IntesisBox[®] Modbus Server

Hisense VRF Air Conditioning





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

Order code:

IBMBSHIS016O000, 16 indoor units IBMBSHIS064O000, 64 indoor units

INDEX

1. Description	5
1.1 Introduction	5
1.1 Functionality	6
1.2 Capacity of IntesisBox	7
2. Modbus interface	8
1.3 Functions supported	8
1.4 Modbus RTU	8
1.5 Modbus TCP	8
1.6 Modbus Address Map	9
3. Connections	12
1.7 Power device	13
1.8 Connect to Hisense VRF installation	13
1.9 Connection to Modbus	13
1.9.1 Modbus TCP	13
1.9.2 Modbus RTU	13
1.10 Connection to PC (Configuration tool)	14
4. Set-up process and troubleshooting	15
1.11 Pre-requisites	15
1.12 IntesisBox MAPS. Configuration & monitoring tool for IntesisBox Modbus series	15
1.12.1 Introduction	15
1.12.2 Connection	15
1.12.3 Configuration tab	16
1.12.4 Modbus Slave configuration	16
1.12.5 Hisense configuration	18
1.12.6 Signals	20
1.12.7 Sending the configuration to IntesisBox	21
1.12.8 Diagnostic	21
1.12.9 Set-up procedure	22
5. Electrical & Mechanical Features	24
6. Dimensions	25
7. AC Unit Types compatibility	26
8. Error codes for Indoor and Outdoor Units	27

1. Description

1.1 Introduction

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

The aim of this integration is to monitor and control Hisense 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, IntesisBox performs as a Modbus Server, allowing poll and write requests from any Modbus master device.

IntesisBox makes available the Hisense 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 Hisense technologies and their technical terms.

Hierese

Integration of Hisense's compatible systems into Modbus systems

1.1 Functionality

IntesisBox[®] continuously monitors Hisense 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	StatusCommandCommunication status
General signals (all units)	Command



1.2 Capacity of IntesisBox

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

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

Their order codes are:

- IBMBSHIS016O000: Model supporting up to 16 indoor units
- IBMBSHIS0640000: Model supporting up to 64 indoor units



2. Modbus interface

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

IntesisBox 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 IntesisBox (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

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email: <u>info@intesisbox.com</u> web: <u>www.intesisbox.com</u> phone: +34 938047134

20	W	Temperature Setpoint (x10°C) (all units)	Cool: 1930°C; Heat: 1730°C
	1		
(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 °C
(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 (x10°C)	-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)	-6363°C
(Ui*100)+6	R	Inlet Temp. (x10ºC)	-6363°C
(Ui*100)+7	R	Outlet Temp. (x10ºC)	-6363°C
(Ui*100)+8	R	GasPipe Temp. (x10ºC)	-6363°C
(Ui*100)+9	R	LiquidPipe Temp. (x10°C)	-6363°C
(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)	-6363°C
(Ui*100)+27	R	RC SW Config	0-Without RCS, 1-With RCS

3. Connections

Find below information regarding the IntesisBox 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 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 / 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 Ω . Bus biasing and termination resistor for EIA485 can be enabled for PortB by means of a dedicated DIP:

SW1:

ON: 120 Ω termination active **OFF:** 120 Ω 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 Hisense VRF installation

Use the PortA connector in the top corner of the IntesisBox device in order to connect H-Link bus to the IntesisBox. 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.

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 Intesisbox. 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 Intesisbox. 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 Ω . 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 IntesisBox.
- USB: Using the console port of IntesisBox, 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 Hisense 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 Intesis Software for this integration are:

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

1.12 IntesisBox MAPS. Configuration & monitoring tool for IntesisBox Modbus series

1.12.1 Introduction

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

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

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

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

1.12.2 Connection

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

				HS-AC-MBS.ibmap	- IntesisBox MAPS - 1.0.18.0 ユーラン
Home Project Tools	View Help				
ø	*	=	1879 -	-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	-		
		Version			
		Last Configuration Date			
		MAC Address			
		IP Address			
		Netmask			
		Gateway			
		DHCP	-		
		Current Date Time			
		Gateway Operating Time	-		
	Refresh				
Selected Device		Disconnect	Connect		
7x Not Connected					BMS Protocol: Modbus Slave I Device Protocol: Hisense I 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 Hisense (Hisense interface parameters).

