

CALEC® ST II

LON TP/FT-10



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1 General information

Content

This operating manual describes the design and function of the LON-TP/FT-10 option card of the CALEC® ST II energy meter. The technical description of the complete CALEC® ST II is given in CALEC® ST II technical information.

REFERENCE!



Main operating manual!

The main operating manual and additional documents can be found on the following website: <http://www.aquametro.ch/qr/prod/calec-st/11111.html>



References – Associated documents

- [1] The LONMARK® SNVT and SCPT Master List Version 12.11 / 2005 / EN 14908-5
- [2] The LONMARK® Appl. Layer Interoperability Guidelines Version 3.4 / 2005 / EN14908-6
- [3] TP/FT-10 Free-Topology Transceiver User's Guide Version 6 ISO/IEC 14908-2
- [4] NeuronC Programmer 078-0002-01H
- [5] LONWORKS® Installationshandbuch, LONWORKS-Praxis für Elektrotechniker, 2. Auflage, VDE Verlag GmbH 2004, ISBN 3-8007-2822-2
- [6] Current papers: <http://www.echelon.com/> und <http://www.lonmark.org/>

Terminology

LON® stands for 'Local Operating Network'.

LONWORKS® signifies Local Operating Network Technology and denotes a communications concept. **LONWORKS®** represents a class of networks in automation technology, which allows the intelligence in large systems to be shared among decentralized components.

LONWORK® is a standardizing organization that ensures that the application programs of various manufacturers are compatible with one another.

Neuron® chip is the basic hardware with **LONTALK®** as the communication protocol and various transceivers (TP/FT-10, LPT-10, PLT-22) used for linking to the transmitting device. **NodeBuilder®** and **LonMaker™** are used as development and integration tools.

Registered trademarks

Echelon®, LON®, LONWORKS®, LonMaker™, NodeBuilder®, LonTalk®, LonUsers®, Neuron® FT5000 LONMARK® and the Echelon logo are trademarks of the Echelon Corporation, registered in the USA and other countries. These and other trademarks are used in the text but not indicated as such for reasons of legibility.

Certification according to LONMARK®

CALEC® ST II with the LON TP/FT-10 card is certified according to LONMARK® 3.4

CALEC® ST II is registered with the LONMARK® Interoperability Association under:

Product name:	Standard Program ID:	Date:
CALEC® ST II Volume	80 00 A8 15 0A 04 04 12	20.03.2012
CALEC® ST II BDE	80 00 A8 15 0A 04 04 14	20.03.2012
CALEC® ST II Masse	80 00 A8 15 0A 04 04 13	20.03.2012
CALEC® ST II Flow	80 00 A8 15 0A 04 04 15	20.03.2012

2 Hardware

The communication interface

Aquametro AG uses a predefined communication interface with twisted pair (2-wire) cabling of LonWorks® Technology based on the TP/FT-10 free topology transceiver.

Transmission and network specifications	
Transmission speed	78 kbits per second
Number of nodes per segment ²⁾	64 max.
Network cabling	22 ..16AWG twisted pair ³⁾
Length of network with free topology ¹⁾ (termination at one end)	Max. 1000 m with one repeater Max. 500 m without repeaters Max. 500 m from node to node
Length of network in double-ended termination of bus topology ¹⁾	5400 m with one repeater 2700 m without repeaters
Maximum open length of open branching in double-ended termination of bus topology	3 m
Network termination	One terminator in free topology Two terminators in bus topology (see User's Guide Echelon) ³⁾

1) The length of the network depends on the type of cabling used

2) Segments (channels) are separated from one another by routers or gateways.

3) The cabling of the LON network complies with the specifications given in the LonWorks® TP/FT-10 Free Topology Transceiver User's Guide, section "Network Cabling". <http://www.echelon.com/support/documentation/manuals/>

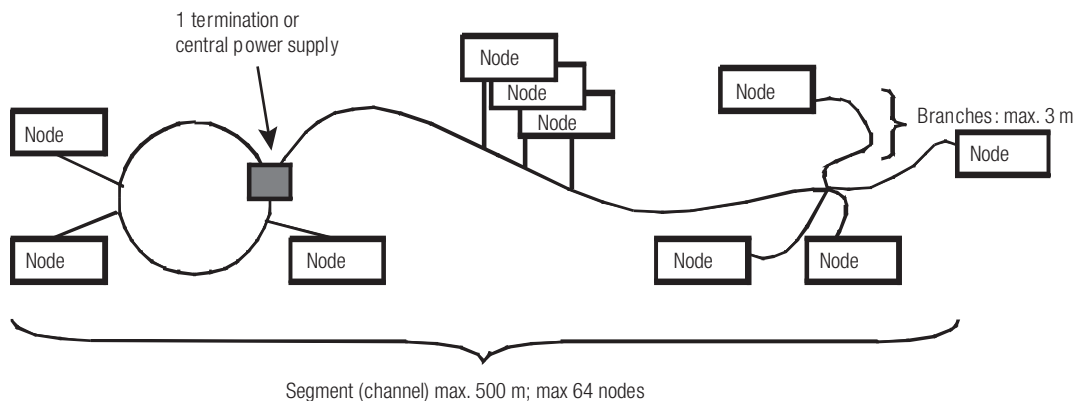
Further information for cabling is available from LonMark®, Switzerland: Module 5 of the system integration course by Mike Andrä, BKS Kabel Service AG. (www.lonmark.ch)

The LON TP/FT-10 free topology transceiver

The TP/FT-10 free topology transceiver enables bus cabling with just one terminating resistor. In general, a ring- or star-shaped cabling or any combination of these is possible.

The TP/FT-10 transceiver requires its own power supply (from an external source), but is compatible with the LPT-10 transceiver. Both can work together with a twisted pair channel. The free topology transceiver is isolated from the power supply of the LPT-10 in the bus by coupling capacitors (DC) and transmitters (AC).

The freely selectable method of cabling and the compatibility between TP/FT-10 and LPT-10 are the reasons why free topology transceivers are used so widely in building automation technology.

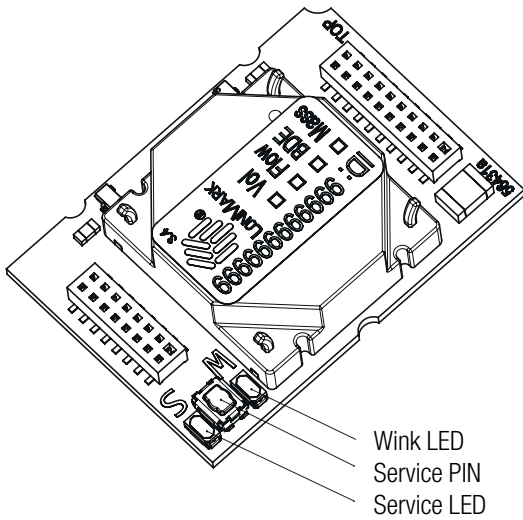


3 Functions and operating

Reset, Start-up and Service

A reset of both controllers is triggered by, e.g. a low voltage. The actual status of the control of the Neuron and the reason for the last reset can be read and checked with suitable LON network tools using established check routines (e.g. LonMaker™).

The service LED



A 'service LED' is mounted on the card. The status of the system can be identified using the following flashing codes:

Service-PIN and Neuron_ID

<p>A: 'Normal Operation'</p>	<p>When first switching on, the LED lights up briefly (<1 sec.) and then goes out. The Neuron is thus configured and working correctly.</p>
<p>B: 'Fatal Error'</p>	<p>The LED remains lit. The Neuron cannot run and indicates a hardware problem.</p>
<p>C: 'Applicationless'</p>	<p>The LED first indicates a correct status, but then after approx. 3 seconds remains lit: The Neuron can operate but, however, has found an application that is not compatible with the hardware.</p>
<p>D: 'Unconfigured'</p>	<p>The LED of an unconfigured node flashes at approximately 1 Hz: The hardware is operating correctly but the firmware must, however, be restarted and the node configured, i.e. a logical address must be assigned to it.</p>
<p>E: 'Watchdoging'</p>	<p>The LED flashes quickly at a rate of approx. 720 ms and the Watchdog responds. This indicates that there is a hardware conflict in the IO component.</p>

When the service PIN is pressed, the node sends out a special network telegram containing its unique Neuron ID (48-bit / 12-character identification number) and its Program ID (device- / node designation). This identification number (Neuron ID) you will find on the label in the unit as a number and bar code (Code 39). This is required for configuration, commissioning and maintenance work. Additionally a separate label is supplied to be placed on the wiring diagram.

