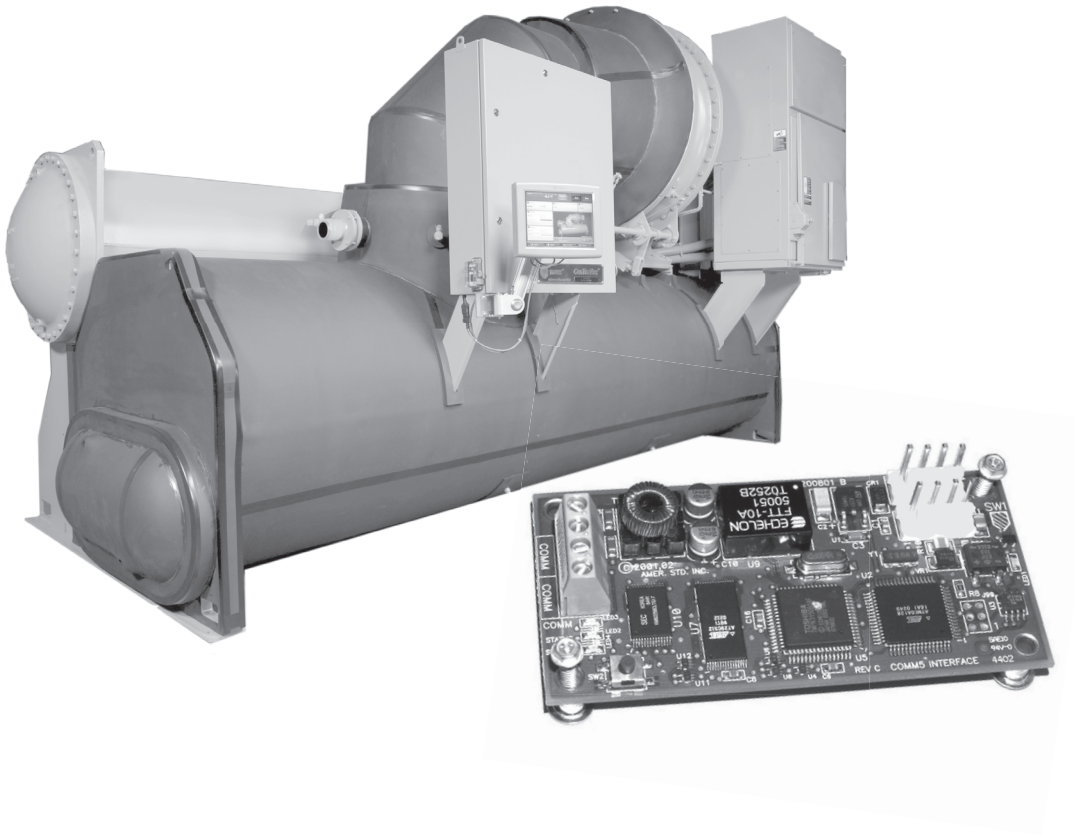
TRANE

Hardware and Software Installation Guide

LonTalk™ Communication Interface

for Trane™ Chillers with Tracer AdaptiView™ Control



February 2008

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Product Overview

About This Guide

This installation guide provides the steps necessary to install and setup a LonTalk™ Communications Interface for Chillers (LCI-C) with a Tracer AdaptiView™ Control. It covers both electronic circuit board/hardware installation and appropriate LCI-C software installation and setup.

Tracer Summit Building Automation Systems

If you are connecting the LCI-C to a Tracer Summit™ system, disregard the information on network variable on pages 21 through 56.

Note: For more details, refer to "Additional Resources," p. 60. In addition, if connecting the LCI-C to a non-Trane building automation system using LonTalk™, refer to the system integration information about network variables on pages p. 20 through 57.

What Does an LCI-C Do?

An LCI-C provides a communication interface between a Tracer AdaptiView controller and a LonTalk network.

LonMark Certification

The LonMark™ organization promotes LonTalk as an industry standard for control communication. The LCI-C is certified to the *LonMark Chiller Functional Profile 8040 Version 1.0* and follows LonTalk FTT-10A communications system technology. Compliance with this technology means that the LCI-C can provide an interface for non-Trane LonTalk networks.

Network Variables

LonTalk uses network variables to communicate points on a communication link. LonMark has defined a list of standard network variables.

Chiller functional profile

The LonMark standard list of variables for chiller control is referred to as the Chiller Functional Profile. This profile is meant to allow interoperability between control systems and chillers, regardless of chiller type or manufacturer.

The LCI-C extension

The LCI-C Extension is a list of additional network variables that Trane™ created to supplement those defined by the Chiller Functional Profile. The LCI-C Extension is considered *open* because the network variables are not proprietary.

The network variables in the LCI-C Extension are defined on pages p. 20 through 57.

LCI-C Shipment and Inspection

The LCI-C is either factory installed with the chiller controller or shipped as an individual part for field installation. The service part number is MOD01216 (X13650845-03).

Storage

If the LCI-C is stored for a period of time prior to being installed, it must be protected from the elements. The temperature of the storage location should be between -40°F (-40°C) and 158°F (70°C) and the relative humidity should be 0–95%, non-condensing.

Hardware Installation

Required Tools for Installation

The following tools are required for installing and setting up a LonTalk™ Communications Interface for Chillers with a Tracer AdaptiView™:

- Laptop computer with: [1]
  - Tracer™ TU software.
  - Tracer UC800 controller software

    Note: To download the most recent versions of Tracer TU software and UC800 software, go to the Tracer UC800 Software Download site: http://www.trane.com/commercial/software/tracerUC800/.
  - Rover™ Service Tool software—at minimum, Version 6.0. You can verify the version currently being used by looking at the splash screen as Rover starts.[2, 3]
- USB type A/B cable for the Tracer TU service tool.
- Rover LonTalk PCMCIA adapter, PN ADP01020 (refer to "Rover Service Tool Parts List," p. 59).
- Rover LonTalk adapter cable, PN CAB00283 (refer to "Rover Service Tool Parts List," p. 59).
- Screwdriver.
- Magnet- south pole.

[1] This guide assumes you are familiar with using Rover and Tracer TU service tools. If not and additional information is needed, refer to "Additional Resources," p. 60.

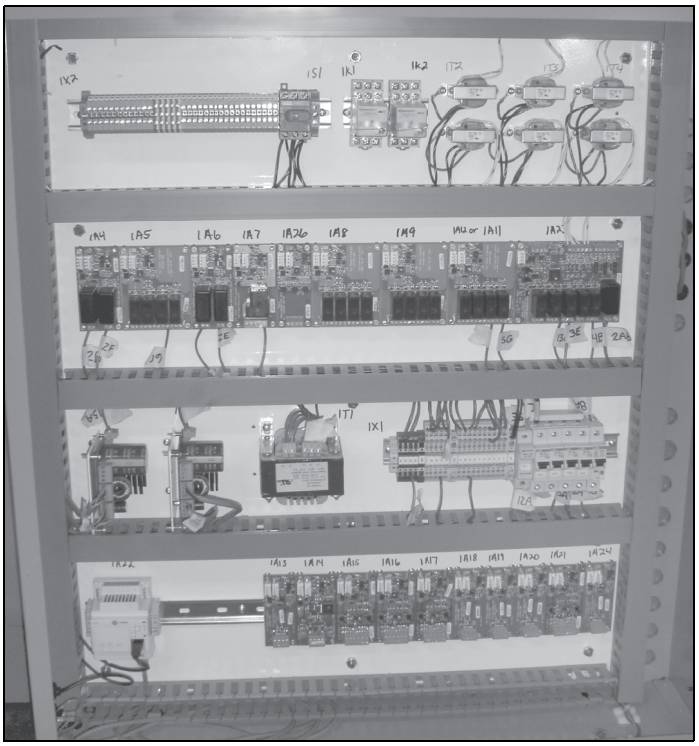
[2] Non-Trane LonTalk software tools can be used, instead of the Rover service tool, for the procedures in this guide. These tools most likely require appropriate XIF and NXE files. Find the XIF file at www.lonmark.org in the product directory. Both the NXE and the XIF files can be found in the directory of a computer that has the correct version of Rover installed: C:\Program Files\Rover\Images. Contact your local Trane office to get these files. However, go to the vendor of that tool for technical support, since Trane will not provide technical support for another vendor's software tool.

[3] For information about parts for the Rover service tool, refer to "Rover Service Tool Parts List," p. 59.

Hardware Installation

The hardware of an LCI-C consists of a low-level intelligent device (LLID), which is an electronic board that allows the UC800 to communicate on a LonTalk™ network. The LLID is designed to be mounted in an enclosure so that it is protected from the environment. The chiller's control panel cabinet, where the other Tracer™ UC800 LLIDs reside, provides a convenient place for the LCI-C (refer to Figure 1).

Figure 1. Chiller control panel box



To install the LCI-C LLID:

1. Use a screwdriver to mount the LCI-C LLID in the chiller control panel box or another suitable enclosure.
2. Attach the Machine bus ribbon cable to the LCI-C LLID.
3. Attach the LonTalk cable to the LCI-C LLID.
4. Attach any necessary termination resistors to the LonTalk link.

   Note: (For Trane control systems, refer to the Tracer Summit™ Hardware and Software Installation guide (BMTX-SVN01C-EN) for more information on where and when to use termination resistors.)

Software Installation

This section describes how to install the correct software for the LCI-C. (For the necessary tools, refer to "Required Tools for Installation" on page 8).

Determine Correct Software for Installation

To determine the correct software or version for your chiller type, refer to Table 1. The table shows the LCI-C Program ID.

Table 1. Software versions identified by chiller type

Chiller type	LCI-C Program ID	LCI-C software version by flash download file name
CVHE/F/G, CVGF	80002A-5028-0304-02	0011_LCI-C_NFD_1_0_UC800-CVH-CVG-CDH-CVR.nxe

LCI-C Ordered as a Service Part

If the LCI-C was ordered as a service part, please follow the installation procedure beginning in the next section.

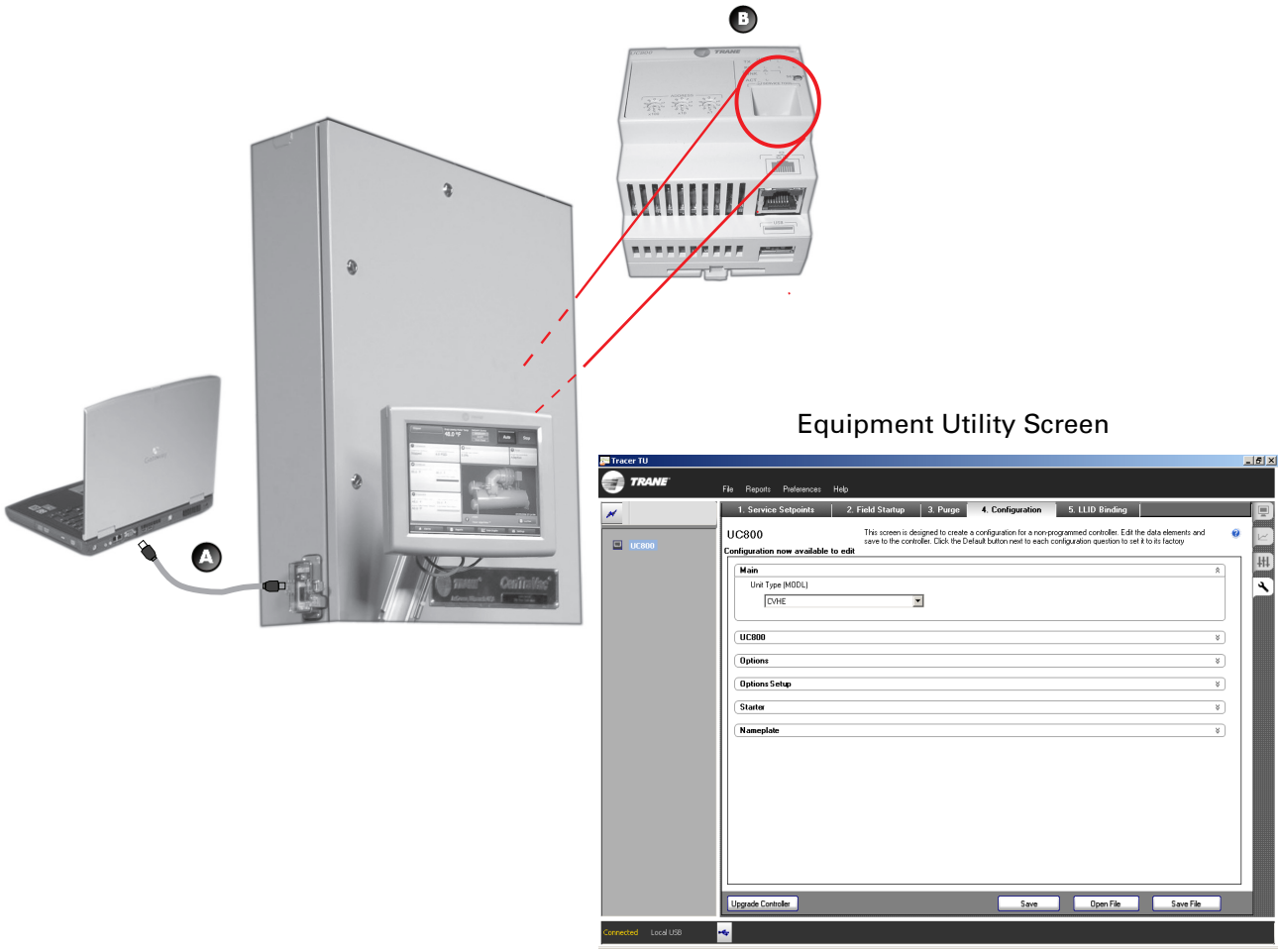
Start Software Installation Procedure with Tracer TU

The Tracer™ TU[4] is used to upgrade the Tracer UC800 controller software and to install the LCI-C on the UC800 . Follow the procedures for "Hardware Installation" on page 9.

