

BACnet MS/TP Server & BACnet IP Server

Mitsubishi Heavy Industries Air Conditioning

Compatible with RAC* Series, FD Series, KX6 and KXR6 (VRF) Series air conditioners
commercialized by Mitsubishi Heavy Industries

USER MANUAL

Issue date: 02/2023 r1.6 ENGLISH



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Gateway for the integration of Mitsubishi Heavy Industries air conditioning units in BACnet enabled monitoring and control systems.

Compatible with RAC* Series, FD Series, KX6 and KXR6 (VRF) Series air conditioners commercialized by Mitsubishi Heavy Industries.

*RAC Series require optional SC-BIKN-E from MHI.

ORDER CODE	LEGACY ORDER CODE
INBACMHI001R000	MH-RC-BAC-1

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1 Description

1.1 Introduction

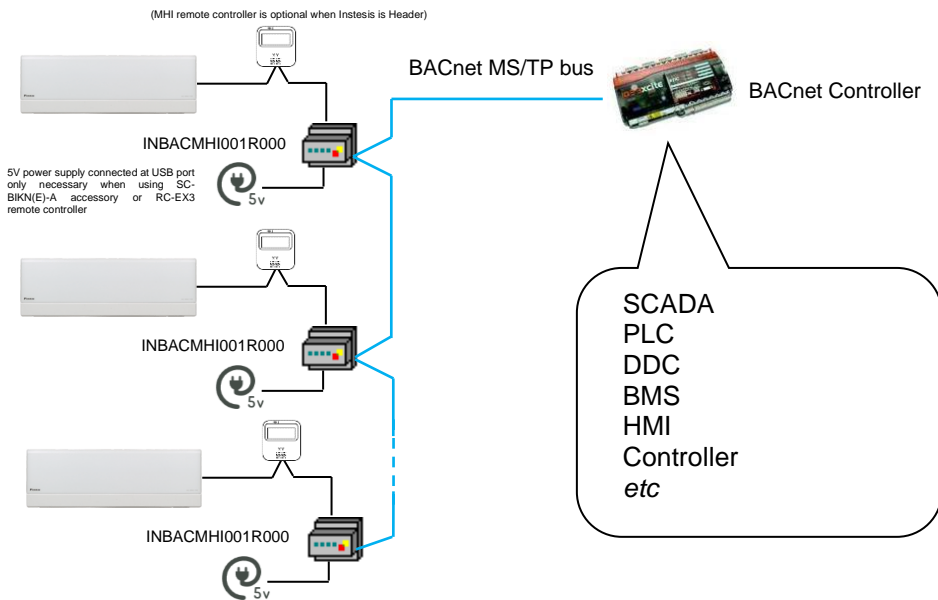
This document describes the integration of Mitsubishi Heavy Industries air conditioning systems into BACnet compatible devices and systems using the *INBACMH1001R000* gateway.

The aim of this integration is to monitor and control your Mitsubishi Heavy Industries air conditioning system, remotely, from your Control Center using any commercial SCADA or monitoring software that includes a BACnet driver, or connect it to other BACnet devices to do any automation. To do it so, Intesis allows BACnet communication allowing polling or subscription requests (COV).

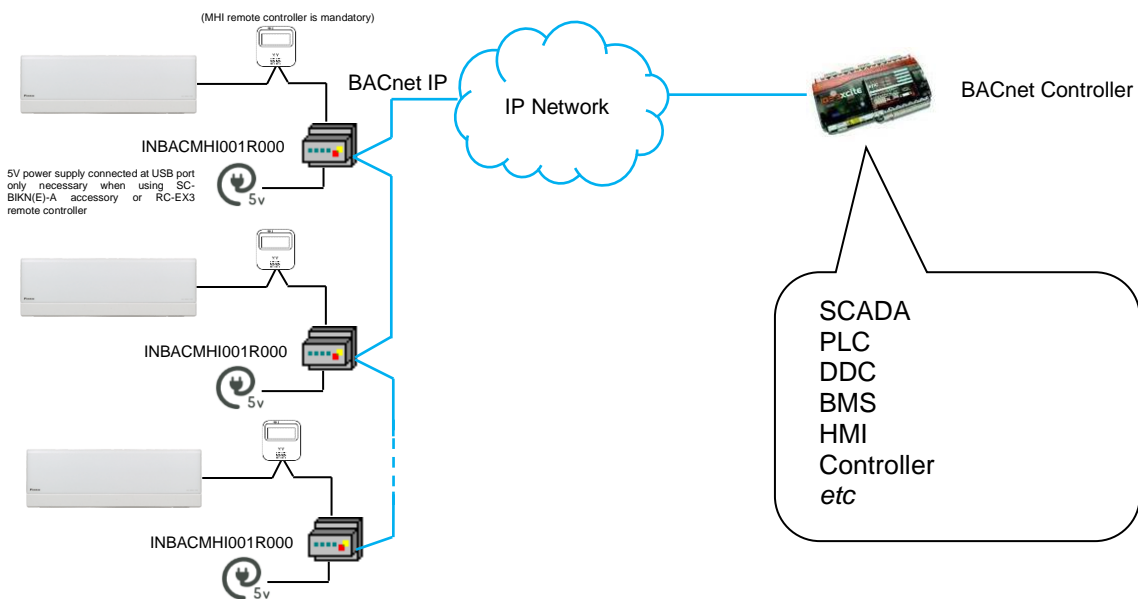
Intesis makes available the Mitsubishi Heavy Industries air conditioning system indoor units through independent BACnet objects.

