

Modbus RTU (EIA-485) Interface for Samsung air conditioners

Compatible with commercial air conditioners by Samsung

USER MANUAL

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Modbus RTU (EIA-485) Interface for Samsung air conditioners

Compatible with commercial air conditioners by Samsung

| ORDER CODE | LEGACY ORDER CODE |
|-------------------|--------------------------|
| INMBSSAM001R000 | SM-RC-MBS-1 |

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1. Presentation



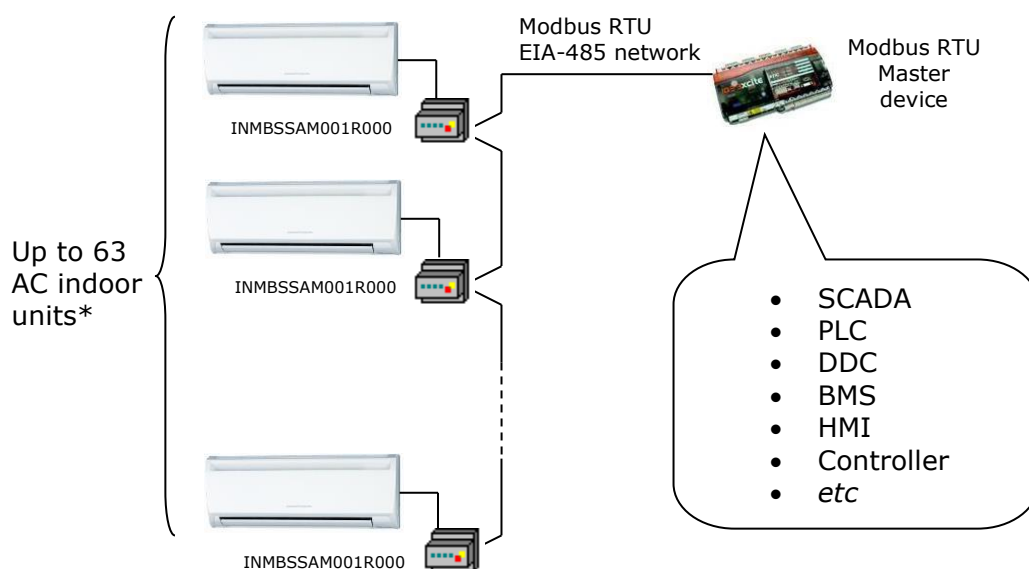
The INMBSSAM001R000 interfaces allow a complete and natural integration of **Samsung** air conditioners into Modbus RTU (EIA-485) networks.

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 INMBSSAM001R000 devices can be connected in the same network.
INMBSSAM001R000 is a Modbus slave device.
- Direct connection to the AC indoor unit. Up to 16 AC indoor units can be connected to INMBSSAM001R000, controlling them as one (not individually).
- 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 Intesis 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 2 plug-in terminal blocks of 2 poles each one, to establish direct connection with the AC indoor unit. It comes as well with a plug-in terminal block of 2 poles to establish direct connection with the Modbus RTU EIA-485 network.

2.1 Connect to the AC indoor unit

The INMBSSAM001R000 connects directly to the Samsung F3F4 V1V2 bus. This bus is not provided within the interface. Depending on which controllers are available, the recommended connection methods are the following ones (details in Figure 2. 1):

- **Wired remote control available.** Connect the gateway as Slave in parallel with the wired Remote Controllers (Remote Controller acts as Master).
- **No remote control available** Connect the gateway directly to the F3F4 V1V2 bus of the indoor unit as Master when there is no Samsung Remote Controller.

Maximum F3F4 V1V2 bus length is 100 m / 328.08 ft. The communication F3F4 V1V2 bus has polarity sensitivity.

Important: If a wired remote controller of the AC manufacturer is connected in the same bus, communication may shut down.

