Midea commercial and VRF with KNX, Serial and IP support

IN770AIR00XO000 GATEWAY

Table of Contents

1. Description and Order Codes

IN770AIR00xO000 Gateway.

Modbus®, KNX®, BACnet®, and Home Automation® gateway for Midea® air conditioning systems.

ORDER CODE	LEGACY ORDER CODE
IN770AIR00xO000[1]	INBACMID004I000
[1] The **x** stands for S, M, or L, depending on the license you have purchased. (See the next section Licensing (page 2)).	

> **NOTE**
> The order code may vary depending on the product seller and the buyer's location.

2. Licensing

Distribution license(s) for the IN770AIR00xO000 gateway:

Order Code	License	Maximum AC units	
		Indoor units	Outdoor units
IN770AIR00SO000	Small	16	0
IN770AIR00MO000	Medium	64	0

NOTE
The order code may vary depending on the product seller and the buyer's location.

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3. General Information

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3.1. Intended Use of the User Manual

This manual contains the main features of this Intesis gateway and the instructions for its appropriate installation, configuration, and operation.

The contents of this manual should be brought to the attention of any person who installs, configures, or operates this gateway or any associated equipment.

Keep this manual for future reference during the installation, configuration, and operation.

3.2. General Safety Information

> **IMPORTANT**
> Follow these instructions carefully. Improper work may seriously harm your health and damage the gateway and/or any other equipment connected to it.

Only technical personnel, following these instructions and the country legislation for installing electrical equipment, can install and manipulate this gateway.

Install this gateway indoors, in a restricted access location, avoiding exposure to direct solar radiation, water, high relative humidity, or dust.

All wires (for communication and power supply, if needed) must only be connected to networks with indoor wiring. All communication ports are considered for indoor use and must only be connected to SELV circuits.

Disconnect all systems from their power source before manipulating and connecting them to the gateway.

Use SELV-rated NEC class 2 or limited power source (LPS) power supply.

Supply always a correct voltage to power the gateway. See Technical Specifications (page 22).

Respect the expected polarity of power and communication cables when connecting them to the gateway.

3.3. Admonition Messages and Symbols

> **DANGER**
> Instructions that must be followed to avoid an imminently hazardous situation that, if not avoided, will result in death or severe injury.

> **WARNING**
> Instructions that must be followed to avoid a potentially hazardous situation that, if not avoided, could result in death or severe injury.

> **CAUTION**
> Instruction that must be followed to avoid a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.

> **IMPORTANT**
> Instruction that must be followed to avoid a risk of reduced functionality and/or damage to the equipment or to avoid a network security risk.

NOTE
Additional information which may facilitate installation and/or operation.

TIP
Helpful advice and suggestions.

NOTICE
Remarkable Information.

4. Overview

This document describes the available applications for this IN770AIR00xO000 gateway.

Midea commercial and VRF HVAC systems to:

Modbus TCP and RTU

KNX TP

BACnet/IP or MS/TP

Home Automation

IMPORTANT
This document assumes that the user is familiar with these technologies.
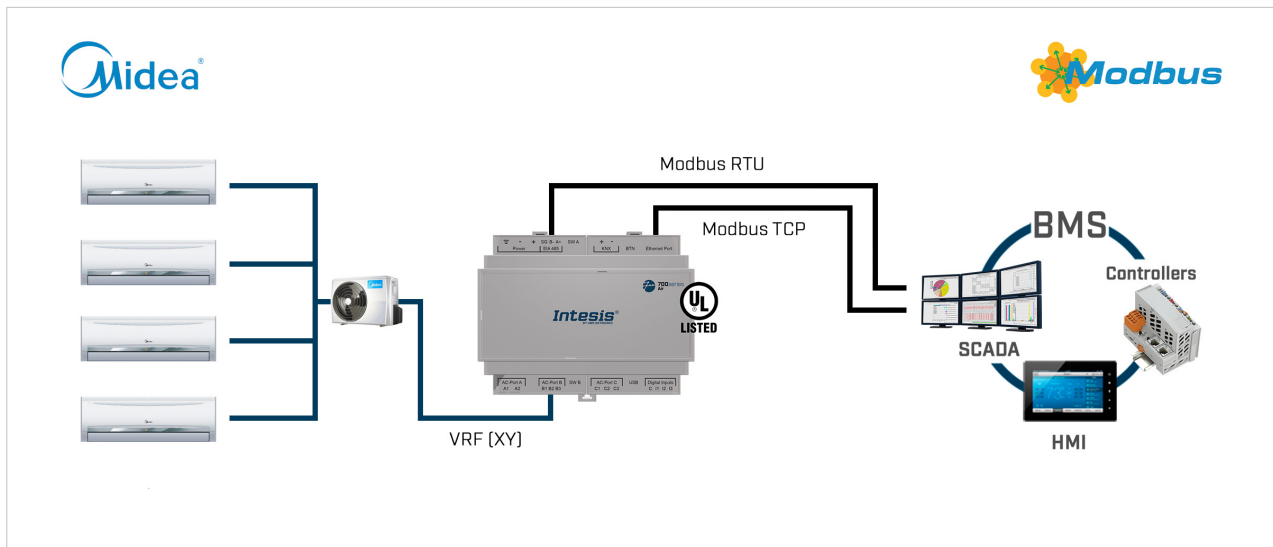
Figure 1. Integration of Midea AC systems into Modbus installations
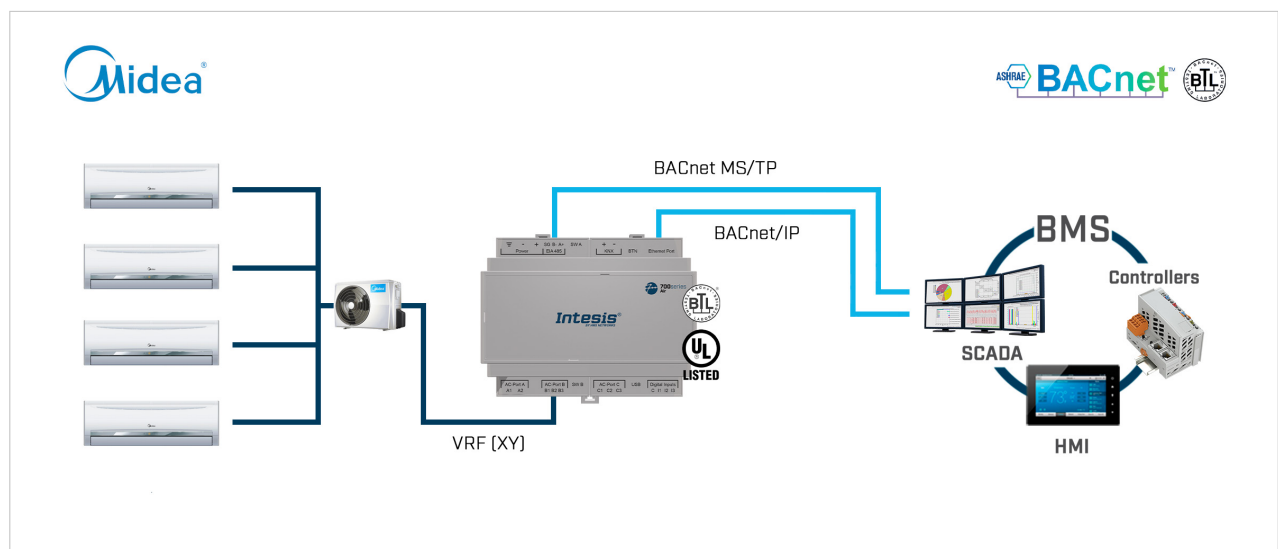
Figure 2. Integration of Midea AC systems into BACnet installations
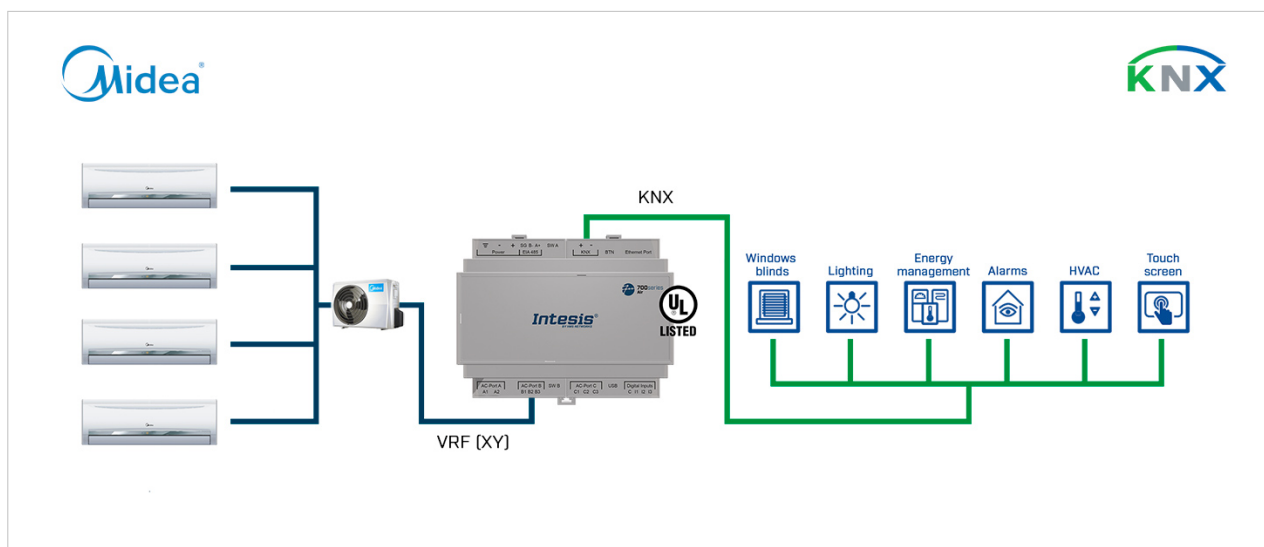
Figure 3. Integration of Midea AC systems into KNX installations
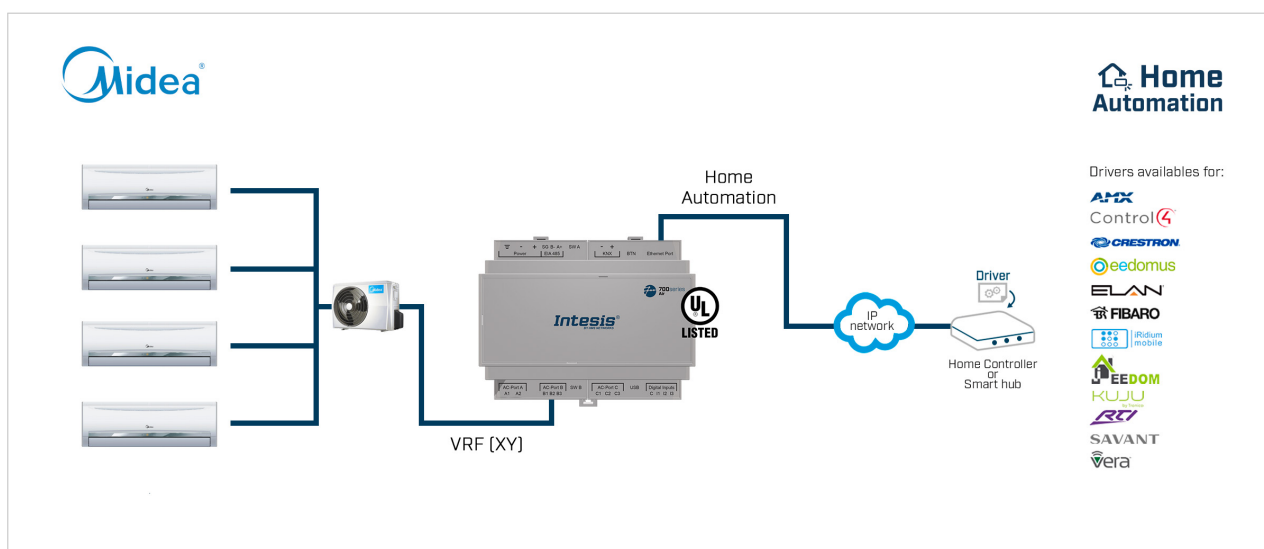
Figure 4. Integration of Midea AC systems into Home Automation installations

4.1. Inside the Package

Items included:

- Intesis IN770AIR00xO000 Gateway
- USB Mini-B type to USB A type cable
- Installation sheet

4.2. Main Features

- Several applications available: Configurable for BACnet/IP and MS/TP, Modbus TCP and RTU, KNX, and Home Automation communication protocols.
- Late configuration: Change between applications easily.
- Scan function: Find the devices connected to the air conditioning bus.
- Specific signals to monitor outdoor units.
- 2 x DIP switches for the EIA-485 connector termination and polarization configuration.
- 14 LEDs indicate the operating status for both the gateway and the communication bus.

- DIN rail and wall mounting case.
- Accredited with the main certifications for electronic equipment.
- Multiple ports for serial and TCP/IP communication:
  – Green pluggable terminal block for EIA-485 (3 poles)
  – Orange pluggable terminal block for KNX (2 poles)
  – Ethernet
  – Green pluggable terminal block for binary inputs (4 poles)
  – USB Mini-B type 2.0 port for connection to the PC
  – Green pluggable terminal block for AC connection (2 poles)
  – Green pluggable terminal block for AC connection (3 poles)
  – Green pluggable terminal block for AC connection (3 poles)

> **NOTE**
> Depending on the AC bus, some of these AC connection ports are not used.

4.3. Gateway General Functionality

With this Intesis IN770AIR00xO000 gateway, you can easily integrate Midea air conditioning (AC) systems into an installation based on Modbus TCP, Modbus RTU, KNX, BACnet/IP, BACnet MS/TP, or Home Automation. To do so, the gateway acts as a server device of the installation itself, accessing all signals from each air conditioner unit and controlling the whole AC network.

The gateway is continuously polling the AC network, storing in its memory the current status of every signal you want to track and serving this data to the installation when requested. Also, when a signal status changes, the gateway sends a write telegram to the installation, waits for the response, and performs the corresponding action.

A lack of response from a signal activates a communication error, allowing you to know which signal from which AC unit is not correctly working.

5. Hardware

5.1. Mounting

> **❗ IMPORTANT**
> Before mounting, please ensure that the chosen installation place preserves the gateway from direct solar radiation, water, high relative humidity, or dust.

> **❗ IMPORTANT**
> Maximum mounting height: below 2 meters (6.5 feet).

> **🖎 NOTE**
> Mount the gateway on a wall or over a DIN rail. We recommend the DIN rail mounting option, preferably inside a grounded metallic industrial cabinet.

