

INSTRUCTIONS OJ-Air2LON Vers. 300



INTRODUCTION

This instruction describes the OJ-LON gateway, which provides connectivity for the OJ Electronics standard ventilation system, OJ Air2, to a LonWorks network.

This instruction applies to OJ-LON with ProgramID: 9F:FE:22:56:00:06:04:30

Product Program

Type	Product
OJ-Air2LON	LonWorks module

Function

The LonWorks gateway converts the signals on the OJ-Air2Masters local RS485 ModBus, to standard LonMark Association SNVT's, such that it is possible to communicate with an AHU, which is equipped with an OJ-Air2 control system, from a LonWorks network.

An FTT-10A transceiver with a transmission speed of 78kbps free topology is used.

CE MARKING

Subject to the consequences of the law, OJ Electronics A/S declares that this product complies with Council EMC Directive 92/31/EEC and subsequent modifications concerning electro-magnetic compatibility, and Council Low Voltage Directive 72/23/EEC (LVD) and subsequent modifications concerning electric material for application within certain voltage limits.

Standards applied

Electromagnetic compatibility (EMC):
EN 61000-6-2 and EN 61000-6-3

The product is intended for installation in machines or assembly with other machine parts for installation in machines covered by the Council Machinery Directive 98/37/EEC -therefore it does not fulfil the provisions in this directive in all respects.

Technical data

Supply
OJ-LON is supplied
from the Mod-Bus with24VDC.

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Mod-Bus connection

Signal RS 485(38,4kbaud)
Protocol Modbus RS485
Connector RJ11/6 jack
(double female mounted in module)
Max. cable length 100m

LonWorks connection

Transceiver FTT-10A
Speed 78kbps
Connector PTA STLZ950/2G-508H
(2-pole male and female parts
are supplied with the module)
Max. cable length 500m

Environmental data

Enclosure rating IP20
Air humidity 10-90% RH
Temperature range 0-50°C

Mechanical Installation

The LonWorks gateway is to be mounted on a DIN rail in an enclosure with the enclosure rating required by the installation. The gateway dimensions can be seen from figure 3.

Configuration of OJ-Air2Master

LON operation requires OJ-Air2Master software vers. 1.05 or higher.
The OJ-Air2Master requires no configuration for LON operation, since this is done automatically when the OJ-Air2LON module is connected to the OJ-Air2Master.
Once the LON module has been recognized, Alarm no. 15 "Lon gateway (Air2Lon): No communication", will be released, if the LON module is disconnected from the OJ-Air2Master.

Electrical Installation

- A. The network cable to the LonWorks network is connected to the LonWorks gateway LON port using the supplied 2-pole male connector.
- B. Then connect one of the LonWorks Gateway ModBus ports to the OJ-Air2Master RS485 plug B or C using an RJ12/6 jack.

User interface

The user interface consists of 3 LEDs and a Service Request button on the front of the module. The Service Request button is used to identify the node on the control network and can be activated using a pencil or similar sharp implement (2 mm dia.). The LEDs have the following colours and functions:

LED Name	Colour	Function
Service	Yellow	Flashes if node is not configured. Turned off if node is configured on network. Lit when the Service Request button is pressed. Constantly lit if node is without program (error condition).
Com.	Green	Flashes whenever data are synchronised by Mod-Bus. Flashes rapidly when data are updated from control network to Mod-Bus. Constantly lit/turned off when communication errors occur.
Power	Green	Lit when node is connected to power supply.
Power & Com	Green	Flash alternately during node initialisation or power supply connection. Flash alternately when WINK signal is sent to node from installation tool.

Location of LED diodes and service button is shown in figure 2.

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AHU Operation

Full control of the AHU by LON network, requires handterminal Fan Operation setting "Weekly program". See fig. 1.

