Intesis™

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Modbus Server

Fujitsu VRF Air Conditioning

USER MANUAL

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HMS **Connecting Devices™**
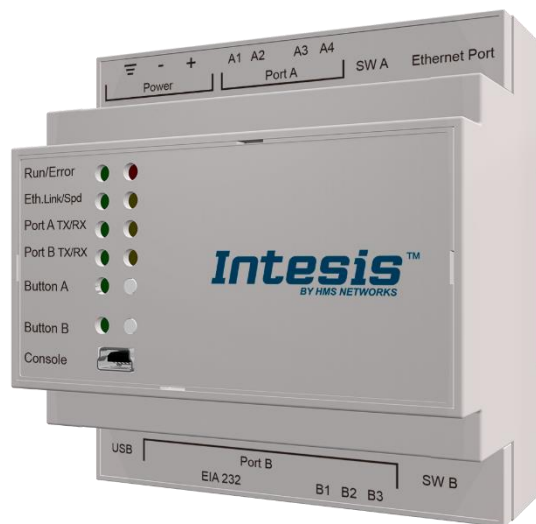
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Gateway for the integration of Fujitsu VRF systems into Modbus (RTU and TCP) systems.

ORDER CODE	LEGACY ORDER CODE
INMBSFGL016O000	FJ-AC-MBS-16

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1. Description

1.1. Introduction

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

The aim of this integration is to monitor and control Fujitsu 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 Fujitsu air conditioning system indoor units' datapoints through independent Modbus registers.

Up to 16 indoor units supported, depending on product version.

This document assumes that the user is familiar with Modbus and Fujitsu technologies and their technical terms.
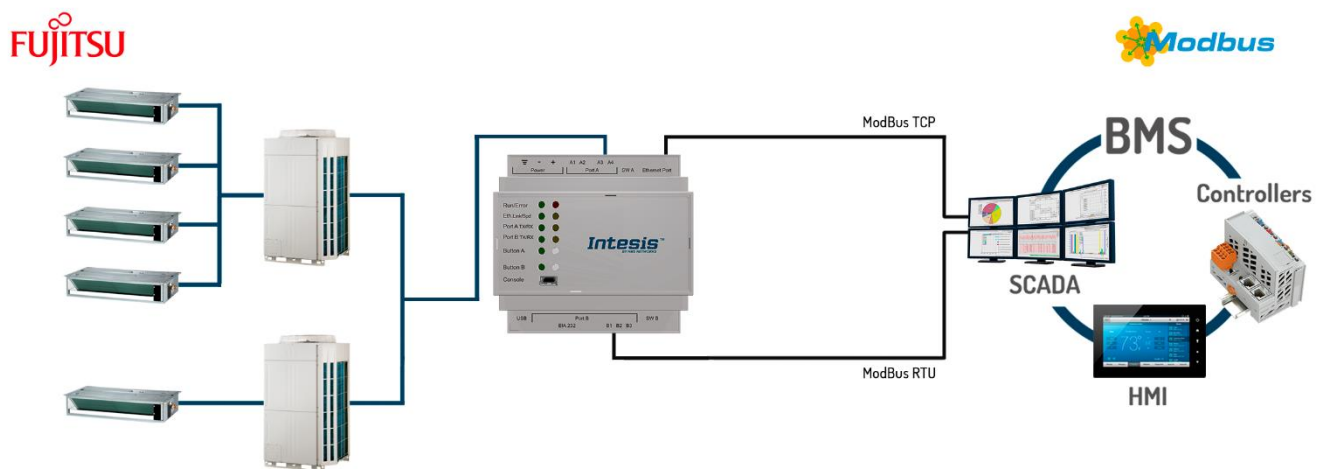
Integration of Fujitsu's compatible systems into Modbus systems

URL   https://www.intesis.com

1.2. Functionality

IntesisTM continuously monitors Fujitsu 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	• Status • Command • Communication status
General signals (all units)	• Command

1.3.   Capacity of Intesis

Element	Max.	Notes
Number of indoor units	16 *	Number of indoor units that can be controlled through Intesis

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

Their order codes are:

- ▪ INMBSFGL016O000: Model supporting up to 16 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 Fujitsu VRF system is also called from now on *external system*.

2.1.   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.

2.2.   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

2.3.   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.