Note: Before beginning the UC800 and LCI-C software installations with Tracer TU, please note that the chiller will be unavailable to run and will not produce chilled water during part of the installation procedure.

[4] If you need information on how to use Tracer TU, refer to "Additional Resources," p. 60

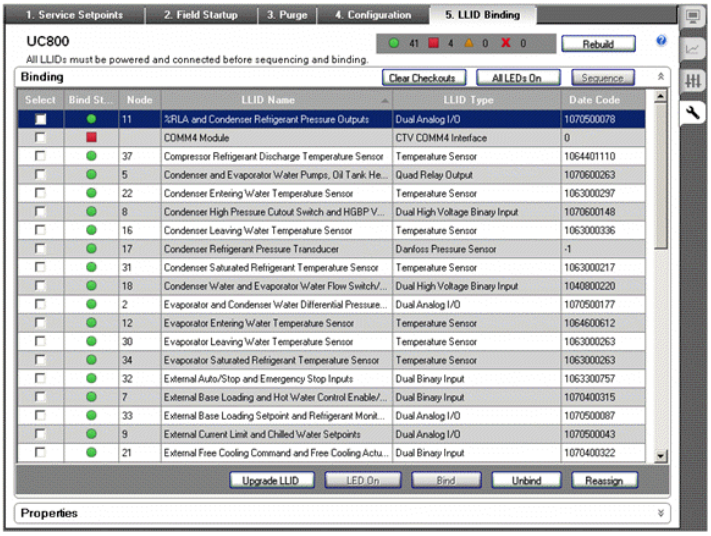
Figure 2. Start software installation procedure with Tracer TU to the LCI-C LLID



1. Connect the laptop containing Tracer TU to the external USB port **(A)** on the control panel, which is directly connected to the UC800 **(B)** inside the panel.
2. Click on the Tracer TU icon and the **Connect** screen appears.
3. Select **Direct Connection** (via USB cable) and click **Connect**. The **Tracer TU Equipment Utility** screen appears as shown in Figure 2.
4. Click the **Configuration** tab.

   Note: If the BAS interface is already configured with the LCI-C LonTalk™ Extension, proceed to step 6 or proceed with step 5 to configure.
5. To configure the LCI-C LonTalk Extension, click on the **Options** expanding box and select the interface.
6. Click **Save** and the **Binding** tab appears as shown in Figure 3, p. 12.
7. Select the device to bind from the binding list on the **LLID Binding** screen.
8. Click **Bind** and the **Select device with magnet** screen appears.

Figure 3. Binding LLIDs



9. Locate the service pin and LED of the hardware device. Using the south end of a magnet, turn the hardware device's LED *On*. Ensure that only that device is selected.
10. Click **Yes** on the **Select device with magnet** screen.
11. The green circle icon (Figure 4) appears signifying that the device is communicating and correctly configured.
12. Exit Tracer™ TU.

Figure 4. Binding status icons and binding completed successfully

– Signifies a device that is communicating and correctly configured. No action required.

– Signifies a device that is communicating, but incorrectly configured or contains unconfirmed information.

– Signifies a necessary device (as it is set on the configuration screen) that is not configured or is not communicating.

The diagnostic *LCI-C Software Mismatch: Use BAS Tool* may appear on the Tracer TU and the Tracer AdaptiView™ display. This diagnostic indicates that the appropriate LCI-C application software needs to be downloaded. Proceed to the next section to complete the software installation using the Rover™ Service Tool.

Complete Software Installation Procedure with the Rover Service Tool

Use the Rover™ service tool to flash download the correct application software to the LCI-C.[5]

Make sure you have followed the procedures for "Hardware Installation" on page 8 and "Start Software Installation Procedure with Tracer TU" on page 10.

1. If the LCI-C is currently connected to:
   - *A Tracer Summit™ system;* it must be removed before proceeding. To remove it, unassign the Neuron ID, wait for the activity on the Comm LED to slow down, and disconnect the LCI-C LLID from the BCU.

     Note: The flash download will cause the LCI-C to lose all of its LonTalk bindings.

   —or—
   - *A non-Trane network*; the flash download may change the LCI-C Program ID, which will therefore change the network variable list. This may require changing the configuration of the non-Trane portion of the network.

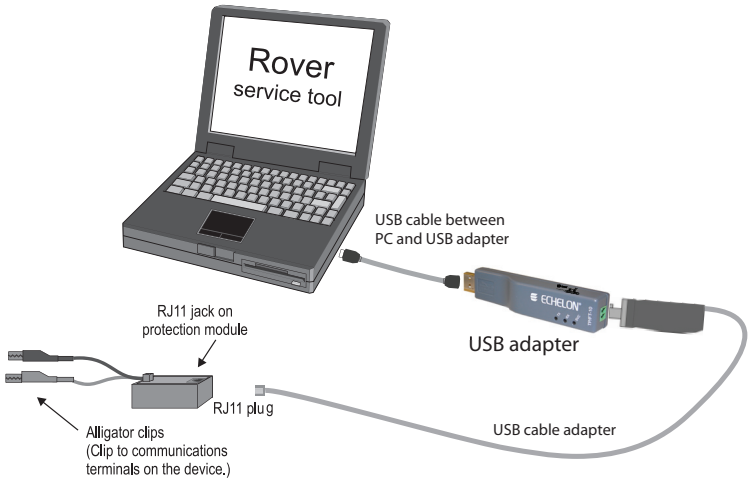
     Note: The flash download will cause the LCI-C to lose all of its LonTalk bindings.
2. Connect the Rover cable to the LCI-C communication terminals (refer to Figure 5). Alternatively, you can connect the Rover alligator clips anywhere on the LonTalk network. However, two network managers cannot be connected to the network at the same time.

   In other words, you cannot have on the network at the same time:
   - Two Rover tools

   —or—
   - Rover and a third party network management device

   —or—
   - Rover and a BCU.[6]

Figure 5. Connecting the Rover service tool to the LCI-C LLID

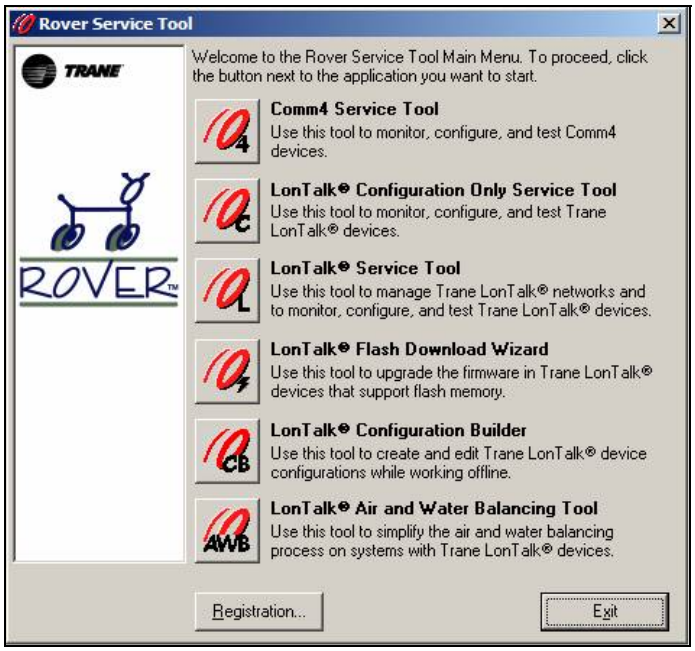


[5] If you need information on how to use the Rover service tool, refer to "Additional Resources".
[6] This is why you were instructed to disconnect the LCI-C from the BCU in step #1.

3. Click on the Rover™ icon to start the application. Then click the **Flash Download Wizard** button, as shown in figure 8, and the Welcome splash screen displays for the Flash Download Wizard.

   Note: If you do not have Flash Download Wizard, you may not have the correct version of Rover. Refer to "Required Tools for Installation" on page 8.

Figure 6. Flash Download Wizard button on the Rover Service Tool



4. The Welcome page lists the steps involved in the current procedure. Click **Next** to display the **Step 1. Discover link** dialog box as shown in Figure 7. Rover does a discovery of devices on the link and displays under **Status** the devices that are connected and powered up.

   When the discovery is complete, click **Next** to display the **Step 2. Select an image file** dialog box (refer to Figure 8).

   Note: The information on saving files on the Welcome page does not apply to the LCI-C because the configuration is done using Tracer™ TU.

Figure 7. Step 1. Discover link

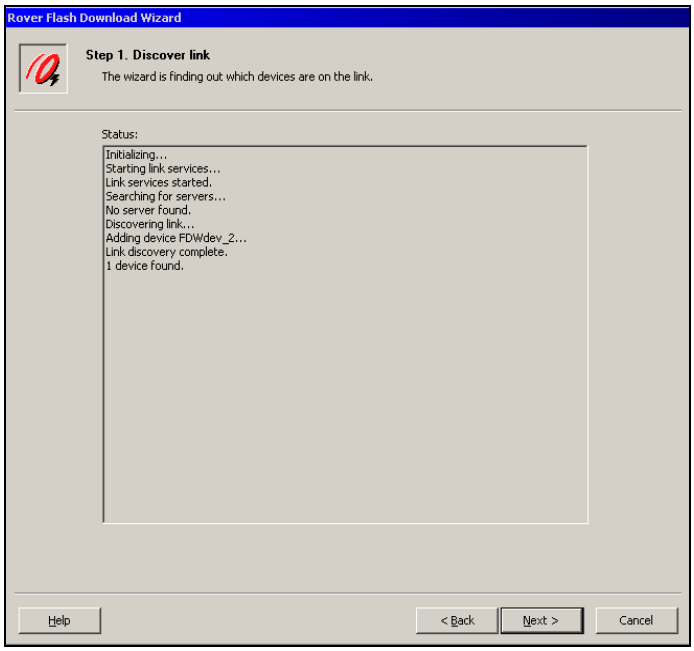
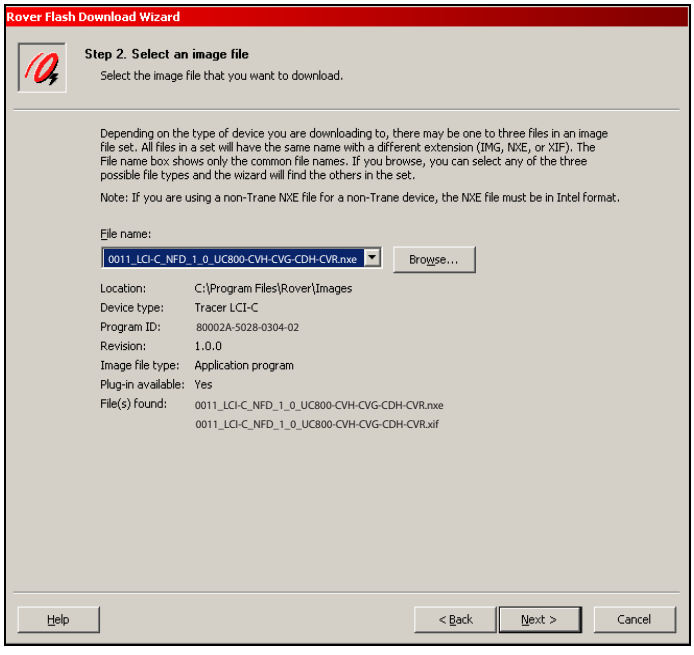


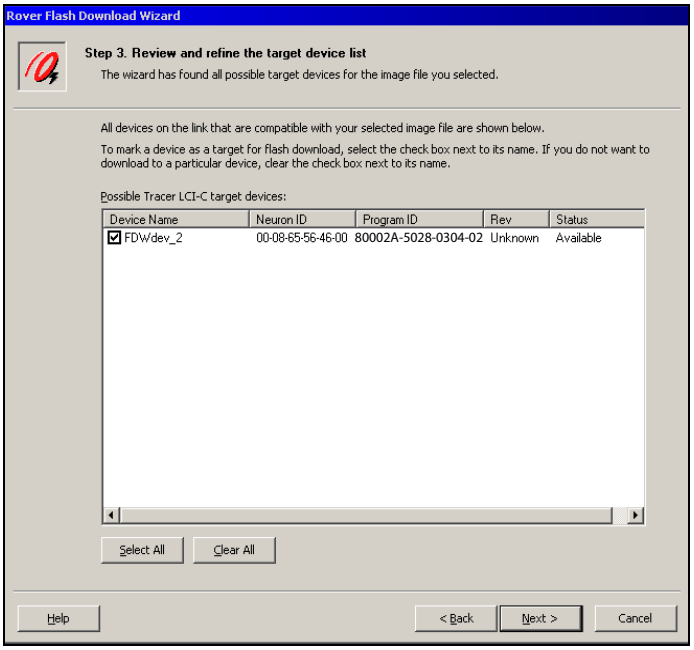
Figure 8. Step 2. Select an image file



5. Choose the appropriate file name from the **File name** drop-down list (refer to Table 1, p. 10 for file name). Click **Next** to display **Step 3. Review and refine the target device list** dialog box (refer to Figure 9).

