WMP
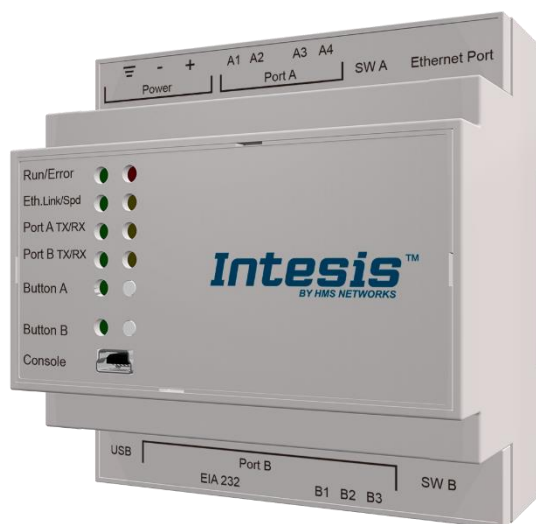
Hisense VRF Air Conditioning

Gateway for the integration of Hisense VRF systems into Home Automation systems (WMP)

USER MANUAL

Important User Information

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Gateway for the integration of Hisense VRF systems into Home Automation systems (WMP).

ORDER CODE	LEGACY ORDER CODE
INMBSHIS016O000	HS-AC-MBS-16
INMBSHIS064O000	HS-AC-MBS-64

URL https://www.intesis.com

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1. Description

1.1. Introduction

This document describes the integration of Hisense VRF air conditioning systems into Home Automation systems using the Home Automation (WMP) to *Hisense VRF* communication gateway.

The aim of this integration is to monitor and control Hisense air conditioning systems, remotely, from a Home Automation system. To do it so, Intesis communicates with Intesis WMP protocol, allowing controlling and update the signals requested from the Home Automation hub.

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

This document assumes that the user is familiar with Home Auotomation (WMP) and Hisense technologies and their technical terms.

Integration of Hisense VRF compatible systems into Home Automation (WMP) systems.

URL https://www.intesis.com

1.2. Functionality

Intesis^{TM} continuously monitors Hisense VRF network for all configured signals and keeps them updated in its memory available for reading and updating them towards the Home Automation system via Intesis WMP protocol.

Commands toward the indoor units are permitted.

Each indoor unit is offered as a set of WMP commands.

Element	WMP commands supported
Indoor Unit	• SET (control) • CHN (status) • GET (read)

1.3. Capacity of Intesis

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

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

Their order codes are:

- INMBSHIS016O000, Model supporting up to 16 indoor units.
- INMBSHIS064O000, Model supporting up to 64 indoor units.

URL | https://www.intesis.com

2. Intesis WMP interface

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

There is a specific Home Automation (WMP) manual available about WMP protocol with available examples. Here is included the specific information regarding to WMP protocol and its integration in this product, for further explanations, refer to the refered WMP manual available in www.intesis.com.

2.1. HVAC WMP Commands supported

Intesis WMP commands SET/CHN/GET can be used with the different WMP functions.

2.2. HVAC WMP Functions allowed

Depending on the signal, different commands are allowed. WMP protocol uses different functions to refer to different signals of the HVAC system.

In the table below are listed the available WMP signals for the HVAC control, the function to identify the signal, its available values and the commands allowed to interact with them.

OUTDOOR UNITS SIGNALS

Signal description	Function	Values	Commands
Comm Error OU	ERROROU	OK/ERR	CHN/GET

INDIVIDUAL UNITS

| Signal description	Function	Values	Commands
On/Off	ONOFF	ON/OFF	SET/CHN/GET
Operation Mode	MODE	HEAT/COOL/FAN/DRY/AUTO	SET/CHN/GET
Fan Speed	FANSP	1/2/3/4/AUTO	SET/CHN/GET
Vane Position	VANEUD	1/2/3/4/5/6/7/AUTO	SET/CHN/GET
Temperature Setpoint (x10) (ºC)	SETPTEMP	(ºC)	SET/CHN/GET
AC Ambient Temperature (x10) (ºC)	AMBTMP	(ºC)	CHN/GET
Unit Error code (0-No Error,X-Error)	ERRCODE	0/X (see user manual)	CHN/GET
Error IU	ERRSTATUS	OK/ERR	CHN/GET

2.3. Link with Home Automation system

This gateway supports one IP connection to communicate with the home automation hub or central controller but allows to communicate with several AC units. To identify the ac unit to control from the Home Automation side, WMP protocol has implemented the acnum parameter. Basically, this parameter links the home automation side identifying the AC unit to control in the AC system.

Given an AC unit, all its individual signals have one unique acnum and this number is always different among all the ac units configured in the gateway. Only in some specific cases, outdoor units might share the acnum with one indoor unit as the commands are independent between themselves.

Acnum is given in the configuration section. See **4.2.5 HISENSE CONFIGURATION** for more information.

