LG VRF Air Conditioning

Gateway for the integration of LG VRF systems into KNX home automation systems

USER MANUAL

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Gateway for the integration of LG VRF systems into KNX home automation systems.

ORDER CODE	LEGACY ORDER CODE
INKNXLGE016O000	LG-AC-KNX-16
INKNXLGE064O000	LG-AC-KNX-64

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1 Description

1.1 *Introduction*

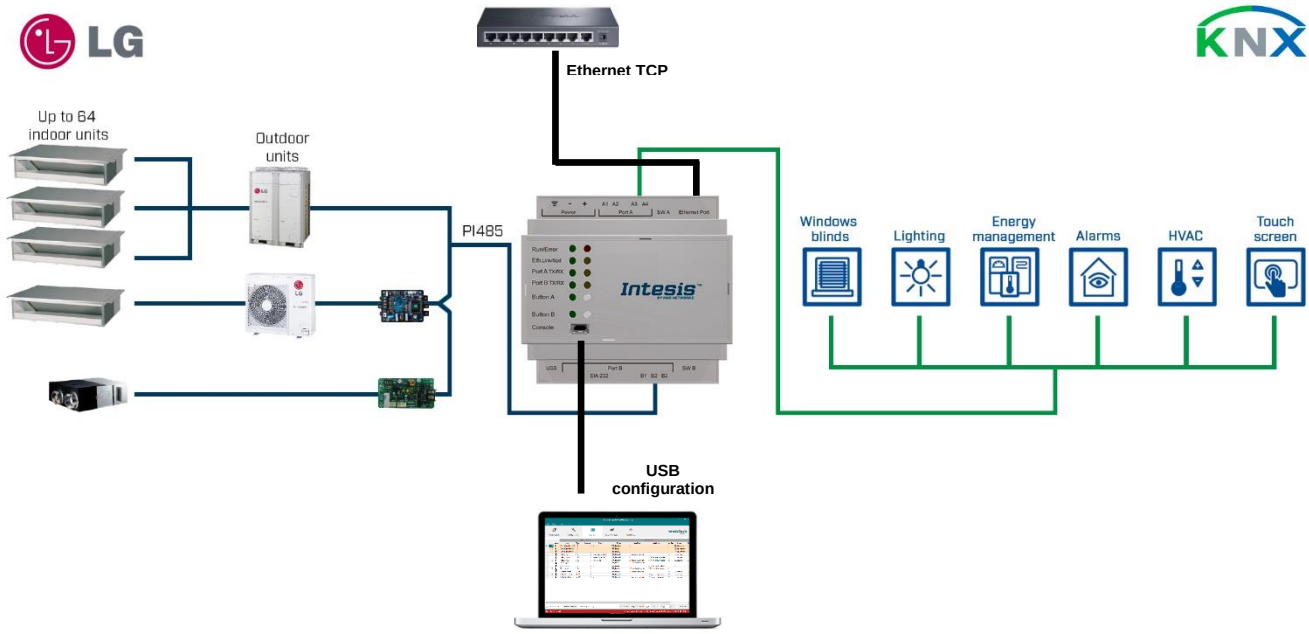
This document describes the integration of LG VRF air conditioning systems into KNX home automation systems using gateway *Intesis KNX – LG VRF.*

The aim of this integration is to monitor and control your LG air conditioning system, from your KNX TP-1 installation. To do it so, Intesis performs as a one more KNX device, sending and receiving telegrams to group addresses in the KNX network.

Intesis makes available the LG air conditioning system indoor units' datapoints through independent KNX objects.

Up to 64 indoor units supported, depending on product version.

This document assumes that the user is familiar with KNX and LG technologies and their technical terms.



Integration of LG VRF systems into KNX control systems

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1.1 Functionality

Intesis™ continuously monitors LG VRF network for all configured signals and keeps the updated status of all of them in its memory. It triggers updates on configured group addresses to KNX network on value change.

Commands toward the indoor unit communication adaptor are permitted.

Each indoor unit is offered as a set of KNX objects.

Element	Object supported
General signals (all units)	• Command
Indoor Unit	• Status • Command • Communication status

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1.2 *Capacity of Intesis*

Element	Max.	Notes
Number of indoor units	64*	Number of indoor units that can be controlled through Intesis

*There are different models of *Intesis KNX – LG VRF* each one with different capacity. The table above shows the capacity for the top model (with maximum capacity).

Their order codes are:

- INKNXLGE016O000: Model supporting up to 16 indoor units
- INKNXLGE064O000: Model supporting up to 64 indoor units

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2 KNX System

In this section, a common description for all Intesis KNX series gateways is given, from the point of view of KNX system which is called from now on *internal system.* Connection with the LG system is also called from now on *external system*.

2.1 *Description*

Intesis KNX connects directly to the KNX TP-1 bus and performs as one more device into the KNX system, with the same configuration and operational characteristics as other KNX devices.

Internally, the circuit part connected to the KNX bus is opto-isolated from the rest of the electronics.

Intesis KNX receives, manages and sends all the telegrams related to its configuration to the KNX bus.

On receiving WRITE telegrams of KNX group addresses associated to communication objects, the corresponding messages are sent to the external system (LG installation).

When a change in a signal of the external system is detected, a WRITE telegram is sent to the KNX bus (addressed with the group address associated to the corresponding group object), in order to maintain both systems synchronized in every moment.

The status of the KNX bus is checked continuously and, if a bus drop-down is detected, for example due to failure in the bus power supply, after the KNX bus is restored again, Intesis will send READ telegrams to group addresses of all communication objects marked with flag 'Ri'. The behavior of each individual point into Intesis is determined by the flags configured for the communication object. See details below.

2.2 *Points definition*

Every group object in configuration has following KNX properties:

Property	Description
Description	Descriptive information about the communication object or signal.
Object function	Information on range of values for the group object.
DPT	Datapoint type. It is the KNX data type used to encode the signal's value. It will depend on the type of signal associated in the external system in every case.
Group	It is the KNX group to which the point is associated. It is also the group to which the read (R), write (W), transmit (T), update (U) and read on init (Ri) flags are applied. It is the sending group.
Listening addresses	They are the addresses that can write on the group object, a part of the main group address.
R	Read. If this flag is activated, READ telegrams of this group address will be accepted.
Ri	Read on Init. If this flag is activated, the object will trigger corresponding READ request (on associated group address) on initialization.
W	Write. If this flag is activated, WRITE telegrams on this group object will be accepted.
T	Transmit. If this flag is activated, when the group object value changes, due to a change in the external system, a WRITE telegram of the associated group address will be sent to the KNX bus.
U	Update. If this flag is activated, UPDATE telegrams (response to READ telegrams) on this group object will be accepted.
Active	If activated, the point will be active in Intesis, if not, the behavior will be as if the point is not defined. This allows deactivating points without the need of delete them for possible future use.

These properties are common for all Intesis KNX series gateways. Although each integration may have specific properties according to the type of signals of the external system.

See list of communication objects in section 9 APPENDIX A – COMMUNICATION OBJECTS TABLE.

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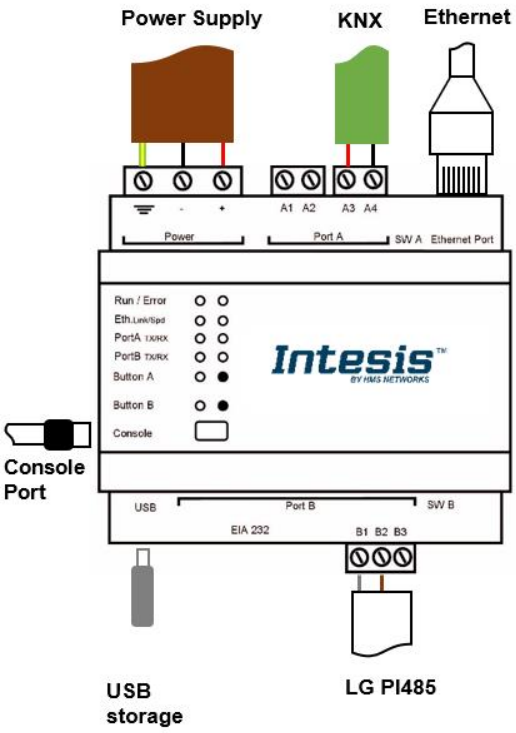
3 Connections

Find below information regarding the Intesis connections available.



Power Supply
Must use NEC Class 2 or Limited Power Source (LPS) and SELV rated power supply.

If using DC power supply:
Respect polarity applied of terminals (+) and (-). Be sure the voltage applied is within the range admitted (check table below). The power supply can be connected to earth but only through the negative terminal, never through the positive terminal.

If using AC power supply:
Make sure the voltage applied is of the value admitted (24 Vac). Do not connect any of the terminals of the AC power supply to earth, and make sure the same power supply is not supplying any other device.

Ethernet
Connect the cable coming from the IP network to the connector ETH of the gateway. Use an Ethernet CAT5 cable. If communicating through the LAN of the building, contact the network administrator and make sure traffic on the port used is allowed through all the LAN path (check the gateway user manual for more information). Default IP is 192.168.100.246. DHCP is enabled by default.

PortA / KNX
Connect the KNX TP1 bus to connectors A3 (+) and A4 (-) of gateway's PortA. Respect the polarity.