Home Project Tools	View Help			HS-AC-MBS.ibmaps - IntesisBox MAPS - 1.0.18.0	1 - 6 X
ø	*	=	10.00	-W	IntesisBox° 🖬
Connection	Configuration	Signals	Receive / Send	Diagnostic	MAPS
General	General Configura	tion			
Modbus Slave	Gateway Name	HS-AC-MBS			
Hisense	Project Description	IntesisBox Hisense t Gateway	to 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

Figure 4.2 IntesisBox MAPS configuration tab

1.12.4 Modbus Slave configuration

Set parameters of Modbus Slave interface of IntesisBox.



				HS-AC-MBS.ibmap	s - IntesisBox MAPS - 1.0.18.0 🛨 _ & X
Home Project Tools	View Help				
ø	*	=	100	-M-	IntesisBox 🗗
Connection	Configuration	Signals	Receive / Send	Diagnostic	MAPS
General	Modbus Configur	ation			
Modbus Slave	Туре	RTU	~		
Hisense	RTU Configuration	n			
	Connection Type	485	~		
	Baudrate	9600	~		
	Data Type	8bit / N	one/1 v		
	Slave Number	1	•		
K Not Connected					BMS Protocol: Modbus Slave 📕 Device Protocol: Hisense 📕 2018/11/07 17:49:47

Figure 4.3 IntesisBox 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 Hisense configuration

Set parameters for connection with Hisense's installation.

				HS-AC-MBS.ibmaps - IntesisBox MAPS - 1.0.18.0	1 – t
me Project Tools	View Help				
ø	*			-M	IntesisBox
Connection	Configuration	Signals	Receive / Send	Diagnostic	MAPS
General	Units Configuratio	n			
Modbus Slave	Autodiscover	Scan			
	Unit ID Unit Typ	e IU (OU Description	^	
Hisense	Unit 1 Not Def	ned 1 1	I Indoor Unit 1		
	Unit 2 Not Def	ned 2 1	I Indoor Unit 2		
	Unit 3 Not Def	ned 3 1	I Indoor Unit 3		
	Unit 4 Not Def	ned 4 1	I Indoor Unit 4		
	Unit 5 Not Def	ned 5 1	I Indoor Unit 5		
	Unit 6 Not Def	ned 6 1	I Indoor Unit 6		
	Unit 7 Not Def	ned 7 1	I Indoor Unit 7		
	Unit 8 Not Def	ned 8 1	I Indoor Unit 8		
	Unit 9 Not Def	ned 9 1	I Indoor Unit 9		
	Unit 10 Not Def	ned 10 1	I Indoor Unit 10		
	Unit 11 Not Def	ned 11 1	I Indoor Unit 11		
	Unit 12 Not Def	ned 12 1	Indoor Unit 12		
	Unit 13 Not Def	ned 13 1	I Indoor Unit 13		
	Unit 14 Not Def	ned 14 1	I Indoor Unit 14		
	Unit 15 Not Def	ned 15 1	Indoor Unit 15		
	Unit 16 Not Def	ned 16 1	I Indoor Unit 16		
	Unit 17 Not Def	ned 17 1	I Indoor Unit 17		
	Unit 18 Not Def	ned 18 1	I Indoor Unit 18		
	Unit 19 Not Def	ned 19 1	I Indoor Unit 19		
	Unit 20 Not Def	ned 20 1	I Indoor Unit 20		
	Unit 21 Not Def	ned 21 1	Indoor Unit 21		
	— Supported Active Units:	-			
Not Connected					BMS Protocol: Modbus Slave Device Protocol: Hisense 2018/11/07

Figure 4.4 IntesisBox 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 IntesisBox 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:



Bus S	can			
Start Sc	an	Scan S	top	
Scan Availab	Results			
Add	ou	IU	Model	
			Replace Units Adv	d Units

Figure 4.5 IntesisBox 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:

Start Scar				
	n	Scan	Stop	
Scan R Available	esults Units			
Add	OU	IU	Model	^
	01	01	SS	
	01	02	SS	
\checkmark	01	03	SS	
\checkmark	01	04	SS	
	01	05	SS	
\checkmark	01	06	SS	
\checkmark	01	07	SS	
	01	no	Replace Units	✓ Add Units

Figure 4.6 IntesisBox 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.