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3. Connections

Find below information regarding the Intesis connections available.
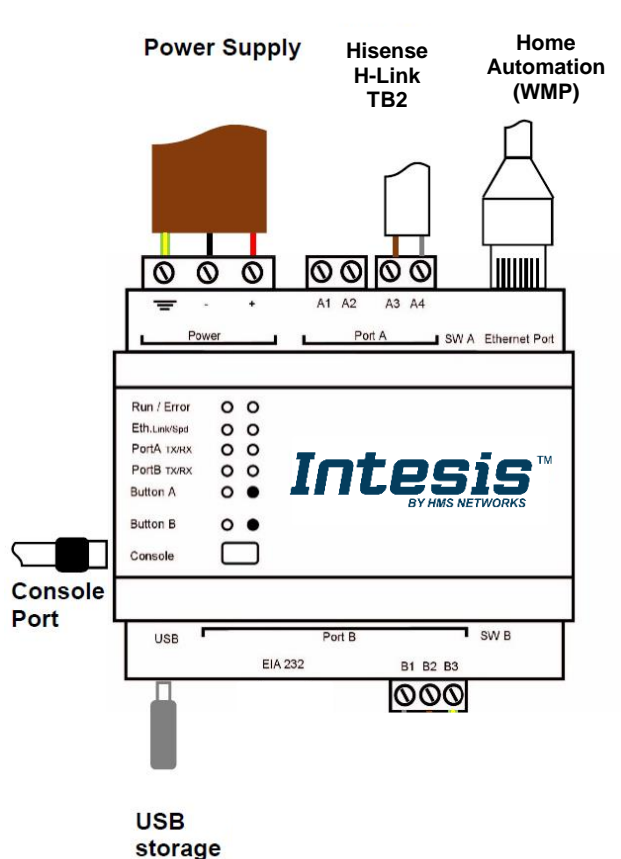
Power Supply
Must use NEC Class 2 or Limited Power Source (LPS) and SELV rated power supply.

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

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

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

PortA / H-Link Hisense
Connect the H-Link terminals (TB2) of Hisense Outdoor Unit to the connectors A3 and A4 of gateway's PortA.
There is no polarity to be respected.

PortB / Free

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 HDD) if required. Check the user manual for more information.

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

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 **5 ELECTRICAL & MECHANICAL FEATURES**). Once connected the ON led will turn on.

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

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

3.2. Connect to Hisense VRF installation

Use the PortA connector in the top corner of the Intesis device in order to connect H-Link bus to the Intesis. Remember to follow all safety precautions indicated by Hisense.

Connect the Hisense H-Link/TB2 bus to connectors A3 and A4 of gateway's PortA. Bus is not sensitive to polarity.

3.3. Connection to Home Automation (WMP)

The gateways Ethernet port connection is used for the Home Automation (WMP) TCP communication. Connect the communication cable coming from the network hub or switch to the Ethernet port of Intesis. The cable to be used shall be a straight Ethernet UTP/FTP CAT5 cable.

TCP port to use (default 3310) and keep alive period must be configured.
IP settings of the gateway (DHCP status, own IP, netmask and default gateway) must be configured as well.

3.4. Connection to PC (Configuration tool)

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

- **Ethernet:** Using the Ethernet port of Intesis.

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

4. Set-up process and troubleshooting

4.1. Pre-requisites

It is necessary to have the Home Automation system (normally a central hub) operative, configured and properly connected to the Ethernet port of the gateway and the Hisense VRF installation connected to the corresponding port.

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

Items supplied by HMS Networks for this integration are:
- Intesis gateway.
- Link to download the configuration tool.
- USB Console cable to communicate with Intesis.
- Product documentation.