PortB / LG VRF
Connect the LG PI 485 bus to the connectors B1 (BUS A) and B2 (BUS B) of gateway's PortB. Respect the polarity.

Console Port
Connect a mini-type B USB cable from your computer to the gateway to allow communication between the Configuration Software and the gateway. Remember that Ethernet connection is also allowed. Check the user manual for more information.

USB
Connect a USB storage device (not a HDD) if required. Check the user manual for more information.

Ensure proper space for all connectors when mounted (see section 6 DIMENSIONS).

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3.1 *Power device*

The first step to perform is to power up the device. To do so, a power supply working with any of the voltage range allowed is needed (check section 5 ELECTRICAL & MECHANICAL FEATURES). Once connected the ON led will turn on.

WARNING! In order to avoid earth loops that can damage the gateway, and/or any other equipment connected to it, we strongly recommend:

- The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC power supply with the positive terminal connected to earth**.
- The use of AC power supplies only if they are floating and not powering any other device.

3.2 *Connect to LG installation*

Use the Port B connector of the Intesis device to connect LG PI485 bus to the Intesis. Remember to follow all safety precautions indicated by LG.

Connect the LG PI 485 bus to connectors B1 (BUS A) and B2 (BUS B) of gateway's PortB. Respect the polarity.

3.3 *Connection to KNX*

Connect the KNX TP1 bus to connectors A3 (+) and A4 (-) of gateway's PortA. Respect the polarity.

3.4 *Connection to the configuration tool*

This action allows the user to have access to configuration and monitoring of the device (more information can be found in the configuration tool User Manual). Two methods to connect to the PC can be used:

- **Ethernet:** Using the Ethernet port of Intesis.
- **USB:** Using the console port of Intesis, connect a USB cable from the console port to the PC.

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4 Set-up process and troubleshooting

4.1 *Pre-requisites*

It is necessary to have a KNX installation, device or interface operative and well connected to the corresponding KNX port of Intesis. It is also required to have a LG Air Conditioner installation, with accessible LG EIA485 bus for connection of Intesis.

Connectors, connection cables, PC to use the configuration tool and other auxiliary material, if needed, are not supplied by HMS Industrial Networks S.L.U. for this standard integration.

Items supplied by HMS Networks for this integration are:

- Intesis gateway.
- Link to download the configuration tool.
- USB Console cable to communicate with Intesis.
- Product documentation.

4.2 *Intesis MAPS. Configuration & monitoring tool for Intesis KNX series*

4.2.1 Introduction

Intesis MAPS is a Windows® compatible software developed specifically to monitor and configure Intesis new generation gateways.

The installation procedure and main functions are explained in the *Intesis MAPS KNX User Manual*. This document can be downloaded from the link indicated in the installation sheet supplied with the Intesis device or in the product website at www.intesis.com

In this section, only the specific case of LG to KNX systems will be covered.

Please check the Intesis MAPS KNX User Manual for specific information about the different parameters and how to configure them.

4.2.2 Connection

To configure the Intesis connection parameters press on the ***Connection*** button in the *menu bar*.

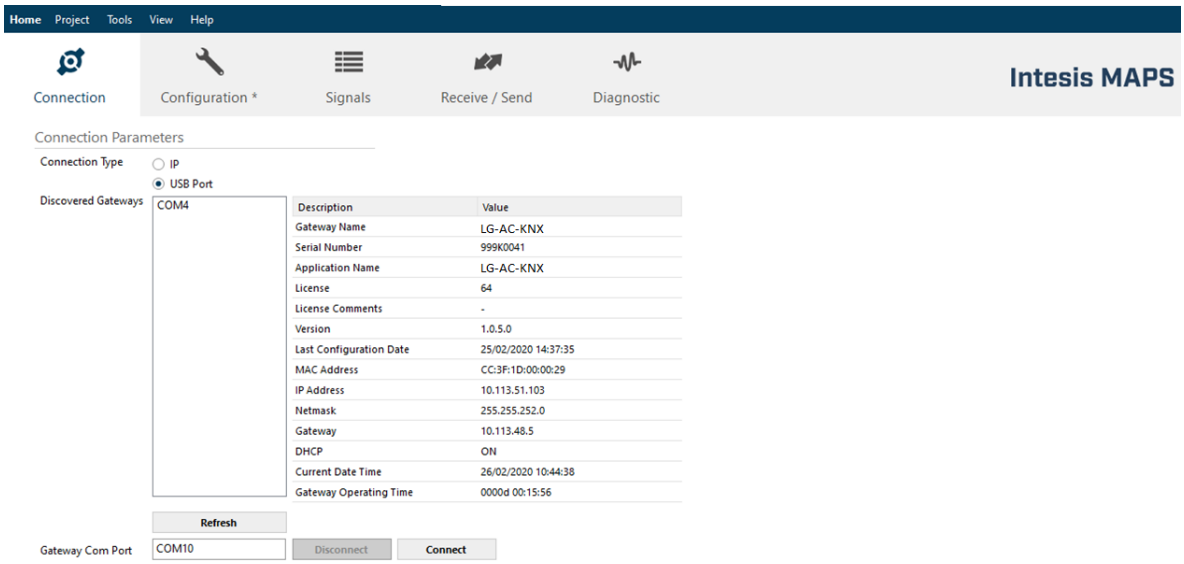

Figure 4.1 MAPS connection

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4.2.3 Configuration tab

Select the ***Configuration*** tab to configure the connection parameters. Three subsets of information are shown in this window: General (Gateway general parameters), KNX (KNX interface configuration) and LG (LG interface parameters).

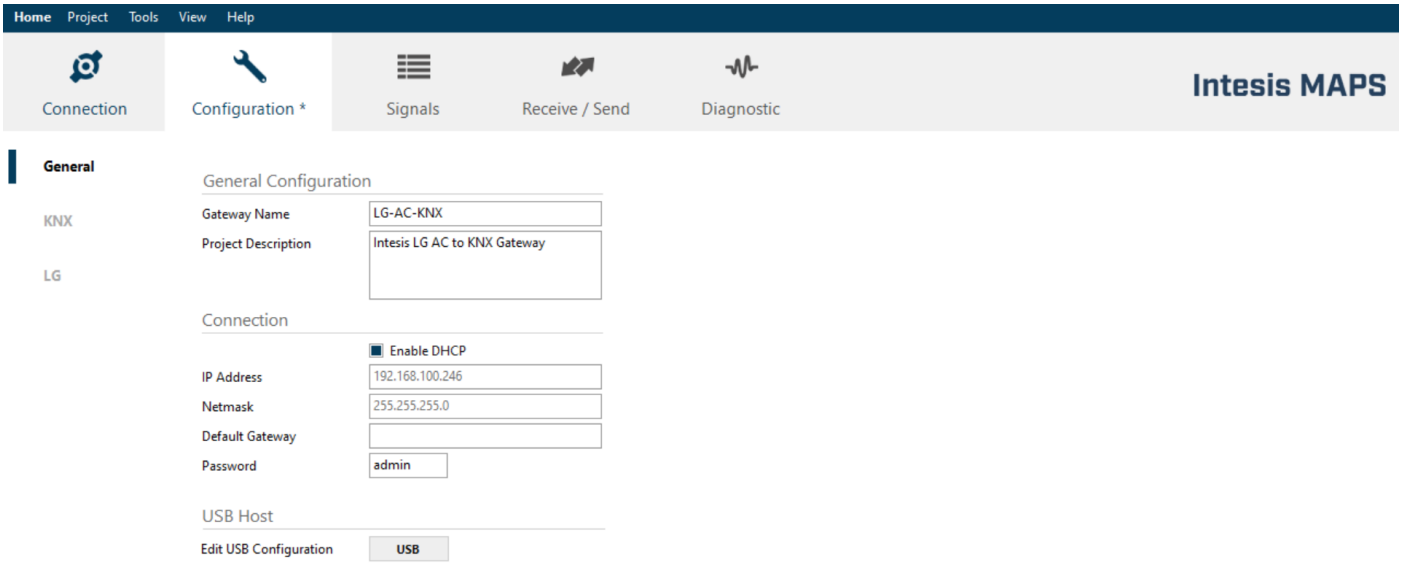

Figure 4.2 Intesis MAPS configuration tab

4.2.4 KNX configuration

Set parameters of KNX interface of Intesis.

