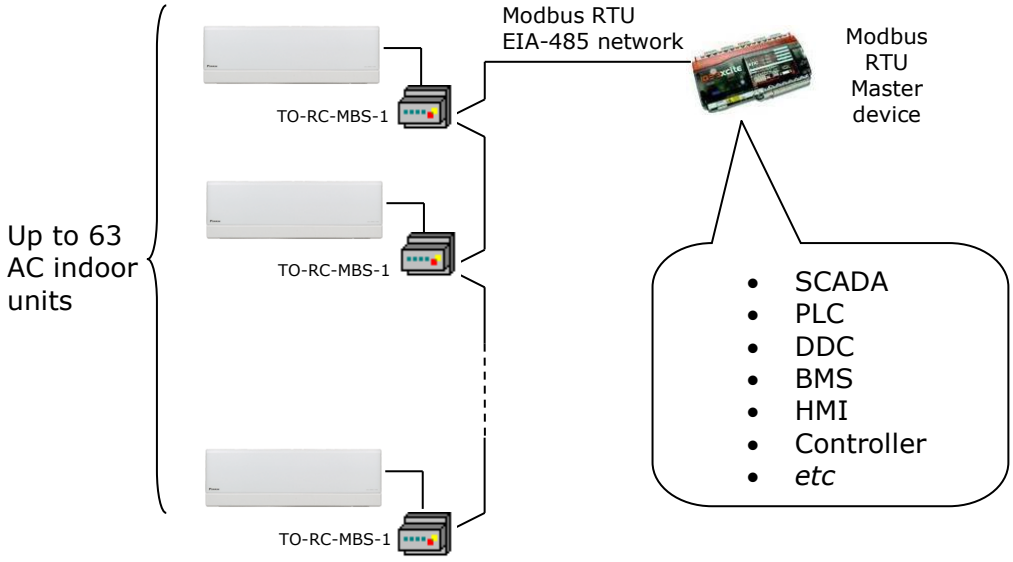
IntesisBox®
TO-RC-MBS-1

Modbus Interface for TOSHIBA Air Conditioners Digital Inverter & VRF lines



The TO-RC-MBS-1 interface allows a complete and natural integration of ***Toshiba*** 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 unit in some models of AC.*
- External power not required.
- Direct connection to Modbus RTU (EIA-485) networks. Up to 63 TO-RC-MBS-1 devices can be connected in the same network. TO-RC-MBS-1 is a Modbus Slave device.
- Direct connection to the AC indoor unit. Up to 16 AC indoor units can be connected to TO-RC-MBS-1, 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 using simultaneously remote controls and Modbus RTU.

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1. Modbus Interface

1.1 Modbus Functions

TO-RC-MBS-1 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 write operations on more than 1 register with the same request, this means that *length* field should always be 1 when this function is being used to write).

1.2 Modbus Communication parameters

TO-RC-MBS-1 implements a Modbus RTU (Slave) interface, to be connected to an EIA-485 line. The communication parameters are:

8N2 communication (8 data bits, no parity and 2 stop bit). It also supports 8N1 communication (1 stop bit). No need to change settings of DIP-switches.

Configurable baud rates:

- 2400 bps
- 4800 bps
- 9600 bps (Default)
- 19200 bps
- 38400 bps
- 57600 bps
- 76800 bps
- 115200 bps

2. List of compatible Toshiba AC indoor units.

A list of Toshiba indoor unit model references compatible with TO-RC-MBS-1 and their available features can be found at:

https://www.intesisbox.com/intesis/support/compatibilities/IntesisBox_TO-RC-xxx-1_Compatibility.pdf

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3. *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	0ºC to +60ºC
Weight	85 g.	Stock Temperature	-20ºC to +85ºC
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 AB bus Plug-in screw terminal block (2 poles): A, B Compatible with Toshiba networks	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		

