



# **IntesisBox<sup>®</sup> KNX**

Mitsubishi Electric Centralized Controller TCP/IP XML

**User Manual**

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**Intesis**   
Member of the HMS group

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Gateway for integration of Mitsubishi Electric City Multi air conditioning systems into KNX home automation systems.

Order code:

**IBKNXMIT015C000, 15 city multi groups version**  
**IBKNXMIT100C000, 100 city multi groups version**

## INDEX

1	Description .....	5
1.1	Introduction.....	5
1.2	Functionality .....	6
1.3	Capacity of ME-AC-KNX .....	6
2	KNX System.....	7
2.1	Description.....	7
2.2	Points definition .....	7
3	Connections .....	9
3.1	Power device .....	10
3.2	Connect to Mitsubishi's Centralized Controller(s).....	10
3.3	Connection to KNX.....	10
3.4	Connect to PC (Configuration tool) .....	10
4	Set-up process and troubleshooting .....	11
4.1	Pre-requisites .....	11
4.2	IntesisBox MAPS. Configuration & monitoring tool for IntesisBox .....	11
4.2.1	Introduction .....	11
4.2.2	Connection.....	11
4.2.3	Configuration tab .....	12
4.2.3.1	KNX Configuration.....	12
4.2.3.2	Mitsubishi Electric Configuration .....	15
4.2.4	Signals .....	19
4.2.5	Sending the configuration to IntesisBox .....	19
4.2.6	Diagnostic .....	20
4.3	Set-up procedure.....	21
5	Electrical & Mechanical Features.....	22
6	Dimensions .....	23
7	Appendix A – Communication Objects Table .....	24

## 1 Description

### 1.1 Introduction

This document describes the integration of Mitsubishi Electric's City Multi series air conditioning systems into KNX compatible devices and systems using the IntesisBox KNX to Mitsubishi Electric's Centralized Controller communication gateway.

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

This integration requires the Mitsubishi Electric City Multi AC system to be equipped with a Mitsubishi Electric's Centralized Controller for MNET (G-50A, GB-50A, AG-150A, EB-50, EW-50 or AE200 and newer). This Centralized Controller offers the signals of the City Multi AC system through XML protocol at its Ethernet port, which is accessed by the IntesisBox. Every Centralized Controller from Mitsubishi Electric allows access to the signals of up to 50 City Multi indoor units groups, no matter the number of outdoor units installed. In the Centralized Controller, the control unit is the group, each of which can have from 1 to 16 associated indoor units.

MNET's Centralized Controller is offered by Mitsubishi Electric. Each different model has different features (some incorporate just a blind cover, others have a keyboard and an LCD panel). Mitsubishi Electric's Expansion Controllers can be connected to the MNET Centralized Controller in order to extend support to more than 50 indoor unit groups (50 additional groups for each Expansion Controller). Expansion Controllers in MNET system are also supported by IntesisBox.

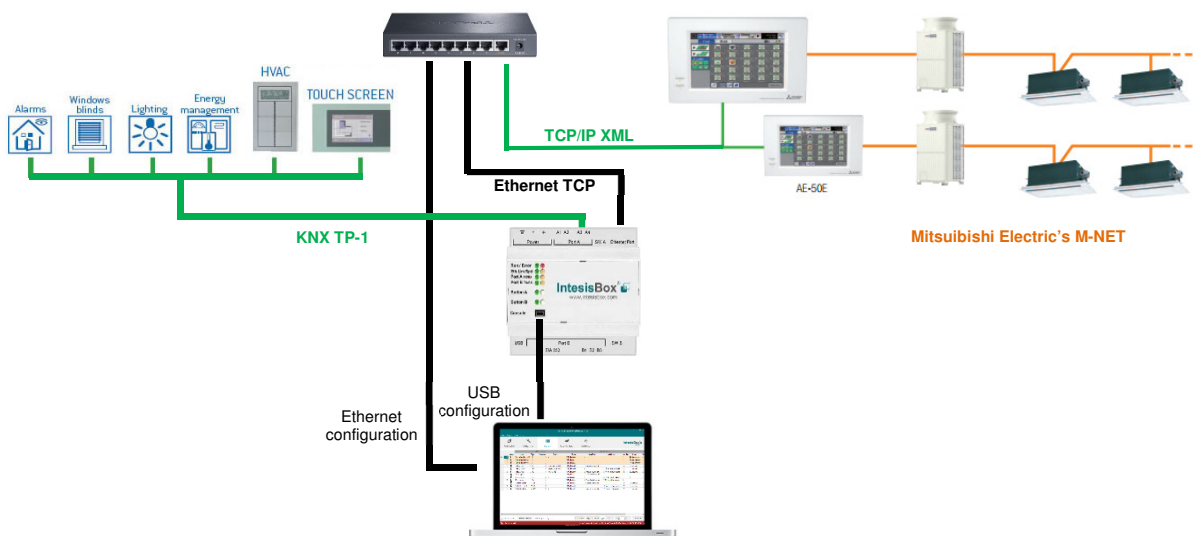


**NOTE:** Please take into account that most Mitsubishi Electric Centralized Controllers require a software license, PC-Monitoring license (SW-Mon), that must be purchased together with the controller in order that the XML interface is active and can be used by the IntesisBox.

IntesisBox needs to be configured using IntesisBox MAPS software configuration tool. In the software, KNX and MNET's Centralized Controller parameters must be selected and downloaded to the IntesisBox.

Up to 15 indoor unit groups (1 Centralized Controller) or 100 indoor unit groups (2 Centralized Controllers) are supported, depending on the version of the gateway.

This document assumes the user is familiar with KNX and Mitsubishi Electric technologies and technical terms.



**Integration of Mitsubishi's Centralized Controller into KNX home automation systems**

## 1.2 Functionality

IntesisBox® continuously polls (reads) all the signals of the Centralized Controller groups and maintains their values updated in the KNX group objects of the gateway interface. Corresponding WRITE telegram is sent to associated group address when change of value is detected (or during first update).

When a WRITE telegram is received from KNX in a gateway group address associated to a writeable group object (flag W enabled), the corresponding command is sent to the City Multi associated signal

In the continuous polling process of the Centralized Controller, if there is no answer, it is indicated with a virtual signal of communication error for the Centralized Controller. In the same way, there is a communication error virtual signal for each of the City Multi groups; normally it will be activated when this group is not configured/active in the Centralized Controller.

The IP address and communication parameters (polling cadence, connection timeout, ...) of every Centralized Controller must be also configured using IntesisBox MAPS configuration tool, as well as KNX interface objects and communication parameters.

From the configuration tool, it is also possible to scan the Centralized Controller for available groups and thereafter add them in the configuration, so that they are continuously polled.

## 1.3 Capacity of ME-AC-KNX

IntesisBox capacity is listed below:

Element	Max.	Notes
Number of MNET Centralized Controllers	2	Number of independent centralized controllers (if expansion controllers are present, each expansion controller counts as a single centralized controller)
Number of City Multi groups	100	50 groups for each centralized controller are supported
Max number of group objects per group	90	Number of available group objects will vary according to unit type
Max number of group objects per Centralized Controller	4514	14 global group objects (error signaling & batch control) + 90 group object/MNET group x 50 MNET groups
Max number of KNX group addresses	9000	Maximum number of different KNX group addresses that can be defined.
Max number of associations	18000	Maximum number of KNX associations (between a group object and a group address) supported.

There are 2 different models of *IntesisBox® KNX – Mitsubishi Electric Centralized Controller* with different capacity every one of them. The table above shows the capacity for the top model (with maximum capacity).

The 2 different models allow integrating respectively: 1 or 2 Centralized Controllers.

Their **order codes** are:

- **IBKNXMIT015C000**. Model supporting up to 15 City Multi groups.
- **IBKNXMIT100C000**. Model supporting up to 100 City Multi groups.

## 2 KNX System

In this section, a common description for all IntesisBox KNX series gateways is given, from the point of view of KNX system which is called from now on *internal system*. Connection with the Mitsubishi Electric's Centralized Controller is also called from now on *external system*.

### 2.1 Description

IntesisBox 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.

*IntesisBox 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 (Mitsubishi Electric's Centralized Controller).

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 synchronised 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, IntesisBox will send READ telegrams to group addresses of all communication objects marked with flag 'Ri'. The behaviour of each individual point into IntesisBox 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
<b>Description</b>	Descriptive information about the communication object or signal.
<b>Object function</b>	Information on range of values for the group object.
<b>DPT</b>	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.
<b>Group</b>	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.
<b>Listening addresses</b>	They are the addresses that can write on the group object, apart of the main group address.
<b>R</b>	Read. If this flag is activated, READ telegrams of this group address will be accepted.
<b>Ri</b>	Read on Init. If this flag is activated, the object will trigger corresponding READ request (on associated group address) on initialization.
<b>W</b>	Write. If this flag is activated, WRITE telegrams on this group object will be accepted.
<b>T</b>	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.
<b>U</b>	Update. If this flag is activated, UPDATE telegrams (response to READ telegrams) on this group object will be accepted.
<b>Active</b>	If activated, the point will be active in IntesisBox, if not, the behaviour 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 IntesisBox 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, according to unit type in section 7



### 3 Connections

Find below information regarding the IntesisBox connections available.