Commands and parameters

The internal cyclical functions (communication to counter, self-monitoring, etc.) as well as the following commands are available to the network user:

The blink task

LONWORKS® technology has a 'blink' command to identify a node whose address is known. When this is activated, the particular node reacts either optically or acoustically. CALEC® ST II supports the "blink" network command by reacting as follows:

- The alarm LED flashes for approx. 3 seconds.
- The Wink LED (located near the service LED) flashes twelve times at three times a second.

This blinking can be used as a tool in service procedures to help identify nodes.

The status request

The following status prompts about the input variable 'nviRequest' are supported in 'Node object #0'.

RQ_NORMAL RQ_UPDATE_STATUS RQ_UPDATE_ALARM	These requests generate a current report on the device status from the LON node and calculator: These can be internal communication problems between LON nodes and the calculator or application-based errors or alarms such as exceeding measuring range limits and overflows. These apply only to node-based requests so that all replies for objects #0..6 ('objekt_id') are identical.
RQ_CLEAR_STATUS RQ_CLEAR_ALARM	Stored flags such as ' feedback_failure' and 'electrical_fault' are deleted. The information is again generated if the fault remains.
RQ_REPORT_MASK - invalid_id: - invalid_request: - out_of_limits: - electrical_fault: - unable_to_measure: - report_mask: - feedback_failure: - comm_failure:	All flags supported by the above requests are shown. These are: - the flag indicates that a request of the selected object is not supported. - the request is not supported. - a user alarm or overflow is present. - an electrical fault / error is present. - the meter is not running. - active flags correspond to the possible mask. - the setting of an input variable is not adopted. - internal communication is faulty.

General remarks on settings

All parameters listed here are processed and stored in the calculator and not on the network card. The task triggered by network communication thus causes the calculator to be programmed.

A delay of around 20 seconds can be expected until the changes to input network variables (nvi...) affect the output network variables (nvo...).

Network input variables

The following input variables are available for setting a node:

- nviSetTime This is used for setting of the date and time of the heat meter.
- nviSetTimeMem1 This is used for setting the date (preset date, Memory 1).

The freeze command

If 'Bit 0' of variables: 'nviDoFrz' in 'Utility Data Logger Register': "Freeze Memory" is set to '1', then CALEC® ST II immediately freezes the readings of all meter datas:

If the 'freeze' command is used via the network, the date and all active readings of the meters are immediately stored in the counter. The values thus frozen can now be read over the given network valuables of the "Freeze Memory" object. (A delay of up to 6 seconds has to be taken into account.)

Freeze data are not available via the counter display.

Relay remote commands

If the switches 'S1', 'S2' are available on the base print of the CALEC ST II are set to "OUT", then two relay outputs are available. If the function programming of the relay ("OUTPUTS" / "FCT") is set to "M-Bus", then these can be switched on or off via remote commands:

NviSetRelais1	Bit 0 of SNVT variables controls the status of relay 1 (OL Actuator Object): "Relay 1"
NviSetRelais2	Bit 0 of SNVT variables controls the status of relay 2 (OL Actuator Object): "Relay 2"

Network variables

With LONWORKS® networks, nodes communicate their measured values and parameters using Standard Network Variables (SNVs) to other network nodes of the same network. If they are changed by node-specific firmware, the operating system of Neuron automatically adopts the communication of the new value via the network. Which of the communication connections of the system are carried out is determined in "binding" (no further details are available here).

CALEC® ST II only uses variables with Standard Network Variable types (SNVT Master list Version: 10.00), to ensure binding without problems.

The network variables are subdivided into logical groups. These groups are designated objects. In CALEC® ST II are 'Node Object #0' "Node Information", which provides more detailed information about all the nodes using the heat meter-specific profile 'Utility Data Logger Register #2110' "Current Values" for the current meter status; "Memory 1" for the memory 1 values and "Freeze Memory" for the frozen meter readings. In addition 'Open-Loop Sensor Object #1' "Instant Values" provides information on the actual values (temperatures, power, flowrate and density), and the 'Open-Loop Actuator Object #3' "Relay 1" and "Relay 2" for control of the relays.

Memory values

The CALEC® ST II as LONWORKS® does not make available as network variables all those memory data sets stored in the counter.

Along with the current data, a total of two memory data sets are available. These are:

- The preset day values for Memory 1 in profile: 'Utility Data Logger Register #2110': "Memory 1"
- The freeze data (frozen values) in profile: 'Utility Data Logger Register #2110': "Freeze Data".

No. / Obj.	NV-Variable	Data Unit	SNVT Obj.	Range of values	Designation	Vol.	Mass	BDE	Flow
Node Object #0: "Node Information"									
1 / 0	nviRequest	Structur / -	SNVT_obj_request		Status prompt	X	X	X	X
2 / 0	nvoStatus	Structur / -	SNVT_obj_status		Status message	X	X	X	X
3 / 0	nviSetTime	Structur / -	SNVT_time_stamp	0..3000 J. / 0..59 Min.	Set date / time	X	X	X	X
8 / 0	nvoFileDirectory	Structur / -	SNVT_address			X	X	X	X
12 / 0	nvoOpTime	float / [Sec.]	SNVT_time_f	0..1E38 Sec.	Operating time counter	X	X	X	X
13 / 0	nvoErrTime	float / [Sec.]	SNVT_time_f	0..1E38 Sec.	Time-off counter	X	X	X	X
14 / 0	nvoSerialNo	ASCII / -	SNVT_str_asc	"00000000..99999999"	Serial number	X	X		X
15 / 0	nvoManufDate	Structur / -	SNVT_time_stamp	0..3000 J. / 0..59 Min.	Manufacturing date	X	X	X	X
16 / 0	nvoTime	Structur / -	SNVT_time_stamp	0..3000 J. / 0..59 Min.	Date / time	X	X	X	X
17 / 0	nvoDevice	ASCII / -	SNVT_str_asc	"Calec ST"	Device tag	X	X		X
18 / 0	nvoComment	ASCII / -	SNVT_str_asc	"Aquametro AG..."	Customer text field	X	X	X	X
	ncoDevice	ASCII / -	UCPT_str_asc	"Calec ST"	Device tag				X
	ncoSerialNo	ASCII / -	UCPT_str_asc	"00000000..99999999"	Serial number				X
	ncoHWVersions	ASCII / -	UCPT_HWVersions	"HW 99.99.99.99"	Hardware Version	X	X	X	X
	ncoFWVers_Calc	ASCII / -	UCPT_FWVers_Calc	"FW 1.01.00"	Firmware Version Calc.	X	X	X	X
	ncoFWVers_Appl	ASCII / -	UCPT_FWVers_Appl	"FW 1.00.00"	Firmware Version Neuron	X	X	X	X
	ncoFWVers_Host	ASCII / -	UCPT_FWVers_Host	"FW 1.00.00"	Firmware Version Host	X	X	X	X
Utility Data Logger Register #2110: "Current Values"									
1 / 1	nvoRegEn	Structur	SNVT_reg_val_ts	99999999, unit, time...	Energy register channel #1	x	x		
1 / 1	nvoRegEnPos	Structur	SNVT_reg_val_ts	99999999, unit, time...	Energy pos. reg. channel #1				x
1 / 1	nvoRegH1	Structur	SNVT_reg_val_ts	99999999, unit, time...	Submeter reg. channel #1				x
8 / 1	nvoRegTime	Structur / -	SNVT_time_stamp	0..3000 J. / 0..59 Min.	Date / Time	x	x	x	x
11 / 1	nvoEn	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Energy value channel #1	x	x		
11 / 1	nvoEnPos	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Energy pos. reg. channel #1				x
12 / 1	nvoRegVol	Structur	SNVT_reg_val_ts	99999999, unit, time...	Volume register channel #1	x			
12 / 1	nvoRegVolPos	Structur	SNVT_reg_val_ts	99999999, unit, time...	V-positiv register channel #1	x			
13 / 1	nvoVol	float / [L]	SNVT_vol_f	0..1E38 L	Volume meter channel #1	x			
13 / 1	nvoVolPos	float / [L]	SNVT_vol_f	0..1E38 L	V-pos. Value channel #1				x
14 / 1	nvoRegEnNeg	Structur	SNVT_reg_val_ts	99999999, unit, time...	Energy neg. reg. channel #1				x
15 / 1	nvoEnNeg	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Energy neg. Value channel #1				x
16 / 1	nvoRegVolNeg	Structur	SNVT_reg_val_ts	99999999, unit, time...	Volume register channel #1				x
17 / 1	nvoVolNeg	float / [L]	SNVT_val_f	0..1E38 L	Volume neg. value channel #1				x
18 / 1	nvoRegMass	Structur/ *)	SNVT_reg_val_ts	99999999, [, Unit, time... 'NONE' = [t]	Mass register channel #1				x
19 / 1	nvoMass	float / [g]	SNVT_mass_f	0..1E38 g	Mass calue channel #1				x
20 / 1	nvoH1	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Submeter #1				x
21 / 1	nvoRegH2	Structur/ *)	SNVT_reg_val_ts	99999999, unit, time...	Submeter reg. channel #2	x	x	x	x
22 / 1	nvoH2	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Submeter #2	x	x	x	x
23 / 1	nvoRegH3	Structur/ *)	SNVT_reg_val_ts	99999999, unit, time...	Submeter reg. channel #3	x	x	x	x
24 / 1	nvoH3	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Submeter #3	x	x	x	x

