

# Modbus Server

Hitachi VRF Air Conditioning

Gateway for the integration of Hitachi VRF systems into Modbus (RTU and TCP) systems

## **USER MANUAL**

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# **Important User Information**

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Gateway for the integration of Hitachi VRF systems into Modbus (RTU and TCP) systems.

ORDER CODE	LEGACY ORDER CODE
INMBSHIT0160000	HI-AC-MBS-16
INMBSHIT0640000	HI-AC-MBS-64



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## 1. Description

#### 1.1 Introduction

This document describes the integration of Hitachi VRF air conditioning systems into Modbus compatible devices and systems using using gateway the Intesis Modbus Server to *Hitachi VRF* communication gateway.

The aim of this integration is to monitor and control Hitachi air conditioning systems, remotely, from a Control Center using any commercial SCADA or monitoring software that includes a Modbus Master driver (RTU and/or TCP). To do it so, Intesis performs as a Modbus Server, allowing poll and write requests from any Modbus master device.

Intesis makes available the Hitachi air conditioning system indoor units' datapoints through independent Modbus registers.

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

This document assumes that the user is familiar with Modbus and Hitachi technologies and their technical terms.

# HITACH

#### Integration of Hitachi's compatible systems into Modbus systems



#### 1.1 Functionality

Intesis<sup>™</sup> continuously monitors Hitachi VRF network for all configured signals and keeps the updated status of all of them in its memory, ready to be served when requested from the Modbus master.

Commands toward the indoor units are permitted.

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

Element	Object supported
Outdoor Unit	Status
Indoor Unit	<ul> <li>Status</li> <li>Command</li> <li>Communication status</li> </ul>
General signals (all units)	Command



#### 1.2 Capacity of Intesis

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

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

Their order codes are:

- INMBSHIT016O000: Model supporting up to 16 indoor units
- INMBSHIT0640000: Model supporting up to 64 indoor units



## 2. Modbus interface

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

#### 1.3 Functions supported

This part is common for Modbus RTU and TCP.

Modbus functions 03 and 04 (*Read Holding Registers* and *Read Input Registers*) can be used to read Modbus registers.

Modbus functions 06 and 16 (*Single Multiple Holding Registers* and *Write Multiple Holding Registers*) can be used to write Modbus registers.

Configuration of poll records is possible between Modbus addresses 0 and 20000. Addresses that are not defined in section 2.2 (Modbus map of the device) are read-only and will always report 0.

Modbus error codes are supported, they will be sent whenever a non-valid Modbus address is queried.

All registers are 16-bit signed integer, in standard Modbus Big Endian (MSB/LSB) format.

Intesis supports Modbus RTU and Modbus TCP and both interfaces can be used simultaneously.

#### 1.4 Modbus RTU

Both EIA485 and EIA232 physical layers are supported. Only the lines RX, TX and GND of the EIA232 connector are used (TX and RX for EIA485).

Baud rate can be selected between 1200, 2400, 4800, 9600, 19200, 38400, 56700 and 115200. Parity (none, even or odd) and stop bits (1 or 2) can be selected as well.

Modbus slave number must be configured and the physical connection (RS232 or RS485) can also be selected

#### 1.5 Modbus TCP

TCP port to use (default is 502) and keep alive period must be configured.

IP settings of Intesis (DHCP status, own IP, net mask and default gateway) must be configured as well.



#### 1.6 Modbus Address Map

Modbus address from the formula is expressed in link layer format. This is, first register address is 0.

Modbus Address First Address is 0	Read /Write	Register/signal name	Possible values
0	W	On (all the units)	1-Set all the units On
1	W	Off (all the units)	1-Set all the units Off
2	W	Operation Mode Auto (all the units)	1-Set Auto Mode
3	W	Operation Mode Heat (all the units)	1-Set Heat Mode
4	W	Operation Mode Dry (all the units)	1-Set Dry Mode
5	W	Operation Mode Fan (all the units)	1-Set Fan Mode
6	W	Operation Mode Cool (all the units)	1-Set Cool Mode
7	W	Fan Speed Auto (all the units)	1-Set Fan Speed Auto
8	W	Fan Speed Low (all the units)	1-Set Fan Speed Low
9	W	Fan Speed Mid (all the units)	1-Set Fan Speed Mid
10	W	Fan Speed High (all the units)	1-Set Fan Speed High
11	W	Fan Speed High+ (all the units)	1-Set Fan Speed High+
12	W	Vane Position Auto (all the units)	1-Set Vane Position Auto
13	W	Vane Position 1 (all the units)	1-Set Vane Position 1
14	W	Vane Position 2 (all the units)	1-Set Vane Position 2
15	W	Vane Position 3 (all the units)	1-Set Vane Position 3
16	W	Vane Position 4 (all the units)	1-Set Vane Position 4
17	W	Vane Position 5 (all the units)	1-Set Vane Position 5
18	W	Vane Position 6 (all the units)	1-Set Vane Position 6
19	W	Vane Position 7 (all the units)	1-Set Vane Position 7



20	W	Temperature Setpoint (x10°C) (all units)	Cool: 1930°C; Heat: 1730°C
(OU*25)+10000+0 OU stands for Outdoor Unit address from 1 to 64.	R	Communication Error OU	0-No error, 1-Error
(OU*25)+10000+1	R	Outdoor Air Temp.	-5099 ℃
(OU*25)+10000+2	R	Comp.Top Temp.	0200 °C
(OU*25)+10000+3	R	Total Real Comp. Freq.	0255 Hz
(OU*25)+10000+4	R	Total Comp. Current	0255 A
(OU*25)+10000+5	R	Out Exp. Valve 1 Open	0100 %
(OU*25)+10000+6	R	Discharge Pressure (x10ºC)	-5.09.9 MPa
(OU*25)+10000+7	R	Suction Pressure (x10ºC)	-5.09.9 MPa
(Ui*100)+0 Ui stands for Unit index number as found in the Units Configuration tab and ranges from 1 to 64.	R/W	On/Off	0-Off, 1-On
(Ui*100)+1	R/W	Operation Mode	0-Auto, 1-Heat, 2-Dry. 3-Fan, 4-Cool
(Ui*100)+2	R/W	Fan Speed	0-Auto, 1-Low, 2-Mid, 3-High, 3-High+
(Ui*100)+3	R/W	Vane Position	0-Auto, 1-Pos17-Pos7
(Ui*100)+4	R/W	Temperature Setpoint (x10ºC)	Cool:1930°C; Heat:1730°C
(Ui*100)+5	R	Remote Sensor Temp. (x10ºC)	-6363ºC
(Ui*100)+6	R	Inlet Temp. (x10ºC)	-6363ºC
(Ui*100)+7	R	Outlet Temp. (x10ºC)	-6363ºC
(Ui*100)+8	R	GasPipe Temp. (x10⁰C)	-6363ºC
(Ui*100)+9	R	LiquidPipe Temp. (x10ºC)	-6363ºC
(Ui*100)+10	R	Unit Error code	Error code
(Ui*100)+11	R	Filter Alarm	0-Normal, 1-Alarm
(Ui*100)+12	W	Filter Alarm Reset	1-Reset
(Ui*100)+13	R	Communication Status	0-Not Exit, 1-Exist