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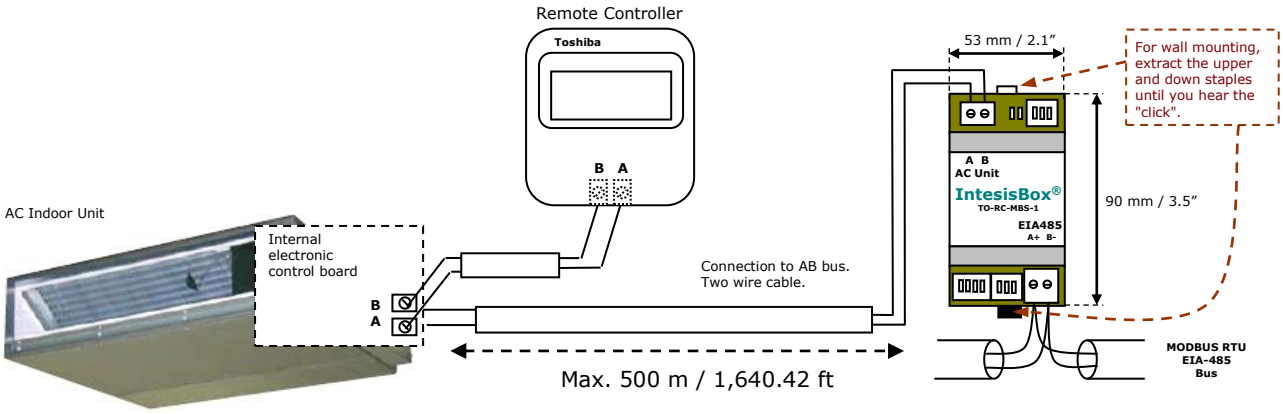
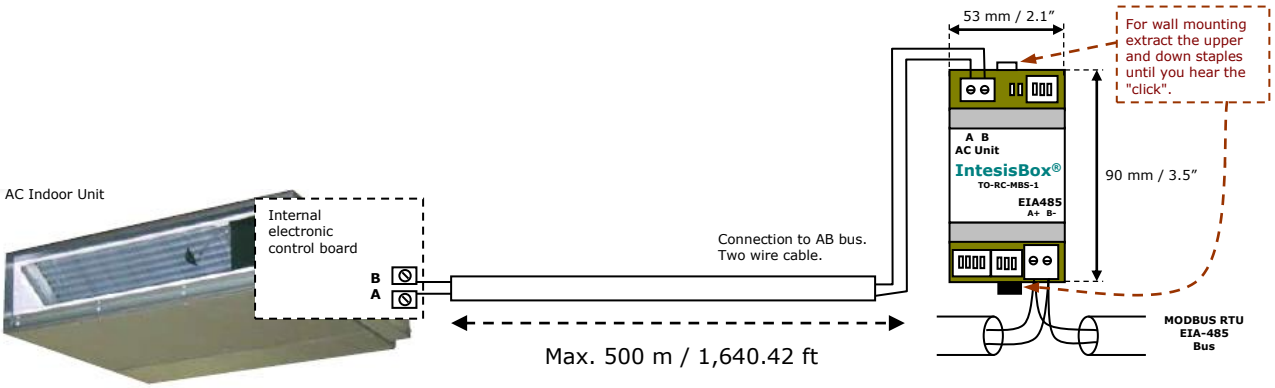
4. Connections

TO-RC-MBS-1 can be used with Remote Controller from Toshiba or without it. Use the *EIA485* connector in the TO-RC-MBS-1 to connect to the Modbus network.

- TO-RC-MBS-1 with Remote Controller from Toshiba



- TO-RC-MBS-1 without Remote Controller from Toshiba



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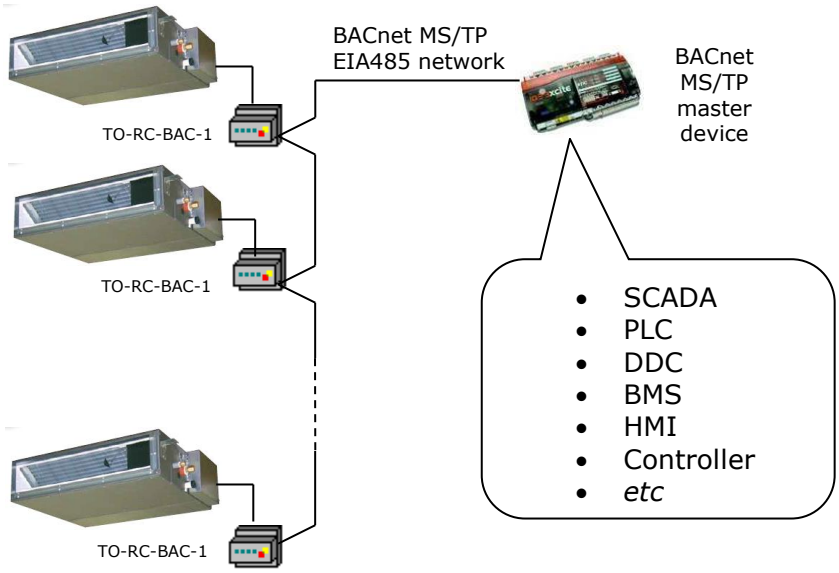
TO-RC-BAC-1

BACnet MS/TP & IP Interface for TOSHIBA Air Conditioners



The TO-RC-BAC-1 interface allows a complete and natural integration of ***Toshiba*** air conditioners into either BACnet IP or MS/TP networks. Compatible with the VRF line models commercialized by TOSHIBA

- Reduced dimensions. 93 x 53 x 58 mm.
- Quick and easy installation. *Mountable on DIN rail, wall, or even inside the indoor unit in some models of AC*.
- External power not required.
- Direct connection to BACnet networks. TO-RC-BAC-1 is a BACnet MS/TP master device or a BACnet IP server (depending on configuration).
- Direct connection to the AC indoor unit.
- Total Control and Supervision. Real states of the AC unit's internal variables.
- Allows using simultaneously the IR and wired remote controls and BACnet.

