



IntesisBox[®]

ModBus RTU

Fujitsu Air Conditioning

Compatible with Domestic and VRF line air conditioners commercialized by Fujitsu

User Manual

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r1.0 eng

Intesis The Intesis logo consists of the word "Intesis" in a bold, teal-colored sans-serif font, followed by a square icon divided into four smaller squares in yellow, red, and teal.

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Intesis Software S.L.U.
Milà i Fontanals, 1 bis
08700 Igualada
Spain

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Gateway for the integration of a Fujitsu air conditioning unit in ModBus RTU enabled monitoring and control systems.

Compatible with Domestic and VRF line air conditioners commercialized by Fujitsu.

Order Code:
IBMBSFGL001I000

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1 Presentation

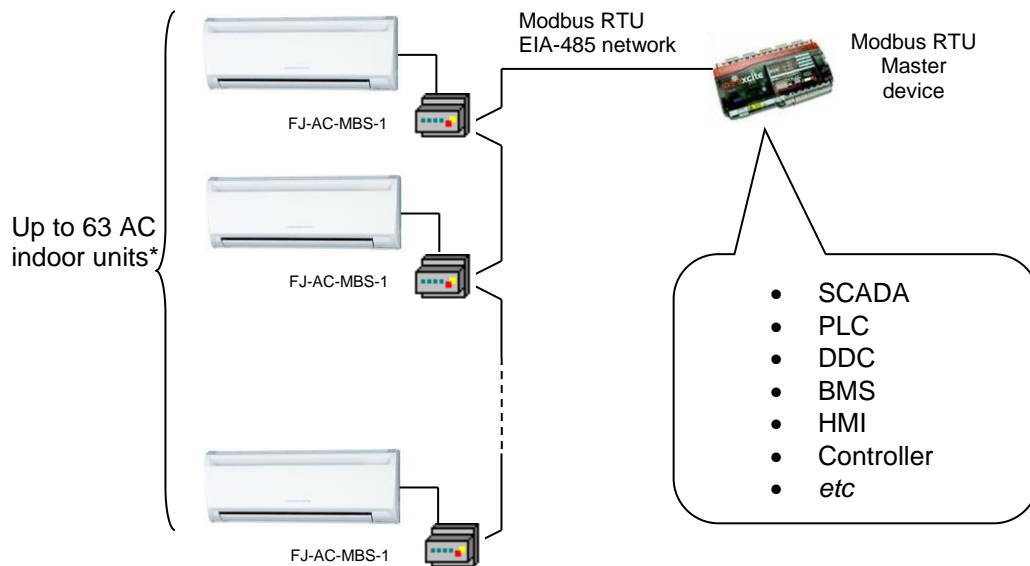


The FJ-AC-MBS-1 interfaces allow a complete and natural integration of **Fujitsu** air conditioners into Modbus RTU (EIA-485) networks.

Reduced dimensions. 93 x 53 x 58 mm
3.7" x 2.1" x 2.3"

Quick and easy installation.
Mountable on DIN rail, wall, or even inside the indoor unit of AC.

- External power not required.
- Direct connection to Modbus RTU (EIA-485) networks. Up to 63 FJ-AC-MBS-1 devices can be connected in the same network.
FJ-AC-MBS-1 is a Modbus slave device.
- Direct connection to the AC indoor unit.
- Configuration from both on-board DIP-switches and Modbus RTU.
- Total Control and Supervision.
- Real states of the AC unit's internal variables.
- Allows simultaneous use of the AC's remote controls and Modbus RTU.



* Up to 63 IntesisBox devices can be installed in the same Modbus RTU bus. However, depending on the configured speed, the installation of Modbus Repeaters may be required

2 Connection

The interface comes with cable + connectors for direct connection to the AC indoor unit, and with a plug-in terminal block of 3 poles for connection to a Modbus RTU EIA-485 network.

2.1 Connect to the AC indoor unit

The FJ-AC-MBS-1 connects directly to the indoor unit internal control board. In the control board locate the socket connector marked as **CN65**.