4.2. Intesis MAPS. Configuration & monitoring tool for Intesis Home Automation (WMP) series

4.2.1. Connection

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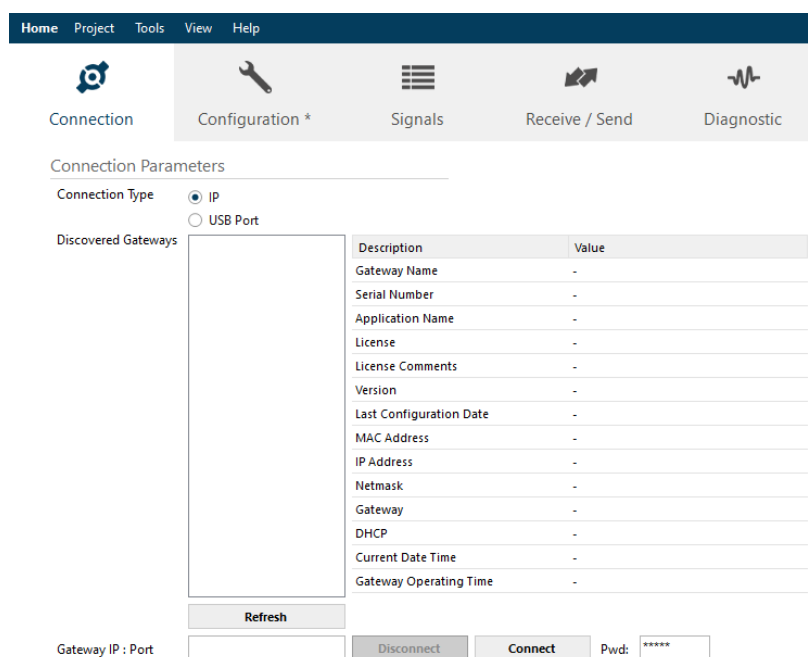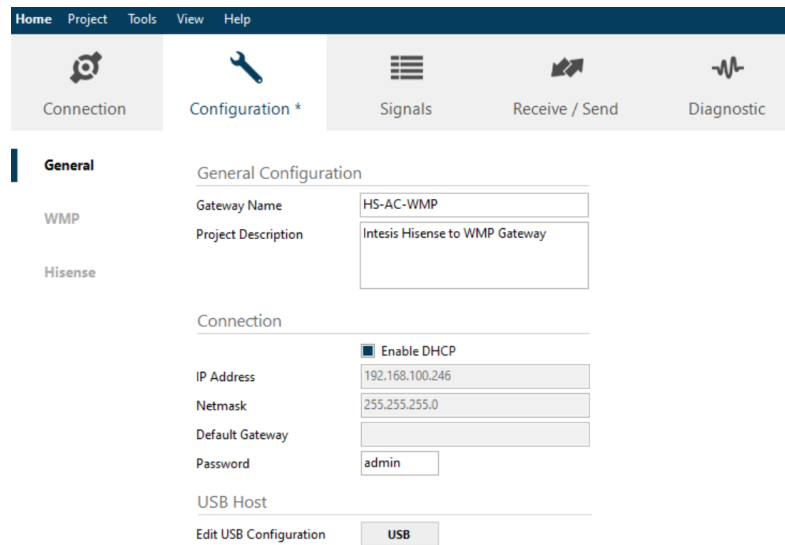

Figure 4.1 MAPS connection

4.2.2. Configuration tab

Select the ***Configuration*** tab to configure the connection parameters. Three subsets of information are shown in this window: General (Gateway general parameters), WMP (Home Automation system) and Hisense (Hisense VRF interface parameters).

Figure 4.2 Intesis MAPS configuration tab

4.2.3. General configuration

These are the general settings of the gateway. Here you can find:

- General configuration

In this section you can include a name and description to identify the gateway.

- Connection

Here are the settings related to the IP address (via DHCP/specific IP address) and the password set for the IP configuration of the gateway in MAPS.

- USB Host

In this section it is possible to configure the different settings for the USB host port.

4.2.4. Home Automation (WMP) system configuration

These are the settings available for the Home Automation system (WMP communication):

URL https://www.intesis.com

Figure 4.3 Intesis MAPS Home Automation configuration tab

1. **Available commands**

This is an informative section displaying all commands available for the WMP communication.

2. **TCP Configuration.**

This section allows to configure the TCP settings for the WMP communication with the Home Automation system.

- **Port:** WMP TCP communication port setting. Default port 3310.
- **Keep Alive.** Set the time of inactivity to send a keep Alive message. Default 10 minutes.

4.2.5. Hisense configuration

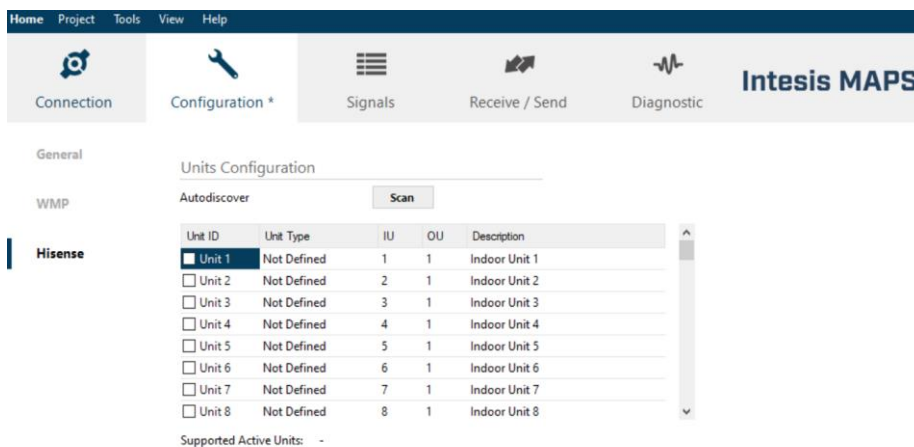Set parameters for the connection with Hisense installation.

Figure 4.4 Intesis MAPS Hisense configuration tab

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

- **Active**. If it's active (checkbox at Unit xx), ranging from 1 to 64 indoor units that will be integrated (maximum number of units will depend on Intesis model)

- **IU address**. Address 1..64 of Unit in Hisense H-Link bus.

