

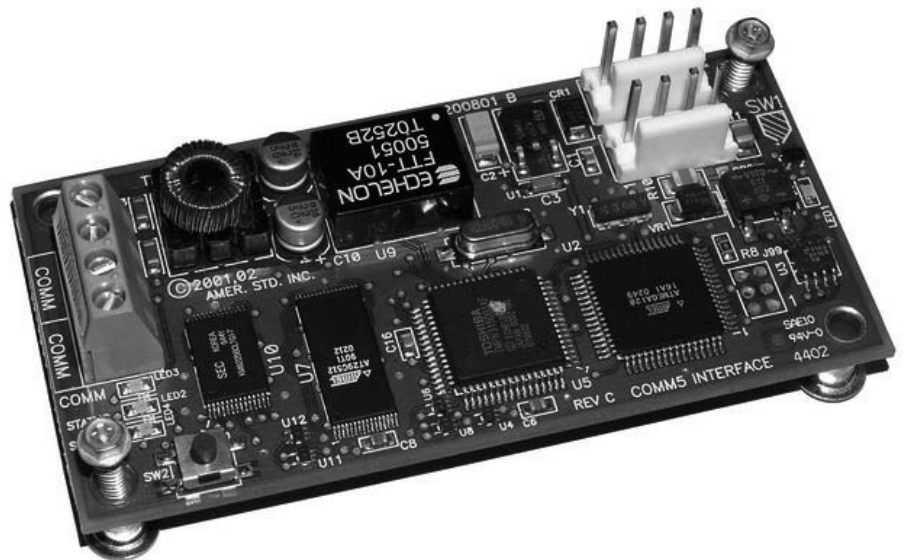


TRANE®

*Cooling and Heating
Systems and Services*

User Guide

LCI-C for Tracer™ CH530/531 chiller controllers



ACC-SVU01A-E4



NOTICE:

Warnings and Cautions appear at appropriate sections throughout this manual. 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 damage or property damage.

The following format and symbol conventions appear at appropriate sections throughout this manual:

IMPORTANT

Alerts installer, servicer, or operator to potential actions that could cause the product or system to operate improperly but will not likely result in potential for damage.

Note:

A note may be used to make the reader aware of useful information, to clarify a point, or to describe options or alternatives.

- u This symbol precedes a procedure that consists of only a single step.

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Product overview

How this guide can help you

This guide takes you through all the steps necessary to setup an LCI-C with a Tracer™ CH530/531 chiller controller.

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.

Non-Trane building automation systems

If you are connecting the LCI-C to a non-Trane building automation system using LonTalk,™ Appendixes A 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 Tracer CH530/531 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 Appendixes C and 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 number is MOD01216 (X13650845-02).

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.

Appendix A

Network variables lists for each chiller type

Table 1 through Table 12 list network variables for different chiller types.

Table 1. Network variables for CVH/CVG/CDH/CVR (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)

**Table 1. Network variables for CVH/CVG/CDH/CVR
(program ID 80002A-5028-0304-02) (continued)**

NV index	Network variable	SNVT type
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)
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 2. Configuration parameters for CVH/CVG/CDH/CVR
(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

**Table 3. Network variables for CGW, CCA, CCU, GGA, CXA, CGC
(program ID 80002A-5028-0304-03)**

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	nvoStatusOutputs	SNVT_state(83)
22	nvoCprsrRunning	SNVT_state(83)
23	nvoCondFans	SNVT_state(83)
24	nvoEvapWtrPump	SNVT_switch(95)
25	nvoEvapWtrFlow	SNVT_switch(95)
26	nvoCondWtrPump	SNVT_switch(95)
27	nvoCondWtrFlow	SNVT_switch(95)
28	nvoOutdoorTemp	SNVT_temp_p(105)
29	nvoUnitVoltage	UNVT_3phase_volt
30	nvoUnitCurrent	UNVT_3phase_current
31	nvoEvapRfgtPrsC1	SNVT_press_f(59)
32	nvoEvapRfgtPrsC2	SNVT_press_f(59)
33	nvoEvapRfgtTmpC1	SNVT_temp_p(105)
34	nvoEvapRfgtTmpC2	SNVT_temp_p(105)
35	nvoCondRfgtPrsC1	SNVT_press_f(59)
36	nvoCondRfgtPrsC2	SNVT_press_f(59)
37	nvoCondRfgtTmpC1	SNVT_temp_p(105)
38	nvoCondRfgtTmpC2	SNVT_temp_p(105)
39	nvoAirFlowPctC1	SNVT_lev_percent(81)