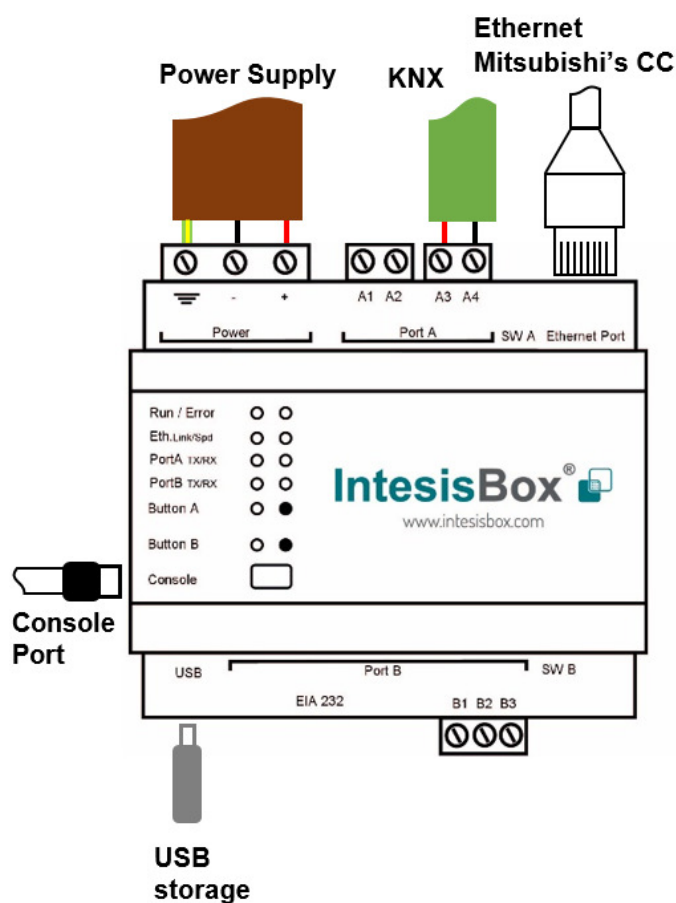


Figure 3.1 Gateway's connections

#### PortA / KNX

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

#### PortB / Not used

#### 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 66).

#### 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 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 / Mitsubishi C.Controller

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). DHCP is enabled by default. When disabled, default IP is 192.168.100.246.

### 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). Once connected the ON led will turn on.

### 3.2 Connect to Mitsubishi's Centralized Controller(s).

Connect the communication cable coming from the network hub, switch or direct from the Centralized Controller to the Ethernet port (Figure 3.1) of the gateway. The cable to be used shall be a straight Ethernet UTP/FTP CAT5 cable.

In case there is no response from Mitsubishi Centralized Controller to the frames sent by gateway, check that it is operative and reachable from the network connection used by the gateway. Check the gateway's Ethernet interface sending Pings to its IP address using a PC connected to the same Ethernet IP network. If the problem persists 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.

*IntesisBox Modbus Server – Mitsubishi Centralized Controller* comes with DHCP functionality enabled by default.

### 3.3 Connection to KNX

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

### 3.4 Connect to PC (Configuration tool)

This action allows the user to have access to configuration and monitoring of the device. Two methods to connect to the PC can be used:

- **Ethernet:** Using the Ethernet port of the IntesisBox.
- **USB cable:** To connect the device to the PC, the USB cable supplied should be plugged to the USB Console port.

## 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 IntesisBox. It is also required to have a Mitsubishi Centralized Controller with Ethernet connected to the gateway.

Connectors, connection cables, PC for the Configuration Tool and other auxiliary material, if needed, are not supplied by Intesis for this standard integration.

Items supplied with this product for this integration are:

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

### 4.2 IntesisBox MAPS. Configuration & monitoring tool for IntesisBox

#### 4.2.1 Introduction

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

The installation procedure and main functions for KNX series devices are explained in the *IntesisBox MAPS KNX User Manual*. This document can be downloaded from the link indicated in the installation sheet supplied with the IntesisBox device or in the product website at [www.intesisbox.com](http://www.intesisbox.com)

In this section, only the specific case of Mitsubishi Electric's Centralized Controller to KNX will be covered.

Please check the IntesisBox MAPS user manual for specific information about the different parameters and how to configure them.

#### 4.2.2 Connection

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

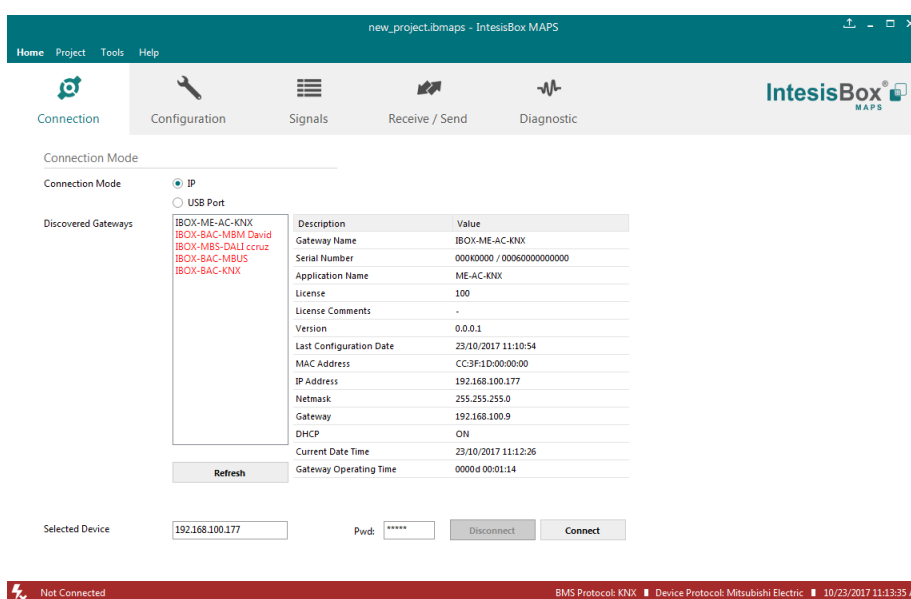


Figure 4.1 MAPS connection

### 4.2.3 Configuration tab

Select the **Configuration** tab to configure the gateway parameters. Three subsets of information are shown in this window: General (Gateway general parameters), KNX (KNX interface configuration) and Mitsubishi Electric (Centralized Controller/s interface parameters).

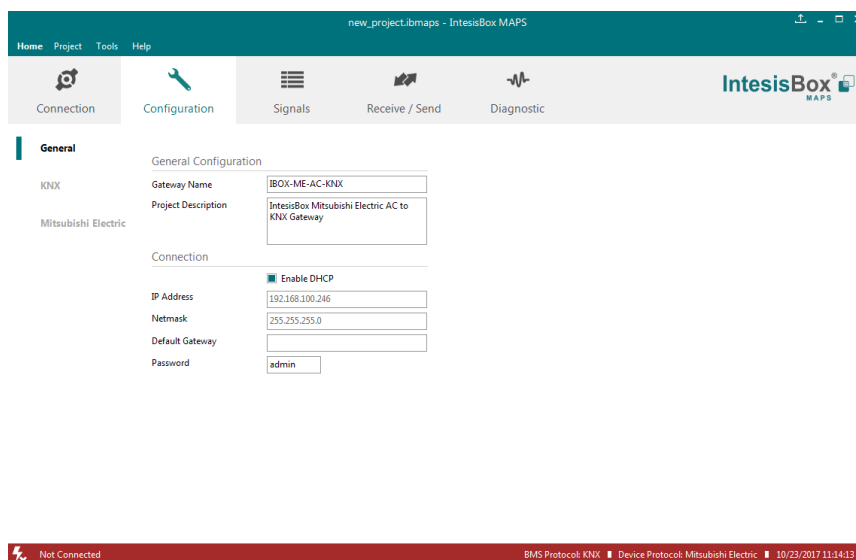


Figure 4.2 IntesisBox MAPS configuration tab

General tab is explained in IntesisBox MAPS user manual for IntesisBox Modbus Server Series.

#### 4.2.3.1 KNX Configuration

Set parameters of KNX interface of IntesisBox.