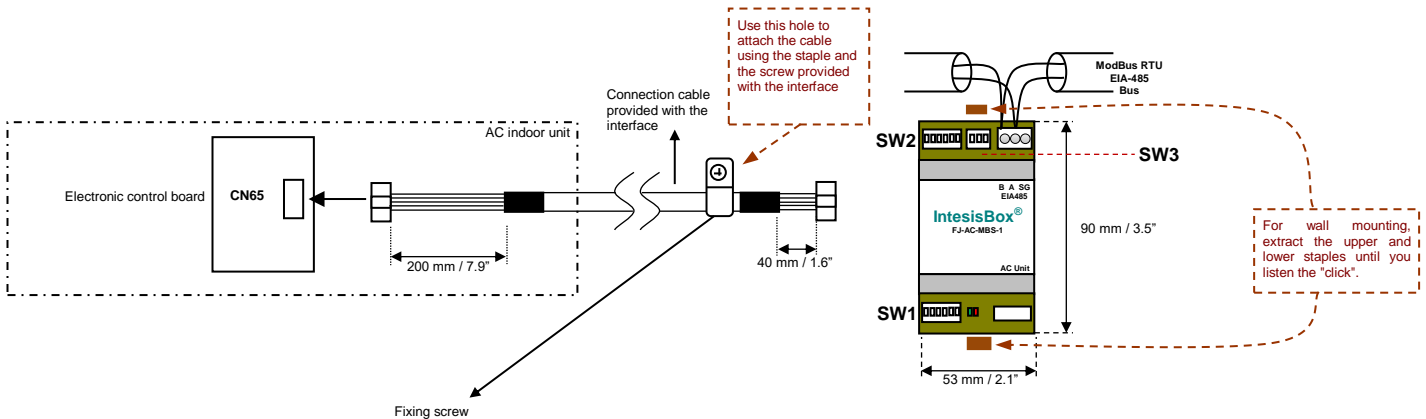


Figure 2.1 FJ-AC-MBS-1 connection diagram

2.2 Connection to the EIA-485 bus

Connect the EIA-485 bus wires to the plug-in terminal block of FJ-AC-MBS-1 and keep the polarity on this connection (A+ and B-). Make sure that the maximum distance to the bus is 1,200 meters (3,937 ft). Loop or star typologies are not allowed in the case of the EIA-485 bus. A terminator resistor of 120Ω must be present at each end of the bus to avoid signal reflections. The bus needs a fail-safe biasing mechanism.

3 Quick Start Guide

1. Disconnect the air conditioning from Mains Power.
2. Attach the interface next to the AC indoor unit (wall mounting) following the instructions of the diagram below or install it inside the AC indoor unit (respect the safety instructions given).
3. Connect to **CN65** between the interface and the AC indoor unit following the instructions of the diagram.
4. Connect the EIA-485 bus to the connector *EIA485* of the interface.
5. Close the AC indoor unit.
6. Check the DIP-Switch configuration of the IntesisBox interface and make sure it matches the current installation's parameters:

By default, the interface is set to:

- Modbus Slave Address → 1
- Modbus baud rate → 9600 bps

These parameters can be modified from DIP-Switches (see for further information).

NOTE: All changes on the DIP-Switch configuration require a system power cycle to be applied.

7. Connect the AC system to Mains Power.

IMPORTANT: The IntesisBox interface requires to be connected to the AC unit (powered) to start communicating.

4 Modbus Interface Specification

4.1 Modbus physical layer

FJ-AC-MBS-1 implements a Modbus RTU (Slave) interface, to be connected to an EIA-485 line. It performs 8N2 communication (8 data bits, no parity and 2 stop bit) with several available baud rates (2400 bps, 4800 bps, 9600 bps -default-, 19200 bps, 38400 bps, 57600 bps, 76800 bps and 115200 bps). It also supports 8N1 communication (8 data bits, no parity and 1 stop bit).

4.2 Modbus Registers

All registers are type “16-bit unsigned Holding Register” and they use the *Modbus big endian* notation.

4.2.1 Control and status registers

Register Address (protocol address)	Register Address (PLC address)	R/W	Description
0	1	R/W	AC unit On/Off <ul style="list-style-type: none"> ▪ 0: Off ▪ 1: On
1	2	R/W	AC unit Mode ¹ <ul style="list-style-type: none"> ▪ 0: Auto ▪ 1: Heat ▪ 2: Dry ▪ 3: Fan ▪ 4: Cool
2	3	R/W	AC unit Fan Speed ¹ <ul style="list-style-type: none"> ▪ 0: Auto ▪ 1: Quiet ▪ 2: Low ▪ 3: Med ▪ 4: High
3	4	R/W	AC unit Vane Position ¹ <ul style="list-style-type: none"> ▪ 1: Position-1 (Horizontal) ▪ 2: Position-2 (Horizontal) ▪ 3: Position-3 (Medium) ▪ 4: Position-4 (Vertical) ▪ 10: Swing
4	5	R/W	AC unit Temperature Setpoint ^{1,2,3,4} <ul style="list-style-type: none"> ▪ -32768 (Initialization value) ▪ 16..30 (°C) (0 = undetermined) ▪ 61..86 (°F) (0 = undetermined)
5	6	R	AC unit Temperature reference ^{1,2,3,4} <ul style="list-style-type: none"> ▪ 18..30 (°C) (0 = undetermined) ▪ 64,4..86 (°F) (0 = undetermined) ▪ 0x8000 There is no temperature sent from the Remote controller
6	7	R/W	Window Contact <ul style="list-style-type: none"> ▪ 0: Closed (Default) ▪ 1: Open
7	8	R/W	FJ-AC-MBS-1 Disablement ⁵ <ul style="list-style-type: none"> ▪ 0: FJ-AC-MBS-1 enabled (Default value) ▪ 1: FJ-AC-MBS-1 disabled
8	9	R/W	AC Remote Control Disablement ⁵ <ul style="list-style-type: none"> ▪ 0: Remote Control enabled (Default value) ▪ 1: Remote Control disabled