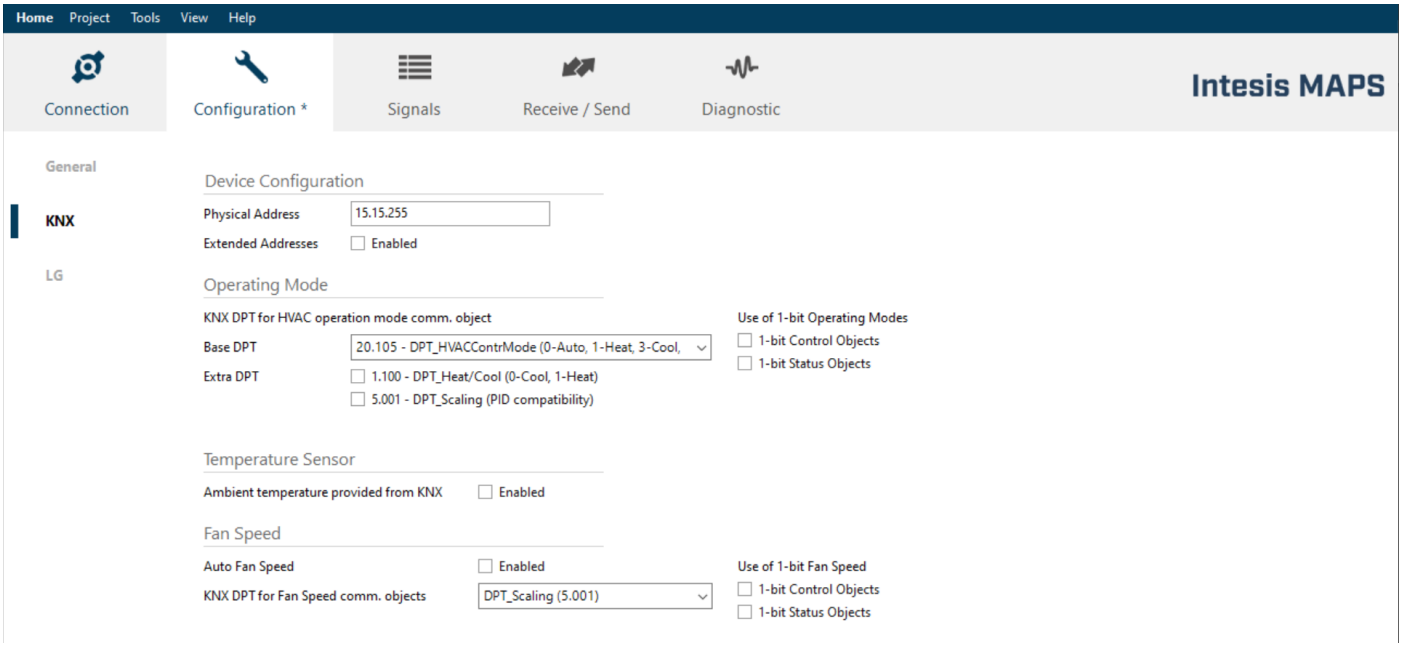

Figure 4.3 Intesis MAPS KNX configuration tab

1. **Device configuration**

   1.1. Physical Address. KNX physical address of the device in the network

   1.2. Extended Addresses. Enables usage of KNX Extended addresses (range from 16/0/0 to 32/7/255).

2. **Operating Mode.** Settings related to KNX interface for control and feedback of AC unit's operating mode.

   2.1. KNX DPT for HVAC operation mode comm object. Base DPT. Base DPT to use for control/monitor the operating mode. Following DPT types are offered:

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- DPT_20.105. DPT_HVACContrMode: 0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry
- DPT_5.x (non-standarized): 0-Auto, 1-Heat, 2-Dry, 3-Fan, 4-Cool

2.2. KNX DPT for HVAC operation mode comm object. Extra DPT. Additional DPT to use for control/monitor the operating mode.

- DPT_1.100. DPT_Heat/Cool: 0-Cool, 1-Heat.
- DPT_5.001. DPT_Scaling: Enables objects "Control_ Heat Mode & On" and "Control_ Cool Mode & On". Their type is DPT_Scaling (0..100%), and their ending is to be able to control parameters On/Off, Cool/Heat of indoor unit from a single percentage object. They are meant to provide compatibility with certain thermostats oriented to the operation of valves for Heating/Cooling. Whenever a value > 0% is received at each of these two objects, the corresponding operating mode and ON operation is sent to the indoor unit. Whenever both values are 0%, indoor unit is set to OFF

2.3. Use of 1-bit Operating Modes. 1-bit Control Objects. Enables a bit-type object for the control of each operating mode.

2.4. Use of 1-bit Operating Modes. 1-bit Status Objects. Enables a bit-type object for monitoring each operating mode.

3. Temperature Sensor.

3.1. Ambient temperature provided from KNX. Enables object Control_ KNX ambient temperature.

NOTE: Indoor unit does not accept, by itself, that an ambient temperature for control of operation of the indoor unit is provided. To allow regulation of indoor unit according to a temperature reference from KNX, what Intesis does is passing a different temperature setpoint to the indoor unit than the one required by the user. The passed setpoint is such that the difference 'Ambient temperature reported by LG IU – AC setpoint' is equal to 'Ambient temperature reported by KNX – AC setpoint required by KNX', using the following formula:

"AC Setp. Temp" = "AC Ret. Temp" - ("KNX Amb. Temp." - "KNX Setp. Temp")

Where:

- AC Setp. Temp: AC indoor unit setpoint temperature
- AC Ret. Temp: AC indoor unit return temperature
- KNX Amb. Temp.: Ambient temperature provided from KNX
- KNX Setp. Temp: Setpoint temperature provided from KNX

Consequently, when using this feature (Ambient temp provided from KNX), setpoint at AC and setpoint in KNX will not necessarily be the same (actually, user will not be able to operate setpoint from AC System controllers as the remote controller).

4. Fan Speed. Settings related to KNX interface for control and feedback of AC unit's fan speed.

4.1. Auto Fan Speed. Configures availability of Auto Fan Speed control/monitoring objects. Necessary if your indoor unit has auto fan speed.

4.2. KNX DPT for Fan Speed comm objects. DPT_5.001, DPT_Scaling. Control/monitoring of Fan Speed is performed by means of scaling (percentage) objects. Thresholds for control object and values for status object will vary according to number of fanspeeds of the unit.

4.2. KNX DPT for Fan Speed comm objects. DPT_5.010, DPT_Value_1_Ucount. Control/monitoring of Fan Speed is performed by means of enumerated values.

4.4. Use of 1-bit Fan Speed. 1-bit Control Objects. Enables a bit-type object for control of fan speed.

4.5. Use of 1-bit Fan Speed. 1-bit Status Objects. Enables a bit-type object for monitoring of each fan speed.

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4.2.5 LG configuration

Units configuration

Set parameters for connection with LG's installation.

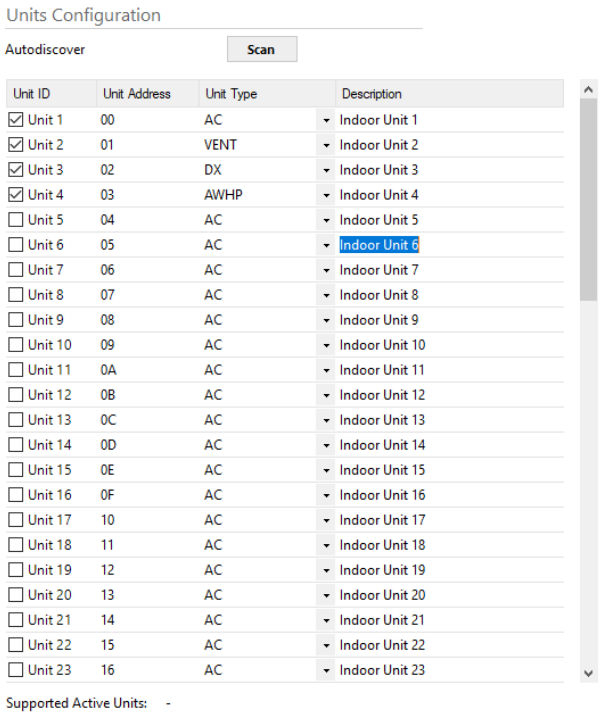

Figure 4.4 Intesis MAPS LG configuration tab

In Units Configuration section you need to enter, for each unit:

- **Active**. If it's active (checkbox at Unit xx), ranging from 1 to 64 indoor units that will be integrated (maximum number of units will depend on Intesis model)
- **Unit address**. Address 0…FF of Unit in LG EIA485 bus.
- **Unit type.** It sets the type of the indoor unit. You can select between AC, VENT, DX and AWHP units.
- **Description**. Descriptive name to easy identification of the unit (for example, 'living room floor 1 unit', etc).

Additional to manual entry of each unit, Autodiscover of present units in LG VRF system is possible. To do so, click button **Scan**. Following window will appear:

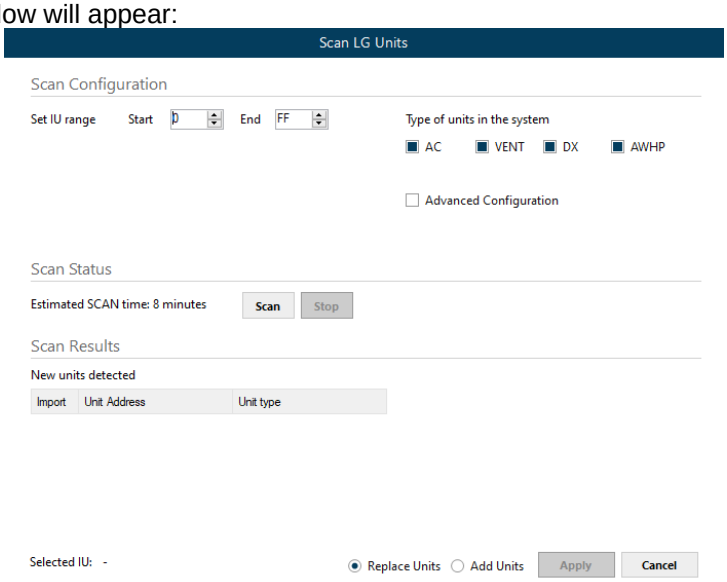

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Figure 4.5 Intesis MAPS Scan LG Units window

Before pressing the **Scan** button, set the appropriate settings for the SCAN:

- Set the IU addresses range to search.
- Set the type of units in the LG system to search.