2.4.   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	R/W	Gateway Energy Saving	0-Disable energy saving 1-Enable energy saving
1	R	Gateway error	0-Normal 1-Error
2	R	Gateway error code	0-No error 1-Comm. error 2-No config. error
3	W	On (all the units)	1-Set all the units On
4	W	Off (all the units)	1-Set all the units Off
5	W	Operation Mode Auto (all the units)	1-Set Auto Mode
6	W	Operation Mode Heat (all the units)	1-Set Heat Mode
7	W	Operation Mode Dry (all the units)	1-Set Dry Mode
8	W	Operation Mode Fan (all the units)	1-Set Fan Mode
9	W	Operation Mode Cool (all the units)	1-Set Cool Mode
10	W	Fan Speed Auto (all the units)	1-Set Fan Speed Auto
11	W	Fan Speed Quiet (all the units)	1-Set Fan Speed Quiet
12	W	Fan Speed Low (all the units)	1-Set Fan Speed Low
13	W	Fan Speed Med-Low (all the units)	1-Set Fan Speed Mid-Low
14	W	Fan Speed Med-High (all the units)	1-Set Fan Speed Mid-High
15	W	Fan Speed High (all the units)	1-Set Fan Speed High
16	W	Temperature Setpoint (x10ºC) (all units)	Cool: 19…30°C; Heat: 17…30°C
Outdoor units			
$(ID+1)*25+10000+0$ Where ID stands for ID field in Fujitsu VRF configuration in MAPS, from 0 to 31	R	Capacity save	0-Not set 1-100% 2-90% 3-80% 4-70% 5-60% 6-50% 7-40%
$(ID+1)*25+10000+1$	R	Forced Off	0-Not forced 1-Forced off

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Modbus Address First Address is 0	Read /Write	Register/signal name	Possible values
(ID+1)*25+10000+2	R	Error	0-No error 1-Error
(ID+1)*25+10000+3	R	Error code	0-No error Any other value: error
Individual units			
(ID+1)*100 +0 Where ID stands for ID field in Fujitsu VRF configuration in MAPS, from 0 to 31	R/W	On/Off	0-Off, 1-On
(ID+1)*100 +1	R/W	Operation Mode	0-Auto, 1-Heat, 2-Dry. 3-Fan, 4-Cool
(ID+1)*100 +2	R/W	Fan Speed	0-Auto,1-Quiet,2-Low,3-Med,4-High
			0-Auto,1-Quiet,2-Low,3-Med-Low,4-Med-High,5-High
(ID+1)*100 +3	R/W	Vane Position U-D	1-Pos1…4-Pos4 10-Swing
(ID+1)*100 +4	R/W	Vane Position L-R	1-Pos1…5-Pos5 10-Swing
(ID+1)*100 +5	R/W	Temperature Setpoint (x10ºC/ºF)	Cool:19…30°C; Heat:17…30°C
(ID+1)*100 +6	R	Ambient Temperature (x10ºC/ºF)	0…63,5ºC / 32…147ºF
(ID+1)*100 +7	R	Temperature Limit Valid	0-Invalid, 1-Valid
(ID+1)*100 +8	R/W	Heat Setpoint Up Limit (x10)	10…30ºC / 50…86ºF
(ID+1)*100 +9	R/W	Heat Setpoint Low Limit (x10)	10…30ºC / 50…86ºF
(ID+1)*100 +10	R/W	Cool Setpoint Up Limit (x10)	10…30ºC / 50…86ºF
(ID+1)*100 +11	R/W	Cool Setpoint Low Limit (x10)	10…30ºC / 50…86ºF
(ID+1)*100 +12	R/W	Auto Setpoint Up Limit (x10)	10…30ºC / 50…86ºF
(ID+1)*100 +13	R/W	Auto Setpoint Low Limit (x10)	10…30ºC / 50…86ºF
(ID+1)*100 +14	R	Unit Error	0-No error 1-Error
(ID+1)*100 +15	R	Unit Error code	0-No error Any other: error
(ID+1)*100 +16	R	Filter Alarm	0-Normal 1-Alarm
(ID+1)*100 +17	W	Filter Alarm Reset	1-Reset
(ID+1)*100 +18	R	Communication Error IU	0-No error 1-Error
(ID+1)*100 +19	R	Emergency	0-OFF 1ON

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Modbus Address First Address is 0	Read /Write	Register/signal name	Possible values
(ID+1)*100 +20	R/W	Allow full control from RC	0-Allow 1-Not allow
(ID+1)*100 +21	R/W	Allow On/Off from RC	0-Allow 1-Not allow
(ID+1)*100 +22	R/W	Allow mode from RC	0-Allow 1-Not allow
(ID+1)*100 +23	R/W	Allow Setpoint from RC	0-Allow 1-Not allow
(ID+1)*100 +24	R/W	Thermo off	0-Thermo OFF 1-Thermo ON