   Note: If you do not have a file name that matches your chiller type, you may not have the correct version of Rover™. Refer to "Required Tools for Installation" on page 8.

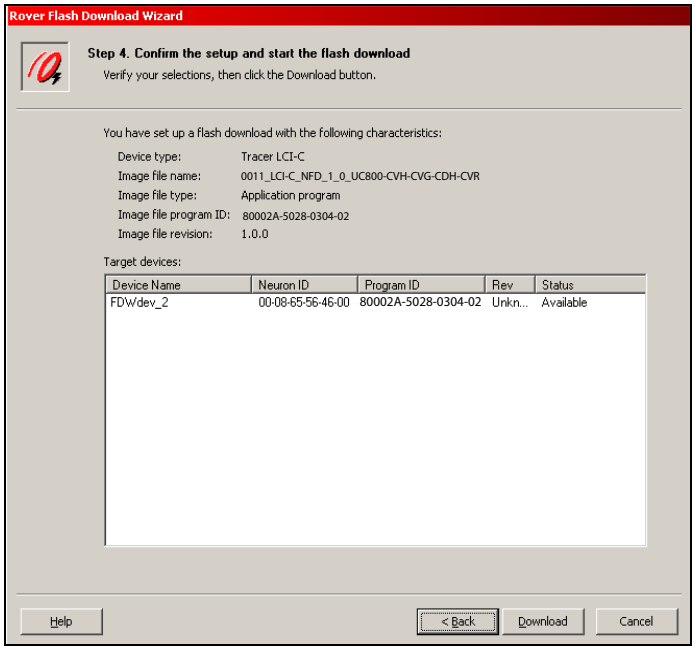
Figure 9. Step 3. Review and refine the target device list



6. In the **Possible Tracer LCI-C target devices:** list, select your target device by checking the appropriate box to the left of device name. Click **Next** to display **Step 4. Confirm the setup and start the flash download** dialog box (refer to Figure 10).

   Note: You may choose more than one LCI-C to flash download. The Rover flash download utility will flash download to one after the other.

Figure 10. Step 4. Confirm the setup and start the flash download

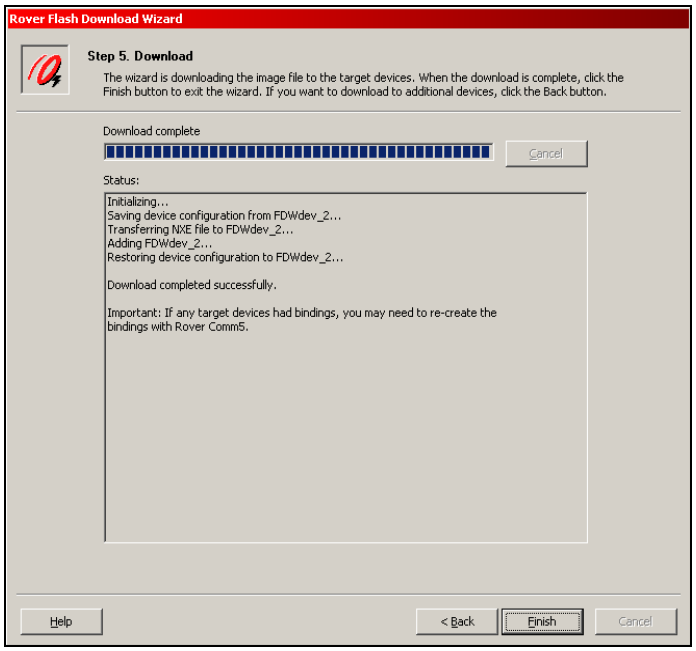


7. This is the confirmation screen that shows the Program ID of the selected image file and the Program ID of the target device(s):
   - If they are the same, then the flash download is not needed. Click **Cancel**.
   - If they are different, then the flash download is required. Click **Download**.

   –or–

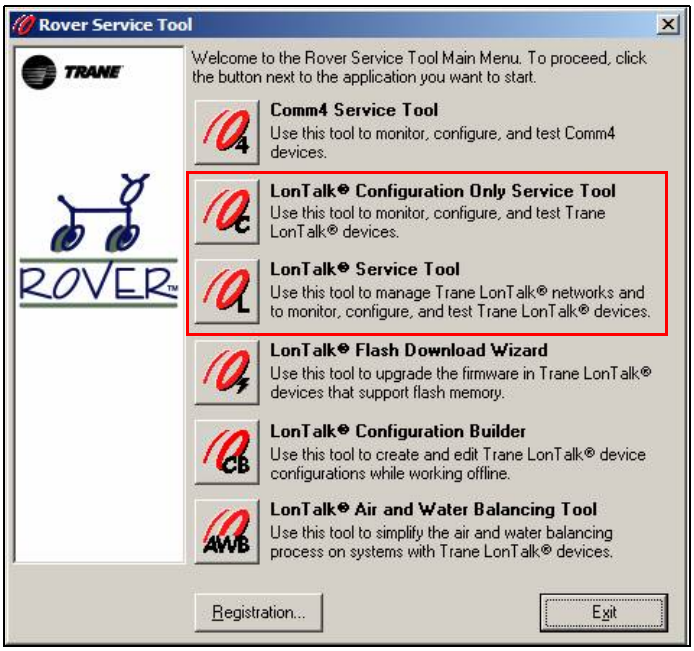
   You can compare the Program ID to Table 1, p. 10:
   - If the LCI-C matches the Program ID for the Trane™ LCI-C Extension for the required chiller type, then the correct application software is being used. Flash download is not needed. Click **Cancel**.
   - If the LCI-C has a Program ID that does not match the required chiller type, then flash download is required. Click **Download** to display **Step 5. Download** dialog box (refer to Figure 11).

Figure 11. Step 5. Download



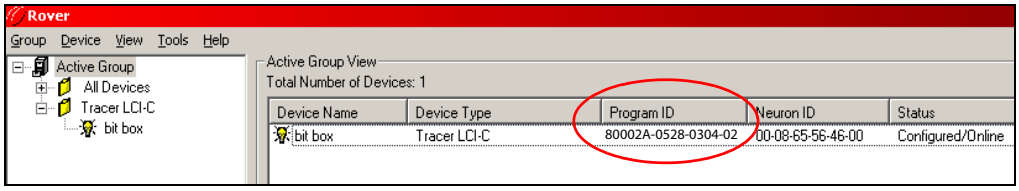
8. When download is complete, click **Finish**. The Rover™ service tool application closes.
9. Remove the Machine bus and reconnect it to cycle power on the LCI-C. Rover can be used to verify that the LCI-C Program ID is correct.
10. Click on the **Rover** icon to start the application. Then click either the **Configuration Only Service Tool** or the **LonTalk™ Service Tool** button (refer to Figure 12).

Figure 12. Rover service tool menu



After Rover™ completes the initial discovery, select Tracer™ LCI-C on the tree to view the Program ID (refer to Figure 13). It should match the Program ID in Table 1, p. 10 for the Trane™ LCI-C Extension of the required chiller type. If it *does not* match, then the wrong software version may have been selected for flash download. Repeat the flash download with a different file.

Figure 13. Verifying the Program ID



This completes the software installation and the diagnostic *LCI-C Software Mismatch: Use BAS Tool* should no longer appear as an active diagnostic on the Tracer AdaptiView™ display or Tracer TU.

Network Variables List

Tables 2 through 5 lists network variables.

Table 2. Network variables for CVH/CVG (program ID 80002A-5028-0304-02)

NV index	Network variable	SNVT type
0	nciLocation	SNVT_str_asc(36)
1	nviChillerEnable	SNVT_switch(95)
2	nviCoolSetpt	SNVT_temp_p(105)
3	nvoOnOff	SNVT_switch(95)
4	nvoActiveSetpt	SNVT_temp_p(105)
5	nviCapacityLim	SNVT_lev_percent(81)
6	nviMode	SNVT_hvac_mode(108)
7	nviHeatSetpt	SNVT_temp_p(105)
8	nvoActualCap	SNVT_lev_percent(81)
9	nvoCapacityLim	SNVT_lev_percent(81)
10	nvoLvgChWTemp	SNVT_temp_p(105)
11	nvoEntChWTemp	SNVT_temp_p(105)
12	nvoEntCndWTemp	SNVT_temp_p(105)
13	nvoLvgCndWTemp	SNVT_temp_p(105)
14	nvoAlarmDescr	SNVT_str_asc(36)
15	nvoChillerStat	SNVT_chlr_status(127)
16	nviRequest	SNVT_obj_request(92)
17	nvoStatus	SNVT_obj_status(93)
18	nvoFileDirectory	SNVT_address(114)
19	nviTraneVar2	UNVT
20	nvoTraneVar9	UNVT
21	nviBaseLdgSetpt	SNVT_lev_percent(81)
22	nviBaseLdgReq	SNVT_switch(95)
23	nvoStatusOutputs	SNVT_state(83)
24	nvoCprsrsRunning	SNVT_state(83)
25	nvoEvapWtrPump	SNVT_switch(95)
26	nvoEvapWtrFlow	SNVT_switch(95)
27	nvoCondWtrPump	SNVT_switch(95)
28	nvoCondWtrFlow	SNVT_switch(95)
29	nvoEvapWFlowRate	SNVT_flow(15)
30	nvoCondWFlowRate	SNVT_flow(15)
31	nvoActiveBLSetpt	SNVT_lev_percent(81)
32	nvoSecCndEntWTmp	SNVT_temp_p(105)
33	nvoSecCndLvgWTmp	SNVT_temp_p(105)
34	nvoEvapRfgtPrsC1	SNVT_press_f(59)
35	nvoEvapRfgtPrsC2	SNVT_press_f(59)
36	nvoEvapRfgtTmpC1	SNVT_temp_p(105)
37	nvoEvapRfgtTmpC2	SNVT_temp_p(105)
38	nvoCondRfgtPrsC1	SNVT_press_f(59)
39	nvoCondRfgtPrsC2	SNVT_press_f(59)
40	nvoCondRfgtTmpC1	SNVT_temp_p(105)
41	nvoCondRfgtTmpC2	SNVT_temp_p(105)

Table 2. Network variables for CVH/CVG (program ID 80002A-5028-0304-02)

NV index	Network variable	SNVT type
42	nvoPurgeInfoC1	UNVT_purge_information
43	nvoPurgeInfoC2	UNVT_purge_information
44	nvoHiSideOilPrsA	SNVT_press_f(59)
45	nvoHiSideOilPrsD	SNVT_press_f(59)
46	nvoLoSideOilPrsA	SNVT_press_f(59)
47	nvoLoSideOilPrsD	SNVT_press_f(59)
48	nvoOilTempA	SNVT_temp_p(105)
49	nvoOilTempD	SNVT_temp_p(105)
50	nvoRfgtDischTmpA	SNVT_temp_p(105)
51	nvoRfgtDischTmpD	SNVT_temp_p(105)
52	nvoVoltageA	UNVT_3phase_volt
53	nvoVoltageD	UNVT_3phase_volt
54	nvoCurrentA	UNVT_3phase_current
55	nvoCurrentD	UNVT_3phase_current
56	nvoStartsRunTmA	UNVT_starts_runtime
57	nvoStartsRunTmD	UNVT_starts_runtime
58	nvoUnitPower	SNVT_power_f(57)

Table 3. Configuration parameters for CVH/CVG/ (program ID 80002A-5028-0304-02)

Index	Configuration parameter	SNVT type	Size (bytes)
1	nciChillerEnable	SNVT_switch(95)	2
2	nciMinOutTm	SNVT_time_sec(107)	2
3	nciSndHrtBt	SNVT_time_sec(107)	2
4	nciCapacityLim	SNVT_lev_percent(81)	2
5	nciCoolSetpt	SNVT_temp_p(105)	2
6	nciMode	SNVT_hvac_mode(108)	1
7	nciHeatSetpt	SNVT_temp_p(105)	2
8	nciDefaults	SNVT_switch(95)	2
9	nciRcvHrtBt	SCPTmaxRcvTime(48)	2
10	nciBaseLdgSetpt	SNVT_lev_percent(81)	2
11	nciBaseLdgReq	SNVT_switch(95)	2
12	nciRefrigerant	UCPT_refrig_type	1
13	nciMfgLocation	UCPT_manufacturing_location	1
14	nciChillerType	UCPT_chiller_type	9
15	nciDevMajVer	SCPTdevMajVer(165)	1
16	nciDevMinVer	SCPTdevMinVer(166)	1

Network Variables- Alphabetically

Network variables for the LCI-C Extension are listed alphabetically in Table 1 with columns for chillers types.