- **OU address**. Address 1..64 of Outdoor Unit in Hisense H-Link bus.

- **Description**. Descriptive name to easy identification of the unit (for example, 'living room floor 1 unit', etc).

Additional to manual entry of each unit, autodiscover of present units in an H-Link installation is possible. To do so, click button **Scan**. Following window will appear:

Figure 4.5 Intesis MAPS Scan Hisense Units window

By pressing **Scan** button, connected Hisense H-Link bus will be scanned for available units. Error window will appear if there is a problem in the connection with H-Link bus (units not powered, bus not connected, …).

A progress bar will appear during the scan, which will take up to a few minutes. After scan is complected, detected units will be shown in available units as follows:
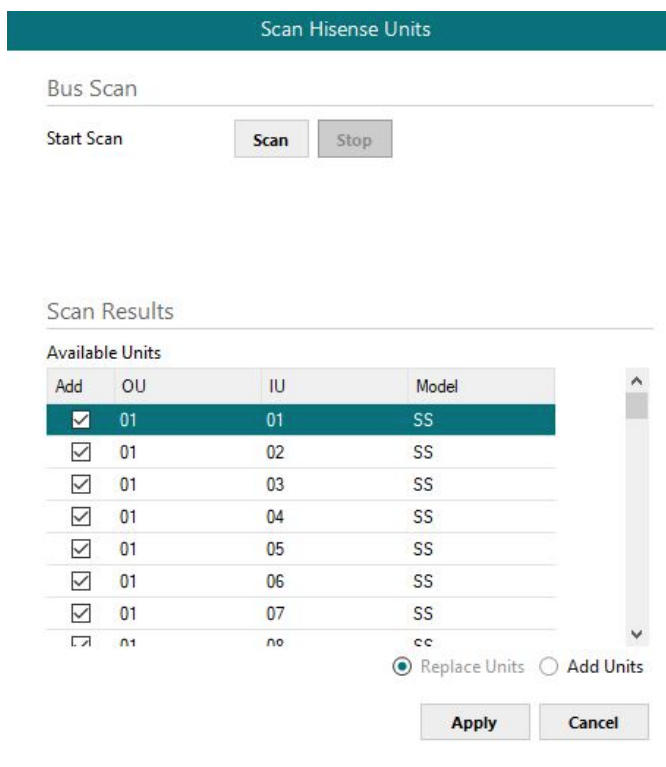
URL https://www.intesis.com

Figure 4.6 Intesis MAPS Scan Hisense Units window with scan results

Select with its checkbox units to add (or replace) in installation, according to selection **Replace Units** / **Add Units**. After units to be integrated are selected, click button **Apply**, and changes will appear in previous **Units Configuration** window.
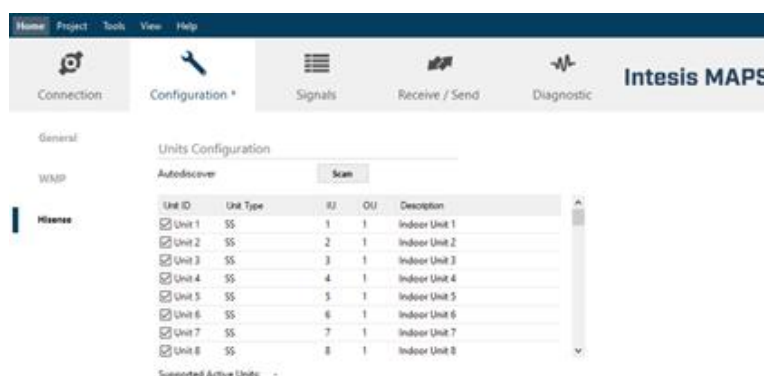

Figure 4.7 Intesis MAPS Hisense configuration tab after importing scan results

Acnum

Acnum is the parameter or number associated to every ac unit. This parameter identifies the ac unit from the home automation side.

In this gateway, this number corresponds with the unit ID available during the configuration process. This number cannot be edited and is automatically generated during the manual or automatic (using SCAN) configuration process. You can check the indoor units Unit ID number in its column.

For the outdoor units, acnum corresponds with the lowest Unit ID of its associated indoors.

4.2.6. Signals

All available WMP signals, its corresponding description and other main parmaters are listed in the signals tab. The acnum of every unit is also displayed in a column in the signals view.

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Figure 4.12 Intesis MAPS Signals tab

4.2.7. Sending the configuration to Intesis

When the configuration is finished, follow the next steps.