Table 3. Network variables for CGW, CCA, CCU, GGA, CXA, CGC (program ID 80002A-5028-0304-03) (continued)

NV index	Network variable	SNVT type
40	nvoAirFlowPctC2	SNVT_lev_percent(81)
41	nvoStartsRunTmA	UNVT_starts_runtime
42	nvoStartsRunTmB	UNVT_starts_runtime
43	nvoStartsRunTmC	UNVT_starts_runtime
44	nvoStartsRunTmD	UNVT_starts_runtime
45	nvoStartsRunTmE	UNVT_starts_runtime
46	nvoStartsRunTmF	UNVT_starts_runtime
47	nvoUnitPower	SNVT_power_f(57)

Table 4. Configuration parameters for CGW, CCA, CCU, GGA, CXA, CGC (program ID 80002A-5028-0304-03)

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	nciRefrigerant	UCPT_refrig_type	1
11	nciMfgLocation	UCPT_manufacturing_location	1
12	nciChillerType	UCPT_chiller_type	9
13	nciDevMajVer	SCPTdevMajVer(165)	1
14	nciDevMinVer	SCPTdevMinVer(166)	1

Table 5. Network variables for RTH (program ID 80002A-5028-0304-04)

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	nvoCprsrRunning	SNVT_state(83)
25	nvoEvapWtrPump	SNVT_switch(95)
26	nvoEvapWtrFlow	SNVT_switch(95)
27	nvoCondWtrPump	SNVT_switch(95)
28	nvoCondWtrFlow	SNVT_switch(95)
29	nvoActiveBLSetpt	SNVT_lev_percent(81)
30	nvoCondControl	SNVT_lev_percent(81)
31	nvoEvapRfgtPrsC1	SNVT_press_f(59)
32	nvoEvapRfgtTmpC1	SNVT_temp_p(105)
33	nvoCondRfgtPrsC1	SNVT_press_f(59)
34	nvoCondRfgtTmpC1	SNVT_temp_p(105)
35	nvoHiSideOilPrsA	SNVT_press_f(59)
36	nvoRfgtDischTmpA	SNVT_temp_p(105)
37	nvoVoltageA	UNVT_3phase_volt
38	nvoCurrentA	UNVT_3phase_current
39	nvoStartsRunTmA	UNVT_starts_runtime
40	nvoUnitPower	SNVT_power_f(57)

**Table 6. Configuration parameters for RTH
(program ID 80002A-5028-0304-04)**

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

**Table 7. Network variables for RTX
(program ID 80002A-5028-0304-05)**

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	nvoAlarmDescr	SNVT_str_asc(36)
13	nvoChillerStat	SNVT_chlr_status(127)
14	nviRequest	SNVT_obj_request(92)
15	nvoStatus	SNVT_obj_status(93)
16	nvoFileDirectory	SNVT_address(114)