Not all variables are available for every chiller. For example, the variables nvoAirFlowPctC1 and nvoCondFans apply to other chiller models that use the LCI-C extension.

Table 4. Network variables for the LCI-C Extension, listed alphabetically

Variable name	SNVT	CVH/CVG Tracer UC800
nviBaseLdgReq	SNVT_switch(95)	×
nviBaseLdgSetpt	SNVT_lev_percent(81)	×
nviCapacityLim	SNVT_lev_percent(81)	×
nviChillerEnable	SNVT_switch(95)	×
nviCoolSetpt	SNVT_temp_p(105)	×
nviHeatSetpt	SNVT_temp_p(105)	×
nviMode	SNVT_hvac_mode(108)	×
nviNoiseRdcnReq	SNVT_switch(95)	
nviRequest.RQ_Clear_Alarm	SNVT_obj_request(92)	×
nvoActiveBLSetpt	SNVT_lev_percent(81)	×
nvoActiveSetpt	SNVT_temp_p(105)	×
nvoActualCap	SNVT_lev_percent(81)	×
nvoAirFlowPctC1	SNVT_lev_percent(81)	
nvoAirFlowPctC2	SNVT_lev_percent(81)	
nvoAlarmDescr	SNVT_str_asc(36)	×
nvoCapacityLim	SNVT_lev_percent(81)	×
nvoChillerStat.chlr_op_mode	SNVT_chlr_status(127)	×
nvoChillerStat.chlr_run_mode	SNVT_chlr_status(127)	×
nvoChillerStat.chw_flow	SNVT_chlr_status(127)	×
nvoChillerStat.condw_flow	SNVT_chlr_status(127)	×
nvoChillerStat.in_alarm	SNVT_chlr_status(127)	×
nvoChillerStat.limited	SNVT_chlr_status(127)	×
nvoChillerStat.local	SNVT_chlr_status(127)	×
nvoChillerStat.run_enabled	SNVT_chlr_status(127)	×
nvoCondControl	SNVT_lev_percent(81)	
nvoCondFans	SNVT_state(83)	
nvoCondRfgtPrsC1	SNVT_press_f(59)	×
nvoCondRfgtPrsC2	SNVT_press_f(59)	×
nvoCondRfgtPrsC3	SNVT_temp_f(105)	
nvoCondRfgtPrsC4	SNVT_temp_f(105)	
nvoCondRfgtTmpC1	SNVT_temp_p(105)	×
nvoCondRfgtTmpC2	SNVT_temp_p(105)	×
nvoCondRfgtTmpC3	SNVT_temp_p(105)	

Table 4. Network variables for the LCI-C Extension, listed alphabetically (continued)

Variable name	SNVT	CVH/CVG Tracer UC800
nvoCondRfgtTmpC4	SNVT_temp_p(105)	
nvoCondWFlowRate	SNVT_flow(15)	×
nvoCondWtrFlow	SNVT_switch(95)	×
nvoCondWtrPump	SNVT_switch(95)	×
nvoCprsrsRunning	SNVT_state(83)	×
nvoCurrentA	UNVT_3phase_current	×
nvoCurrentB	UNVT_3phase_current	
nvoCurrentC	UNVT_3phase_current	
nvoCurrentD	UNVT_3phase_current	×
nvoCurrentE	UNVT_3phase_current	
nvoCurrentF	UNVT_3phase_current	
nvoEntChWTemp	SNVT_temp_p(105)	×
nvoEntCndWTemp	SNVT_temp_p(105)	×
nvoEvapRfgtPrsC1	SNVT_press_f(59)	×
nvoEvapRfgtPrsC2	SNVT_press_f(59)	×
nvoEvapRfgtPrsC3	SNVT_press_f(59)	
nvoEvapRfgtPrsC4	SNVT_press_f(59)	
nvoEvapRfgtTmpC1	SNVT_temp_p(105)	×
nvoEvapRfgtTmpC2	SNVT_temp_p(105)	×
nvoEvapRfgtTmpC3	SNVT_temp_p(105)	
nvoEvapRfgtTmpC4	SNVT_temp_p(105)	
nvoEvapWFlowRate	SNVT_flow(15)	×
nvoEvapWtrFlow	SNVT_switch(95)	×
nvoEvapWtrPump	SNVT_switch(95)	×
nvoHiSideOilPrsA	SNVT_press_f(59)	×
nvoHiSideOilPrsB	SNVT_press_f(59)	
nvoHiSideOilPrsC	SNVT_press_f(59)	
nvoHiSideOilPrsD	SNVT_press_f(59)	×
nvoHiSideOilPrsE	SNVT_press_f(59)	
nvoHiSideOilPrsF	SNVT_press_f(59)	
nvoLoSideOilPrsA	SNVT_press_f(59)	×
nvoLoSideOilPrsB	SNVT_press_f(59)	
nvoLoSideOilPrsC	SNVT_press_f(59)	
nvoLoSideOilPrsD	SNVT_press_f(59)	×
nvoLoSideOilPrsE	SNVT_press_f(59)	
nvoLoSideOilPrsF	SNVT_press_f(59)	
nvoLvgChWTemp	SNVT_temp_p(105)	×
nvoLvgCndWTemp	SNVT_temp_p(105)	×
nvoOilTempA	SNVT_temp_p(105)	×
nvoOilTempB	SNVT_temp_p(105)	

Table 4. Network variables for the LCI-C Extension, listed alphabetically (continued)

Variable name	SNVT	CVH/CVG Tracer UC800
nvoOilTempC	SNVT_temp_p(105)	
nvoOilTempD	SNVT_temp_p(105)	×
nvoOilTempE	SNVT_temp_p(105)	
nvoOilTempF	SNVT_temp_p(105)	
nvoOnOff	SNVT_switch(95)	×
nvoOutdoorTemp	SNVT_temp_p(105)	
nvoPurgeInfoC1	UNVT_purge_information	×
nvoPurgeInfoC2	UNVT_purge_information	×
nvoRfgtDischTmpA	SNVT_temp_p(105)	×
nvoRfgtDischTmpB	SNVT_temp_p(105)	
nvoRfgtDischTmpC	SNVT_temp_p(105)	
nvoRfgtDischTmpD	SNVT_temp_p(105)	×
nvoRfgtDischTmpE	SNVT_temp_p(105)	
nvoRfgtDischTmpF	SNVT_temp_p(105)	
nvoSecCndEntWTmp	SNVT_temp_p(105)	×
nvoSecCndLvgWTmp	SNVT_temp_p(105)	×
nvoStartsRunTmA	UNVT_starts_runtime	×
nvoStartsRunTmB	UNVT_starts_runtime	
nvoStartsRunTmC	UNVT_starts_runtime	
nvoStartsRunTmD	UNVT_starts_runtime	×
nvoStartsRunTmE	UNVT_starts_runtime	
nvoStartsRunTmF	UNVT_starts_runtime	
nvoStatus.Invalid_Request	SNVT_obj_status(93)	×
nvoStatusOutputs	SNVT_state(83)	×
nvoUnitCurrent	UNVT_3phase_current	
nvoUnitPower	SNVT_power_f(57)	×
nvoUnitVoltage	UNVT_3phase_volt	
nvoVoltageA	UNVT_3phase_volt	×
nvoVoltageB	UNVT_3phase_volt	
nvoVoltageC	UNVT_3phase_volt	
nvoVoltageD	UNVT_3phase_volt	×
nvoVoltageE	UNVT_3phase_volt	
nvoVoltageF	UNVT_3phase_volt	

Network Variable and Configuration Property Definitions

This section includes:

- Network variable input definitions
- Network variable output definitions
- Configuration property definitions

Network Variable Input Definitions

The network variable input definitions are listed alphabetically by network variable.

nviBaseLdgReq

Base loading Auto/On request, SNVT_switch

This input requests the chiller to use the base loading control method. With this method, the chiller controls to a requested capacity level rather than to a chilled-water or hot-water setpoint. This variable is used as an Auto/On and cannot be used to force the chiller to exit base loading control.

- Default: Uses nciBaseLdgReq
- Invalid value: 0xFF, 0xFF

Valid range (uses 2-state definition of SNVT_switch)

Value byte	State byte	Resulting interpretation
Any	0	Auto (0)
0	1	Auto (0)
>0	1	On (1)
Any	0xFF	Invalid

nviBaseLdgSetpt

Base loading setpoint, SNVT_lev_percent

This input network variable is the requested capacity level the chiller should control to when using the Base Loading control method. Any setpoint value received will be clamped into a valid range by the chiller.

- Default: Uses nciBaseLdgSetp
- Invalid value: 0x7FFF = 163.835%
- Range: -163.84% to 163.83% (limited at chiller) or invalid

nviCapacityLim

Capacity limit setpoint, SNVT_lev_percent

- Default: Uses nciCapacityLim
- Invalid value: 0x7FFF = 163.835%
- Range: -163.84% to 163.83% (limited at chiller) or Invalid

This input network variable sets the maximum capacity level the chiller can use. This level cannot be adjusted above the manufacturer-specified limit.

nviChillerEnable

Chiller enable/disable request, SNVT_switch

- Default: Uses nciChillerEnable
- Invalid value: 0xFF, 0xFF

This input variable provides the mechanism to enable (start) the chiller to run if operating conditions are satisfied, or to disable (stop) the chiller from running.

Valid range (uses 2-state definition of SNVT_switch)

Value byte	State byte	Resulting interpretation
Any	0	Disable (0)
0	1	Disable (0)
>0	1	Enable (1)
Any	0xFF	Invalid

nviCoolSetpt

Chilled water setpoint, SNVT_temp_p

- Default: Uses nciCoolSetpt
- Invalid value: 0x7FFF = 327.67°C
- Range: -273.17°C to 327.66°C (limited at chiller) or Invalid

This input variable provides the desired setpoint of the evaporator leaving water when the chiller is operating in cooling mode. This will be ignored if the control is in heat mode. The cooling mode is the normal mode of chiller operation, unless overridden to another mode. Any setpoint value received will be clamped into a valid range by the chiller.

nviHeatSetpt

Hot water setpoint, SNVT_temp_p

- Default: Uses nciHeatSetpt
- Invalid value: 0x7FFF = 327.67°C
- Range: -273.17°C to 327.66°C (limited at chiller) or Invalid

This input network variable provides the heating setpoint when the chiller is operating in the heat mode. This will be ignored if the control is in cooling mode. Any setpoint value received will be clamped into a valid range by the chiller.

nciLocation

Location label, SNVT_str_asc

- Default: **No Unit Config Required**
- SCPT reference: SCPTlocation (17)
- Range: Any valid string

This configuration property provides a description of the location of the unit.

nviMode

Operating mode request, SNVT_hvac_mode

This input network variable provides the mode of operation of the chiller and provides the ability for another node on the network to place a chiller in another mode.

Structure definition

Type	Enumeration name	Enumeration definition[a]	Default
Unsigned 8-bit	hvac_t	1 = HVAC_HEAT 3 = HVAC_COOL 10 = HVAC_FREE_COOL 11 = HVAC_ICE	uses nciMode

[a] Other enumeration definitions for hvac_t, as defined by LonMark, are not used by the UC800 controller and have no effect on its operations.

nviNoiseRdcnReq

Noise reduction Auto/On request, SNVT_switch

This input network variable requests the chiller to enter a mode of operation where the noise of the unit is reduced. When Noise Reduction is active the chiller reduces speed of the condenser fans in order to create less noise.

- Default: Uses nciNoiseRdcnReq
- Invalid value: 0xFF, 0xFF

Valid range (uses 2-state definition of SNVT_switch)

Value byte	State byte	Resulting interpretation
Any	0	Auto (0)
0	1	Auto (0)
>0	1	On (1)
Any	0xFF	Invalid

nviRequest

Status request input, SNVT_obj_request

Provides a mechanism for the mode of an object to be requested. Default value will be adopted at power-up or until an update is received. Does not use the receive heartbeat function. Responses are received through nvoStatus.

Structure definition

Item	Type	Enumeration definition	Default	Invalid value
Object ID	Unsigned 16-bit	0 = node object	65535	65535
		1 = chiller object		
		2 to 65535 are not valid		
Object request	Unsigned 8-bit enum object_request_t	See next table: "Object request"	255	255

Object request

Enumeration definition	Description	Controller interpretation
0 = RQ_NORMAL	Enable object and remove override	Report object status
2 = RQ_UPDATE_STATUS	Just report object status	Report object status
5 = RQ_REPORT_MASK	Report status bit mask	Report status bit mask
9 = RQ_CLEAR_STATUS	Clear object status	Report object status
10 = RQ_CLEAR_ALARM	Clear object alarm	Clear object alarm
16 to 255 = RQ_NUL	Value not available	Ignore object request
Note: Other enumeration definitions for object_request_t, as defined by LonMark, are not used by the UC800 controller and have no effect on its operation.		

Chiller object behavior in response to object request

Request code	Chiller object behavior
normal	Status of the object is sent.
update status	Status of the object is sent.
report mask	Send a mask of supported status bits.
clear status	Status of the object is sent.
clear alarm	Sends a command to the Chiller to clear all "remote reset" diagnostics. Status of the object is then sent with alarm bit cleared.
NUL	Ignore object request.