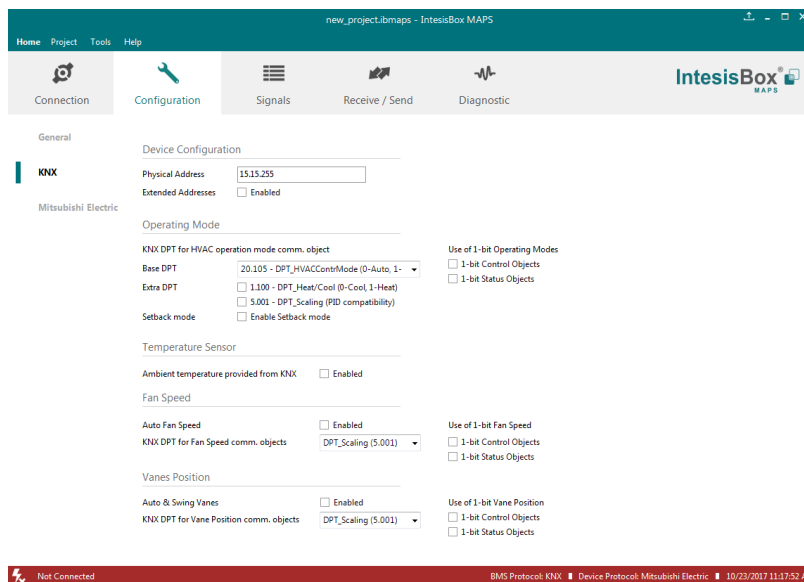


Figure 4.3 IntesisBox MAPS KNX configuration tab

#### 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 Mitsubishi 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:

- DPT\_20.105. DPT\_HVACContrMode: 0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry
- DPT\_5.x (non-standardized): 0-Auto, 1-Heat, 2-Dry, 3-Fan, 4-Cool, 5-Setback (if enabled)

**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" at IC/FU unit types. Their type is DPT\_Scaling (0..100%), and their ending is to be able to control parameters On/Off, Cool/Heat 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. Setback mode.** Enables objects for control/monitoring of Setback mode (applicable to IC/FU units).

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

**2.5. 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:** Mitsubishi Centralized Controller 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 IntesisBox 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 MNET – AC setpoint' is equal to 'Ambient temperature reported by KNX – AC setpoint required by KNX', using the following formula:

$$\text{"AC Setp. Temp"} = \text{"AC Ret. Temp"} - (\text{"KNX Amb. Temp."} - \text{"KNX Setp. Temp"})$$

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 Mitsubishi System controllers - Centralized Controller screen or remote controller).

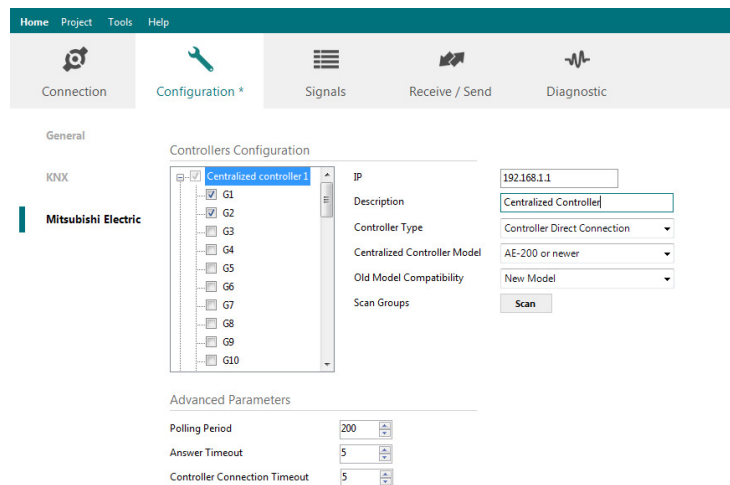
## 4. Fan Speed. Settings related to KNX interface for control and feedback of Mitsubishi unit's fan speed.

**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 (number of fanspeeds of each unit is configured in Mitsubishi Electric configuration tab).
- 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.
- 4.3. 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.
- 5. Vane Position.** Settings related to KNX interface for control and feedback of Mitsubishi unit's vane position.
- 5.1. Auto & Swing Vanes.** Configures availability of Auto Vanes and Swing vanes control/monitoring objects.
- 5.2. KNX DPT for Vane Position comm objects. DPT\_5.001, DPT\_Scaling.** Control/monitoring of Vane Position is performed by means of scaling (percentage) objects.
- 5.3. KNX DPT for Vane Position comm objects. DPT\_5.010, DPT\_Value\_1\_Ucount.** Control/monitoring of Fan Speed is performed by means of enumerated values.
- 5.4. Use of 1-bit Vane Position. 1-bit Control Objects.** Enables a bit-type object for control of vane position.
- 5.5. Use of 1-bit Vane Position. 1-bit Status Objects.** Enables a bit-type object for monitoring of each vane position.

### 4.2.3.2 Mitsubishi Electric Configuration

Set parameters for connection with Mitsubishi Electric's Centralized Controller.



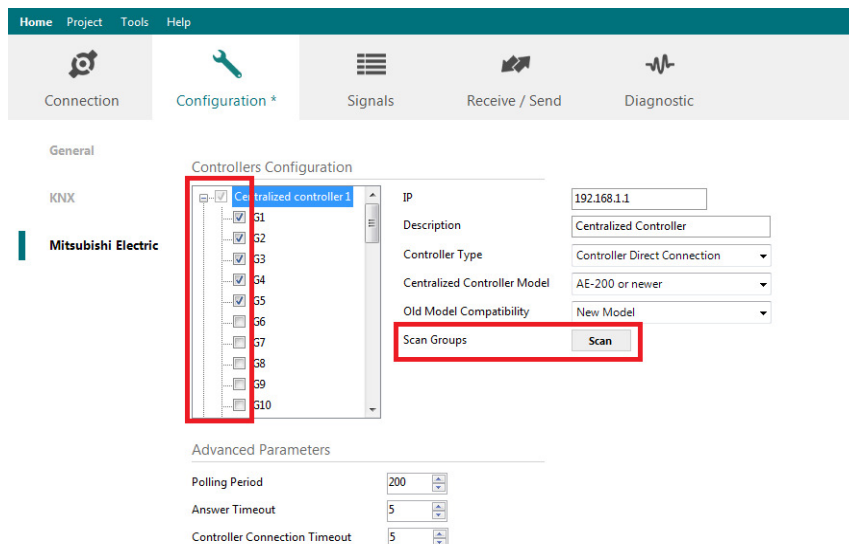
**Figure 4.4** IntesisBox MAPS Mitsubishi Electric configuration tab

Up to two Centralized Controller's can be configured (depending on the IntesisBox version). Each Centralized controller must be configured with the following parameters:

1. **IP:** IP Address of the Centralized Controller.
2. **Description:** Text description for the Centralized Controller
3. **Controller type:** Select if Centralized Controller has direct connection, or it is an Expansion Controller. Possible values are:
  - Controller Direct Connection
  - Expansion Controller 1
  - Expansion Controller 2
  - Expansion Controller 3
4. **Centralized Controller Model:** Select the Centralized Controller model. Possible values are:
  - AG-150A, GB-50ADA or older
  - EB-50GU
  - AE-200, EW-50 or newer
5. **Old Model Compatibility:** Set up if EB-50GU or AE-200 (or newer) Centralized Controller has been setup in 'Old Compatibility' mode.

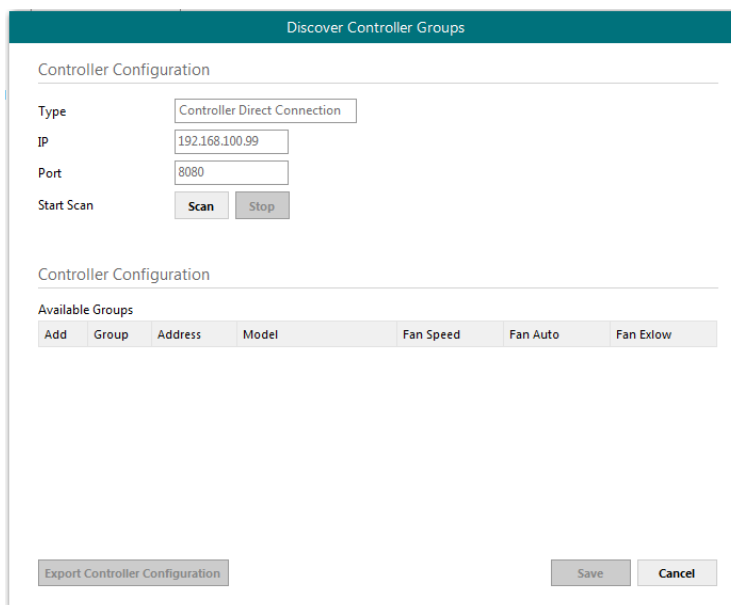
For each Centralized Controller, it must also be selected the groups that will be monitored/controlled using IntesisBox. You can do it manually in 'Controllers Configuration' section, by unfolding the corresponding 'Centralized Controller' in the list of controllers.

You can also scan for available groups under the IP of the Centralized Controller:



**Figure 4.5** Selection of active groups in Centralized Controller

By pressing the 'Scan' button, 'Discover Controller Groups' window will appear:



**Figure 4.6** Discover control groups window

By pressing 'Scan' button, configured Centralized Controller will be scanned for available control groups. Error window will appear if there is a problem in the connection with the Centralized Controller (Ethernet cable not connected, wrong IP address for Centralized Controller, PC Monitoring license in Centralized Controller is not active, ...).