**Table 7. Network variables for RTX
(program ID 80002A-5028-0304-05) (continued)**

Index	Network variable	SNVT type
17	nviTraneVar2	UNVT
18	nvoTraneVar9	UNVT
19	nviNoiseRdcnReq	SNVT_switch(95)
20	nvoStatusOutputs	SNVT_state(83)
21	nvoCprsrRunning	SNVT_state(83)
22	nvoEvapWtrPump	SNVT_switch(95)
23	nvoEvapWtrFlow	SNVT_switch(95)
24	nvoOutdoorTemp	SNVT_temp_p(105)
25	nvoEvapRfghtPrsC1	SNVT_press_f(59)
26	nvoEvapRfghtPrsC2	SNVT_press_f(59)
27	nvoEvapRfghtTmpC1	SNVT_temp_p(105)
28	nvoEvapRfghtTmpC2	SNVT_temp_p(105)
29	nvoCondRfghtPrsC1	SNVT_press_f(59)
30	nvoCondRfghtPrsC2	SNVT_press_f(59)
31	nvoCondRfghtTmpC1	SNVT_temp_p(105)
32	nvoCondRfghtTmpC2	SNVT_temp_p(105)
33	nvoHiSideOilPrsA	SNVT_press_f(59)
34	nvoHiSideOilPrsB	SNVT_press_f(59)
35	nvoHiSideOilPrsC	SNVT_press_f(59)
36	nvoHiSideOilPrsD	SNVT_press_f(59)
37	nvoOilTempA	SNVT_temp_p(105)
38	nvoOilTempB	SNVT_temp_p(105)
39	nvoOilTempC	SNVT_temp_p(105)
40	nvoOilTempD	SNVT_temp_p(105)
41	nvoVoltageA	UNVT_3phase_volt
42	nvoCurrentA	UNVT_3phase_current
43	nvoCurrentB	UNVT_3phase_current
44	nvoCurrentC	UNVT_3phase_current
45	nvoCurrentD	UNVT_3phase_current
46	nvoStartsRunTmA	UNVT_starts_runtime
47	nvoStartsRunTmB	UNVT_starts_runtime
48	nvoStartsRunTmC	UNVT_starts_runtime
49	nvoStartsRunTmD	UNVT_starts_runtime
50	nvoEvapRfghtPrsC3	SNVT_press_f(59)
51	nvoEvapRfghtPrsC4	SNVT_press_f(59)
52	nvoEvapRfghtTmpC3	SNVT_temp_p(105)
53	nvoEvapRfghtTmpC4	SNVT_temp_p(105)

**Table 7. Network variables for RTX
(program ID 80002A-5028-0304-05) (continued)**

Index	Network variable	SNVT type
54	nvoCondRfgtPrsC3	SNVT_press_f(59)
55	nvoCondRfgtPrsC4	SNVT_press_f(59)
56	nvoCondRfgtTmpC3	SNVT_temp_p(105)
57	nvoCondRfgtTmpC4	SNVT_temp_p(105)

**Table 8. Configuration parameters for RTX
(program ID 80002A-5028-0304-05)**

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	nciRefrigerant	UCPT_refrig_type	1
11	ncifgLocation	UCPT_manufacturing_location	1
12	nciChillerType	UCPT_chiller_type	9
13	nciNoiseRdcnReq	SCPTdevMajVer(165)	2
14	nciDevMajVer	SCPTdevMinVer(166)	1
15	nciDevMinVer	SNVT_time_sec(107)	1

**Table 9. Network variables for RTA
(program ID 80002A-5028-0304-06)**

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	nvoActualCap	SNVT_str_asc(36)

**Table 9. Network variables for RTA
(program ID 80002A-5028-0304-06) (continued)**

NV index	Network variable	SNVT type
8	nvoCapacityLim	SNVT_switch(95)
9	nvoLvgChWTemp	SNVT_temp_p(105)
10	nvoEntChWTemp	SNVT_temp_p(105)
11	nvoAlarmDescr	SNVT_str_asc(36)
12	nvoChillerStat	SNVT_shlr_status(127)
13	nviRequest	SNVT_obj_request(92)
14	nvoStatus	SNVT_obj_status(93)
15	nvoFileDirectory	SNVT_address(114)
16	nviTraneVar2	UNVT
17	nvoTraneVar9	UNVT
18	nvoStatusOutputs	SNVT_state(83)
19	nvoCprsrsRunning	SNVT_state(83)
20	nvoEvapWtrPump	SNVT_switch(95)
21	nvoEvapWtrFlow	SNVT_switch(95)
22	nvoOutdoorTemp	SNVT_temp_p(105)
23	nvoEvapRfgtPrsC1	SNVT_press_f(59)
24	nvoEvapRfgtPrsC2	SNVT_press_f(59)
25	nvoEvapRfgtTmpC1	SNVT_temp_p(105)
26	nvoEvapRfgtTmpC2	SNVT_temp_p(105)
27	nvoCondRfgtPrsC1	SNVT_press_f(59)
28	nvoCondRfgtPrsC2	SNVT_press_f(59)
29	nvoCondRfgtTmpC1	SNVT_temp_p(105)
30	nvoCondRfgtTmpC2	SNVT_temp_p(105)
31	nvoAirFlowPctC1	SNVT_lev_percent(81)
32	nvoAirFlowPctC2	SNVT_lev_percent(81)
33	nvoHiSideOilPrsA	SNVT_press_f(59)
34	nvoHiSideOilPrsB	SNVT_press_f(59)
35	nvoHiSideOilPrsC	SNVT_press_f(59)
36	nvoHiSideOilPrsD	SNVT_press_f(59)
37	nvoOilTempA	SNVT_temp_p(105)
38	nvoOilTempB	SNVT_temp_p(105)
39	nvoOilTempC	SNVT_temp_p(105)
40	nvoOilTempD	SNVT_temp_p(105)
41	nvoVoltageA	SNVT_3phase_volt
42	nvoCurrentA	SNVT_3phase_current
43	nvoCurrentB	SNVT_3phase_current
44	nvoCurrentC	SNVT_3phase_current