Abstraction of Mitsubishi Heavy Industries air conditioning system properties and functionalities as fixed BACnet Objects. Intesis allows fixed BACnet object IDs mapping.

This document assumes that the user is familiar with BACnet and Mitsubishi Heavy Industries technologies and their technical terms.



BACnet MS/TP installation sketch



BACnet IP installation sketch

1.2 Functionality

Intesis continuously reads the Mitsubishi Heavy Industries AC system and keeps the updated status of all objects in its memory, ready to be served when requested from the BACnet side.

The role of Intesis consists in associate the elements of the Mitsubishi Heavy Industries AC system with BACnet objects.

The control of the indoor units through the INBACMHI001R000 is permitted, so commands towards the Mitsubishi Heavy Industries AC units are permitted too.

The indoor unit is offered in a set of BACnet objects and extra functionalities.

1.3 Capacity of Intesis

Intesis is capable of integrating one or more Mitsubishi Heavy Industries AC units and its associated elements.

Element	Max.	Notes
Number of indoor units	1*	Number of indoor units that can be controlled through Intesis
Number of Objects	30	Number of Mitsubishi Heavy Industries AC signals available as objects into Intesis.

* **NOTE:** Keep in mind that more than one unit can be connected to the same INBACMHI001R000 gateway. You can control then more than one AC unit, but it will be actuated as a single unit. Different commands to different AC units connected to the same INBACMHI001R000 will not be allowed.

1.4 Quick Setup

1. Install Intesis in the desired installation site (DIN rail mounting inside a metallic industrial cabinet connected to ground is recommended).
2. Connect the communication cables. Details in section 6.
3. Connect to Intesis USB port to 5V power-supply (only required if using RC-EX3 remote and/or SC-BIKN(E)-A).
4. (Optional) Connect Intesis to Ethernet and configure the Intesis using the configuration tool. Details in section 7.5.2.
5. Check the BACnet objects list for its integration to your BACnet project. Details in section 5.2.
6. Check if there is communication between BACnet and AC system. Details in section 7.5.3.
7. The Intesis is ready to be used in your system.

2 Protocol Implementation Conformance Statement

BACnet Protocol Implementation Conformance Statement (PICS)

Date: 2014-12-05

Vendor Name: HMS Industrial Networks S.L.U

Product Name: INBACMHI001R000

Product Model Number: INBACMHI001R000

Application Software Version: 1.0

Firmware Revision: 1.0.0.0

BACnet Protocol Revision: 12

Product Description:

Mitsubishi Heavy Industries air conditioning system – BACnet MS/TP & BACnet IP Gateway

Abstraction of Mitsubishi Heavy Industries air conditioning system properties and functionalities as BACnet Objects.

2.1 BACnet Standardized Device Profile (Annex L):

- BACnet Operator Workstation (B-OWS)
- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
- BACnet Smart Sensor (B-SS)
- BACnet Smart Actuator (B-SA)

Additional BACnet Interoperability Building Blocks Supported (Annex K):
Reference of BIBBs List

2.2 Segmentation Capability:

Segmented request supported No Yes Window Size 16

Segmented responses supported No Yes Window Size 16

2.3 Data Link Layer Options:

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) _____
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 76800
- MS/TP slave (Clause 9), baud rate(s): _____
- Point-To-Point, EIA 232 (Clause 10), baud rate(s): _____
- Point-To-Point, modem, (Clause 10), baud rate(s): _____
- LonTalk, (Clause 11), medium: _____
- Other: _____

2.4 Device Address Binding:

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) Yes No

2.5 Networking Options:

- Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
- Annex H, BACnet Tunneling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)
Does the BBMD support registrations by Foreign Devices? Yes No

2.6 Character Sets Supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- ANSI X3.4
- IBM™/Microsoft™ DBCS
- JIS C 6226
- ISO 10646 (UCS-4)
- ISO 10646 (UCS-2)
- ISO 8859-1

2.7 Gateway

If this product is a communication gateway, describe the types of non-BACnet equipment/network(s) that the gateway supports:

Mitsubishi Heavy Industries Air Conditioning with RAC Series, FD Series, KX6 and KXR6 (VRF) Series air conditioners commercialized by Mitsubishi Heavy Industries.

