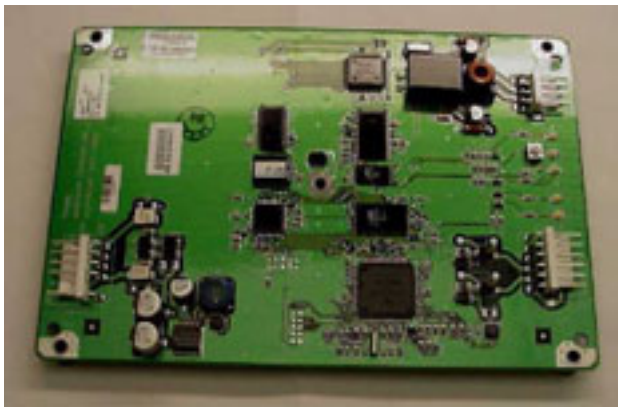
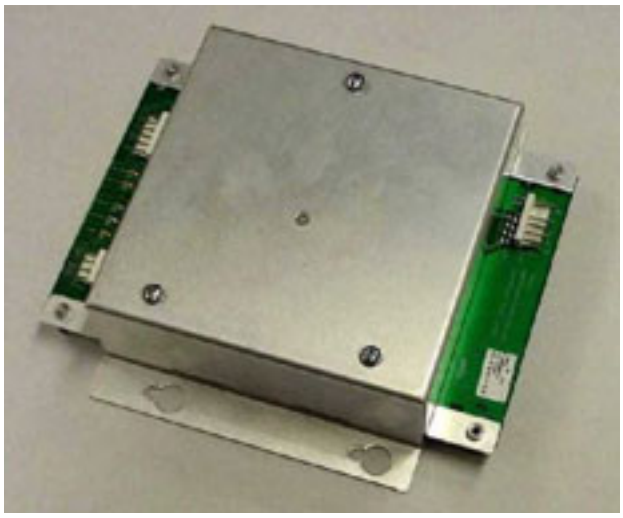
Hardware Installation Guide

LonTalk Communications Interface for CGAF, RTAA, RTWA and RTUA Chillers





March 2005 ACC-SVN32A-EN

NOTICE: Warnings and Cautions 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, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

CAUTION: Indicates a situation that may result in equipment or property-damage only accidents.

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Product Overview

How this guide can help you

This installation guide takes you through all the steps necessary to install and setup an LCI-C on a CGAF chiller or an RTAA/RTWA/RTUA. It covers both electronic circuit board/hardware installation and appropriate LCI-C software installation and set up.

Tracer Summit building automation systems

If you are connecting the LCI-C to a Tracer Summit™ system, you will not need the network variable information in the Appendixes. Appendix F, however, provides a list of additional resources that you may find useful.

Non-Trane building automation systems

If you are connecting the LCI-C to a non-Trane building automation system using LonTalk,™ Appendixes B through D will provide you with the system integration information you will need regarding network variables.

What does an LCI-C do?

An LCI-C (LonTalk Communications Interface for Chillers) provides a communication interface between a chiller 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

LonMark calls their standard list of variables for chiller control 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 Trane created that are over and above the ones 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 in Appendix D.

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 numbers are:

CGAF - KIT12178
RTAA/RTWA/RTUA - KIT12182

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 °C (-40 °F) and 158 °F (70 °C) and the relative humidity should be 0–95%, non-condensing.

Product Overview

Communications

The Tracer LCI-C controller communicates via Trane's LonTalk protocol. Typically, a communication link is applied between unit controllers and a building automation system. Communication also is possible via Rover service tool. Peer-to-peer communication across controllers is possible even when a building automation system is not present.

You do not need to observe polarity for LonTalk communication links.

The LonTalk communications protocol allows peer to peer communications between controllers, which allows controllers to share information or data. A communicated variable input such as setpoint, space temperature, or outdoor air temperature has priority over a locally wired input to the controller.

Example: if the LCI-C 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-C controller. If a communicated input value is lost, the LCI-C controller reverts to using the locally wired sensor input.

Device Addressing

LonTalk devices are given a unique address by the manufacturer. This address is called a Neuron ID. Each LCI-C controller can be identified by its unique Neuron ID, which is printed on a label on the controller (see figure 1). The Neuron ID is also displayed when communication is established using Tracer Summit or Rover service tool. The Neuron ID format is 00-01-64-1C-2B-00.

LonTalk Communication Link Wiring Requirements

The LonTalk communications link is for connection to a Building LonTalk Network.

The Communications link wiring is dependent on the network architecture. It is recommended that a System Integrator refer to "LonWorks FTT-10A Free Topology Transceiver User's Guide" by the Echelon Corporation for proper wire selection. The physical limits are defined in Chapter 4, Network Cabling and Connection. This User's Guide is available on the Echelon Web page. A typical wire recommendation is Belden 85102, single twisted pair, stranded 19/29, unshielded, 150 C.

