ENGLISH

Midea commercial and VRF with KNX, Serial, and IP support

IN770AIR***O000 GATEWAY

USER MANUAL
Version 1.0.9
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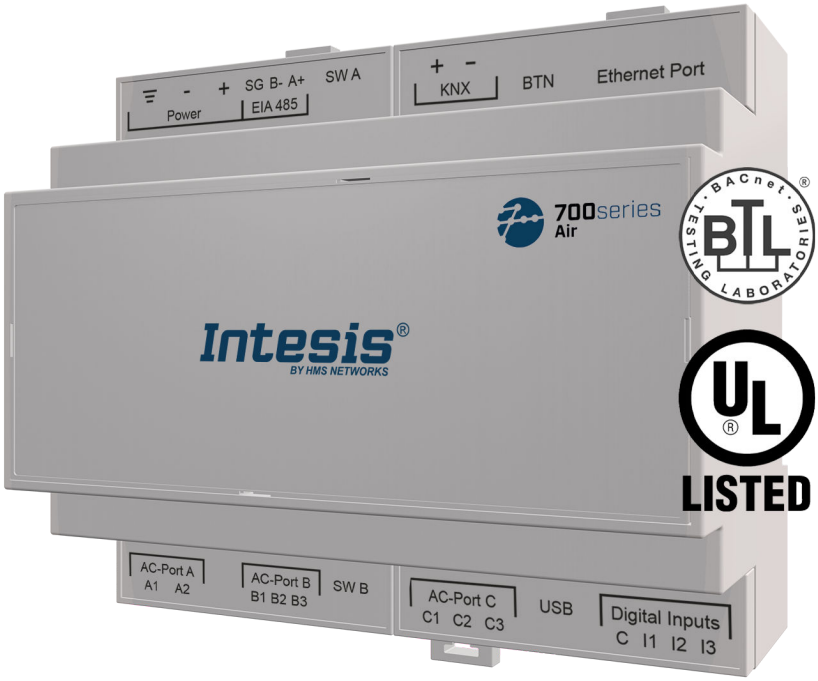

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1. Description and Order Codes

IN770AIR*O000 Gateway.**

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

ORDER CODE	LEGACY ORDER CODE
IN770AIR***O000 [1]	INBACMID004I000

[1] *** stands for XXS, S, or M, depending on the license you have purchased. To know more, see 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 IN770AIR∗∗∗O000 gateway:

Order Code	License	Maximum AC units	
		Indoor units	Outdoor units
IN770AIRXXSO000	XXS	4	0
IN770AIR00SO000	Small	16	0
IN770AIR00MO000	Medium	64	0

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

3. General Information

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 power before manipulating and connecting them to the gateway.

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

Use a circuit breaker before the power supply. Rating: 250 V, 6 A.

Supply always a correct voltage to power the gateway. See Technical Specifications (page 20).

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 IN770AIR***O000 gateway supports four applications.

Gateway's client interface	↔	Gateway's server interface
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