3 BACnet Interoperability Building Blocks Supported (BIBBs)

3.1 Data Sharing BIBBs

BIBB Type		Active	BACnet Service	Initiate	Execute
DS-RP-A	Data Sharing-ReadProperty–A	<input type="checkbox"/>	ReadProperty	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DS-RP-B	Data Sharing-ReadProperty–B	<input checked="" type="checkbox"/>	ReadProperty	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DS-RPM-A	Data Sharing-ReadPropertyMultiple–A	<input type="checkbox"/>	ReadPropertyMultiple	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DS-RPM-B	Data Sharing-ReadPropertyMultiple–B	<input checked="" type="checkbox"/>	ReadPropertyMultiple	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DS-RPC-A	Data Sharing-ReadPropertyConditiona–A	<input type="checkbox"/>	ReadPropertyConditional	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DS-RPC-B	Data Sharing-ReadPropertyConditional–B	<input type="checkbox"/>	ReadPropertyConditional	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DS-WP-A	Data Sharing-WriteProperty–A	<input type="checkbox"/>	WriteProperty	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DS-WP-B	Data Sharing-WriteProperty–B	<input checked="" type="checkbox"/>	WriteProperty	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DS-WPM-A	Data Sharing-WritePropertyMultiple–A	<input type="checkbox"/>	WritePropertyMultiple	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DS-WPM-B	Data Sharing-WritePropertyMultiple–B	<input checked="" type="checkbox"/>	WritePropertyMultiple	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DS-COV-A	Data Sharing-COV–A	<input type="checkbox"/>	SubscribeCOV	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	ConfirmedCOVNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	UnconfirmedCOVNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DS-COV-B	Data Sharing-COV–B	<input checked="" type="checkbox"/>	SubscribeCOV	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input checked="" type="checkbox"/>	ConfirmedCOVNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input checked="" type="checkbox"/>	UnconfirmedCOVNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DS-COVP-A	Data Sharing-COVP–A	<input type="checkbox"/>	SubscribeCOV	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	ConfirmedCOVNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	UnconfirmedCOVNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DS-COVP-B	Data Sharing-COVP–B	<input type="checkbox"/>	SubscribeCOV	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	ConfirmedCOVNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	UnconfirmedCOVNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DS-COVU-A	Data Sharing-COV-Unsolicited–A	<input type="checkbox"/>	UncofirmedCOVNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DS-COVU-B	Data Sharing-COV-Unsolicited–B	<input type="checkbox"/>	UncofirmedCOVNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>

3.2 Alarm and Event Management BIBBs

BIBB Type		Active	BACnet Service	Initiate	Execute
AE-N-A	Alarm and Event-Notification–A	<input type="checkbox"/>	ConfirmedEventNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	UnconfirmedEventNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
AE-N-I-B	Alarm and Event-Notification Internal–B	<input type="checkbox"/>	ConfirmedEventNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	UnconfirmedEventNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AE-N-E-B	Alarm and Event-Notification External–B	<input type="checkbox"/>	ConfirmedEventNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	UnconfirmedEventNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AE-ACK-A	Alarm and Event-ACK–A	<input type="checkbox"/>	AcknowledgeAlarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AE-ACK-B	Alarm and Event-ACK–B	<input type="checkbox"/>	AcknowledgeAlarm	<input type="checkbox"/>	<input checked="" type="checkbox"/>
AE-ASUM-A	Alarm and Event-Summary–A	<input type="checkbox"/>	GetAlarmSummary	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AE-ASUM-B	Alarm and Event-Summary–B	<input type="checkbox"/>	GetAlarmSummary	<input type="checkbox"/>	<input checked="" type="checkbox"/>
AE-ESUM-A	Event-Summary–A	<input type="checkbox"/>	GetEnrollmentSummary	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AE-ESUM-B	Event-Summary–B	<input type="checkbox"/>	GetEnrollmentSummary	<input type="checkbox"/>	<input checked="" type="checkbox"/>
AE-INFO-A	Alarm and Event-Information–A	<input type="checkbox"/>	GetEventInformation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AE-INFO-B	Alarm and Event-Information–B	<input type="checkbox"/>	GetEventInformation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
AE-LS-A	Alarm and Event-LifeSafety–A	<input type="checkbox"/>	LifeSafetyOperation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AE-LS-B	Alarm and Event-LifeSafety–B	<input type="checkbox"/>	LifeSafetyOperation	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3.3 Scheduling BIBBs

BIBB Type		Active	BACnet Service	Initiate	Execute
SCHEd-A	Scheduling–A (must support DS-RP-A and DS-WP-A)	<input type="checkbox"/>			
		<input type="checkbox"/>			
SCHEd-I-B	Scheduling-Internal–B (shall support DS-RP-B and DS-WP-B) (shall also support ether DM-TS-B or DS-UTC-B)	<input type="checkbox"/>			
		<input type="checkbox"/>			
SCHEd-E-B	Scheduling-External–B (shall support SCHEd-I-B and DS-WP-A)	<input type="checkbox"/>			
		<input type="checkbox"/>			
T-VMT-A	Trending - Viewing and Modifying Trends–A	<input type="checkbox"/>	ReadRange	<input type="checkbox"/>	<input checked="" type="checkbox"/>
T-VMT-I-B	Trending - Viewing and Modifying Trends Internal–B	<input type="checkbox"/>	ReadRange	<input type="checkbox"/>	<input checked="" type="checkbox"/>
T-VMT-E-B	Trending - Viewing and Modifying Trends External–B	<input type="checkbox"/>	ReadRange	<input type="checkbox"/>	<input checked="" type="checkbox"/>
T-ATR-A	Trending - Automated Trend Retrieval–A	<input type="checkbox"/>	ConfirmedEventNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	ReadRange	<input checked="" type="checkbox"/>	<input type="checkbox"/>
T-ATR-B	Trending - Automated Trend Retrieval–B	<input type="checkbox"/>	ConfirmedEventNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	ReadRange	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3.4 Trending BIBBs