**Table 9. Network variables for RTA
(program ID 80002A-5028-0304-06) (continued)**

NV index	Network variable	SNVT type
45	nvoCurrentD	SNVT_3phase_current
46	nvoStartsRunTmA	UNVT_starts_runtime
47	nvoStartsRunTmB	UNVT_starts_runtime
48	nvoStartsRunTmC	UNVT_starts_runtime
49	nvoStartsRunTmD	UNVT_starts_runtime

**Table 10. Configuration parameters for RTA
(program ID 80002A-5028-0304-06)**

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	nciDefaults	SNVT_temp_p(105)	2
8	nciRcvHrtBt	SCPTmaxRcvTime(48)	2
9	nciRefrigerant	UCPT_refrig_type	1
10	nciMfgLocation	UCPT_manufacturing_location	1
11	nciChillerType	UCPT_chiller_type	9
12	nciDevMajVer	SCPTdevMajVer(165)	1
13	nciDevMinVer	SCPTdevMinVer(166)	1

**Table 11. Network variables for LCI-C Profile Only
(program ID 80002A-5028-0304-01)**

NV index	Network variable	SNVT type
0	nviChillerEnable	SNVT_switch(95)
1	nviCoolSetpt	SNVT_temp_p(105)
2	nvoOnOff	SNVT_switch(95)
3	nvoActiveSetpt	SNVT_temp_p(105)
4	nviCapacityLim	SNVT_lev_percent(81)
5	nviMode	SNVT_hvac_mode(108)
6	nviHeatSetpt	SNVT_temp_p(105)
7	nvoActualCap	SNVT_lev_percent(81)
8	nvoCapacityLim	SNVT_lev_percent(81)

**Table 11. Network variables for LCI-C Profile Only
(program ID 80002A-5028-0304-01) (continued)**

NV index	Network variable	SNVT type
9	nvoLvgChWTemp	SNVT_temp_p(105)
10	nvoEntChWTemp	SNVT_temp_p(105)
11	nvoEntCndWTemp	SNVT_temp_p(105)
12	nvoLvgCndWTemp	SNVT_temp_p(105)
13	nvoAlarmDescr	SNVT_str_asc(36)
14	nvoChillerStat	SNVT_chlr_status(127)
15	nviRequest	SNVT_obj_request(92)
16	nvoStatus	SNVT_obj_status(93)
17	nvoFileDirectory	SNVT_address(114)
18	nviTraneVar2	UNVT
19	nvoTraneVar9	UNVT

**Table 12. Configuration parameters for LCI-C Profile Only
(program ID 80002A-5028-0304-01)**

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	nciLocation	SNVT_str_asc(36)	31
8	nciHeatSetpt	SNVT_temp_p(105)	2
9	nciDefaults	SNVT_switch(95)	2
10	nciRcvHrtBt	SCPTmaxRcvTime(48)	2

Appendix B

Network variables listed alphabetically

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

Note:

Not all variables are available for every chiller. For example, the variables nvoSecCndEntWTmp and nvoSecCndLvgWTmp apply only to the CVH model.