Configuration * Signals Receive / Send Diagnostic Units Configuration Server Mutodiscover Server Mutodiscover Gan Imit 10 Unit 7 ppe 10 00 Des ectors Imit 10 Unit 2 SS 2 1 Imit 4 SS 3 1 Imit 4 SS 3 1 Imit 4 SS 4 1 Imit 4 SS 4 1 Imit 4 SS 4 1 Imit 4	Configuration * Signal Units Configuration Autediscover Unit 10 Unit 35 Unit 35 Unit 35 Unit 35 Unit 4 S5 Unit 4 S5 Unit 55 Unit 65 Unit 755
Units Configuration Server Katediscover IU OU Destedom Unit 1 Ss 1 <th>Units Configuration Autodiscover Unit ID Unit Type Unit ID SS Unit ID SS Unit 3 SS VInit 4 SS VInit 5 SS VInit 5 SS VInit 6 SS VInit 7 SS</th>	Units Configuration Autodiscover Unit ID Unit Type Unit ID SS Unit ID SS Unit 3 SS VInit 4 SS VInit 5 SS VInit 5 SS VInit 6 SS VInit 7 SS
Autodiscover Scan Unit 10 Unit Type IU OU Den bdom ^ Image: I	Autodiscover Unit 10 Unit Type II Unit 1 SS - 1 IV Unit 2 SS - 2 IV Unit 3 SS - 3 IV Unit 4 SS - 4 IV Unit 5 SS - 5 IV Unit 5 SS - 6 IV Unit 5 SS - 6 IV Unit 7 SS - 7
Unit 10 Unit Type IU OU Des etcm ✓ Unit 1 SS + 1 1 ☑ Unit 2 SS + 1 1 ☑ Unit 2 SS + 2 1 ☑ Unit 3 SS + 3 1 ☑ Unit 4 SS + 4 1 ☑ Unit 5 SS + 6 1 ☑ Unit 6 SS + 6 1 ☑ Unit 6 SS + 7 1 ☑ Unit 8 SS + 8 1 ☑ Unit 9 FC + 9 1 ☑ Unit 10 FC + 10 1 ☑ Unit 11 FC + 12 1	Unit ID Unit Type I Ø Unit I SS -1 Ø Unit 2 SS -2 Ø Unit 3 SS -3 Ø Unit 4 SS -4 Ø Unit 5 SS -6 Ø Unit 6 SS -7
2 Unit 1 SS 1 \square Unit 2 SS 2 \square Unit 3 SS 3 \square Unit 4 SS 4 \square Unit 5 SS 5 \square Unit 6 SS 6 \square Unit 7 SS 7 \square Unit 8 SS 8 \square Unit 9 FC 9 \square Unit 10 FC 110 \square Unit 11 FC 110 \square Unit 12 FC 12	Z Unit 1 SS -1 V Unit 2 SS -2 V Unit 3 SS -3 V Unit 4 SS -4 V Unit 5 SS -6 V Unit 6 SS -6 V Unit 7 SS -7
\Box loni 2 SS 2 1 \Box Uni 3 SS 3 1 \Box Uni 4 SS 4 1 \Box Uni 5 SS 5 1 \Box Uni 6 SS 6 6 \Box Uni 7 SS 7 1 \Box Uni 7 SS 8 1 \Box Uni 8 S 8 1 \Box Uni 9 FC 9 1 \Box Uni 10 FC 10 1 \Box Uni 11 FC 11 1 \Box Uni 12 FC 12 1	Image: Signal with the second secon