Node object behavior in response to object request

Request code	Node object behavior
normal	Status of the node object is sent. The status will be the same as the chiller object since it is the only object in the device.
update status	Status of the node object is sent. The status will be the same as the chiller object since it is the only object in the device.
report mask	Send a mask of supported status bits.
clear status	Status of the node object is sent. The status will be the same as the chiller object since it is the only object in the device.
clear alarm	Sends a command to the chiller to clear all "remote reset" diagnostics. Status of the object is then sent with alarm bit cleared.
NUL	Ignore object request.

Network Variable Output Definitions

The network variable output definitions are listed alphabetically by network variable.

nvoActiveBLSetpt

Active base loading setpoint, SNVT_lev_percent

This variable indicates the value of the Base Loading Setpoint actively being used by the chiller when in base loading mode of operation.

- Default: 0x7FFF = 163.835%
- Invalid value: 0x7FFF = 163.835%

nvoActiveSetpt

Active chilled water or hot water setpoint, SNVT_temp_p

This variable indicates the value of the Active Chilled Water Setpoint or Active Hot Water Setpoint actively being used by the chiller. The Active Hot Water Setpoint will be displayed when in heat mode, otherwise the Active Chilled Water Setpoint will be displayed.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoActualCap

Actual running capacity, SNVT_lev_percent

This network variable provides the level of capacity at which the chiller is currently operating. It may be more or less than the nominal value of the chiller's capacity.

- Default: 0x7FFF = 163.835%
- Invalid value: 0x7FFF = 163.835%

nvoAirFlowPctC1

Air flow percent—circuit 1, SNVT_lev_percent

This network variable provides the approximate air flow percentage of circuit 1.

- Default: 0x7FFF = 163.835%
- Invalid value: 0x7FFF = 163.835%

nvoAirFlowPctC2

Air flow percent—circuit 2, SNVT_lev_percent

This network variable provides the approximate air flow percentage of circuit 2.

- Default: 0x7FFF = 163.835%
- Invalid value: 0x7FFF = 163.835%

nvoAlarmDescr

Alarm description, SNVT_str_asc

This network variable provides alarm messages based on manufacturer-determined criteria. Alarm text will vary significantly based on the chiller model. See the corresponding chiller literature for more details on the diagnostics. The format will be as follows: "s nnnnnnnnnnnnnnnnnnnnnnnnnnnn"

s Indicates the severity of the diagnostic. There are five possibilities. There is an ASCII space between *s* and the first *n*.

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 form the human readable message. The last *n* must be null (0x00). Can be less than 29 *n*s, but not more.

For *0* or *P* this text must be *Normal*

- When transmitted: It is transmitted when a diagnostic occurs
- Update rate: Update occurs no faster than the configured min send time

nvoCapacityLim

Active capacity limit setpoint, SNVT_lev_percent

This variable indicates the value of the Capacity Limit Setpoint actively being used by the chiller.

- Default: 0x7FFF = 163.835
- Invalid value: 0x7FFF = 163.835%

nvoChillerStat

Chiller status, SNVT_chlr_status

This variable indicates the main running mode and states of the chiller. The modes indicate the primary running states of the chiller and the states indicate other conditions present.

Structure definition

Item	Type	Enumeration name	Definition	Description
chiller_run_mode	unsigned 8-bit	chiller_t	00 = CHLR_OFF	Chiller off
			01 = CHLR_START	Chiller in start mode
			02 = CHLR_RUN	Chiller in run mode
			03 = CHLR_PRESHUTDN	Chiller in pre-shutdown mode
			04 = CHLR_SERVICE	Chiller in service mode
			any others = CHLR_NULL	
chlr_op_mode	unsigned 8-bit	hvac_t	01 = HVAC_HEAT	Heating only
			03 = HVAC_COOL	Cooling only
			0A = HVAC_FREE_COOL	Free cooling
			0B = HVAC_ICE	Ice-making mode
			any others = HVAC_NULL	

Structure definition (continued)

Item	Type	Enumeration name	Definition		Description
chlr_state	unsigned 8-bit	no enum bit field only	bit 0 (MSB)	in_alarm	1 = Chiller has an active diagnostic that caused the chiller to be shutdown. (These are shutdown alarms, not warnings.)
					0 = No shutdown alarms are present.
			bit 1	run_enabled	1 = Chiller is available to run or is currently running.
					0 = Chiller is not permitted to run.
			bit 2	local	1 = Chiller is in local mode. BAS is disabled in the Setpoint Source and the chiller will ignore communications.
					0 = Chiller is not in local mode and network visible values may be changed remotely.
			bit 3	limited	1 = Conditions may exist that prevent the chiller from reaching setpoint.
					0 = Chiller is not restricted from attempting to reach setpoint.
			bit 4	chw_flow	1 = Chilled water flow is detected.
					0 = No chilled water flow is observed.
			bit 5	condw_flow	1 = Condenser water flow is detected.
					0 = No condenser water flow is observed.

nvoCondControl

Condenser Control, SNVT_lev_percent

This network variable is the percentage of condenser water flow being requested by the controller.

- Default: 0x7FFF = 163.835%
- Invalid value: 0x7FFF = 163.835%

nvoCondFans

Condenser fan(s) running outputs, SNVT_state

This variable is used to relay information about which condenser fans (or banks of fans) on the chiller are currently being commanded to run.

Structure definition

Bit position	Description
Bit 0	Condenser fan(s) A exists (1=Yes)
Bit 1	Condenser fan(s) B exists (1=Yes)
Bit 2	Condenser fan(s) C exists (1=Yes)
Bit 3	Condenser fan(s) D exists (1=Yes)
Bit 4	Condenser fan(s) E exists (1=Yes)
Bit 5	Condenser fan(s) F exists (1=Yes)
Bit 6	Condenser fan(s) E exists (1=Yes)
Bit 7	Condenser fan(s) H exists (1=Yes)
Bit 8	Condenser fan(s) A On (1=On)
Bit 9	Condenser fan(s) B On (1=On)
Bit 10	Condenser fan(s) C On (1=On)
Bit 11	Condenser fan(s) D On (1=On)
Bit 12	Condenser fan(s) E On (1=On)
Bit 13	Condenser fan(s) F On (1=On)
Bit 14	Condenser fan(s) G On (1=On)
Bit 15 (LSB)	Condenser fan(s) H On (1=On)

nvoCondRfgtPrsC1

Condenser refrigerant pressure—circuit 1, SNVT_press_f

This network variable provides the pressure of the refrigerant in the condenser on circuit 1. This refrigerant pressure is sometimes referred to as the condenser discharge pressure.

- Default: NaN
- Invalid value: NaN

nvoCondRfgtPrsC2

Condenser refrigerant pressure—circuit 2, SNVT_press_f

This network variable provides the pressure of the refrigerant in the condenser on circuit 2. This refrigerant pressure is sometimes referred to as the condenser discharge pressure.

- Default: NaN
- Invalid value: NaN

nvoCondRfgtPrsC3

Condenser refrigerant pressure—circuit 3, SNVT_press_f

This network variable provides the pressure of the refrigerant in the condenser on circuit 3. This refrigerant pressure is sometimes referred to as the condenser discharge pressure.

- Default: NaN
- Invalid value: NaN

nvoCondRfgtPrsC4

Condenser refrigerant pressure—circuit 4, SNVT_press_f

This network variable provides the pressure of the refrigerant in the condenser on circuit 4. This refrigerant pressure is sometimes referred to as the condenser discharge pressure.

- Default: NaN
- Invalid value: NaN

nvoCondRfgtTmpC1

Condenser refrigerant temperature—circuit 1, SNVT_temp_p

This network variable provides the temperature of the refrigerant in the condenser on circuit 1. This refrigerant temperature is sometimes referred to as the condenser discharge temperature.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoCondRfgtTmpC2

Condenser refrigerant temperature—circuit 2, SNVT_temp_p

This network variable provides the temperature of the refrigerant in the condenser on circuit 2. This refrigerant temperature is sometimes referred to as the condenser discharge temperature.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoCondRfgtTmpC3

Condenser refrigerant temperature—circuit 3, SNVT_temp_p

This network variable provides the temperature of the refrigerant in the condenser on circuit 3. This refrigerant temperature is sometimes referred to as the condenser discharge temperature.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoCondRfgtTmpC4

Condenser refrigerant temperature—circuit 4, SNVT_temp_p

This network variable provides the temperature of the refrigerant in the condenser on circuit 4. This refrigerant temperature is sometimes referred to as the condenser discharge temperature.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoCondWFlowRate

Condenser water flow rate, SNVT_flow

This network variable provides the rate of water flow in the condenser.

- Default: 0xFFFF = 65535 L/s
- Invalid value: 0xFFFF = 65535 L/s

nvoCondWtrFlow

Condenser water flow status, SNVT_switch

This network variable indicates that there is water flowing through the condenser.

Valid range (uses 2-state definition of SNVT_switch)

Value byte	State byte	Resulting interpretation
0	0	No flow (0)
100	1	Flow (1)
0xFF	0xFF	Invalid

nvoCondWtrPump

Condenser water pump output, SNVT_switch

This variable indicates a request from the chiller to turn on the condenser water pump.)

Valid range (uses 2-state definition of SNVT_switch)

Value byte	State byte	Resulting interpretation
0	0	Pump Off (0)
100	1	Pump On (1)
0xFF	0xFF	Invalid

nvoCprsrsRunning

Compressor running outputs, SNVT_state

This variable is used to relay information about which compressors on the chiller are running.

Structure definition

Bit position	Description
Bit 0	Compressor A exists (1 = Yes)
Bit 1	Compressor B exists (1 = Yes)
Bit 2	Compressor C exists (1 = Yes)
Bit 3	Compressor D exists (1 = Yes)
Bit 4	Compressor E exists (1 = Yes)
Bit 5	Compressor F exists (1 = Yes)
Bits 6–7	Not used
Bit 8	Compressor A running (1 = On)
Bit 9	Compressor B running (1 = On)
Bit 10	Compressor C running (1 = On)
Bit 11	Compressor D running (1 = On)
Bit 12	Compressor E running (1 = On)
Bit 13	Compressor F running (1 = On)
Bits 14–15(LSB)	Not used

nvoCurrentX

Current per line—compressor X, UNVT_3phase_current*
nvoCurrentA
nvoCurrentB
nvoCurrentC
nvoCurrentD
nvoCurrentE
nvoCurrentF

These network variables provides a measurement of the three-line currents at compressor X (*where X = A, B, C, D, E and/or F, depending on the network variable, in amperes and/or in %RLA). There are separate network variables for each compressor.

Structure definition

Field in structure	Description
SNVT_amp_ac	L1 current (Amps)—compressor X
SNVT_amp_ac	L2 current (Amps)—compressor X
SNVT_amp_ac	L3 current (Amps)—compressor X
SNVT_lev_percent	L1 current (%RLA)—compressor X
SNVT_lev_percent	L2 current (%RLA)—compressor X
SNVT_lev_percent	L3 current (%RLA)—compressor X
Note: X = A, B, C, D, E, and/or F, depending on the network variable.	

nvoEntChWTemp

Evaporator entering water temperature, SNVT_temp_p

This network variable provides the temperature of the water entering the evaporator.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoEntCndWTemp

Condenser entering water temperature, SNVT_temp_p

This network variable provides the temperature of the water entering the condenser.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoEvapRfgtPrsC1

Evaporator refrigerant pressure—circuit 1, SNVT_press_f

This network variable provides the pressure of the refrigerant in the evaporator on circuit 1. This refrigerant pressure is sometimes referred to as the evaporator suction pressure.

- Default: NaN
- Invalid value: NaN

nvoEvapRfgtPrsC2

Evaporator refrigerant pressure—circuit 2, SNVT_press_f

This network variable provides the pressure of the refrigerant in the evaporator on circuit 2. This refrigerant pressure is sometimes referred to as the evaporator suction pressure.

- Default: NaN
- Invalid value: NaN

nvoEvapRfgtPrsC3

Evaporator refrigerant pressure—circuit 3, SNVT_press_f

This network variable provides the pressure of the refrigerant in the evaporator on circuit 3. This refrigerant pressure is sometimes referred to as the evaporator suction pressure.

- Default: NaN
- Invalid value: NaN

nvoEvapRfgtPrsC4

Evaporator refrigerant pressure—circuit 4, SNVT_press_f

This network variable provides the pressure of the refrigerant in the evaporator on circuit 4. This refrigerant pressure is sometimes referred to as the evaporator suction pressure.

- Default: NaN
- Invalid value: NaN

nvoEvapRfgtTmpC1

Evaporator refrigerant temperature—circuit 1, SNVT_temp_p

This network variable provides the temperature of the refrigerant in the evaporator on circuit 1. This refrigerant temperature is sometimes referred to as the evaporator suction temperature.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoEvapRfgtTmpC2

Evaporator refrigerant temperature—circuit 2, SNVT_temp_p

This network variable provides the temperature of the refrigerant in the evaporator on circuit 2. This refrigerant temperature is sometimes referred to as the evaporator suction temperature.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoEvapRfgtTmpC3

Evaporator refrigerant temperature—circuit 3, SNVT_temp_p

This network variable provides the temperature of the refrigerant in the evaporator on circuit 3. This refrigerant temperature is sometimes referred to as the evaporator suction temperature.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoEvapRfgtTmpC4

Evaporator refrigerant temperature—circuit 4, SNVT_temp_p

This network variable provides the temperature of the refrigerant in the evaporator on circuit 4. This refrigerant temperature is sometimes referred to as the evaporator suction temperature.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoEvapWFlowRate

Evaporator water flow rate, SNVT_flow

This network variable provides the rate of water flow in the evaporator.