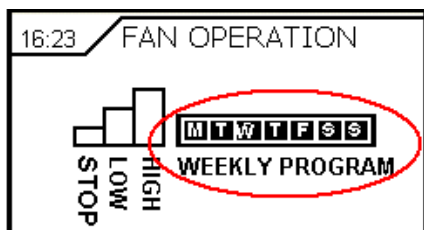


Fig. 1, Handterminal settings for LON start/stop operation

If the OJ-Air2 system is in STOP, will fan operation settings from LON have no effect. STOP has always high priority in the OJ-Air2 system, and can origin from different sources:

- Handterminal
- WEB settings
- Hardwired digital input
- Modbus/RS485
- Modbus/TCP-IP
- LON

Neuron ID

The actual LON module Neuron ID can be readout in the handterminal "Internet" menu.

LonWorks software conformity

The LonWorks module is designed to connect an OJ Air2 ventilation system to an open LonWorks control network in compliance with LonMark International guidelines.

Standard Program ID: 9F:FE:22:56:00:06:04:30

For use in connection with LonWorks installation tools and to document conformity, the following data files can be requested from OJ Electronics A/S

Latest eXternal Interface File	0936Ayxx.xif
Latest ResourceFileSet	RFFE2256000604xx.zip

Version management

y signifies a major release and x signifies a minor release.

The actual version can be found online by the installation tool browser in NodeObject cpDevMinorVer and cpDevMajorVer. Major version upgrading requires a new XIF file.

Lists of LonMark objects are shown in tables 1-6.

Function blocks are shown in fig. 3-4.

For further information regarding LON Functional Profiles see: www.lonmark.org/products/fprofile.htm#hvac

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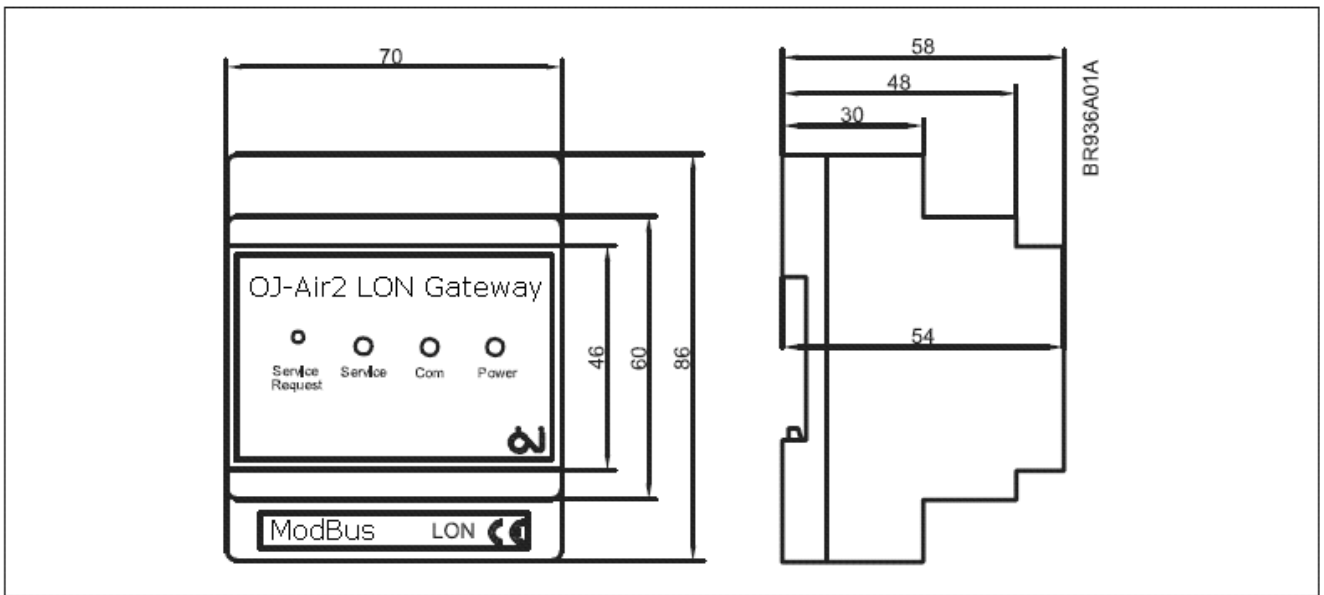