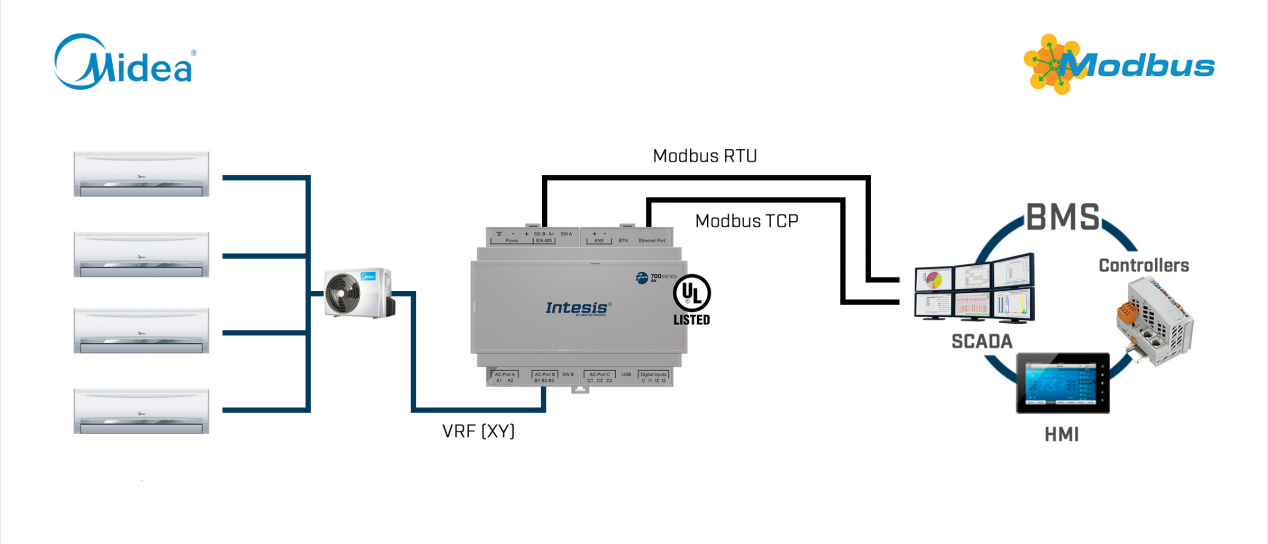


Figure 2. Integration of Midea AC systems into KNX installations

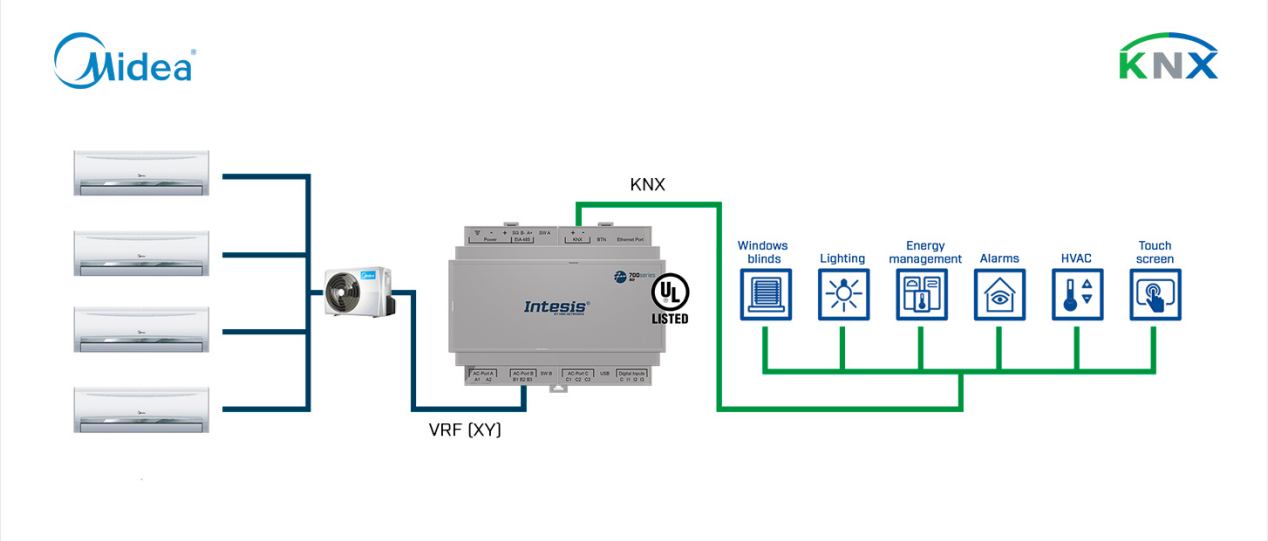


Figure 3. Integration of Midea AC systems into BACnet installations

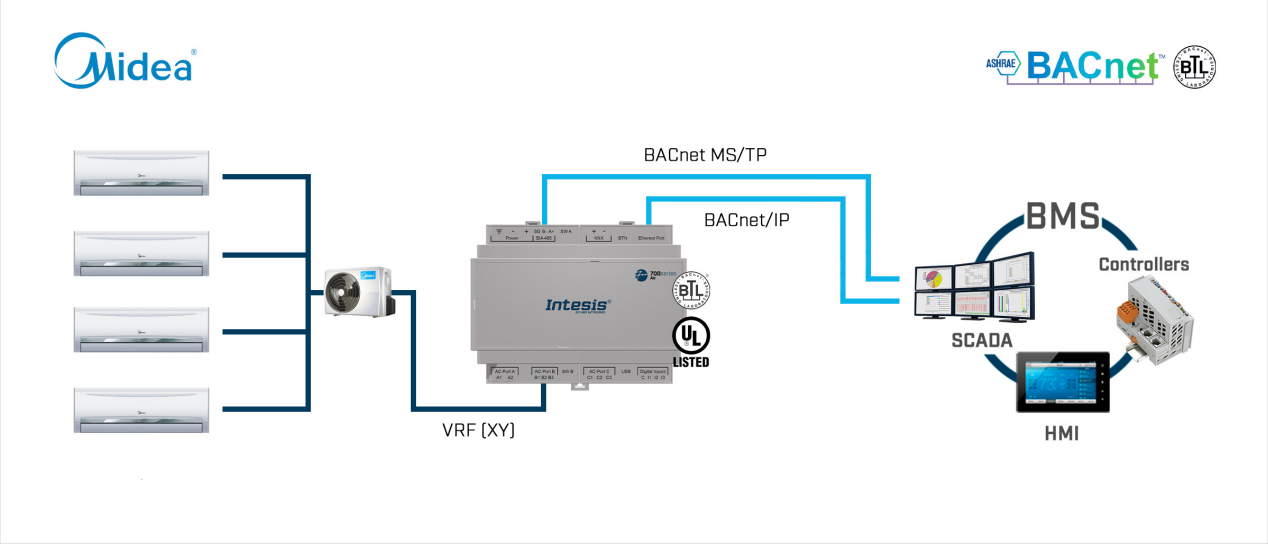
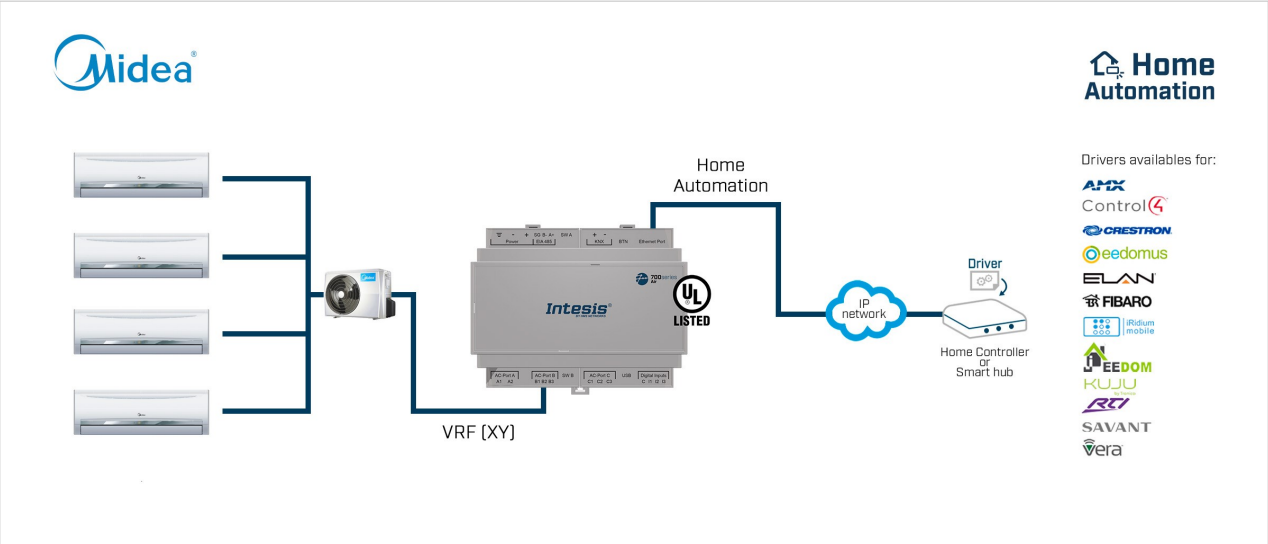


Figure 4. Integration of Midea AC systems into Home Automation installations



4.1. Inside the Package

Items included:

- Intesis IN770AIR***O000 Gateway
- USB Mini-B type to USB Type-A 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. See Gateway Connectors (page 10).