3. Connections

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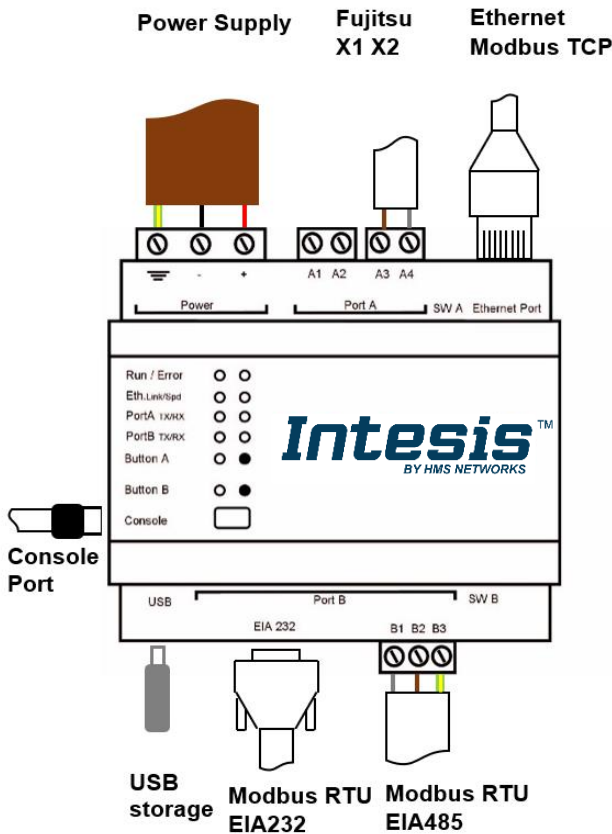
Power Supply
Must use NEC Class 2 or Limited Power Source (LPS) and SELV rated power supply.

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 / Fujitsu VRF
Connect the terminals (X1 X2) of Fujitsu 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 an HDD) if required.

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

3.1. Power device

The first step to perform is to power up the device. To do so, a power supply working with any of the voltage range allowed is needed (check 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.

3.2. Connect to Fujitsu VRF installation

Use the PortA connector in the top corner of the Intesis device in order to connect the X1X2 bus to the Intesis. Remember to follow all safety precautions indicated by Fujitsu.

Connect the Fujitsu X1X2 bus to connectors A3 and A4 of gateway's PortA. Bus is not sensitive to polarity.

3.3. Connection to Modbus

3.3.1. 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.

3.3.2. 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 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.

3.4. Connection to PC (Configuration tool)

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

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

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

4. Set-up process and troubleshooting

4.1.　　Pre-requisites

It is necessary to have the Modbus RTU or TCP master/client device (BMS side device) operative and properly connected to the corresponding port of the gateway and the Fujitsu 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.

4.2.　　Intesis MAPS. Configuration & monitoring tool for Intesis

4.2.1.　　Introduction

Intesis MAPS is a Windows® 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 www.intesis.com.

In this section, only the specific case of Fujitsu 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.

4.2.2.　　Connection

To configure the Intesis connection parameters press on the **Connection** button in the *menu bar*.
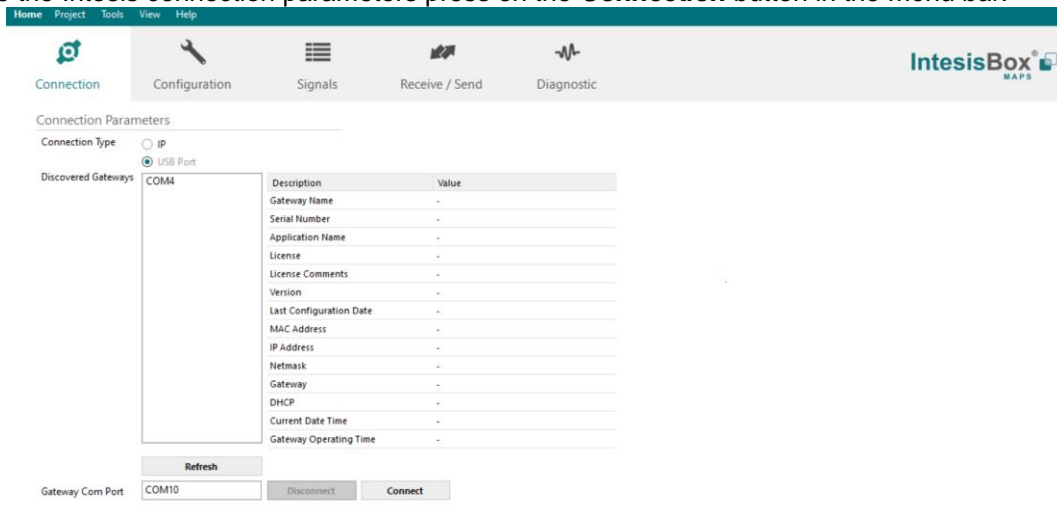
Figure 4.2.2.1 MAPS connection