BIBB Type		Active	BACnet Service	Initiate	Execute
T-VMT-A	Trending - Viewing and Modifying Trends–A	<input type="checkbox"/>	ReadRange	<input checked="" type="checkbox"/>	<input type="checkbox"/>
T-VMT-I-B	Trending - Viewing and Modifying Trends Internal–B	<input type="checkbox"/>	ReadRange	<input type="checkbox"/>	<input checked="" type="checkbox"/>
T-VMT-E-B	Trending - Viewing and Modifying Trends External–B	<input type="checkbox"/>	ReadRange	<input type="checkbox"/>	<input checked="" type="checkbox"/>
T-ATR-A	Trending - Automated Trend Retrieval–A	<input type="checkbox"/>	ConfirmedEventNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	ReadRange	<input checked="" type="checkbox"/>	<input type="checkbox"/>
T-ATR-B	Trending - Automated Trend Retrieval–B	<input type="checkbox"/>	ConfirmedEventNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	ReadRange	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3.5 Network Management BIBBs

BIBB Type		Active	BACnet Service	Initiate	Execute
NM-CE-A	Network Management - Connection Establishment–A	<input type="checkbox"/>	Establish-Connection-To-Network	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	Disconnect-Connection-To-Network	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NM-CE-B	Network Management - Connection Establishment– B	<input type="checkbox"/>	Establish-Connection-To-Network	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	Disconnect-Connection-To-Network	<input type="checkbox"/>	<input checked="" type="checkbox"/>
NM-RC-A	Network Management - Router Configuration–A	<input type="checkbox"/>	Who-Is-Router-To-Network	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	I-Am-Router-To-Network	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	I-Could-Be-Router-To-Network	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	Initialize-Routing-Table	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	Initialize-Routing-Table-Ack	<input type="checkbox"/>	<input checked="" type="checkbox"/>
NM-RC-B	Network Management - Router Configuration–B	<input type="checkbox"/>	Who-Is-Router-To-Network	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	I-Am-Router-To-Network	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	Initialize-Routing-Table	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	Initialize-Routing-Table-Ack	<input checked="" type="checkbox"/>	<input type="checkbox"/>

3.6 Device Management BIBBs

BIBB Type	Active	BACnet Service	Initiate	Execute
DM-DDB-A	<input type="checkbox"/>	Who-Is	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	I-Am	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-DDB-B	<input checked="" type="checkbox"/>	Who-Is	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>	I-Am	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-DOB-A	<input type="checkbox"/>	Who-Has	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	I-Have	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-DOB-B	<input checked="" type="checkbox"/>	Who-Has	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>	I-Have	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-DCC-A	<input type="checkbox"/>	DeviceCommunicationControl	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-DCC-B	<input checked="" type="checkbox"/>	DeviceCommunicationControl	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-PT-A	<input type="checkbox"/>	ConfirmedPrivateTransfer	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	UnconfirmedPrivateTransfer	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-PT-B	<input type="checkbox"/>	ConfirmedPrivateTransfer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	UnconfirmedPrivateTransfer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-TM-A	<input type="checkbox"/>	ConfirmedTextMessage	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	UnconfirmedTextMessage	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-TM-B	<input type="checkbox"/>	ConfirmedTextMessage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	UnconfirmedTextMessage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-TS-A	<input type="checkbox"/>	TimeSynchronization	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-TS-B	<input type="checkbox"/>	TimeSynchronization	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-UTC-A	<input type="checkbox"/>	UTCTimeSynchronization	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-UTC-B	<input type="checkbox"/>	UTCTimeSynchronization	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-RD-A	<input type="checkbox"/>	ReinitializeDevice	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-RD-B	<input checked="" type="checkbox"/>	ReinitializeDevice	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-BR-A	<input type="checkbox"/>	AtomicReadFile	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AtomicWriteFile	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	CreateObject	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	ReinitializeDevice	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-BR-B	<input type="checkbox"/>	AtomicReadFile	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	AtomicWriteFile	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	ReinitializeDevice	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-R-A	<input type="checkbox"/>	UnconfirmedCOVNotification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-R-B	<input type="checkbox"/>	UnconfirmedCOVNotification	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-LM-A	<input type="checkbox"/>	AddListElement	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	RemoveListElement	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-LM-B	<input type="checkbox"/>	AddListElement	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	RemoveListElement	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-OCD-A	<input type="checkbox"/>	CreateObject	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	DeleteObject	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DM-OCD-B	<input type="checkbox"/>	CreateObject	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	DeleteObject	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DM-VT-A	<input type="checkbox"/>	VT-Open	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	VT-Close	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	VT-Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DM-VT-B	<input type="checkbox"/>	VT-Open	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	VT-Close	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	VT-Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