4.3. Gateway General Functionality

With this Intesis IN770AIR∗∗∗O000 gateway, you can easily integrate Midea Commercial and VRF 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.

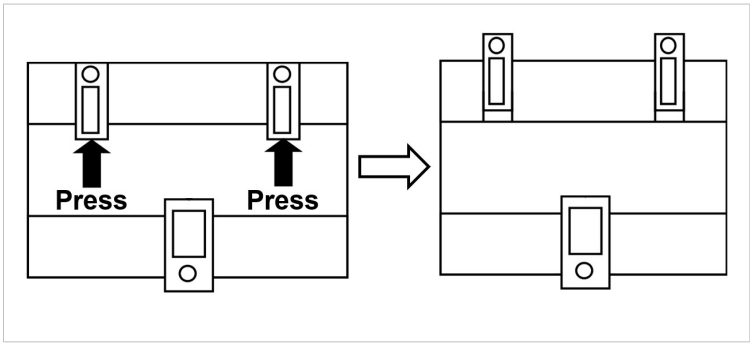
IMPORTANT
Maximum mounting height: below 2 meters (6.5 feet).

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 21).

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.

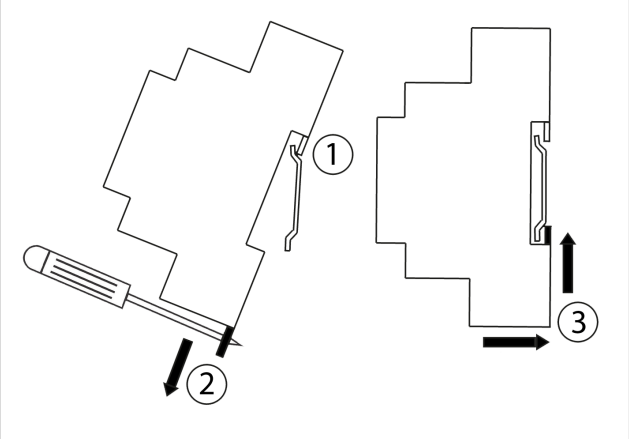
NOTE
Use M3 screws, 25 mm (1") length.

3. Make sure the gateway is firmly fixed.

DIN rail mounting

1. Fit the gateway's top-side clips in the upper edge of the DIN rail.
2. Press the low side of the gateway gently to lock it in the DIN rail.
3. Make sure the gateway is firmly fixed.

NOTE
For some DIN rails, to complete step 2, you may need a small screwdriver or similar to pull the bottom clip down.