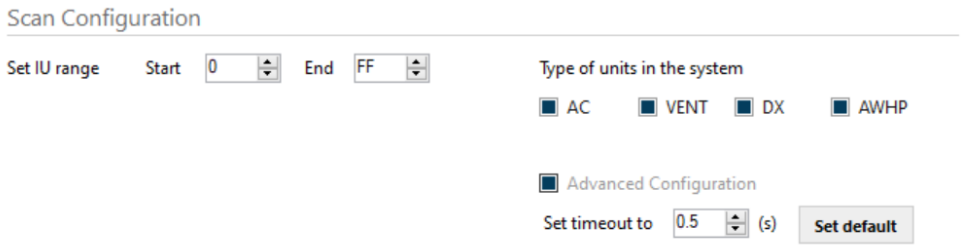

Figure 4.6 Intesis MAPS Scan Configuration settings

- In advance configuration we can set the timeout of the SCAN in case of need.

Scanning time will be different according to SCAN Configuration. As we add more type of AC units to scan, the scanning time will increase. It is the same in case we scan a large range of units compared to a short range.

Once the settings are stablished, by pressing SCAN EIA 485 bus will be scanned for available units. Error window will appear if there is a problem in the connection with EIA 485 bus (units not powered, bus not connected, …).

A progress bar will appear during the scan. When the scan finishes, detected units will be shown in available units as follows:

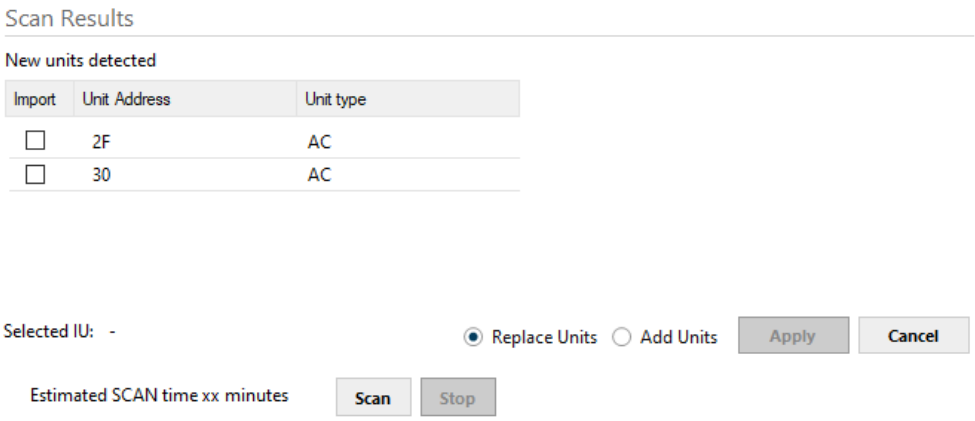

Figure 4.7 Intesis MAPS Scan LG Units window with scan results

Select the units to add (or replace) in installation, according to selection **Replace Units** / **Add Units**.
Once the desired units and action are selected, click **Apply** to perform the action.

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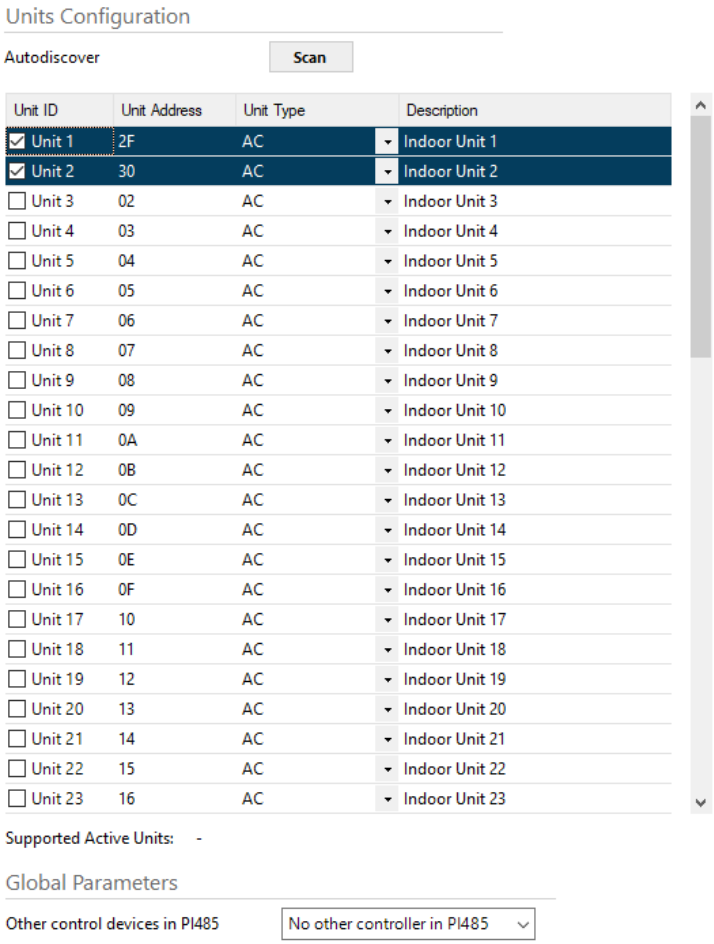

Figure 4.8 Intesis MAPS LG configuration tab after importing scan results

Global parameters
In this section we will find the following settings:

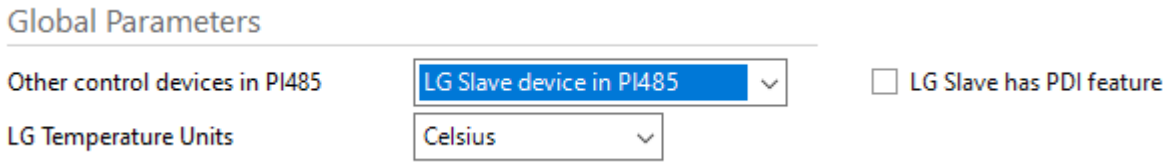

Figure 4.9 Intesis MAPS LG configuration tab. Global parameters

- **Other control devices in PI485**. This setting will allow to configure if there were any other controller device in the LG VRF bus or not.
    - **LG Slave has PDI feature.** If there were a LG slave device with PDI feature (Power Distribution Indicator), it is necessary to activate the LG Slave has PDI feature checkbox. This action will create a new signal to transmit the consumption value to KNX (Wh).

- **LG Temperature Units.** This setting allows to choose between Celsius or Fahrenheit degrees for the KNX side.

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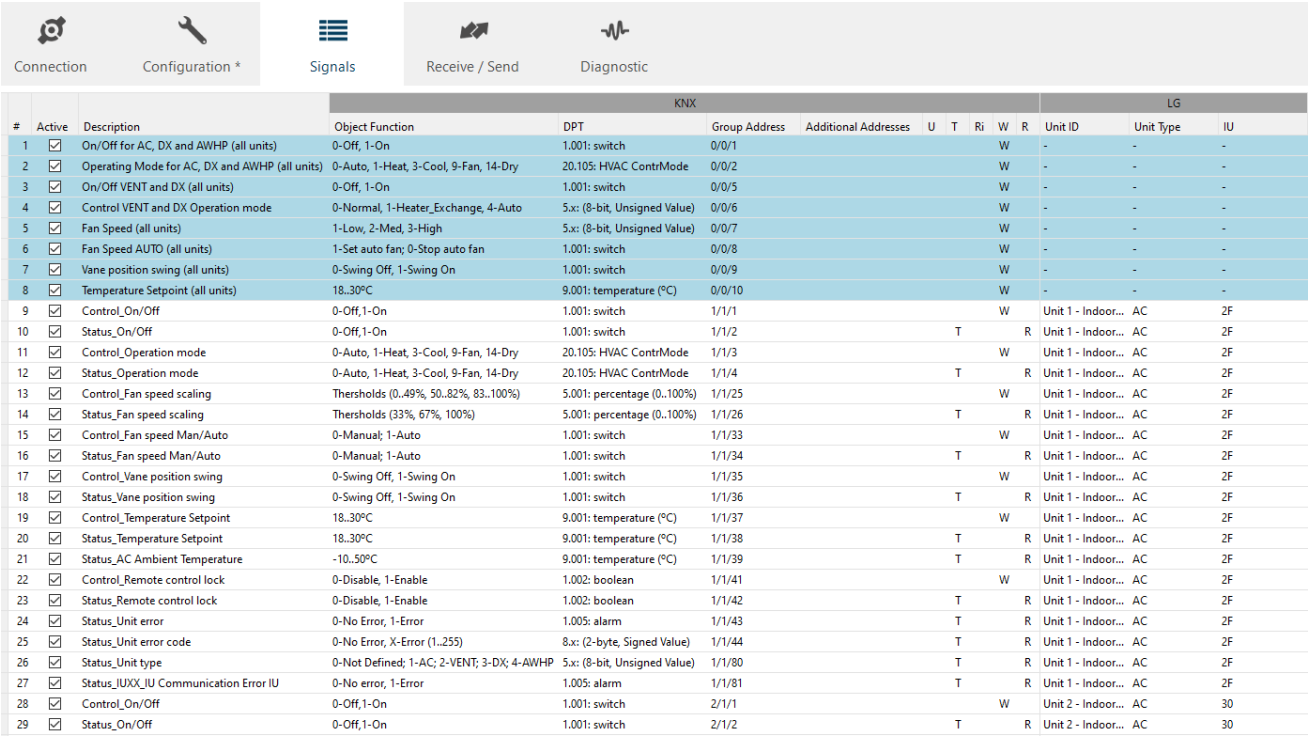
4.2.6 Signals

All available KNX objects, its corresponding description and other main parameters are listed in the signals tab.