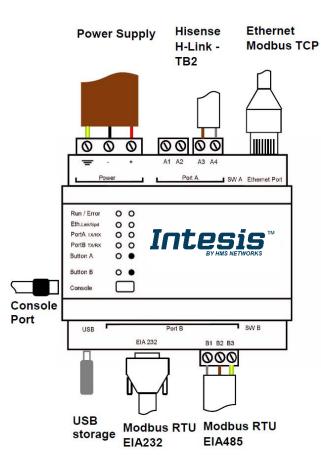


(Ui*100)+14	R/W	Allow On/Off from RC	0-Allow, 1-Not allow
(Ui*100)+15	R/W	Allow Mode from RC	0-Allow, 1-Not allow
(Ui*100)+16	R/W	Allow Setpoint from RC	0-Allow, 1-Not allow
(Ui*100)+17	R/W	Allow Fan from RC	0-Allow, 1-Not allow
(Ui*100)+18	R	Unit Type	0:Not Defined,1-SS,2-FC,3-VRF,4- IU,5-ES
(Ui*100)+19	R	Unit Address	164
(Ui*100)+20	R	System Address	164
(Ui*100)+21	R	Dehumidification	0-Disabled, 1-Enabled
(Ui*100)+22	R/W	Dehumidification Correction	0-0, 1-(-1), 2-(-2)
(Ui*100)+23	R	Compresor Stop Cause	255-Operation Off, Other-See manual
(Ui*100)+24	R	Expansion Valve Open	0100%
(Ui*100)+25	R	Operation Condition	0-Off, 1-Thermo Off, 2-Thermo On, 3- Alarm
(Ui*100)+26	R	RC SW Temperature (x10°C)	-6363ºC
(Ui*100)+27	R	RC SW Config	0-Without RCS, 1-With RCS



### 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 / Modbus TCP (TCP) / 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 Hitachi

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

#### PortB / Modbus-RTU RS485

Connect the EIA485 bus to connectors B1 (B+), B2 (A-) and B3 (SNGD) of gateway's PortB. Respect the polarity. Remember the characteristics of the standard EIA485 bus: maximum distance of 1200 meters, maximum 32 devices connected to the bus, and in each end of the bus it must be a termination resistor of 120  $\Omega$ . Bus biasing and termination resistor for EIA485 can be enabled for PortB by means of a dedicated DIP:

SW1:

**ON:** 120  $\Omega$  termination active **OFF:** 120  $\Omega$  termination inactive (Default setting). SW2+3:

**ON:** Polarization active **OFF:** Polarization inactive **(**Default setting).

If the gateway is installed in one bus end, make sure that termination is active.

#### Console Port

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

#### USB

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

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



#### 1.7 Power device

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

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

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

#### **1.8** Connect to Hitachi 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 Hitachi.

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

#### 1.9 Connection to Modbus

#### 1.9.1 Modbus TCP

The gateways Ethernet port connection is used for Modbus 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 502) 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.

#### 1.9.2 Modbus RTU

Connect the communication cable coming from the motbus network to the port marked as Port B of the Intesis. Connect the EIA485 bus to connectors B1 (-), B2 (+) and B3 (SNGD) of gateway's PortB. Respect the polarity.

Remember the characteristics of the standard EIA485 bus: maximum distance of 1200 meters, maximum 32 devices (without repeaters) connected to the bus, and in each end of the bus it must be a termination resistor of 120  $\Omega$ . The gateway has an internal bus biasing circuit that incorporates the termination resistor. Bus biasing and termination resistor for EIA485 can be enabled for PortB by means of a dedicated DIP switch.



#### 1.10 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

#### 1.11 Pre-requisites

It is necessary to have the Modbus RTU or TCP master/client device (BMS side device) operative and properly connected to the corresponding port of the gateway and the Hitachi VRF installation connected to their corresponding ports as well.

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.

#### 1.12 Intesis MAPS. Configuration & monitoring tool for Intesis Modbus series

#### 1.12.1 Introduction

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

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

In this section, only the specific case of Hitachi VRF to Modbus systems will be covered.

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

#### 1.12.2 Connection

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

				HS-AC-MBS.ibmap	: - IntesisBox MAPS - 1.0.18.0 🕺 = 5 X
Home Project Tools	View Help				
ø	*	=	建築	-M-	IntesisBox 🖆
Connection	Configuration	Signals	Receive / Send	Diagnostic	MAPS
Connection Paran	neters				
Connection Type	USB Port				
	O IP				
Discovered Gateways	COM3	Description	Value		
		Gateway Name			
		Serial Number	-		
		Application Name			
		License			
		License Comments Version			
		Last Configuration Date	-		
		MAC Address			
		IP Address			
		Netmask	-		
		Gateway			
		DHCP	-		
		Current Date Time			
		Gateway Operating Time	-		
	Refresh				
Selected Device		Disconnect	Connect		
🍢 Not Connected					8MS Protocol: Modbus Slave 📱 Device Protocol: Hisense 📱 2018/11/07 17:48:18

Figure 4.1 MAPS connection



#### 1.12.3 Configuration tab

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

				HS-AC-MBS.ibmaps - IntesisBox MAPS - 1.0.18	3.0 土_ ラ×
Home Project Tools	View Help				
ø	*	=	100	-M-	IntesisBox 🖷
Connection	Configuration	Signals	Receive / Send	Diagnostic	MAPS
General	General Configural	tion			
Modbus Slave	Gateway Name	HS-AC-MBS			
Hisense	Project Description	IntesisBox Hisense to Gateway	o Modbus Slave		
	Connection				
		Enable DHCP			
	IP Address	192.168.100.246			
	Netmask	255.255.255.0			
	Default Gateway				
	Password				
	USB Host				
	Edit USB Configuration	USB			
K Not Connected					BMS Protocol: Modbus Slave ■ Device Protocol: Hisense ■ 2018/11/07 17:49:20
-7X					

Figure 4.2 Intesis MAPS configuration tab

1.12.4 Modbus Slave configuration

Set parameters of Modbus Slave interface of Intesis.



Home Project Tools	Verse Made			HS-AC-MBS.ibmaps - IntesisBox MAPS - 1.0.18.0	1 б X
		=	11	-M-	
Connection	Configuration	Signals	Receive / Send	Diagnostic	IntesisBox 🗐
connection	comgulation	Signais	Receive / Senu	Diagnostic	
General	Modbus Configur	ration			
Modbus Slave	Туре	RTU	~		
Hisense	RTU Configuration	n			
Hisense	Connection Type	485	~		
	Baudrate	9600	~		
	Data Type	8bit / No			
	Slave Number	1	•		
Kot Connected					BMS Protocol: Modbus Slave 🔳 Device Protocol: Hisense 🔳 2018/11/07 17:49:47
Tx Not Connected					

Figure 4.3 Intesis MAPS Modbus configuration tab

- 1. Modbus Configuration
  - **1.1. Modbus type selection.** Select RTU, TCP or simultaneous RTU and TCP communication.
- 2. TCP Configuration.
  - 2.1. Modbus TCP Port: Modbus TCP communication port setting. Default port 502.
  - **2.2. Keep Alive.** Set the time of inactivity to send a keep Alive message. Default 10 minutes.
- 3. RTU Configuration.
  - 3.1. RTU bus connection type. Select the RTU connection type serial bus RS485 or 232.
  - 3.2 Baudrate. Set the RTU bus communication speed. Default: 9600 bps.
    - Available values: 1200, 2400, 4800, 9600,19200, 38400, 57600, 115200 bps.
  - 3.3 Data Type. Set the Data-bit/parity/stop-bit. Default: 8bit/None/1.
    - Available selection: 8bit/None/1, 8bit/Even/1, 8bit/Odd/1, 8bit/None/2.
  - 3.4 Slave Number. Set the Modbus Slave address. Default slave address: 1.
    - Valid address: 1..255.