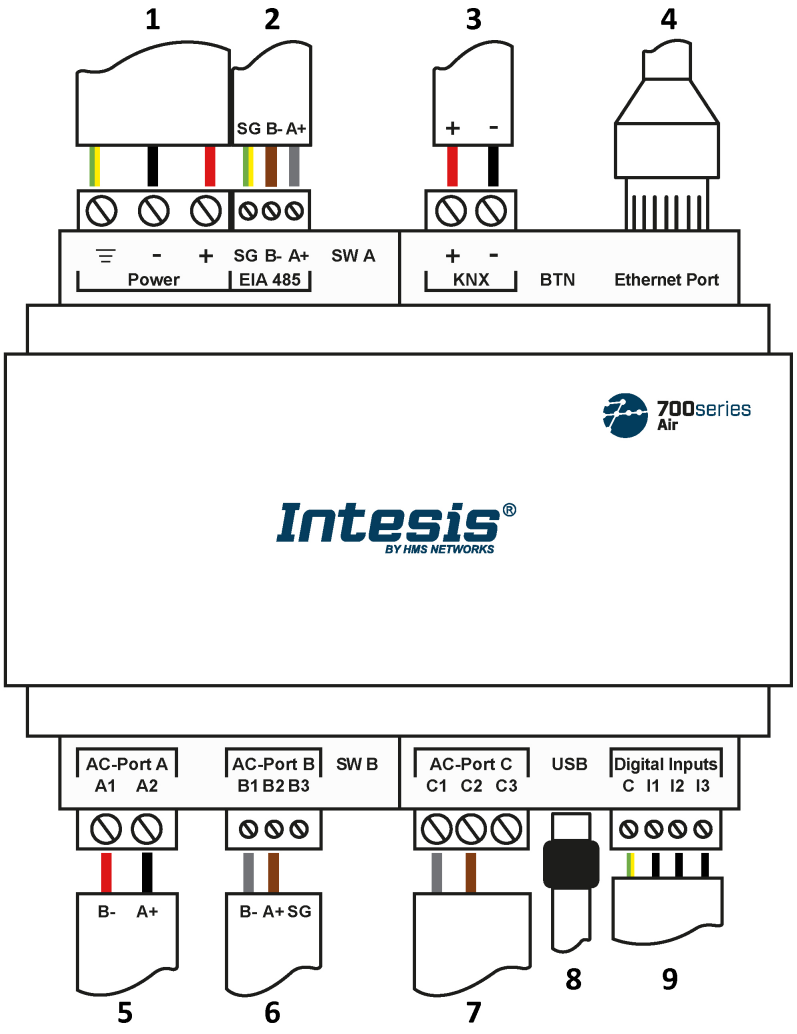
5.2. Connection

CAUTION
Disconnect all systems from power 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. Wiring diagram



1. **Power Supply** (12-36 VDC / 24 VAC)
2. **Port EIA-485**
3. **Port KNX**
4. **Ethernet**
5. **Not used**
6. **Midea** VRF (XY)
7. **Not used**
8. **Console**
9. **Binary inputs (dry contact)** optional

Connectors' wiring:

IMPORTANT
For all connectors, use solid or stranded wires (twisted or with ferrule).

Cross-section/gauge per terminal:

- One core: 0.2 .. 2.5 mm^2 / 24 .. 11 AWG
- Two cores: 0.2 .. 1.5 mm^2 / 24 .. 15 AWG
- Three cores: Not permitted

NOTE
To know more about each port's specifications, see Technical Specifications (page 20).

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

Communication ports:

PORT	USAGE	WIRING			
EIA-485	BACnet MS/TP and Modbus RTU	**SG**: Signal ground	**B-**	**A+**	
KNX	KNX bus	**+**		-	
Ethernet	**As an IP/TCP port**: BACnet/IP, Modbus TCP, and Home Automation **As a console port**: Connection to a PC for configuration purposes	Ethernet cable (CAT5 or higher) When using the building LAN, contact the network administrator and make sure traffic is allowed. When starting up the gateway for the first time, DHCP will be enabled for 30 seconds. After that time, the default IP 192.168.100.246 will be set.			
AC-Port A	*Not used*				
AC-Port B Observe polarity	Midea bus	**B1**: Y	**B2**: X	B3: *Not used*	
AC Port-C	*Not used*				
USB	Connection to a PC for configuration purposes	USB Mini-B type			
Digital Inputs	Dry contact for input devices	**C**: Common	**I1**: Input 1	**I2**: Input 2	**I3**: Input 3

Power supply:

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

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.

IMPORTANT

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

5.2.2. Connection Procedure for the AC Unit

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

NOTE

See the Wiring diagram (page 10).

5.2.3. Connection Procedure for Modbus

For Modbus TCP:

Connect the Modbus TCP Ethernet cable to the gateway's **Ethernet Port**. The correct cable to use depends on where the gateway is connected:

- **Connecting directly to a Modbus TCP 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.

NOTE

Some devices detect the difference automatically and adjust themselves.

NOTE

When commissioning the gateway for the first time, DHCP will be enabled for 30 seconds. During that time, if there is a DHCP server, an IP address will be automatically assigned to the gateway. After that time, the default IP address 192.168.100.246 will be automatically 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 Modbus RTU:

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

The connector for the EIA-485 bus is a green pluggable terminal block labeled **SG** (signal ground), **B-**, and **A+**.

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 120 ohms (Ω) termination resistor 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.
  Positions 2 and 3
  – ON: Polarization active.
  – OFF: Polarization inactive.
  For further details, see DIP Switches (page 18).