			KNX									LG		
#	Active	Description	Object Function	DPT	Group Address	Additional Addresses	U	T	Ri	W	R	Unit ID	Unit Type	IU
1	☑	On/Off for AC, DX and AWHP (all units)	0-Off, 1-On	1.001: switch	0/0/1					W		-	-	-
2	☑	Operating Mode for AC, DX and AWHP (all units)	0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry	20.105: HVAC ContrMode	0/0/2					W		-	-	-
3	☑	On/Off VENT and DX (all units)	0-Off, 1-On	1.001: switch	0/0/5					W		-	-	-
4	☑	Control VENT and DX Operation mode	0-Normal, 1-Heater_Exchange, 4-Auto	5.x: (8-bit, Unsigned Value)	0/0/6					W		-	-	-
5	☑	Fan Speed (all units)	1-Low, 2-Med, 3-High	5.x: (8-bit, Unsigned Value)	0/0/7					W		-	-	-
6	☑	Fan Speed AUTO (all units)	1-Set auto fan; 0-Stop auto fan	1.001: switch	0/0/8					W		-	-	-
7	☑	Vane position swing (all units)	0-Swing Off, 1-Swing On	1.001: switch	0/0/9					W		-	-	-
8	☑	Temperature Setpoint (all units)	18..30ºC	9.001: temperature (ºC)	0/0/10					W		-	-	-
9	☑	Control_On/Off	0-Off,1-On	1.001: switch	1/1/1					W		Unit 1 - Indoor...	AC	2F
10	☑	Status_On/Off	0-Off,1-On	1.001: switch	1/1/2			T			R	Unit 1 - Indoor...	AC	2F
11	☑	Control_Operation mode	0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry	20.105: HVAC ContrMode	1/1/3					W		Unit 1 - Indoor...	AC	2F
12	☑	Status_Operation mode	0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry	20.105: HVAC ContrMode	1/1/4			T			R	Unit 1 - Indoor...	AC	2F
13	☑	Control_Fan speed scaling	Thersholds (0..49%, 50..82%, 83..100%)	5.001: percentage (0..100%)	1/1/25					W		Unit 1 - Indoor...	AC	2F
14	☑	Status_Fan speed scaling	Thersholds (33%, 67%, 100%)	5.001: percentage (0..100%)	1/1/26			T			R	Unit 1 - Indoor...	AC	2F
15	☑	Control_Fan speed Man/Auto	0-Manual; 1-Auto	1.001: switch	1/1/33					W		Unit 1 - Indoor...	AC	2F
16	☑	Status_Fan speed Man/Auto	0-Manual; 1-Auto	1.001: switch	1/1/34			T			R	Unit 1 - Indoor...	AC	2F
17	☑	Control_Vane position swing	0-Swing Off, 1-Swing On	1.001: switch	1/1/35					W		Unit 1 - Indoor...	AC	2F
18	☑	Status_Vane position swing	0-Swing Off, 1-Swing On	1.001: switch	1/1/36			T			R	Unit 1 - Indoor...	AC	2F
19	☑	Control_Temperature Setpoint	18..30ºC	9.001: temperature (ºC)	1/1/37					W		Unit 1 - Indoor...	AC	2F
20	☑	Status_Temperature Setpoint	18..30ºC	9.001: temperature (ºC)	1/1/38			T			R	Unit 1 - Indoor...	AC	2F
21	☑	Status_AC Ambient Temperature	-10..50ºC	9.001: temperature (ºC)	1/1/39			T			R	Unit 1 - Indoor...	AC	2F
22	☑	Control_Remote control lock	0-Disable, 1-Enable	1.002: boolean	1/1/41					W		Unit 1 - Indoor...	AC	2F
23	☑	Status_Remote control lock	0-Disable, 1-Enable	1.002: boolean	1/1/42			T			R	Unit 1 - Indoor...	AC	2F
24	☑	Status_Unit error	0-No Error, 1-Error	1.005: alarm	1/1/43			T			R	Unit 1 - Indoor...	AC	2F
25	☑	Status_Unit error code	0-No Error, X-Error (1..255)	8.x: (2-byte, Signed Value)	1/1/44			T			R	Unit 1 - Indoor...	AC	2F
26	☑	Status_Unit type	0-Not Defined; 1-AC; 2-VENT; 3-DX; 4-AWHP	5.x: (8-bit, Unsigned Value)	1/1/80			T			R	Unit 1 - Indoor...	AC	2F
27	☑	Status_IUXX_IU Communication Error IU	0-No error, 1-Error	1.005: alarm	1/1/81			T			R	Unit 1 - Indoor...	AC	2F
28	☑	Control_On/Off	0-Off,1-On	1.001: switch	2/1/1					W		Unit 2 - Indoor...	AC	30
29	☑	Status_On/Off	0-Off,1-On	1.001: switch	2/1/2			T			R	Unit 2 - Indoor...	AC	30

Figure 4.10 Intesis MAPS Signals tab

4.2.7 Sending the configuration to Intesis

When the configuration is finished, follow the next steps.

1.- Save the project (Menu option ***Project->Save***) on your hard disk (more information in Intesis MAPS User Manual).

2.- Go to tab 'Receive / Send' of MAPS, and in Send section, press Send button. Intesis will reboot automatically once the new configuration is loaded.

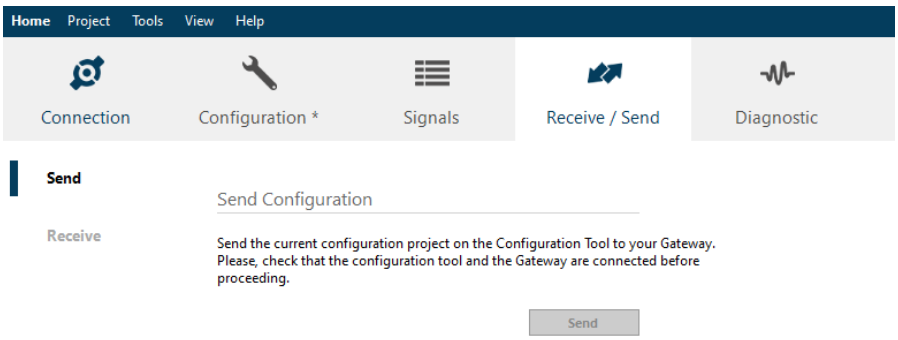


Figure 4.11 Intesis MAPS Receive/Send tab

After any configuration change, do not forget to send the configuration file to the Intesis using the Send button in the Receive / Send section.

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4.2.8 Diagnostic

To help integrators in the commissioning tasks and troubleshooting, the Configuration Tool offers some specific tools and viewers.

In order to start using the diagnostic tools, connection with the Gateway is required.

The Diagnostic section is composed by two main parts: Tools and Viewers.

- **Tools**
  Use the tools section to check the current hardware status of the box, log communications into compressed files to be sent to the support, change the Diagnostic panels' view or send commands to the gateway.

- **Viewers**
  In order to check the current status, viewer for the Internal and External protocols are available. It is also available a generic Console viewer for general information about communications and the gateway status and finally a Signals Viewer to simulate the BMS behavior or to check the current values in the system.