For additional wiring information, see the Trane "LonTalk Wiring Installation guide" (BAS-SVN01A-EN.)

Hardware Installation Procedures

CGAF

Backward Compatibility

The LCI-C was designed to be backward compatible with existing Chiller controls on a functional level. All LCI-C features will work on older controller software.

The differences that will be seen on older CGM and HI software are confined to the HI display:

- In places where there are references to the network interface it will show TCI instead of LCI. Such as TCI Module Installed under the Configuration Menu. That will also refer to an LCI.
- In areas were it should refer to a general BAS/NETWORK it will indicate TRACER instead. We changed that with the advent of Lonmark since we may be connected to third party networks.
- Under the Controlling Setpoints Status Menu - Active Capacity Limit Setpoint; It will show 255% when the unit is in Remote network control and will use that value as capacity limit. This is supposed to be recognized as "Invalid", but will not affect unit operation since it will allow 100% of compressors. If the user sets the nviCapacityLim for a proper value from LCI it will use the value transmitted.

The LCI-C will work properly without the anomalies above with the following software versions which were released as part of the CG Enhancements project:

- CGM 4.02
- LHI/RHI 28.03

Refer to CG-SVP01B-EN, System Programming Setup to enable LCI-C control.

Hardware Installation Procedures

Hardware Installation

⚠ WARNING
Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

1. Disconnect all power from the Unit.
2. Using 3 #8-32 x 1/2 inch mounting screws from the kit, align the mounting holes in the mounting bracket up with the holes in the control panel mounting plate. Refer to Figure 1 and Figure 2 for proper orientation.