IMPORTANT
When installing the gateway at the end of the bus with the termination resistor enabled, do not install an additional termination resistor at that end.

NOTE
See the Wiring diagram (page 10).

5.2.4. Connection Procedure for KNX

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

IMPORTANT
Observe polarity.

NOTE
See the Wiring diagram (page 10).

5.2.5. Connection Procedure for BACnet

For BACnet/IP:

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.

NOTE
Some devices detect the difference automatically and adjust themselves.

NOTE
When commissioning the gateway for the first time, DHCP will be enabled for 30 seconds. During that time, if there is a DHCP server, an IP address will be automatically assigned to the gateway. After that time, the default IP address 192.168.100.246 will be automatically 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:

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

The connector for the EIA-485 bus is a green pluggable terminal block labeled **SG** (signal ground), **B-**, and **A+**.

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 18).

IMPORTANT
When installing the gateway at the end of the bus with the termination resistor enabled, do not install an additional termination resistor at that end.

NOTE
See the Wiring diagram (page 10).

5.2.6. Connection Procedure for Home Automation

Connect the Home Automation Ethernet cable to the gateway's **Ethernet Port**. The correct cable to use depends on where the gateway is connected:

- **Connecting directly to a Home Automation 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.

NOTE
When commissioning the gateway for the first time, DHCP will be enabled for 30 seconds. During that time, if there is a DHCP server, an IP address will be automatically assigned to the gateway. After that time, the default IP address 192.168.100.246 will be automatically 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.

NOTE
See the Wiring diagram (page 10).

5.2.7. Connection to a PC for Configuration

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

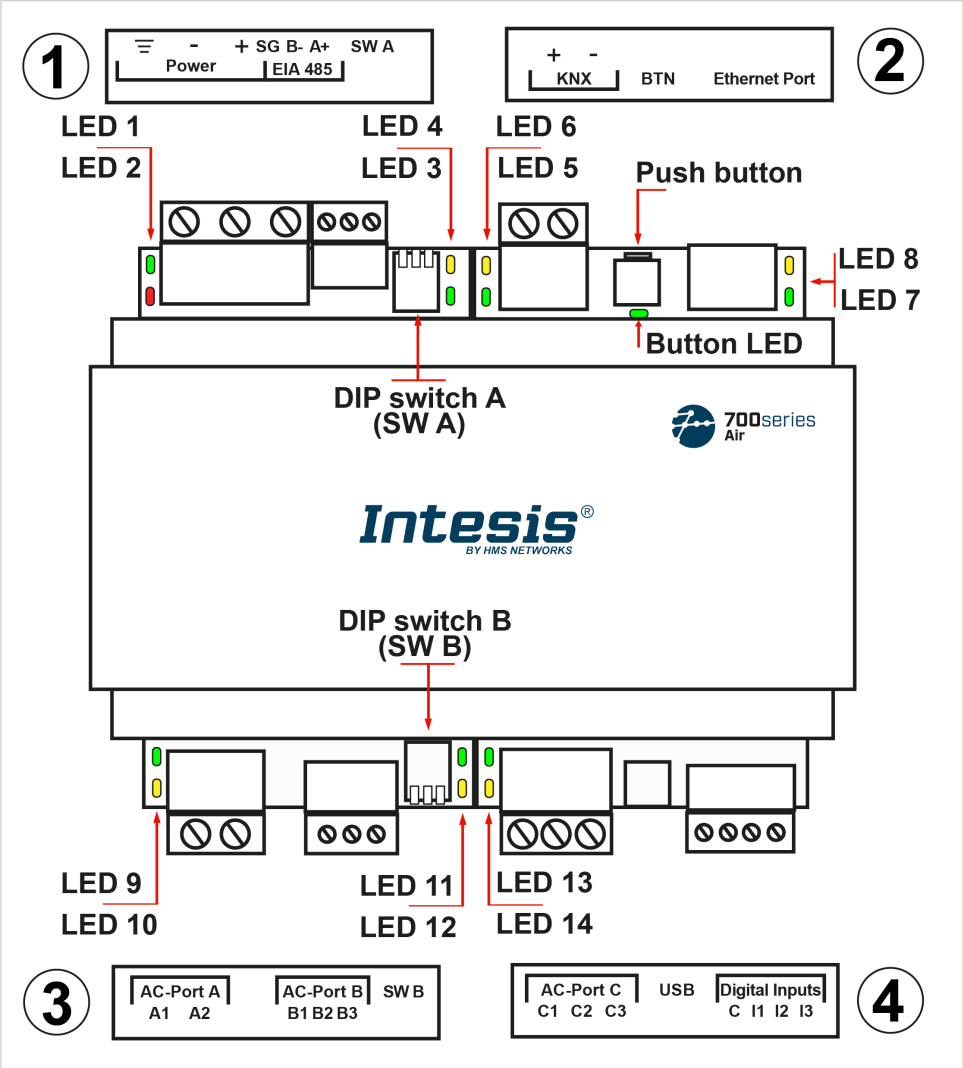
NOTE
You can use the **Ethernet Port** to connect the gateway and the PC instead.