Fig. 2, Mechanical dimensions

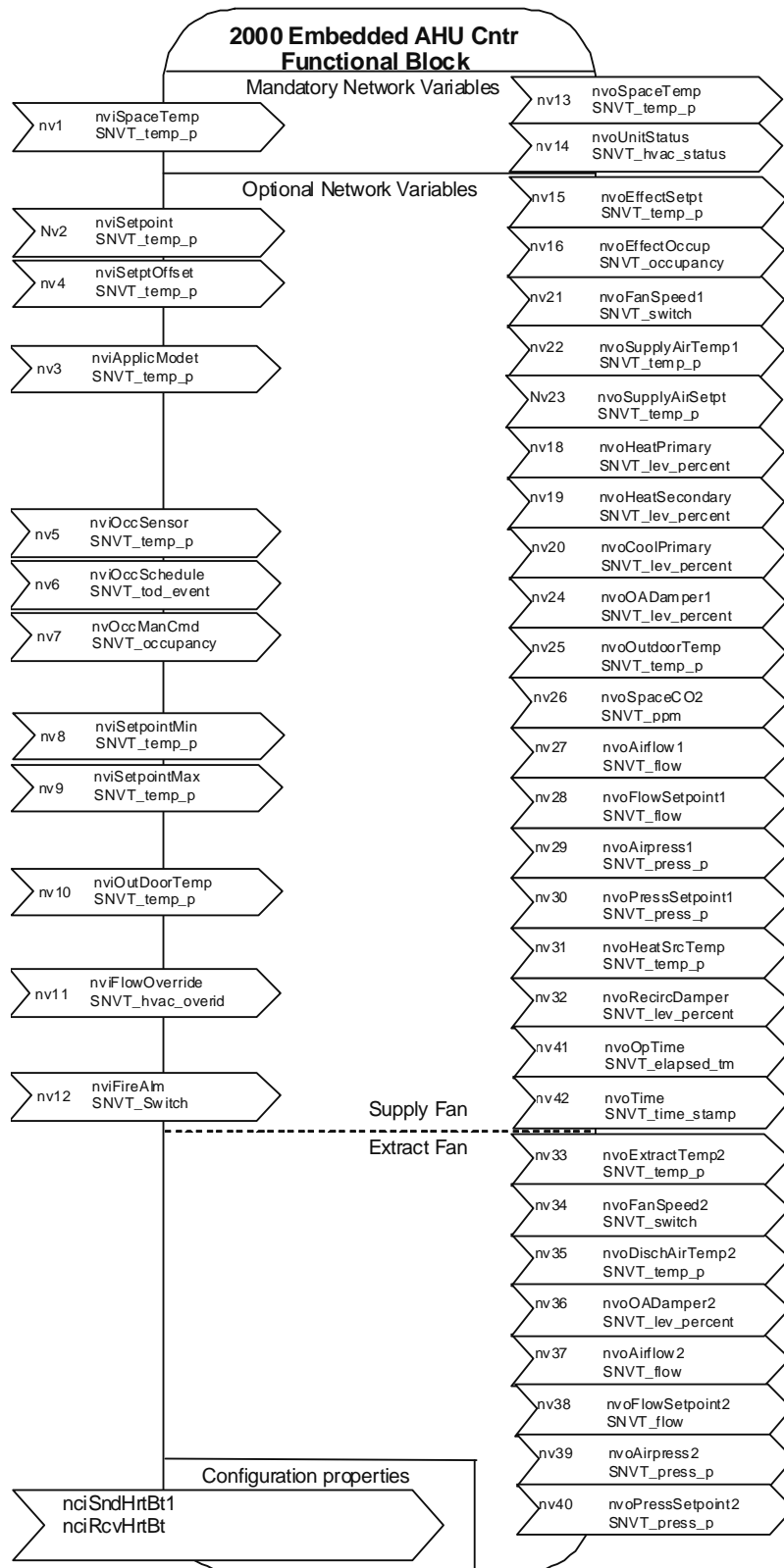


Fig. 3, Function block UFTP Embedded AHU cntr

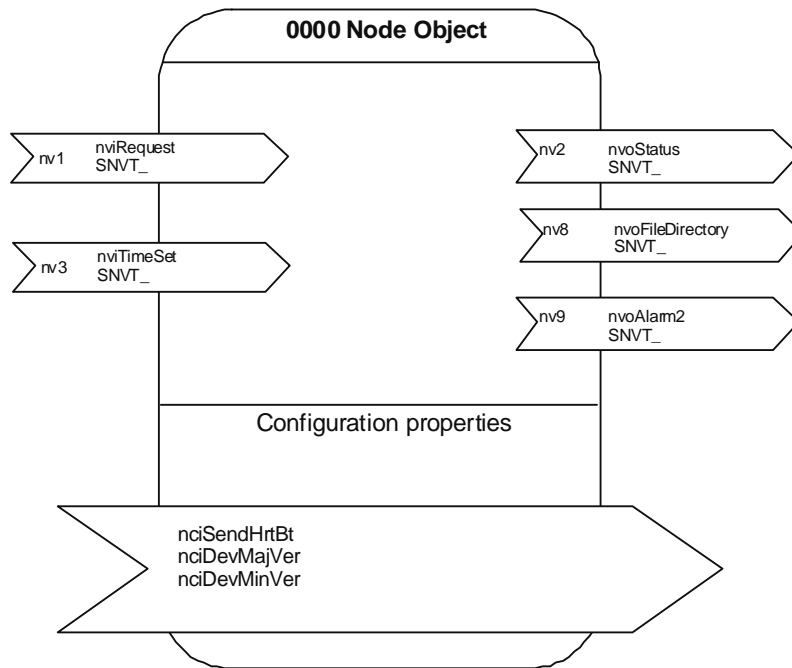


Fig. 4, Function block Node Object

Table1: Network Variable Inputs, UFTP Embedded AHU cntr

NV # (M/O)*	Variable Name	Recv HrtBt	SNVT Name	SNVT Index	Class	Description
1 (M)	nviSpaceTemp	Yes	SNVT_temp_p	105	RAM	Space Temperature Input
2 (O)	nviSetpoint	No	SNVT_temp_p	105	RAM	Temperature Setpoint Input (absolute)
3 (O)	nviApplicMode	Yes	SNVT_hvac_mode	108	RAM	Application Mode Input
4 (O)	nviSetptOffset	Yes	SNVT_temp_p	105	RAM	Setpoint Offset Input
5 (O)	nviOccSensor	Yes	SNVT_occupancy	109	RAM	Occupancy Sensor Input
6 (O)	nviOccSchedule	Yes	SNVT_tod_event	128	RAM	Occupancy Scheduler Input
7 (O)	nviOccManCmd	No	SNVT_occupancy	109	RAM	Occupancy Override Input
8 (O)	nviSetpointMin	Yes	SNVT_temp_p	105	RAM	Setpoint supply air min. temperature
9 (O)	nviSetpointMax	Yes	SNVT_temp_p	105	RAM	Setpoint supply air max. temperature
10 (O)	nviOutdoorTemp	Yes	SNVT_temp_p	105	RAM	Outdoor Air Temperature Input
11 (O)	nviFlowOverride	No	SNVT_hvac_overid	111	RAM	Air Flow Override Input
12 (O)	nviFireAlm	Yes	SNVT_switch	95	RAM	Fire Alarm Input

Table2: Supported nviApplicMode functions

Value	nviApplicMode	nvoEffectOccup	AHU Fan operation
0	HVAC_AUTO	See table 2	See table 2
6	HVAC_OFF	OC_UNOCCUPIED	Stop
13	HVAC_ECONOMY	OC_STANDBY	Low speed
0xFF	HVAC_NUL	Same as HVAC_AUTO	Same as HVAC_AUTO

Default value is HVAC_AUTO

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Table3: nviApplicMode: 0 = HVAC_Auto