¹ Available values will depend on the AC unit mode. Check the AC unit model functions in its user manual to know the possible values for this register.

² Magnitude for this register can be adjusted to Celsius x 1°C, Celsius x 10°C (default) or Fahrenheit.

³ It is not possible turn to x10 the value shown in Fahrenheit.

⁴ See section 4.2.3 CONSIDERATIONS ON TEMPERATURE REGISTERS for more information

⁵ This value is stored in non-volatile memory

Register Address (protocol address)	Register Address (PLC address)	R/W	Description
9	10	R/W	AC unit Operation Time <ul style="list-style-type: none"> 0..65535 (hours). Counts the time the AC unit is in "On" state.
10	11	R	AC unit Alarm Status <ul style="list-style-type: none"> 0: No alarm condition 1: Alarm condition
11	12	R	Error Code ⁶ <ul style="list-style-type: none"> 0: No error present 65535(-1 if it is read as signed value): Error in the communication of FJ-AC-MBS-1 or Remote Controller with the AC unit. Any other value, see the table at the end of this document.
22	23	R/W	Indoor unit's ambient temperature from external sensor (at Modbus side) ^{1,2,3,4} <ul style="list-style-type: none"> -32768: (Initialization value). No temperature is being provided from an external sensor. Any other: (°C/x10°C/°F)
23	24	R	AC Real temperature setpoint ^{1,2,3,4} <ul style="list-style-type: none"> When no external temperature is provided, this read-only register will have the same value as register 5 (PLC addressing). In all cases, it will show the current setpoint in the indoor unit. 16..31°C (°C/x10°C) 60..92°F
24	25	R	Current AC max setpoint ^{1,2,3} <ul style="list-style-type: none"> -32768 (Initialization value) Ranges are specific from Manufacturer
25	26	R	Current AC min setpoint ^{1,2,3} <ul style="list-style-type: none"> -32768 (Initialization value) Ranges are specific from Manufacturer
26	27	R/W	AC unit Horizontal Vane Position ¹ <ul style="list-style-type: none"> 0: Auto (Default) 1: Position 1 ... 5: Position 5 10: Swing
31	32	R	Window status (feedback) <ul style="list-style-type: none"> 0: Not active (Default value) 1: Active (Window is open)
36	37	R/W	External On/Off disablement: <ul style="list-style-type: none"> 0: Not active (Default value) 1: Active
40	41	R	Window contact ON/OFF disablement: <ul style="list-style-type: none"> 0: Window contact is disabled (not working) 1: Window contact is enabled (in use)
43	44	W	Filter reset: <ul style="list-style-type: none"> 1: Reset
44	45	R	Filter status <ul style="list-style-type: none"> 0: Off 1: Lit
56	57	R/W	Antifreeze operation <ul style="list-style-type: none"> 0: Disabled 1: Enabled
64	65	R/W	Economy <ul style="list-style-type: none"> 0: Disabled 1: Enabled
65	66	R	Input reference temperature ^{1,2,3}

⁶ See section 7 ERROR CODES for possible error codes and their explanation

Register Address (protocol address)	Register Address (PLC address)	R/W	Description
			<ul style="list-style-type: none"> ▪ 0x8000: No temperature's value is being provided from an external sensor. No virtual temperature is being applied. ▪ Any other: (°C/x10°C/°F)
66	67	R	Return path temperature ^{1,2,3} <ul style="list-style-type: none"> ▪ -32768 (Initialization value) ▪ Ranges are specific from Manufacturer
97	98	R/W	Block Periodic Sendings ^{5,7} <ul style="list-style-type: none"> ▪ 0: Non-blocked (Default value) ▪ 1: Blocked
98	99	R	Master/Slave (gateway's role) <ul style="list-style-type: none"> ▪ 0: Slave ▪ 1: Master