Table 1. Network variables for the LCI-C Extension, listed alphabetically

Variable name	SNVT	CVH/CVG/ CVR/CDH Tracer CH530/531	CGW/ CCA/CGA/ CCU/CXA/ CGC Tracer CH530	RTH Tracer CH530	RTAC Tracer CH530	RTXA+ Tracer CH530
nviBaseLdgReq	SNVT_switch(95)	x				
nviBaseLdgSetpt	SNVT_lev_percent(81)	x				
nviCapacityLim	SNVT_lev_percent(81)	x	x	x	x	x
nviChillerEnable	SNVT_switch(95)	x	x	x	x	x
nviCoolSetpt	SNVT_temp_p(105)	x	x	x	x	x
nviHeatSetpt	SNVT_temp_p(105)	x	x	x		x
nviMode	SNVT_hvac_mode(108)	x	x	x	x	x
nviNoiseRdcnReq	SNVT_switch(95)					x
nviRequest.RQ_Clear_Alarm	SNVT_obj_request(92)	x	x	x	x	x
nvoActiveBLSetpt	SNVT_lev_percent(81)	x	x	x		
nvoActiveSetpt	SNVT_temp_p(105)	x	x	x	x	x
nvoActualCap	SNVT_lev_percent(81)	x	x	x	x	x
nvoAirFlowPctC1	SNVT_lev_percent(81)		x		x	
nvoAirFlowPctC2	SNVT_lev_percent(81)		x		x	
nvoAlarmDescr	SNVT_str_asc(36)	x	x	x	x	x
nvoCapacityLim	SNVT_lev_percent(81)	x	x	x	x	x
nvoChillerStat.chlr_op_mode	SNVT_chlr_status(127)	x	x	x	x	x
nvoChillerStat.chlr_run_mode	SNVT_chlr_status(127)	x	x	x	x	x
nvoChillerStat.chw_flow	SNVT_chlr_status(127)	x	x	x	x	x

Table 1. Network variables for the LCI-C Extension, listed alphabetically (continued)

Variable name	SNVT	CVH/CVG/ CVR/CDH Tracer CH530/531	CGW/ CCA/CGA/ CCU/CXA/ CGC Tracer CH530	RTH Tracer CH530	RTAC Tracer CH530	RTXA+ Tracer CH530
nvoChillerStat.condw_flow	SNVT_chlr_status(127)	x	x	x		
nvoChillerStat.in_alarm	SNVT_chlr_status(127)	x	x	x	x	x
nvoChillerStat.limited	SNVT_chlr_status(127)	x	x	x	x	x
nvoChillerStat.local	SNVT_chlr_status(127)	x	x	x	x	x
nvoChillerStat.run_enabled	SNVT_chlr_status(127)	x	x	x	x	x
nvoCondControl	SNVT_lev_percent(81)			x		
nvoCondFans	SNVT_state(83)		x			
nvoCondRfghtPrsC1	SNVT_press_f(59)	x	x	x	x	x
nvoCondRfghtPrsC2	SNVT_press_f(59)	x	x		x	x
nvoCondRfghtPrsC3	SNVT_temp_f(105)					x
nvoCondRfghtPrsC4	SNVT_temp_f(105)					x
nvoCondRfghtTmpC1	SNVT_temp_p(105)	x	x	x	x	x
nvoCondRfghtTmpC2	SNVT_temp_p(105)	x	x		x	x
nvoCondRfghtTmpC3	SNVT_temp_p(105)					x
nvoCondRfghtTmpC4	SNVT_temp_p(105)					x
nvoCondWFlowRate	SNVT_flow(15)	x				
nvoCondWtrFlow	SNVT_switch(95)	x	x	x		
nvoCondWtrPump	SNVT_switch(95)	x	x	x		
nvoCprsrRunning	SNVT_state(83)	x	x	x	x	x
nvoCurrentA	UNVT_3phase_current	x		x	x	x
nvoCurrentB	UNVT_3phase_current				x	x
nvoCurrentC	UNVT_3phase_current				x	x
nvoCurrentD	UNVT_3phase_current	x			x	x
nvoCurrentE	UNVT_3phase_current					
nvoCurrentF	UNVT_3phase_current					
nvoEntChWTemp	SNVT_temp_p(105)	x	x	x	x	x
nvoEntCndWTemp	SNVT_temp_p(105)	x	x	x		
nvoEvapRfghtPrsC1	SNVT_press_f(59)	x	x	x	x	x
nvoEvapRfghtPrsC2	SNVT_press_f(59)	x	x		x	x
nvoEvapRfghtPrsC3	SNVT_press_f(59)					x
nvoEvapRfghtPrsC4	SNVT_press_f(59)					x
nvoEvapRfghtTmpC1	SNVT_temp_p(105)	x	x	x	x	x
nvoEvapRfghtTmpC2	SNVT_temp_p(105)	x	x		x	x
nvoEvapRfghtTmpC3	SNVT_temp_p(105)					x
nvoEvapRfghtTmpC4	SNVT_temp_p(105)					x