4.2.3.   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 Fujitsu (Fujitsu interface parameters).
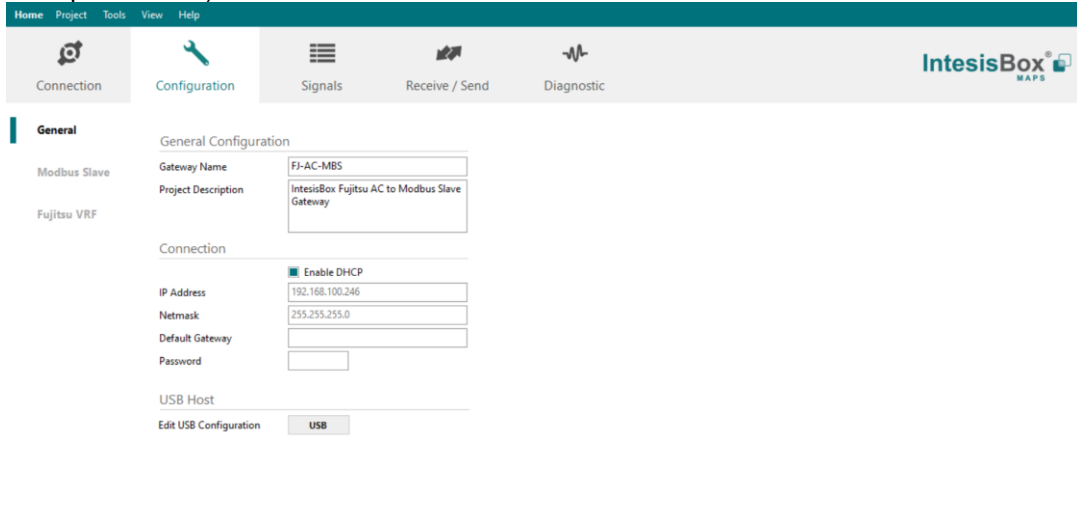
Figure 4.2.3.1 Intesis MAPS configuration tab

4.2.4.   Modbus Slave configuration

Set parameters of Modbus Slave interface of Intesis.
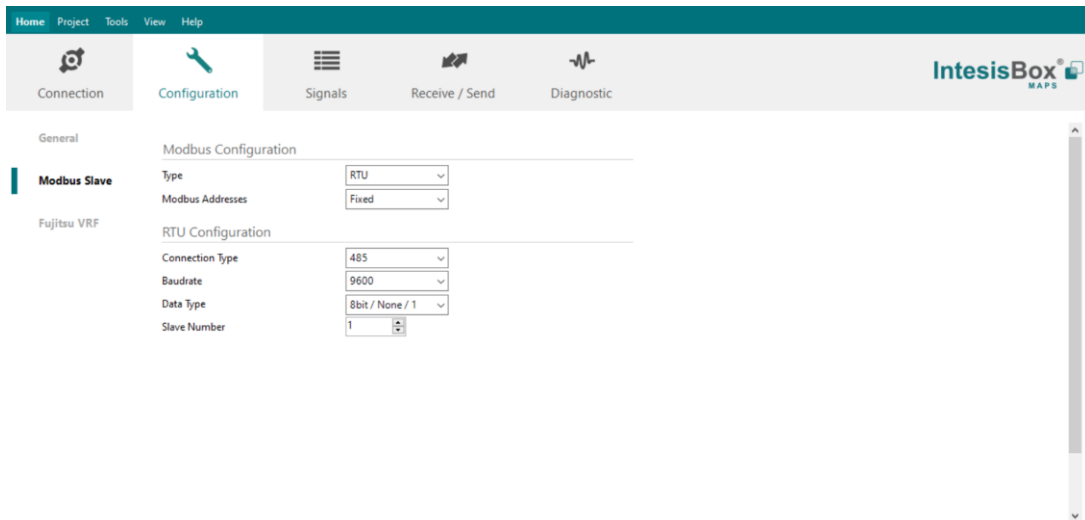
Figure 4.2.4.1 Intesis MAPS Modbus configuration tab

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.