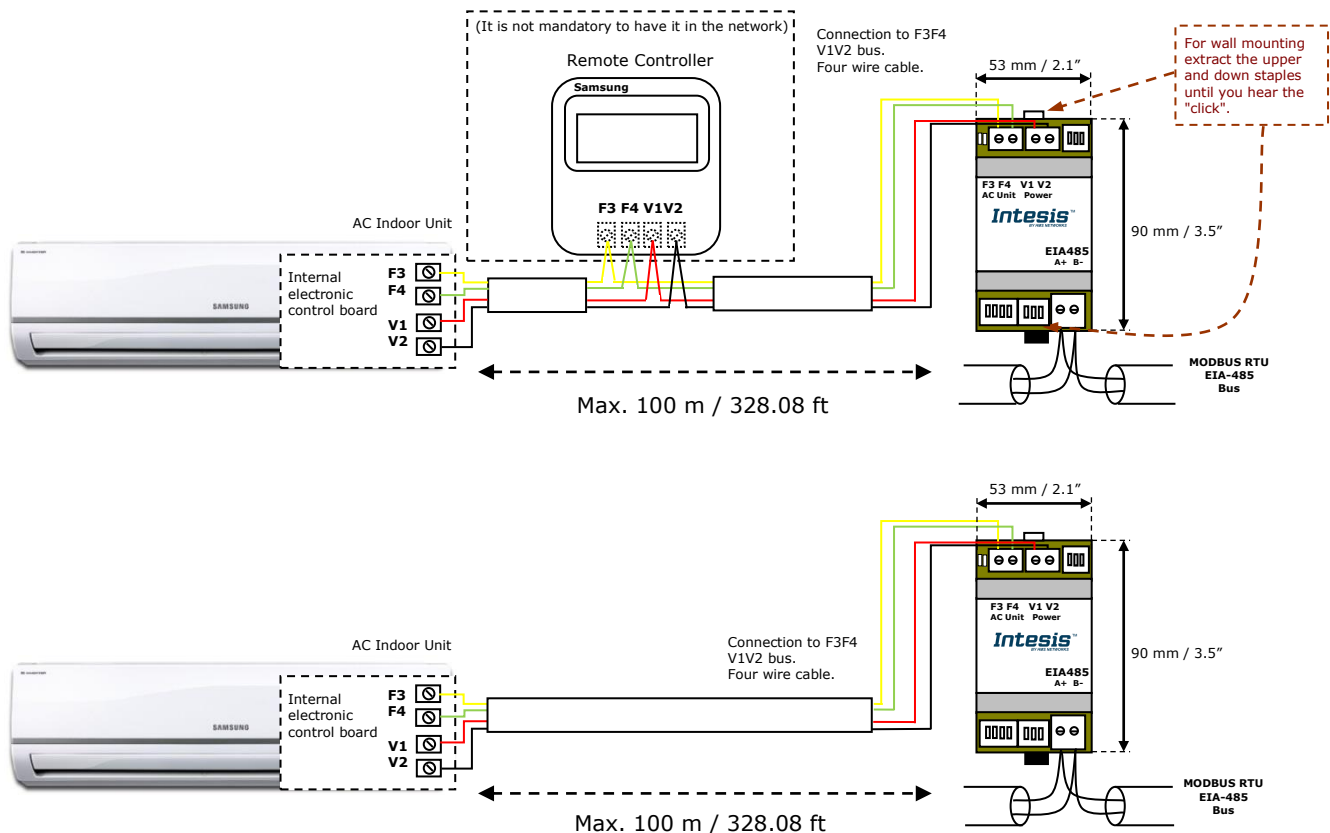


Figure 2. 1 INMBSSAM001R000 connection diagram

2.2 Connection to the EIA-485 bus

Connect the EIA-485 bus wires to the plug-in terminal block (the one of two poles) of INMBSSAM001R000 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 (see section 4.6 for more details).