4 Service Types

Service type	Service name	Supported	Remarks
Alarm and Event Services	AcknowledgeAlarm	<input type="checkbox"/>	
	ConfirmedCOVNotification	<input type="checkbox"/>	
	ConfirmedEventNotification	<input type="checkbox"/>	
	GetAlarmSummary	<input type="checkbox"/>	
	GetEnrollmentSummary	<input type="checkbox"/>	
	SubscribeCOV	<input checked="" type="checkbox"/>	
File Access Services	AtomicReadFile	<input type="checkbox"/>	
	AtomicWriteFile	<input type="checkbox"/>	
Object Access Services	AddListElement	<input type="checkbox"/>	
	RemoveListElement	<input type="checkbox"/>	
	CreateObject	<input type="checkbox"/>	
	DeleteObject	<input type="checkbox"/>	
	ReadProperty	<input checked="" type="checkbox"/>	
	ReadPropertyConditional	<input type="checkbox"/>	
	ReadPropertyMultiple	<input checked="" type="checkbox"/>	
	ReadRange	<input type="checkbox"/>	
	WriteProperty	<input checked="" type="checkbox"/>	
	WritePropertyMultiple	<input checked="" type="checkbox"/>	
Remote Device Management Services	DeviceCommunicationControl	<input type="checkbox"/>	
	ConfirmedPrivateTransfer	<input type="checkbox"/>	
	ConfirmedTextMessage	<input type="checkbox"/>	
	ReinitializeDevice	<input checked="" type="checkbox"/>	
Virtual Terminal Services	VtOpen	<input type="checkbox"/>	
	VtClose	<input type="checkbox"/>	
	VtData	<input type="checkbox"/>	
Security Services	Authenticate	<input type="checkbox"/>	
	RequestKey	<input type="checkbox"/>	
Unconfirmed Services	I-Am	<input checked="" type="checkbox"/>	
	I-Have	<input checked="" type="checkbox"/>	
	UnconfirmedCOVNotification	<input type="checkbox"/>	
	UnconfirmedEventNotification	<input type="checkbox"/>	
	UnconfirmedPrivateTransfer	<input type="checkbox"/>	
	UnconfirmedTextMessage	<input type="checkbox"/>	
	TimeSynchronization	<input type="checkbox"/>	
	UtcTimeSynchronization	<input type="checkbox"/>	
	Who-Has	<input checked="" type="checkbox"/>	
	Who-Is	<input checked="" type="checkbox"/>	
	LifeSafetyOperation	<input type="checkbox"/>	
	SubscribeCOVProperty	<input checked="" type="checkbox"/>	
	GetEventInformation	<input type="checkbox"/>	

5 Objects

5.1 Supported Object Types

The objects supported are shown in the table below.

Object Type	ID	Supported	Management Point
Analog-Input	0	<input checked="" type="checkbox"/>	SetPoint_status RoomTemperature_status ErrorCode ErrorAddress OutdoorTemp_status
Analog-Output	1	<input checked="" type="checkbox"/>	SetPoint_command RoomTemperature_command
Analog-Value	2	<input checked="" type="checkbox"/>	OnTimeCounter OccupiedCoolSetPoint OccupiedHeatSetPoint UnoccupiedCoolSetPoint UnoccupiedHeatSetPoint
Averaging	18	<input type="checkbox"/>	
Binary-Input	3	<input checked="" type="checkbox"/>	OnOff_status ErrorActive FilterSign
Binary-Output	4	<input checked="" type="checkbox"/>	OnOff_command ErrorReset FilterReset
Binary-Value	5	<input checked="" type="checkbox"/>	OccupancyContinousCheck UnoccupiedDeadBandAction LockRemoteControl
Calendar	6	<input type="checkbox"/>	
Command	7	<input type="checkbox"/>	
Device	8	<input checked="" type="checkbox"/>	INBACMHI001R000
Event-Enrollment	9	<input type="checkbox"/>	
File	10	<input type="checkbox"/>	
Group	11	<input type="checkbox"/>	
Life-Safety-Point	21	<input type="checkbox"/>	
Life-Safety-Zone	22	<input type="checkbox"/>	
Loop	12	<input type="checkbox"/>	
Multistate-Input	13	<input checked="" type="checkbox"/>	Mode_status FanSpeed_status AirDirectionUD_status ErrorCodeM CenterRemote
Multistate-Output	14	<input checked="" type="checkbox"/>	Mode_command FanSpeed_command AirDirectionUD_command
Multistate-Value	19	<input checked="" type="checkbox"/>	Occupancy
Notification-Class	15	<input type="checkbox"/>	
Program	16	<input type="checkbox"/>	
Schedule	17	<input type="checkbox"/>	
Trend-Log	20	<input type="checkbox"/>	

5.2 Member objects

5.2.1 Type: Gateway

Object-name	Description	Object-type	Object-instance
INBACMHI001R000	Mitsubishi Heavy Industries RC Interface	Device	246000*