No. / Obj.	NV-Variable	Data Unit	SNVT Obj.	Range of values	Designation	Vol.	Mass	BDE	Flow
Open Loop Sensor Object #1: "Instant Values"									
1 / 2	nvoPower	float / [W]	SNVT_power_f	0..1E38 W	Power	x	x	x	x
5 / 2	nvoTh	Int / [0.01°C]	SNVT_temp_p	-60.00..+185.00 °C	Flow temperature	x	x		
6 / 2	nvoThf	float / [°C]	SNVT_temp_f	+/-999 °C	Flow temperature float	x	x	x	
7 / 2	nvoTc	Int / [0.01°C]	SNVT_temp_p	-60.00..+185.00 °C	Return temperature	x	x		
8 / 2	nvoTcf	float / [°C]	SNVT_temp_f	+/-999 °C	Return temperature float	x	x	x	
9 / 2	nvodT	Int / [0.01°C]	SNVT_temp_p	+/-185.00 °C	Temperature difference	x	x		
10 / 2	nvodTf	float / [°C]	SNVT_temp_f	+/-999 °C	Temperature difference float	x	x	x	
11 / 2	nvoVFlow	float / [L/Sec]	SNVT_flow_f	0..1E38 L/Sec	Volume flowrate	x		x	x
12 / 2	nvoMFlow	float / [Kg/Sec]	SNVT_count_f	0..1E38 Counts in Kg / Sec	Mass flowrate		x		x
13 / 2	nvoDensity	float / [Kg / m³]	SNVT_density_f	0..1E38 Kg/m³	Density	x	x	x	
Utility Data Logger Register #2110: "Stich-Memory 1"									
1 / 3	nvoRegEnMem1	Structur	SNVT_reg_val_ts	99999999, unit, time...	Memory1 energy register #1	x	x		
1 / 3	nvoRegEnPosMem1	Structur	SNVT_reg_val_ts	99999999, unit, time...	Energy pos. reg. channel #1				x
1 / 3	nvoRegH1Mem1	Structur	SNVT_reg_val_ts	99999999, unit, time...	Submeter reg. channel #1				x
3 / 3	nviSetTimeMem1	Structur / -	SNVT_time_stamp	0..3000 J. / 0..59 Min.	Set Memory1 date / time	x	x	x	x
8 / 3	nvoRegTimeMem1	Structur / -	SNVT_time_stamp	0..3000 J. / 0..59 Min.	Memory1 date / time	x	x	x	x
11 / 3	nvoEnMem1	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Memory1 energy value #1	x	x		
11 / 3	nvoEnPosMem1	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Memory1 energy pos. value #1				x
12 / 3	nvoRegVolMem1	Structur	SNVT_reg_val_ts	99999999, unit, time...	Memory1 volume register #1	x			
12 / 3	nvoRegVolPosMem1	Structur	SNVT_reg_val_ts	99999999, unit, time...	Memory1 volume pos. reg. #1				x
13 / 3	nvoVolMem1	float / [L]	SNVT_vol_f	0..1E38 L	Memory1 volume value #1	x			
13 / 3	nvoVolPosMem1	float / [L]	SNVT_vol_f	0..1E38 L	Memory1 volume pos. value #1				x
14 / 3	nvoRegEnNegMem1	Structur	SNVT_reg_val_ts	99999999, unit, time...	Memory1 volume neg. reg. #1				x
15 / 3	nvoEnNegMem1	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Memory1 energy neg. value #1				x
16 / 3	nvoRegVolNegMem1	Structur	SNVT_reg_val_ts	99999999, unit, time...	Memory1 vol. neg. reg. #1				x
17 / 3	nvoVolNegMem1	float / [L]	SNVT_vol_f	0..1E38 L	Memory1 vol. neg. value #1				x
18 / 3	nvoRegMassMem1	Structur / *)	SNVT_reg_val_ts	99999999, [,], unit, time 'NONE' = [t]	Memory1 mass reg. #1		x		
19 / 3	nvoMassMem1	float / [g]	SNVT_mass_f	0..1E38 g	Memory1 mass meter #1		x		
20 / 3	nvoH1Mem1	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Memory1 submeter #1				x
21 / 3	nvoRegH2Mem1	Structur / *)	SNVT_reg_val_ts	99999999, unit, time...	Memory1 submeter reg. #2	x	x	x	x
22 / 3	nvoH2Mem1	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Memory1 submeter #2	x	x	x	x
23 / 3	nvoRegH3Mem1	Structur / *)	SNVT_reg_val_ts	99999999, unit, time...	Memory1 submeter reg. #3	x	x	x	x
24 / 3	nvoH3Mem1	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Memory1 submeter #3	x	x	x	x

No. / Obj.	NV-Variable	Data Unit	SNVT Obj.	Range of values	Designation	Vol.	Mass	BDE	Flow
Utility Data Logger Register #2110: "Freeze-Memory"									
1 / 4	nvoRegEnFrz	Structur	SNVT_reg_val_ts	99999999, unit, time...	Freeze energy register	x	x		
1 / 4	nvoRegEnPosFrz	Structur	SNVT_reg_val_ts	99999999, unit, time...	Freeze energy pos.register			x	
1 / 4	nvoRegH1Frz	Structur	SNVT_reg_val_ts	99999999, unit, time...	Submeter register #1				x
8 / 4	nvoRegTimeFrz	Structur / -	SNVT_time_stamp	0..3000 J. / 0..59 Min.	Freeze date / time	x	x	x	x
10 / 4	nviDoFrz	Structur / -	SNVT_state	Bit 0: "1": Freeze	Freeze command	x	x	x	x
11 / 4	nvoEnFrz	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Freeze energy value #1	x	x		
11 / 4	nvoEnPosFrz	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Freeze energy pos. value #1				x
12 / 4	nvoRegVolFrz	Structur	SNVT_reg_val_ts	99999999, unit, time...	Freeze volume reg. #1	x			
12 / 4	nvoRegVolPosFrz	Structur	SNVT_reg_val_ts	99999999, unit, time...	Freeze volume pos. Reg. #1				x
13 / 4	nvoVolFrz	float / [L]	SNVT_vol_f	0..1E38 L	Freeze volume value #1	x			
13 / 4	nvoVolPosFrz	float / [L]	SNVT_vol_f	0..1E38 L	Freeze volume pos. value #1				x
14 / 4	nvoRegEnNegFrz	Structur	SNVT_reg_val_ts	99999999, unit, time...	Freeze energy neg. register				x
15 / 4	nvoEnNegFrz	float / [Wh]	SNVT_elec_whr_f	0..1E38 Wh	Freeze energy neg. value #1				x
16 / 4	nvoRegVolNegFrz	Structur	SNVT_reg_val_ts	99999999, unit, time...	Freeze volume neg. reg. #1				x
17 / 4	nvoVolNegFrz	float / [L]	SNVT_vol_f	0..1E38 L	Freeze volume neg. value #1				x
18 / 4	nvoRegMassFrz	Structur / *)	SNVT_reg_val_ts	99999999, [,], time... unit 'NONE' = [t]	Freeze mass reg. #1			x	
19 / 4	nvoMassFrz	float / [g]	SNVT_mass_f	0..1E38 g	Freeze mass value #1		x		
20 / 4	nvoH1Frz	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Freeze submeter #1				x
21 / 4	nvoRegH2Frz	Structur / *)	SNVT_reg_val_ts	99999999, unit, time...	Freeze submeter reg. #2	x	x	x	x
22 / 4	nvoH2Frz	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Freeze submeter #2	x	x	x	x
23 / 4	nvoRegH3Frz	Structur / *)	SNVT_reg_val_ts	99999999, unit, time...	Freeze submeter reg. #3	x	x	x	x
24 / 4	nvoH3Frz	float / **) [Wh],[L],[g]	SNVT_count_f	0..1E38 Counts in Wh or L or g	Freeze submeter #3	x	x	x	x
Open Loop Actuator Object #3: "Relais 1"									
1 / 5	nviSetRelais1	Structur / -	SNVT_state	Bit 0: "1" Relais activ	Set relay 1	x	x	x	x
Open Loop Actuator Object #3: "Relais 2"									
1 / 6	nviSetRelais2	Structur / -	SNVT_state	Bit 0: "1" Relais activ	Set relay 2	x	x	x	x