3. Quick Start Guide


1. Disconnect the air conditioning from the 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 the F3F4 V1V2 bus between the interface and the AC indoor unit following the instructions of the diagram. Screw each bare cable end in the corresponding F3F4 V1V2 terminals.
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 Intesis interface and make sure it matches the current installation's parameters (see section 4.3).

By default, the interface is set to:

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



These parameters can be modified from SW4 and SW3 DIP-Switches.

All other switch positions are set at low level (Off position ) by default.

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 Intesis interface requires to be connected to the AC unit (powered) to start communicating.

4. Modbus Interface Specification

4.1 Modbus physical layer

INMBSSAM001R000 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).

NOTE: The gateway automatically detects the communication type (8N2 or 8N1) and sets itself accordingly. No action is needed.

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: Low ▪ 2: Mid ▪ 3: High |
| 3 | 4 | R/W | AC unit Vane Position ¹ <ul style="list-style-type: none"> ▪ 0: Auto ▪ 10: Swing |
| 4 | 5 | R/W | AC unit Temperature setpoint ^{1,2,3} <ul style="list-style-type: none"> ▪ -32768 (Initialization value) ▪ 18..30°C (°C/x10°C) ▪ 65..86°F |
| 5 | 6 | R | AC unit Temperature reference ^{1,2,3} <ul style="list-style-type: none"> ▪ -32768 (Initialization value) ▪ 10..38°C (°C/x10°C) ▪ 50..100°F |

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 10°C, Celsius x 100°C (default) or Fahrenheit. See section 4.2.3 for more information.

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

| Register Address (protocol address) | Register Address (PLC address) | R/W | Description |
|--|-----------------------------------|-----|--|
| 6 | 7 | R/W | Window Contact <ul style="list-style-type: none"> 0: Closed (Default) 1: Open |
| 7 | 8 | R/W | Gateway disablement ⁴ <ul style="list-style-type: none"> 0: Gateway disabled (Default) 1: Gateway enabled |
| 8 | 9 | R/W | AC Remote Control Disablement ⁴ <ul style="list-style-type: none"> 0: Remote Controller enabled (Default) 1: Remote Controller disabled |
| 9 | 10 | R/W | AC unit Operation Time ⁴ <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 ⁵ <ul style="list-style-type: none"> 0: No error present 65535(-1 if it is read as signed value): Error in the communication of INMBSSAM001R000 or Remote Controller with the AC indoor unit. Any other error present, see the table at the end of this document. |
| 22 | 23 | R/W | Indoor unit's ambient temperature from external sensor (at Modbus side) ^{1,2,3,6} <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 ^{1,2,3,6} <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. Ranges determined by the Manufacturer of the AC indoor unit: (°C/x10°C/°F) |
| 26 | 27 | R/W | AC unit Left/Right Vane Position <ul style="list-style-type: none"> 0: Auto (Default) 10: Swing |

⁴ This value is stored in non-volatile memory.

⁵ See section 7 for possible error codes and their explanation.

⁶ See section 4.2.3 for more information.

| Register Address (protocol address) | Register Address (PLC address) | R/W | Description |
|-------------------------------------|--------------------------------|-----|--|
| 66 | 67 | R | Return path Temperature ^{1,2,3} <ul style="list-style-type: none"> -32768 (Initialization value) Ranges determined by the Manufacturer of the AC indoor unit: (°C/x10°C/°F) |
| 97 | 98 | R/W | Block Periodic Sendings ^{4,7,8} <ul style="list-style-type: none"> 0: Non-blocked (Default value) 1: Blocked |
| 98 | 99 | R/W | Master/Slave (gateway) <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 ⁹ <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: 0x1200 |
| 50 | 51 | R | Software version |
| 67 | 68 | R | Number of IUs connected |
| 81 | 82 | R | Error Address |
| 99 | 100 | W | Reset/Reboot device <ul style="list-style-type: none"> 1: Reset |

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 (values sent on change).