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1. BACnet Interface (Member Objets)

Object-name	Description	Object-type
TO-RC-BAC-1	Toshiba RC Interface	Device
OnOff_status		BI
OnOff_command		BO
Mode_status		MI
Mode_command		MO
SetPoint_status		AI
SetPoint_command		AO
FanSpeed_status		MI
FanSpeed_command		MO
AirDirectionUD_status		MI
AirDirctionUD_command		MO
Room_Temperature		AI
ErrorCode		AI
ErrorCodeM		MI
ErrorActive		BI
ErrorCodeAdress		AI
OnTimeCounter		AV
FilterSign		BI
FilterReset		BO
Occupancy		MV
OccupiedCoolSetPoint		AV
OccupiedHeatSetPoint		AV
UnoccupiedCoolSetPoint		AV
UnoccupiedHeatSetPoint		AV
OccupancyContinuousCheck		BV
UnoccupiedDeadbandAction		BV
RemoteControllerProhibit_statuss		MI
RemoteControllerProhibit_command		MO
RuntimeModeRestriction		MI

2. List of compatible Toshiba AC indoor units.

A list of Toshiba indoor unit model references compatible with TO-RC-BAC-1 and their available features can be found at:

http://intesis.com/pdf/IntesisBox_TO-RC-xxx-1_Toshiba_Compatibility.pdf

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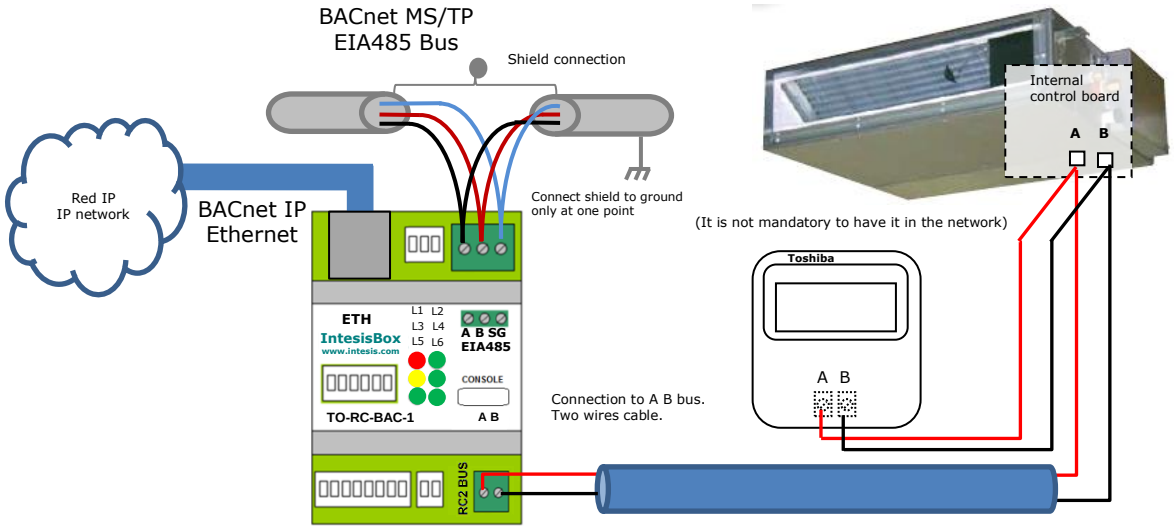
3. Connections

TO-RC-BAC-1 connects directly to the indoor unit connector using the **A B** connector and to the BACnet side using BACnet IP or BACnet MS/TP (See picture below).



4. Technical Specifications

Enclosure	Plastic, type PC (UL 94 V-0). Dimensions: 93mm x 53mm x 58mm. Weight: 85 g
Color	Light Grey. RAL 7035.
Terminal wiring (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 1 core: 0.5 … 2.5mm^2 2 cores: 0.5 … 1.5mm^2 3 cores: not permitted
Console Port	Mini USB port for console usage
Mounting	Wall. DIN rail EN60715 TH35.
BACnet MS/TP port	1 x EIA485 Plug-in screw terminal block (2 poles + GND)
LED indicators	6 x Gateway/Communication status
Operational temperature	0°C to +40°C
Operational humidity	5% to 95%, non-condensing
Isolation Voltage	*4000 VDC (between AC unit and EIA-485)* *1000 VDC (between AC unit and console)*
Protection	IP20 (IEC60529).
RoHS conformity	Compliant with RoHS directive (2002/95/CE).
Certifications	CE conformity to EMC directive (2004/108/EC) and Low-voltage directive (2006/95/EC) EN 61000-6-1 ;EN 61000-6-3; EN 60950-1; EN 50491-3 This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) This device may not cause harmful interference 2) This device must accept any interference received, including interference that may cause undesired operation.

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