*) The data type: 'SNVT_reg_val_ts' contains no unit for mass. When using as a mass register 'dimensionless' equals [t].

**) The submeter as a float variable is transmitted as 'SNVT_count_f' and is dimensionless. The counter values are also transmitted for:

- medium energy in watt-hours [Wh]
- medium volume in liters [l]
- medium mass in gram [g]
- medium without unit.

Device protection on LON side

For verification purposes, the CALEC® ST II has 4 levels of protection and which have a mechanical seal. The LonTalk protocol, however, has no such similar protection. Editing of verification parameters via the LON network was therefore dispensed with.

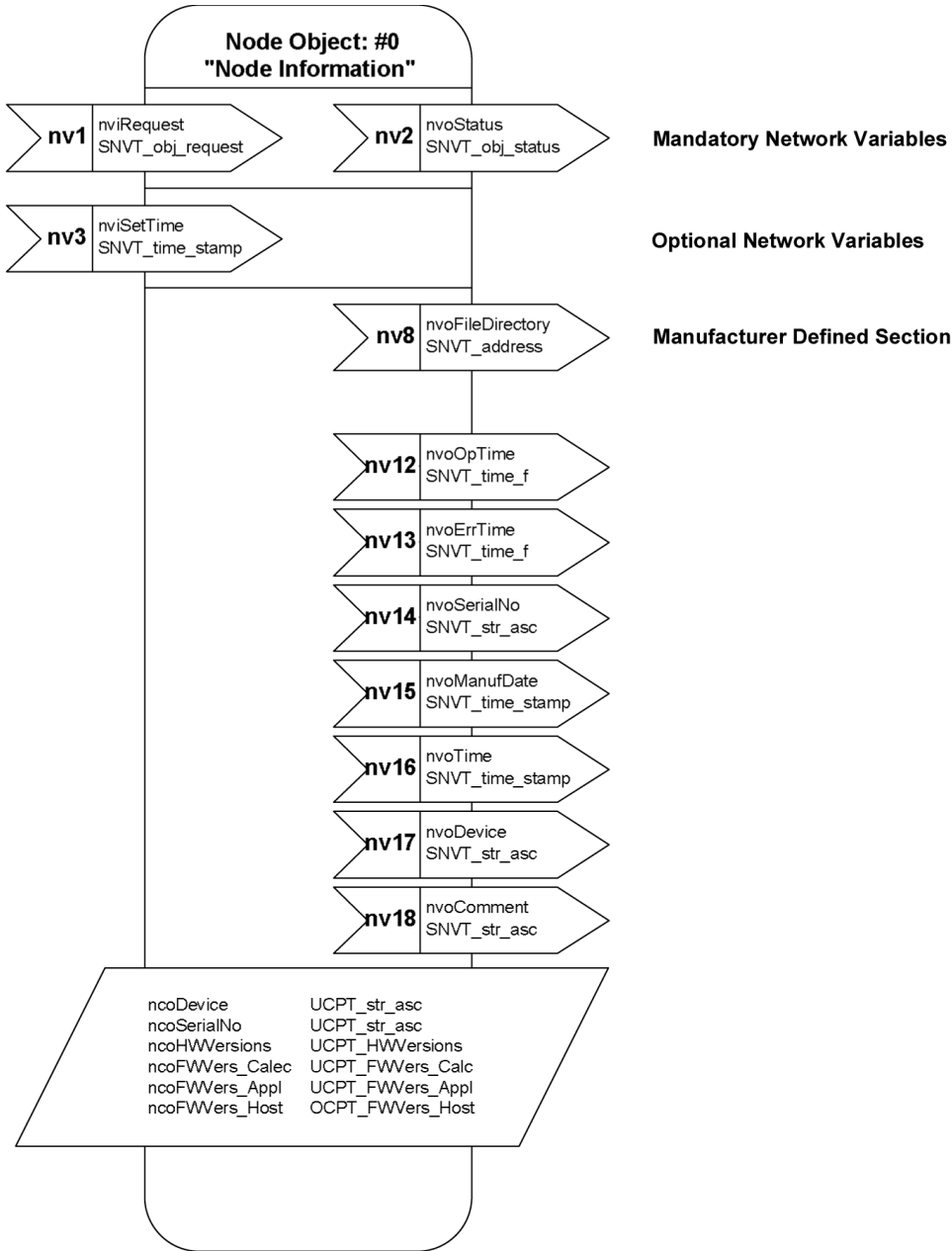
Configuration of the LON interface is carried out using the LonTalk protocol.

Firmware update

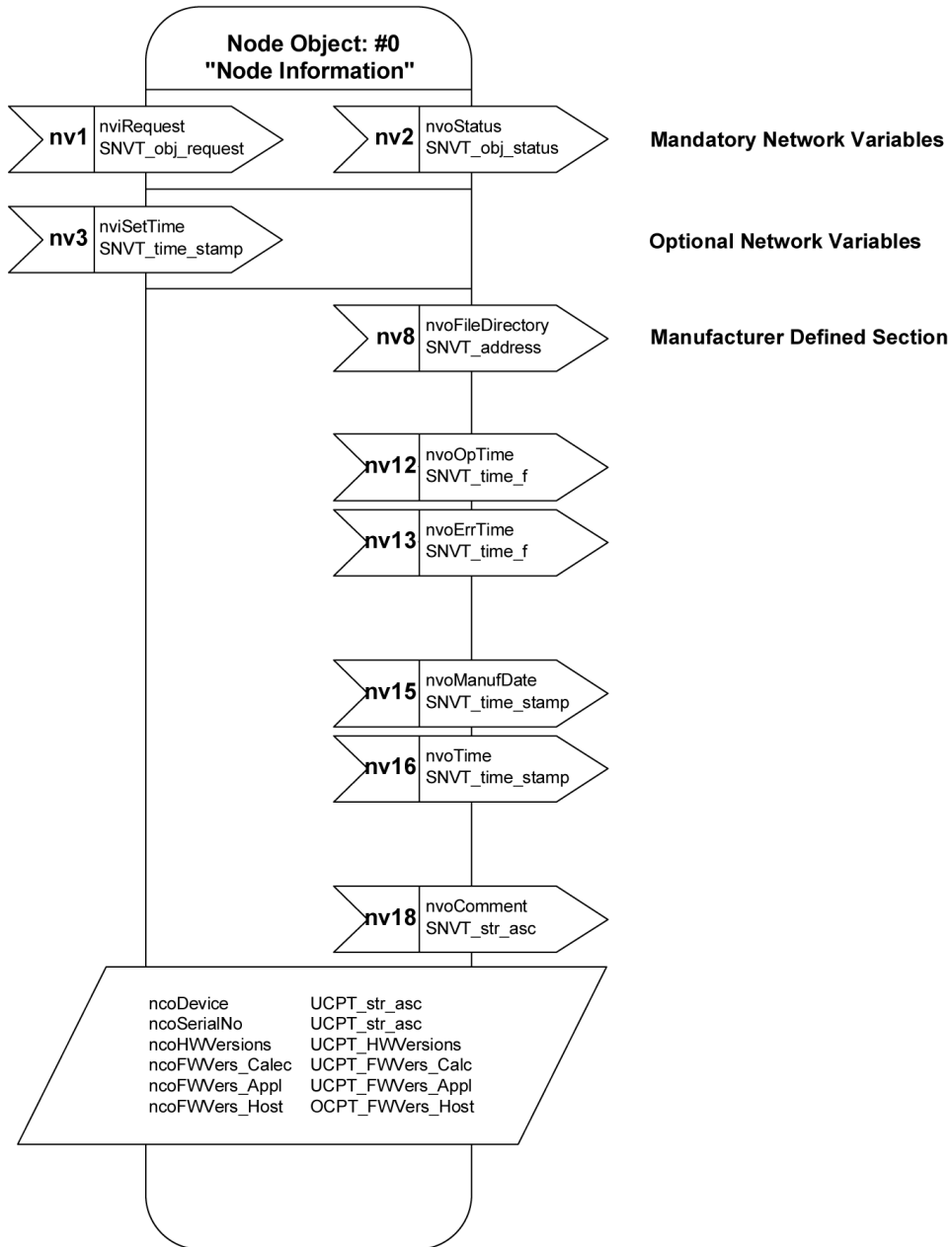
The firmware of the Neuron can be updated using appropriate network tools (e.g. LonMaker™).