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

2.- Go to tab '**Receive / Send**' of MAPS, and in **Send** section, press **Send** button. Intesis will reboot automatically once the new configuration is loaded.
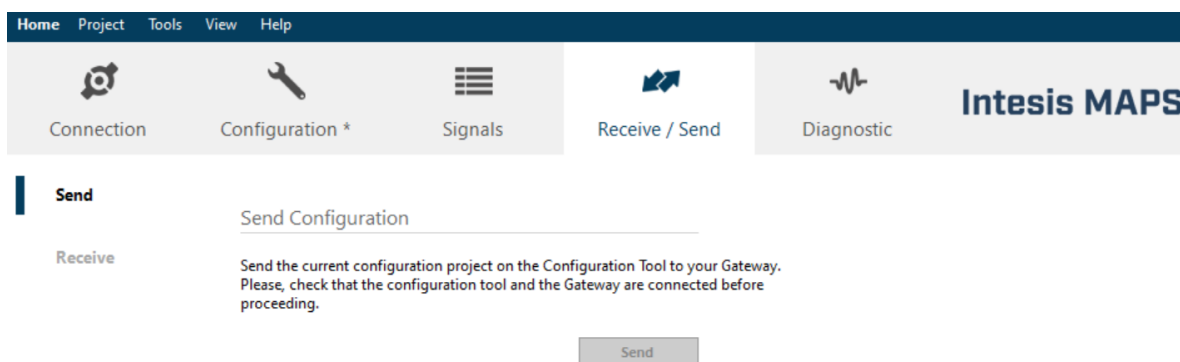
Figure 4.13 Intesis MAPS Receive/Send tab

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

4.2.8. Diagnostic

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

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**

To check the status, viewer for the Internal and External protocols are available. It is also available a generic Console viewer for general information about communications and the gateway status and finally a Signals Viewer to simulate the BMS behavior or to check the current values in the system.
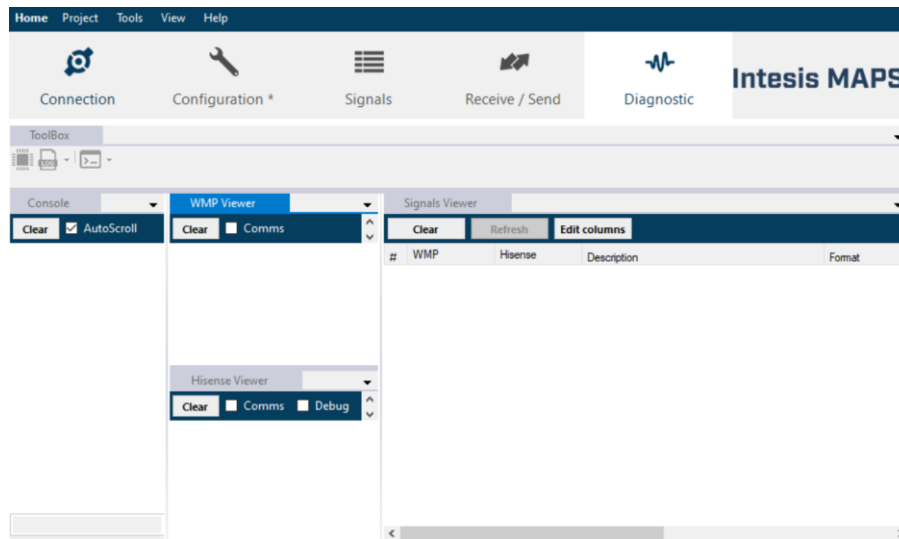
Figure 4.14 Diagnostic

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

4.2.9. Set-up procedure

1. Install Intesis MAPS on your laptop, use the setup program supplied for this and follow the instructions given by the Installation wizard.

2. Install Intesis 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. For the Home Automation (WMP) communication, connect the communication cable coming from the Ethernet port of the WMP TCP installation to the port marked as Ethernet Port of Intesis. More details in **3 CONNECTIONS**.

4. Connect the communication cable coming from the **Hisense VRF** installation to the port marked as Port A of Intesis.

5. Power up Intesis. The supply voltage can be 9 to 36 Vdc or just 24 Vac. Take care of the polarity of the supply voltage applied.

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

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

6. If you want to connect using IP, connect the Ethernet cable from the laptop PC to the port marked as Ethernet of Intesis. More details in **3 CONNECTIONS**.

   If you want to connect using USB, connect the USB cable from the laptop PC to the port marked as Console of Intesis. More details in **3 CONNECTIONS**.