☑ Unit 3 SS • 3 1 ☑ Unit 4 SS • 4 1 ☑ Unit 5 SS • 5 1 ☑ Unit 6 SS • 6 1 ☑ Unit 7 SS • 8 1 ☑ Unit 8 SS • 8 1 ☑ Unit 8 SS • 8 1 ☑ Unit 9 FC • 9 1 ☑ Unit 10 FC • 10 1 ☑ Unit 11 FC • 11 1 ☑ Unit 12 FC • 12 1	✓ Unit 3 SS → 3 ✓ Unit 4 SS → 4 ✓ Unit 5 SS → 5 ✓ Unit 6 SS → 6 ✓ Unit 7 SS → 7
↓ Unit 4 SS - 4 1 ↓ Unit 5 SS - 5 1 ↓ Unit 6 SS - 6 1 ↓ Unit 7 SS - 7 1 ↓ Unit 8 SS - 8 1 ↓ Unit 9 FC - 9 1 ↓ Unit 10 FC - 10 1 ↓ Unit 11 FC - 11 1 ↓ Unit 12 FC - 12 1	✓ Unit 4 SS - 4 ✓ Unit 5 SS - 5 ✓ Unit 6 SS - 6 ✓ Unit 7 SS - 7
☑ Unit 5 SS • 5 1 ☑ Unit 6 SS • 6 1 ☑ Unit 7 SS • 7 1 ☑ Unit 8 SS • 8 1 ☑ Unit 8 FC • 9 1 ☑ Unit 10 FC • 10 1 ☑ Unit 11 FC • 11 1 ☑ Unit 12 FC • 12 1	✓ Unit 5 SS ▼ 5 ✓ Unit 6 SS ▼ 6 ✓ Unit 7 SS ▼ 7
☑ Unit 6 SS • 6 1 ☑ Unit 7 SS • 7 1 ☑ Unit 8 SS • 8 1 ☑ Unit 8 FC • 9 1 ☑ Unit 10 FC • 10 1 ☑ Unit 11 FC • 11 1 ☑ Unit 12 FC • 12 1	
☑ Unit 7 SS • 7 1 ☑ Unit 8 SS • 8 1 ☑ Unit 9 FC • 9 1 ☑ Unit 10 FC • 10 1 ☑ Unit 11 FC • 11 1 ☑ Unit 12 FC • 12 1	Unit 7 SS • 7
☑ Unit 8 SS - 8 1 ☑ Unit 8 FC - 9 1 ☑ Unit 10 FC - 10 1 ☑ Unit 11 FC - 11 1 ☑ Unit 12 FC - 12 1	
☑ Unit 10 FC • 9 1 ☑ Unit 10 FC • 10 1 ☑ Unit 11 FC • 11 1 ☑ Unit 12 FC • 12 1	Unit 8 SS • 8
☑ Unit 10 FC • 10 1 ☑ Unit 11 FC • 11 1 ☑ Unit 12 FC • 12 1	✓ Unit 9 FC + 9
☑ Unit 11 FC • 11 1 ☑ Unit 12 FC • 12 1	Unit 10 FC • 1
Unit 12 FC • 12 1	Villunit 11 EC • 1
	Vunit 12 FC • 1
15 FC. • 15	☑ Unit 13 FC 1
V Unit 14 FC • 14 1	Vunit 14 FC 1
Ø Unit 15 FC + 15 1	Vulnit 15 FC + 1
☑ Unit 16 FC + 16 2	Vulit 16 FC 1
	Unit 17 VBF
VIII 18 VIE 18 2	VIII Unit 18 VRF + 1
□ Unit 10 VDE = 10 2	Cillait 10 VPE - 1
EZ LIGHZ 20 VDE - 20 2	
20 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
V 0011 21 VKP V 21 2	
M_0011122 VKP ▼ 22 2	
M UNIT 23 VKP ▼ 23 2	✓ Unit 23 VRF • 2
≥ 0nit 24 VRF ▼ 24 3	M Unit 24 VKF ▼ 2
⊻ Unit 25 10 • 25 3	⊻ Unit 25 10 • 2
∠0 10 √ 26 3	₩ Unit 26 IU • 2
⊻ Unit 27 IU + 27 3	
⊻ Unit 28 IU • 28 3	✓ Unit 28 IU • 2
✓ Unit 29 IU - 29 3	✓ Unit 29 IU • 2
✓ Unit 30 IU v 30 3	✓ Unit 30 IU • 3
☑ Unit 31 IU + 31 3	☑ Unit 31 IU • 3