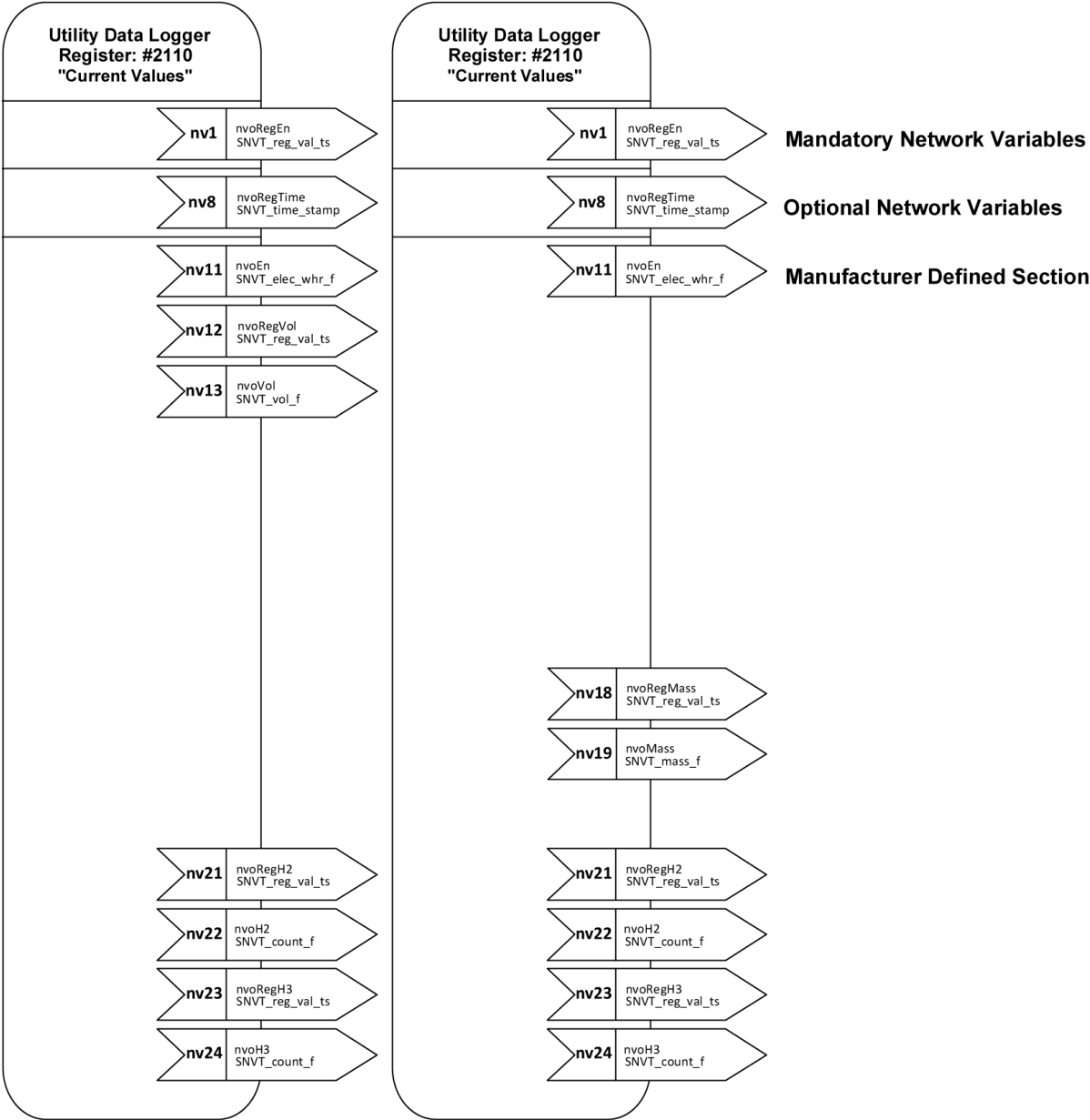
4 LONMARK® – Objects

CALEC® ST II Volume, CALEC® ST II Mass, CALEC® ST II Flow



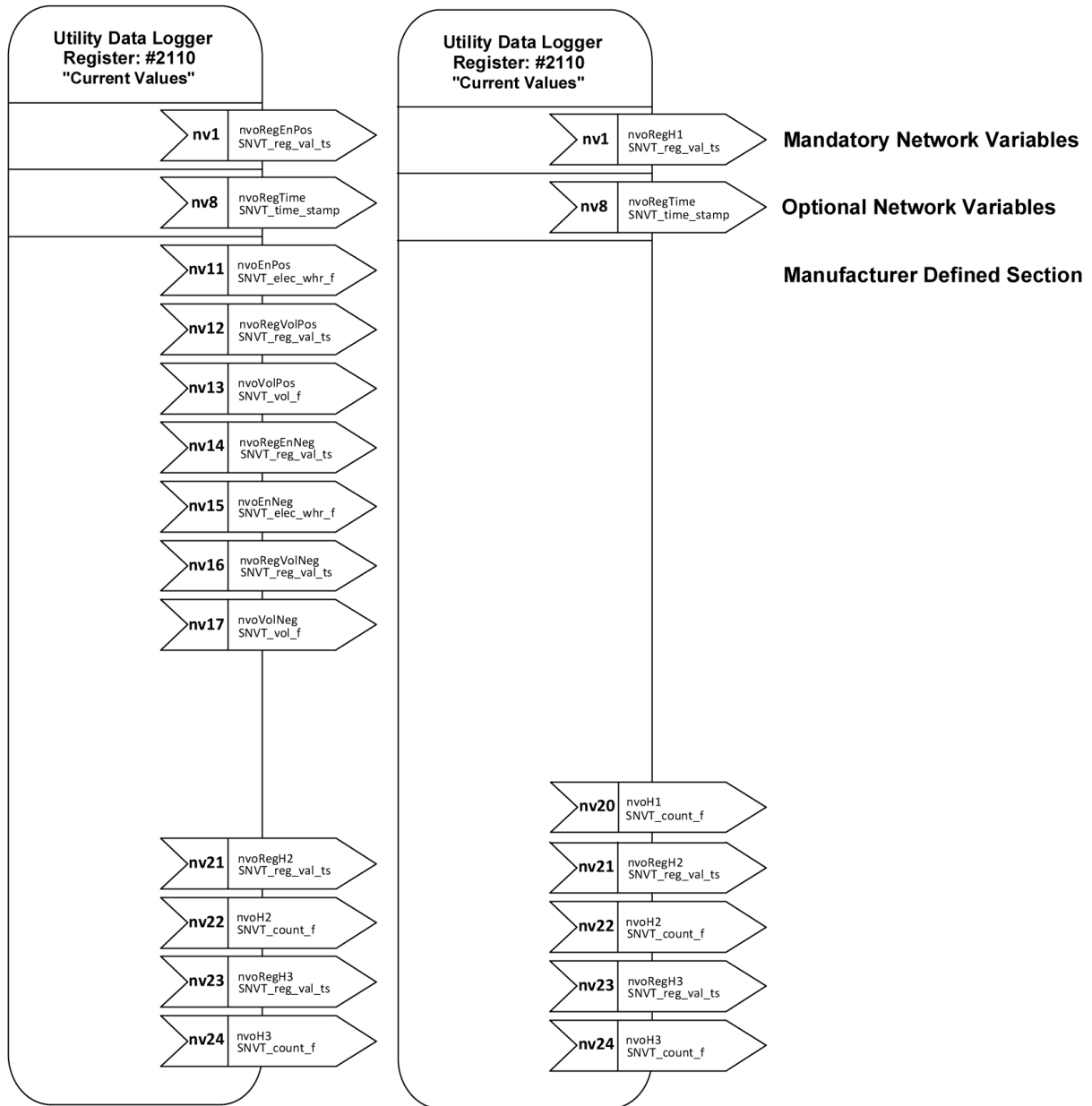
CALEC® ST II BDE

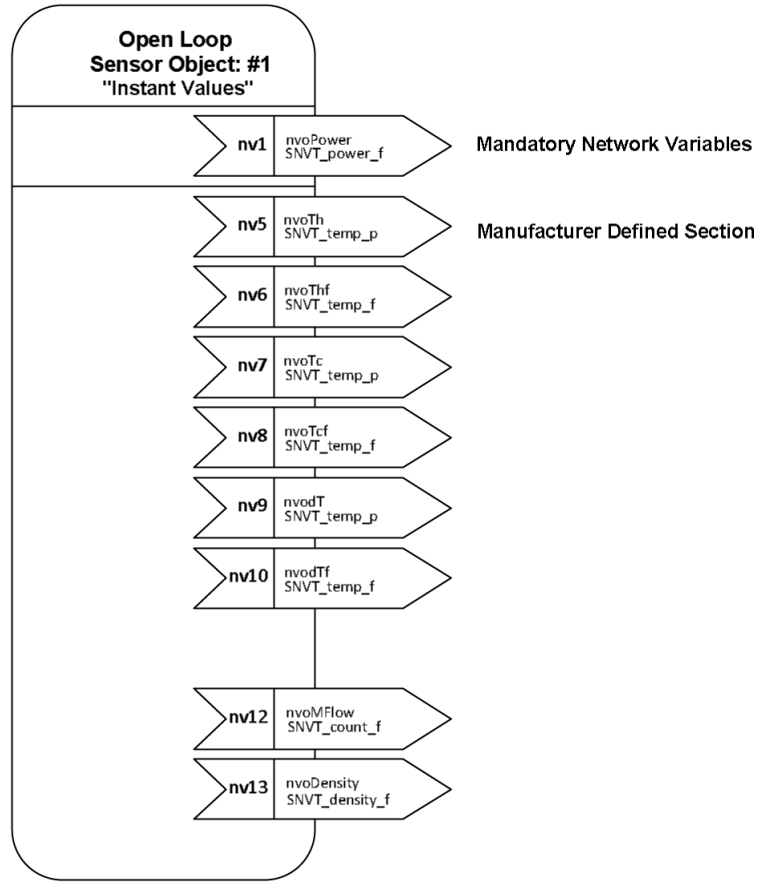
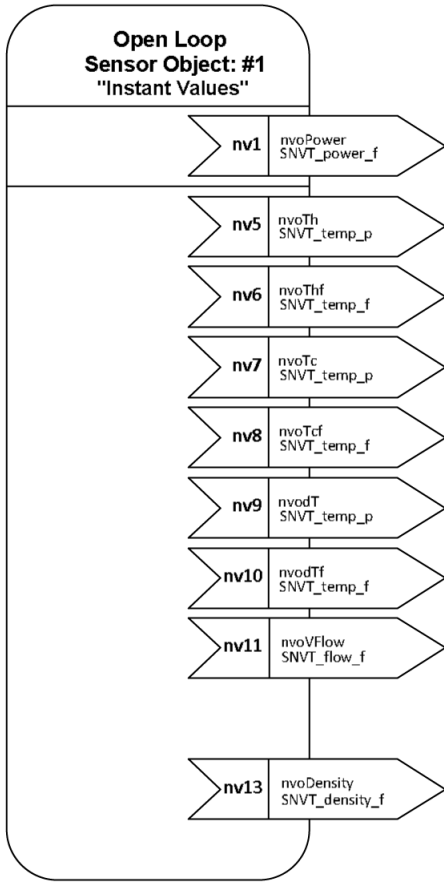