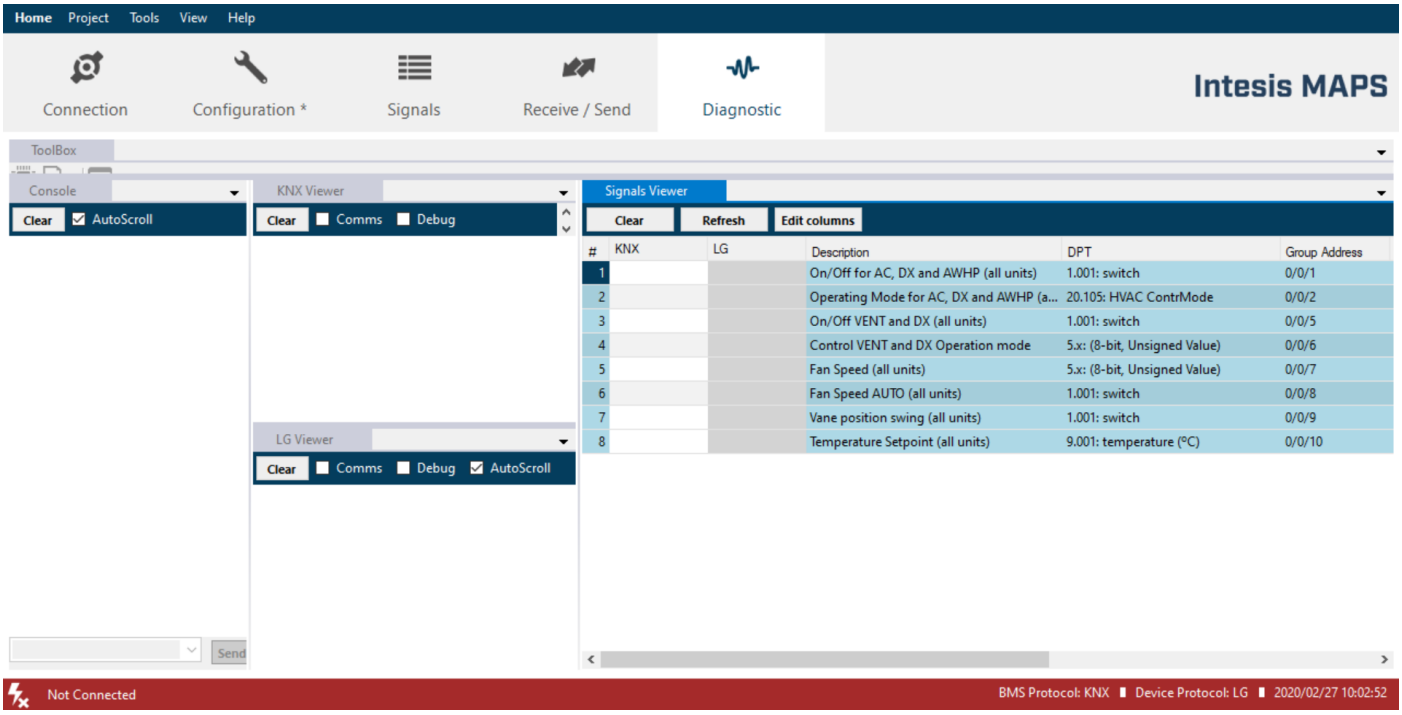

Figure 4.12 Diagnostic

More information about the Diagnostic section can be found in the Configuration Tool manual.

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4.2.9 Set-up procedure

1. Install Intesis MAPS on your laptop following the instructions given by the Installation wizard.

2. Mount the Intesis device in the desired installation location. Installation can be on DIN rail or on a stable not vibrating surface (DIN rail mounted inside a metallic industrial cabinet connected to ground is recommended).

3. Connect the device to the communication busses according to **3 CONNECTIONS**. Do not supply yet the device.

4. Once all the connections are committed, power up the Intesis device. The supply voltage can be 9 to 36 Vdc or just 24 Vac. Take care of the polarity of the supply voltage applied when using DC PS.

   WARNING! In order to avoid earth loops that can damage Intesis and/or any other equipment connected to it, we strongly recommend:

   - The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC power supply with the positive terminal connected to earth**.
   - The use of AC power supplies only if they are floating and not powering any other device.

5. Connect the PC to Intesis by using the Ethernet or the console port (see **3 CONNECTIONS**).

6. Open Intesis MAPS, create a new project selecting a copy of the one named **INKNXLGE---O000**.

7. Modify the configuration as desired, save it and download the configuration file to Intesis as explained in the Intesis MAPS user manual.

8. Visit the Diagnostic section and check that there is communication activity, some TX frames and some other RX frames. This means that the communication is OK.

   In case there were no communication activity between Intesis and the KNX side and/or LG units, check that those are operative: check communication cable used to connect all devices and any other communication parameter.

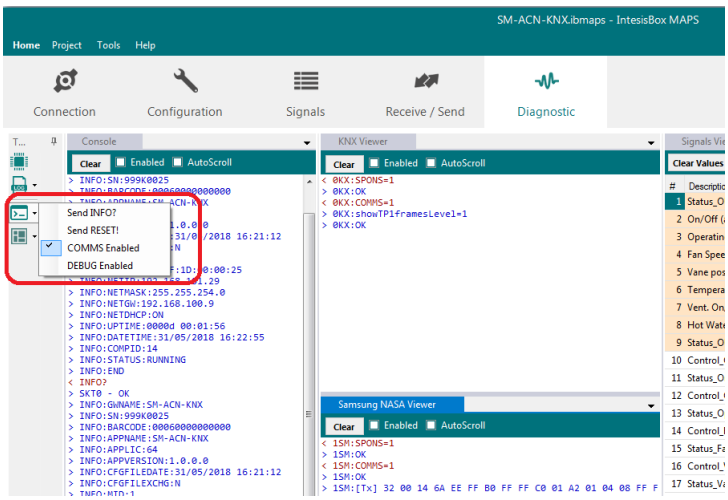

Figure 4.13 Enable COMMS

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5 Electrical & Mechanical Features

Enclosure	Plastic, type PC (UL 94 V-0) Net dimensions (dxwxh): 90x88x56 mm Recommended space for installation (dxwxh): 130x100x100mm Color: Light Grey. RAL 7035
Mounting	Wall. DIN rail EN60715 TH35.
Terminal Wiring (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 1 core: 0.5mm^2… 2.5mm^2 2 cores: 0.5mm^2… 1.5mm^2 3 cores: not permitted
Power	1 x Plug-in screw terminal block (3 poles) 9 to 36VDC +/-10%, Max.: 140mA. 24VAC +/-10% 50-60Hz, Max.: 127mA Recommended: 24VDC
Ethernet	1 x Ethernet 10/100 Mbps RJ45 2 x Ethernet LED: port link and activity
Port A	1 x KNX TP-1 Plug-in screw terminal block orange (2 poles) 2500VDC isolation from other ports KNX power consumption: 5mA Voltage rating: 29VDC 1 x Plug-in screw terminal block green (2 poles) Reserved for future use
Switch A (SWA)	1 x DIP-Switch for PORT A configuration: Reserved for future use
PORT B	1 x Serial EIA232 (SUB-D9 male connector) Reserved for future use 1 x LG EIA 485 Plug-in screw terminal block (3 poles) 1500VDC isolation from other ports
Switch B (SWB)	1 x DIP-Switch for PORT B configuration: Reserved for future use (leave OFF, default)

Battery	Size: Coin 20mm x 3.2mm Capacity: 3V / 225mAh Type: Manganese Dioxide Lithium
Console Port	Mini Type-B USB 2.0 compliant 1500VDC isolation
USB port	Type-A USB 2.0 compliant Only for USB flash storage device *(USB pen drive)* Power consumption limited to 150mA *(HDD connection not allowed)*
Push Button	Button A: Check the user manual Button B: Check the user manual
Operation Temperature	0°C to +60°C
Operational Humidity	5 to 95%, no condensation
Protection	IP20 (IEC60529)
LED Indicators	10 x Onboard LED indicators 2 x Run (Power)/Error 2 x Ethernet Link/Speed 2 x Port A TX/RX 2 x Port B TX/RX 1 x Button A indicator 1 x Button B indicator

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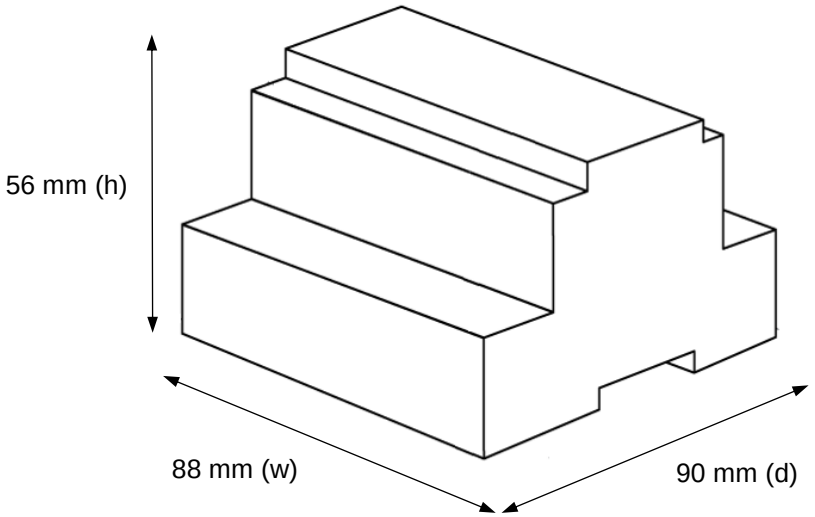
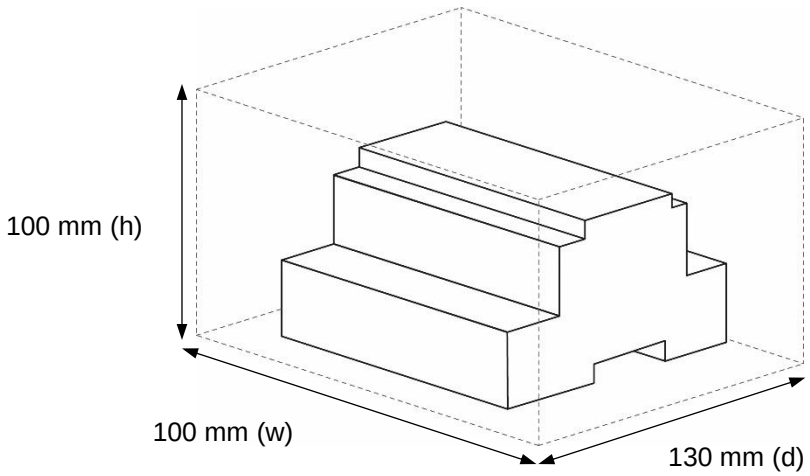
6 Dimensions



Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections.



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7 AC Unit Types compatibility

A list of LG unit model references compatible with INKNXLGE016O000 / INKNXLGE064O000 and their available features can be found in:

https://www.intesis.com/docs/compatibilities/inxxxlge0xxo000_compatibility

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8 Error codes for Indoor and Outdoor Units

This list contains all possible values shown in KNX Object for “Error Code” for each indoor unit and outdoor unit.