4.2.2 Configuration Registers

Register Address (protocol address)	Register Address (PLC address)	R/W	Description
13	14	R/W	"Open Window" switch-off timeout ⁸ <ul style="list-style-type: none"> ▪ 0..30 (minutes) ▪ Factory setting: 30 (minutes)
14	15	R	Modbus RTU baud-rate <ul style="list-style-type: none"> ▪ 2400bps ▪ 4800bps ▪ 9600bps (Default) ▪ 19200bps ▪ 38400bps ▪ 57600bps ▪ 76800bps ▪ 115200bps
15	16	R	Modbus Slave Address <ul style="list-style-type: none"> ▪ 1..63
21	22	R	Max number of fan speeds
49	50	R	Device ID: 0x0D00
50	51	R	Software version
99	100	W	Reset <ul style="list-style-type: none"> ▪ 1: Reset

4.2.3 Considerations on Temperature Registers

- **AC unit Temperature Setpoint (R/W)** (register 5 – in PLC addressing): This is the adjustable temperature setpoint meant to be required by the user. This register can be read (Modbus function 3 or 4) or written (modbus functions 5 or 16). A remote controller connected to the 3-wire bus of the Fujitsu indoor unit will report the same temperature setpoint value as this register.
- **AC unit external reference temperature (R/W)** (register 23 – in PLC addressing): This register allows providing an external temperature reference from Modbus side. If an external temperature is provided through this register, indoor unit will use it as reference for its temperature control loop.
 - This register will have no effect in those Fujitsu RAC / domestic line splits Air-Conditioning units – this is, those models requiring an additional communication accessory enabling communication with FJ-AC-MBS-1.
 - For this temperature to take effect it is required that the Fujitsu AC indoor unit is configured in such a way that it uses the "thermostat sensor in the remote controller" (this is, FJ-AC-MBS-1 will act as thermostat sensor providing a temperature sensor reading).

⁷ If the register is configured as "0:Non-blocked", all commands received from Modbus will be sent to the AC system. If "1: Blocked", commands from Modbus will only be sent to the AC system if they differ from the previous value.

⁸ Once window contact is open, a count-down to switch off the AC Unit will start from this configured value.

- This configuration is done via a Fujitsu remote controller connected to the indoor unit (Function number “42” – setting value “1” / operation of Thermosensor button) and must be done by Fujitsu authorized installers at the time of the installation of the AC.
- Register value after FJ-AC-MBS-1 startup is -32768, which means that no temperature reference is provided to the AC indoor unit. In that case, AC indoor unit will use its own return path temperature sensor as reference for its control loop.
- Virtual temperature mechanism will be activated once the first temperature value is received on register 23 – in PLC addressing:

$$S_{AC} = S_u - (T_u - S_u)$$

Where:

S_{AC} - setpoint value currently applied to the indoor unit

S_u - setpoint value

T_u - external temperature reference written at BACnet side

When FJ-AC-MBS-1 detects a change in any of the values of $\{S_u, T_u\}$, it will send the new setpoint (S_{AC}) to the indoor unit.

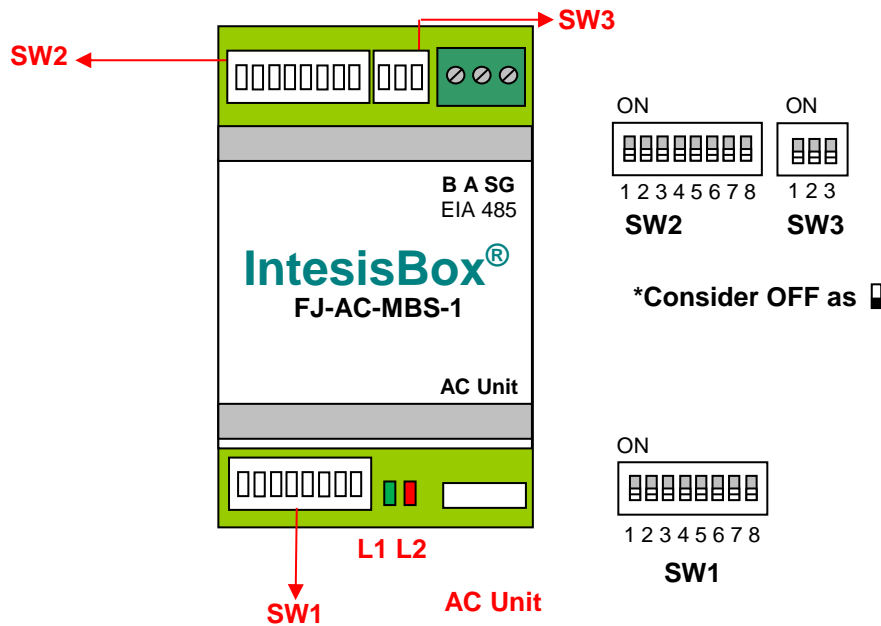
Moreover, notice that temperature's values of all these four registers are expressed according to the temperature's format configured through its onboard DIP-Switches (See [¡ERROR! NO SE ENCUENTRA EL ORIGEN DE LA REFERENCIA. ¡ERROR! NO SE ENCUENTRA EL ORIGEN DE LA REFERENCIA.](#)). These following formats are possible:

- **Celsius value:** Value in Modbus register is the temperature value in Celsius (i.e. a value “22” in the Modbus register must be interpreted as 22°C).
- **Tenths of value:** Value in Modbus register is the temperature value in decicelsius (i.e. a value “220” in the Modbus register must be interpreted as 22.0°C).
- **Fahrenheit value:** Value in Modbus register is the temperature value in Fahrenheit (i.e. a value “72” in the Modbus register must be interpreted as 72°F (~22°C)).

4.3 DIP-switch Configuration Interface

All the configuration values on FJ-AC-MBS-1 can be written and read from Modbus interface. Otherwise, some of them can also be setup from its on-board DIP-switch interface.

The device has DIP-switches SW1, SW2 and SW3 on the following locations:



The following tables apply to the interface's configuration through DIP-switches:

SW1 – AC configuration + Modbus baud rate

AC Configuration				Modbus Baud rate	
SW1-P1...5	Description	SW1-P1...5	Description	SW1-P6..8	Description
	Follower (default value)		Low Power mode (default value)		2400bps
	Header		High Performance Mode		4800bps
	Outdoor Demand rate deactivated				9600bps (Default value)
	Outdoor Demand rate deactivated (default value)				19200bps
	Rotation and backup deactivated (default value)				38400bps
	Rotation and backup activated				57600bps
	Not used (default value)				76800bps
	Not used				115200bps

Table 4.1 SW1: AC Configuration + Modbus baud rate

SW2 – Modbus Slave address + Degrees/tenths of degrees (x10) + Temp. magnitude (°C/°F)

Add	SW3-P1..6	Add	SW3-P1..6	Add	SW3-P1..6	Add	SW3-P1..6	Add	SW3-P1..6
0		13		26		39		52	
1		14		27		40		53	
2		15		28		41		54	
3		16		29		42		55	
4		17		30		43		56	
5		18		31		44		57	
6		19		32		45		58	
7		20		33		46		59	
8		21		34		47		60	
9		22		35		48		61	
10		23		36		49		62	
11		24		37		50		63	
12		25		38		51			

Table 4.2 SW2: Modbus slave address

SW2-P7-8	Description
	Temperature values in ModBus register are represented in degrees (x1) (default value)
	Temperature values in ModBus register are represented in tenths of degrees (x10)
	Temperature values in ModBus register are represented in Celsius degrees (default value)
	Temperature values in ModBus register are represented in Fahrenheit degrees

Table 4.3 SW2: Degrees / tenths of degrees (x10) + Temperature magnitude (°C/°F)

SW3 – Termination resistor + BUS polarization configuration





SW3-P1..3	Description
	EIA-485 bus without termination resistor (Default value).
	Internal termination resistor of 120Ω connected to EIA-485 bus.
	No BUS polarization (default value).
	BUS polarization active.

Table 4.4 SW3: Temperature and termination resistor configuration

4.4 Implemented Functions

PA-RC2-MBS-1-LOW implements the following standard Modbus functions:

- 3: Read Holding Registers
- 4: Read Input Registers
- 6: Write Single Register
- 16: Write Multiple Registers (Despite this function is allowed, the interface does not allow to write operations on more than 1 register with the same request, this means that length field should be always be 1 when this function is being used in case of writing)

4.5 Device LED indicator

The device includes two LED indicators to show all the possible operational states. In the following table there are written the indicators which can be performed and their meaning.

L1 (green LED)

Device status	LED indication	ON / OFF Period	Description
During not normal operation	LED blinking	500ms ON / 500ms OFF	Communication error
During normal operation	LED flashing	100ms ON / 1900ms OFF	Normal operation (configured and working properly)

L2 (red LED)

Device status	LED indication	ON / OFF Period	Description
During not normal operation	LED Pulse	3sec ON / --- OFF	Under voltage

L1 (green LED) & L2 (red LED)

Device status	LED indication	ON / OFF Period	Description
During normal operation	LED Pulse	5sec ON / --- OFF	Device Start-up
During not normal operation	LED alternatively blinking	500ms ON / 500ms OFF	EEPROM failure

4.6 EIA-485 bus. Termination resistors and Fail-Safe Biasing mechanism

EIA-485 bus requires a 120Ω terminator resistor at each end of the bus to avoid signal reflections.