⁸ This register applies to firmware version 0.3 onwards.

⁹ Once window contact is open, a countdown to switch off the AC unit will start from this configured value.

4.2.3 Considerations on Temperature Registers

- **AC unit temperature setpoint (R/W)**
(register 4 – in Protocol address / register 5 – in PLC address):
This is the adjustable temperature setpoint value that must be required by the user. This register can be read (Modbus function 3 or 4) or written (Modbus functions 6 or 16). A remote controller connected to the Samsung indoor unit will report the same temperature setpoint value as this register, but only will happen when no AC unit's external reference is provided from INMBSSAM001R000 (see detail for register 22/23 below).
- **AC unit temperature reference (R)**
(register 5 – in Protocol address / register 6 – in PLC address):
This register reports the temperature that is currently used by the Samsung indoor unit as the reference of its own control loop. Depending on the configuration of the indoor unit, this value can be the temperature reported by the sensor on the return path of the Samsung indoor unit or the sensor of its remote controller. It is a read-only register (Modbus functions 3 or 4).
- **AC unit external temperature reference (Modbus) (R/W)**
(register 22 – in Protocol address / register 23 – in PLC address):
This register allows us to provide an external temperature's sensor from the Modbus side. Samsung indoor unit does not allow on devices like INMBSSAM001R000 to provide directly temperature to be used as a reference of the control loop of the AC indoor unit. In order to overcome this limitation and enable the usage of an external temperature sensor (i.e. from Modbus side), INMBSSAM001R000 applies the following mechanism (only if "external temperature's reference" is being used):
 - After a couple of values have been entered in the "AC unit external temperature's reference" (register 22/23) and "AC unit temperature set point" (register 4/5), INMBSSAM001R000 is going to estimate the temperature chosen implied (e.g. if a "temperature setpoint (register 4/5)" of **22°C**, and an "external temperature reference (register 22/23)" of **20°C** are entered, INMBSSAM001R000 will assume that the user is demanding a **+2°C** increase in temperature).
 - By knowing at any time the ambient temperature currently used by the indoor unit to control its own operation (register 5/6), INMBSSAM001R000 can calculate the required temperature setpoint needed to apply the decrease/increase on the real temperature and reach the temperature chosen by the user (following the example above, if INMBSSAM001R000 reads an "ambient temperature" (register 5/6) of **24°C** in the indoor unit, it will apply a final setpoint of **24°C + 2°C = 26°C**).
 - At this moment, each time that INMBSSAM001R000 detects a change on the ambient temperature reported by the indoor unit (register 5/6), it will also change the required setpoint, in order to keep the temperature required by the user at any time. If we follow the last example, if INMBSSAM001R000 receives a new temperature's value coming from the indoor unit of **25°C**, INMBSSAM001R000 will automatically adjust the temperature setpoint required of the AC indoor unit to **25°C + 2°C = 27°C**).
 - In general, INMBSSAM001R000 is constantly applying the "Virtual Temperature" formula:

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

Where:

- S_{AC} - setpoint value currently applied to the indoor unit
- S_u - setpoint value written at Modbus side (register 4/5)
- T_u - external temperature reference written at Modbus side (register 22/23)
- T_{AC} - ambient temperature that the indoor unit is using as the reference of its own control loop (register 5/6)

When INMBSSAM001R000 detects a change in any of the values of $\{ S_u, T_u, T_{AC} \}$, it will send the new setpoint (S_{AC}) to the indoor unit.