#### 1.12.5 Hitachi configuration

Set parameters for connection with Hitachi's installation.

Ø	×				1	-M-	IntesisBo
onnection	Configuratio	on *	Signals		Receive / Send	Diagnostic	МАР
eneral	Units Conf	figuration					
odbus Slave	Autodiscover	-	Sca	n			
	Unit ID	Unit Type	IU	OU	Description	^	
tachi	Unit 44	Not Defined	44	1	Indoor Unit 44		
	Unit 45	Not Defined	45	1	Indoor Unit 45		
	Unit 46	Not Defined	46	1	Indoor Unit 46		
	Unit 47	Not Defined	47	1	Indoor Unit 47		
	Unit 48	Not Defined	48	1	Indoor Unit 48		
	Unit 49	Not Defined	49	1	Indoor Unit 49		
	Unit 50	Not Defined	50	1	Indoor Unit 50		
	Unit 51	Not Defined	51	1	Indoor Unit 51		
	Unit 52	Not Defined	52	1	Indoor Unit 52		
	Unit 53	Not Defined	53	1	Indoor Unit 53		
	🗌 Unit 54	Not Defined	54	1	Indoor Unit 54		
	Unit 55	Not Defined	55	1	Indoor Unit 55		
	Unit 56	Not Defined	56	1	Indoor Unit 56		
	Unit 57	Not Defined	57	1	Indoor Unit 57		
	Unit 58	Not Defined	58	1	Indoor Unit 58		
	Unit 59	Not Defined	59	1	Indoor Unit 59		
	Unit 60	Not Defined	60	1	Indoor Unit 60		
	Unit 61	Not Defined	61	1	Indoor Unit 61		
	Unit 62	Not Defined	62	1	Indoor Unit 62		
	Unit 63	Not Defined	63	1	Indoor Unit 63		
	Unit 64	Not Defined	64	1	Indoor Unit 64	v	
	Supported Ac	tive Units: -					

Figure 4.4 Intesis MAPS Hitachi 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 Hitachi H-Link bus.
- **OU address**. Address 1..64 of Outdoor Unit in Hitachi 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:



Start Sca	an	Scan S	itop	
Scan F Availabl	Results le Units			
Add	OU	IU	Model	

Figure 4.5 Intesis MAPS Scan Hitachi Units window

By pressing **Scan** button, connected Hitachi 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:

	Scan Hitachi Units					
Bus S	can					
Start Sc	an	Scan	Stop			
Scan I	Results					
Availab	le Units					
Add	OU	IU	Model			
	01	01	SS			
$\checkmark$	01	02	FC			
$\checkmark$	01	03	VRF			
$\checkmark$	05	04	IU			
$\checkmark$	09	05	ES			
			Replace Units     Apply	Add Units		

Figure 4.6 Intesis MAPS Scan Hitachi 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.



ø	<b>≺</b>					-₩-
Connection	Configurati	on *	Signals		Receive / Send	Diagnost
General	Units Con	figuration				
BACnet Server	Autodiscove		Scan			
bycher berver						
Hitachi	Unit ID	Unit Type	IU	OU	Description	^
Hitachi	🗹 Unit 1	SS	1	1		
	Unit 2	FC	2	1		
	Unit 3	VRF	3	1		
	🗹 Unit 4	IU	4	5		
	Unit 5	ES	5	9		
	Unit 6	Not Defined		1		
	Unit 7	Not Defined		1		
	Unit 8	Not Defined		1		
	Unit 9	Not Defined		1		
	Unit 10	Not Defined		1		
	🗌 Unit 11	Not Defined		1		
	Unit 12	Not Defined		1		
	Unit 13	Not Defined		1		
	Unit 14	Not Defined		1		
	Unit 15	Not Defined		1		
	Unit 16	Not Defined		1		
	Unit 17	Not Defined		1		
	Unit 18	Not Defined		1		
	Unit 19	Not Defined		1		
	Unit 20	Not Defined		1		
	Unit 21	Not Defined		1		
	Unit 22	Not Defined		1		
	Unit 23	Not Defined				
	Unit 24	Not Defined		1		
	Unit 25	Not Defined		1		
	Unit 26	Not Defined		1		~
	Supported A			1		