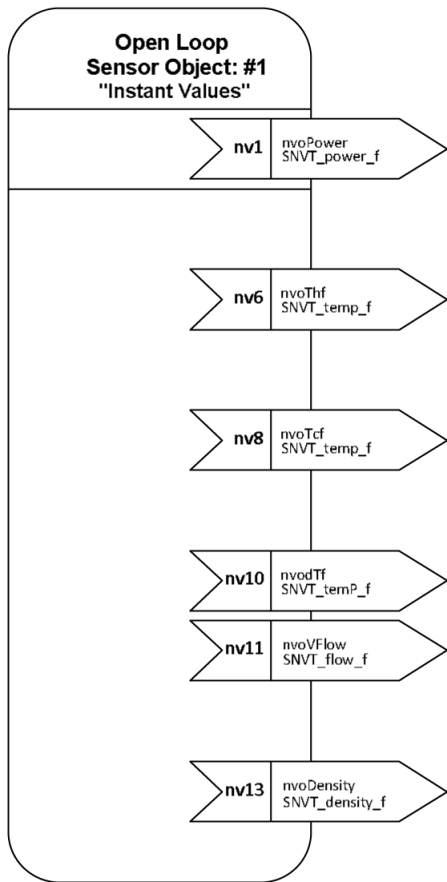
CALEC® ST II BDE

CALEC® ST II Flow

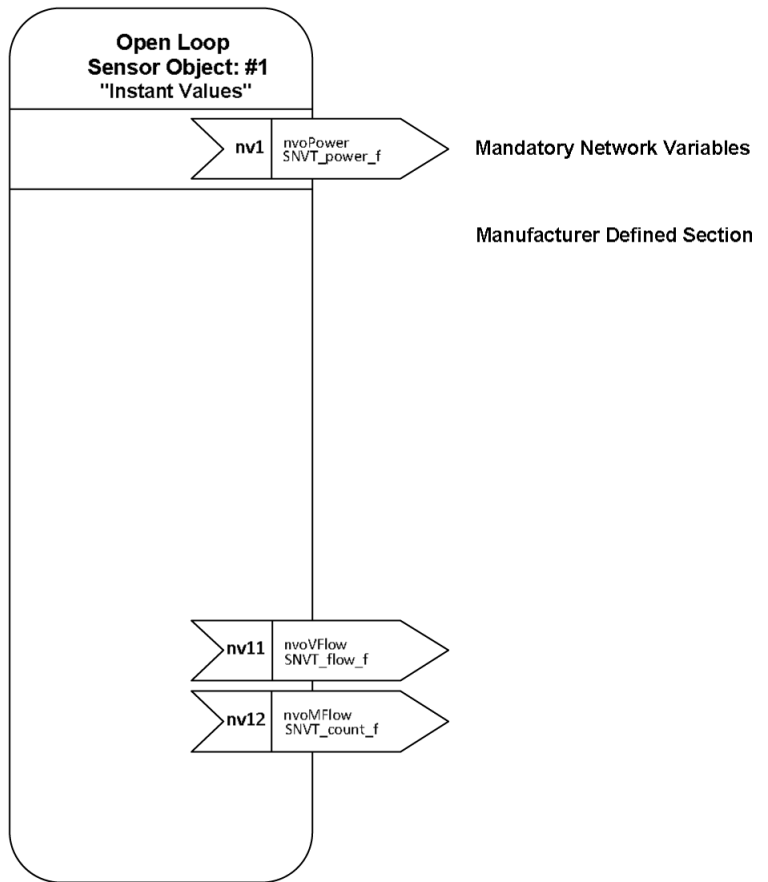


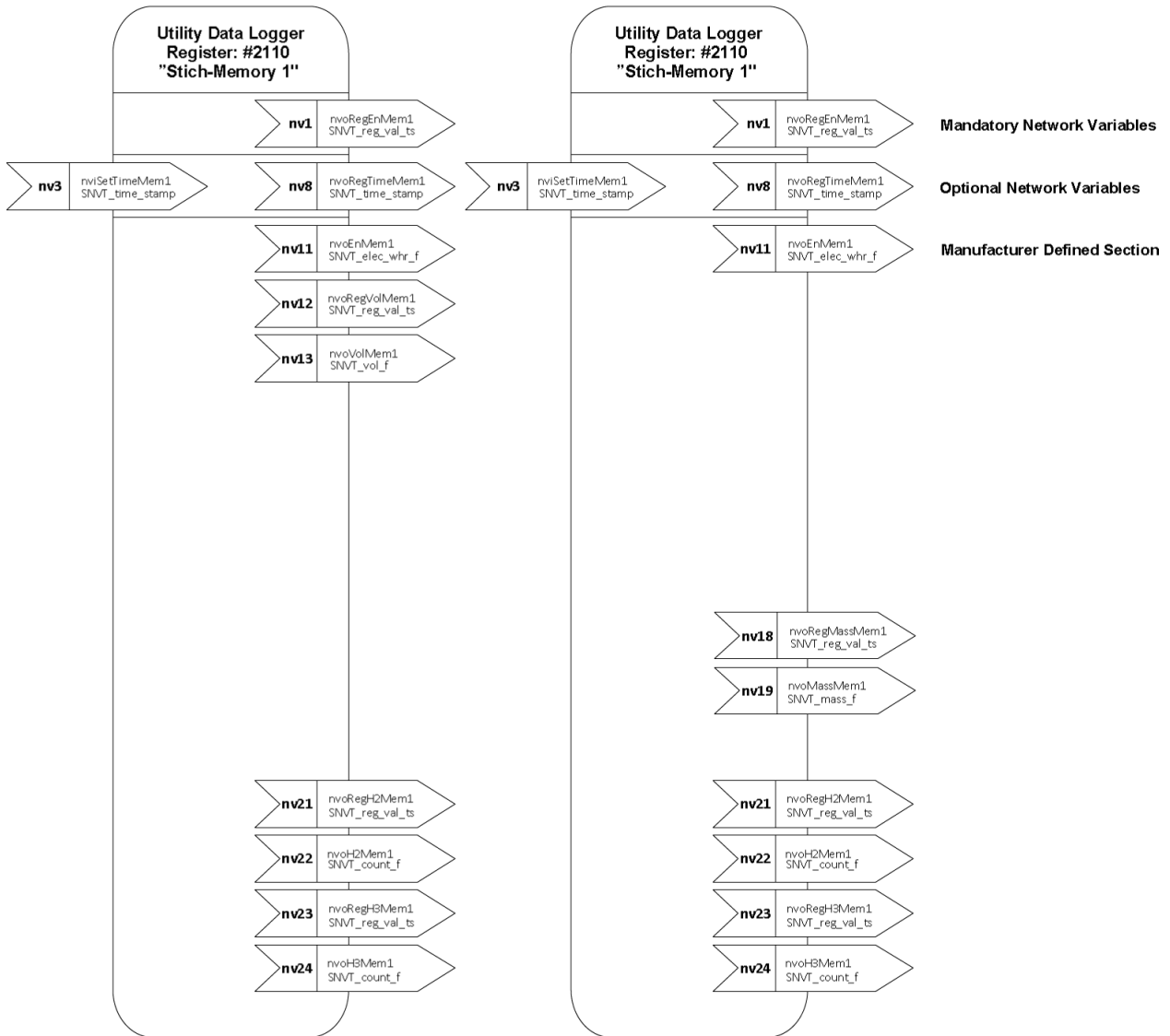


CALEC® ST II BDE



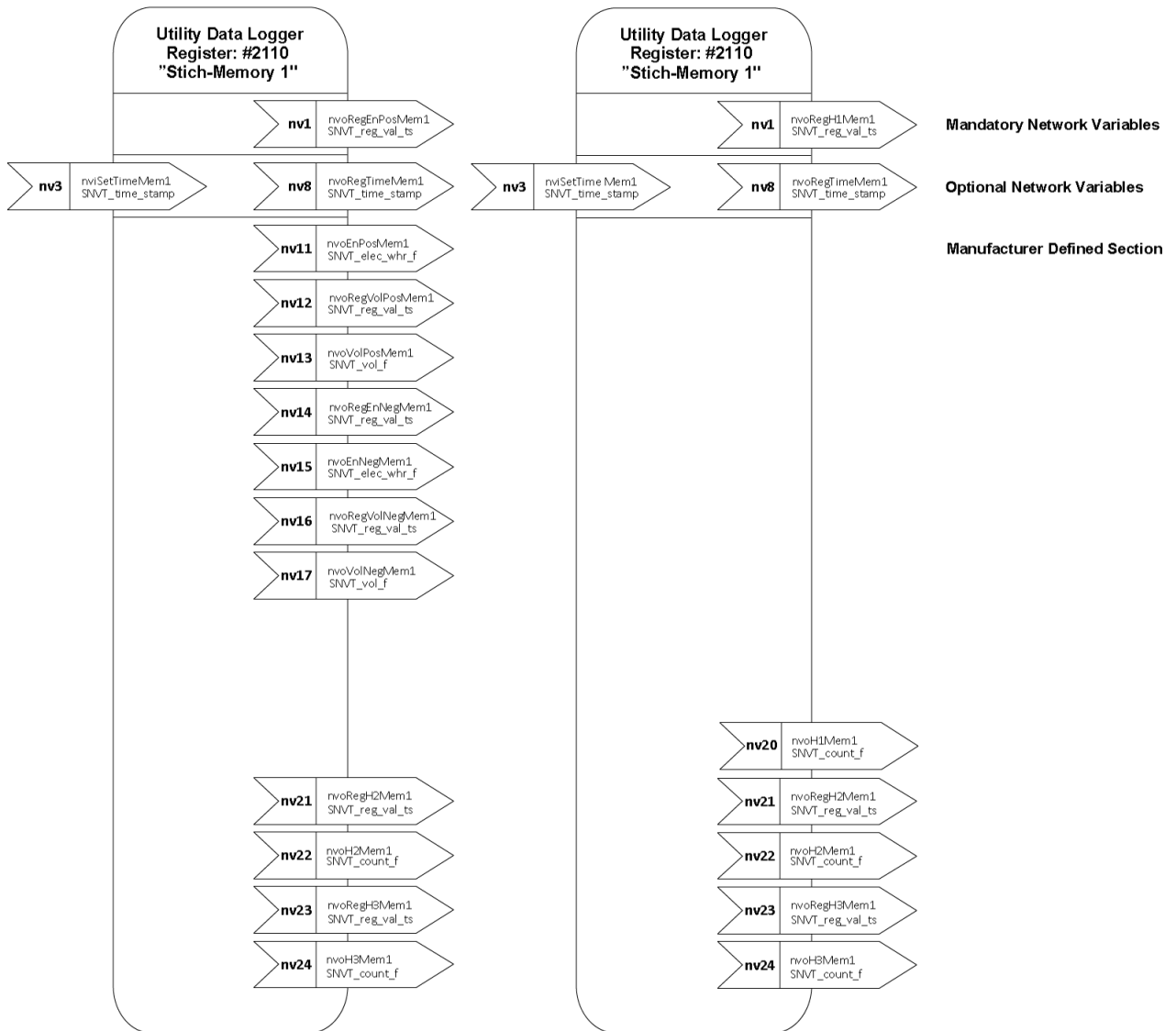
CALEC® ST II Flow





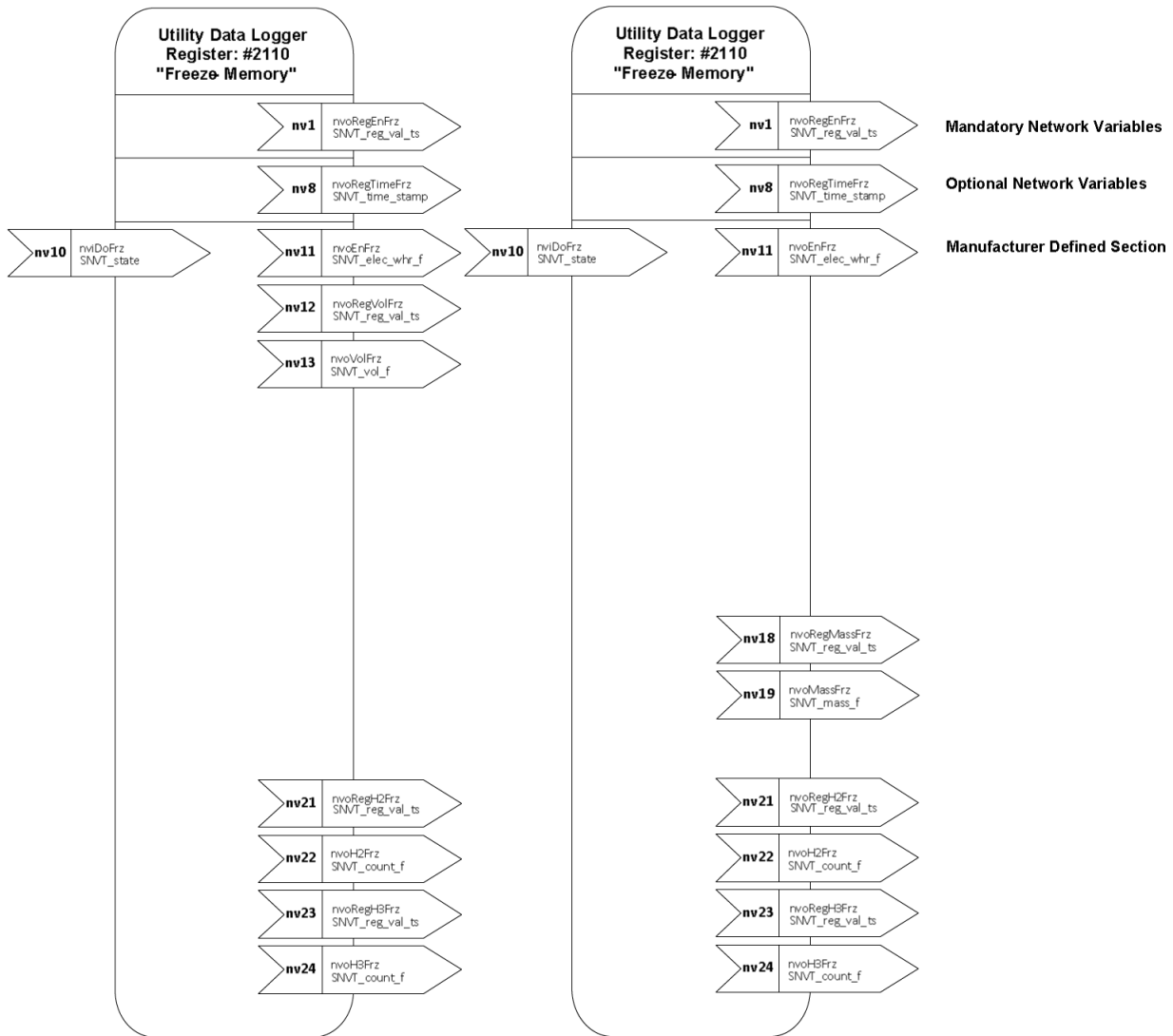