> **❗ IMPORTANT**
> Ensure the gateway has sufficient clearances for all connections when mounted. See Dimensions (page 23).

Wall mounting

1. Press the top side mobile clips in the rear panel until you hear a *click*.
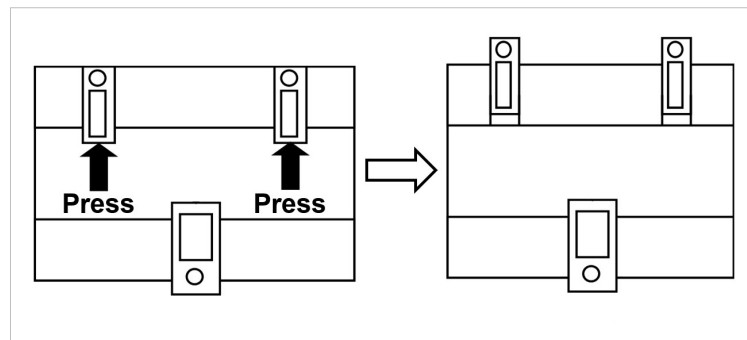
2. Use the clip holes to fix the gateway on the wall using screws.

> **🖎 NOTE**
> Use M3 screws, 25 mm (1") length.

3. Make sure the gateway is firmly fixed.

DIN rail mounting

Keep the clips down in their original position.

1. Fit the gateway's top side clips in the upper edge of the DIN rail.
2. Use a screwdriver or similar to pull the bottom clip down.
3. Fit the low side of the gateway in the DIN rail and let the clip switch back to its original position, locking the gateway to the rail.
4. Make sure the gateway is firmly fixed.
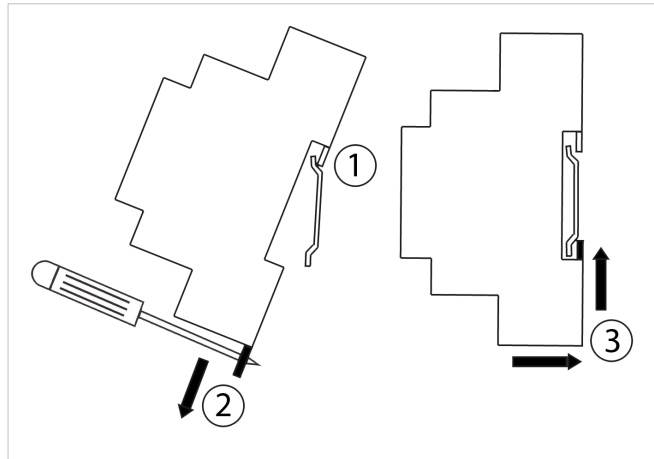
5.2. Connection

> ⚠️ **CAUTION**
> Disconnect all systems from the power source before manipulating and connecting them to the gateway.

> ❗ **IMPORTANT**
> Keep communication cables away from power and ground wires.

5.2.1. Gateway Connectors
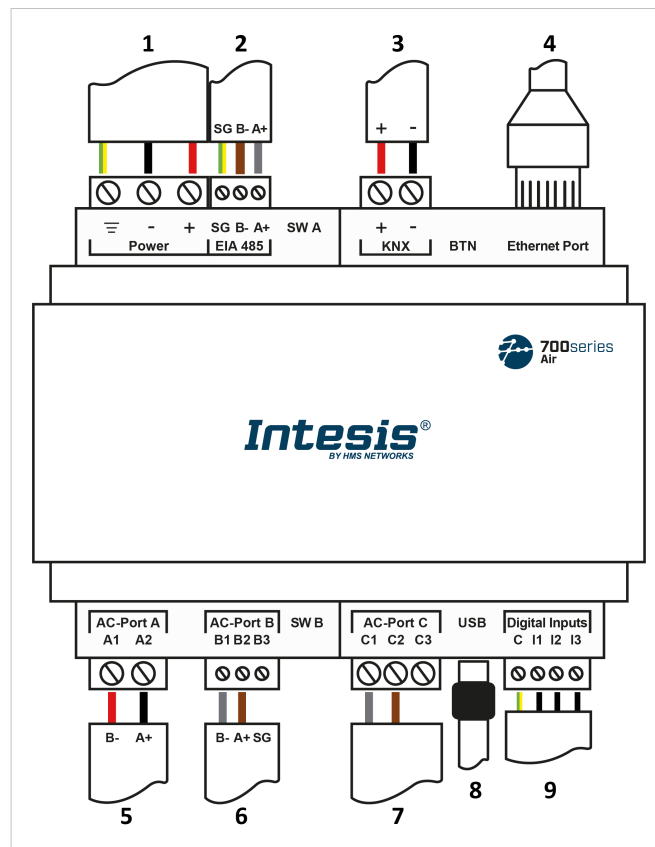
Figure 5. General view of all gateway connectors

1. Power supply: 12 to 36 VDC / 24 VAC

2. Port EIA 485: For RS 485 serial bus connection

3. Port KNX: Exclusive to the KNX bus

4. Ethernet Port: For TCP/IP and Home Automation connection

5. AC-Port A: Not used

6. AC-Port B: Midea bus (XY)

7. AC-Port C: Not used

8. USB: Connection with the PC for configuration purposes

9. Binary inputs: Dry contact (optional)

> 🗒️ **NOTE**
> You can also use the **Ethernet Port** to connect the gateway and the PC for configuration purposes.

> 🗒️ **NOTE**
> To know more about each port's specifications, see Technical Specifications (page 22).

NOTE
Mount the gateway in the desired installation site before wiring.

IMPORTANT
Use solid or stranded wires (twisted or with ferrule).

Wire cross-section/gauge for all wire connectors:

- One core: 0.2 .. 2.5 mm^2 (24 .. 14 AWG).
- Two cores: 0.2 .. 1.5 mm^2 (24 .. 16 AWG).
- Three cores: Not permitted.

Summary tables

BMS Protocol	Port EIA 485	Port KNX	Ethernet
BACnet	BACnet MS/TP	(Not used)	BACnet/IP and Console
Modbus	Modbus RTU	(Not used)	Modbus TCP and Console
KNX	(Not used)	KNX	Console
Home Automation	(Not used)	(Not used)	Home Automation and Console

AC Manufacturer	Port A	Port B	Port C	Ethernet
Midea	(Not used)	XY	(Not used)	(Not used)

Bus connectors pinout			
EIA 485	**Port A**	**Port B**	**Port C**
B- (NEG pole)	A1 (NEG pole)	B1 (NEG pole)	C1 (NEG pole)
A+ (POS pole)	A2 (POS pole)	B2 (POS pole)	C2 (POS pole)
SG (Ground)		B3 (Ground)	

NOTICE
The common connectors (those used for all applications), specific connectors (those used for each application), and the connection procedures are deeply explained in the following sections.

5.2.2. Common Connections

5.2.2.1. Connecting the Gateway to the Power Supply

The power supply connector is a green pluggable terminal block (3 poles) labeled as **Power**.

> **!** **IMPORTANT**
> - Use SELV-rated NEC class 2 or limited power source (LPS) power supply.
> - Connect the gateway's ground terminal to the installation grounding.
> - A wrong connection may cause earth loops that can damage the Intesis gateway and/or any other system equipment.