- After the startup, the value for "external temperature's reference" (register 22/23) has a value -32768 (0x8000). This value means that no external temperature reference is being provided through INMBSSAM001R000. In this scenario, the setpoint value shown in register 4/5 will always be the same as the current setpoint value of the indoor unit. AC indoor unit will use its own return path temperature sensor as reference for its control loop.
 - When the mechanism of "Virtual Temperature" is applied. The temperature setpoint's value shown by the Remote Controller or other Control System from Samsung connected to the indoor unit may show a different value from the value shown in register 4/5.
 - If it is desired to use the temperature's reading from the Remote Control as the external temperature reference (T_u , register 22/33), the Remote Controller must be configured as Master, and the Samsung AC indoor unit must have the option "thermostat sensor in the Remote Controller" as activated. This configuration is done via a Samsung Remote Controller connected to the indoor unit and must be done by Samsung authorized installers while the AC is being installed.
 - This configuration is done following the instructions from the Service Manual of Samsung (In Service Mode: Main Menu **1**, press [**>**] button to Sub Menu **2** (= "Function Wireless Remote Control Option setting"); press [**>**] button data-bit **1** (= "Temperature sensor selection") set value **1**-Wired Remote Controller). This configuration is done via a Samsung Remote Controller connected to the indoor unit and must be done by Samsung authorized installers while the AC is being installed.
 - When INMBSSAM001R000 is set as "Master" of F3F4 V1V2 bus, the external temperature's sensor connected to Modbus RTU EIA-485 network provides directly the value currently applied to the indoor unit (S_{AC}), and the process of the Virtual temperature is not applied. In this case, the Remote Controller or any other Control System connected from Samsung is not able to send the external temperature reference's value to the register 22/23.
- **AC Real temperature setpoint (R)**
(register 23 – In Protocol address / register 24 – in PLC address):
As it has been detailed on the previous point, the real temperature setpoint in the indoor unit and the temperature setpoint requested from INMBSSAM001R000 might differ (when a value in register 22/23 – "external temperature reference" is entered). This register always informs about the current temperature setpoint which is being used by the indoor unit – it is also includes the temperature setpoint that will be shown by an additional remote controller from Samsung connected to the indoor unit, if it is present on the system.

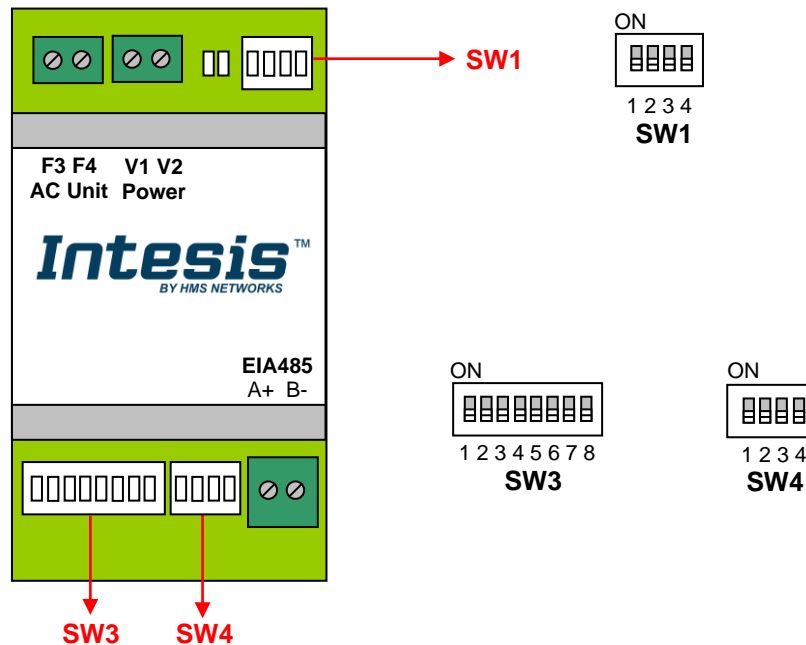
Moreover, notice that temperature's values of all these four registers are expressed according to the temperature's format configured through its onboard DIP-Switches (See "4.3 -

DIP-switch Configuration Interface"). 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).
- **Decicelsius 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 INMBSSAM001R000 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, SW3 and SW4 on the following locations:



