWU Temp
		Failed	Invalid
	Zone Reset Temp Source = ECEM	OK	Return Air Temp
		Failed	Invalid
Unit Control = CV	Occ Zone Temp Source = RTM	OK	RTM Zone Temp
		Failed	Invalid
	Occ Zone Temp Source = NSB	OK	NSB Temp
		Failed	Invalid
	Occ Zone Temp Source = RTM Aux	OK	RTM Aux Temp
		Failed	Invalid
	Occ Zone Temp Source = MWU	OK	MWU Temp
		Failed	Invalid
	Occ Zone Temp Source = ECEM	OK	Return Air Temp
		Failed	Invalid

Glossary

A

Active Setpoint
The setpoint that is currently being used for control. Occupied/unoccupied heating/cooling setpoints are selected according to unit mode and occupied/ unoccupied switching functions.

B

BAS
Building Automation System.

C

CSC
Commercial Self-contained.

CV
Constant Volume.

D

DAC
Discharge Air Controller (LonMark™ profile).

DACX
Discharge Air Controller Extension (Trane®).

Daytime Warm-up
Applies to VAV units. Refers to a zone warm-up cycle that occurs when the zone temperature falls to a predetermined value.

Deadband
As applied to discharge air temperature control, this refers to a range of temperature equally spaced above and below the discharge air temperature control point in which the control algorithm is satisfied. There is no adjustment of machine capacity within the deadband.

E

ECEM
Exhaust/comparative enthalpy module.

Emergency Stop input
RTM binary input. Can be used for emergency shutdown of the unit by field-installed contacts. A diagnostic is produced when this input is open.

Enthalpy
A measure of the heat content or total heat, including both sensible and latent heat, measured in Joules (J) or British thermal units (Btu).

H

HI
Human Interface.

HrtBt
Heartbeat.

I

IGV
Inlet Guide Vanes.

I/O
Input/output.

IPC
Interprocessor Communications.

IWC
Inches Water Column.

M

MCM
Multiple Circuit Compressor Module.

Minimum Position
Also known as economizer minimum position.

MWU
Morning Warm-up.

N

NSB
Night setback which applies to the control of heating and cooling operation of a rooftop unit during unoccupied mode.

NV
Network Variable.

nvi
Network Variable Input.

nvo
Network Variable Output.

O

OA
Outdoor Air.

OA Reset
A function that resets (*modifies*) the Supply Air Temperature Cooling (*or Heating*) Setpoint based on the outside air temperature.

P

Pa
Pascals

Purge
A function which causes zone air to be purged and replaced by outside air.

R

Reference Enthalpy
An outdoor enthalpy value above which economizing is disabled.

RA
Return Air.

Remote Human Interface (Remote HI)
A human interface module design to be mounted remotely from the unit. There are some functional differences between a machine and remote HI.

RT
Rooftop systems and rooftop air handlers.

RT1
IntelliPak I rooftop units manufactured before March 2009.

RT2
All IntelliPak II units and IntelliPak I+ units manufactured after March 2009.

RTM
Rooftop Module– contains I/Os for most air-handling functions.

S

SCC
Space Comfort Controller (LonMark profile).

SCCX
Space Comfort Controller Extension (Trane®).

SCM
Single Circuit Compressor Module.

SCPT
Standard Configuration Property Type.

SNVT
Standard Network Variable Type.

SPID
Standard Program Identification.

StatiTrac™
Trane trademark for control of space pressurization.

SA
Supply Air.

U

UCPT
User-defined configuration property type.

V

VAV
Variable-air-volume.

VCM
Ventilation Control Module.

VOM
Ventilation Override Module.

X

XIF
External Interface File.

Z

Zone Reset
A function that resets (*modifies*) the supply air temperature cooling (*or heating*) setpoint based on the zone temperature.

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