**Figure 4.7** Intesis MAPS Hitachi configuration tab after importing scan results

#### 1.12.6 Signals

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

Contiguration*         Signals         Receive / Second         Diagnetit           Active         Deconglient         Ontal         Femal         Addees         Bit         Bead/Wind         U         Outal           0         Ontal (Sectifient winds)         16         Outaigned         Bit         Receive / Sectifient         U/U         Outaigned         Image: Sectifient winds         Imag	nnecti					-M-				IntesisBox
Active       Description       Data L       Format       Addres       Bit       Read / Write       Unit 10       U       Out         I       C       Or full unith (1-5t the units Or)       16       0. Unigned       1       1       Figger       -       -         2       Of full unith (1-5t the units Or)       16       0. Unigned       2       1       1       Figger       -       -       -         3       C       Operation Mode Mach (all the unith) (1-5t H.       16       0. Unigned       3       1       1       -       -       -       -         5       Operation Mode Mach (all the unith) (1-5t H.       16       0. Unigned       4       1       1       Tigger       -       -       -         6       C       Operation Mode for (all the unith) (1-5t Fins Spec.       16       0. Unigned       6       1       Tigger       -       -       -         7       Operation Mode Cov (all the unith) (1-5t Fins Spec.       16       0. Unigned       8       1       Tigger       -       -       -         10       Fin Speed Mid (all the unith) (1-5t Fins Spec.       16       0. Unigned       1       1       Tigger       -       -       -		on Configuration *	Signals	Rec	eive / Send	Diagnost	tic			МАР
II         C         On (aff unita) (1-5st the unita) On)         16         0. Unigned         0         1. Trigger         -         -           I         Operation Mode Aut (all the unita) (1-5st L				1	Modbus Slave			Hisen	se	
2         0         Off (all unit) (1-55 the units Off)         16         0. Uningned         1         1         1         1         1         1         1         0. Operation Mode Aud (all the units) (1-54 L.         16         0. Uningned         2         1: Tringger         -         -         -           5         C         Operation Mode for (all the units) (1-54 L.         16         0. Uningned         3         1: Tringger         -         -         -           7         Operation Mode for (all the units) (1-54 L.         16         0. Uningned         6         1: Tringger         -         -         -           8         Fan Speed Auto (all the units) (1-54 Fan Spe         16         0. Uningned         6         1: Tringger         -         -         -           10         Fan Speed Mode fan (all the units) (1-54 Fan Spe         16         0. Uningned         1         1: Tringger         -         -         -           11         Fan Speed High (all the units) (1-54 Fan Spe         16         0. Uningned         10         1: Tringger         -         -         -           12         Fan Speed High (all the units) (1-54 Fan Spe         16         0. Uningned         10         1: Tringger         -         -	Active	Description	Data L	Format	Address Bit	Read / Write	Unit ID	IU	OU	
3         C         Operation Mode Auto (all the unit) (1-54 A 16         0. Unigned         2         •         1. Trigger         •         •           4         Operation Mode Auto (all the unit) (1-54 A 16         0. Unigned         3         •         1. Trigger         •         •           5         Operation Mode D/ clift unit) (1-56 F 16         0. Unigned         5         •         1. Trigger         •         •           7         Operation Mode Col clift unit) (1-56 F 16         0. Unigned         6         •         •         •           8         C         Fan Speed Auto (all the unit) (1-56 F 16         0. Unigned         7         •         1. Trigger         •         •           9         Fan Speed How (all the unit) (1-56 F 16         0. Unigned         9         •         •         •           11         Fan Speed Holy (all the unit) (1-56 F 16         0. Unigned         10         •         1. Trigger         •         •           2         Fan Speed Holy (all the unit) (1-56 F 16         0. Unigned         11         •         1. Trigger         •         •           3         Vane Position Auto (all the unit) (1-56 F 16         0. Unigned         12         •         •         •				0: Unsigned	0	- 1: Trigger	-			
4         C         Operation Mode Heat (all the units) (1-54 H 16         0. Uningred         3         -         1. Trigger         -         -           5         O         Operation Mode Heat (all the units) (1-54 H 16         0. Uningred         5         -         -           6         O         Operation Mode Fain all the units) (1-54 H 16         0. Uningred         5         -         -           7         C         Operation Mode Fain all the units) (1-54 H 16         0. Uningred         6         1. Trigger         -         -           8         F an Speed Mu (all the units) (1-54 H 16         0. Uningred         8         1. Trigger         -         -           9         F an Speed Mu (all the units) (1-54 H 16         0. Uningred         8         1. Trigger         -         -           10         F an Speed Mu (all the units) (1-54 H.m. 5 16         0. Uningred         1. Trigger         -         -         -           11         F an Speed Mu (all the units) (1-54 H.m. 5 16         0. Uningred         1. Trigger         -         -         -           12         F an Speed Mu (all the units) (1-54 H.m. 5 16         0. Uningred         1. Trigger         -         -         -           13         V ane P				0: Unsigned	1					
5         C         Operation Mode Dry (all the unit) (1-Set Dr.         16         0. Unigned         4         •         1. Trigger         -         -           6         C         Operation Mode Dry (all the unit) (1-Set Dr.         16         0. Unigned         6         •         -           7         Operation Mode Coll (all the unit) (1-Set Dr.         16         0. Unigned         6         •         I: Trigger         -         -           8         C         Fan Speed Auta (all the unit) (1-Set Fan Spec         16         0. Unigned         9         •         I: Trigger         -         -           9         Fan Speed Mid (all the unit) (1-Set Fan Spec         16         0. Unigned         9         •         I: Trigger         -         -           10         Fan Speed High- (all the unit) (1-Set Fan Spec         16         0. Unigned         10         •         I: Trigger         -         -           11         Fan Speed High- (all the unit) (1-Set Fan Spec         16         0. Unigned         12         •         I: Trigger         -         -           12         Fan Speed High- (all the unit) (1-Set Vane Po         16         0. Unigned         12         •         I: Trigger         -				-	2				1.1	
6         C         Operation Mode Fan (all the unit) (1-Set Fan. 16         0. Unigned         5         • 1. Trigger         •         •           7         C         Operation Mode Co (all the unit) (1-Set Fan. 5ne. 16         0. Unigned         6         • 1: Trigger         •         •           9         Fan Speed Low (all the unit) (1-Set Fan. 5ne. 16         0. Unigned         8         • 1: Trigger         •         •           9         Fan Speed Low (all the unit) (1-Set Fan. 5ne. 16         0. Unigned         9         • 1: Trigger         •         •           11         Fan Speed High (all the unit) (1-Set Fan. 5ne. 16         0. Unigned         10         • 1: Trigger         •         •           2         Fan Speed High (all the unit) (1-Set Fan. 5ne. 16         0. Unigned         11         • 1: Trigger         •         •           3         Vane Position A (all the unit) (1-Set Vane Pos. 16         0. Unigned         12         • 1: Trigger         •         •           4         Vane Position 2 (all the unit) (1-Set Vane Pos. 16         0. Unigned         15         • 1: Trigger         •         •           5         Vane Position 2 (all the unit) (1-Set Vane Pos. 16         0. Unigned         15         • 1: Trigger         •         •					3		-	-	-	
7         7         7         9         Operation Mode Cool (all the unit) (1-Set C. 16         0. Unigned         6         • 1. Trigger         -         -           8         7         Fan Speed Auto (all the unit) (1-Set Fan Spe 16         0. Unigned         8         • 1. Trigger         -         -           9         7         Fan Speed Mid (all the unit) (1-Set Fan Spe 16         0. Unigned         8         • 1. Trigger         -         -           10         7         Fan Speed Mid (all the unit) (1-Set Fan Spe 16         0. Unigned         9         • 1. Trigger         -         -           2         Fan Speed Mid (all the unit) (1-Set Fan Spe 16         0. Unigned         11         • 1. Trigger         -         -           3         7         Vane Pontion Auto (all the unit) (1-Set Vane Pan 16         0. Unigned         12         • 1. Trigger         -         -           4         7         Vane Pontion Auto (all the unit) (1-Set Vane Pan 16         0. Unigned         13         • 1. Trigger         -         -           5         7         Vane Pontion Alto (all the unit) (1-Set Vane Pan 16         0. Unigned         15         • 1. Trigger         -         -           6         7         Vane Pontion Alto (all the unit) (1				0: Unsigned	4		-			