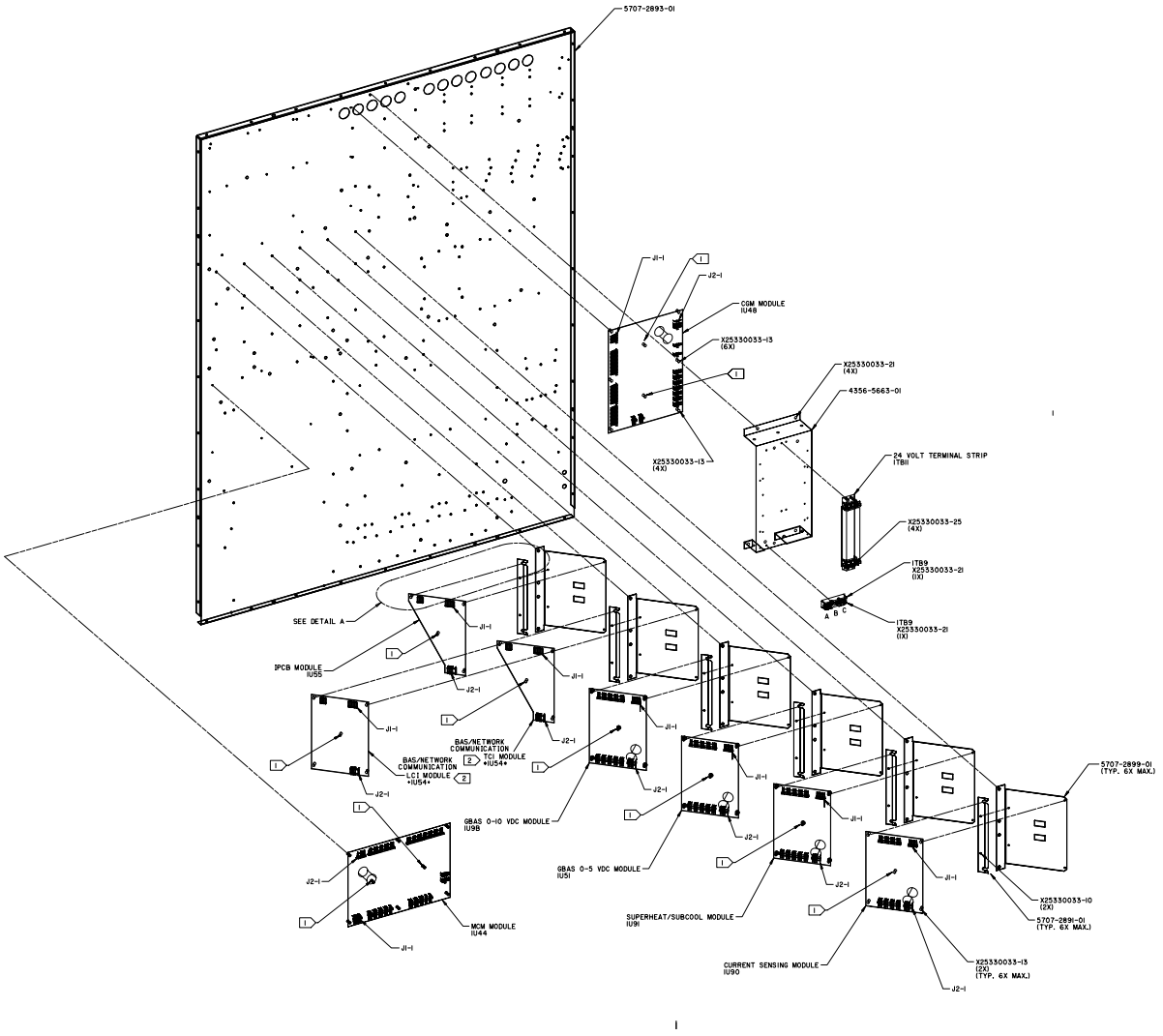

Figure 1 20-30 Ton CGAF Units

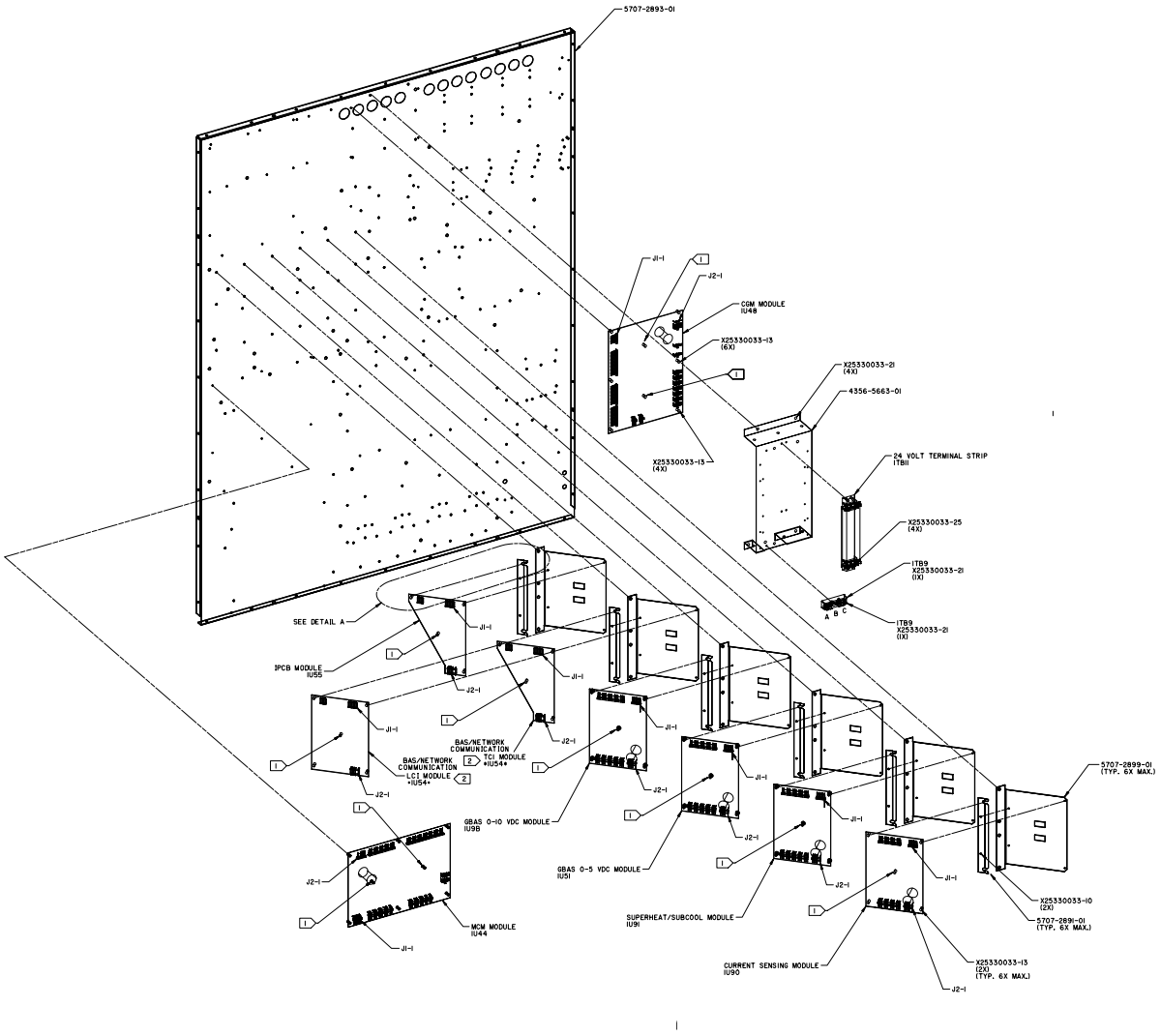

Figure 2 40-60 Ton CGAF Units

3. Using 2 #6-32 x 3/8 inch screws from the kit, install the module mounting clip for the TLCI Module as illustrated in Figure 3.