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

SW1 – AC indoor unit's features

| SW1-P1..4 | Description |
|-----------|---|
| | Slave - A Samsung Controller must be present in F3F4 V1V2 bus, configured as Master (Default value) |
| | Master – Samsung Controller not needed in F3F4 V1V2 bus. If it exists, it must be configured as Slave |
| | Not used (Default value) |
| | Not used |
| | Not used (Default value) |
| | Not used |
| | Not used (Default value) |
| | Not used |

Table 4.1 SW1: AC indoor unit's features

SW3/SW4 – Baud rate configuration

| SW3-P7..8 | SW4-P3 | Description |
|-----------|--------|-------------------------|
| | | 2400bps |
| | | 4800bps |
| | | 9600bps (Default value) |
| | | 19200bps |
| | | 38400bps |
| | | 57600bps |
| | | 76800bps |
| | | 115200bps |

Table 4.2 SW3-SW4: Modbus baud rate

SW4 – Degrees/Decidegrees (x10), temperature magnitude (°C/°F) and EIA-485 termination resistor.

| SW4-P1..2-4 | Description |
|-------------|--|
| | Temperature values in Modbus register are represented in degrees (x1) (Default value) |
| | Temperature values in Modbus register are represented in decidegrees (x10) |
| | Temperature values in Modbus register are represented in Celsius degrees (Default value) |
| | Temperature values in Modbus register are represented in Fahrenheit degrees |
| | EIA-485 bus without termination resistor (Default value) |
| | Internal termination resistor of 120Ω connected to EIA-485 bus |

Table 4.3 SW4: Temperature and termination resistor configuration

SW3 – Modbus Slave address

| 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 4.4 SW3: Modbus slave address

4.4 Implemented Functions

INMBSSAM001R000 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).

The maximum of registers that can be read in a single request is 100.

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 | Flash checksum not OK |

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.

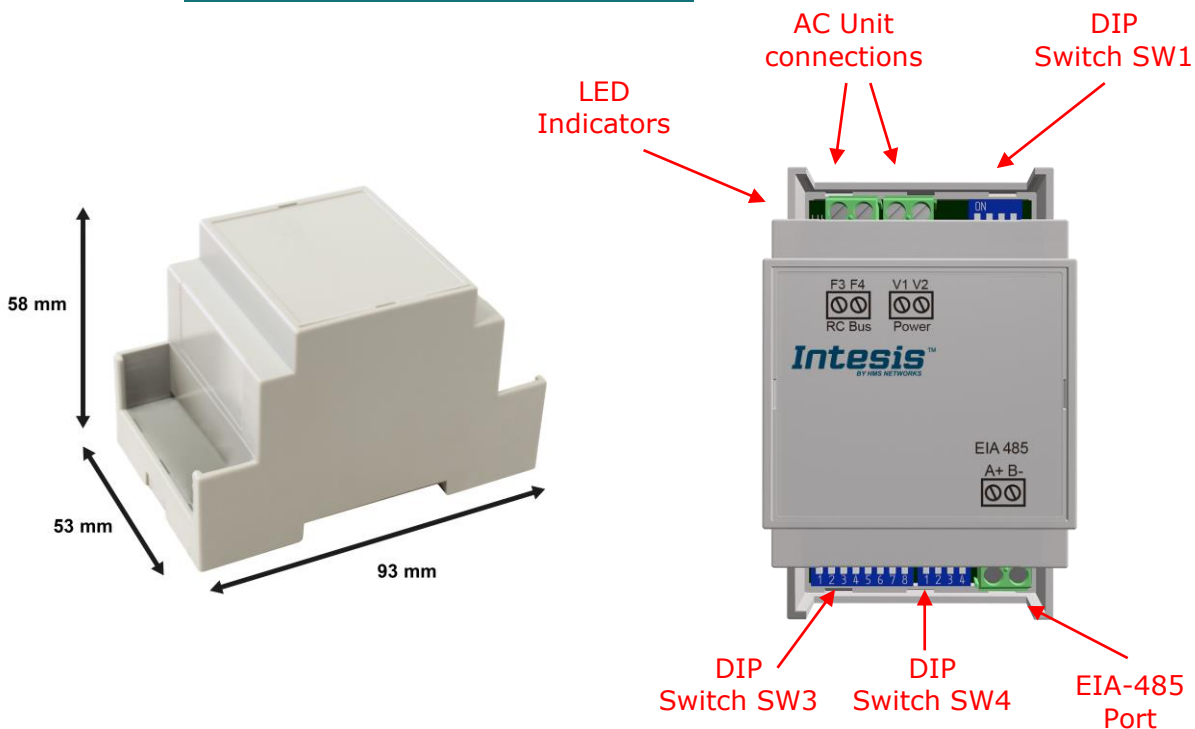
In order to prevent fail status detected by the receivers, which are "*listening*" the bus, when all the transmitters' outputs are in three-state (high impedance), it is also required a fail-safe biasing mechanism. This mechanism provides a safe status (a correct voltage level) in the bus when all the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