- Default: 0xFFFF = 65535 L/s
- Invalid value: 0xFFFF = 65535 L/s

nvoEvapWtrFlow

Evaporator water flow status, SNVT_switch

This network variable indicates that there is water flowing through the evaporator.

Valid range (uses 2-state definition of SNVT_switch)

Value byte	State byte	Resulting interpretation
0	0	No flow (0)
100	1	Flow (1)
0xFF	0xFF	Invalid

nvoEvapWtrPump

Evaporator water pump output, SNVT_switch

This network variable indicates a request from the chiller to turn on the evaporator water pump.

Valid range (uses 2-state definition of SNVT_switch)

Value byte	State byte	Resulting interpretation
0	0	Pump Off (0)
100	1	Pump On (1)
0xFF	0xFF	Invalid

nvoFileDirectory

File directory, SNVT_address

This network variable points to a file directory containing descriptors for the files in the device. It is used because the LCI-C implements configuration properties as configuration parameter files accessed by network management read/write messages.

- Default: None
- Invalid value: None
- Range: 0x4000 to 0xFCFF

nvoHiSideOilPrsX

High side oil pressure—compressor X, SNVT_press_f*
nvoHiSideOilPrsA
nvoHiSideOilPrsB
nvoHiSideOilPrsC
nvoHiSideOilPrsD
nvoHiSideOilPrsE
nvoHiSideOilPrsF

This network variable measures the pressure of the oil at the high-pressure side of compressor X (*where X = A, B, C, D, E, or F, depending on the network variable). There are separate network variables for each compressor.

- Default: NaN
- Invalid value: NaN

nvoLoSideOilPrsX

Low side oil pressure—compressor X, SNVT_press_f*
nvoLoSideOilPrsA
nvoLoSideOilPrsB
nvoLoSideOilPrsC
nvoLoSideOilPrsD
nvoLoSideOilPrsE
nvoLoSideOilPrsF

This network variable measures the pressure of the oil at the low-pressure side of compressor X (*where X is A, B, C, D, E, or F, depending on the network variable). There are separate network variables for each compressor.

- Default: NaN
- Invalid value: NaN

nvoLvgChWTemp

Evaporator leaving water emperature, SNVT_temp_p

This network variable provides the temperature of the water leaving the evaporator.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoLvgCndWTemp

Condenser leaving water temperature, SNVT_temp_p

This network variable provides the temperature of the water leaving the condenser.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoOilTempX

Oil temperature—compressor X, SNVT_temp_p*
nvoOilTempA
nvoOilTempB
nvoOilTempC
nvoOilTempD
nvoOilTempE
nvoOilTempF

This network variable provides the temperature of the oil in the compressor X (*where X is A, B, C, D, E, or F depending on the network variable.) There are separate network variables for each compressor.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoOnOff

Chiller running state, SNVT_switch

This variable indicates whether the chiller is on (currently doing either cooling or heating) or is considered off (currently doing neither cooling nor heating)

Valid range (uses 2-state definition of SNVT_switch)

Value byte	State byte	Resulting interpretation
0	0	Off (0)
100	1	On (1)
0xFF	0xFF	Invalid

nvoOutdoorTemp

Outdoor air temperature, SNVT_temp_p

This network variable provides the temperature of the outdoor air.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoPurgeInfoC1

Purge information—circuit 1, UNVT_purge_information

This variable is used to relay state information about the purge system on circuit 1 of the chiller. Refrigeration Circuit On indicates that the Purge condensing unit is operating its refrigerant circuit and is attempting to extract non-condensable gasses from the chiller refrigerant. Pumping Out indicates that the purge unit is attempting to rid itself of collected non-condensable gasses. Regenerating indicates that the purge carbon bed is going through a regeneration cycle. The Purge 24 Hour Pumpout Average is the amount of pump-out time over the last sliding 24-hour window.

Structure definition

Field in structure	Byte	Bit definitions	Description
SNVT_state purge status	Byte 0 (MSB)	Bits 0–7 (MSB)	Validity of bits 8–15 (1 = Valid)
		Bit 8	Refrigeration Circuit On (1)
		Bit 9	Pumping Out (1)
		Bit 10	Regenerating (1)
		Bits 11–15 (LSB)	Not used
SNVT_time_f	Byte 1–2 (LSB)		Purge 24 Hour Pumpout Average

nvoPurgeInfoC2

Purge information–circuit 2, UNVT_purge_information

This variable is used to relay state information about the purge system on circuit 2 of the chiller. Refrigeration Circuit On indicates that the Purge condensing unit is operating its refrigerant circuit and is attempting to extract non-condensable gasses from the chiller refrigerant. Pumping Out indicates that the purge unit is attempting to rid itself of collected non-condensable gasses. Regenerating indicates that the purge carbon bed is going through a regeneration cycle. The Purge 24 Hour Pumpout Average is the amount of pumpout time over the last sliding 24 hour window.

Structure definition

Field in structure	Byte	Bit definitions	Description
SNVT_state: Purge Status	Byte 0 (MSB)	Bits 0–7 (MSB)	Validity of bits 8–15 (1 = Valid)
		Bit 8	Refrigeration Circuit On (1)
		Bit 9	Pumping Out (1)
		Bit 10	Regenerating (1)
		Bits 11-15 (LSB)	Not Used
SNVT_time_f	Byte 1–2 (LSB)		Purge 24 Hour Pumpout Average

nvoRfgtDischTmpX

Refrigerant discharge temperature—compressor X, SNVT_temp_p*
nvoRfgtDischTmpA
nvoRfgtDischTmpB
nvoRfgtDischTmpC
nvoRfgtDischTmpD
nvoRfgtDischTmpE
nvoRfgtDischTmpF

This network variable provides the temperature of the refrigerant being discharged from compressor X (*where X is A, B, C, D, E, or F, depending on the network variable). There are separate network variables for each compressor.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoSecCndEntWTmp

Second condenser entering water temperature, SNVT_temp_p

This network variable provides the temperature of the water entering the second condenser.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoSecCndLvgWTmp

Second condenser leaving water temperature, SNVT_temp_p

This network variable provides the temperature of the water leaving the second condenser.

- Default: 0x7FFF = 327.67°C
- Invalid value: 0x7FFF = 327.67°C

nvoStartsRunTmX

Starts and run time—compressor X, UNVT_starts_runtime*
nvoStartsRunTmA
nvoStartsRunTmB
nvoStartsRunTmC
nvoStartsRunTmD
nvoStartsRunTmE
nvoStartsRunTmF

This network variable provides the number of starts and the amount of running time over the life of compressor X (*where X is A, B, C, D, E, or F, depending on the network variable.) There are separate network variables for each compressor.

Structure definition

Field in structure	Description
SNVT_count_f	Starts—compressor X
SNVT_time_f	Run time—compressor X

nvoStatus

Status request output, SNVT_obj_status

This network variable indicates the status of the objects in the node. Sent in response to nviRequest or poll or heartbeat. Polling does not update nvoStatus. For example, polling will not change the alarm bit. Only nviRequest and heartbeat update nvoStatus.

Structure definition (6 bytes)

Item	Type	Report mask	Byte #	Bit #	Definition
object id	unsigned 16-bit		0, 1		0 = node object
					1 = chiller object
					2 to 65535 = invalid
invalid_id[a]	bit	0	2	7	1 = requested ID is not implemented in this node
invalid_request[b]	bit	0	2	6	1 = request for unimplemented function
in_alarm[c]	bit	1	4	6	1 = object is in alarm (only shutdown alarms, not warnings)
report_mask[d]	bit	1	4	4	1 = status is an event mask (set for RQ_REPORT_MASK)

[a] invalid_id: A status of invalid_id is reported whenever a nviRequest is received for an object id that is not implemented in the node.

[b] invalid_request: A status of invalid_request is reported whenever a nviRequest is received for an unimplemented function.

[c] in_alarm: A value of TRUE is reported if the controller has a diagnostic condition.

[d] report_mask: Report_mask status is used to document the 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 status bits by way of nvoStatus. A ONE in the mask means that the object may set the corresponding bit in the object status when the condition defined for that bit occurs. A ZERO means that the bit will never be set by the object. When reporting status in response to a RQ_REPORT_MASK, the report_mask bit must be set to distinguish this from other forms of status.

Note: Any bits within SNVT_obj_status that are defined by the LonMark profile but are not listed above, are not used by the UC800 controller and have no affect on its operation.

- When Transmitted: nvoStatus is transmitted whenever a request is received on the nviRequest input and as one of the heartbeat nvos. The node object status is sent during the first heartbeat nvoStatus transmission. Then the chiller object status is sent during the second heartbeat nvoStatus transmission, depending on which profile is being used. And then the cycle repeats.
- Update Rules: The application must update the status such that a poll of the status following the request returns the most recent data.
- Update Rate: Send heartbeat time
- Default Service Type: Unacknowledged

nvoStatusOutputs

Status outputs, SNVT_state

This variable is used to relay state information about the chiller. Max Capacity provides an indication that all available chiller capacity is being used. When the Head Relief Request bit is set, the chiller is asking an outside system to provide more heat rejection from the condenser water loop. Additional heat rejection creates lower condenser water loop temperatures, which lowers the condenser refrigerant pressure (head). Base Loading Active indicates whether the Base Loading control method is currently being used. Hot Gas Bypass Active is set when Hot Gas Bypass is being performed by the chiller. Noise Reduction Active is set when the chiller is in a state where the noise is being reduced. The efficiency of the chiller may be reduced in this mode. In Defrost indicates that one or more circuits on the chiller are in a defrost mode.

Structure definition

Bit position	Description
Bits 0–7	Validity of bits 8–15 (1 = valid)
Bit 8	Max Capacity (1)
Bit 9	Head Relief Request (1)
Bit 10	Base Loading Active (1)
Bit 11	Hot Gas Bypass Active (1)
Bit 12	Noise Reduction Active (1)
Bit 13	In Defrost (1)
Bits 14–15(LSB)	Not Used

nvoUnitCurrent

Unit current per line, UNVT_3phase_current

This network variable provides the measurement of the three-line currents of the chiller in amperes (Amps) and/or %RLA.

Structure definition

Field in structure	Description
SNVT_amp_ac	L1 current (Amps)
SNVT_amp_ac	L2 current (Amps)
SNVT_amp_ac	L3 current (Amps)
SNVT_lev_percent	L1 current (%RLA)
SNVT_lev_percent	L2 current (%RLA)
SNVT_lev_percent	L3 current (%RLA)

nvoUnitPower

Unit power consumption, SNVT_power_f

This network variable provides the measurement of the power being consumed by the chiller.

- Default: NaN
- Invalid value: NaN

nvoUnitVoltage

Unit voltage per phase, UNVT_3phase_volt

This network variable provides the measurement of the three phase voltages of the chiller.

Structure definition

Field in structure	Description
SNVT_volt_ac	AB voltage
SNVT_volt_ac	BC voltage
SNVT_volt_ac	CA voltage

nvoVoltageX

Voltage per phase—compressor X, UNVT_3phase_volt*
nvoVoltageA
nvoVoltageB
nvoVoltageC
nvoVoltageD
nvoVoltageE
nvoVoltageF

This network variable provides a measurement of the three phase voltages at compressor X (*where X is A, B, C, D, E, or F depending on the network variable.) There are separate network variables for each compressor.

Structure definition

Field in structure	Description
SNVT_volt_ac	AB voltage—compressor X
SNVT_volt_ac	BC voltage—compressor X
SNVT_volt_ac	CA voltage—compressor X

Configuration Property Definitions

The configuration property definitions (implemented as configuration parameters) are listed alphabetically by nci name.

nciBaseLdgReq

Default Value for nviBaseLdgReq, SNVT_switch, level 1

This configuration property sets the default value for the base loading request (nviBaseLdgReq) of the chiller, unless the configuration property nciDefaults = 1. When nciDefaults = 1, the UC800 controller ignores the BAS value and chooses from other available requests (external or front panel) based on internal arbitration rules.

- Range: Same as nviBaseLdgReq
- Default: Invalid (0xFF, 0xFF)
- UCPT reference: None

nciBaseLdgSetpt

SNVT_lev_percent, level 1

This configuration property sets the default value for the base loading setpoint (nviBaseLdgSetpt) of the chiller, unless the configuration property nciDefaults = 1. When nciDefaults = 1, the UC800 controller ignores the BAS value and chooses from other available setpoints (external or front panel) based on internal arbitration rules.

- Range: Same as nviBaseLdgSetpt
- Default: Invalid (0x7FFF)
- UCPT reference: None

nciCapacityLim

Default value for nviCapacityLim, SNVT_lev_percent, level 1

This configuration property sets the default value for the Capacity Limit (nviCapacityLim) of the chiller, unless the configuration property nciDefaults = 1. When nciDefaults = 1, the UC800 controller ignores the BAS value and chooses from other available values (external or front panel) based on internal arbitration rules.