Apply the voltage within the admitted range and of enough power:

- **For DC**: 12 .. 36 VDC (+/-10%), Max: 250 mA
- **For AC**: 24 VAC (+/-10 %), 50-60 Hz, Max: 127 mA

Recommended voltage: 24 VDC, Max: 127 mA

> **!** **IMPORTANT**
> - **When using a DC power supply:** Respect the polarity labeled on the power connector for the positive and negative wires.
> - **When using an AC power supply:** Ensure the same power supply is not powering any other device.

5.2.2.2. Connecting the Gateway to the Air Conditioning System

Connect the Midea air conditioning network bus (XY) to the gateway using the **B1** and **B2** poles of the **AC-Port B**.

> **!** **INCOMPATIBILITY**
> The gateway cannot be connected when a central controller module (CCM) is present in the bus.

> **!** **IMPORTANT**
> Observe polarity

> **i** **NOTICE**
> See the wiring diagram in the gateway connectors figure: General view of all gateway connectors (page 10).

5.2.3. Connection Procedure for Modbus

> **NOTE**
> Remember to consult the Common Connections (page 12).

For Modbus TCP:

1. Connect the Modbus TCP Ethernet cable to the gateway's **Ethernet Port**.

> **IMPORTANT**
> Use a straight Ethernet UTP/FTP CAT5 or higher cable.

> **IMPORTANT**
> If communicating through the LAN of the building, contact the network administrator and make sure traffic on the used port is allowed through all LAN paths.

> **NOTE**
> When commissioning the gateway for the first time, DHCP will be enabled for 30 seconds. After that time, the default IP address 192.168.100.246 will be set.

For Modbus RTU:

1. Connect the Modbus RTU communication cable to the gateway's **EIA-485** port.

> **IMPORTANT**
> Observe polarity.

> **IMPORTANT**
> Remember the characteristics of the standard EIA-485 bus:
>
> - Maximum distance of 1200 meters (0.75 miles).
> - Maximum of 32 devices connected to the bus.
> - A termination resistor of 120 ohms (Ω) is needed at each end of the bus. The gateway has an internal bus biasing circuit already incorporating the termination resistor. It can be enabled using the DIP switch block (**SW A**) dedicated to the **EIA-485** port:
>   **Position 1**
>   – ON: 120 Ω termination active.
>   – OFF: 120 Ω termination inactive.
>   **Position 2 and 3**
>   – ON: Polarization active.
>   – OFF: Polarization inactive.
>   For further details, see DIP Switches (page 20).

> **IMPORTANT**
> If the termination resistor is enabled and you install the gateway at an end of the bus, do not install an additional termination resistor at that end.

2. Use the supplied USB Mini-B type to A type cable to connect the gateway, through its **USB** port, to a PC to configure it with Intesis MAPS.

> **NOTE**
>
> For Modbus RTU only, you can use the **Ethernet Port** to connect the gateway and the PC instead.

> **NOTICE**
>
> Find all you need to know about the gateway configuration and Intesis MAPS in the Intesis MAPS User manual for IN770AIR00xO000.

> **NOTICE**
>
> See the wiring diagram in the gateway connectors figure: General view of all gateway connectors (page 10)

5.2.4. Connection Procedure for KNX

> **NOTE**
> Remember to consult the Common Connections (page 12).

1. Connect the KNX TP communication cable to the gateway's **KNX** port.

> **IMPORTANT**
> Observe polarity.

2. Use the supplied USB Mini-B type to A type cable to connect the gateway, through its **USB** port, to a PC to configure it with Intesis MAPS.

> **NOTE**
> You can use the **Ethernet Port** to connect the gateway and the PC instead.

> **NOTICE**
> Find all you need to know about the gateway configuration and Intesis MAPS in the Intesis MAPS User manual for IN770AIR00xO000.

> **NOTICE**
> See the wiring diagram in the gateway connectors figure: General view of all gateway connectors (page 10)

5.2.5. Connection Procedure for BACnet

> **NOTE**
>
> Remember to consult the Common Connections (page 12).

For BACnet/IP:

1. Connect the BACnet/IP Ethernet cable to the gateway's **Ethernet Port**. The correct cable to use depends on where the gateway is connected:

    *   **Connecting directly to a BACnet/IP device:** use a crossover Ethernet UTP/FTP CAT5 or higher cable.

    *   **Connecting to a hub or switch of the LAN of the building:** use a straight Ethernet UTP/FTP CAT5 or higher cable.

    > **IMPORTANT**
    >
    > When commissioning the gateway for the first time, DHCP will be enabled for 30 seconds. After that time, the default IP address 192.168.100.246 will be set.

    > **IMPORTANT**
    >
    > If communicating through the LAN of the building, contact the network administrator and make sure traffic on the used port is allowed through all LAN paths.

For BACnet MS/TP:

1. Connect the BACnet MS/TP communication cable to the gateway's **EIA-485** port.

    > **IMPORTANT**
    >
    > Observe polarity.

    > **IMPORTANT**
    >
    > Remember the characteristics of the standard EIA-485 bus:
    >
    > *   Maximum distance of 1200 meters (0.75 miles).
    >
    > *   Maximum of 32 devices connected to the bus.
    >
    > *   A termination resistor of 120 ohms (Ω) is needed at each end of the bus. The gateway has an internal bus biasing circuit already incorporating the termination resistor. It can be enabled using the DIP switch block dedicated to the EIA-485 port:
    >   **Position 1**
    >
    >   –   ON: 120 Ω termination active.
    >   –   OFF: 120 Ω termination inactive.
    >
    >   **Position 2 and 3**
    >
    >   –   ON: Polarization active.
    >   –   OFF: Polarization inactive.
    >
    >   For further details, see DIP Switches (page 20).

    > **IMPORTANT**
    >
    > If the termination resistor is enabled and you install the gateway at one end of the bus, do not install an additional termination resistor at that end.

2. Use the supplied USB Mini-B type to A type cable to connect the gateway, through its **USB** port, to a PC to configure it with Intesis MAPS.

> **NOTE**
> For BACnet MS/TP only, you can use the **Ethernet Port** to connect the gateway and the PC instead.

> **NOTICE**
> Find all you need to know about the gateway configuration and Intesis MAPS in the Intesis MAPS User manual for IN770AIR00xO000.

> **NOTICE**
> See the wiring diagram in the gateway connectors figure: General view of all gateway connectors (page 10)

5.2.6. Connection Procedure for Home Automation

> **NOTE**
> Remember to consult the Common Connections (page 12).

1. Connect the Home Automation Ethernet cable to the gateway's **Ethernet Port**.

    > **IMPORTANT**
    > Use a straight Ethernet UTP/FTP CAT5 or higher cable.

    > **IMPORTANT**
    > If communicating through the LAN of the building, contact the network administrator and make sure traffic on the used port is allowed through all LAN paths.

    > **NOTE**
    > When commissioning the gateway for the first time, DHCP will be enabled for 30 seconds. After that time, the default IP address 192.168.100.246 will be set.

2. Use the supplied USB Mini-B type to A type cable to connect the gateway, through its **USB** port, to a PC to configure it with Intesis MAPS.

    > **NOTICE**
    > Find all you need to know about the gateway configuration and Intesis MAPS in the Intesis MAPS User manual for IN770AIR00xO000.