LON Inputs			LON Output	AHU Output	
nviOccManCmd	nviOccSchedule¹	nviOccSensor²	nvoEffectOccup	Fan operation	
OC_OCCUPIED ³	Don't Care	Don't Care	OC_OCCUPIED	High Speed	
OC_UNOCCUPIED ³	Don't Care	Don't Care	OC_UNOCCUPIED	Stop	
OC_BYPASS	Same as nviOccManCmd equal OC_NUL	Same as nviOccManCmd equal OC_NUL	Same as nviOccManCmd equal OC_NUL	Same as nviOccManCmd equal OC_NUL	
OC_STANDBY	Don't Care	OC_OCCUPIED	OC_OCCUPIED	High Speed	
		OC_UNOCCUPIED	OC_OCCUPIED ⁶	High Speed ⁶ High Speed run-on ⁵	
OC_NUL	OC_OCCUPIED ³	Don't Care	OC_STANDBY	Low speed	
	OC_UNOCCUPIED ³	Don't Care	OC_OCCUPIED	High Speed	
	OC_STANDBY ³	OC_OCCUPIED	OC_OCCUPIED	OC_UNOCCUPIED	Stop
		OC_UNOCCUPIED	OC_UNOCCUPIED	OC_OCCUPIED	High Speed
OC_NUL ⁴	OC_OCCUPIED	OC_OCCUPIED	OC_OCCUPIED ⁵	High Speed run-on ⁵	
	OC_UNOCCUPIED	OC_UNOCCUPIED	OC_STANDBY	Low speed	
OC_OCCUPIED ⁶	OC_OCCUPIED	OC_OCCUPIED	OC_OCCUPIED	High Speed	
			OC_OCCUPIED ⁶	High Speed ⁶ High Speed run-on ⁵	
OC_STANDBY ⁷	OC_UNOCCUPIED	OC_UNOCCUPIED	OC_STANDBY ⁷	Low speed ⁷	
			OC_UNOCCUPIED	Stop	

Notes:

- 1) For nviOccSchedule, this refers to the "current_state" field.
"next_state" and "time_to_next_state" fields are not active.
- 2) The Occupancy sensor can be a local input or a LON network input.
If both are used, OC_OCCUPIED from one source override OC_UNOCCUPIED from the other source.
OC_NUL is same as OC_UNOCCUPIED
- 3) Disables device scheduler embedded in OJ-Air2 Master.
- 4) Default value. Enables device scheduler embedded in OJ-Air2 Master.
- 5) nvoEffectOccup will be OC_OCCUPIED during run-on time embedded in OJ-Air2 Master, if initiated by a Occupancy sensor.
- 6) "High speed" controlled by device scheduler embedded in OJ-Air2 Master.
- 7) "Low speed" controlled by device scheduler embedded in OJ-Air2 Master.
- 8) "Don't Care" = Any state

Table4: Supported nviFlowOverride functions

nviFlowOverride	Description	Fan Operation
0	HVO_OFF	Normal control
2	HVO_FLOW_VALUE	Supply Air setpoint in l/s
3	HVO_FLOW_PERCENT	Supply Fan speed in %
8	HVO_FLOW2_VALUE	Extract Air setpoint in l/s
9	HVO_FLOW2_PERCENT	Extract Fan speed in %
0xFF	Same as HVO_OFF	Same as HVO_OFF

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Table5: Network Variable Outputs, UFTP Embedded AHU cntr