CALEC® ST II BDE

CALEC® ST II Flow



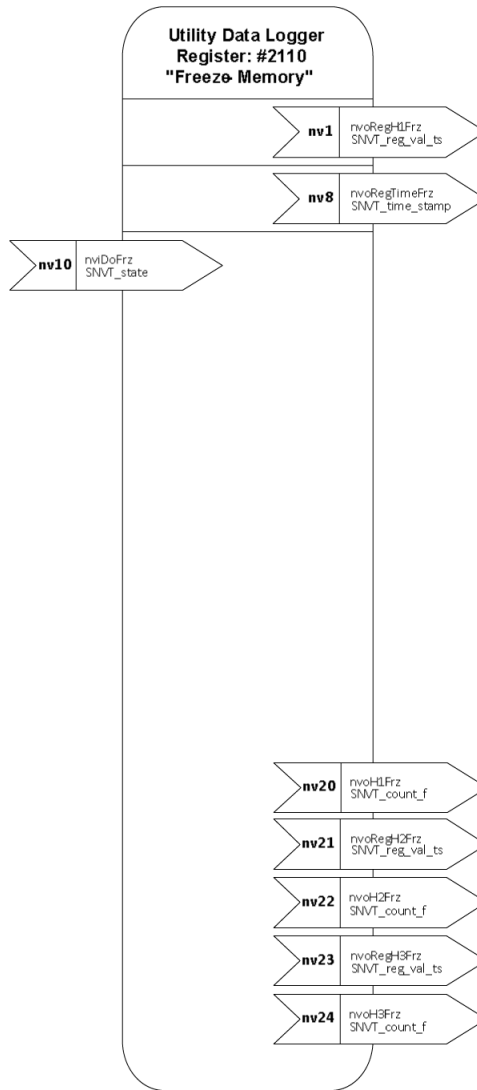
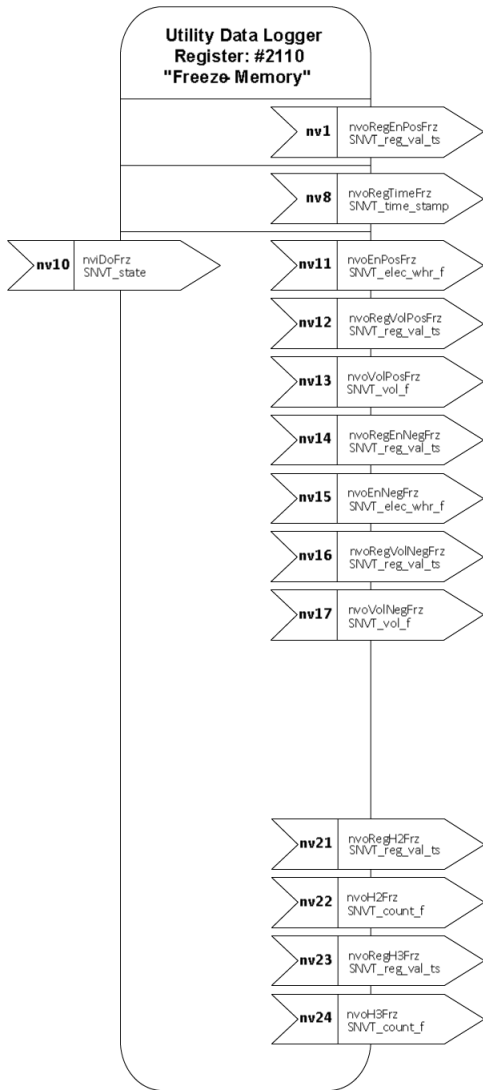
CALEC® ST II Volume

CALEC® ST II Mass



CALEC® ST II BDE

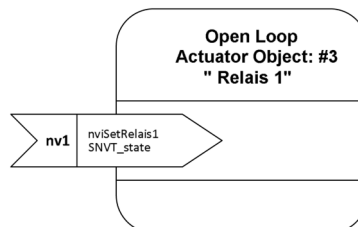
CALEC® ST II Flow



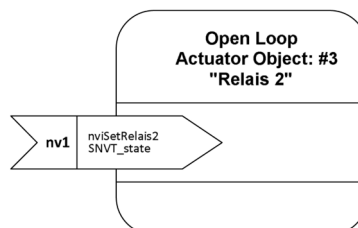
Mandatory Network Variables

Optional Network Variables

Manufacturer Defined Section



Mandatory Network Variables



Mandatory Network Variables

SALES PARTNER:

HEAD OFFICE:

AQUAMETRO AG
Ringstrasse 75
CH-4106 Therwil
Phone +41 61 725 11 22
Fax +41 61 725 15 95
info@aquametro.com



www.aquametro.com