> **NOTICE**
> See the wiring diagram in the gateway connectors figure: General view of all gateway connectors (page 10)

5.3. Gateway Layout

Find in this image below the disposition of various hardware elements in the gateway.
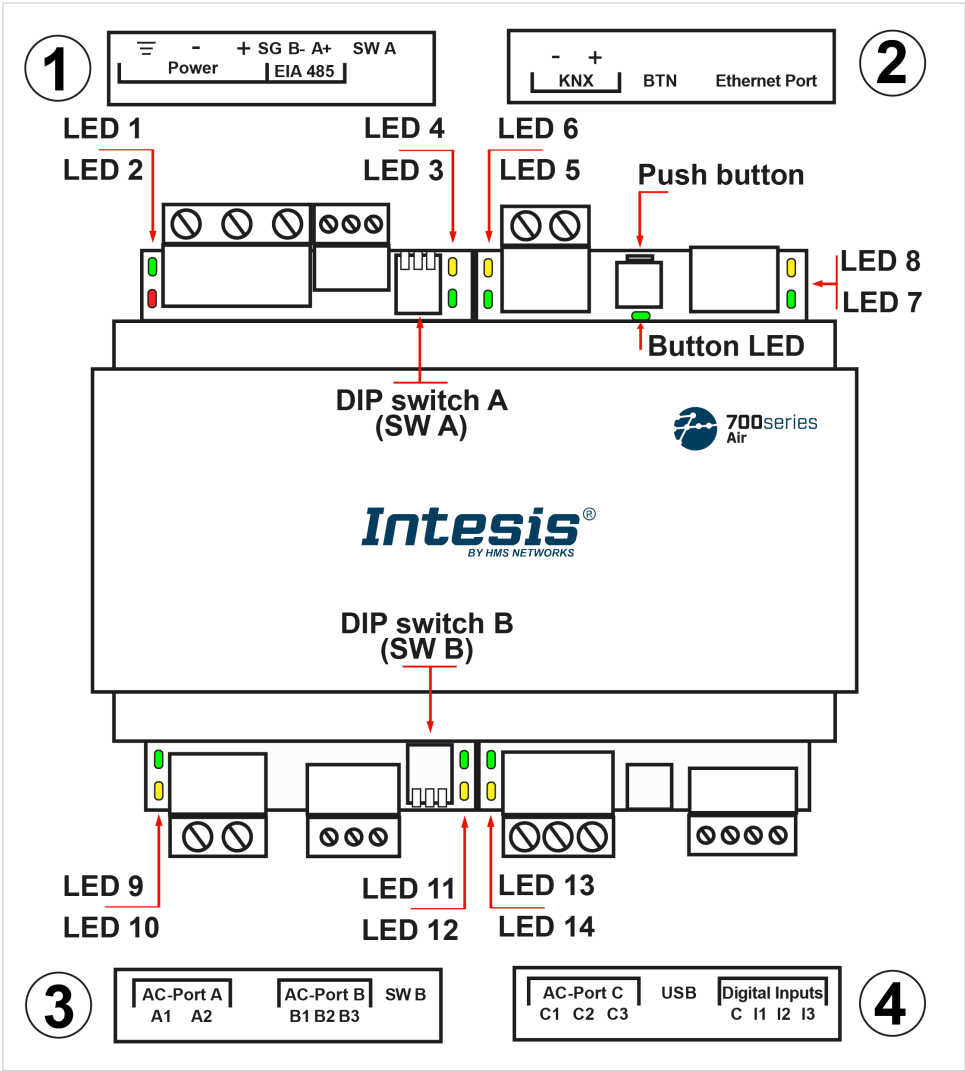
Figure 6. Gateway layout

The following sections explain in more detail each element: LEDs, DIP switches, and the push button.

5.4. LED Indicators

Table 1. LEDs location and behavior

Cover	LED	Color	Description
Top side			
Under frontal cover ①	LED 1 (PWR)	Green	Power on (not programmable)
	LED 2 (ERR)	Red	Blinking: Hardware error
	LED 3	Green	485 Tx (RS485 for BACnet or Modbus)
	LED 4	Yellow	485 Rx (RS485 for BACnet or Modbus)
Under frontal cover ②	LED 5	Green	KNX Port Tx
	LED 6	Yellow	KNX Port Rx
	BUTTON LED	Green	**KNX**: Programming mode on **BACnet**: BACnet link established **Modbus** and **Home Automation**: Not used
	LED 7	Green	Ethernet link established
	LED 8	Yellow	Ethernet speed
Bottom side			
Under frontal cover ③	LED 9	Green	AC-Port A Tx (HBS)
	LED 10	Yellow	AC-Port A Rx (HBS)
	LED 11	Green	AC-Port B Tx (RS485)
	LED 12	Yellow	AC-Port B Rx (RS485)
Under frontal cover ④	LED 13	Green	AC-Port C Tx (UFO-SLQ)
	LED 14	Yellow	AC-Port C Rx (UFO-SLQ)

> **NOTE**
> LEDs are hidden behind the four frontal labeled covers (figure Gateway layout (page 19)). These covers are assembled by pressure, so you just need to pull them to remove them.

5.5. DIP Switches

The gateway has two DIP switches (figure Gateway layout (page 19)):

- DIP switch A (SW A)
- DIP switch B (SW B)

Each DIP switch is dedicated to a 485 port, and its function is to activate or deactivate the termination resistor and the polarization of each port:

Position			Description
1	**2**	**3**	
↑	X	X	120 Ω termination active
↓	X	X	120 Ω termination inactive (default position)
X	↑	↑	Polarization active (default position)
X	↓	↓	Polarization inactive

5.6. Push Button

Find the push button at the top side, between the KNX and the Ethernet connectors (figure Gateway layout (page 19)).

> **NOTE**
> The button is hidden and only accessible using a thin object like a paper clip.

Common functionality:

Reset factory settings

1. Push the button.
2. Power on the gateway.
3. Wait four seconds.
4. Release the button.

Functionalities depending on the current project:

BACnet

• Push the button to send an I-Am message to all BACnet ports.

KNX

• Push the button to switch between normal mode and programming mode.

5.7. Technical Specifications

Case	Plastic, type PC (UL 94 V-0). Color: Light Grey. RAL 7035
	Net dimensions (dxwxh): Millimeters: 90 x 106 x 58 mm / Inches: 3.5 x 4.2 x 2.3"
	Recommended space for installation (dxwxh): Millimeters: 130 x 115 x 100 mm / Inches: 5.1 x 4.5 x3.9"
Mounting	Wall: M3 25 mm (1") length screws. Secure mounting: below 2 meters (6 feet)
	DIN rail (recommended mounting) EN60715 TH35
Wires (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule)
	Wire cross-section/gauge:
	One core: 0.2 .. 2.5 mm^2 (24 .. 14 AWG)
	Two cores: 0.2 to 1.5 mm^2 (24 .. 16 AWG)
	Three cores: Not permitted
	For distances longer than 3.05 meters (10 feet), use class 2 cables
Power	1 x Green pluggable terminal block (3 poles)
	12 to 36 VDC +/-10%, Max.: 250 mA
	24 VAC +/-10% 50-60 Hz, Max.: 127 mA
	Recommended: 24 VDC
Ethernet	1 x Ethernet 10/100 Mbps RJ45
Port EIA 485	1 x Green pluggable terminal block (3 poles)
	SGND (Reference ground or shield)
	1500VDC isolation from other ports
Port KNX	1 x Orange pluggable terminal block (2 poles): A, B
AC Ports	AC-Port A (serial, 2 poles): Not used
	AC-Port B (serial, 3 poles): AC bus connection (XY)
	AC-Port C: (serial, 3 poles): Not used
LEDs	2 x Run (Power/Error) 2 x Ethernet Link/Speed
	2 x Port EIA-485 TX/RX 2 x AC-Port A TX/RX
	2 x Port KNX TX/TR 2 x AC-Port B TX/RX
	1 x Button indicator 2 x AC-Port C TX/RX
Binary inputs	1 x Green pluggable terminal block (4 poles)
	I1, I2, I3, and Common
	1500 VDC isolation from other ports
Console port	USB Mini-B type 2.0 compliant
	1500 VDC isolation
SW A SW B	2 x DIP switch blocks for EIA-485 serial port configuration:
	Position 1:
	On: 120 Ω termination active
	Off: 120 Ω termination inactive
	Position 2 and 3:
	On: Polarization active
	Off: Polarization inactive
Push button	1 x Push button
	Factory reset
	I-Am message (for BACnet only)
	Normal mode/programming mode switch (for KNX only)
Operational temperature	Celsius: 0 .. 60°C
	Fahrenheit: 32 .. 140ºF
Operational humidity	5 to 95%. No condensation
Protection	IP20 (IEC60529)