NV # (M/O)*	Variable Name	Snd HrtBt	SNVT Name	SNVT Index	Class	Description
13 (M)	nvoSpaceTemp	Yes	SNVT_temp_p	105	RAM	Effective Space Temperature Output
14 (O)	nvoUnitStatus	Yes	SNVT_hvac_statuses	112	RAM	Unit Status Output
15 (O)	nvoEffectSetpt	Yes	SNVT_temp_p	105	RAM	Effective Setpoint Output
16 (O)	nvoEffectOccup	No	SNVT_occupancy	109	RAM	Effective Occupancy Output
18 (O)	nvoHeatPrimary	Yes	SNVT_lev_percent	81	RAM	Primary Heat Output
19 (O)	nvoHeatSecondary	Yes	SNVT_lev_percent	81	RAM	Secondary Heat Output
20 (O)	nvoCoolPrimary	Yes	SNVT_lev_percent	81	RAM	Primary Cool Output
21 (O)	nvoFanSpeed1	Yes	SNVT_switch	95	RAM	Fan1 Speed Output
22 (O)	nvoSupplyAirTemp1	No	SNVT_temp_p	105	RAM	Supply Air Temperature Output
23 (O)	nvoSupplyAirSetpt	Yes	SNVT_temp_p	105	RAM	Supply Air Temperature Setpoint Output
24 (O)	nvoOADamper1	Yes	SNVT_lev_percent	81	RAM	Outdoor Air Damper1 Output
25 (O)	nvoOutdoorTemp	Yes	SNVT_temp_p	105	RAM	Outdoor Air Temperature Output
26 (O)	nvoSpaceCO2	Yes	SNVT_ppm	29	RAM	Space CO2 Sensor Output
27 (O)	nvoAirflow1	Yes	SNVT_flow	15	RAM	Air Flow1 Output
28 (O)	nvoFlowSetpoint1	Yes	SNVT_flow	15	RAM	Air Flow1 Setpoint Output
29 (O)	nvoAirPress1	Yes	SNVT_press_p	113	RAM	Air Pressure1 Output
30 (O)	nvoPressSetpoint1	Yes	SNVT_press_p	113	RAM	Air Pressure1 Setpoint Output
31 (O)	nvoHeatSrcTemp	Yes	SNVT_temp_p	105	RAM	Heat Source Temperature Output
32 (O)	nvoRecircDamper	Yes	SNVT_lev_percent	81	RAM	Recirculation Air Damper Output
33 (O)	nvoExtractTemp2	Yes	SNVT_temp_p	105	RAM	Extract Air Temperature Output
34 (O)	nvoFanSpeed2	Yes	SNVT_switch	95	RAM	Fan2 Speed Output
35 (O)	nvoDischAirTemp2	No	SNVT_temp_p	105	RAM	Discharge Air2 Temperature Output
36 (O)	nvoOADamper2	Yes	SNVT_lev_percent	81	RAM	Outdoor Air Damper2 Output
37 (O)	nvoAirflow2	Yes	SNVT_flow	15	RAM	Air Flow2 Output
38 (O)	nvoFlowsetpoint2	Yes	SNVT_flow	15	RAM	Air Flow2 Setpoint Output
39 (O)	nvoAirpress2	Yes	SNVT_press_p	113	RAM	Air Pressure2 Output
40 (O)	nvoPressSetpoint2	Yes	SNVT_flow	15	RAM	Air Pressure2 Setpoint Output
41 (O)	nvoOpTime	No	SNVT_elapsed_tm	87	RAM	Reports device's total accumulated operating time
42 (O)	nvoTime	No	SNVT_time_stamp	84	RAM	Reports device's internal real time clock

1) nvoUnitStatus provides a basic alarmstatus in SNVT_hvac_status field "in_alarm"

0 = No alarm

1 = A alarm (Alarm has stopped AHU, service required)

2 = B alarm (Alarm AHU is operating with reduced performance, maintenance required)

3 = A + B alarm.