- Range: Same as nviCapacityLim
- Default: Invalid (0x7FFF)
- SCPT reference: SCPTlimitChlrCap (81)

nciChillerEnable

Default value for nviChillerEnable, SNVT_switch, level 1

This configuration property provides the default power up and restart modes (nviChillerEnable) of the chiller, unless the configuration property nciDefaults = 1. When nciDefaults = 1, the UC800 controller ignores the BAS value and chooses from other available setpoints (external or front panel) based on internal arbitration rules.

- Range: Same as nviChillerEnable
- Default: Invalid (0xFF, 0xFF)
- SCPT reference: SCPTpwrUpState (73)

nciChillerType

Chiller type information, UCPT_chiller_type, level 1

This configuration property defines some of the properties of the chiller. These values are set when the LCI-C is bound into the UC800 controller. It is a read-only configuration property that cannot be modified over LonTalk communications.

Structure definition

Item	Length	Range
Model information	1 byte	Range of enum values in UCPT_chiller_type (refer to User-defined Types, p. 53)
Unit capacity	4 bytes	SNVT_power_f
Cooling type	1 byte	Range of enum values (0=water-cooled, 1=air-cooled)
Number of circuits	1 byte	1–2
Number of compressors: circuit 1	1 byte	0–3
Number of compressors: circuit 2	1 byte	0–3

nciCoolSetpt

Default value for nviCoolSetpt, SNVT_temp_p, level 1

This configuration property sets the default Setpoint for the Leaving Chilled Water Temperature (nviCoolSetpt), unless the configuration property nciDefaults = 1. When nciDefaults = 1, the UC800 controller ignores the BAS value and chooses from other available setpoints (external or front panel) based on internal arbitration rules.

- Range: Same as nviCoolSetpt
- Default: Invalid (0x7FFF)
- SCPT reference: SCPTcoolSetpoint (75)

nciDefaults

Default values, SNVT_switch, level 1

This configuration property determines which set of values will be used on power up and communications failure. The choice is the stated default values or a list of manufacturer specified values.

- Range:0–Use Stated Defaults
  1–Use Manufacturer Specified Defaults
  0xFF–Invalid (act with Default [1])
- Default: 1 = Use Manufacturer Specified Defaults
- SCPT reference: SCPTdefltBehave (71)

nciDefaults setting

nciDefaults setting	Action at power-up	Action on communication loss (nciRcvHrtBt timeout)
0—Use Stated defaults	Set each of the nvis equal to the value that is stored in their corresponding nci.	For each nvi individually, when it has not been heard from for the Receive Heartbeat time, it should be set back to the value that is in its corresponding nci.
1—Use Manufacturer Specified Defaults	Set each of the nvis equal to a value that we hardcode in the LCI. Where possible this value should be an invalid value that causes the controller to use its front panel inputs. If this is not possible, it should be a safe default. For this project, the Manufacturer Specified Defaults should be equal to the default value for each of the nci's, which have this same effect.	In this case, the nvis should not be changed. We have defined Manufacturer Specified on a Comm Loss to mean that we continue using the last sent value.
0xFF	Invalid (act with Default [1])	Invalid (act with Default [1])

nciDevMajVer

Device Major Version, unsigned 8-bit, level 1

This configuration property displays the major version number for the software in the device. It is read-only.

- Range: 0–254
- Default: N/A
- SCPT reference: SCPTdevMajVer (165)

nciDevMinVer

Device Minor Version, unsigned 8-bit, level 1

This configuration property displays the minor version number for the software in the device. It is read-only.

- Range: 0–254
- Default: N/A
- SCPT reference: SCPTdevMinVer (166)

nciHeatSetpt

Default Value for nviHeatSetpt, SNVT_temp_p, level 1

This configuration property sets the default Setpoint for the Leaving Chilled Water Temperature (nviHeatSetpt) when in heating mode, unless the configuration property nciDefaults = 1. When nciDefaults = 1, the UC800 controller ignores the BAS value and chooses from other available setpoints (external or front panel) based on internal arbitration rules.

- Range: Same as nviHeatSetpt
- Default: Invalid (0x7FFF)
- SCPT reference: SCPTheatSetpoint (78)

nciMinOutTm

Minimum send time, SNVT_time_sec, level 1

This is the minimum period of time between any two network variable output transmissions. It is only used by send on delta and is not used by the send on heartbeat function. If nciMinOutTm = 0x7FFF (6,553.5 s), which is the not valid value, the controller will use the default value of 2.5 s for the minimum send time. If nciMinOutTm = 0, there is no minimum time requirement between transmissions. Transmissions will happen as fast as possible (however send on delta still applies) when nciMinOutTm = 0.

- Range: 0–6, 553.4 s, 0 disables
- Default: 2.5 s (0x0019)
- SCPT reference: SCPTminSendTime (52)

nciMfgLocation

Chiller manufacturing location, UCPT_manufacturing_location, level 1

This configuration property defines the location that the chiller was manufactured. It will be set when the LCI-C is bound into the UC800 controller. It is a read-only configuration property that cannot be modified over LonTalk communications.

- Range: Range of enum values
- Default: Invalid (0xFF)
- UCPT reference: UCPT_manufacturing location (refer to User-defined Types, p. 53)

nciMode

Default value for nviMode, SNVT_hvac_mode, level 1

This configuration property sets the default operating mode of the chiller (nviMode), unless the configuration property nciDefaults = 1. When nciDefaults = 1, the UC800 controller ignores the BAS value and chooses from other available modes (external or front panel) based on internal arbitration rules.

- Range: Same as nviMode
- Default: HVAC_NULL (0xFF)
- SCPT reference: SCPThvacMode (74)

nciNoiseRdcnReq

Default value for nviNoiseRdcnReq, SNVT_switch, level 1

This configuration property sets the default value for the Noise Reduction Request (nviNoiseRdcnReq) of the chiller, unless the configuration property nciDefaults = 1. When nciDefaults = 1, the UC800 controller ignores the BAS value and chooses from other available modes (external or front panel) based on internal arbitration rules.

- Range: Same as nviNoiseRdcnReq
- Default: Invalid (0xFF, 0xFF)
- UCPT Reference: None

nciRcvHrtBt

Receive heartbeat time, SNVT_time_sec, level 1

Used to control the maximum time that elapses after the last update to a network variable input before the controller starts to use its default values.

- Range: 0–6,553.4 s, 0 disables
- Default value: Disabled (0x0000)
- SCPT reference: SCPTmaxRcvTime (48)

nciRefrigerant

Chiller refrigerant type, UNVT_refrig, level 1

This configuration property defines the type of refrigerant that the chiller uses. It will be set when the LCI-C is bound into the UC800 controller. It is a read-only configuration property that cannot be modified over LonTalk communications.

- Range: Range of enum values
- Default: Invalid (0xFF)
- UCPT reference: UCPT_refrig_type

nciSndHrtBt

Send heartbeat time, SNVT_time_sec, level 1

This is the maximum period of time that will expire before each bound heartbeated network variable output will be automatically updated once. The configured minimum send time (nciMinOutTm) is ignored. If nciSndHrtBt = 0x7FFF (6,553.5 s), which is the not valid value, the controller will use the default value of 300 s for the send heartbeat time.

- Range: 0–6,553.4 s, 0 disables
- Default: 300 s (0x0BB8)
- SCPT reference: SCPTmaxSendTime (49)

User-defined Types

This section includes:

- User-defined network variable types
- User-defined configuration property types

These user-defined types have been created by Trane™ for use by Trane controllers. In many cases, the Trane user-defined types contain standard network variable types (SNVTs) to make them easy to understand.

User-defined Network Variable Types (UNVTs)

UNVT_purge_information

Structure definition

Field in structure	Byte	Bit definition	Description
SNVT_state purge status	Byte 0 (MSB)	Bits 0–7 (MSB)	Validity of bits 8–15 (1 = Valid)
		Bit 8	Refrigeration Circuit On (1)
		Bit 9	Pumping Out (1)
		Bit 10	Regenerating (1)
		Bits 11–15(LSB)	Not Used
SNVT_time_f	Byte 1–2 (LSB)		Purge 24 Hour Pumpout Average

UNVT_starts_runtime

Structure definition

Field in structure	Definition
SNVT_count_f	Compressor Starts
SNVT_time_f	Compressor Run Time

UNVT_3phase_current

Structure definition

Field in structure	Definition
SNVT_amp_ac	L1 Current (Amps)
SNVT_amp_ac	L2 Current (Amps)
SNVT_amp_ac	L3 Current (Amps)
SNVT_lev_percent	L1 Current (%RLA)
SNVT_lev_percent	L2 Current (%RLA)
SNVT_lev_percent	L3 Current (%RLA)

UNVT_3phase_volt

Structure definition

Field in structure	Definition
SNVT_volt_ac	AB Voltage
SNVT_volt_ac	BC Voltage
SNVT_volt_ac	CA Voltage

UNVT_refrig

Range of enumeration values

Enumeration	Definition	Description (reference: ARI guideline K)
0	RT_R11	R-11 (Trichlorofluoromethane)
1	RT_R12	R-12 (Dichlorodifluoromethane)
2	RT_R13	R-13 (Chlorotrifluoromethane)
3	RT_R13B1	R-13B1 (Bromotrifluoromethane)
4	RT_R14	R-14
5	RT_R21	R-21
6	RT_R22	R-22 (Chlorodifluoromethane)
7	RT_R23	R-23 (Trifluoromethane)
8	RT_R32	R-32
9	RT_R40	R-40
10	RT_R112	R-112
11	RT_R113	R-113 (Trichlorotrifluoroethane)
12	RT_R114	R-114 (Dichlorotetrafluoroethane)
13	RT_R115	R-115
14	RT_R116	R-116
15	RT_R123	R-123 (Dichlorotrifluoroethane)
16	RT_R124	R-124 (Chlorotetrafluoroethane)
17	RT_R125	R-125
18	RT_R134a	R-134a (Tetrafluoroethane)
19	RT_R141B	R-141B
20	RT_R142B	R-142B
21	RT_R143A	R-143A
22	RT_R152A	R-152A
23	RT_R401A	R-401A (Chlorodifluoromethane, Difluoroethane, Chlorotetrafluoroethane)
24	RT_R401B	R-401B (Chlorodifluoromethane, Difluoroethane, Chlorotetrafluoroethane)
25	RT_R402A	R-402A (Chlorodifluoromethane, Pentafluoroethane, Propane)
26	RT_R402B	R-402B (Chlorodifluoromethane, Pentafluoroethane, Propane)

Range of enumeration values (continued)

Enumeration	Definition	Description (reference: ARI guideline K)
27	RT_R403B	R-403B (Chlorodifluoromethane, Octafluoropropane, Propane)
28	RT_R404A	R-404A (Pentafluoroethane, Trifluoroethane, Tetrafluoroethane)
29	RT_R406A	R-406A (Chlorodifluoroethane, Isobutane, Chlorodifluoroethane)
30	RT_R407A	R-407A (Difluoromethane, Pentafluoroethane, Tetrafluoroethane)
31	RT_R407B	R-407B (Difluoromethane, Pentafluoroethane, Tetrafluoroethane)
32	RT_R407C	R-407C (Difluoromethane, Pentafluoroethane, Tetrafluoroethane)
33	RT_R408A	R-408A (Chlorodifluoromethane, Trifluoroethane, Pentafluoroethane)
34	RT_R409A	R-409A (Chlorodifluoromethane, Chlorotetrafluoroethane, Chlorodifluoroethane)
35	RT_R410A	R-410A (Difluoromethane, Pentafluoroethane)
36	RT_R414B	R-414B (Chlorodifluoromethane, Chlorotetrafluoroethane, Chlorodifluoroethane, Isobutane)
37	RT_R416A	R-416A (Tetrafluoroethane, Chlorotetrafluorethane, Butane)
38	RT_R500	R-500 (Dichlorodifluoromethane, Difluoroethane)
39	RT_R502	R-502 (Chlorodifluoromethane, Chloropentafluoroethane)
40	RT_R503	R-503 (Chlorotrifluoromethane, Trifluoromethane)
41	RT_R507	R-507 (Pentafluoroethane, Trifluoroethane)
42	RT_R508B	R-508B (Trifluoromethane, Hexafluoroethane)
43	RT_R717	R-717
44-254	RT_RESERVED	Reserved for future use
0xFF	RT_INVALID	Invalid (default)

User-defined Configuration Property Types

UCPT_chiller_type

Structure definition

Item	Type	Bytes	Range and meaning
Model information *(See enumeration definitions table below.)*	Unsigned 8-bit (enum)	1	Range of enum values in UCPT_chiller_type
Unit capacity	SNVT_power_f	4	Capacity of unit (in watts)
Cooling type	Unsigned 8-bit (enum)	1	0 = water-cooled 1 = air-cooled 2–254 = unused
Number of circuits	Unsigned 8-bit	1	0-4; number of circuits on unit
Number of compressors on circuit 1	Unsigned 8-bit	1	0-3; number of compressors on circuit 1
Number of compressors on circuit 2	Unsigned 8-bit	1	0-3; number of compressors on circuit 2
Total length		9	

Enumeration definitions for UCPT_chiller_type

Enumeration	Enumeration definition (Trane chiller model designators)
0	RTA
1	CVH
2	CVG
3	CVR
4	CDH
5	RTH
6	CGW
7	CGA
8	CCA
9	RTW
10	RTX
11	RTU
12	CCU
13	CXA
14	CGC
15	RAU
16–254	Unused
255	Invalid (unknown)

UCPT_manufacturing_location

Range of enumeration values

Enumeration	Enumeration definition
0	Field applied (unknown location)
1	La Crosse, Wisconsin, USA
2	Pueblo, Colorado, USA
3	Charmes, France
4	Rushville, Indiana, USA
5	Macon, Georgia, USA
6	Waco, Texas, USA
7	Lexington, Kentucky, USA
8	Forsyth, Georgia, USA
9	Clarksville, Tennessee, USA
10	Ft. Smith, Arkansas, USA
11	Penang, Malaysia
12	Colchester, UK
13	Curitiba, Brazil
14	Taicang, China
15	Taiwan
16	Epinal, France
17	Golbey, France
18 to 254	Unused
255	Invalid (unknown location)

Troubleshooting the LCI-C Installation

Diagnostics

Table 1 gives a list of diagnostics and their explanation. The diagnostics (printed in italics) will appear in both Tracer AdaptiView™ or Tracer™ TU.