5.8. Dimensions

- **Net dimensions (DxWxH)**
  Millimeters: 90 x 106 x 58 mm
  Inches: 3.5 x 4.2 x 2.3"

- **Clear space for installation (DxWxH)**
  Millimeters: 130 x 115 x 100 mm
  Inches: 5.1 x 4.5 x 3.9"
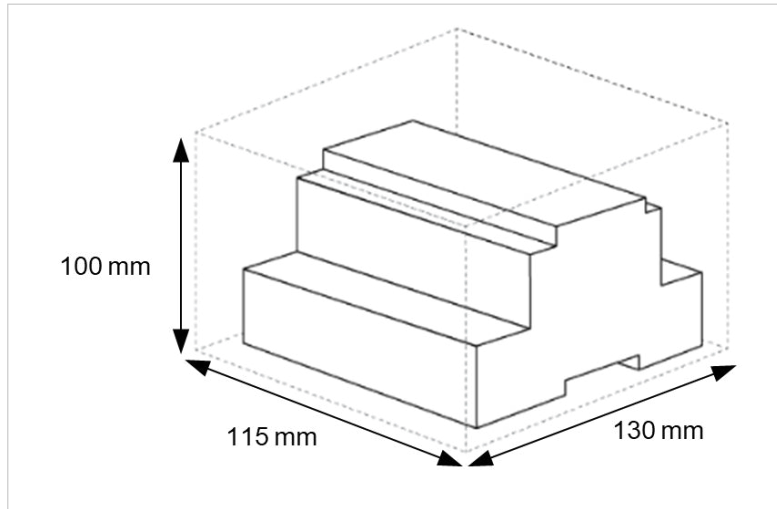
6. Available Applications

6.1. Integration into Modbus Systems

6.1.1. Modbus Registers

> **ℹ️ NOTICE**
> This part is common for Modbus RTU and TCP.

Functions to read Modbus registers:

- 03 Read Holding Registers.
- 04 Read Input Registers.

Function to write Modbus registers:

- 06 Single Holding Registers.

Modbus register contents are expressed in most significant bit (MSB) .. less significant bit (LSB).

The following tables list all available Modbus registers for the gateway.

> **ℹ️ NOTICE**
> Read/write parameter terminology:
>
> - **R**: Read-only register.
> - **W**: Write-only register.
> - **RW**: Read and write register.

Table 2. Global signals

Register name	Possible values	R/W
On (all units)	1: Set the units On	Trigger
Off (all units)	1: Set the units Off	Trigger
Operation Mode Auto (all units)	1: Set Auto Mode	Trigger
Operation Mode Heat (all units)	1: Set Heat Mode	Trigger
Operation Mode Dry (all units)	1: Set Dry Mode	Trigger
Operation Mode Fan (all units)	1: Set Fan Mode	Trigger
Operation Mode Cool (all units)	1: Set Cool Mode	Trigger
Fan Speed Auto (all units)	1: Set Fan Speed Auto	Trigger
Fan Speed Low (all units)	1: Set Fan Speed Low	Trigger
Fan Speed Mid (all units)	1: Set Fan Speed Mid	Trigger
Fan Speed High (all units)	1: Set Fan Speed High	Trigger
Swing On (all units)	1: Set Swing On	Trigger
Swing Off (all units)	1: Set Swing Off	Trigger
Temperature Setpoint (x10) (all units)	Celsius: 17 .. 30°C Fahrenheit: 62 .. 86°F	Trigger
Operating mode force On (all Units)	1: Force Operating mode	Trigger
Operating mode force Off (all Units)	1: Unforce Operating mode	Trigger

Register name	Possible values	R/W
Remote control lock On (all units)	1: Lock remote control	Trigger
Remote control lock Off (all units)	1: Unlock remote control	Trigger

Table 3. Individual units signals

Register name	Possible values	Modbus address formula	R/W
On/Off	0: Off 1: On	(Unit adress×100)+0	R, W
Operation Mode	0: Heat 1: Cool 2: Fan 3: Dry 4: Auto	(Unit adress×100)+1	R, W
Temperature Setpoint (x10°C)	Celsius: 17 .. 30°C Fahrenheit: 62 .. 86°F	(Unit adress×100)+2	R, W
Fan Speed	0: Auto 1: Low 2: Med : High	(Unit adress×100)+3	R, W
Vane Position Swing	0: Swing Off 1: Swing On	(Unit adress×100)+4	R, W
Room Temperature (x10)	Celsius: -20 .. 100°C Fahrenheit: -4 .. 212°F	(Unit adress×100)+5	R
Unit Error Code	0: No Error X (0 .. 255): Error	(Unit adress×100)+6	R
Communication Error IU	0: No error 1: Error	(Unit adress×100)+7	R
Remote Control lock	0: Unlock 1: Lock	(Unit adress×100)+8	R, W
Force Operating mode	0: No force 1: Force	(Unit adress×100)+9	R, W
Consumption Yesterday	Wh/KWh	(Unit adress×100)+10	R
Consumption Today	Wh/KWh	(Unit adress×100)+12	R
Consumption Total	Wh/KWh	(Unit adress×100)+14	R
Consumption Yesterday Heat	Wh/KWh	(Unit adress×100)+16	R
Consumption Today Heat	Wh/KWh	(Unit adress×100)+18	R
Consumption Total Heat	Wh/KWh	(Unit adress×100)+20	R
Consumption Yesterday Cool	Wh/KWh	(Unit adress×100)+22	R
Consumption Today Cool	Wh/KWh	(Unit adress×100)+24	R
Consumption Total Cool	Wh/KWh	(Unit adress×100)+26	R

6.2. Integration into KNX Systems

6.2.1. KNX Signals

The following tables list all available KNX signals for this gateway.

> **NOTE**
>
> **Physical Address:** The gateway supports (P/S) and (P/I/S) format levels.

> **NOTICE**
>
> Communication object flags:
>
> - **Ri (Read on initialization)**: The gateway requests this signal's updated data after an initialization instead of waiting for a change in the signal.
> - **R**: The KNX system can read this signal.
> - **W**: The KNX system can write this signal.
> - **T**: The KNX system receives a telegram when this signal changes its value.
> - **U**: This signal's data is updated after a reboot of either the gateway or the bus.