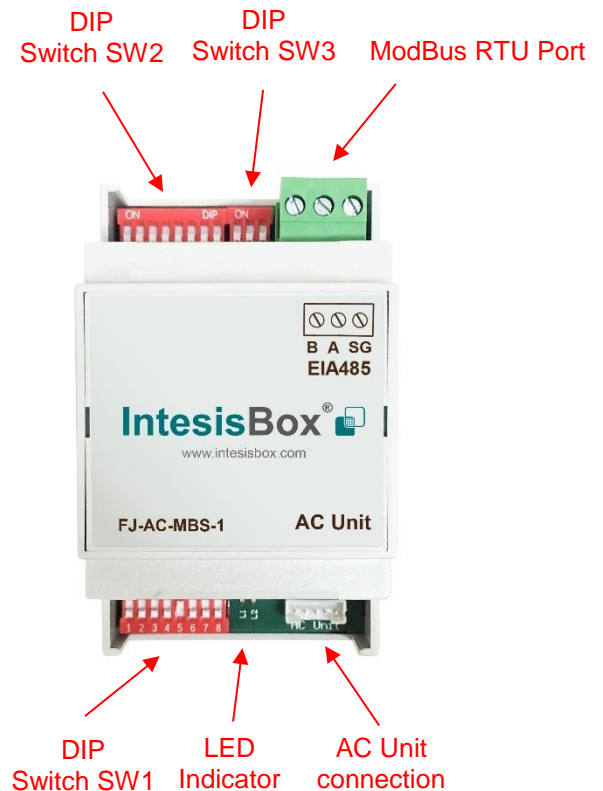
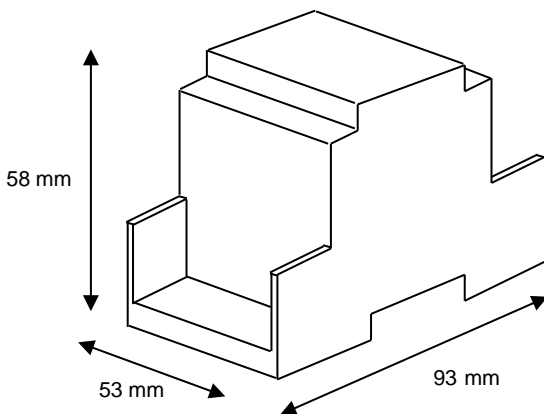
To prevent fail status detected by the receivers, which are “*listening*” the bus, when all the transmitters’ outputs are in three-state (high impedance), it is also required a fail-safe biasing mechanism. This mechanism provides a safe status (a correct voltage level) in the bus when all the transmitters’ outputs are in three-state. This mechanism must be supplied by the Modbus Master.

The FJ-AC-MBS-1 device includes an on-board terminator resistor of 120Ω that can be connected to the EIA-485 bus by using DIP-switch SW4.

Some Modbus RTU EIA-485 Master devices can provide also internal 120Ω terminator resistor and/or fail-safe biasing mechanism (Check the technical documentation of the Master device connected to the EIA-485 network in each case).

5 Mechanical & electrical characteristics

Enclosure	Plastic, type PC (UL 94 V-0) Net dimensions (dxwxh): 93 x 53 x 58 mm / 3.7" x 2.1" x 2.3" Color: Light Grey. RAL 7035	Operation Temperature	0°C to +70°C
Weight	85 g.	Stock Temperature	-20°C to +85°C
Mounting	Wall DIN rail EN60715 TH35.	Operational Humidity	<95% RH, non-condensing
Terminal Wiring (for low-voltage signals)	For 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	Stock Humidity	<95% RH, non-condensing
ModBus RTU port	1 x EIA485 Plug-in screw terminal block (2 poles + GND) with 120 Ω resistor termination and polatization selectable by switch.	Isolation voltage	1500 VDC
AC unit port	1 x Specific connector Specific cable included	Isolation resistance	1000 MΩ
Switch 1 (SW1)	1 x DIP-Switch for Air Conditioner Unit + ModBus baud rate	Protection	IP20
Switch 3 (SW3)	1 x DIP-Switch for ModBus RTU slave address + temperature magnitude (°C/°F) and scale (x1/x10).	LED indicators	2 x Onboard LED - Operational status



6 AC Unit Types compatibility

Please, check compatibility list at to know which Fujitsu units are compatible with our gateway.
http://www.intesis.com/pdf/IntesisBox_fj-ac-xxx-1_AC_Compatibility.pdf