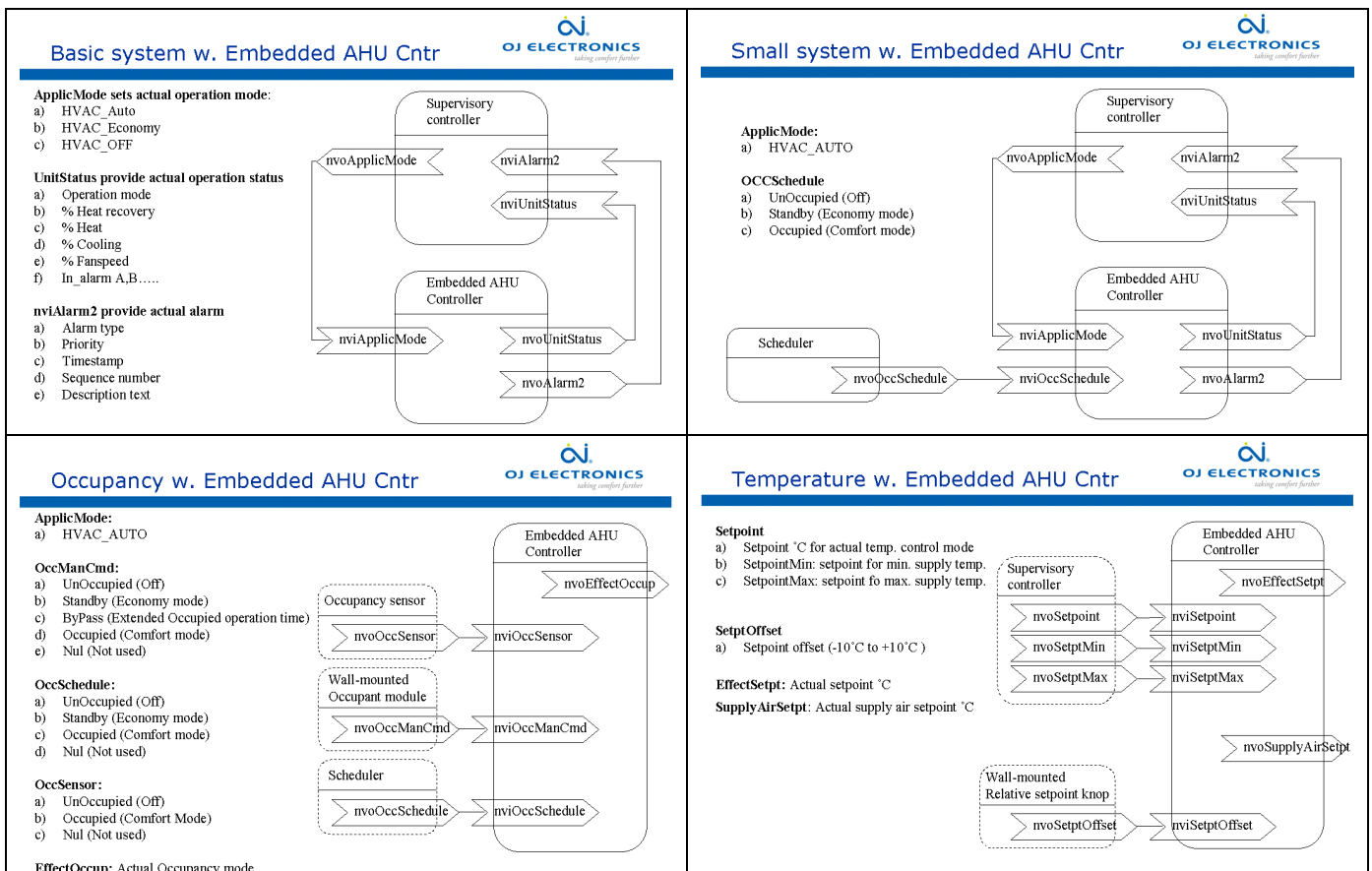
2) Suffix "1" applies in general to supply air, "2" applies to extract air.

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Table 6: Network Variable Inputs, Node Object

NV # (M/O)*	Variable Name	SNVT Name	SNVT Index	Description
1 (M)	nviRequest	SNVT_obj_request	92	Requests a particular mode for a particular functional block in the device
2 (M)	nvoStatus	SNVT_obj_status	93	Reports the status of the requested functional block in the device
3 (O)	nviTimeSet	SNVT_time_stamp	84	Synchronize the device's internal real time clock with an external time source
8 (O)	nvoFileDirectory	SNVT_address	114	Address for the file directory containing descriptors for configuration files
9 (O)	nvoAlarm2	SNVT_alarm_2	164	Transmits alarm data for each functional block on a device whenever an alarm occurs or is cleared, and upon request. Replaces nvoAlarm

1) Successive updates of nviTimeSet within the hour is not recommended on a regular basis, since changes of device real time clock is stored in EE-PROM. The EE-PROM protection will reduce system performance if time is updated repeatedly with high frequency.



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