4.2.5.   Fujitsu configuration

Set parameters for connection with Fujitsu's installation.
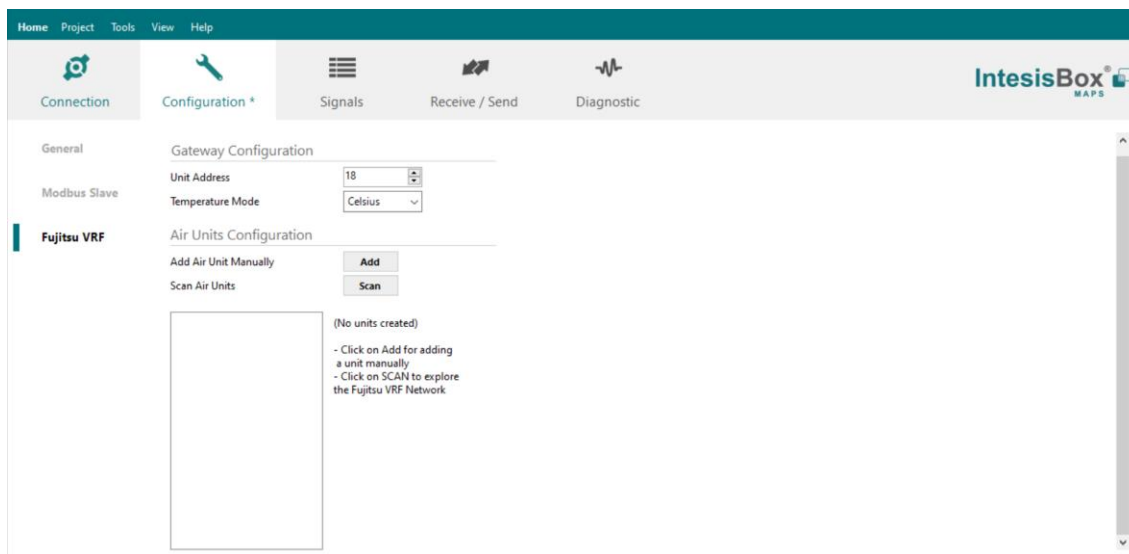
Figure 4.2.5.1 Intesis MAPS Fujitsu configuration tab

In Gateway Configuration section, it is necessary to define the address of the gateway inside the Fujitsu VRF network. In addition, it is possible to define the temperature scale between Celsius and Fahrenheit.

In Air Units Configuration section, you can do both:
- **Add**. To do a manual configuration of the Fujitsu VRF system. To do this configuration it is not necessary to be connected to the VRF system:
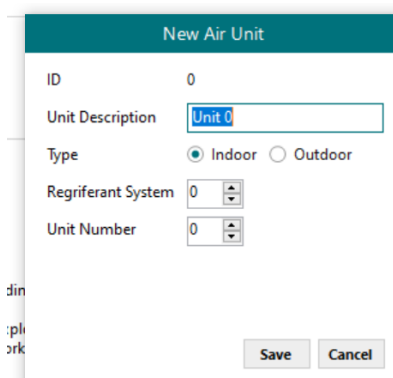
Figure 4.2.5.5 Add new air unit

Consider that it is necessary to know the information of the different units:

- **Indoor / outdoor: depending type of the AC unit.**

- **Refrigerant system:** as is defined in the VRF network for this certain unit.

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

- **Scan**. To do an auto configuration of the gateway by retrieving the information from the Fujitsu VRF system. To do so, it is necessary to be connected to the VRF system:
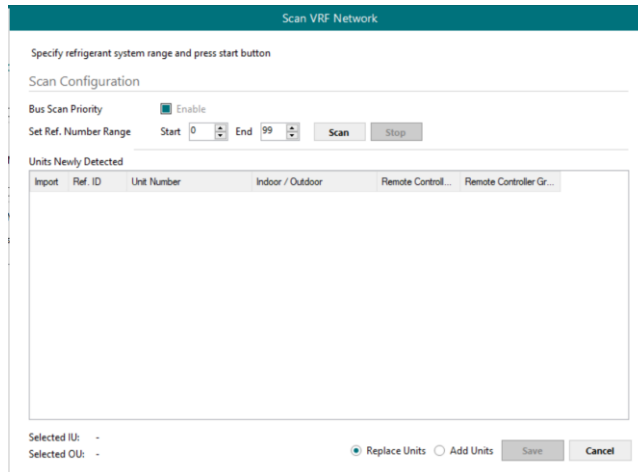
Figure 4.2.5.6 Scan VRF units in network

It is possible to priorize the SCAN function within the VRF network (activated by default). In addition, to short the time that the scanning may take, the integrator can define the range for the refrigerant system in advance.