Thus, a unit having two or more active errors from that list will only report a single error code – the one of the first error that has been detected.

INTESIS Error code	LG Error Code	Error contents
1	CH01	Indoor unit air sensor error
2	CH02	Indoor unit pipe inlet sensor error
3	CH03	No transmission between cabled remote controller & indoor unit
4	CH04	Drain pump error
5	CH05	Indoor & outdoor unit transmission error
6	CH06	Indoor unit pipe outlet sensor error
7	CH07	All indoor units are not running in same mode on HP devices
8	CH08	Hydro kit hot water storage tank temperature sensor error.
9	CH09	Indoor unit EEPROM malfunction
10	CH10	Indoor unit BLDC fan motor malfunction
11	CH11	Indoor unit communication error
21	CH21	Inverter PVB IPM failure (appears as 211 on VRF Master, 212 on Slave 1, 213 on Slave 2, 214 on Slave 3)
22	CH22	AC input overcurrent failure (appears as 211 on VRF Master, 212 on Slave 1, 213 on Slave 2, 214 on Slave 3)
23	CH23	Inv Compressor DC Link low voltage (appears as 211 on VRF Master unit, 212 on Slave 1, 213 on Slave 2, 214 on Slave 3)
24	CH24	Compressor output head too high (Main outdoor unit 24, Slave1 109, Slave2 140 Slave3 153)
25	CH25	Input voltage high or low
26	CH26	Inv Compressor first operation failure (Master 261, Slave1 262, Slave2 263, Slave3 264)
27	CH27	PSC error
43	CH43	High pressure sensor failure (Master 431, Slave1 432, Slave2 433, Slave3 434)
44	CH44	Outdoor unit ambient sensor faulty (Master 441, Slave1 442, Slave2 443, Slave3 444)
45	CH45	Condenser pipe sensor defective (Master 451, Slave1 452, Slave2 453, Slave3 454)
46	CH46	Compressor suction temperature thermistor defective
47	CH47	Constant1 Compressor outlet pipe temperature sensor malfunction (Master 471, Slave1 472, Slave2 443, Slave3 474)
48	CH48	Constant 2 Compressor outlet pipe temperature sensor failure (Master 481, Slave1 482, Slave2 483, Slave3 484)
49	CH49	Outdoor unit IPM temperature sensor defective
50	CH50	Outdoor unit phase connection error (Master 501, Slave1 502, Slave2 503, Slave3 504)
51	CH51	Capacity Excess
52	CH52	Communication error between inverter PCB and main PCB (Master 521, Slave1 522, Slave2 522, Slave3 523)
53	CH53	Communication error between outdoor main PCB and indoor unit PCB. (Master 531, Slave1 532, Slave2 532, Slave3 533)
54	CH54	The phase connections are missing or in the wrong order (Master 541, Slave1 542, Slave2 543, Slave3 544)
57	CH57	Communication error between main PCB and inverter PCB (Master 571, Slave 572, Slave2 573, Slave3 574)
59	CH59	Plus connection error (Master 591, Slave1 592, Slave2 593, Slave3 594)

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60	CH60	Inverter PCB EEPROM error (Master 601, Slave1 602, Slave2 603, Slave3 604)
61	CH61	Condenser pipe sensor temperature load
62	CH62	Heat sink sensor overheat
65	CH65	Heat sink sensor open or short circuit
67	CH67	Outdoor unit fan locked (Master 671, Slave1 672, Slave2 673, Slave3 674)
69	CH69	Constant 1 Compressor CT Sensor failure (Master 691, Slave1 692, Slave2 693, Slave3 694)
70	CH70	Stationary 2 Compressor CT Sensor failure (Master 701, Slave1 702, Slave2 703, Slave3 704)
73	CH73	AC input surge current failure (Master 731, Slave1 732, Slave2 733, Slave3 734)
75	CH75	Fan CT sensor fault (Master 751, Slave1 752, Slave2 753, Slave3 754)
76	CH76	Fan DC link high voltage error (Master 761, Slave1 762, Slave2 763, Slave3 764)
77	CH77	Fan overcurrent fault (Master 771, Slave1 772, Slave2 773, Slave3 774)
79	CH79	Fan initial start error (Master 791, Slave1 792, Slave2 793, Slave3 794)
86	CH86	Main PCB EEPROM failure (Master 861, Slave1 862, Slave2 863, Slave3 864)
87	CH87	Fan PCB EEPROM failure (Master 871, Slave1 872, Slave2 873, Slave3 874)
104	CH104	Communication error between outdoor units (Master 11- & gt; 041, Slave1 12- & gt; 042, Slave2 13- & gt; 043, Slave3 14- & gt; 044)
105	CH105	Communication error between fan PCB and inverter PCB (Master 11 – & 051, Slave1 12 – 05 052, Slave2 13- & 053, Slave3 14 – 05 054)
106	CH106	Outdoor Unit Fan PCB IPM Error
107	CH107	Fan DC link low voltage fault (Master 11 – 07 071, Slave1 12 – 07 072, Slave2 13 – 07 073, Slave3 14 – 07 074)
113	CH113	Outdoor Unit Liquid pipe (condenser) temperature sensor faulty (Master 11- 131 131, Slave1 12 – 132 132, Slave2 13 – 133 133, Slave3 14 – 134 134)
115	CH115	Outdoor unit subcool output temperature sensor failure (Master 11 – & gt; 151, Slave1 12 – & gt; 152, Slave2 13- & gt; 153, Slave3 14 – & gt; 154
173	CH173	Outdoor unit constant1 compressor overcurrent (Master 11 – 73 731, Slave1 12 – 7 732, Slave2 13 – 7 733, Slave3 14 – 73 734)
174	CH174	Outdoor unit constant2 compressor overcurrent (Master 11 – 74 741, Slave1 12 – 74 742, Slave2 13 – 74 743, Slave3 14 – 74 744)
182	CH182	Master Outdoor Unit main PCB to auxiliary PCB communication error
184	CH184	Oil compensating pipe temperature sensor malfunction (Master (11-841), Slave1 (12-842), Slave2 (13-843), Slave3 (14-844)
185	CH185	Oil compensating pipe temperature sensor malfunction (Master (11-851), Slave1 (12-852), Slave2 (13-853), Slave3 (14-854)
186	CH186	Oil compensating pipe temperature sensor malfunction (Master (11-861), Slave1 (12-862), Slave2 (13-863), Slave3 (14-864)
193	CH193	Fan PCB Heatsink temperature is high (Master 11 – 93 931, Slave1 12- 9 932, Slave2 – 9 933, Slave3 14- 93 934)
194	CH194	Fan PCB heatsink temperature sensor faulty (Master 11 – 94 941, Slave1 12 – 94 942, Slave2 13 – 94 943, Slave3 14 – 94 944)
242	CH242	Network failure

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9 Appendix A – Communication Objects Table

TYPE OF SIGNAL FUNCTION		TYPE OF UNITS				NAME	LEN.	DPT	DPT ID	FLAGS				FUNCTION
		AC	VENT	DX	AWHP					R	W	T	U	
GLOBAL SIGNALS	ON/OFF	X	X	X	X	*On/Off (all units)*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off, 1-On*
	OP MODE	X	X	X	X	*Operating Mode (all units)*	*1 byte*	*DPT_HVACContrMode*	*20.105*		W			*0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry*
		X	X	X	X	*Operating Mode (all units)*	*1 byte*	*Non-standarized*	*5.x*		W			*0-Auto, 1-Heat, 2-Dry, 3-Fan, 4-Cool*
		X	X	X	X	*Operating Mode (all units)*	*1 byte*	*Non-standarized*	*5.x*		W			*0-Cool, 1-Heat, 2-Dry, 3-Fan, 4-Auto*
	ON/OFF VENT and DX	X	X	X	X	*On/Off VENT and DX (all units)*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off, 1-On*
	OP MODE VENT and DX	X	X	X	X	*Control VENT and DX (all units)*	*1 byte*	*Non-standarized*	*5.x*		W			*0-Normal, 1-Heater_Exchange, 4-Auto*
	FAN SPEED	X	X	X	X	*Fan Speed (all units)*	*1 byte*	*Non-standarized*	*5.x*		W			*1-Low, 2-Mid, 3-High, 4-High+*
		X	X	X	X	*Fan Speed AUTO (all units)*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set auto fan; 0-Stop auto fan*
	VANE POSITION	X	X	X	X	*Vane position SWING (all units)*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set swing vane; 0-Stop swing vane*
	SETP TEMP	X	X	X	X	*Temperature Setpoint (ºC) (all units)*	*2 byte*	*DPT_Value_Temp*	*9.001*		W			*Cool:18…30 ºC; Heat:18…30 ºC*
INDOOR UNIT SIGNALS	ON/OFF	X		X	X	*Control _On/Off*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off,1-On*
		X		X	X	*Status _On/Off*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Off,1-On*
	OP MODE	X		X	X	*Control _Operation mode*	*1 byte*	*DPT_HVACContrMode*	*20.105*		W			*0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry*
		X		X	X	*Status _Operation mode*	*1 byte*	*DPT_HVACContrMode*	*20.105*	R		T		*0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry*
		X		X	X	*Control _Operation mode*	*1 byte*	*Non-standarized*	*5.x*		W			*0-Auto, 1-Heat, 2-Dry, 3-Fan, 4-Cool*
		X		X	X	*Status _Operation mode*	*1 byte*	*Non-standarized*	*5.x*	R		T		*0-Auto, 1-Heat, 2-Dry, 3-Fan, 4-Cool*
		X		X	X	*Control _Operation mode*	*1 byte*	*Non-standarized*	*5.x*		W			*0-Cool, 1-Heat, 2-Dry, 3-Fan, 4-Auto*
		X		X	X	*Status _Operation mode*	*1 byte*	*Non-standarized*	*5.x*	R		T		*0-Cool, 1-Heat, 2-Dry, 3-Fan, 4-Auto*
		X		X	X	*Control _Mode Cool/Heat*	*1 bit*	*DPT_Heat/Cool*	*1.100*		W			*0-Cool, 1-Heat*
		X		X	X	*Status _Mode Cool/Heat*	*1 bit*	*DPT_Heat/Cool*	*1.100*	R		T		*0-Cool, 1-Heat*
		X		X	X	*Control _Heat mode&ON*	*1 byte*	*DPT_Scaling*	*5.001*		W			*0%-Off, 1%-100%-On+Heat*
		X		X	X	*Control _Cool mode&ON*	*1 byte*	*DPT_Scaling*	*5.001*		W			*0%-Off, 1%-100%-On+Cool*
		X		X	X	*Control _Auto mode*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set auto mode*
		X		X	X	*Status _Auto mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Auto mode active, 0-Auto mode not active*