A progress bar will appear during the scan, which will take a few seconds (up to 1 or 2 minutes). After scan is completed, detected groups will be shown in the 'Available Groups' area, as follows:



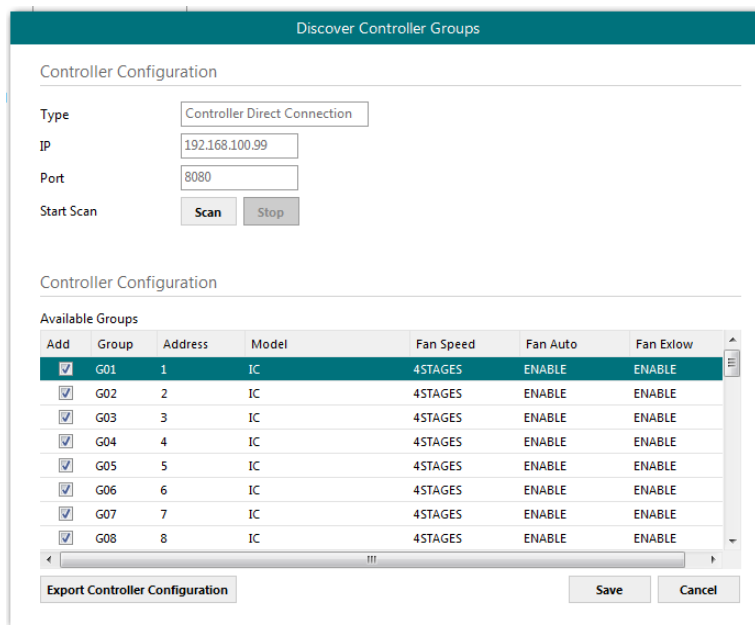


Figure 4.7 Scan results window

From available groups, mark the checkbox under column 'Add' to select these groups as active and configured in the Centralized Controller.

By pressing the 'Save' button, information will be passed to previous 'Controllers Configuration' window in MAPS.

'Discover Control Groups' also allows to Export Controller Configuration (see corresponding button in Figure 4.7), which will generate a text file with the active groups in the controller, for documentation and support purposes.

Once the list of active groups is filled, parameters for each group must be configured. For doing so, select each group in the list:

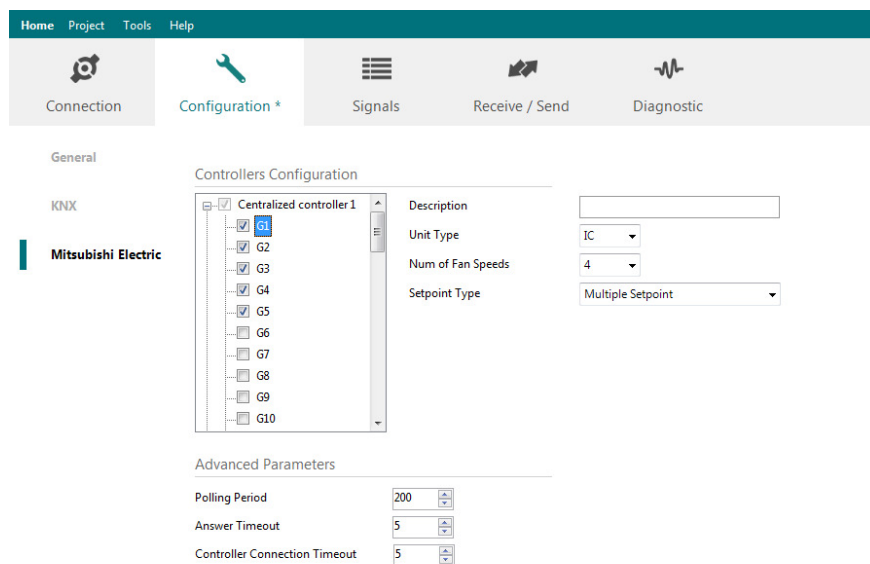


Figure 4.8 Scan results window

Parameters that must be configured for each group are the following:

- Description:** Text description for the control Group

2. **Unit Type:** Possible values are:

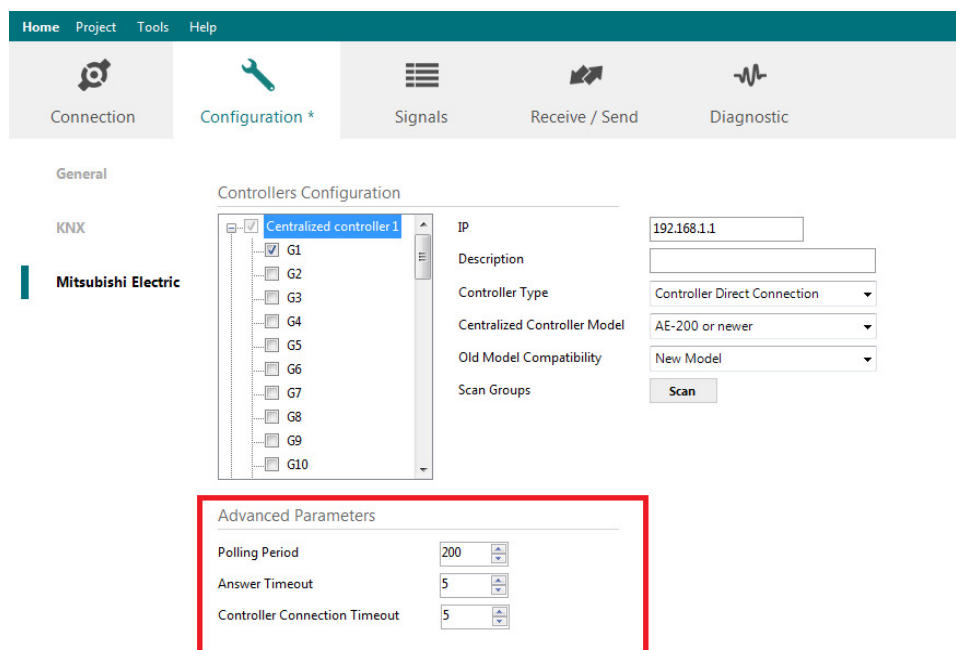
- IC: Air conditioning indoor unit (VRF, M-series, P-series and K-control unit)
- LC: Lossnay
- FU: Outdoor-Air Processing unit
- BU: Air to Water Booster unit
- WH: Air to Water HEX unit
- CEh: Heat Pump

3. **Setpoint type:** Select if unit supports different setpoints according to operation mode, or it supports single setpoint.

4. **URC Controller:** Select if unit has URC controller

Please note that the scan is taking the configuration of “Unit Type”, “Num of Fan Speeds” and “URC Controller” automatically so you might not need to modify these parameters after performing a scan.

Finally, in addition to Centralized Controller parameters, and parameters for each corresponding group, there is a set of advanced global parameters defining the communication of the IntesisBox with the centralized controller. These are following:



**Figure 4.9** Advanced Parameters for communication with Centralized Controllers

For them, the default values should be correct for most installations. They might need adjusting in particular cases where there are particular requirements in the communication. Their function is following:

1. **Polling Period:** Time in milliseconds between each request sent to the Centralized Controller
2. **Answer Timeout:** Time in seconds that IntesisBox will wait for a response from Centralized Controller after sending a single request for information through TCP/IP.
3. **Controller Connection Timeout:** After IntesisBox starts TCP/IP socket connection, time that the IntesisBox will wait for the Centralized Controller to accept the socket request. For each individual request, IntesisBox starts a new socket connection.

### 4.2.4 Signals

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

#	Active	Description	Object Function	DPT	Sending	U	T	Ri	W	R	Group	Mitsubishi Electric
1	<input checked="" type="checkbox"/>	Centralized controller communication error	0-Ok, 1-Comm...	1.005: alarm	0/0/1			T			R	Controller 1
2	<input checked="" type="checkbox"/>	Reset errors for all groups	1-Reset the errors	1.015: reset	0/0/2				W			Controller 1
3	<input checked="" type="checkbox"/>	On/Off (all groups)	0-Off, 1-On	1.001: switch	0/0/3				W			Controller 1
4	<input checked="" type="checkbox"/>	Operation Mode (all IC groups)	0-Auto, 1-Heat...	20.105: HVAC ContrMode	0/0/4				W			Controller 1
5	<input checked="" type="checkbox"/>	Operation Mode (all LOSSNAY groups)	0-LC_Auto, 1-H...	5.x	0/0/6				W			Controller 1
6	<input checked="" type="checkbox"/>	Operation Mode (all ATW & HWHF groups)	0-Hot Water, 1...	5.x	0/0/7				W			Controller 1
7	<input checked="" type="checkbox"/>	Fan Speed (all IC groups)	1-Speed 1, 2-Sp...	5.010: counter pulses (0..255)	0/0/8				W			Controller 1
8	<input checked="" type="checkbox"/>	Fan Speed (all LOSSNAY groups)	1-Speed 1, 2-Sp...	5.010: counter pulses (0..255)	0/0/9				W			Controller 1
9	<input checked="" type="checkbox"/>	Fan Speed AUTO (all IC groups)	1-Set auto fan; ...	1.001: switch	0/0/10				W			Controller 1
10	<input checked="" type="checkbox"/>	Vane position (all groups)	1-Horizontal, 2...	5.010: counter pulses (0..255)	0/0/11				W			Controller 1
11	<input checked="" type="checkbox"/>	Vane position AUTO (all groups)	1-Set auto vane...	1.001: switch	0/0/12				W			Controller 1
12	<input checked="" type="checkbox"/>	Vane position Swing (all groups)	1-Set swing van...	1.001: switch	0/0/13				W			Controller 1
13	<input checked="" type="checkbox"/>	Individual Temperature Setpoint (°C) (all ...)	5.90 °C	9.001: temperature (C)	0/0/14				W			Controller 1
14	<input checked="" type="checkbox"/>	Control_On/Off	0-Off, 1-On	1.001: switch	0/0/2					W	GI	Controller 1
15	<input checked="" type="checkbox"/>	Status_On/Off	0-Off, 1-On	1.001: switch	0/0/3			T			R	Controller 1
16	<input checked="" type="checkbox"/>	Control_Operation mode IC	0-Auto, 1-Heat...	20.105: HVAC ContrMode	0/0/4					W	GI	Controller 1
17	<input checked="" type="checkbox"/>	Status_Operation mode IC	0-Auto, 1-Heat...	20.105: HVAC ContrMode	0/0/5			T			R	Controller 1
18	<input checked="" type="checkbox"/>	Control_Fan Speed scaling (4stages)	Threshold (0..37...	5.001: percentage (0..100%)	0/0/54					W	GI	Controller 1
19	<input checked="" type="checkbox"/>	Status_Fan Speed scaling (4stages)	Threshold (25%...	5.001: percentage (0..100%)	0/0/55			T			R	Controller 1
20	<input checked="" type="checkbox"/>	Control_Vane position scaling	Threshold (0..30...	5.001: percentage (0..100%)	0/0/72					W	GI	Controller 1
21	<input checked="" type="checkbox"/>	Status_Vane position scaling	Threshold (20%...	5.001: percentage (0..100%)	0/0/73			T			R	Controller 1
22	<input checked="" type="checkbox"/>	Control_Temperature Setpoint (°C)	Cool or dry19.....	9.001: temperature (C)	0/0/88					W	GI	Controller 1
23	<input checked="" type="checkbox"/>	Status_Temperature Setpoint (°C)	Cool or dry19.....	9.001: temperature (C)	0/0/89			T			R	Controller 1
24	<input checked="" type="checkbox"/>	Status_AC Ambient Temperature (°C)	0.0..99.9	9.001: temperature (C)	0/0/92			T			R	Controller 1
25	<input checked="" type="checkbox"/>	Control_Operational Status for Lossnay or ...	0-Off, 1-Low, 2...	5.x	0/0/94					W	GI	Controller 1