By pressing **Scan** button, Fujitsu X1X2 bus will be scanned for available units. Error window will appear if there is a problem in the connection with X1X2 bus (units not powered, bus not connected, …).

A progress bar will appear during the scan. After scan is complected, detected units will be shown in units newly detected.

Select the 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.

4.2.6. Signals

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

Figure 4.2.6.7 Intesis MAPS Signals tab

4.2.7.　　　Sending the configuration to Intesis

When the configuration is finished, follow the next steps.

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

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

Figure 4.2.7.8 Intesis MAPS Receive/Send tab

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

4.2.8.　　　Diagnostic

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

To start using the diagnostic tools, connection with the Gateway is required. The Diagnostic section is composed by two main parts: Tools and Viewers.

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

- **Viewers**
  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.
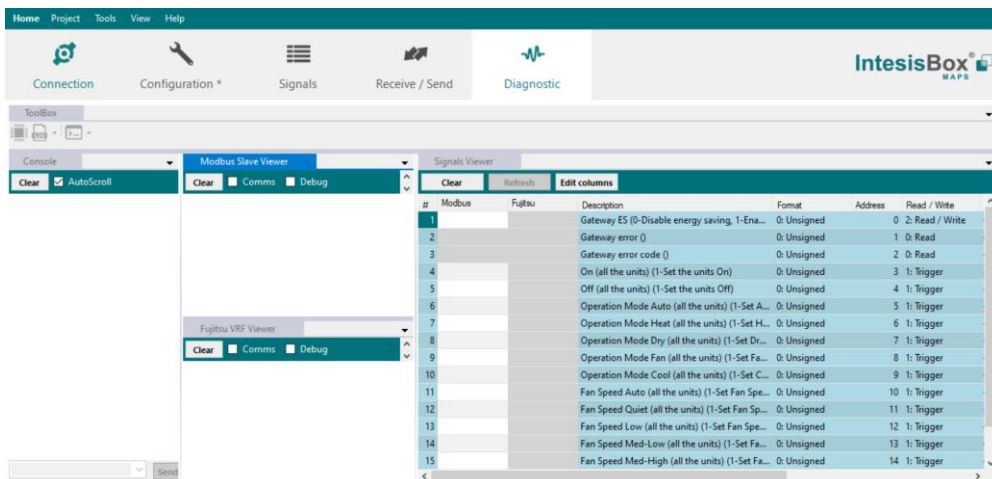

Figure 4.2.8.9 Diagnostic

URL　https://www.intesis.com

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

4.2.9.   Set-up procedure

See connection details of the gateway in 3 CONNECTIONS.

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.

    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.

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

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

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

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

6. If you want to connect using IP, connect the Ethernet cable from the laptop PC to the port marked as Ethernet of Intesis.

    If you want to connect using USB, connect the USB cable from the laptop PC to the port marked as Console of Intesis.