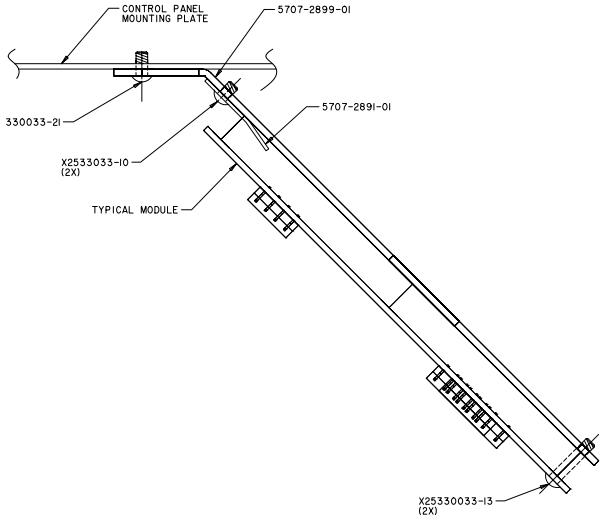

Figure 3 Detail of Module Mounting

4. Slide the left LCI Module mounting foot into the slotted holes on the mounting clip. Using 12 #6-32 x 3/4 inch screw from the kit, secure the module onto the mounting bracket as illustrated in Figure 3.

LCI Wiring Harness Installation

1. Remove all three (3) wire harnesses from the Kit.

J1 - IPC Plug - 406D and 407D
J2 - 24 VAC Plug - 403K and 436K
J3 - Comm Link Plug - 533A and 534A

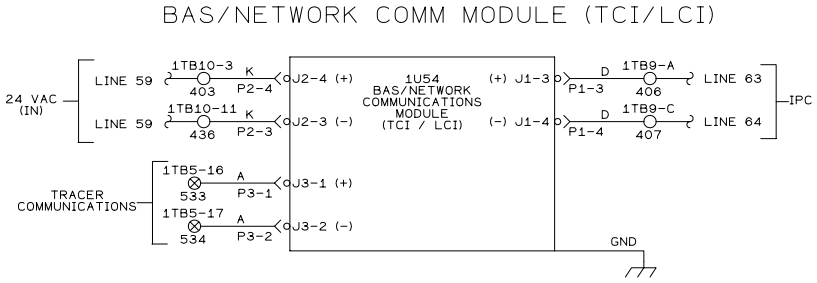

Figure 4 CGAF Wiring

2. Connect each plug to its appropriate receptacle on the LCI Module.
3. IPC Harness - Connect the 1/4" spade connector on wire 406D to 1TB9-A. Connect wire 407D to 1TB9-C.

4. 24 VAC Harness - Connect the 1/4" spade connector on wire 403K to 1TB10-3. Connect wire 436K to 1TB10-11.
5. Comm Link Harness - Connect the 1/4" spade connector on wire 533A to 1TB5-16. Connect wire 534A to 1TB5-17.
6. Secure the harness wires within the control panel to the existing wire bundles. Coil any excess wire and secure as well.
7. For the LCI external wiring connections, refer to the Field Connection Wiring Diagram inside the unit control panel.
8. This completes the LCI Module installation and wiring. Restore power to the unit.
9. Before operating the unit, the operating parameters must be re-programmed to include the LCI Module. Refer to the latest edition of the Trouble Shooting Guide for unit configuration and programming instructions.

RTAA/RTWA/RTUA

Backward Compatibility

The LCI-C was designed to be backward compatible with existing Chiller controls on a functional level. All LCI-C features will work on older controller software.

Hardware Installation

⚠ WARNING
Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

1. Install LCI-C bracket using the supplied screws either on top of the 1U2 module, if installed or on the back panel where the 1U2 would be located.