Figure 4.7 IntesisBox MAPS Hisense 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.

						HS-AC-MBS.i	bmaps * - Ii	ntesisBox MAPS		ك	L_ 8 X
Home F	Project	Tools View Help									
	-										
	Ø	~								Intesis	3ox°
Con	nectio	on Configuration *	Signals	R	eceive / Send	Diagnos	stic				MAPS
		-									
					Modbus Slave			Hisen	se		^
	Active	Description	Data L	Format	Address B	Bit Read / Write	Unit ID	IU	OU		
· •		On (all units) (1-Set the units On)	16	0: Unsigned	0	- 1: Trigger		-	-		
2		Off (all units) (1-Set the units Off)	16	0: Unsigned	1	- 1: Irigger		-			
3		Operation Mode Auto (all the units) (1-Set A	10	0: Unsigned	2	- I: Trigger		-			
4		Operation Mode Heat (all the units) (1-Set H	10	U: Unsigned	3	- I: Irigger		-			
5		Operation Mode Dry (all the units) (1-set Dr	10	0: Unsigned	4	- I: Ingger		-			
0		Operation Mode Fan (all the units) (1-Set Fa	10	0: Unsigned	2	- I: Irigger					
/		Operation Mode Cool (all the units) (1-Set C	10	0: Unsigned	8	- I: Irigger		-	-		
0		Fan Speed Auto (all the units) (1-Set Fan Spe	16	0: Unsigned	/	- 1: Trigger		-	-		
10		Fan Speed Low (all the units) (1-Set Fan Spe	10	0: Unsigned	8	- I: Trigger	· ·				
10		Fan Speed Wild (all the units) (1-Set Fan Speel.	16	0: Unsigned	9	- I: Ingger	-	-	-		
12		Fan Speed High (all the units) (1-set Fan Spe	16	0: Unsigned	10	- I: Ingger					
12		Pan speed high+ (all the units) (1-set Pan S	10	0: Unsigned	12	- I: Irigger		-	-		
15		Vane Position Auto (all the units) (1-Set Vane	. 10	0: Unsigned	12	- I: Ingger		-	•		
14		vane Position 1 (all the units) (1-set vane Po	10	0: Unsigned	15	- I: Irigger					
15		Vane Position 2 (all the units) (1-Set Vane Po	10	0: Unsigned	14	- I: Trigger		-			
10		vane Position 3 (all the units) (1-Set vane Po	10	U: Unsigned	15	- I: Irigger		-			
17		Vane Position 4 (all the units) (1-Set Vane Po	10	0: Unsigned	10	- I: Trigger		-			
18		vane Position 5 (all the units) (1-Set vane Po	10	U: Unsigned	17	- I: Irigger		-			
19		Vane Position 6 (all the units) (1-Set Vane Po	10	0: Unsigned	18	- 1: Trigger		-			
20		vane Position 7 (all the units) (1-Set vane Po	10	U: Unsigned	19	- I: Irigger					
21		Temperature Setpoint (x10°C) (all units) (Co	10	0: Unsigned	20	- 1: Trigger	-	-			
22		Communication Error OU (0-Off, 1-On)	10	U: Unsigned	10000	- U: Kead					
23		Outdoor Air Temp. (-50.59 °C)	10	1: Signed (C2)) 10001	- Ut Kead		-			
24		Comp. Top Temp. (0200 °C)	10	0: Unsigned	10002	- U: Read		-	-		
25		Total Comp. Freq. (0.255 Hz)	10	0: Unsigned	10003	- Ut Kead		-			
26		Total Comp. Current (0.255 A)	10	u: Unsigned	10004	- U: Kead		-			
2/		Out Exp. valve i Open (0100 %)	10	U: Unsigned	10005	- Ut Kead		-			
28		Susting Pressure (-3.09.9 MPa)	10	1: Signed (C2)	10006	- Ut Read		-			
29		Suction Pressure (x10°C) (-5.09.9 MPa)	10	1: Signed (C2)	, 10007	- U: Kead		-			~
Active size	gnals:	113/-								Edit Columns Export	Check table
L	c									PMS Protocol: Modbur Stave II. Davice Protocol: Hiceano. II. 2019/	11/07 19:07:12

Figure 4.8 IntesisBox MAPS Signals tab

1.12.7 Sending the configuration to IntesisBox

When the configuration is finished, follow the next steps.

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

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

Home Project Tools	Help	SM-ACN-MBS.it	bmaps * - IntesisBox MAP	S	±_ □ ×		
Connection	K Configuration *	Signals	Receive / Send	-M- Diagnostic			
Send Send Configuration Receive Send the current configuration project on the Configuration Tool to your Gateway. Please, check that the configuration tool and the Gateway are connected before proceeding.							
			Send				

Figure 4.9 IntesisBox MAPS Receive/Send tab

After any configuration change, do not forget to send the configuration file to the IntesisBox 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.