Image: Properties Auto (all the unit) (1-5t Fan Spee. 16         0. Unisgned         7         -         1: Trigger         -         -           Image: Pan Speed Auto (all the unit) (1-5t Fan Spee. 16         0. Unisgned         8         -         1: Trigger         -         -           Image: Pan Speed High (all the unit) (1-5t Fan Spee. 16         0. Unisgned         9         -         1: Trigger         -         -           Image: Pan Speed High (all the unit) (1-5t Fan Spee. 16         0. Unisgned         10         -         1: Trigger         -         -           Image: Pan Speed High (all the unit) (1-5t Fan Spee. 16         0. Unisgned         12         -         1: Trigger         -         -           Image: Pan Speed High (all the unit) (1-5t Van Pan. 16         0. Unisgned         12         -         1: Trigger         -         -           Image: Pan Speed To (all the unit) (1-5t Van Pan. 16         0. Unisgned         15         -         1: Trigger         -         -           Image: Pan Speed To (all the unit) (1-5t Van Pan. 16         0. Unisgned         15         -         1: Trigger         -         -           Image: Pan Speed To (all the unit) (1-5t Van Pan. 16         0. Unisgned         16         1: Trigger         -         -           Image: Van Paniton A					5		-			
9         Fm Speed Low (all the unit) (1-Set Fm Spe         16         0. Unigned         8         • 1: Trigger         •         •           0         Fm Speed Mid (all the unit) (1-Set Fm Spe         6         0. Unigned         9         • 1: Trigger         •         •           2         Fm Speed Mid (all the unit) (1-Set Fm Spe         6         0. Unigned         10         • 1: Trigger         •         •           2         Fm Speed High (all the unit) (1-Set Vm Pac         16         0. Unigned         11         • 1: Trigger         •         •           3         Vane Position Alado (all the unit) (1-Set Vm Pac         16         0. Unigned         11         • 1: Trigger         •         •           4         Vane Position 2 (all the unit) (1-Set Vm Pac         16         0. Unigned         11         • 1: Trigger         •         •           5         Vane Position 2 (all the unit) (1-Set Vm Pac         16         0. Unigned         15         • 1: Trigger         •         •         •           6         Vane Position 3 (all the unit) (1-Set Vm Pac	-			-	6		-			
9       Fan Speed Mei (all the unkt) (1-Set Fan Spee 16       0. Unsigned       9       -       1. Trigger       -       -         10       Fan Speed Heigh (all the unkt) (1-Set Fan Spee 16       0. Unsigned       10       -       1. Trigger       -       -         20       Fan Speed Heigh (all the unkt) (1-Set Fan Spee 16       0. Unsigned       11       -       1. Trigger       -       -         31       Vane Position Ald (all the unkt) (1-Set Vane 16       0. Unsigned       12       -       1. Trigger       -       -         40       Vane Position 2 (all the unkt) (1-Set Vane 16       0. Unsigned       13       -       1. Trigger       -       -         50       Vane Position 2 (all the unkt) (1-Set Vane Po 16       0. Unsigned       15       -       1. Trigger       -       -         60       Vane Position 3 (all the unkt) (1-Set Vane Po 16       0. Unsigned       17       -       1. Trigger       -       -         70       Vane Position 4 (all the unkt) (1-Set Vane Po 16       0. Unsigned       18       -       -       -         71       Vane Position 5 (all the unkt) (1-Set Vane Po 16       0. Unsigned       18       -       -       -         72       Vane Position 5 (all				-	7		-		-	
1       Fan Speed High (all the unit) (1-Set Yan-Pu- Set Speed High (1-				-	8		-			
2       Fan Speed High+ (all the unit) (1-5e Fan S				-	9		-	1.1	-	
Vere Position Auto (all the units) (1-Set Vane							-		-	
4         5         Vane Position 1 (all the unit) (1-5et Vane Po 16         0. Unsigned         13         - 1: Trigger         -         -           5         Vane Position 2 (all the unit) (1-5et Vane Po 16         0. Unsigned         14         - 1: Trigger         -         -           6         Vane Position 2 (all the unit) (1-5et Vane Po 16         0. Unsigned         15         - 1: Trigger         -         -           7         Vane Position 4 (all the unit) (1-5et Vane Po 16         0. Unsigned         16         - 1: Trigger         -         -           8         Vane Position 5 (all the unit) (1-5et Vane Po 16         0. Unsigned         16         - 1: Trigger         -         -           9         Vane Position 7 (all the unit) (1-5et Vane Po 16         0. Unsigned         18         - 1: Trigger         -         -           9         Vane Position 7 (all the unit) (1-5et Vane Po 16         0. Unsigned         18         - 1: Trigger         -         -           9         Vane Position 7 (all the unit) (1-5et Vane Po 16         0. Unsigned         19         - 1: Trigger         -         -           10         Vane Position 7 (all the unit) (1-5et Vane Po 16         0. Unsigned         0         - 1: Trigger         -         -         -				-			-	-	-	
S       Vame Position 2 (all the unit) (1-5et Vame Po 16       0. Unsigned       14       • 1: Trigger       -       -         S       Vame Position 3 (all the unit) (1-5et Vame Po 16       0. Unsigned       15       • 1: Trigger       -       -         More Position 3 (all the unit) (1-5et Vame Po 16       0. Unsigned       16       • 1: Trigger       -       -         More Position 5 (all the unit) (1-5et Vame Po 16       0. Unsigned       17       • 1: Trigger       -       -         More Position 5 (all the unit) (1-5et Vame Po 16       0. Unsigned       18       • 1: Trigger       -       -         Vame Position 5 (all the unit) (1-5et Vame Po 16       0. Unsigned       18       • 1: Trigger       -       -         Vame Position 5 (all the unit) (1-5et Vame Po 16       0. Unsigned       18       • 1: Trigger       -       -         Vame Position 5 (all the unit) (1-5et Vame Po 16       0. Unsigned       0       -       1: Trigger       -       -         Vame Position 5 (all the unit) (1-5et Vame Po 16       0. Unsigned       0       -       1: Trigger       -       -         Communication for 0UIP (0,01:00)       16       0. Unsigned       0       -       1: Trigger       -       -         Communicat				-			-	-	-	
5         Vane Position 3 (all the units) (1-54: Vane Po 16         0. Unsigned         15         - 1: Trigger         -         -           7         Vane Position 4 (all the units) (1-54: Vane Po 16         0. Unsigned         16         1: Trigger         -         -           9         Vane Position 5 (all the units) (1-54: Vane Po 16         0. Unsigned         17         -         1: Trigger         -         -           9         Vane Position 6 (all the units) (1-54: Vane Po 16         0. Unsigned         18         - 1: Trigger         -         -           9         Vane Position 6 (all the units) (1-54: Vane Po 16         0. Unsigned         18         - 1: Trigger         -         -           10         Vane Position 6 (all the units) (1-54: Vane Po 16         0. Unsigned         16         - 1: Trigger         -         -           11         Temperature Seption (all the units) (1-54: Vane Po 16         0. Unsigned         100         - 0: Trigger         -         -         -           12         Communication Enror 0U (-0ft, 1-164: Mare Po 16         0. Unsigned         100         - 0: Trigger         -         -         -           12         Communication Enror 0U (-0ft, 1-164: Mare Po 16         0. Unsigned         100         -         1: T				0: Unsigned	13		-	-		
Yune Position 4 (all the unit) (1-Set Vane Po 16         0. Unsigned         16         - 1: Trigger         -         -           Vane Position 5 (all the unit) (1-Set Vane Po 16         0. Unsigned         17         - 1: Trigger         -         -           Vane Position 5 (all the unit) (1-Set Vane Po 16         0. Unsigned         18         - 1: Trigger         -         -           Vane Position 7 (all the unit) (1-Set Vane Po 16         0. Unsigned         19         - 1: Trigger         -         -           Vane Position 7 (all the unit) (1-Set Vane Po 16         0. Unsigned         19         - 1: Trigger         -         -           Ottober All Temper, (10CV) (10 unit) (10C 16         0. Unsigned         0         - 6: Read         -         -           Outdoor All Temper, (1-S0 9C)         16         0. Unsigned         100         - 6: Read         -         1           Outdoor All Temper, (1-S0 9C)         16         0. Unsigned         1000         - 6: Read         -         1           Total Leng Comp, Freq. (0.230 *C)         16         0. Unsigned         1004         - 6: Read         -         1           Outdoor All Temper, (0.235 Al)         16         0. Unsigned         1004         - 6: Read         -         1 <td></td> <td></td> <td></td> <td>-</td> <td>14</td> <td></td> <td>-</td> <td>1.1</td> <td></td> <td></td>				-	14		-	1.1		