2. Install LCI-C module on the bracket.

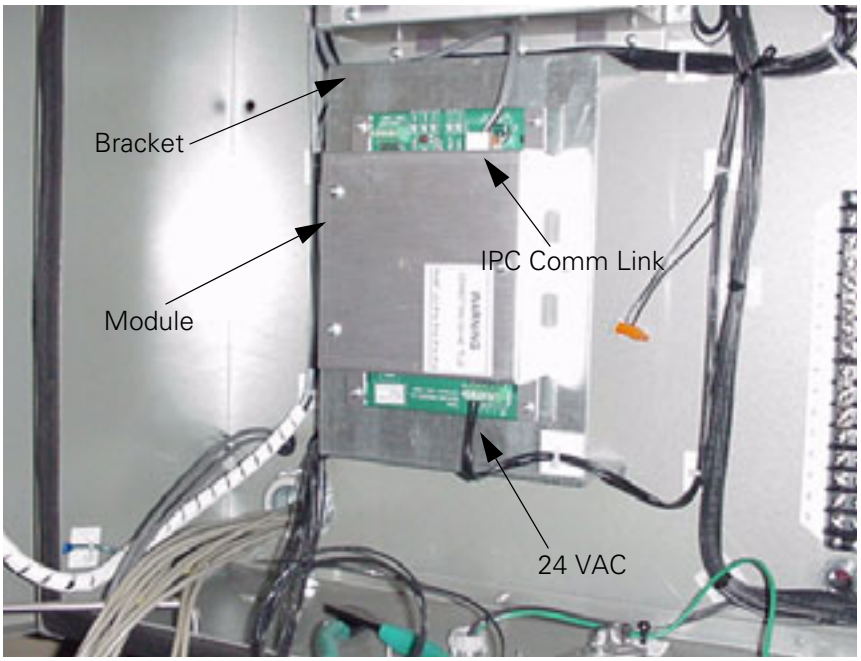

Figure 5 Module Installation

3. Connect 24VAC (wires 69B, 70B) from the 1T9 Transformer to the module power connection at J2-4(+) and J2-3(-) using the existing screw terminal.

   Do not connect 115V to this module. This will damage the module.

   Note: 18 awg wire and two spade connectors are field supplied.

4. Connect the IPC comm link to J1-3 and J1-4 using the existing MTA connector and wiring.

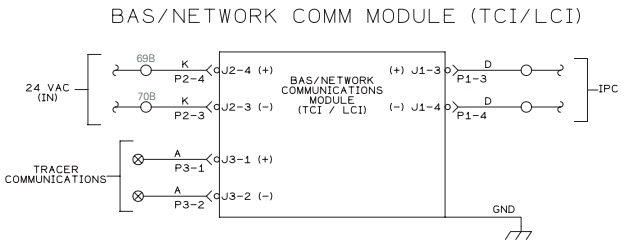

Figure 6 RTAA/RTWA/RTUA Wiring

5. Refer to the field wiring diagram for external wiring connections.

Hardware Installation Procedures

Appendix A

Glossary

Comm5	Trane's implementation of the LonTalk protocol.
IPC	Acronym for interprocessor communications.
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.
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.
LCI-C Extension software	Trane LCI-C software that implements network variables from both the LonMark Chiller Functional Profile and Trane Chiller Extension.
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.
LonTalk network	A collection of LonTalk devices that communicate and interact with one another.
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.
Neuron software	Software within the LCI-C Neuron processor that defines its program ID and network variables.
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.
Rover service tool	A Trane software program used as a service tool to configure Trane LonTalk controllers, flash download Neuron 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.
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.

Glossary

system 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.
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.)
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.

Appendix B

Network Variable Lists by Chiller Type

CGAF (Program ID 80002A-5028-0304-07) - Network Variables

Index	Network Variable	SNVT Type
0	nciLocation	SNVT_str_asc(36)
1	nciChillerEnable	SNVT_switch(95)
2	nciMinOutTm	SNVT_time_sec(107)
3	nciSndHrtBt	SNVT_time_sec(107)
4	nciCapacityLim	SNVT_lev_percent(81)
5	nciCoolSetpt	SNVT_temp_p(105)
6	nciMode	SNVT_hvac_mode(108)
7	nciDefaults	SNVT_switch(95)
8	nciRcvHrtBt	SCPTmaxRcvTime(48)
9	nciRefrigerant	UCPT_refrig_type
10	nciMfgLocation	UCPT_manufacturing_location
11	nciChillerType	UCPT_chiller_type
12	nciDevMajVer	SCPTdevMajVer(165)
13	nciDevMinVer	SCPTdevMinVer(166)
16	nviChillerEnable	SNVT_switch(95)
17	nviCoolSetpt	SNVT_temp_p(105)
18	nvoOnOff	SNVT_switch(95)
19	nvoActiveSetpt	SNVT_temp_p(105)
20	nviCapacityLim	SNVT_lev_percent(81)
21	nviMode	SNVT_hvac_mode(108)
22	nvoActualCap	SNVT_lev_percent(81)
23	nvoCapacityLim	SNVT_lev_percent(81)
24	nvoLvgChWTemp	SNVT_temp_p(105)
25	nvoEntChWTemp	SNVT_temp_p(105)
26	nvoAlarmDescr	SNVT_str_asc(36)
27	nvoChillerStat	SNVT_chlr_status(127)
28	nviRequest	SNVT_obj_request(92)
29	nvoStatus	SNVT_obj_status(93)
30	nviTraneVar2	UNVT
31	nvoTraneVar9	UNVT
32	nvoStatusOutputs	SNVT_state(83)
33	nvoCprsrsRunning	SNVT_state(83)
34	nvoCondFans	SNVT_state(83)
35	nvoEvapWtrPump	SNVT_switch(95)
36	nvoEvapWtrFlow	SNVT_switch(95)
37	nvoOutdoorTemp	SNVT_temp_p(105)
38	nvoUnitVoltage	UNVT_3phase_volt
39	nvoEvapRfgtPrsC1	SNVT_press_f(59)
40	nvoEvapRfgtPrsC2	SNVT_press_f(59)
41	nvoEvapRfgtTmpC1	SNVT_temp_p(105)
42	nvoEvapRfgtTmpC2	SNVT_temp_p(105)
43	nvoCondRfgtPrsC1	SNVT_press_f(59)
44	nvoCondRfgtPrsC2	SNVT_press_f(59)
45	nvoCondRfgtTmpC1	SNVT_temp_p(105)
46	nvoCondRfgtTmpC2	SNVT_temp_p(105)
47	nvoCurrentA	UNVT_3phase_current
48	nvoCurrentB	UNVT_3phase_current
49	nvoCurrentC	UNVT_3phase_current
50	nvoCurrentD	UNVT_3phase_current