Table 1. Network variables for the LCI-C Extension, listed alphabetically (continued)

Variable name	SNVT	CVH/CVG/ CVR/CDH Tracer CH530/531	CGW/ CCA/CGA/ CCU/CXA/ CGC Tracer CH530	RTH Tracer CH530	RTAC Tracer CH530	RTXA+ Tracer CH530
nvoEvapWFlowRate	SNVT_flow(15)	x				
nvoEvapWtrFlow	SNVT_switch(95)	x	x	x	x	x
nvoEvapWtrPump	SNVT_switch(95)	x	x	x	x	x
nvoHiSideOilPrsA	SNVT_press_f(59)	x		x	x	x
nvoHiSideOilPrsB	SNVT_press_f(59)				x	x
nvoHiSideOilPrsC	SNVT_press_f(59)				x	x
nvoHiSideOilPrsD	SNVT_press_f(59)	x			x	x
nvoHiSideOilPrsE	SNVT_press_f(59)					
nvoHiSideOilPrsF	SNVT_press_f(59)					
nvoLoSideOilPrsA	SNVT_press_f(59)	x				
nvoLoSideOilPrsB	SNVT_press_f(59)					
nvoLoSideOilPrsC	SNVT_press_f(59)					
nvoLoSideOilPrsD	SNVT_press_f(59)	x				
nvoLoSideOilPrsE	SNVT_press_f(59)					
nvoLoSideOilPrsF	SNVT_press_f(59)					
nvoLvgChWTemp	SNVT_temp_p(105)	x	x	x	x	x
nvoLvgCndWTemp	SNVT_temp_p(105)	x	x	x		
nvoOilTempA	SNVT_temp_p(105)	x			x	x
nvoOilTempB	SNVT_temp_p(105)				x	x
nvoOilTempC	SNVT_temp_p(105)				x	x
nvoOilTempD	SNVT_temp_p(105)	x			x	x
nvoOilTempE	SNVT_temp_p(105)					
nvoOilTempF	SNVT_temp_p(105)					
nvoOnOff	SNVT_switch(95)	x	x		x	
nvoOutdoorTemp	SNVT_temp_p(105)		x		x	x
nvoPurgeInfoC1	UNVT_purge_information	x				x
nvoPurgeInfoC2	UNVT_purge_information	x				
nvoRfgtDischTmpA	SNVT_temp_p(105)	x		x		
nvoRfgtDischTmpB	SNVT_temp_p(105)					
nvoRfgtDischTmpC	SNVT_temp_p(105)					
nvoRfgtDischTmpD	SNVT_temp_p(105)	x				
nvoRfgtDischTmpE	SNVT_temp_p(105)					
nvoRfgtDischTmpF	SNVT_temp_p(105)					
nvoSecCndEntWTmp	SNVT_temp_p(105)	x				
nvoSecCndLvgWTmp	SNVT_temp_p(105)	x				

Table 1. Network variables for the LCI-C Extension, listed alphabetically (continued)

Variable name	SNVT	CVH/CVG/ CVR/CDH Tracer CH530/531	CGW/ CCA/CGA/ CCU/CXA/ CGC Tracer CH530	RTH Tracer CH530	RTAC Tracer CH530	RTXA+ Tracer CH530
nvoStartsRunTmA	UNVT_starts_runtime	x	x	x	x	x
nvoStartsRunTmB	UNVT_starts_runtime		x		x	x
nvoStartsRunTmC	UNVT_starts_runtime		x		x	x
nvoStartsRunTmD	UNVT_starts_runtime	x	x		x	x
nvoStartsRunTmE	UNVT_starts_runtime		x			
nvoStartsRunTmF	UNVT_starts_runtime		x			
nvoStatus.Invalid_Request	SNVT_obj_status(93)	x		x	x	x
nvoStatusOutputs	SNVT_state(83)	x	x	x	x	x
nvoUnitCurrent	UNVT_3phase_current					
nvoUnitPower	SNVT_power_f(57)	x		x		
nvoUnitVoltage	UNVT_3phase_volt					
nvoVoltageA	UNVT_3phase_volt	x		x	x	x
nvoVoltageB	UNVT_3phase_volt					
nvoVoltageC	UNVT_3phase_volt					
nvoVoltageD	UNVT_3phase_volt	x				
nvoVoltageE	UNVT_3phase_volt					
nvoVoltageF	UNVT_3phase_volt					