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TYPE OF SIGNAL FUNCTION		TYPE OF UNITS				NAME	LEN.	DPT	DPT ID	FLAGS				FUNCTION
		AC	VENT	DX	AWHP					R	W	T	U	
INDOOR UNIT SIGNALS		X		X	X	*Control _Heat mode*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set heat mode*
		X		X	X	*Status _Heat mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Heat mode active, 0-Heat mode not active*
		X		X	X	*Control _Cool mode*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set cool mode*
		X		X	X	*Status _Cool mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Cool mode active, 0-Cool mode not active*
		X				*Control _Fan mode*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set fan mode*
		X				*Status _Fan mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Fan mode active, 0-Fan mode not active*
		X				*Control _Dry mode*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set dry mode*
		X				*Status _Dry mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Dry mode active, 0-Dry mode not active*
	FAN SPEED	X	X	X		*Control_Fan speed enumerated*	*1 byte*	*Non-standarized*	*5.x*		W			*1-Low, 2-Mid, 3-High*
		X	X	X		*Status _Fan speed enumerated*	*1 byte*	*Non-standarized*	*5.x*	R		T		*1-Low, 2-Mid, 3-High*
		X	X	X		*Control _Fan speed scaling*	*1 byte*	*DPT_Scaling*	*5.001*		W			*Thersholds (0%..49%; 50%..82%; 83%..100%)*
		X	X	X		*Status _Fan speed scaling*	*1 byte*	*DPT_Scaling*	*5.001*	R		T		*Thersholds (33%; 67%; 100%)*
		X	X	X		*Control_ Fan speed low*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set fan speed low*
		X	X	X		*Status_Fan speed low*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Speed low active, 0-Speed low not active*
		X	X	X		*Control_Fan speed mid*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set fan speed mid*
		X	X	X		*Status_Fan speed mid*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Speed mid active, 0-Speed mid not active*
		X	X	X		*Control_Fan speed high*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set fan speed high*
		X	X	X		*Status_Fan speed high*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Speed high active, 0-Speed high not active*
		X	X	X		*Control_Fan speed Man/Auto*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Manual; 1-Auto*
		X	X	X		*Status_Fan speed Man/Auto*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Manual; 1-Auto*
	VANES	X				*Control_Vane position swing*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set swing vane, 0-Stop swing vane*
		X				*Status_Vane position swing*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Vane swing active, 0-Vane swing not active*
	TEMP.	X		X		*Control_Temperature Setpoint (ºC)*	*2 byte*	*DPT_Value_Temp*	*9.001*		W			*Cool:18..30 ºC; Heat:18..30 ºC*
		X		X		*Status_Temperature Setpoint (ºC)*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*Cool:18..30 ºC; Heat:18..30 ºC*
		X		X	X	*Status_AC Ambient Temperature (ºC)*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*-10..50 ºC*
		X		X		*Control_KNX ambient Temperature (ºC)*	*2 byte*	*DPT_Value_Temp*	*9.001*		W			*ºC*

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TYPE OF SIGNAL FUNCTION		TYPE OF UNITS				NAME	LEN.	DPT	DPT ID	FLAGS				FUNCTION
		AC	VENT	DX	AWHP					R	W	T	U	
INDOOR UNIT SIGNALS	REMOTE CONTROL	X	X	X	X	*Control_Remote control lock*	*1 bit*	*DPT_Bool*	*1.002*		W			*0-Lock Disabled, 1-Lock enabled*
		X	X	X	X	*Status_Remote control lock*	*1 bit*	*DPT_Bool*	*1.002*	R		T		*0-Lock Disabled, 1-Lock enabled*
	ERROR CODE	X	X	X	X	*Status_Unit error*	*1 bit*	*1.005-DPT_Alarm*	*1.005*	R		T		*0-No error, 1-Error*
		X	X	X	X	*Status_Unit error code*	*2 byte*	*Non-standarized*	*8.x*	R		T		*0-No Error, X-Error*
	CONSUMP.	X		X	X	*Status_Accumulated power consumption*	*4 byte*	*DPT_ActiveEnergy*	*13.010*	R		T		*0…999990Wh*
	ON/OFF VENT and DX		X	X		*Control_Vent. On/Off*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off, 1-On*
			X	X		*Status_Vent. On/Off*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Off, 1-On*
	OP MODE VENT and DX		X	X		*Control_Vent. Operation mode*	*1 byte*	*Non-standarized*	*5.x*		W			*0-Normal, 1-Heater_Exchange, 4-Auto*
			X	X		*Status_Vent. Operation mode*	*1 byte*	*Non-standarized*	*5.x*	R		T		*0-Normal, 1-Heater_Exchange, 4-Auto*
			X	X		*Control_Vent. Normal mode*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set Vent. Normal mode*
			X	X		*Status_Vent. Normal mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Vent. Normal mode active, 0-Vent. Normal mode not active*
			X	X		*Control_Vent. HeatEx mode*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set Vent. HeatEx mode*
			X	X		*Status_Vent. HeatEx mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Vent. HeatEx mode active, 0-Vent. HeatEx mode not active*
			X	X		*Control_Vent. Auto mode*	*1 bit*	*DPT_Switch*	*1.001*		W			*1-Set Vent. Auto mode*
			X	X		*Status_Vent. Auto mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*1-Vent. Auto mode active, 0-Vent. Auto mode not active*
	MAINT.		X	X		*Status_FilterSign*	*1 bit*	*DPT_Alarm*	*1.005*	R		T		*0-Normal, 1-Alarm*
	DX SIGNALS			X		*Status_Supply air temperature*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*-10..50 ºC*
				X		*Status_Outdoor temperature*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*-10..50 ºC*
				X		*Control_Heater*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off, 1-On*
				X		*Status_Heater*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Off, 1-On*
				X		*Control_Power saving*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off, 1-On*
				X		*Status_Power saving*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Off, 1-On*
				X		*Control_Rapidity*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off, 1-On*
				X		*Status_Rapidity*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Off, 1-On*
				X		*Control_Humidity*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off, 1-On*
				X		*Status_Humidity*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Off, 1-On*
	AWHP SIGNALS				X	*Status_A2W setpoint mode*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Air, 1-Water*
					X	*Control_A2W setpoint*	*2 byte*	*DPT_Value_Temp*	*9.001*		W			*Air (18..30ºC) / Water (6..80ºC)*
					X	*Status_A2W setpoint*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*Air (18..30ºC) / Water (6..80ºC)*
					X	*Control_HotWater On/Off*	*1 bit*	*DPT_Switch*	*1.001*		W			*0-Off, 1-On*

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TYPE OF SIGNAL FUNCTION		TYPE OF UNITS				NAME	LEN.	DPT	DPT ID	FLAGS				FUNCTION
		AC	VENT	DX	AWHP					R	W	T	U	
INDOOR UNIT SIGNALS	AWHP SIGNALS				X	*Status_HotWater On/Off*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Off, 1-On*
					X	*Status_HotWater only*	*1 bit*	*DPT_Switch*	*1.001*	R		T		*0-Off, 1-On*
					X	*Control_HotWater setpoint*	*2 byte*	*DPT_Value_Temp*	*9.001*		W			*30…80ºC*
					X	*Status_HotWater setpoint*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*30…80ºC*
					X	*Status_Water inlet temperature*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*ºC*
					X	*Status_Water discharge temperature*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*ºC*
					X	*Status_Water tank temperature*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*ºC*
					X	*Status_Water solar temperature*	*2 byte*	*DPT_Value_Temp*	*9.001*	R		T		*ºC*
	SYSTEM INFO	X	X	X	X	*Status_Unit type*	*1 byte*	*Non-standarized*	*5.x*	R		T		*0-Not defined, 1-AC, 2-VENT, 3-DX, 4-AWHP*
	COMM. STATUS	X	X	X	X	*Status IUXX_Communication Error IU*	*1 bit*	*DPT_Alarm*	*1.005*	R		T		*0-No error, 1-Error*

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