5.2.2 Type: Indoor Unit

Object-name	Description	Object-type	Object-instance
OnOff_status		BI	0
OnOff_command		BO	0
Mode_status		MI	0
Mode_command		MO	0
SetPoint_status		AI	0
SetPoint_command		AO	0
FanSpeed_status		MI	1
FanSpeed_command		MO	1
AirDirectionUD_status		MI	2
AirDirectionUD_command		MO	2
RoomTemperature_status		AI	1
RoomTemperature_command		AO	1
ErrorCode		AI	2
ErrorCodeM		MI	4
ErrorActive		BI	1
ErrorAddress		AI	4
ErrorReset		BO	5
OnTimeCounter		AV	0
FilterSign		BI	6
FilterReset		BO	4
Occupancy		MV	0
OccupiedCoolSetPoint		AV	1
OccupiedHeatSetPoint		AV	2
UnoccupiedCoolSetPoint		AV	3
UnoccupiedHeatSetPoint		AV	4
OccupancyContinuousCheck		BV	0
UnoccupiedDeadbandAction		BV	1
LockRemoteControl		BV	2
OutdoorTemp_status		AI	8
CenterRemote		MI	9

* This is the default value. Check section 5.3 (below) for more information.

5.3 Objects and properties

Below you can find relevant information for the objects and properties.

Object_Identifier: In the **Device Object**, is configurable writing directly on the property. either from BACnet or through our configuration tools and can be set automatically or manually. When set automatically, it is set using a base address and the address selected in SW2 P1..P7. The base address can be selected using the configuration tool. When set manually, the address is directly the one configured on the configuration tool. See section 7.4 for more information

Object_Name: In the **Device Object**, is configurable writing directly on this property. This can be done using the configuration tools too. See section 7.5 for more information.

Description: In the **Device Object**, is configurable writing directly on the property, length maximum 63 chars. This string is configurable using the configuration tool. See section 7.5 for more information.

5.3.1 Mitsubishi Heavy Industries AC Gateway (Device Object Type)

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Device, 246000)	R	R
Object_Name	CharacterString	"INBACMHI001R000"	R	R
Object_Type	BACnetObjectType	DEVICE (8) (Device Object Type)	R	R
System_Status	BACnetDeviceStatus	OPERATIONAL (0)	R	R
Vendor_Name	CharacterString	"HMS Industrial Networks S.L.U"	R	R
Vendor_Identifier	Unsigned16	246	R	R
Model_Name	CharacterString	"INBACMHI001R000"	R	R
Firmware_Revision	CharacterString	"1.0.0.0"	R	R
Application_Software_Version	CharacterString	"1.0.0.0"	R	R
Location	CharacterString	""	O	-
Description	CharacterString	"Mitsubishi Heavy Industries RC interface"	O	R
Protocol_Version	Unsigned	1	R	R
Protocol_Revision	Unsigned	12	R	R
Protocol_Services_Supported	BACnetServiceSupported	Refer to section 4 [Service Types]	R	R
Protocol_Object_Types_Supported	BACnetObjectTypes Supported	Refer to section 5.1 [Object Types]	R	R
Object_List	BACnetArray[N] of BACnetObjectIdentifier	BACnetARRAY[N]	R	R
Structured_Object_List	BACnetArray[N] of BACnetObjectIdentifier	-	O	-
Max_APDU_Length_Accepted	Unsigned	480 when MSTP / 1476 when BACnet/IP	R	R
Segmentation_Supported	BACnetSegmentation	SEGMENTED-BOTH (0)	R	R
Max_Segments_accepted	Unsigned	16	O	R
VT_Classes_Supported	List of BACnetVTClass	-	O	-
Active_VT_Sessions	List of BACnetVTSession	-	O	-
Local_Date	Date	-	O	-

Local_Time	Time	-	O	-
UTC_Offset	INTEGER	-	O	-
Daylight_Savings_Status	BOOLEAN	-	O	-
APDU_Segment_Timeout	Unsigned	3000	R	R
APDU_Timeout	Unsigned	3000	R	R
Number_of_APDU_Retries	Unsigned	3	R	R
List_Of_Session_Keys	List of BACnetSessionKey	-	O	-
Time_Synchronization_Recipients	List of BACnetRecipient	-	O	-
Max_Master * **	Unsigned	127	R	W
Max_Info_Frames *	Unsigned	1	O	R
Device_Address_Binding	List of BACnetAddressBinding	NULL (empty)	R	R
Database_Revision	Unsigned	0	R	R
Configuration_Files	BACnetArray[N] of BACnetObjectIdentifier	-	O	-
Last_Restore_Time	BACnetTimeStamp	-	O	-
Backup_Failure_Timeout	Unsigned16	-	O	-
Active_COV_Subscriptions	List of BACnetCOVSubscription	List of BACnetCOVSubscription	O	R
Slave_Proxy_Enable	BACnetArray[N] of BOOLEAN	-	O	-
Manual_Slave_Address_Binding	List of BACnetAddressBinding	-	O	-
Auto_Slave_Discovery	BACnetArray[N] of BOOLEAN	-	O	-
Slave_Address_Binding	BACnetAddressBinding	-	O	-
Last_Restart_Reason	BACnetRestartReason	-	O	-
Time_Of_Device_Restart	BACnetTimeStamp	-	O	-
Restart_Notification_Recipients	List of BACnetRecipient	-	O	-
UTC_Time_Synchronization_Recipients	List of BACnetRecipient	-	O	-
Time_Synchronization_Interval	Unsigned	-	O	-
Align_Intervals	BOOLEAN	-	O	-
Interval_Offset	Unsigned	-	O	-
Profile_Name	CharacterString	-	O	-