Table 5. Troubleshooting the LCI-C installation

Symptom or Diagnostic	Probable Cause	Action
Chiller is not using setpoints sent by LonTalk	Chiller is in Local mode.	Check the Setpoint Source on the AdaptiView (front panel). It must be BAS/Ext/FP on the AdaptiView in order for the chiller to use remote setpoints. Check that the network variable nvoChillerStat.local has a value of 0, which means Remote. A value of 1 means Local.
LCI-C Software Mismatch: Use BAS Tool	Application software does not match chiller type.	Flash download correct applicationapplication software as described in the section, "Hardware Installation," p. 8
Comm Loss: Local BAS Interface	Machine bus communication was lost between the Tracer UC800 controller and the LCI-C.	Check wire connection between the LCI-C and the Machine bus. Start Tracer TU. Go to Binding View and make sure the LCI-C is still bound. Replace the LCI-C hardware and repeat the installation process in the section, "Hardware Installation," p. 8
Waiting for BAS Communication	No heartbeated network variable inputs have yet been received through LonTalk after power-up of the LCI-C LLID. If they are not received within a specified time, diagnostic status becomes *BAS Failed to Establish Communication*.[a]	Check to make sure that the BAS system is setup to communicate with LCI-C. Otherwise, simply wait until communication is established or *BAS Failed to Establish Communication* appears.
BAS Failed to Establish Communication	No heartbeated network variable inputs have been received within the specified time after startup.[a]	Check: • LonTalk communication line wiring • That BAS is still trying to communicate with LCI-C
BAS Communication Lost	Valid LonTalk message not received within a specified time.[a]	Check: • LonTalk communication line wiring • That BAS is still trying to communicate with LCI-C

[a] The Trane LCI-C has a receive heartbeat functionality that can determine if communication is lost with the BAS system. This functionality is enabled using the heartbeat configuration variable (nciRcvHrtBt).

The LCI-C Extension has the receive heartbeat functionality disabled as a default. (nciRcvHrtBt = 0 seconds).

Not all BAS systems use receive heartbeat functionality. Since LCI-C Extension has the receive heartbeat disabled, it accommodates those BAS systems that choose not to use this LonTalk feature. These diagnostics will never appear. If the receive heartbeat is enabled (nciRcvHrtBt has a value other than zero), then the diagnostic can appear even if the non-Trane BAS system is able to read status and send values to the LCI-C.

The Tracer Summit System uses the receive heartbeat functionality and will automatically enable it upon installation by setting nciRcvHrtBt to 900 seconds (15 minutes). This then allows the LCI-C to know when communication is lost. Communication is recognized as lost when none of the network variable inputs have been written to within nciRcvHrtBt time that was set. It doesn't matter what value is written. The same value can be written over and over.

Rover Service Tool Parts List

Below is a parts list for Rover™, Version 6.0. Items in italics are not used in the LCI-C installation procedure.

Table 6. Rover Version 6 parts list

Lynx ordering number	Rover model description	Service parts mnemonic number	Controls part number	Service part descriptions
X39651500-01	LonTalk & LonTalk (software and hardware) consists of:	ADP01019	S3090-0365-62	Rover Comm4 PCMCIA adapter
		CAB010103	S3090-0368-62	Rover Comm4 adapter cable
		ADP01020	S3090-0360-62	Rover LonTalk PCMCIA adapter
		CAB00283	S3090-0113-62	Rover LonTalk adapter cable
		MOD00510	S3090-0091-62	Module, transient protection w/ alligator leads
		KEY00482	S3090-0127-62	LonTalk communication key for ZN010
		ADP00494	S3090-0114-62	Cable adapter with 1/4-inch quick connects
4020-1196	LonTalk & Comm4 Upgrade (software)	Software only—no service parts		
X1365149901	LonTalk (software and hardware) consists of:	ADP01020	S3090-0360-62	Rover LonTalk PCMCIA adapter
		CAB00283	S3090-0113-62	Rover LonTalk adapter cable
		MOD00510	S3090-0091-62	Module, transient protection w/alligator leads
		KEY00482	S3090-0127-62	LonTalk communication key for ZN010
		ADP00494	S3090-0114-62	Cable adapter with 1/4-inch quick connects
X39651501-01	Comm4 (software and hardware) consists of:	ADP01019	S3090-0365-62	Rover Comm4 PCMCIA Adapter
		CAB01013	S3090-0368-62v	Rover Comm4 Adapter Cable
		MOD00510	S3090-0091-62	Module, transient protection w/alligator leads
4020-1121	LonTalk software upgrade (software)	Software only—no service parts		
4020-1191	Comm4 software upgrade (software)	Software only—no service parts		
X13651502-01	LonTalk configuration only (software and hardware) consists of:	ADP01020	S3090-0360-62	Rover LonTalk PCMCIA Adapter
		CAB00283	S3090-0113-62	Rover LonTalk Adapter Cable
		MOD00510	S3090-0091-62	Module, transient protection w/alligator leads
		KEY00482	S3090-0127-62	LonTalk communication key for ZN010
		ADP00494	S3090-0114-62	Cable adapter with 1/4-inch quick connects
4020-1192	LonTalk Configuration only (Software)	Software only—no service parts		
4020-1193	LonTalk Hardware Kit (Hardware) consists of:	ADP01020	S3090-0360-62	Rover LonTalk PCMCIA Adapter
		CAB00283	S3090-0113-62	Rover LonTalk Adapter Cable
		MOD00510	S3090-0091-62	"Module, transient protection w/alligator leads
		KEY00482	S3090-0127-62	LonTalk communication key for ZN010
		ADP00494	S3090-0114-62	"Cable adapter with 1/4-inch quick connects
4020-1194	Comm4 Hardware Kit (Hardware) consists of:	ADP01019	S3090-0365-62	Rover Comm4 PCMCIA Adapter
		CAB01013	S3090-0368-62	Rover Comm4 Adapter Cable
		MOD00510	S3090-0091-62	Module, transient protection w/alligator leads
4950-0504	Multi-user license	Software only—no service parts		
4020-1195	Multi-user license additional seat	Software only—no service parts		

Additional Resources

Use the following documents and links as reference material:

- *Installing Rover™ Service Tool, Version 6.0 Installation Sheet* (X39641065-01A)
- *LonTalk™ Communications Interface for Chillers LCI-C Sales Brochure* (RF-SLB005-EN)
- *Rover 6.0 Operation and Programming Guide* (EMTX-SVX01F-EN)
- *Tracer Summit™ Version 17 Hardware and Software Installation Guide* (BMTX-SVN01C-EN)
- *Tracer Summit Version 17 System Programming Guide* (BMTX-SVP01C-EN)
- *Tracer™ TU Service Tool Getting Started Guide* (TTU-SVN02A-EN) (X39641083-01A)
- *Tracer TU Service Tool for Water-cooled CenTraVac™ Chillers with Tracer AdaptiView™ Control Programming Guide* (CTV-SVP02A-EN)
- *USB Comm4 Adapter Replacement Installation Sheet* (X39641082-01A)
- *Water-cooled CenTraVac™ Chiller with Tracer AdaptiView Control Diagnostics Manual and Component Summary* (CTV-SVP03A-EN)
- Product support online:
  - www.ComfortSite.com
  - www.lonmark.org
  - Tracer TU Help online
- For further assistance, contact your local Trane sales office.

Glossary

A

Application software

Software within the LCI-C Neuron processor that defines its program ID and network variables

B

binding (LonTalk)
On LonTalk communication links, a binding links a network variable in one device with a network variable in another device, thereby allowing the devices to share common information, such as the same setpoint or temperature sensor value. *This type of binding is different from a binding on a Tracer UC800 Machine bus.*

C

configuration (Tracer UC800 controller)
Refers to the use of the Tracer TU service tool to select the chiller type, tonnage, and other options, of a Tracer UC800 controller. It also refers to adding the LCI-C as one of these options, which is necessary for the LCI-C LLID to be installed properly on the Tracer UC800.

F

flash download wizard (Rover)
A step-by-step process with Rover software to change (flash) the application software of the LCI-C.

I

IPC
Acronym for inter-processor communications.

L

LCI-C Extension software
Trane LCI-C software that implements network variables from both the LonMark Chiller Functional Profile and Trane Chiller Extension.

LCI-C Profile Only software

The initial release of Trane LCI-C software, which implements only the network variables described in the LonMark Chiller Functional Profile.

low-level intelligent device (LLID)
An electronic board that is configured and installed on the Tracer UC800 Machine bus in order to fulfill a function for the chiller controller. The LCI-C LLID allows the Tracer UC800 to communicate on a LonTalk network.

LonMark Chiller Functional profile

A standard list of network variables, mandatory and optional, that LonMark defines for chiller controller communications on a LonTalk network.

LonMark communications interface (LCI)
An interface developed by Trane to allow unit controllers to communicate using LonTalk protocol.

LonMark International
LonMark International is a global membership organization created to promote and advance the business of efficient and effective integration of open, multi-vendor control systems utilizing ANSI/EIA/CEA 709.1 (LonTalk) and related standards.

LonTalk network
A collection of LonTalk devices that communicate and interact with one another.

LonTalk Protocol
An interoperable protocol developed by the Echelon Corporation and named as a standard by the Electronics Industries Alliance (EIA-709.1). It is packaged on a Neuron processor that is on the LCI-C LLID.

M

Machine Bus/the binding process (formerly the IPC3 communication bus)

On a Tracer UC800 Machine bus, the bindings process is performed with the Tracer TU service tool. The process installs the LLIDs on the bus so that the LLIDs can communicate with the main processor and are able to function as intended.

main processor (Tracer UC800 controller)
The processor contained within the control panel of the chiller to control the chiller and coordinate communication of the LLIDs on the Machine bus. It stores the configuration of the UC800 and what LLIDs are expected to be on the Machine bus.

N

network variable input (nvi)

A controller's input data item that enables it to exchange data values with other devices on the LonTalk network. This type of data item can be changed and controlled.

network variable output (nvo)

A controller's output data item that enables it to exchange data values with other devices on the LonTalk network. This type of data item is for status only.

network variable type

A pre-defined structure for a network variable. A network variable type can be either a standard network variable type (SNVT) or a user-defined network variable type (UNVT).

Neuron ID

A unique 48-bit digital identifying number assigned by Echelon to every Neuron processor produced. This number is printed on a label that is attached to the LCI-C. Neuron IDs eliminate the need to set addresses with DIP switches.

P

Program ID

An identifier stored in the LCI-C Neuron processor that identifies the application program that is running. All controllers with the same Program ID have the same network variable list.

R

Rover service tool

A Trane software program used as a service tool to configure Trane LonTalk controllers, flash download application software, make LonTalk bindings between network variables, and otherwise install devices on a LonTalk network. Rover can also be described as a LonTalk network management tool.

S

SCPT

Acronym for standard configuration parameter type. A pre-defined structure for communicating configuration information.

SNVT

Acronym for standard network variable type. See *network variable type*.

applicationsystem integration

Generally, the ability for products designed independently to communicate with each other by using the same communications protocol. Specifically in relation to Trane products, the ability for them to monitor and/or control another vendor's equipment by using an open, standard protocol.

T

Tracer UC800 controller

Name of a Trane chiller controller. The Tracer UC800 does not indicate a particular kind of chiller.

Trane Chiller Extension

The network variables that Trane provides in addition to the network variables provided by the LonMark Chiller Functional Profile, 8040 Version 1. (Not all network variables in the Trane Chiller Extension are available for every chiller type.)

U

UCPT

Acronym for user-defined configuration parameter type. A pre-defined structure for communicating configuration information.

UNVT

Acronym for user-defined network variable type. See *network variable type*.

www.trane.com

For more information, contact your local Trane office or e-mail us at comfort@trane.com

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