The INMBSSAM001R000 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. Electrical and Mechanical features

| | | | |
|---|--|-----------------------|--------------------------------------|
| 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 +60°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 Serial EIA485 Plug-in screw terminal block (2 poles): A, B Compatible with Modbus RTU EIA-485 networks | Isolation voltage | 1500 VDC |
| AC unit port | 1 x F3F4 bus Plug-in screw terminal block (2 poles): F3, F4 Compatible with Samsung networks 1 x V1V2 Power screw terminal block (2 poles): V1, V2 | Isolation resistance | 1000 MΩ |
| Switch 1 (SW1) | 1 x DIP-Switch for AC features | Protection | IP20 (IEC60529) |
| Switch 3 (SW3) | 1 x DIP-Switch for Modbus RTU settings | LED indicators | 2 x Onboard LED - Operational status |
| Switch 4 (SW4) | 1 x DIP-Switch for extra functions | | |



6. List of supported AC Unit Types.

A list of Samsung indoor unit model's references compatible with INMBSSAM001R000 and its available features can be found on this link:

https://www.intesis.com/docs/compatibilities/inxxsam001r000_compatibility

7. Error Codes

| Error Code Modbus | Error in Remote Controller | Error category | Error Description |
|-------------------|----------------------------|------------------------|---|
| 0 | N/A | INMBSSAM001R000 | No active error |
| 101 | 101 | Communication error | Indoor unit communication error |
| 102 | 102 | Communication error | Indoor unit/outdoor unit communication time-out error; errors in more than 6 packets. |
| 121 | 121 | Indoor sensor error | Indoor temperature sensor (open/short). |
| 122 | 122 | Indoor sensor error | Indoor unit evaporator-in sensor (open/short) |
| 128 | 128 | Indoor sensor error | Indoor unit evaporator-in disconnection. (sensor displacement) |
| 129 | 129 | Indoor sensor error | Indoor unit evaporator-out separation. |
| 153 | 153 | Drain diagnostic error | Indoor floating switch secondary detection |
| 201 | 201 | Configuration error | Unit Miss Match indoor/outdoor |
| 202 | 202 | Communication error | Indoor/outdoor communication error (1 min) |
| 203 | 203 | Communication error | Comm. error between indoor/outdoor INV<>MAIN MICOM (1 min) |
| 221 | 221 | Outdoor sensor error | Outdoor temperature sensor error |
| 231 | 231 | Outdoor sensor error | Condenser temperature sensor error |
| 237 | 237 | Outdoor sensor error | Condenser temperature error |
| 251 | 251 | Outdoor sensor error | Inverter Emission temperature sensor error |
| 320 | 320 | Outdoor sensor error | OPL sensor error |
| 402 | 402 | Outdoor sensor error | Detection of outdoor freezing when compressor stop |
| 404 | 404 | Outdoor unit error | Overload Protection of Outdoor when compressor stop |
| 419 | 419 | Control error | EEV Open error (Electronic Evaporation Valve) |
| 422 | 422 | Control error | EEV Close error |
| 425 | 425 | Installation error | Power Cable Miss connection |
| 440 | 440 | Self-diagnostic error | Heating operation blocked |
| 441 | 441 | Self-diagnostic error | Cooling operation blocked |
| 461 | 461 | ODU protection error | Inverter Compressor startup error |
| 462 | 462 | ODU protection error | Inverter total current error / PFC over current error |
| 463 | 463 | ODU protection error | OLP Heat Sink error |