7. Open Intesis MAPS, create a new project selecting a copy of the one named **INMBSFGL016O000**.

8. Modify the configuration as desired, save it and download the configuration file to Intesis as explained above.

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.
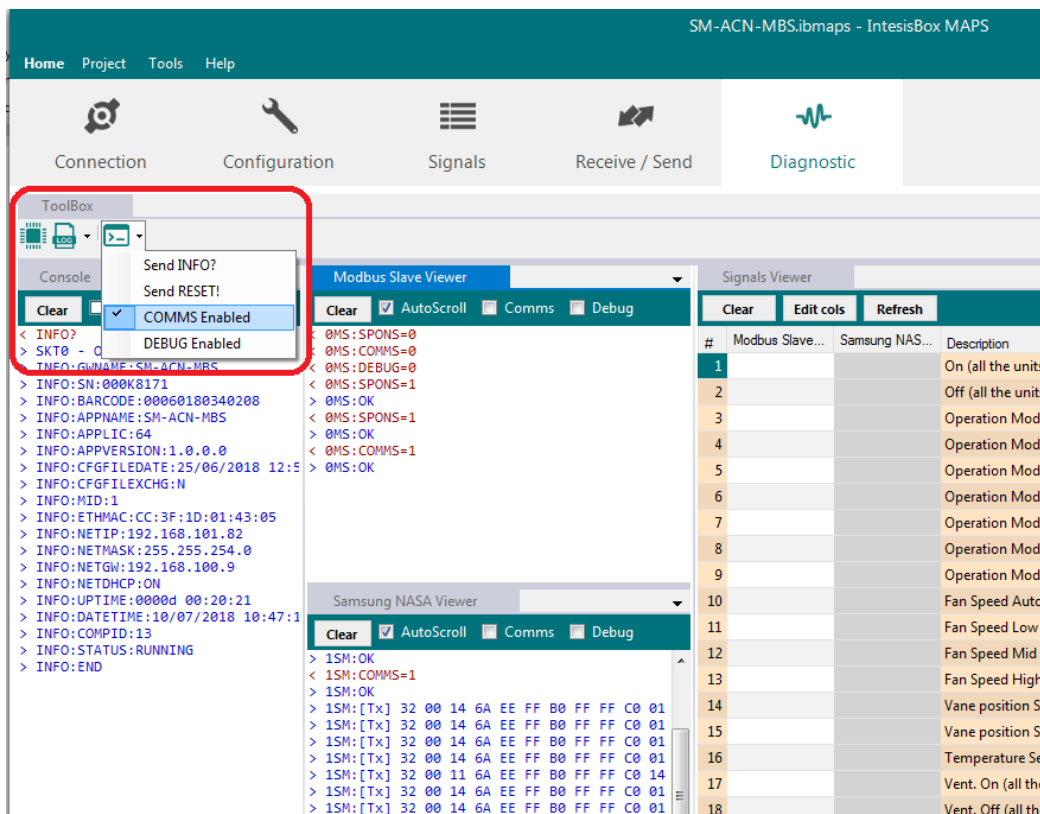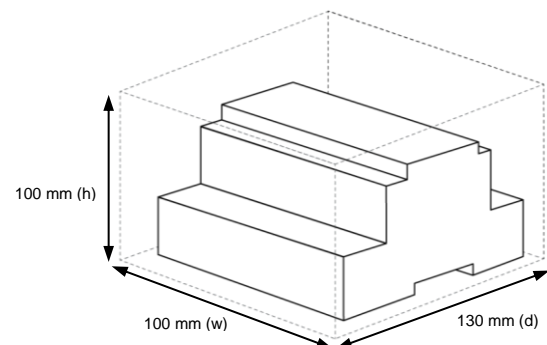
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Figure 4.2.9.10 Enable COMMS

5. Electrical & Mechanical Features

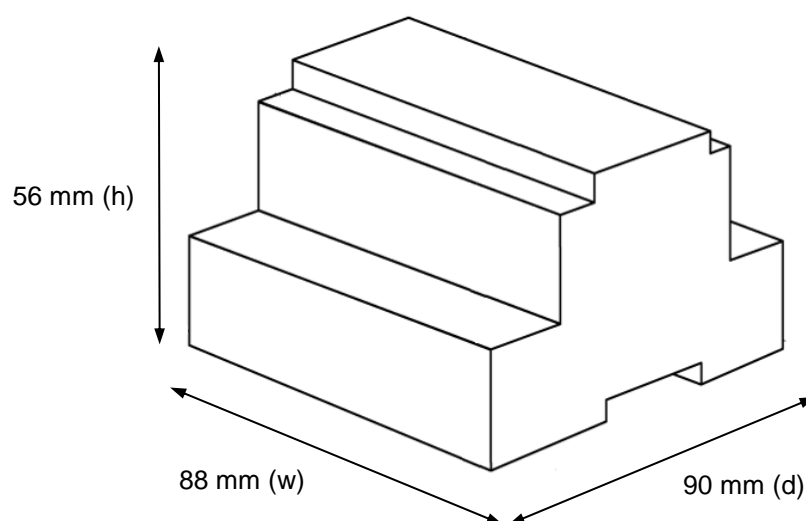|				
Enclosure	Plastic, type PC (UL 94 V-0) Net dimensions (dxwxh): 90x88x56 mm Recommended space for installation (dxwxh): 130x100x100mm Color: Light Grey. RAL 7035		**Battery**	Size: Coin 20mm x 3.2mm Capacity: 3V / 225mAh Type: Manganese Dioxide Lithium
Mounting	Wall. DIN rail EN60715 TH35.		**Console Port**	Mini Type-B USB 2.0 compliant 1500VDC isolation
Terminal Wiring (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 　1 core: 0.5mm^2… 2.5mm^2 　2 cores: 0.5mm^2… 1.5mm^2 　3 cores: not permitted If cables are more than 3.05 meters long, Class 2 cable is required.		**USB port**	Type-A USB 2.0 compliant Only for USB flash storage device *(USB pen drive)* Power consumption limited to 150mA *(HDD connection not allowed)*
Power	1 x Plug-in screw terminal block (3 poles) 　9 to 36VDC +/-10%, Max.: 140mA. 　24VAC +/-10% 50-60Hz, Max.: 127mA 　Recommended: 24VDC		**Push Button**	Button A: Not used Button B: Not used
			Operation Temperature	0°C to +60°C
Ethernet	1 x Ethernet 10/100 Mbps RJ45 2 x Ethernet LED: port link and activity		**Operational Humidity**	5 to 95%, no condensation
			Protection	IP20 (IEC60529)
Port A	1 x Fujitsu X1X2 Plug-in screw terminal block orange (2 poles) 　1500VDC isolation from other ports 1 x Plug-in screw terminal block green (2 poles) 　Reserved for future use		**LED Indicators**	10 x Onboard LED indicators 　2 x Run (Power)/Error 　2 x Ethernet Link/Speed 　2 x Port A TX/RX 　2 x Port B TX/RX 　1 x Button A indicator 　1 x Button B indicator
Switch A (SWA)	1 x DIP-Switch for PORTA configuration: 　Reserved for future use (leave OFF, default)			
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)			