				HS-AC-KNX.ibmaps -	IntesisBox MAPS - 1.0.16.3			- 8 ×
Home Project Tools	View Help							
ø	*		10	~~		Int	esisR	ov°
Connection	Configuration	Signals	Receive / Send	Diagnostic			63130	MAPS
ToolBox								-
🔜								
Console	-	KNX Viewer		 Signals Viewer 				-
Clear AutoScroll		Clear Comms	Debug 🗹 AutoScroll	Clear	Refresh Edit columns			
				# KNX	Hisense Description	DPT	Sending	Listening ^
				1	On/Off (all units)	1.001: switch	0/0/16	
				2	Operating Mode (all units)	5.x	0/0/18	
				3	Fan Speed (all units)	5.x	0/0/19	
				4	Vane position (all units)	5.x	0/0/21	
				5	Temperature Setpoint (°C) (all units)	9.001: temperature (C)	0/0/23	
				6	Status_Communication Error OU	1.005: alarm	0/1/10	
				7	Status_Outdoor Air Temperature (°C)	9.001: temperature (C)	0/1/11	
				8	Status_Compresor Top Temperature (°C)	9.001: temperature (C)	0/1/12	
				9	Status_Total Real Compresor Freq.	14.033: frequency (Hz)	0/1/13	
				10	Status_Total Compresor Current	14.019: electric current (A)	0/1/14	
				11	Status_Out Exp. Valve 1 Open	5.001: percentage (0100%)	0/1/15	
				12	Status_Discharge Pressure	14.058: pressure (Pa)	0/1/16	
		Hisense Viewer		- 13	Status_Suction Pressure	14.058: pressure (Pa)	0/1/17	
		Clear Comms	Debug 🔽 AutoScroll	14	Control_On/Off	1.001: switch	1/1/19	
		ciear Commis	Debug D Autoscion	15	Status_On/Off	1.001: switch	1/1/20	
				16	Control_Operation mode	5.x	1/1/33	
				17	Status_Operation mode	5.x	1/1/34	
				18	Control_Fan speed scaling	5.001: percentage (0100%)	1/1/51	
				19	Status_Fan speed scaling	5.001: percentage (0100%)	1/1/52	
				20	Control_Vane position scaling	5.001: percentage (0100%)	1/1/65	
				21	Status_Vane position scaling	5.001: percentage (0100%)	1/1/66	
				22	Control_Temperature Setpoint (°C)	9.001: temperature (C)	1/1/83	
				23	Status_Temperature Setpoint (°C)	9.001: temperature (C)	1/1/84	
				24	Status_AC Ambient Temperature (°C)	9.001: temperature (C)	1/1/85	
				25	Status_Remote Sensor Temperature (°C)	9.001: temperature (C)	1/1/86	
				26	Status_Outlet Temperature (°C)	9.001: temperature (C)	1/1/88	
	× Send			27	Status GarDino Tomporaturo (00)	0.001: temperature (C)	1/1/00	×
★ Not Connected						BMS Protocol: KNX 📱 Device Protocol: Hiser	nse 🛯 2018/10	/11 13:14:03

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 IntesisBox MAPS on your laptop, use the setup program supplied for this and follow the instructions given by the Installation wizard.
- 2. Install IntesisBox in the desired installation site. Installation can be on DIN rail or on a stable not vibrating surface (DIN rail mounted inside a metallic industrial cabinet connected to ground is recommended).
- 3. 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 IntesisBox (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 IntesisBox (More details in section 3).

- 4. Connect the communication cable coming from the Hisense VRF installation to the port marked as Port A of IntesisBox (More details in section 3).
- 5. Power up IntesisBox. 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 IntesisBox and/or any other equipment connected to it, we strongly recommend:

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

6. If you want to connect using IP, connect the Ethernet cable from the laptop PC to the port marked as Ethernet of IntesisBox (More details in section 3).

If you want to connect using USB, connect the USB cable from the laptop PC to the port marked as Console of IntesisBox (More details in section 3).

- 7. Open IntesisBox MAPS, create a new project selecting a copy of the one named IBOX-MBS-HS.
- 8. Modify the configuration as desired, save it and download the configuration file to IntesisBox as explained in the IntesisBox 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 IntesisBox and the Centralized Controller and/or Modbus devices, check that those are operative: check the baud rate, the communication cable used to connect all devices and any other communication parameter.