NOTE
Find all you need to know about the gateway configuration and Intesis MAPS in the Intesis MAPS Configuration Guide for IN770AIR***O000.

NOTE
See the Wiring diagram (page 10).

5.3. Gateway Layout

Figure 6. Disposition of hardware elements in the gateway



Plastic covers numbered in the image as ①, ②, ③, and ④ can be easily disassembled.

The following sections explain each element in more detail: 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 (see the figure Disposition of hardware elements in the gateway (page 16)). 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 (see the figure Disposition of hardware elements in the gateway (page 16)):

- 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 (position 1) and the polarization (positions 2 and 3) of each port:

Position			Description
1	2	3	
OFF	X	X	120 Ω termination inactive
ON	X	X	120 Ω Termination active
X	OFF	OFF	Polarization inactive
X	ON	ON	Polarization active

NOTE
Default positions are:

- DIP switch A (SW A): **OFF, ON, ON** (120 Ω termination inactive, polarization active)
- DIP switch B (SW B): **OFF, OFF, OFF** (120 Ω termination and polarization inactive)

IMPORTANT
Observe the **ON** indicator on the DIP switch as a reference.

5.6. Push Button

Find the push button at the top side, between the KNX and the Ethernet connectors (see the figure Disposition of hardware elements in the gateway (page 16)).

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.

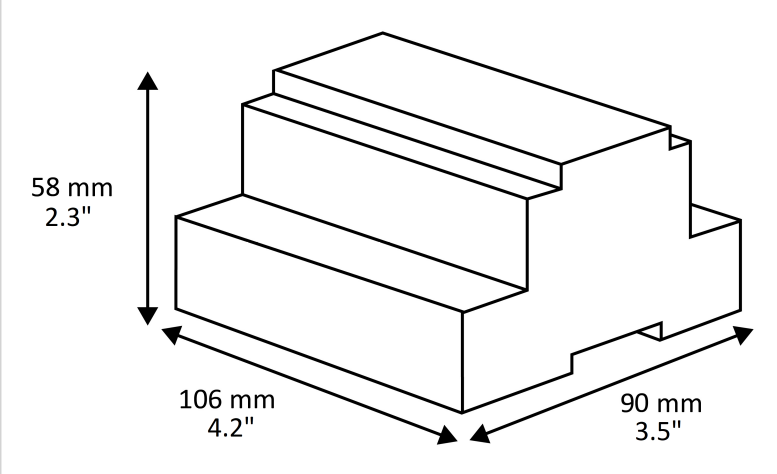
5.7. Technical Specifications

Housing	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"	
Mounting	Wall: Use 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)	Wire cross-section/gauge per terminal: 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 Use solid or stranded wires (twisted or with ferrule). 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) 1500 VDC 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 Port EIA-485 TX/RX 2 x Port KNX TX/TR 1 x Button indicator	2 x Ethernet Link/Speed 2 x AC-Port A TX/RX 2 x AC-Port B TX/RX 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 .. 140°F	
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"

IMPORTANT
Leave enough clear space to wire the gateway easily and for the subsequent manipulation of elements.