Appendix C

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 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

Range of enumeration values (continued)

Enumeration	Definition	Description (reference: ARI guideline K)
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)
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)

Range of enumeration values (continued)

Enumeration	Definition	Description (reference: ARI guideline K)
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

Enumeration definitions for UCPT_chiller_type (continued)

Enumeration	Enumeration definition (Trane chiller model designators)
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)

Appendix D

Network variable and configuration property definitions

This appendix includes

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

Note:

Not all variables are available for every chiller. For a listing of variables for each chiller type, see Appendix A or B.

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 nciBaseLdgSetpt
- 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 Tracer CH530/531 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

Object request (continued)

Enumeration definition	Description	Controller interpretation
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 Tracer CH530/531 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%

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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 nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn"

- 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 *ns*, 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%

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%

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_PRESHUTDOWN		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		
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.

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)

nvoCondRfghtPrsC1

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

nvoCondRfghtPrsC2

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.

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

nvoCprsrRunning

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.	

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

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

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.

Notes: Any bits within SNVT_obj_status that are defined by the LonMark profile but are not listed above, are not used by the Tracer CH530/531 and have no effect 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)

Structure definition

Field in structure	Description
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 Tracer CH530/531 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 Tracer CH530/531 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 Tracer CH530/531 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 Tracer CH530/531 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 Tracer CH530/531. It is a read-only configuration property that cannot be modified over Lon-Talk communications.

Structure definition

Item	Length	Range
Model information	1 byte	Range of enum values in UCPT_chiller_type (see Appendix C).
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 Tracer CH530/531 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 Tracer CH530/531 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 Tracer CH530/531. 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` (see Appendix C)

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 Tracer CH530/531 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 Tracer CH530/531 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 Tracer CH530/531. It is a read-only configuration property that cannot be modified over Lon-Talk 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)

Appendix E

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 DynaView or TechView.

Table 1. 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 DynaView (front panel). It must be BAS/Ext/FP on the DynaView in order for the chiller to use remote setpoints. Check that the network variable nvoChiller-Stat.local has a value of 0, which means Remote. A value of 1 means Local.
<i>LCI-C Software Mismatch: Use BAS Tool</i>	Neuron software does not match chiller type.	Flash download correct Neuron software.
<i>Comm Loss: Local BAS Interface</i>	IPC3 communication was lost between the Tracer CH530/531 main processor and the LCI-C.	Check wire connection between the LCI-C and the IPC3 bus. Start TechView. Go to Binding View and make sure the LCI-C is still bound. Replace the LCI-C hardware.
<i>Waiting for BAS Communication</i>	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 <i>BAS Failed to Establish Communication</i> . ^a	If you have a non-Trane BAS system, upgrade from the LCI-C Profile Only to the LCI-C Extension. If you have a Trane BAS system, check to make sure that the BAS system is setup to communicate with LCI-C. Otherwise, simply wait until communication is established or <i>BAS Failed to Establish Communication</i> appears.

Table 1. Troubleshooting the LCI-C installation (continued)

Symptom or Diagnostic	Probable Cause	Action
<i>BAS Failed to Establish Communication</i>	No heartbeated network variable inputs have been received within the specified time after startup. ^a	If you have a non-Trane BAS system, upgrade from the LCI-C Profile Only to the LCI-C Extension. If you have a Trane BAS system, check: • LonTalk communication line wiring • That BAS is still trying to communicate with LCI-C
<i>BAS Communication Lost</i>	Valid LonTalk message not received within a specified time. ^a	If you have a non-Trane BAS system, upgrade from the LCI-C Profile Only to the LCI-C Extension. If you have a Trane BAS system, check: • LonTalk communication line wiring • That BAS is still trying to communicate with LCI-C

^a This diagnostic can appear only if:

- The LCI-C contains LCI-C Profile Only software, and/or
- The LCI-C is connected to a Trane Tracer Summit System regardless of the software contained in the LCI-C

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 Profile Only has the receive heartbeat functionality enabled as a default (nciRcvHrtBt = 900 seconds).

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 better 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.



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