Image: Solution 5 (all the unit) (1-54: Vane Po 16         0. Unsigned         17         - 1: Trigger         -         -           Image: Solution 6 (all the unit) (1-54: Vane Po 16         0. Unsigned         18         - 1: Trigger         -         -           Image: Solution 6 (all the unit) (1-54: Vane Po 16         0. Unsigned         18         - 1: Trigger         -         -           Image: Solution 6 (all the unit) (1-54: Vane Po 16         0. Unsigned         19         - 1: Trigger         -         -           Image: Solution 5 (all the unit) (1-54: Vane Po 16         0. Unsigned         19         - 1: Trigger         -         -           Image: Solution 5 (all the unit) (1-54: Vane Po 16         0. Unsigned         10         - 1: Trigger         -         -           Image: Solution 5 (all the unit) (10-Cull the 0. Unsigned         1000         - 0: Read         -         -         1           Image: Solution 5 (all the unit) (10-Cull the 0. Unsigned         10002         - 0: Read         -         -         1           Image: Solution 5 (all the unit) (10-Cull the 0. Unsigned         10002         - 0: Read         -         -         1           Image: Solution 5 (all the unit) (10-Cull the 0. Unsigned         10004         - 0: Read         -         1           <				0: Unsigned	15	- 1: Trigger	-	-	-	
Yane Position 5 (all the units) (1-Set Vane Po 16         0. Unsigned         18         - 1: Trigger         -         -           Vane Position 7 (all the units) (1-Set Vane Po 16         0. Unsigned         19         - 1: Trigger         -         -           Mark Position 7 (all the units) (1-Set Vane Po 16         0. Unsigned         10         - 1: Trigger         -         -           Mark Position 7 (all the units) (1-Set Vane Po 16         0. Unsigned         20         - 1: Trigger         -         -           Mark Position 7 (all the units) (1-Set Vane Po 16         0. Unsigned         1000         - 0: Read         -         -           Outdoor Air Temp. (-1:50.98*C)         16         0. Unsigned         1000         - 0: Read         -         -           Comp. Torem (0.100: C)         16         0. Unsigned         1000         - 0: Read         -         -           Total Comp. Unret (0.25S Hz)         16         0. Unsigned         1000         - 0: Read         -         -           Total Comp. Unret (0.25S Hz)         16         0. Unsigned         1003         - 0: Read         -         -           Out Exp. Vale 1 Open (0.100: S)         16         0. Unsigned         0: 0: Read         -         -         1				-			-	1.1		
Image: Section 7 (all the unit) (1-Set Vane Po 16         0. Unsigned         19         - 1. Trigger         -         -           Image: Section 7 (all the unit) (1-Set Vane Po 16         0. Unsigned         10         - 1. Trigger         -         -           Image: Section 7 (all the unit) (1-Set Vane Po 16         0. Unsigned         100         - 1. Trigger         -         -           Image: Section 7 (all the unit) (1-Set Vane Po 16         0. Unsigned         1000         - 0. Read         -         -           Image: Section 7 (all the unit) (1-Sot Vane Po 16         0. Unsigned         1000         - 0. Read         -         1           Image: Section 7 (all the unit) (1-Sot Vane Po 16         0. Unsigned         1000         - 0. Read         -         1           Image: Section 7 (all the unit) (1-Sot Vane Po 16         0. Unsigned         1000         - 0. Read         -         1           Image: Section 7 (all the unit) (1-Sot Vane Po 16         0. Unsigned         10004         - 0. Read         -         1           Image: Section 7 (all the Unit) (1-Sot Vane Po 16         0. Unsigned         1004         - 0. Read         -         1           Image: Section 7 (1-Sot Vane Po (1-Sot Vane				0: Unsigned			-	-		
Image: State				-			-			
2         2         Communication Error OU (0-Off, 1-On)         16         0: Unsigned         1000         -0: Read         -         -         1           3         O cutdoor Air Temp, (-30, 90°C)         16         1: Signed (2)         1001         -0: Read         -         -         1           4         Comp.Temp (0, 200°C)         16         0: Unsigned         1000         -0: Read         -         -         1           5         7: Total Real Comp. Frequ. (0, 255 Hz)         16         0: Unsigned         1003         -0: Read         -         -         1           6         7: Total Real Comp. Frequ. (0, 255 Hz)         16         0: Unsigned         1003         -0: Read         -         -         1           7         Out Exp. Valve 1: Open (0, 100°S)         16         0: Unsigned         -0: Read         -         1           8         D: Untexp.Valve 1: Open (0, 100°S)         16         0: Unsigned         -0: Read         -         1           9         Dirt Exp. Valve 1: Open (0, 100°S)         16         0: Unsigned         -0: Read         -         1		Vane Position 7 (all the units) (1-Set Vane Po	16	0: Unsigned	19	- 1: Trigger	-	-		
1         Coutdoor Air Temp. (-30.59 °C)         16         1: Signed (C2)         1001         - 0. Read         -         -         1           4         Comp. Top Temp. (-30.59 °C)         16         0. Undoor Air Temp. (-30.59 °C)         16         0. Undoor Air Temp. (-30.59 °C)         16         0. Undoor Air Temp. (-30.59 °C)         - 0. Read         -         -         1           5         Total Secomp. Current (0.255 A)         16         0. Undigned         - 0. Read         -         -         1           6         Total Comp. Current (0.255 A)         16         0. Undigned         - 0. Read         -         -         1           7         Duct Exp. Valve 1 Open (0.100 S)         16         0. Undigned (C2)         - 0. Read         -         -         1           8         Duct Exp. Valve 1 Open (0.100 S)         16         0. Undigned (C2)         - 0. Read         -         -         1										
Image: Comp. Top Temp. (0.200 °C)         16         0. Unsigned         1000         -         Read         -         -         1           Image: Comp. Top Temp. (0.200 °C)         16         0. Unsigned         1000         -         0. Read         -         -         1           Image: Comp. Top Temp. (0.255 Hz)         16         0. Unsigned         1000         -         0. Read         -         -         1           Image: Comp. Current (0.255 Hz)         16         0. Unsigned         1000         -         0. Read         -         -         1           Image: Comp. Current (0.255 Hz)         16         0. Unsigned         1000         -         0. Read         -         -         1           Image: Comp. Current (0.255 Hz)         16         0. Unsigned         1000         -         0. Read         -         -         1           Image: Comp. Current (0.250 Hz)         16         0. Unsigned         1000         -         0. Read         -         -         1           Image: Comp. Top Temp. Comp. Current (0.250 Hz)         16         1. Signed (C2)         1000         -         0. Read         -         1				-			-		1	
i         □         Total Read Comp. Freq. (0.255 Hz)         16         0. Unsigned         1000 3         - 0. Read         -         -         1           i         □         Total Comp. Current (0.255 Hz)         16         0. Unsigned         10004         - 0. Read         -         -         1           i         □         Total Comp. Current (0.255 Hz)         16         0. Unsigned         - 0. Read         -         -         1           i         □         Out Exp. Value T Operon (0.100 %)         16         0. Unsigned         1000         - 0. Read         -         -         1           i         □         Discharge Pressure (-5.093 MPa)         16         1. 'signed (C2)         1000         - 0. Read         -         1									1	
i ⊘ Total Comp. Current (0.255 A) 16 0 Unsigned 1004 - 0 Read 1 ⊂ Out Exp. Value 1 Open (0.100 %) 16 0 Unsigned 10005 - 0 Read 1 i ⊘ Dictrustep Pressure (-50.36 MPa) 16 1: Signed (C2) 10006 - 0 Read 1				-					1	
Out Exp. Value 1 Open (0.100 %)         16         0. Unsigned         10005         - 0. Read         -         -         1           Image Pressure (-5.0.3.9 MPa)         16         1: Signed (C2)         10006         - 0. Read         -         -         1				-			-	-	1	
I Discharge Pressure (-5.099 MPa) 16 1: Signed (C2) 10006 - 0: Read 1				-					1	
				-			-		1	
A Surtice Description Description (v1090) (JSD 0.0 MDa) 16 1: Signed (C2) 10007 - 0: Read - 1				1: Signed (C2)		- 0: Read	-		1	
		Suction Pressure (x10°C) (-5.09.9 MPa)	16	1: Signed (C2)	10007	- 0: Read			1	