Network Variable Lists by Chiller Type

RTAA, RTWA, RTUA (Program ID 80002A-5028-0304-08) - Network Variables

Index	Network Variable	SNVT Type
0	nciLocation	SNVT_str_asc(36)
1	nciChillerEnable	SNVT_switch(95)
2	nciMinOutTm	SNVT_time_sec(107)
3	nciSndHrtBt	SNVT_time_sec(107)
4	nciCapacityLim	SNVT_lev_percent(81)
5	nciCoolSetpt	SNVT_temp_p(105)
6	nciMode	SNVT_hvac_mode(108)
7	nciHeatSetpt	SNVT_temp_p(105)
8	nciDefaults	SNVT_switch(95)
9	nciRcvHrtBt	SCPTmaxRcvTime(48)
10	nciRefrigerant	UCPT_refrig_type
11	nciMfgLocation	UCPT_manufacturing_location
12	nciChillerType	UCPT_chiller_type
13	nciDevMajVer	SCPTdevMajVer(165)
14	nciDevMinVer	SCPTdevMinVer(166)
17	nviChillerEnable	SNVT_switch(95)
18	nviCoolSetpt	SNVT_temp_p(105)
19	nvoOnOff	SNVT_switch(95)
20	nvoActiveSetpt	SNVT_temp_p(105)
21	nviCapacityLim	SNVT_lev_percent(81)
22	nviMode	SNVT_hvac_mode(108)
23	nviHeatSetpt	SNVT_temp_p(105)
24	nvoActualCap	SNVT_lev_percent(81)
25	nvoCapacityLim	SNVT_lev_percent(81)
26	nvoLvgChWTemp	SNVT_temp_p(105)
27	nvoEntChWTemp	SNVT_temp_p(105)
28	nvoEntCndWTemp	SNVT_temp_p(105)
29	nvoLvgCndWTemp	SNVT_temp_p(105)
30	nvoAlarmDescr	SNVT_str_asc(36)
31	nvoChillerStat	SNVT_chlr_status(127)
32	nviRequest	SNVT_obj_request(92)
33	nvoStatus	SNVT_obj_status(93)
34	nviTraneVar2	UNVT
35	nvoTraneVar9	UNVT
36	nvoStatusOutputs	SNVT_state(83)
37	nvoCprsrsRunning	SNVT_state(83)
38	nvoCondFans	SNVT_state(83)
39	nvoEvapWtrPump	SNVT_switch(95)
40	nvoEvapWtrFlow	SNVT_switch(95)
41	nvoCondWtrPump	SNVT_switch(95)
42	nvoCondWtrFlow	SNVT_switch(95)
43	nvoOutdoorTemp	SNVT_temp_p(105)
44	nvoUnitVoltage	UNVT_3phase_volt
45	nvoEvapRfgtPrsC1	SNVT_press_f(59)
46	nvoEvapRfgtPrsC2	SNVT_press_f(59)
47	nvoEvapRfgtTmpC1	SNVT_temp_p(105)
48	nvoEvapRfgtTmpC2	SNVT_temp_p(105)
49	nvoCondRfgtPrsC1	SNVT_press_f(59)
50	nvoCondRfgtPrsC2	SNVT_press_f(59)
51	nvoCondRfgtTmpC1	SNVT_temp_p(105)
52	nvoCondRfgtTmpC2	SNVT_temp_p(105)
53	nvoAirFlowPctC1	SNVT_lev_percent(81)
54	nvoAirFlowPctC2	SNVT_lev_percent(81)
55	nvoOilTempA	SNVT_temp_p(105)
56	nvoOilTempB	SNVT_temp_p(105)
57	nvoOilTempC	SNVT_temp_p(105)
58	nvoOilTempD	SNVT_temp_p(105)
59	nvoCurrentA	UNVT_3phase_current
60	nvoCurrentB	UNVT_3phase_current
61	nvoCurrentC	UNVT_3phase_current
62	nvoCurrentD	UNVT_3phase_current
63	nvoStartsRunTmA	UNVT_starts_runtime
64	nvoStartsRunTmB	UNVT_starts_runtime
65	nvoStartsRunTmC	UNVT_starts_runtime
66	nvoStartsRunTmD	UNVT_starts_runtime