| 464 | 464 | ODU protection error | Inverter IPM over current error |
| 465 | 465 | ODU protection error | Compressor V limit error |
| 466 | 466 | ODU protection error | DC LINK over/low voltage error |
| 467 | 467 | ODU protection error | Inverter compressor rotation error |
| 468 | 468 | ODU protection error | Inverter current sensor error |
| 469 | 469 | ODU protection error | Inverter DC LINK voltage sensor error |
| 471 | 471 | ODU protection error | Inverter OTP error / Inverter EEPROM read/write error |
| 472 | 472 | ODU protection error | AC Zero crossing signal out error |
| 473 | 473 | ODU protection error | Compressor Lock error |
| 474 | 474 | ODU protection error | Heat Sink sensor error |
| 475 | 475 | Self-diagnostic error | Outdoor Fan 2 error |
| 484 | 484 | ODU protection error | PFC Overload error |
| 485 | 485 | ODU protection error | Input current sensor error |
| 500 | 500 | ODU protection error | Heat Sink Over Heat error |
| 554 | 554 | Self-diagnostic error | Gas leak detector |
| 556 | 556 | Configuration error | Outdoor unit Capacity Setup option error |
| 557 | 557 | Configuration error | Option Code Miss match indoor units |
| 601 | 601 | Communication error | Communication error between wired remote and |

| | | | |
|------------|-----|---------------------|---|
| | | | indoor unit. (When communication has stopped for 3 minutes after detecting indoor unit and wired remote control) |
| 602 | 602 | Communication error | Communication error between the Master and Slave wired remote controller. (Only one Master and one Slave can exist). |
| 604 | 604 | Communication error | Tracking 10 or more errors between wired remote control and indoor unit. |
| 606 | 606 | Installation error | -COM1, Com2 crossing connection error. -When wired remote is connected to indoor unit COM1 (F1, F2) terminals. |
| 607 | 607 | Configuration error | -Multiple Master error. (When using Master remote control). -Error occurs when two wired remotes are both set as Master in one COM line. |
| 609 | 609 | Configuration error | Indoor unit is not installed. (when the indoor unit is not detected after outside gearing option setting and tracking are finished). In case of using outside gear control. |
| 618 | 618 | Configuration error | -Exceeded maximum no. of installation for indoor units. -A reset is required after checking the number of indoor unit. |
| 619 | 619 | Configuration error | -Mixed installations for °C/°F indoor unit. (Only detected on master wired remote control). -Error occurs when mixed indoor units of °C and °F settings are installed. |
| 620 | 620 | Configuration error | -Wired remote control °C/°F setting error. -This error occurs if the indoor unit is set in °C while the wired remote is set in °F or vice versa. |
| 621 | 621 | Configuration error | This error occurs when the option setting of the Master and Slave wired remote controls are different from each other. |
| 627 | 627 | Configuration error | Slave wired remote control installation error (when two Slave wired remote controls are installed). |
| EA | EA | Configuration error | Wired remote controller COM2 option setting error. |
| 65535 (-1) | N/A | INMBSSAM001R000 | Error in the communication of INMBSSAM001R000 or Remote Controller with the AC unit. |

In case to detect an error code not listed, contact your closest Samsung technical support service.