Figure 4.10 IntesisBox MAPS Signals tab

### 4.2.5 Sending the configuration to IntesisBox

When the configuration is finished, follow steps to program the gateway.

- 1.- Click on **Save** button to save the project to the project folder on your hard disk (more information in IntesisBox MAPS User Manual).
- 2.- You will be prompted to generate the configuration file to be sent to the gateway.
  - a.- If **Yes** is selected, the file containing the configuration for the gateway will be generated and saved also into the project folder.
  - b.- If **NO** is selected, remember that the binary file with the project needs to be generated before the IntesisBox starts to work as expected.
- 3.- Press the **Send** button to send the binary file to the IntesisBox device. The process of file transmission can be monitored in the IntesisBox Communication Console window. IntesisBox will reboot automatically once the new configuration is loaded.

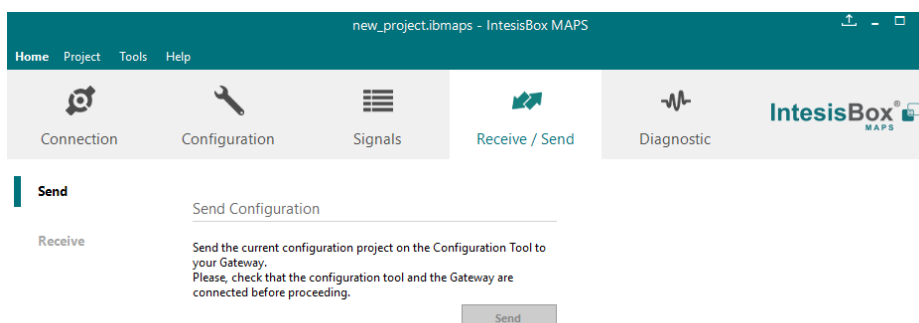


Figure 4.11 IntesisBox MAPS Receive/Send tab

After any configuration change, do not forget to send the configuration file to the IntesisBox using the button “Send”.

### 4.2.6 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, a viewer for the Internal and External protocols is 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.

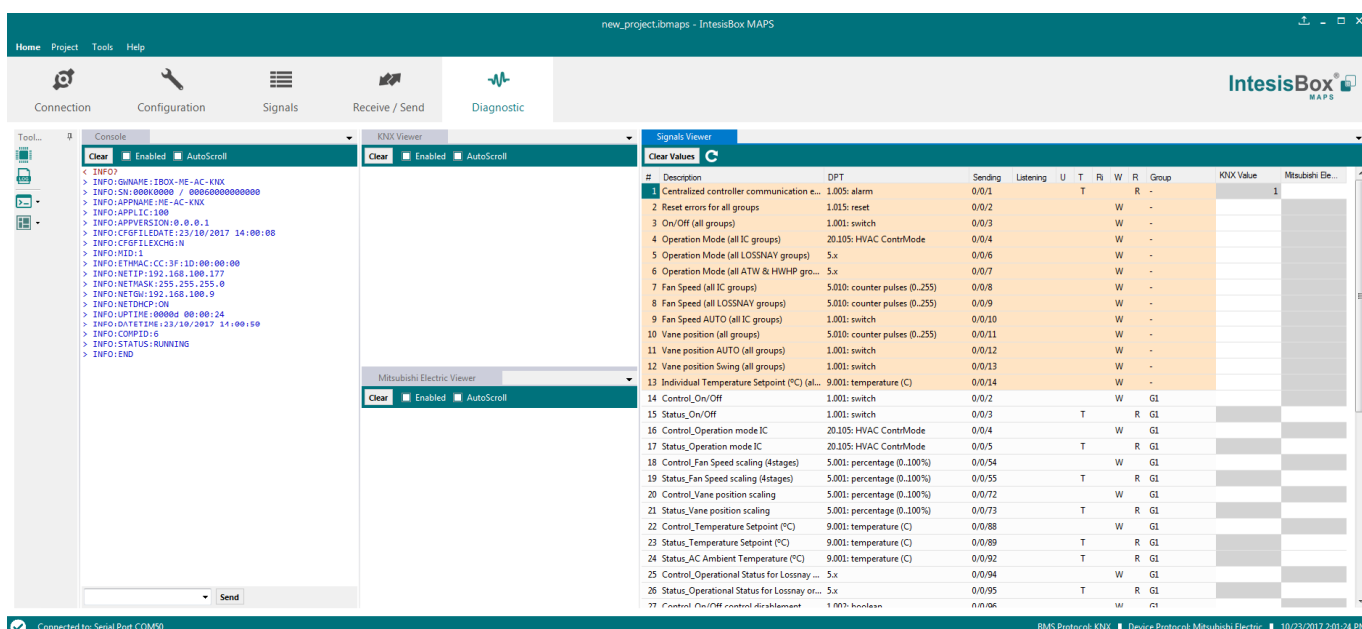


Figure 4.12 Diagnostic

More information about the Diagnostic section can be found in IntesisBox MAPS user manual for IntesisBox KNX Series.

### 4.3 Set-up procedure

1. Install IntesisBox MAPS on your laptop, use the setup program supplied for this and follow the instructions given by the Installation wizard.
2. Install IntesisBox in the desired installation site. 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 KNX communication cable coming from the KNX network to the port marked as Port A on IntesisBox (More details in section 0).
4. Connect the communication cable coming from Mitsubishi Electric's Centralized Controller network to the port marked as Ethernet on IntesisBox (More details in section 0).
5. Power up IntesisBox. The supply voltage can be 9 to 30 Vdc or just 24 Vac. Take care of the polarity of the supply voltage applied.

**WARNING!** In order to avoid earth loops that can damage IntesisBox 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.
6. If you want to connect using IP, connect the Ethernet cable from the laptop PC to the port marked as Ethernet of IntesisBox (More details in section 0).

If you want to connect using USB, connect the USB cable from the laptop PC to the port marked as Console of IntesisBox (More details in section 0).

7. Open IntesisBox MAPS, create a new project for Modbus and select the IBOX-KNX-ME-Template project.
8. Modify the configuration as desired, save it and download the configuration file to IntesisBox as explained in section 4.2.5 .
9. Visit the Diagnostic section, enable COMMS () and check that there is communication activity, some TX frames and some other RX frames. This means that the communication with the Centralized Controller and Modbus Master devices is OK. In case there is no communication activity between IntesisBox and the Centralized Controller and/or Modbus devices, check that those are operative: check the baud rate, the communication cable used to connect all devices and any other communication parameter.