* Only available when MSTP is used

** Configurable through the configuration tool. See section 7.5 for more information.

5.3.2 OnOff_status (Binary Input Object Type)

It indicates if the indoor unit is in On or Off status.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Input, 0)	R	R
Object_Name	CharacterString	"OnOff_status"	R	R
Object_Type	BACnetObjectType	BINARY_INPUT (3)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Off"	O	R
Active_Text	CharacterString	"On"	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.3 OnOff_command (Binary Output Object Type)

It sets the indoor unit to On or Off.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Output, 0)	R	R
Object_Name	CharacterString	"OnOff_command"	R	R
Object_Type	BACnetObjectType	BINARY_OUTPUT (4)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Off"	O	R
Active_Text	CharacterString	"On"	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Minimum_Off_Time	Unsigned32	-	O	-
Minimum_On_Time	Unsigned32	-	O	-
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	BACnetBinaryPV	INACTIVE (0)	R	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Feedback_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.4 Mode_status (Multistate Input Object Type)

It indicates the active mode for the indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, 0)	R	R
Object_Name	CharacterString	"Mode_status"	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT (13)	R	R
Present_Value	Unsigned	1 ~ 7	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	7	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Mode Status setting table below.</i>	O	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Values	List of Unsigned	-	O	-
Fault_Values	List of Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Mode status setting table

Mode status interpretation is possible using the value in the following correspondence table.

Present_Value	Contents displayed in State_Text
1	Heat
2	Cool
3	Fan
4	Dry
5	Auto
6	AutoCool
7	AutoHeat

5.3.5 Mode_command (Multistate Output Object Type)

It allows control over the indoor unit's mode.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, 0)	R	R
Object_Name	CharacterString	"Mode_command"	R	R
Object_Type	BACnetObjectType	MULTISTATE_OUTPUT (14)	R	R
Present_Value	Unsigned	1 ~ 5	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	5	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Mode Command setting table below</i>	O	R
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	Unsigned	1	R	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Feedback_Value	Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Mode Command setting table

Mode commands can be set using the values in the following correspondence table.

Present_Value	Contents displayed in State_Text
1	Heat
2	Cool
3	Fan
4	Dry
5	Auto

5.3.6 Setpoint_status (Analog Input Object Type)

It indicates the current setpoint temperature in the indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, 0)	R	R
Object_Name	CharacterString	"SetPoint_status"	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	16...32 °C 60...90 °F	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units **	BACnetEngineeringUnits	Degrees Celsius (62), Degrees Fahrenheit (64)	R	R
Min_Pres_Value	REAL	16 °C // 60 °F	O	R
Max_Pres_Value	REAL	32 °C // 90 °F	O	R
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

** Use of Celsius or Fahrenheit units can be selected through the switch configuration. Check section 6.1 for more information.

5.3.7 Setpoint_command (Analog Output Object Type)

It sets the desired temperature in the indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Output, 0)	R	R
Object_Name	CharacterString	"SetPoint_command"	R	R
Object_Type	BACnetObjectType	ANALOG_OUTPUT (1)	R	R
Present_Value	REAL	16...32 °C 60...90 °F	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units **	BACnetEngineeringUnits	Degrees Celsius (62), Degrees Fahrenheit (64)	R	R
Min_Pres_Value	REAL	16 °C // 60 °F	O	R
Max_Pres_Value	REAL	32 °C // 90 °F	O	R
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	Unsigned	22	R	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

** Use of Celsius or Fahrenheit units can be selected through the switch configuration. Check section 6.1 for more information.

5.3.8 FanSpeed_status (Multistate Input Object Type)

It indicates the fan speed status of the indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, 1)	R	R
Object_Name	CharacterString	"FanSpeed_status"	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT (13)	R	R
Present_Value	Unsigned	1 ~ 4	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	4	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Fan Speed status setting table below.</i>	O	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Values	List of Unsigned	-	O	-
Fault_Values	List of Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Fan Speed status setting table

Fan speed interpretation is possible using the value in the following correspondence table.

Present_Value	Contents displayed in State_Text
1	Auto
2	Fan Speed 1
3	Fan Speed 2
4	Fan Speed 3
5	Fan Speed 4

5.3.9 FanSpeed_command (Multistate Output Object Type)

It allows control over the fan speed for the indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, 1)	R	R
Object_Name	CharacterString	"FanSpeed_command"	R	R
Object_Type	BACnetObjectType	MULTISTATE_OUTPUT (14)	R	R
Present_Value	Unsigned	1 ~ 4	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	4	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Fan Speed command setting table below</i>	O	R
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	Unsigned	1	R	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Feedback_Value	Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Fan Speed command setting table

Fan speed interpretation is possible using the value in the following correspondence table.