Figure 4.8 Intesis MAPS Signals tab



#### 1.12.7 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.

Home Project Tools	Help	SM-ACN-MBS.it	omaps * - IntesisBox MAP	S	±_ □ ×
Connection	K Configuration *	Signals	Receive / Send	<b>M</b> - Diagnostic	
Send Receive		uration project on the Co	nfiguration Tool to your Gate Gateway are connected befor Send		

Figure 4.9 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.

#### 1.12.8 Diagnostic

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

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

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

• Tools

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

• Viewers

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



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Ø	*		127	-11-					Intesis	Boy
Connection	Configuration *	Signals	Receive / Send	Diagnostic						EAF
lBox										
- 5										
sole		Modbus Slave Viewer		<ul> <li>Signals Viewe</li> </ul>	er .					
AutoScroll	a	ear 📃 Comms 📃 Debug	3 🗹 AutoScroll	Clear	Refresh	Edit columns				
				# Modbus	Htachi	Description	Format	Address Read / Write	Unit ID	
				1		On (all units) (1-Set the units On)	0: Unsigned	0 1: Trigger	-	
				2		Off (all units) (1-Set the units Off)	0: Unsigned	1 1: Trigger	2	
				3		Operation Mode Auto (all the units) (1-Set A	0: Unsigned	2 1: Trigger	-	
				4		Operation Mode Heat (all the units) (1-Set H	0: Unsigned	3 1: Trigger		
				5		Operation Mode Dry (all the units) (1-Set Dr	0: Unsigned	4 1: Trigger	-	
				6		Operation Mode Fan (all the units) (1-Set Fa	0: Unsigned	5 1: Trigger	-	
				7		Operation Mode Cool (all the units) (1-Set C	0: Unsigned	6 1: Trigger	-	
				8		Fan Speed Auto (all the units) (1-Set Fan Spe	0: Unsigned	7 1: Trigger	-	
				9		Fan Speed Low (all the units) (1-Set Fan Spe	0: Unsigned	8 1: Trigger		
				10		Fan Speed Mid (all the units) (1-Set Fan Spee	0: Unsigned	9 1: Trigger		
				11		Fan Speed High (all the units) (1-Set Fan Spe	0: Unsigned	10 1: Trigger		
				12		Fan Speed High+ (all the units) (1-Set Fan S	0: Unsigned	11 1: Trigger	-	
		Hitachi Viewer		■ 13		Vane Position Auto (all the units) (1-Set Vane	0: Unsigned	12 1: Trigger		
	a	ear 🔲 Comms 🔲 Debug	g 🗹 AutoScroll	14		Vane Position 1 (all the units) (1-Set Vane Po	0: Unsigned	13 1: Trigger	-	
	_			15		Vane Position 2 (all the units) (1-Set Vane Po	0: Unsigned	14 1: Trigger	-	
				16		Vane Position 3 (all the units) (1-Set Vane Po	0: Unsigned	15 1: Trigger		
				17		Vane Position 4 (all the units) (1-Set Vane Po	0: Unsigned	16 1: Trigger	-	
				18		Vane Position 5 (all the units) (1-Set Vane Po	0: Unsigned	17 1: Trigger	-	
				19		Vane Position 6 (all the units) (1-Set Vane Po	0: Unsigned	18 1: Trigger		
				20		Vane Position 7 (all the units) (1-Set Vane Po	0: Unsigned	19 1: Trigger		
				21		Temperature Setpoint (x10°C) (all units) (Co	0: Unsigned	20 1: Trigger		

#### Figure 4.10 Diagnostic

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

#### 1.12.9 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. If using Modbus RTU, connect the communication cable coming from the EIA485 port of the Modbus RTU installation to the port marked as Port B of Intesis (More details in section 3).

If using, Modbus TCP, connect the communication cable coming from the Ethernet port of the Modbus TCP installation to the port marked as Ethernet Port of Intesis (More details in section 3).

- 4. Connect the communication cable coming from the Hitachi VRF installation to the port marked as Port A of Intesis (More details in section 3).
- 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!** In order to avoid earth loops that can damage Intesis and/or any other equipment connected to it, we strongly recommend:

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



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 section 3).

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 section 3).

- 7. Open Intesis MAPS, create a new project selecting a copy of the one named INMBSHIT---O000.
- 8. Modify the configuration as desired, save it and download the configuration file to Intesis as explained in the Intesis MAPS user manual.
- 9. Visit the Diagnostic section, enable COMMS () and check that there is communication activity, some TX frames and some other RX frames. This means that the communication with the Centralized Controller and Modbus Master devices is OK. In case there is no communication activity between Intesis and the Centralized Controller and/or Modbus devices, check that those are operative: check the baud rate, the communication cable used to connect all devices and any other communication parameter.

<b>lome</b> Project Tools	Help		SN	M-ACN-MBS.ibma	ips - IntesisBox	MAPS
ø	*		11. T			
Connection	Configuration	Signals	Receive / Send	Diagnos	stic	
ToolBox	SET!	is Slave Viewer ☑ AutoScroll 🔲 Comm	s 🗌 Debug	Signals Viewer	ols Refresh	
INFO? SKT0 - C DEBUG E INFO: GWAWE - SM. 2006 INFO: SN: 000K8171 INFO: BARCODE: 0006011 INFO: APPLIC: 64 INFO: APPLIC: 64 INFO: APPLIC: 64 INFO: CFGFILEZATE: 25, INFO: CFGFILEZATE: 25, INFO: CFGFILEZATE: 25, INFO: STHMAC: CC: 3F: 11 INFO: STHMAC: CC: 3F: 11 INFO: STHMAC: 252, 252 INFO: STHMAC:	Enabled         eMs: SPC           inabled         eMs: SPC           eMs: OE         eMs: SPC           s0340208         eMs: SPC           eMs: SPC         eMs: SPC           off: 43:05         eMs: SPC           101: 82         .254:.0	MMS=0 3UG=0 DNS=1 DNS=1		# Modbus Slave 2 3 4 5 6 7 8	Samsung NAS	Description On (all the u Off (all the u Operation M Operation M Operation M Operation M Operation M
INFO:NETGW:192.168. INFO:NETDHCP:ON INFO:UPTIME:0000d 00 INFO:DATETIME:10/07 INFO:COMPID:13 INFO:STATUS:RUNNING INFO:END	8:20:21 /2018 10:47:1 Clear > 15M:0K < 15M:0C > 15M:0K > 15M:0K > 15M:0K > 15M:0K	<] 32 00 14 6A EE FF	s Debug	9 10 11 12 13 14		Operation M Fan Speed A Fan Speed L Fan Speed M Fan Speed H Vane position
	> 15M:[T) > 15M:[T) > 15M:[T) > 15M:[T) > 15M:[T)	<pre>&lt;] 32 00 14 6A EE FF &lt;] 32 00 11 6A EE FF &lt;] 32 00 14 6A EE FF &lt;] 32 00 14 6A EE FF</pre>	B0 FF FF C0 01 B0 FF FF C0 01 B0 FF FF C0 14 B0 FF FF C0 01 <sub>≡</sub>	15 16 17 18		Vane position Temperatur Vent. On (all Vent. Off (all