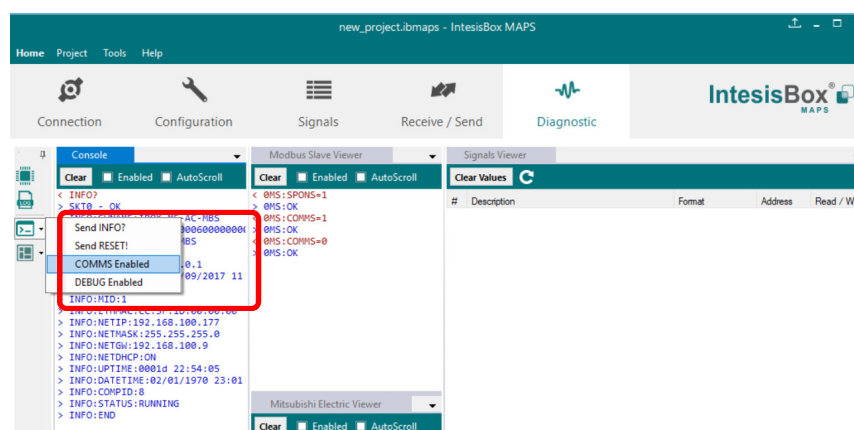


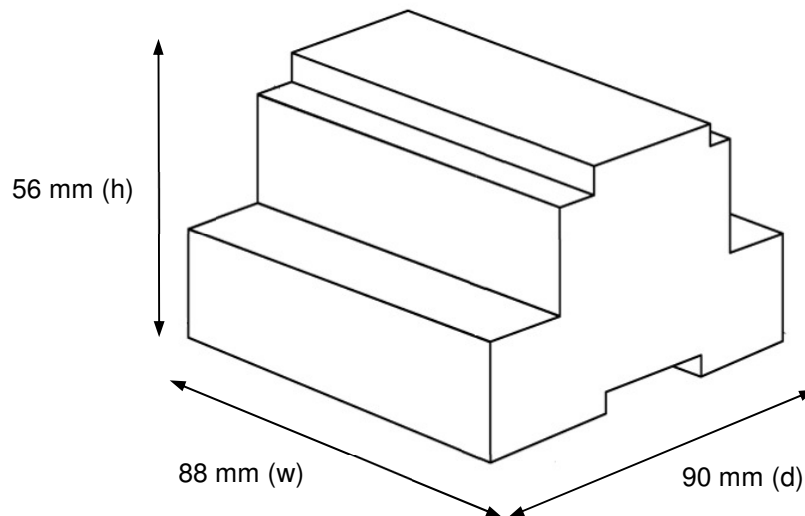
Figure 4.13 Enable COMMS

## 5 Electrical & Mechanical Features

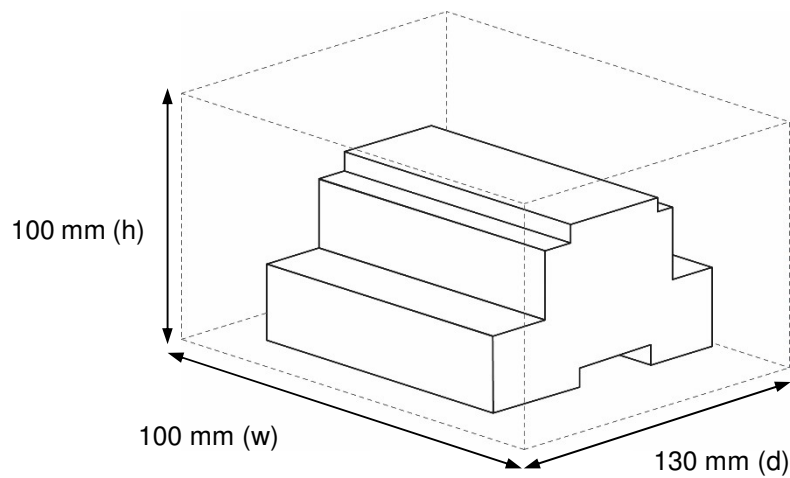


<b>Enclosure</b>	Plastic, type PC (UL 94 V-0) Net dimensions (d×w×h): 90x88x56 mm Recommended space for installation (d×w×h): 130x100x100mm Color: Light Grey, RAL 7035	<b>Battery</b>	Size: Coin 20mm x 3.2mm Capacity: 3V / 225mAh Type: Manganese Dioxide Lithium
<b>Mounting</b>	Wall. DIN rail EN60715 TH35.	<b>Console Port</b>	Mini Type-B USB 2.0 compliant 1500VDC isolation
<b>Terminal Wiring</b> (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 1 core: 0.5mm <sup>2</sup> ... 2.5mm <sup>2</sup> 2 cores: 0.5mm <sup>2</sup> ... 1.5mm <sup>2</sup> 3 cores: not permitted	<b>USB port</b>	Type-A USB 2.0 compliant Only for USB flash storage device ( <i>USB pen drive</i> ) Power consumption limited to 150mA ( <i>HDD connection not allowed</i> )
<b>Power</b>	1 x Plug-in screw terminal block (3 poles) 9 to 36VDC +/-10%, Max.: 140mA. 24VAC +/-10% 50-60Hz, Max.: 127mA Recommended: 24VDC	<b>Push Button</b>	Button A: Check the user manual Button B: Check the user manual
<b>Ethernet</b>	1 x Ethernet 10/100 Mbps RJ45 2 x Ethernet LED: port link and activity	<b>Operation Temperature</b>	0 °C to +60 °C
<b>Port A</b>	1 x Plug-in screw terminal block (2 poles) Reserved for future use 1 x Plug-in screw terminal block green (2 poles) Reserved for future use 1500VDC isolation from other ports	<b>Operational Humidity</b>	5 to 95%, no condensation
<b>Switch A (SWA)</b>	1 x DIP-Switch for serial EIA485 configuration: Reserved for future use	<b>Protection</b>	IP20 (IEC60529)
<b>PORT B</b>	1 x Serial EIA232 (SUB-D9 male connector) Pinout from a DTE device 1500VDC isolation from other ports (except PORT B: EIA485) 1 x Serial EIA485 Plug-in screw terminal block (3 poles) A, B, SGND (Reference ground or shield) 1500VDC isolation from other ports (except PORT B: EIA232)	<b>LED Indicators</b>	10 x On board LED indicators 1 x Error LED 1 x Power LED 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
<b>Switch B (SWB)</b>	1 x DIP-Switch for serial EIA485 configuration: Position 1: ON: 120 Ω termination active Off: 120 Ω termination inactive Position 2-3: ON: Polarization active Off: Polarization inactive		100 mm

## 6 Dimensions



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



## 7 Appendix A – Communication Objects Table

Available signals depend on unit type, which must be selected in MAPS configuration tool:

- IC: Air conditioning indoor unit (VRF, M-series, P-series and K-control unit)
- LC: Lossnay
- FU: Outdoor-Air Processing unit
- BU: Air to Water Booster unit
- WH: Air to Water HEX unit
- CEh: Heat Pump

TOPIC	UNIT TYPE							NAME	LEN	DATAPOINT TYPE		FLAGS				FUNCTION
	IC	LC	FU	BU	WH	CEh	DPT_NAME			DPT_ID	R	W	T	U		
GLOBAL SIGNALS	COMM ERR	x	x	x	x	x	x	Centralized controller communication error	1 bit	DPT_Alarm	1.005	R		T		0 – No alarm; 1 – Alarm
	RESET ERR	x	x	x	x	x	x	Reset errors for all the groups	1 bit	DPT_Reset	1.015		W			1 – Reset command
	ON / OFF	x	x	x	x	x	x	On/Off (all the groups)	1 bit	DPT_Switch	1.001		W			0 – Off; 1 – On
	OP MODE	x		x				Operation Mode (all the IC groups)	1 byte	DPT_HVACContrMode	20.105		W			0 – Auto; 1 – Heat; 3 – Cool; 9 – Fan; 14 – Dry
		x		x				Operation Mode (all the IC groups)	1 byte	Non-standarized	5.x		W			0 – Auto; 1 – Heat; 2 – Dry; 3 – Fan; 4 – Cool; 5 – Setback
			x					Operation Mode (all the LOSSNAY groups)	1 byte	Non-standarized	5.x		W			0 – LC_Auto; 1 – Heat Recovery; 2 – Bypass
	FAN SPEED				x	x	x	Operation Mode (all the ATW & HWHP groups)	1 byte	Non-standarized	5.x		W			0 – Hot Water; 1 – Heating; 2 – Heating_Eco; 3 – Anti_Freeze; 4 – Cooling
		x		x				Fan Speed (all the IC groups)	1 byte	DPT_Value_1_Ucount	5.010		W			1 – Speed 1; 2 – Speed 2; 3 – Speed 3; 4 – Speed 4
			x					Fan Speed (all the LOSSNAY groups)	1 byte	DPT_Value_1_Ucount	5.010		W			1 – Speed 1; 2 – Speed 2; 3 – Speed 3; 4 – Speed 4
		x		x				Fan Speed AUTO (all the IC groups)	1 bit	DPT_Switch	1.001		W			1 – Set auto fan