7. Open Intesis MAPS, create a new project selecting a copy of the one named IBOX-WMP-HS-Template.

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

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URL https://www.intesis.com

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 Home Automation Hub is OK. In case there is no communication activity between Intesis and the Home Automation hub or controller, check that those are operative: check the baud rate, the communication cable used to connect all devices and any other communication parameter.
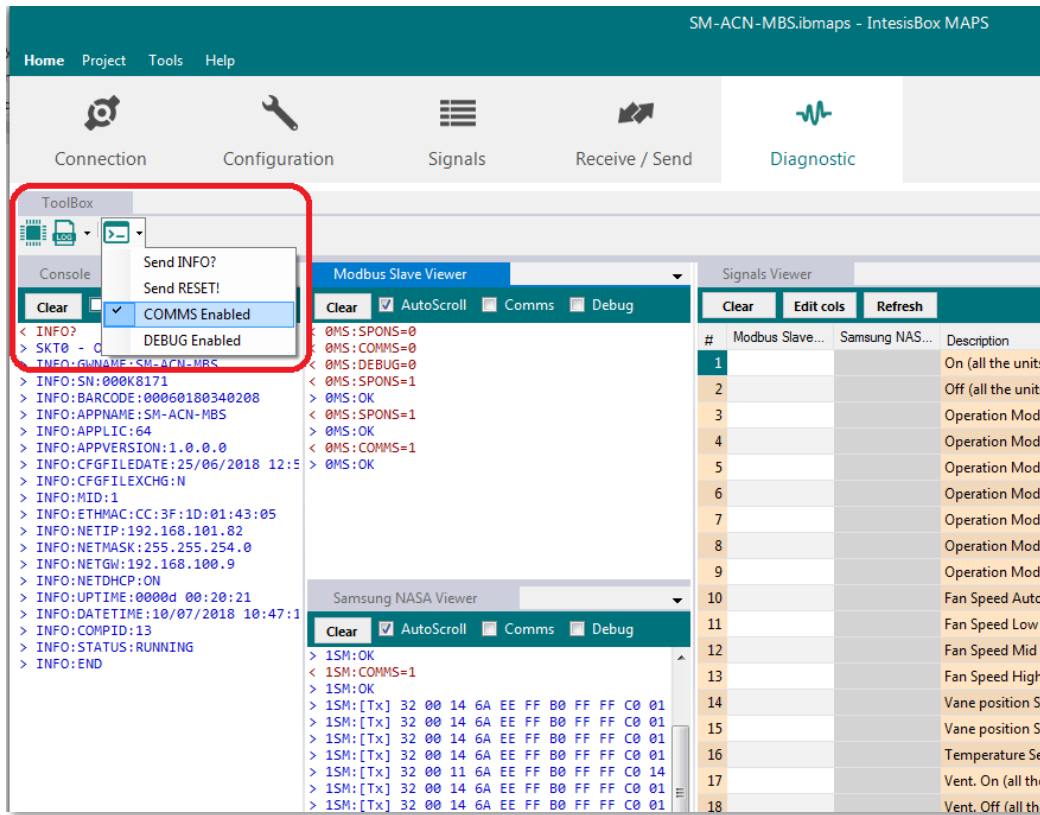

Figure 4.15 Enable COMMS

5. Electrical & Mechanical Features

Enclosure	Plastic, type PC (UL 94 V-0) Net dimensions (dxwxh): 90x88x56 mm Recommended space for installation (dxwxh): 130x100x100mm Color: Light Grey. RAL 7035	**Battery**	Size: Coin 20mm x 3.2mm Capacity: 3V / 225mAh Type: Manganese Dioxide Lithium
Mounting	Wall. DIN rail EN60715 TH35.	**Console Port**	Mini Type-B USB 2.0 compliant 1500VDC isolation
Terminal Wiring (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 　1 core: 0.5mm^2… 2.5mm^2 　2 cores: 0.5mm^2… 1.5mm^2 　3 cores: not permitted If cables are more than 3.05 meters long, Class 2 cable is required.	**USB port**	Type-A USB 2.0 compliant Only for USB flash storage device *(USB pen drive)* Power consumption limited to 150mA *(HDD connection not allowed)*
Power	1 x Plug-in screw terminal block (3 poles) 　9 to 36VDC +/-10%, Max.: 140mA. 　24VAC +/-10% 50-60Hz, Max.: 127mA 　Recommended: 24VDC	**Push Button**	Button A: Not used Button B: Not used
		Operation Temperature	0°C to +60°C
Ethernet	1 x Ethernet 10/100 Mbps RJ45 2 x Ethernet LED: port link and activity	**Operational Humidity**	5 to 95%, no condensation
Port A	1 x H-Link Plug-in screw terminal block orange (2 poles) 　1500VDC isolation from other ports 1 x Plug-in screw terminal block green (2 poles) 　Reserved for future use	**Protection**	IP20 (IEC60529)
		LED Indicators	10 x Onboard LED indicators 　2 x Run (Power)/Error 　2 x Ethernet Link/Speed 　2 x Port A TX/RX 　2 x Port B TX/RX 　1 x Button A indicator 　1 x Button B indicator
Switch A (SWA)	1 x DIP-Switch for EIA485 configuration: 　Reserved for future use		
PORT B	1 x Serial EIA232 (SUB-D9 male connector) *Not used* 1 x Serial EIA485 Plug-in screw terminal block (3 poles) 　A, B, SGND (Reference ground or shield) 　1500VDC isolation from other ports		
Switch B (SWB)	1 x DIP-Switch for serial EIA485 configuration: 　Position 1: 　　**ON:** 120 Ω termination active 　　**Off:** 120 Ω termination inactive (default) 　Position 2-3: 　　**ON:** Polarization active 　　**Off:** Polarization inactive (default)		

URL https://www.intesis.com

6. Dimensions

56 mm (h)

88 mm (w)