Appendix C

Network Variable Listed Alphabetically

Variable Name	SNVT	CGAF	RTAA RTWA RTAU
nciCapacityLim	SNVT_lev_percent(81)	X	X
nciChillerEnable	SNVT_switch(95)	X	X
nciChillerType	UCPT_chiller_type	X	X
nciCoolSetpt	SNVT_temp_p(105)	X	X
nciDefaults	SNVT_switch(95)	X	X
nciDevMajVer	SCPTdevMajVer(165)	X	X
nciDevMinVer	SCPTdevMinVer(166)	X	X
nciHeatSetpt	SNVT_temp_p(105)		X
nciLocation	SNVT_str_asc(36)	X	X
nciMfgLocation	UCPT_manufacturing_location	X	X
nciMinOutTm	SNVT_time_sec(107)	X	X
nciMode	SNVT_hvac_mode(108)	X	X
nciRcvHrtBt	SCPTmaxRcvTime(48)	X	X
nciRefrigerant	UCPT_refrig_type	X	X
nciSndHrtBt	SNVT_time_sec(107)	X	X
nviBaseLdgReq	SNVT_switch(95)		
nviBaseLdgSetpt	SNVT_lev_percent(81)		
nviCapacityLim	SNVT_lev_percent(81)	X	X
nviChillerEnable	SNVT_switch(95)	X	X
nviCoolSetpt	SNVT_temp_p(105)	X	X
nviHeatSetpt	SNVT_temp_p(105)		X
nviMode	SNVT_hvac_mode(108)	X	X
nviRequest.RQ_Clear_Alarm	SNVT_obj_request(92)	X	X
nvoActiveBLSetpt	SNVT_lev_percent(81)		
nvoActiveSetpt	SNVT_temp_p(105)	X	X
nvoActualCap	SNVT_lev_percent(81)	X	X
nvoAirFlowPctC1	SNVT_lev_percent(81)		X
nvoAirFlowPctC2	SNVT_lev_percent(81)		X
nvoAlarmDescr	SNVT_str_asc(36)	X	X
nvoCapacityLim	SNVT_lev_percent(81)	X	X
nvoChillerStat.chlr_op_mode	SNVT_chlr_status(127)	X	X
nvoChillerStat.chlr_run_mode	SNVT_chlr_status(127)	X	X
nvoChillerStat.chw_flow	SNVT_chlr_status(127)	X	X

Network Variable Listed Alphabetically

Variable Name	SNVT	CGAF	RTAA RTWA RTAU
nvoChillerStat.condw_flow	SNVT_chlr_status(127)		X
nvoChillerStat.in_alarm	SNVT_chlr_status(127)	X	X
nvoChillerStat.limited	SNVT_chlr_status(127)	X	X
nvoChillerStat.local	SNVT_chlr_status(127)	X	X
nvoChillerStat.run_enabled	SNVT_chlr_status(127)	X	X
nvoCondControl	SNVT_lev_percent(81)		
nvoCondFans	SNVT_state(83)	X	X
nvoCondRfgtPrsC1	SNVT_press_f(59)	X	X
nvoCondRfgtPrsC2	SNVT_press_f(59)	X	X
nvoCondRfgtTmpC1	SNVT_temp_p(105)	X	X
nvoCondRfgtTmpC2	SNVT_temp_p(105)	X	X
nvoCondWFlowRate	SNVT_flow(15)		
nvoCondWtrFlow	SNVT_switch(95)		X
nvoCondWtrPump	SNVT_switch(95)		X
nvoCprsrsRunning	SNVT_state(83)	X	X
nvoCurrentA	UNVT_3phase_current	X	X
nvoCurrentB	UNVT_3phase_current	X	X
nvoCurrentC	UNVT_3phase_current	X	X
nvoCurrentD	UNVT_3phase_current	X	X
nvoCurrentE	UNVT_3phase_current		
nvoCurrentF	UNVT_3phase_current		
nvoEntChWTemp	SNVT_temp_p(105)	X	X
nvoEntCndWTemp	SNVT_temp_p(105)		X
nvoEvapRfgtPrsC1	SNVT_press_f(59)	X	X
nvoEvapRfgtPrsC2	SNVT_press_f(59)	X	X
nvoEvapRfgtTmpC1	SNVT_temp_p(105)	X	X
nvoEvapRfgtTmpC2	SNVT_temp_p(105)	X	X
nvoEvapWFlowRate	SNVT_flow(15)		
nvoEvapWtrFlow	SNVT_switch(95)	X	X
nvoEvapWtrPump	SNVT_switch(95)	X	X
nvoHiSideOilPrsA	SNVT_press_f(59)		
nvoHiSideOilPrsB	SNVT_press_f(59)		
nvoHiSideOilPrsC	SNVT_press_f(59)		
nvoHiSideOilPrsD	SNVT_press_f(59)		