Table 4. Global signals

Object name	Possible values	DPT	Flags
Control_On/Off (all units)	0: Off, 1: On	1.001-DPT_Switch (1bit)	W
Control_Operating Mode (all units)	0: Auto 1: Heat 3: Cool 9: Fan 14: Dry	20.105-DPT_HVACContrMode (1byte)	W
Control_Operating Mode (all units)	0: Auto 1: Heat 2: Dry 3: Fan 4: Cool	5.x (1byte)	W
Control_Operating Mode (all units)	0: Cool 1: Heat 2: Fan 3: Dry 4: Auto	5.x (1byte)	W
Control_Fan Speed (all units)	0: Low 1: Mid 2: High 3: Powerful	5.x (1byte)	W
Control_Fan Speed AUTO (all units)	1: Set auto fan 0: Stop auto fan	1.001-DPT_Switch (1bit)	W
Control_Setpoint (all the units)	Celsius: 17 .. 30°C Fahrenheit: 62 .. 86°F	9.001/9.027-DPT_Value_Temp (2byte)	W
Control_Operating Mode force (all the units)	0: No force 1: Force	1.002 DPT_Bool (1bit)	W
Control_Remote Lock/Unlock (all the units)	0: Unlock 1: Lock	1.002 DPT_Bool (1bit)	W

Table 5. Individual units signals

Object name	Possible values	DPT	Flags
Status_CommError	0: No error 1: Error	1.005-DPT_Alarm (1bit)	R, T
Control_On/Off	0: Off 1: On	1.001-DPT_Switch (1bit)	Ri, W, U
Status_On/Off	0: Off 1: On	1.001-DPT_Switch (1bit)	R, T
Control_Operation mode	0: Auto 1: Heat 3: Cool 9: Fan 14: Dry	20.105-DPT_HVACContrMode (1byte)	Ri, W, U
Status_Operation mode	0: Auto 1: Heat 3: Cool 9: Fan 14: Dry	20.105-DPT_HVACContrMode (1byte)	R, T
Control_Operation mode	0: Auto 1: Heat 2: Dry 3: Fan 4: Cool	5.x (1byte)	Ri, W, U
Status_Operation mode	0: Auto 1: Heat 2: Dry 3: Fan 4: Cool	5.x (1byte)	R, T
Control_Operation mode	0: Cool 1: Heat 2: Fan 3: Dry 4: Auto	5.x (1byte)	Ri, W, U
Status_Operation mode	0: Cool 1: Heat 2: Fan 3: Dry 4: Auto	5.x (1byte)	R, T
Control_Mode Cool/Heat	0: Cool 1: Heat	1.100-DPT_Heat/Cool (1bit)	Ri, W, U
Status_Mode Cool/Heat	0: Cool 1: Heat	1.100-DPT_Heat/Cool (1bit)	R, T
Control_Auto mode	1: Set auto mode	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Auto mode	1: Auto mode active 0: Auto mode not active	1.001-DPT_Switch (1bit)	R, T
Control_Heat mode	1: Set heat mode	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Heat mode	1: Heat mode active 0: Heat mode not active	1.001-DPT_Switch (1bit)	R, T
Control_Cool mode	1: Set cool mode	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Cool mode	1: Cool mode active 0: Cool mode not active	1.001-DPT_Switch (1bit)	R, T

Object name	Possible values	DPT	Flags
Control_Fan mode	1: Set fan mode	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Fan mode	1: Fan mode active 0: Fan mode not active	1.001-DPT_Switch (1bit)	R, T
Control_Dry mode	1: Set dry mode	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Dry mode	1: Dry mode active 0: Dry mode not active	1.001-DPT_Switch (1bit)	R, T
Control_Temperature setpoint	Celsius: 17 .. 30°C Fahrenheit: 62 .. 86°F	9.001/9.027-DPT_Value_Temp (2byte)	Ri, W, U
Status_Temperature setpoint	Celsius: 17 .. 30°C Fahrenheit: 62 .. 86°F	9.001/9.027-DPT_Value_Temp (2byte)	R, T
Control_Fan speed enumerated	0: Low 1: Medium 2: High	5.x (1byte)	Ri, W, U
Status_Fan speed enumerated	0: Low 1: Medium 2: High	5.x (1byte)	R, T
Control_Fan speed scaling	Thresholds: 0.. 49 % 50 .. 82 % 83 .. 100 %	5.001-DPT_Scaling (1byte)	Ri, W, U
Status_Fan speed scaling	Thresholds: 33 % 66 % 100 %	5.001-DPT_Scaling (1byte)	R, T
Control_Fan speed low	1: Set fan speed low	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Fan speed low	1: Speed low active 0: Speed low not active	1.001-DPT_Switch (1bit)	R, T
Control_Fan speed medium	1: Set fan speed medium	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Fan speed medium	1: Speed medium active 0: Speed medium not active	1.001-DPT_Switch (1bit)	R, T
Control_Fan speed high	1: Set fan speed high	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Fan speed high	1: Speed high active 0: Speed high not active	1.001-DPT_Switch (1bit)	R, T
Control_Fan speed Man/Auto	0: Manual 1: Auto	1.001-DPT_Switch (1bit)	Ri, W, U
Status_Fan speed Man/Auto	0: Manual 1: Auto	1.001-DPT_Switch (1bit)	R, T
Control_VanesUD position swing	0: Swing off 1: Swing on	1.001-DPT_Switch (1bit)	Ri, W, U
Status_VanesUD position swing	0: Swing off 1: Swing on	1.001-DPT_Switch (1bit)	R, T
Status_AC ambient temperature	Celsius: 0 .. 30°C Fahrenheit: 32 .. 86°F	9.001/9.027-DPT_Value_Temp (2byte)	R, T
Control_KNX ambient temperature	°C / °F	9.001/9.027-DPT_Value_Temp (2byte)	Ri, W, U
Status_Unit error code	0: No Error 1 .. 255: Error	8.x (2 byte)	R, T
Control_Remote control lock	0: Unlock 1: Lock	1.002 DPT_Bool (1bit)	Ri, W, U
Status_Remote control lock	0: Unlock 1: Lock	1.002 DPT_Bool (1bit)	R, T

Object name	Possible values	DPT	Flags
Control_Force operating mode	0: No force 1: Force	1.002 DPT_Bool (1bit)	Ri, W, U
Status_Force operating mode	0: No force 1: Force	1.002 DPT_Bool (1bit)	R, T
Status_Consumption Yesterday	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T
Status_Consumption Today	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T
Status_Consumption Total	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T
Status_Consumption Yesterday Heat	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T
Status_Consumption Today Heat	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T
Status_Consumption Total Heat	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T
Status_Consumption Yesterday Cool	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T
Status_Consumption Today Cool	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T
Status_Consumption Total Cool	Wh/KWh	13.010 active energy (Wh) (4byte)	R, T

NOTE

The default unit for the consumption signals is Wh, but you can set it in KWh instead. If so, the DPT number changes from 13.010 to 13.013.

6.3. Integration into BACnet Systems

ℹ NOTICE
You can see the Protocol Implementation Conformance Statement (PICS) document on https://www.intesis.com/docs/bacnet-client-pic-statement-770

6.3.1. BACnet Objects

ℹ NOTICE
This part is common for BACnet MS/TP and BACnet/IP.