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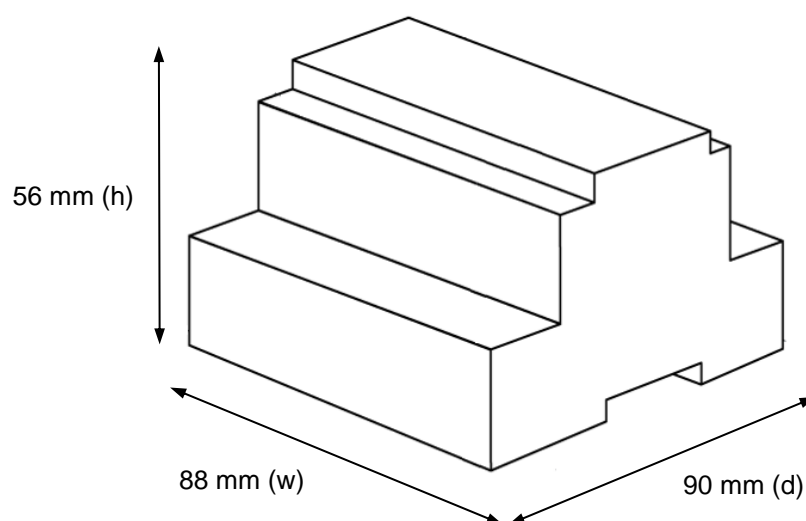
Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections

100 mm (h)

100 mm (w)

130 mm (d)
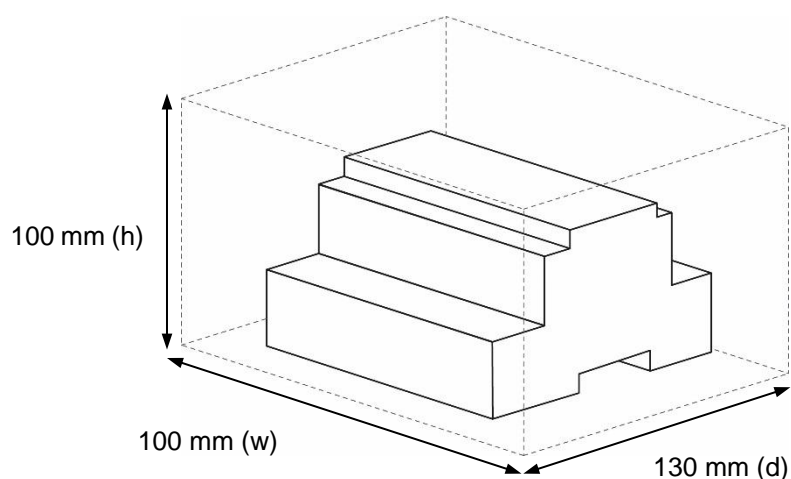
7. AC Unit Types compatibility

A list of Hisense unit model references compatible with INMBSHIS---O000 and their available features can be found in:

https://www.intesis.com/docs/compatibilities/inxxxhis001r000_compatibility

URL   https://www.intesis.com

8. Error codes for Indoor and Outdoor Units

This list contains all possible values shown in WMP for "Error Code" for each indoor unit and outdoor unit.

It must be taken into account that Outdoor Units are only able to reflect a single error for each indoor / outdoor unit in the system. Thus, a unit having two or more active errors from that list will only report a single error code – the one of the first error that has been detected.

Error Code	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Activation of Protection Device (Float Switch)	Activation of Float Switch (High Water Level in Drain Pan, Abnormality of Drain Pipe, Float Switch or Drain Pan)
02	Outdoor Unit	Activation of Protection Device (High Pressure Cut)	Activation of PSH (Pipe Clogging, Excessive Refrigerant! Inert Gas Mixing)
03	Transmission	Abnormality between Indoor and Outdoor	incorrect Wiring, Loose Terminals, Disconnect Wire, Blowout of Fuse, Outdoor Unit Power OFF
04		Abnormality between Inverter PCB and Outdoor PCB	Inverter PCB - Outdoor PCB Transmission Failure (Loose Connector, Wire Breaking, Blowout of Fuse)
04.		Abnormality between Fan Controller and Outdoor PCB	Fan Controller - Outdoor PCB Transmission Failure (Loose Connector, Wire Breaking, Blowout of Fuse)
05	Supply Phase	Abnormality Power Source Phases	Incorrect Power Source, Connection to Reversed Phase, Open-Phase
06	Voltage	Abnormal Inverter Voltage	Outdoor Voltage Drop, insufficient Power Capacity
06.		Abnormal Fan Controller Voltage	Outdoor Voltage Drop, Insufficient Power Capacity
07	Cycle	Decrease in Discharge Gas Superheat	Excessive Refrigerant! Charge, Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Opened Position (Disconnect Connector)
08		Increase in Discharge Gas Temperature	Insufficient Refrigerant! Charge, Pipe Clogging, Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Closed Position (Disconnect Connector)