6. Available Applications

6.1. Integration into Modbus Systems

6.1.1. Modbus Registers

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.

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	Modbus address	R/W
On (all units)	1: Set the units On	0	Trigger
Off (all units)	1: Set the units Off	1	Trigger
Operation Mode Auto (all units)	1: Set Auto Mode	2	Trigger
Operation Mode Heat (all units)	1: Set Heat Mode	3	Trigger
Operation Mode Dry (all units)	1: Set Dry Mode	4	Trigger
Operation Mode Fan (all units)	1: Set Fan Mode	5	Trigger
Operation Mode Cool (all units)	1: Set Cool Mode	6	Trigger
Fan Speed Auto (all units)	1: Set Fan Speed Auto	7	Trigger
Fan Speed Low (all units)	1: Set Fan Speed Low	8	Trigger
Fan Speed Mid (all units)	1: Set Fan Speed Mid	9	Trigger
Fan Speed High (all units)	1: Set Fan Speed High	10	Trigger
Swing On (all units)	1: Set Swing On	11	Trigger
Swing Off (all units)	1: Set Swing Off	12	Trigger
Temperature Setpoint (x10) (all units)	Celsius: 17 .. 30°C Fahrenheit: 62 .. 88°F	13	Trigger
Operating mode force On (all Units)	1: Force Operating mode	14	Trigger
Operating mode force Off (all Units)	1: Unforce Operating mode	15	Trigger
Remote control lock On (all units)	1: Lock remote control	16	Trigger
Remote control lock Off (all units)	1: Unlock remote control	17	Trigger

Table 3. Individual units signals

Register name	Possible values	Modbus address formula	R/W
On/Off	0: Off 1: On	(IU address[1..N] × 100) + 0	R, W
Operation Mode	0: Heat 1: Cool 2: Fan 3: Dry 4: Auto	(IU address[1..N] × 100) + 1	R, W
Temperature Setpoint (x10)	Celsius: 17 .. 30°C Fahrenheit: 62 .. 88°F	(IU address[1..N] × 100) + 2	R, W
Fan Speed	0: Auto 1: Low 2: Med 3: High	(IU address[1..N] × 100) + 3	R, W
Vane Position Swing	0: Swing Off 1: Swing On	(IU address[1..N] × 100) + 4	R, W
Room Temperature (x10)	Celsius: -20 .. 100°C Fahrenheit: -4 .. 212°F	(IU address[1..N] × 100) + 5	R
Unit Error Code	0: No error 1 .. 255: Error	(IU address[1..N] × 100) + 6	R
Communication Error IU	0: No error 1: Error	(IU address[1..N] × 100) + 7	R
Remote Control lock	0: Unlock 1: Lock	(IU address[1..N] × 100) + 8	R, W
Force Operating mode	0: No force 1: Force	(IU address[1..N] × 100) + 9	R, W
Consumption Yesterday	Wh/KWh	(IU address[1..N] × 100) + 10	R
Consumption Today	Wh/KWh	(IU address[1..N] × 100) + 12	R
Consumption Total	Wh/KWh	(IU address[1..N] × 100) + 14	R
Consumption Yesterday Heat	Wh/KWh	(IU address[1..N] × 100) + 16	R
Consumption Today Heat	Wh/KWh	(IU address[1..N] × 100) + 18	R
Consumption Total Heat	Wh/KWh	(IU address[1..N] × 100) + 20	R
Consumption Yesterday Cool	Wh/KWh	(IU address[1..N] × 100) + 22	R
Consumption Today Cool	Wh/KWh	(IU address[1..N] × 100) + 24	R
Consumption Total Cool	Wh/KWh	(IU address[1..N] × 100) + 26	R

NOTE

[1..N] refers to the Unit index in Intesis MAPS, as shown in the **Unit** column on the Signals Tab.

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	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

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

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

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

NOTE
[1..N] refers to the Unit index in Intesis MAPS, as shown in the **Unit** column on the Signals Tab.

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 according to the Unit ID Index.

For outdoor units, the acNum value must be the same as 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 Configuration Guide for IN770AIR∗∗∗O000.

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.