	VANE POS	x					Vane position (all the groups)	1 byte	DPT_Value_1_Ucount	5.010		W		1 – Horizontal; 2 – Position-2; 3 – Position-3; 4 – Position-4; 5 – Vertical
		x					Vane position AUTO (all the groups)	1 bit	DPT_Switch	1.001		W		0 – Stop auto vane; 1 – Set auto vane
		x					Vane position Swing (all the groups)	1 bit	DPT_Switch	1.001		W		0 – Stop swing vane; 1 – Set swing vane;
	SETP TEMP	x		x	x	x	Individual Temperature Setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		5..90 °C
GROUP SIGNALS	ON / OFF	x	x	x	x	x	Control_On/Off	1 bit	DPT_Switch	1.001		W		0 – Off; 1 – On
		x	x	x	x	x	Status_On/Off	1 bit	DPT_Switch	1.001	R		T	0 – Off; 1 – On
	OP MODE IC	x		x			Control_Operation mode IC	1 byte	DPT_HVACContrMode	20.105		W		0 – Auto; 1 – Heat; 3 – Cool; 9 – Fan; 14 – Dry
		x		x			Status_Operation mode IC	1 byte	DPT_HVACContrMode	20.105	R		T	0 – Auto; 1 – Heat; 3 – Cool; 9 – Fan; 14 – Dry
		x		x			Control_Operation mode IC	1 byte	Non-standarized	5.x		W		0 – Auto; 1 – Heat; 2 – Dry; 3 – Fan; 4 – Cool; 5 – Setback
		x		x			Status_Operation mode IC	1 byte	Non-standarized	5.x	R		T	0 – Auto; 1 – Heat; 2 – Dry; 3 – Fan; 4 – Cool; 5 – Setback
		x		x			Control_Mode Cool/Heat IC	1 bit	DPT_Heat/Cool	1.100		W		0 – Cool; 1 – Heat
		x		x			Status_Mode Cool/Heat IC	1 bit	DPT_Heat/Cool	1.100	R		T	0 – Cool; 1 – Heat
		x		x			Control_Heat mode&ON IC	1 byte	DPT_Scaling	5.001		W		0% – Off, 0.1%-100% – On+Heat
		x		x			Control_Cool mode&ON IC	1 byte	DPT_Scaling	5.001	R		T	0% – Off, 0.1%-100% – On+Cool
		x		x			Control_Auto mode IC	1 bit	DPT_Switch	1.001		W		1 – Set Auto mode
		x		x			Status_Auto mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Auto mode not active; 1 – Auto mode active
		x		x			Control_Heat mode IC	1 bit	DPT_Switch	1.001		W		1 – Set Heat mode
		x		x			Status_Heat mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Heat mode not active; 1 – Heat mode active
		x		x			Control_Cool mode IC	1 bit	DPT_Switch	1.001		W		1 – Set Cool mode
		x		x			Status_Cool mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Cool mode not active; 1 – Cool mode active
		x		x			Control_Fan mode IC	1 bit	DPT_Switch	1.001		W		1 – Set Fan mode
		x		x			Status_Fan mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Fan mode not active; 1 – Fan mode active

<b>GROUP SIGNALS</b>		x	x			Control_Dry mode IC	1 bit	DPT_Switch	1.001		W		1 – Set Dry mode		
		x	x			Status_Dry mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Dry mode not active; 1 – Dry mode active		
		x	x			Status_Auto heat mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Auto heat mode not active; 1 – Auto heat mode active		
		x	x			Status_Auto cool mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Auto cool mode not active; 1 – Auto cool mode active		
		x	x			Control_Setback mode IC	1 bit	DPT_Switch	1.001		W		1 – Set Setback mode		
		x	x			Status_Setback mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Setback mode not active; 1 – Setback mode active		
		x	x			Status_Setbackheat mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Setbackheat mode not active; 1 – Setbackheat mode active		
		x	x			Status_Setbackcool mode IC	1 bit	DPT_Switch	1.001	R		T	0 – Setbackcool mode not active; 1 – Setbackcool mode active		
	OP MODE LOSSNAY		x				Control_Operation mode LOSSNAY	1 byte	Non-standarized	5.x		W		0 – LC_Auto; 1 – Heat Recovery; 2 – Bypass	
			x				Status_Operation mode LOSSNAY	1 byte	Non-standarized	5.x	R		T	0 – LC_Auto; 1 – Heat Recovery; 2 – Bypass	
			x				Control_LC_auto mode LOSSNAY	1 bit	DPT_Switch	1.001		W		1 – Set LC_Auto mode	
			x				Status_LC_auto mode LOSSNAY	1 bit	DPT_Switch	1.001	R		T	0 – LC_Auto mode not active; 1 – LC_Auto mode active	
			x				Control_Heat recovery mode LOSSNAY	1 bit	DPT_Switch	1.001		W		1 – Set Heat_Recovery mode	
			x				Status_Heat recovery mode LOSSNAY	1 bit	DPT_Switch	1.001	R		T	0 – Heat_Recovery mode not active; 1 – Heat_Recovery mode active	
			x				Control_Bypass mode LOSSNAY	1 bit	DPT_Switch	1.001		W		1 – Set Bypass mode	
			x				Status_Bypass mode LOSSNAY	1 bit	DPT_Switch	1.001	R		T	0 – Bypass mode not active; 1 – Bypass mode active	
	OP MODE ATW / HWHP				x	x	x	Control_Operation mode ATW & HWHP	1 byte	Non-standarized	5.x		W		0 – Hot Water; 1 – Heating; 2 – Heating_Eco; 3 – Anti Freeze; 4 – Cooling
					x	x	x	Status_Operation mode ATW & HWHP	1 byte	Non-standarized	5.x	R		T	0 – Hot Water; 1 – Heating; 2 – Heating_Eco; 3 – Anti Freeze; 4 – Cooling
					x	x	x	Control_Hot water mode ATW & HWHP	1 bit	DPT_Switch	1.001		W		1 – Set Hot water mode
					x	x	x	Status_Hot water mode ATW & HWHP	1 bit	DPT_Switch	1.001	R		T	0 – Hot water mode not active; 1 – Hot water mode active

<b>GROUP SIGNALS</b>	<b>OP MODE ATW / HWHP</b>				x	x	x	Control_Heating mode ATW & HWHP	1 bit	DPT_Switch	1.001		W		1 – Set Heating mode
					x	x	x	Status_Heating mode ATW & HWHP	1 bit	DPT_Switch	1.001	R		T	0 – Heating mode not active; 1 – Heating mode active
					x	x	x	Control_Cooling mode ATW & HWHP	1 bit	DPT_Switch	1.001		W		1 – Set Cooling mode
					x	x	x	Status_Cooling mode ATW & HWHP	1 bit	DPT_Switch	1.001	R		T	0 – Cooling mode not active; 1 – Cooling mode active
					x	x	x	Control_Heating_Eco mode ATW & HWHP	1 bit	DPT_Switch	1.001		W		1 – Set Heating_Eco mode
					x	x	x	Status_Heating_Eco mode ATW & HWHP	1 bit	DPT_Switch	1.001	R		T	0 – Heating_Eco mode not active; 1 – Heating_Eco mode active
					x	x	x	Control_Anti_Freeze mode ATW & HWHP	1 bit	DPT_Switch	1.001		W		1 – Set Anti_Freeze mode
					x	x	x	Status_Anti_Freeze mode ATW & HWHP	1 bit	DPT_Switch	1.001	R		T	0 – Anti_Freeze mode not active; 1 – Anti_Freeze mode active
	<b>FAN SPEED</b>	x	x	x				Control_Fan Speed enumerated (4stages)	1 byte	DPT_Value_1_Ucount	5.010		W		1 – Speed 1; 2 – Speed 2; 3 – Speed 3; 4 – Speed 4
		x	x	x				Status_Fan Speed enumerated (4stages)	1 byte	DPT_Value_1_Ucount	5.010	R		T	1 – Speed 1; 2 – Speed 2; 3 – Speed 3; 4 – Speed 4
		x	x	x				Control_Fan Speed enumerated (3stages)	1 byte	DPT_Value_1_Ucount	5.010		W		1 – Speed 1; 2 – Speed 2; 3 – Speed 3
		x	x	x				Status_Fan Speed enumerated (3stages)	1 byte	DPT_Value_1_Ucount	5.010	R		T	1 – Speed 1; 2 – Speed 2; 3 – Speed 3
		x	x	x				Control_Fan Speed enumerated (2stages)	1 byte	DPT_Value_1_Ucount	5.010		W		1 – Speed 1; 2 – Speed 2
		x	x	x				Status_Fan Speed enumerated (2stages)	1 byte	DPT_Value_1_Ucount	5.010	R		T	1 – Speed 1; 2 – Speed 2
		x	x	x				Control_Fan Speed scaling (4stages)	1 byte	DPT_Scaling	5.001		W		0-37% – Speed 1; 38-62% – Speed 2; 63-87% – Speed 3; 88-100% – Speed 4
		x	x	x				Status_Fan Speed scaling (4stages)	1 byte	DPT_Scaling	5.001	R		T	25% – Speed 1; 50% – Speed 2; 75% – Speed 3; 100% – Speed 4
		x	x	x				Control_Fan Speed scaling (3stages)	1 byte	DPT_Scaling	5.001		W		0-49% – Speed 1; 50-82% – Speed 2; 83-100% – Speed 3
		x	x	x				Status_Fan Speed scaling (3stages)	1 byte	DPT_Scaling	5.001	R		T	33% – Speed 1; 67% – Speed 2; 100% – Speed 3
		x	x	x				Control_Fan Speed scaling (2stages)	1 byte	DPT_Scaling	5.001		W		0-74% – Speed 1; 75-100% – Speed 2
		x	x	x				Status_Fan Speed scaling (2stages)	1 byte	DPT_Scaling	5.001	R		T	50% – Speed 1; 100% – Speed 2
x	x	x				Control_Fan speed 1	1 bit	DPT_Switch	1.001		W		1 – Set Fan speed 1		
x	x	x				Status_Fan speed 1	1 bit	DPT_Switch	1.001	R		T	0 – Fan speed 1 not active; 1 – an speed 1 active		