Home Project Tools Help		SM-	-ACN-MBS.ibmaps - Inte	sisBox MAPS
ø <		11 M	-vv-	
Connection Configura	tion Signals	Receive / Send	Diagnostic	
ToolBox	Modbus Slave Viewer	•	Signals Viewer	
Clear COMMS Enabled V INFO? SKT0 - C DEBUG Enabled INFO: SMRODE: 00060180340208 VINFO: BARCODE: 00060180340208 VINFO: CFGFLEXCHG:N VINFO: CFGFLEXCHG:N VINFO: MID:1 VINFO: MAX: 255.255.254.0 VINFO: NETIMAC: CC: 3F: 1D: 01: 43:05 VINFO: NETIME: 100: 00: 20: 20: 21 VINFO: NETIME: 100: 00: 20: 20: 20: 21 VINFO: NETIME: 100: 00: 20: 20: 21 VINFO: NETIME: 100: 00: 20: 20: 21 VINFO: NETIME: 100: 00: 20: 20: 20: 20: 20: 20: 21 VINFO: NETIME: 100: 00: 20: 20: 20: 20: 20: 20: 20: 20:	Clear AutoScroll Cor CMS:COMVS=0 cMS:COMVS=0 cMS:COMVS=0 CMS:COMVS=0 cMS:COMVS=0 cMS:COMVS=1 > OMS:COX cMS:COX cMS:COX > Cear V AutoScroll Cor > Clear V AutoScroll Cor > Samsung NASA Viewer Clear V AutoScroll Cor > ISM:CK Samsung NASA Viewer Cor Samsung NASA Viewer > LSM:CK Samsung NASA Viewer Cor Samsung NASA Viewer > ISM:CK Samsung NASA Viewer Cor Samsung NASA Viewer > ISM:CK Samsung NASA Viewer Cor Samsung NASA Viewer > ISM:CK Samsung NASA Viewer Samsung NASA Viewer Samsung NASA Viewer > ISM:[Tx] 32 00 14 GA EE Samsung NASA Viewer Samsung NASA Viewer Samsung NASA Viewer > ISM:[Tx] 32 00 14 GA EE Samsung NASA Viewer Samsung NASA Viewer Samsung NASA Viewer	mms Debug # # mms Debug 1 mms Debug 1 1 FF 80 FF FF C0 01 1 FF 80 FF FF C0 01 1 1 FF 80 FF FF C0 01 1 1 FF 80 FF FF C0 01 1 1 FF 80 FF FF C0 01 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Edit cols Ref Modbus Slave Samsung I A - B - P - Q -	resh Description VAS Description On (all the units Off (all the units Operation Mode Fan Speed Auto Fan Speed High Vane position Sv Vane position Sv Temperature Se Vent. On (all the

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 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.	Push Button	Button A: Not used Button B: Not used		
Fower	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		
	1 x H-Link Plug-in screw terminal block orange (2 poles)	Protection	IP20 (IEC60529)		
Port A	1500VDC isolation from other ports 1 x Plug-in screw terminal block green (2 poles) Reserved for future use	LED	10 x Onboard LED indicators 2 x Run (Power)/Error 2 x Ethernet Link/Speed		
Switch A (SWA)	tch A 1 x DIP-Switch for PORTA configuration: Reserved for future use (leave OFF, default)		2 x Port A 1 X/RX 2 x Port B TX/RX 1 x Button A indicator 1 x Button B indicator		
PORT B	 1 x Serial EIA232 (SUB-D9 male connector) Pinout from a DTE device 1500VDC isolation from other ports (except PORT B: EIA485) 1 x Serial EIA485 Plug-in screw terminal block (3 poles) A, B, SGND (Reference ground or shield) 1500VDC isolation from other ports (except PORT B: EIA232) 				
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)	10	0 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 Hisense unit model references compatible with HS-AC-MBS-16/64 and their available features can be found in:

http://intesis.com/pdf/IntesisBox_HS-AC-xxx-MIU_AC_Compatibility.pdf



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		Outlet Air Thermistor	
13	Sensoron	Freeze Protection Thermistor	Incorrect Wiring,
14	Indoor Unit	Gas Piping Thermistor	Disconnecting Wiring 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			(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

User Manual r1.0 EN

3d			
43		Activation of Low Compression Ratio Protection Device	Defective Compression (Failure of Compressor of Inverter, Loose Power Supply Connection)
44	Drotaction	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		More than 17 Non-Corresponding to Hi-

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User Manual r1.0 EN

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.