Network Variable Listed Alphabetically

Variable Name	SNVT	CGAF	RTAA RTWA RTAU
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)	X	X
nvoLvgCndWTemp	SNVT_temp_p(105)		X
nvoOilTempA	SNVT_temp_p(105)		X
nvoOilTempB	SNVT_temp_p(105)		X
nvoOilTempC	SNVT_temp_p(105)		X
nvoOilTempD	SNVT_temp_p(105)		X
nvoOilTempE	SNVT_temp_p(105)		
nvoOilTempF	SNVT_temp_p(105)		
nvoOnOff	SNVT_switch(95)	X	X
nvoOutdoorTemp	SNVT_temp_p(105)	X	X
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		X
nvoStartsRunTmB	UNVT_starts_runtime		X
nvoStartsRunTmC	UNVT_starts_runtime		X
nvoStartsRunTmD	UNVT_starts_runtime		X
nvoStartsRunTmE	UNVT_starts_runtime		
nvoStartsRunTmF	UNVT_starts_runtime		

Network Variable Listed Alphabetically

Variable Name	SNVT	CGAF	RTAA RTWA RTAU
nvoStatus.Invalid_Request	SNVT_obj_status(93)	X	X
nvoStatusOutputs	SNVT_state(83)	X	X
nvoUnitCurrent	UNVT_3phase_current		
nvoUnitPower	SNVT_power_f(57)		
nvoUnitVoltage	UNVT_3phase_volt	X	X
nvoVoltageA	UNVT_3phase_volt		
nvoVoltageB	UNVT_3phase_volt		
nvoVoltageC	UNVT_3phase_volt		
nvoVoltageD	UNVT_3phase_volt		
nvoVoltageE	UNVT_3phase_volt		
nvoVoltageF	UNVT_3phase_volt		

Appendix D

User-defined types

This appendix 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 definitionStructure definition

Field in structure	Byte	Bit definition	Description
SNVT_state	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

SUNVT_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)

User-defined types

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

User-defined types

Range of enumeration values

Enumeration	Definition	Description (reference: ARI guideline K)
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)
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, Chlorotetrafluoroethane, 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 types

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	0-2; 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
12–254	Unused
255	Invalid (unknown)

User-defined types

UCPT_manufacturing_location

Range of enumeration values

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

User-defined types

Appendix E Troubleshooting the LCI-C installation

Diagnostics

The following tables give a list of diagnostics and their explanation. The diagnostics (printed in italics) will appear on the Front Panel display.

CGAF

Table 1 gives a list of diagnostics and their explanation. The diagnostics will appear on the CLD (clear language display).

Table 1 CGAF Diagnostics

Symptom or Diagnostic	Probable Cause	Action
BAS Module Communications Failure	Valid IPC message not received within a specified time.	Check IPC communication wiring and configuration
BAS/NETWORK Communication Failure	Valid LonTalk message not received within a specified time.	Check LonTalk communication wiring and configuration If connecting to a device that does not "heartbeat" their variable, then change the nciRcvHrtBt to 0, which will disable this diagnostic
Chiller is not using setpoints sent by LonTalk	Chiller is in Local mode.	Check the Unit Control on the Human Interface. It must be set to BAS/ Network on the Human Interface 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.

Troubleshooting the LCI-C installation

RTAA/RTWA/RTUA

Table 2 gives a list of diagnostics and their explanation. The diagnostics will appear on the CLD (clear language display).

Table 2 RTAA/RTWA/RTUA Diagnostics

Symptom or Diagnostic	Probable Cause	Action
Tracer Communications Loss	Valid LonTalk message not received within a specified time	Check LonTalk communication wiring and configuration If connecting to a device that does not "heartbeat" their variable, then change the nciRcvHrtBt to 0, which will disable the diagnostic
Chiller is not using setpoints sent by LonTalk	Chiller is in Local mode.	Check the Setpoint Source on the Front panel. It must be set to Tracer on the Front panel 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.

Appendix F Additional resources

RF-SLB005-EN	LCI-C LonTalk Communications Interface for Chillers. An overview and points list of the LCI-C Extension for different chiller types.
BMTX-SVN01A-EN	Tracer Summit Version 16 Hardware and Software Installation guide.
BMTX-SVP01A-EN	Tracer Summit Version 16 System Programming guide.
RTAA-IOM-4A	Installation, Operation, and Maintenance for Series R Air Cooled Chillers
RTWA-IOM-1A	Installation, Operation, and Maintenance for Series R Water Cooled and Condensers Chillers
RTAA-SB-9	Control Operation, Setup and Troubleshooting the UCM Microprocessor for RTAA/RTWA/RTUA Series R Air Cooled Chillers with Clear Language Display.
CG-SVX02B-EN	IntelliPak Installation, Operation, and Maintenance Manuel
CG-SVP01B-EN	IntelliPak Programing and Troubleshooting Guide
Product Support Online	http://www.ComfortSite.com or http://psonline.comfortsite.com
	www.Lonmark.org
	For further assistance, contact your local Trane office.

Trane
A business of American Standard Companies
www.trane.com

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

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