GROUP SIGNALS	FAN SPEED	x	x	x				Control_Fan speed 2	1 bit	DPT_Switch	1.001		W			1 – Set Fan speed 2
		x	x	x				Status_Fan speed 2	1 bit	DPT_Switch	1.001	R		T		0 – Fan speed 2 not active; 1 – an speed 2 active
		x	x	x				Control_Fan speed 3	1 bit	DPT_Switch	1.001		W			1 – Set Fan speed 3
		x	x	x				Status_Fan speed 3	1 bit	DPT_Switch	1.001	R		T		0 – Fan speed 3 not active; 1 – an speed 3 active
		x	x	x				Control_Fan speed 4	1 bit	DPT_Switch	1.001		W			1 – Set Fan speed 4
		x	x	x				Status_Fan speed 4	1 bit	DPT_Switch	1.001	R		T		0 – Fan speed 4 not active; 1 – an speed 4 active
		x	x	x				Control_Fan speed Man/Auto	1 bit	DPT_Bool	1.002		W			0 – Manual; 1 – Auto
		x	x	x				Status_Fan speed Man/Auto	1 bit	DPT_Bool	1.002	R		T		0 – Manual; 1 – Auto
	VANE POS	x						Control_Vane position enumerated	1 byte	Non-standarized	5.x		W			1 – Horiz; 2 – Pos-2, 3 – Pos-3, 4 – Pos-4, 5 – Vert
		x						Status_Vane position enumerated	1 byte	Non-standarized	5.x	R		T		1 – Horiz; 2 – Pos-2, 3 – Pos-3, 4 – Pos-4, 5 – Vert
		x						Control_Vane position scaling	1 byte	DPT_Scaling	5.001		W			0-30% – Horiz; 31-50% – Pos-2; 51-70% – Pos-3; 71-90% – Pos-4; 91-100% – Vert
		x						Status_Vane position scaling	1 byte	DPT_Scaling	5.001	R		T		20% – Horiz; 40% – Pos-2; 60% – Pos-3; 80% – Pos-4; 100% – Vert
		x						Control_Vane position auto	1 bit	DPT_Switch	1.001		W			1 – Set Auto Vane; 0 – Stop Auto Vane
		x						Status_Vane position auto	1 bit	DPT_Switch	1.001	R		T		0 – Auto Vane not active; 1 – Auto Vane active
		x						Control_Vane position horizontal	1 bit	DPT_Switch	1.001		W			1 – Set Horizontal Vane
		x						Status_Vane position horizontal	1 bit	DPT_Switch	1.001	R		T		0 – Horizontal Vane not active; 1 – Horizontal Vane active
		x						Control_Vane position-2	1 bit	DPT_Switch	1.001		W			1 – Set Position-2 Vane
		x						Status_Vane position-2	1 bit	DPT_Switch	1.001	R		T		0 – Position-2 Vane not active; 1 – Position-2 Vane active
		x						Control_Vane position-3	1 bit	DPT_Switch	1.001		W			1 – Set Position-3 Vane
		x						Status_Vane position-3	1 bit	DPT_Switch	1.001	R		T		0 – Position-3 Vane not active; 1 – Position-3 Vane active
		x						Control_Vane position-4	1 bit	DPT_Switch	1.001		W			1 – Set Position-4 Vane
		x						Status_Vane position-4	1 bit	DPT_Switch	1.001	R		T		0 – Position-4 Vane not active; 1 – Position-4 Vane active
		x						Control_Vane position vertical	1 bit	DPT_Switch	1.001		W			1 – Set Vertical Vane

GROUP SIGNALS	VANE POS	x					Status_Vane position vertical	1 bit	DPT_Switch	1.001	R		T	0 – Vertical Vane not active; 1 – Vertical Vane active	
		x					Control_Vane position swing	1 bit	DPT_Switch	1.001		W		0 – Stop Swing Vane; 1 – Set Swing Vane	
		x					Status_Vane position swing	1 bit	DPT_Switch	1.001	R		T	0 – Vane Swing not Active; 1 – Vane Swing Active	
	TEMP	x	x				Control_Temperature Setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		Cool or dry:19-30 °C; Heat or Auto:17-28 °C	
		x	x				Status_Temperature Setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	Cool or dry:19-30 °C; Heat or Auto:17-28 °C	
					x	x	x	Control_Temperature Setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		5-90 °C
					x	x	x	Status_Temperature Setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	5-90 °C
		x	x	x	x	x	x	Status_AC Ambient Temperature (°C)	2 byte	DPT_Value_Temp	9.001		W		0,0-99,9 °C
		x	x					Control_KNX ambient Temperature (°C)	2 byte	DPT_Value_Temp	9.001	R		T	0,0-99,9 °C
	LOSSNAY OP	x					Control_Operational Status for Lossnay or OA	1 byte	Non-standarized	5.x		W		0 – Off; 1 – Low; 2 – High	
		x					Status_Operational Status for Lossnay or OA	1 byte	Non-standarized	5.x	R		T	0 – Off; 1 – Low; 2 – High	
	PARAMS DISABLE	x	x	x	x	x	x	Control_On/Off control disablement	1 bit	DPT_Enable	1.003		W		0 – Enabled; 1 – Disabled
		x	x	x	x	x	x	Status_On/Off control disablement	1 bit	DPT_Enable	1.003	R		T	0 – Enabled; 1 – Disabled
		x	x	x	x	x	x	Control_operating mode control disablement	1 bit	DPT_Enable	1.003		W		0 – Enabled; 1 – Disabled
		x	x	x	x	x	x	Status_operating mode control disablement	1 bit	DPT_Enable	1.003	R		T	0 – Enabled; 1 – Disabled
		x		x	x	x	x	Control_set point control disablement	1 bit	DPT_Enable	1.003		W		0 – Enabled; 1 – Disabled
		x		x	x	x	x	Status_set point control disablement	1 bit	DPT_Enable	1.003	R		T	0 – Enabled; 1 – Disabled
		x		x				Control_filter reset control disablement	1 bit	DPT_Enable	1.003		W		0 – Enabled; 1 – Disabled
		x		x				Status_filter reset control disablement	1 bit	DPT_Enable	1.003	R		T	0 – Enabled; 1 – Disabled
	GROUP ERROR	x	x	x	x	x	x	Status_Group operation time (seconds)	4 byte	DPT_LongDeltaTimeSec	13.100	R		T	0-2147483647s
		x	x	x	x	x	x	Status_group error	1 bit	DPT_Alarm	1.005	R		T	0 – No alarm; 1 – Alarm
		x	x	x	x	x	x	Status_group error code	2 byte	Non-standarized	7.x	R		T	0-9999: Number of the error code
	MODEL	x	x	x	x	x	x	Control_group error reset	1 bit	DPT_Reset	1.015		W		1 – Reset command
		x	x	x	x	x	x	Status_group model	1 byte	Non-standarized	5.x	R		T	0 – IC; 1 – KIC; 2 – AIC; 3 – LC; 4 – FU; 5 – BU; 6 – WH; 7 – CEh
	SETB.	x		x				Control_Setback	1 bit	DPT_Switch	1.001		W		0 – Disabled; 1 – Enabled
		x		x				Status_Setback	1 bit	DPT_Switch	1.001	R		T	0 – Disabled; 1 – Enabled

GROUP SIGNALS	MULT. SETP.	x	x			Control_Cool/dry/auto(upper) dual temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C	
		x	x			Status_Cool/dry/auto(upper) dual temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C	
				x	x	x	Control_Heating ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
				x	x	x	Status_Heating ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C
		x	x				Control_Heat/auto(lower) dual temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
		x	x				Status_Heat/auto(lower) dual temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C
				x	x	x	Control_Heating ECO ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
				x	x	x	Status_Heating ECO ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C
		x	x				Control_Auto single temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
		x	x				Status_Auto single temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C
				x	x	x	Control_Hot water ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
				x	x	x	Status_Hot water ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C
		x	x				Control_Setback upper temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
		x	x				Status_Setback upper temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C
				x	x	x	Control_Anti-Freeze ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
				x	x	x	Status_Anti-Freeze ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C
		x	x				Control_Setback lower temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
		x	x				Status_Setback lower temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C
				x	x	x	Control_Cooling ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001		W		4,5-90°C
			x	x	x	Status_Cooling ATW temperature setpoint (°C)	2 byte	DPT_Value_Temp	9.001	R		T	4,5-90°C	
	OUT TEMP				x	Status_Outdoor temperature (°C)	2 byte	DPT_Value_Temp	9.001	R		T	0,0-99,9 °C	
	FILTER	x	x	x		Status_Filter	1 bit	DPT_Alarm	1.005	R		T	0 – Filter OK; 1 – Filter Dirty	
		x	x	x		Control_Dirty filter indication reset	1 bit	DPT_Reset	1.015		W		1 – Reset command	