6. Dimensions

Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections
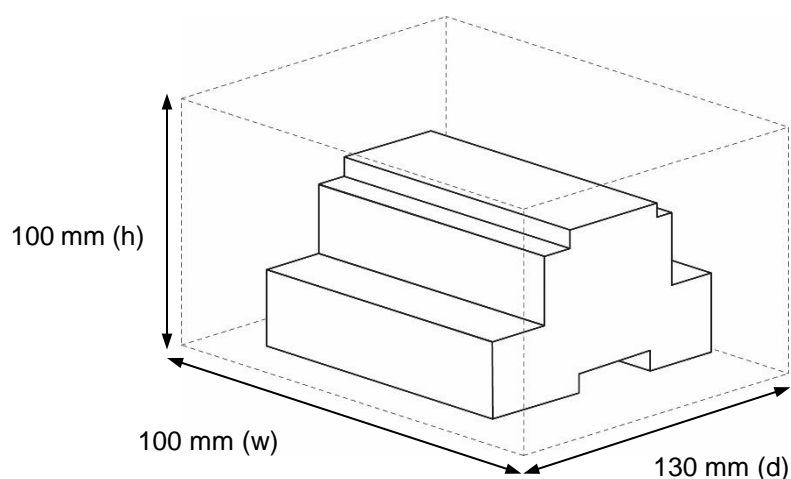
7. AC Unit Types compatibility

The gateway is compatible with Fujitsu VRF units after the VRF-II series (included).

8. Error codes for Indoor and Outdoor Units

Below you can find a list of error codes from Fujitsu air conditioning system.

Modbus Value	Error Code	Error Description
1	-	-
2	12	Remote controller communication error
3	13	Communication error between Outdoor unit
4	14	Network communication error
5	15	Scan error
6	16	Peripheral device communication error
7	21	Initial setting error
8	26	Address setting error
9	27	Master unit, slave unit set-up error
10	28	Other setting error
11	31	Indoor unit power supply abnormal
12	32	Indoor unit main PCB error
13	35	Manual auto switch error
14	37	Indoor unit transmission PCB error
15	38	Network convertor PCB error
16	41	Room temp. sensor error
17	42	Indoor unit Heat Ex. sensor error
18	51	Indoor unit fan motor1 error
19	53	Water Drain Abnormal
20	5U	Indoor unit error
21	61	Outdoor unit power supply abnormal
22	62	Outdoor unit main PCB error
23	63	Inverter PCB error
24	67	Short interruption detection protected operation
25	68	Magnetic relay error
26	69	Outdoor unit transmission PCB error
27	71	Discharge Temp Sensor Error
28	72	Compressor Temp Sensor Error
29	73	Outdoor unit Heat Ex. sensor error
30	74	Outdoor Temp Sensor Error
31	75	Suction Gas Temp Sensor Error
32	77	Heat sink temp. sensor error
33	82	Sub-cool Heat Ex. gas temp. sensor error
34	83	Liquid pipe temp. sensor error
35	84	Current sensor error
36	86	Pressure sensor error
37	92	Compressor 2 error
38	93	Compressor start up error
39	94	Trip detection
40	95	Compressor motor control error
41	97	Outdoor unit fan motor 1 error
42	99	4-way valve error
43	9U	Outdoor unit error
44	A1	Discharge temperature 1 abnormal
45	A2	Discharge temperature 2 abnormal
46	A3	Compressor temperature abnormal
47	A4	Pressure abnormal 1
48	A5	Pressure abnormal 2
49	AA	Special operation error
50	AC	Ambient temperature abnormal
51	C1	Main PCB error

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