0A	Transmission	Abnormality between Outdoor and Outdoor	Incorrect Wiring, Breaking Wire, Loose Terminals
0b	Outdoor Unit	Incorrect Outdoor Unit Address Setting	Duplication of Address Setting for Outdoor Units (Sub Units) in Same Refrigerant! Cycle System
0c		Incorrect Outdoor Unit Main Unit Setting	Two (or more) Outdoor Units Set as "Main Unit" Exist in Same Refrigerant! Cycle System
11	Sensoron Indoor Unit	Inlet Air Thermistor	Incorrect Wiring, Disconnecting Wiring Breaking Wire, Short Circuit
12		Outlet Air Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
19	Fan Motor	Activation of Protection Device for Indoor Fan	Fan Motor Overheat, Locking
21	Sensor on Outdoor Unit	High Pressure Sensor	Incorrect Wiring, Disconnecting Wiring Breaking Wire, Short Circuit
22		Outdoor Air Thermistor	
23		Discharge Gas Thermistor on Top of Compressor	
24		Heat Exchanger Liquid Pipe Thermistor	
25		Heat Exchanger Gas Pipe Thermistor	
29		Low Pressure Sensor	
31	System	Incorrect Capacity Setting of Outdoor Unit and Indoor Unit	Incorrect Capacity Code Setting of Combination Excessive or Insufficient Indoor Unit Total Capacity Code
35		Incorrect Setting of Indoor Unit No.	Duplication of Indoor Unit No. in same Ref. Gr.
36		Incorrect of Indoor Unit Combination	Indoor Unit is Designed for R22
38		Abnormality of Picking up Circuit for Protection in Outdoor Unit	Failure of Protection Detecting Device (Incorrect Wiring of Outdoor PCB)
39	Compressor	Abnormality Running Current at Constant! Speed Compressor	Overcurrent, Blowout Fuse, Current Sensor Failure, instantaneous Power Failure, Voltage Drop, Abnormal Power Supply
3A	Outdoor Unit	Abnormality of Outdoor Unit Capacity	Outdoor Unit Capacity > 510kBtu/h
3b		Incorrect Setting of Outdoor Unit Models Combination or Voltage	Incorrect Setting of Main and Sub Unit(s) Combination or Voltage
3d		Abnormality Transmission between Main Unit and Sub Unit(s)	Incorrect Wiring, Disconnect Wire, Breaking Wire, PCB Failure
		Activation of Low Compression Ratio Protection Device	Defective Compression (Failure of Compressor of Inverter, Loose Power

43			Supply Connection)
44	Protection Device	Activation of Low Pressure Increase Protection Device	Overload at Cooling, High Temperature at Heating, Expansion Valve Locking (Loose Connector)
45		Activation of High Pressure Increase Protection Device	Overload Operation (Clogging, Short-Pass), Pipe Clogging, Excessive Refrigerant!, Inert Gas Mixing
47		Activation of Low Pressure Decrease Protection Device (Vacuum Operation Protection)	Insuffcient Refrigerant!, Refrigerant! Piping, Clogging, Expansion Valve Locking at Open Position (Loose Connector)
48		Activation of Inverter Overcurrent Protection Device	Overload Operation, Compressor Failure
51	Sensor	Abnormal Inverter Current! Sensor	Current! Sensor Failure
53	Inverter	Inverter Error Signal Detection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short Circuit)
54		Abnormality of Inverter Fin Temperature	Abnormal Inverter Fin Thermistor, Heat Exchanger Clogging, Fan Motor Failure
55			
		Inverter Failure	Inverter PCB Failure
57	Fan Controller	Activation of Fan Controller Protection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short Circuit), Instantaneous Overcurrent
5A		Abnormality of Fan Controller Fin Temperature	Fin Thermistor Failure, Heat Exchanger Clogging, Fan Motor Failure
5b		Activation of Overcurrent Protection	Fan Motor Failure
5C		Abnormality of Fan Controller Sensor	Failure of Current! Sensor (Instantaneous Overcurrent, Increase of Fin Temperature, Low Voltage, Earth Fault, Step-Out)
EE	Compressor	Compressor Protection Alarm (It is cannot be reset from remote Controller)	This alarm code appears when the following alarms• occurs three times within 6 hours. *02, 07, 08, 39, 43 to 45, 47
b1	Outdoor Unit No. Setting	Incorrect Setting of Unit and Refrigerant! Cycle No.	Over 64 Number is Set for Address or Refrigerant! Cycle.
b5	Indoor Unit No. Setting	Incorrect Indoor Unit Connection Number Setting	More than 17 Non-Corresponding to Hi-NET Units are Connected to One System.
			2 or more Switch Box Units are connected

C1		Incorrect Indoor Unit Connection	between outdoor unit and indoor unit.
C2	Switch Box Unit	Incorrect Indoor Unit Connection No. Setting	9 or More Indoor Units Connected to Switch Box Unit
C3		Incorrect Indoor Unit Connection	The indoor units of different refrigerant! cycle is connected to Switch Box unit.

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