Figure 4.11 Enable COMMS



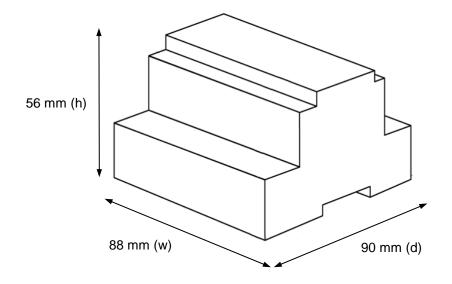
## 5. Electrical & Mechanical Features



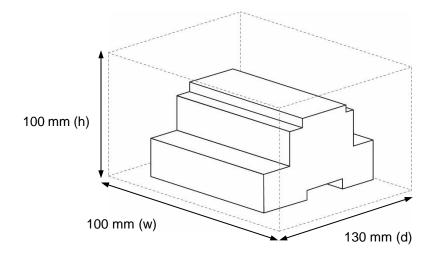
Enclosure	Plastic, type PC (UL 94 V-0) Net dimensions (dxwxh): 90x88x56 mm Recommended space for installation (dxwxh): 130x100x100mm Color: Light Grey. RAL 7035	Battery	Size: Coin 20mm x 3.2mm Capacity: 3V / 225mAh Type: Manganese Dioxide Lithium
Mounting	Wall. DIN rail EN60715 TH35.	Console Port	Mini 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 <sup>2</sup> 2.5mm <sup>2</sup> 2 cores: 0.5mm <sup>2</sup> 1.5mm <sup>2</sup> 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.	Push Button	Button A: Not used Button B: Not used
Power	24VAC +/-10% 50-60Hz, Max.: 127mA Recommended: 24VDC	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	<ol> <li>x H-Link Plug-in screw terminal block orange (2 poles)</li> <li>1500VDC isolation from other ports</li> <li>x Plug-in screw terminal block green (2 poles)</li> <li>Reserved for future use</li> </ol>	Protection	IP20 (IEC60529) 10 x Onboard LED indicators 2 x Run (Power)/Error 2 x Ethernet Link/Speed
Switch A (SWA)	1 x DIP-Switch for PORTA configuration: Reserved for future use (leave OFF, default)	Indicators	2 x Port A TX/RX 2 x Port B TX/RX 1 x Button A indicator 1 x Button B indicator
PORT B	<ol> <li>x Serial EIA232 (SUB-D9 male connector) Pinout from a DTE device 1500VDC isolation from other ports (except PORT B: EIA485)</li> <li>x Serial EIA485 Plug-in screw terminal block (3 poles) A, B, SGND (Reference ground or shield) 1500VDC isolation from other ports (except PORT B: EIA232)</li> </ol>	100 mm (h)	
Switch B <sub>(SWB)</sub>	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)	10	00 mm (w) 130 mm (d)



## 6. Dimensions



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





# 7. AC Unit Types compatibility

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

https://www.intesis.com/docs/compatibilities/inxxxhit001r000\_compatibility



## 8. Error codes for Indoor and Outdoor Units

This list contains all possible values shown in Modbus register 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		Abnormality between Indoor and Outdoor	incorrect Wiring, Loose Terminals, Disconnect Wire, Blowout of Fuse, Outdoor Unit Power OFF
04	Transmission	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
Ob	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		Inlet Air Thermistor	
12	Concernen	Outlet Air Thermistor	la como et Mileia e
13	Sensoron Indoor Unit	Freeze Protection Thermistor	Incorrect Wiring, Disconnecting Wiring
14		Gas Piping Thermistor	Breaking Wire, Short Circuit
19	Fan Motor	Activation of Protection Device for Indoor Fan	Fan Motor Overheat, Locking
21		High Pressure Sensor	
22		Outdoor Air Thermistor	
23	Sensor on	Discharge Gas Thermistor on Top of Compressor	Incorrect Wiring,
24	Outdoor Unit	Heat Exchanger Liquid Pipe Thermistor	Disconnecting Wiring
25		Heat Exchanger Gas Pipe Thermistor	Breaking Wire, Short
29		Low Pressure Sensor	Circuit
31		Incorrect Capacity Setting of Outdoor Unit and Indoor Unit	Incorrect Capacity Code Setting of Combination Excessive or Insufficient Indoor Unit Total Capacity Code
35	System	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
		Abnormality of Picking up Circuit for	Failure of Protection Detecting Device
38		Protection in Outdoor Unit	(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		Abnormality of Outdoor Unit Capacity	Outdoor Unit Capacity > 510kBtu/h
3b	Outdoor Unit	Incorrect Setting of Outdoor Unit Models Combination or Voltage	Incorrect Setting of Main and Sub Unit(s) Combination or Voltage
		Abnormality Transmission between Main Unit and Sub Unit(s)	Incorrect Wiring, Disconnect Wire, Breaking Wire, PCB Failure



3d			
43		Activation of Low Compression Ratio Protection Device	Defective Compression (Failure of Compressor of Inverter, Loose Power Supply Connection)
44	Protection	Activation of Low Pressure Increase Protection Device	Overload at Cooling, High Temperature at Heating, Expansion Valve Locking (Loose Connector)
45	Device	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 Error Signal Detection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short Circuit)
54		Abnormality of Inverter Fin	Abnormal Inverter Fin Thermistor,
55	Inverter	Temperature	Heat Exchanger Clogging, Fan Motor Failure
		Inverter Failure	Inverter PCB Failure
57		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	Fan Controller	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)
		Compressor Protection Alarm	This alarm code appears when the
EE	Compressor	(It is cannot be reset from remote Controller)	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.
	Indoor Unit No. Setting		More than 17 Non-Corresponding to Hi- NET Units are Connected to One System.



b5		Incorrect Indoor Unit Connection Number Setting	
C1		Incorrect Indoor Unit Connection	2 or more Switch Box Units are connected between outdoor unit and indoor unit.
C2	Switch Box	Incorrect Indoor Unit Connection No. Setting	9 or More Indoor Units Connected to Switch Box Unit
C3	Unit	Incorrect Indoor Unit Connection	The indoor units of different refrigerant! cycle is connected to Switch Box unit.