7 Error codes

7.1 Intesis Codes

Error Code Modbus	Error in Remote Controller	Error Description
0	N/A	No active error
65535 (-1)	N/A	Error in the communication of FJ-AC-MBS-1 or Remote Controller with the AC unit

7.2 RAC and VRF J-II / V-II / VR-II series

Error Code Modbus	Error in Remote Controller	System	Error Description
0	00	RAC Inverter and Non Inverter	Wired remote controller error
1	01		Indoor signal error
2	02		Indoor room temperature sensor error
3	03		Indoor room temperature sensor error
4	04		Indoor heat exchanger temperature sensor (middle) error
5	05		Indoor heat exchanger temperature sensor (middle) error
6	06		Outdoor heat exchanger temperature sensor (outlet) error
7	07		Outdoor heat exchanger temperature sensor (outlet) error
8	08		Power voltage error
9	09		Float switch operated
10	0A		Outdoor temperature sensor error
11	0b		Outdoor temperature sensor error
12	0C		Outdoor discharge pipe temperature sensor error
13	0d		Outdoor discharge pipe temperature sensor error
14	0E		Heat sink thermistor (Inverter) error
15	0F		Discharge temperature error
17	11		Indoor unit EEPROM error
18	12		Indoor fan error
19	13		Indoor signal error
20	14		Outdoor EEPROM error
21	15		Compressor temperature sensor error
22	16		Pressure switch abnormal, Pressure sensor error
23	17		IPM protection
24	18		CT error
25	19		Active filter error
26	1A		INV voltage protection
27	1b		Compressor location error
28	1C		Outdoor fan error
29	1d		Outdoor unit computer communication error
30	1E		2-way valve temperature sensor error
31	1F		3-way valve temperature sensor error
32	20		Connected indoor unit error
33	21		Indoor MANUAL AUTO switch error
34	22		reverse VDD permanent stop protection
36	24		VDD permanent stop protection
37	25		Excessive high pressure protection on cooling
38	26		P.F.C. circuit error
39	27		Indoor signal error
40	28		Indoor signal error
41	29		Indoor heat exchanger temperature sensor (inlet) error
42	2A		Outdoor heat exchanger temperature sensor (middle) error
43	2b		Power supply frequency detection error
			Compressor temperature error

Error Code Modbus	Error in Remote Controller	System	Error Description
44	2C	RAC Inverter and Non Inverter	4-way valve error
45	2d		Heat sink thermistor P.F.C. error
46	2E		Indoor unit damper error
47	2F		Inverter error
48	30		Low pressure error
49	31		Refrigerant circuit address set-up error
50	32		Master unit, Slave unit set-up error
51	33		Connected the indoor number set-up error
52	34		P.F.C. printed circuit board error
53	35		Indoor fan 2 error
54	36		Control box thermistor error
55	37		Indoor unit CT error
56	38		Indoor fan motor 1 driving circuit error
			Indoor fan motor 2 driving circuit error
117	11	RAC Inverter Models G series VRF J-II/V-II/VR-II Series	Serial communication error between indoor/outdoor units
118	12		Remote controller communication error
119	13		Communication error between outdoor units
120	14		Network communication error
121	15		Scan error
122	16		Peripheral unit communication error
123	17		Electricity charge apportionment error
133	21		Indoor unit initial setting error
134	22		Indoor unit capacity abnormal
135	23		Incompatible series connection error
136	24		Connection unit number error
137	25		Connection pipe length error
138	26		Indoor unit address setting error
139	27		Master/slave unit setting error
140	28		Other setting error
141	29		Connection unit number error in wired remote controller system
149	31		Indoor unit power supply abnormal
150	32		Indoor unit main PCB error
151	33		Indoor unit display PCB error
152	34		Power relay error
153	35		Indoor unit manual auto switch error
154	36		Heater relay error
155	37		Indoor unit transmission PCB error
156	38		Network convertor PCB error
157	39		Indoor unit power supply circuit error
158	3A		Indoor unit communication circuit (wired remote controller) error
165	41		Indoor unit room temp. thermistor error
166	42		Indoor unit heat ex. temp. thermistor error
167	43		Humidity sensor error
168	44		Light sensor error
169	45		Gas sensor error
170	46		Float sensor error
171	47		Water temperature sensor error
172	48		Warm water flow rate sensor error
173	49		Heater sensor error
181	51		Indoor unit fan motor 1 error
182	52		Indoor unit coil (expansion valve) error
183	53	Indoor unit water drain abnormal	
184	54	Air cleaning function error	
185	55	Filter cleaning function error	
186	56	Water circulation pump error	
187	57	Indoor unit damper error	