Input object types:

• Binary input

Output object types:

• Binary output
• Multistate output
• Analog output

The following tables list all available BACnet objects for this gateway.

Table 6. Global signals

Object name	Possible values	Object type	Object instance
On/Off (all units)	0: Off 1: On	4-Binary Output	0+0
Mode (all units)	1: Heat 2: Cool 3: Fan 4: Dry 5: Auto	14-Multistate Output	0+0
FanSpeed (all units)	1: Auto 2: Low 3: Med 4: High	14-Multistate Output	0+1
Vane Position (all units)	0: Swing Off 1: Swing On	4-Binary Output	0+1
Temperature Setpoint (all units)	Celsius: 17 .. 30°C Fahrenheit: 62 .. 86°F	1-Analog Output	0+0
Operating mode force (all Units)	0: No force 1: Force	4-Binary Output	0+2
Remote control lock (all units)	0: Unlock 1: Lock	4-Binary Output	0+3

Table 7. Individual units signals

Object name	Possible values	Object type	Object instance
UXX_On/Off_S	0: Off 1: On	3-Binary Input	(U[1..64]×100)+0
UXX_On/Off_C	0: Off 1: On	4-Binary Output	(U[1..64]×100)+0
UXX_Mode_S	1: Heat 2: Cool 3: Fan 4: Dry 5: Auto	13-Multistate Input	(U[1..64]×100)+0
UXX_Mode_C	1: Heat 2: Cool 3: Fan 4: Dry 5: Auto	14-Multistate Output	(U[1..64]×100)+0
UXX_Setpoint_S	Celsius: 17 .. 30°C Fahrenheit: 62 .. 86°F	0-Analog Input	(U[1..64]×100)+0
UXX_Setpoint_C	Celsius: 17 .. 30°C Fahrenheit: 62 .. 86°F	1-Analog Output	(U[1..64]×100)+0
UXX_FanSpeed_S	1: Auto 2: Low 3: Med 4: High	13-Multistate Input	(U[1..64]×100)+1
UXX_FanSpeed_C	1: Auto 2: Low 3: Med 4: High	14-Multistate Output	(U[1..64]×100)+1
UXX_Vane position_S	0: Swing Off 1: Swing On	3-Binary Input	(U[1..64]×100)+1
UXX_Vane position_C	0: Swing Off 1: Swing On	4-Binary Output	(U[1..64]×100)+1
UXX_Room Temperature	Celsius: -35 .. 92.5°C Fahrenheit: -31 .. 198.5°F	0-Analog Input	(U[1..64]×100)+1
UXX_Unit Error Code	0: No Error 0 .. 255: Error	0-Analog Input	(U[1..64]×100)+2
UXX_Communication Error IU	0: No error 1: Error	3-Binary Input	(U[1..64]×100)+2
UXX_Remote control lock_S	0: Unlock 1: Lock	3-Binary Input	(U[1..64]×100)+3
UXX_Remote control lock_C	0: Unlock 1: Lock	4-Binary Output	(U[1..64]×100)+2
UXX_Operating mode force_S	0: No force 1: Force	3-Binary Input	(U[1..64]×100)+4
UXX_Operating mode force_C	0: No force 1: Force	4-Binary Output	(U[1..64]×100)+3
UXX_Consumption_Yesterday_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+3
UXX_Consumption_Today_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+4
UXX_Consumption_Total_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+5
UXX_Consumption_Yesterday_Heat_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+6
UXX_Consumption_Today_Heat_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+7

Object name	Possible values	Object type	Object instance
UXX_Consumption_Total_Heat_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+8
UXX_Consumption_Yesterday_Cool_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+9
UXX_Consumption_Today_Cool_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+10
UXX_Consumption_Total_Cool_S	Wh/KWh	0-Analog Input	(U[1..64]×100)+11

6.4. Integration into Home Automation Systems

6.4.1. Home Automation Signals

The following tables list all available Home Automation signals for this gateway.

> **NOTE**
> - **SET**: Command used to control the indoor unit. It is sent by the client.
> - **CHN**: Command used to get notifications of changes in the status of a specific function of the gateway. It is sent spontaneously by the gateway itself.
> - **GET**: Command used to get the status of a specific function. It is sent by the client.
>
> To know more about the Home Automation protocol, see the Protocol specifications manual.

Table 8. Indoor units signals

Name	Possible values	acNum[1]	Commands supported
On/Off	ON OFF	See the note below	SET/CHN/GET
Operation Mode	HEAT COOL FAN DRY AUTO		SET/CHN/GET
Fan Speed	1 2 3 4 5 AUTO		SET/CHN/GET
Vane Position	1 2 3 4 Stop Swing		SET/CHN/GET
Temperature Setpoint (x10)	°C / °F		SET/CHN/GET
AC Ambient Temperature (x10)	Celsius: -35 .. 92.5°C Fahrenheit: -31 .. 198.5°F		CHN/GET
Unit Error code	0: No Error X: Error		CHN/GET
Error IU	OK ERR		CHN/GET

> **NOTE**
> [1] This index must be set accordingly to the Unit ID Index.
>
> For outdoor units, the acNum value must be the same than the minimum indoor unit associated in the CONFIGURATION section.

7. Late Configuration: Change the Gateway's Protocol

Reconfiguring the gateway with a different protocol is very easy:

1.   Connect the gateway to the PC and open the configuration tool Intesis MAPS.
2.   Select the new template you need.
3.   Click **Next** or double-click the template in the list.
4.   A message will pop up, asking if you want to save the project currently loaded in the gateway.
5.   Click **Yes** or **No**, depending on your needs.
6.   Configure the needed parameters and signals for your new project.
7.   Send the configuration to the gateway.

> **NOTE**
> For a complete gateway configuration guide, please refer to the Intesis MAPS User manual for IN770AIR00xO000.

8. Error Codes

> **NOTE**
> These error codes are the same for all applications.

Error code	Error in RC	Error description
-200	N/A	Overconsumption error in XYE bus
-100	N/A	License error / Indoor units not supported by current license
65535 (-1)	N/A	Communication error between the gateway and the AC unit
0	N/A	No active error
1	E0	Phase error or error in the phase sequence
2	E1	Communication error
3	E2	T1 sensor error
4	E3	T2A sensor error
5	E4	T2B sensor error
6	E5	T3 temperature and T4 temperature Compressor discharge temperature sensors error
7	E6	Zero cross error detection
8	E7	EEPROM memory error
9	E8	Indoor fan speed out of control
10	E9	Communication error between the main panel and the visualization panel
11	EA	Compressor's current overload error (4 times)
12	EB	Inverter module protection
13	EC	Cooling error
14	ED	Outdoor unit fault protection
15	EE	Water level fault detection
16	EF	Other errors
101	P0	Vaporizer temperature protection
102	P1	Thawing or cold air protection
103	P2	Condenser high temperatures protection
104	P3	Compressor temperature protection
105	P4	Evacuation duct temperature protection
106	P5	Discharge high pressure protection
107	P6	Discharge low pressure protection
108	P7	Current overload or underload protection
109	P8	Compressor's current overload protection
110	P9	Reserved
111	PA	Reserved
112	PB	Reserved
113	PC	Reserved
114	PD	Reserved
115	PE	Reserved
116	PF	Other protection measures

> **IMPORTANT**
> These error codes may differ depending on the specific AC unit model.

NOTE

If you detect a non-listed error code, please contact Midea technical support.