Error Code Modbus	Error in Remote Controller	System	Error Description
188	58		Indoor unit intake grille position error
189	59		Indoor unit fan motor 2 error
195	5U		Indoor unit miscellaneous error
197	61		Outdoor unit power supply abnormal
198	62		Outdoor unit main PCB error
199	63		Outdoor unit inverter PCB error
200	64		Outdoor unit active filter/PFC circuit error
201	65		Outdoor unit IPM error
202	66		Convertor distinction error
203	67		Outdoor unit power short interruption error (protective operation)
204	68		Outdoor unit magnetic relay error
205	69		Outdoor unit transmission PCB error
206	6A		Outdoor unit display PCB error
213	71		Outdoor unit discharge temp. thermistor error
214	72		Outdoor unit compressor temp. thermistor error
215	73		Outdoor unit heat ex. temp. thermistor error
216	74		Outside air temp. thermistor error
217	75		Outdoor unit suction gas temp. thermistor error
218	76		Outdoor unit operating valve thermistor error
219	77		Outdoor unit heat sink temp. thermistor error
220	78		Expansion valve temperature sensor error
229	81		Receiver liquid level detection sensor error
230	82		Outdoor unit sub-cool heat ex. gas temp. thermistor error
231	83		Outdoor unit liquid pipe temp. thermistor error
232	84	RAC	Outdoor unit current sensor error
233	85	Inverter	Fan motor current sensor error
234	86	Models G	Outdoor unit pressure sensor error
235	87	series	Oil sensor error
245	91		Outdoor unit compressor 1 error
246	92		Outdoor unit compressor 2 error
247	93	VRF	Outdoor unit compressor start up error
248	94	J-II/V-II/VR-II	Outdoor unit trip detection
249	95	Series	Outdoor unit compressor motor control error
250	96		Open loop error (Field-weakening relevant)
251	97		Outdoor unit fan motor 1 error
252	98		Outdoor unit fan motor 2 error
253	99		Outdoor unit 4-way valve error
254	9A		Outdoor unit coil (expansion valve) error
259	9U		Outdoor unit miscellaneous error
261	A1		Outdoor unit discharge temperature 1 error
262	A2		Outdoor unit discharge temperature 2 error
263	A3		Outdoor unit compressor temperature error
264	A4		Outdoor unit pressure error 1
265	A5		Outdoor unit pressure error 2
266	A6		Outdoor unit heat exchanger temperature error
267	A7		Suction temperature abnormal
268	A8		Poor refrigerant circulation
269	A9		Current overload error
270	AA		Outdoor unit special operation error
271	AC		Ambient temperature error
272	AF		Out of the possible operation range
273	AJ		Freeze protection operated
277	C1		Peripheral unit main PCB error
278	C2		Peripheral unit transmission PCB error
279	C3		Peripheral unit PCB 1 error
280	C4		PCB 2 error
281	C5		PCB 3 error

Error Code Modbus	Error in Remote Controller	System	Error Description
282	C6	RAC Inverter Models G series	PCB 4 error
283	C7		PCB 5 error
284	C8		Peripheral unit input device error
285	C9		Display device error
286	CA		EEPROM error
287	CC		Peripheral unit sensor error
288	CF		Peripheral unit external connector error (USB memory)
289	CJ		Other parts error
293	F1		System tool software error
294	F2		System tool adaptor error
295	F3		System tool interface error
296	F4		System tool environment error
309	J1		RB unit error
310	J2	VRF J-II/V-II/VR-II Series	Branch boxes error
311	J3		Total heat exchanging, ventilation unit error
312	J4		Domestic hot water unit error
313	J5		Zone control interface error

7.3 VRF V / S / J Series

Error Code Modbus	Error in Remote Controller	System	Error Description
0	00	VRF V / S / J Series	No Error
2	02		Model information Error
4	04		Power frequency Error
6	06		EEPROM access Error
7	07		EEPROM deletion Error
9	09		Room sensor Error
10	0A		Heat Ex. Middle Sensor Error
11	0b		Heat Ex. Inlet sensor Error
12	0C		Heat Ex. Outlet sensor Error
13	0d		Blower temperature thermistor Error
17	11		Drain Error
18	12		Room temperature Error
19	13		Indoor fan motor Error
20	18	VRF V / S / J Series	Standard wired remote Error
31	1F		Standard wired token Error
32	20		Network communication Error
33	21		Node setting error
34	32		Communication Error between Main PCB & Transmission PCB
			Outdoor unit Error

In case you detect an error code not listed, contact your nearest Fujitsu technical support service for more information on the error meaning.