Present_Value	Contents displayed in State_Text
1	Auto
2	Fan Speed 1
3	Fan Speed 2
4	Fan Speed 3
5	Fan Speed 4

5.3.10 AirDirectionUD_status (Multistate Input Object Type)

It indicates the status of the vertical vane (Up/Down) for the indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, 2)	R	R
Object_Name	CharacterString	"AirDirectionUD_status"	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT(13)	R	R
Present_Value	Unsigned	1 ~ 5	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	5	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Air Direction Status table below.</i>	O	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Values	List of Unsigned	-	O	-
Fault_Values	List of Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Air direction Up/Down status table

Air direction interpretation is possible using the value in the following correspondence table.

Present_Value	Contents displayed in State_Text
1	Pos-1
2	Pos-2
3	Pos-3
4	Pos-4
5	Swing

5.3.11 AirDirectionUD_command (Multistate Output Object Type)

It allows control over the vertical air direction (Up/Down) for the indoor unit. Note that, in case indoor unit has vanes, INBACMHI001R000 switch configuration needs to be set accordingly. See installation sheet for detail.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, 2)	R	R
Object_Name	CharacterString	"AirDirectionUD_command"	R	R
Object_Type	BACnetObjectType	MULTISTATE_OUTPUT (14)	R	R
Present_Value	Unsigned	1 ~ 5	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	5	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Air Direction Command table below</i>	O	R
Priority_Array	BACnetPriorityArray	-	R	R
Relinquish_Default	Unsigned	-	R	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Feedback_Value	Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Air direction Up/Down Command table

Air direction commands can be set using the values in the following correspondence table.

Present_Value	Contents displayed in State_Text
1	Pos-1
2	Pos-2
3	Pos-3
4	Pos-4
5	Swing

5.3.12 RoomTemperature_status (Analog Input Object Type)

It indicates the room temperature from the sensor in the indoor unit or the remote controller, depending on indoor unit configuration.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, 1)	R	R
Object_Name	CharacterString	"RoomTemperature_status"	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-10...50	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	Degrees Celsius (62) Degrees Fahrenheit (64)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.13 RoomTemperature_command (Analog Output Object Type)

It sets the room temperature to be used on the Mitsubishi Heavy Industries Ac system. Note that this parameter can only take effect when INBACMHI001R000 is setup as Master of X-Y bus (see installation sheet for more detail).

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Output, 1)	R	R
Object_Name	CharacterString	"RoomTemperature_command"	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-10...50	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units **	BACnetEngineeringUnits	Degrees Celsius (62) Degrees Fahrenheit (64)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	Unsigned	22	R	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

** Use of Celsius or Fahrenheit units can be selected through the switch configuration. Check section 6.1 for more information.

5.3.14 ErrorCode (Analog Input Object Type)

It indicates the current error present in the AC system.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, 2)	R	R
Object_Name	CharacterString	"ErrorCode"	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-1... 92*	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	300	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

* Check section 0 for more information about each error code.

5.3.15 ErrorCodeM (Multistate Input Object Type)

It indicates the current error present in the AC system.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, 4)	R	R
Object_Name	CharacterString	"ErrorCodeM"	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT(13)	R	R
Present_Value	Unsigned	1 ~ 92	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	92	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Error Code table below.</i>	O	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Values	List of Unsigned	-	O	-
Fault_Values	List of Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Error Code table

In the table below you will find the error correspondence value.

Pesent_Value	State_Text
1	
2	CommError
3	E1
4	E2
5	E3
6	E4
7	E5
8	E6
9	E7
10	E8
11	E9
12	E10
13	E11
14	E12
15	E13
16	E14
17	E15
18	E16
19	E17
20	E18
21	E19
22	E20
23	E21
24	E22
25	E23
26	E24
27	E25
28	E26
29	E27
30	E28
31	E29

Pesent_Value	State_Text
32	E30
33	E31
34	E32
35	E33
36	E34
37	E35
38	E36
39	E37
40	E38
41	E39
42	E40
43	E41
44	E42
45	E43
46	E44
47	E45
48	E46
49	E47
50	E48
51	E49
52	E50
53	E51
54	E52
55	E53
56	E54
57	E55
58	E56
59	E57
60	E58
61	E59
62	E60

Pesent_Value	State_Text
63	E61
64	E62
65	E63
66	E64
67	E65
68	E66
69	E67
70	E68
71	E69
72	E70
73	E71
74	E72
75	E73
76	E74
77	E75
78	E76
79	E77
80	E78
81	E79
82	E80
83	E81
84	E82
85	E83
86	E84
87	E85
88	E86
89	E87
90	E88
91	E89
92	E90

Check section 0 for more information about each error code.

5.3.16 ErrorActive (Binary Input Object Type)

It indicates if there is an active error in the indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Input, 1)	R	R
Object_Name	CharacterString	"ErrorActive"	R	R
Object_Type	BACnetObjectType	BINARY_INPUT (3)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"No Error"	O	R
Active_Text	CharacterString	"Error"	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.17 ErrorAddress (Analog Input Object Type)

It indicates the indoor unit address where the error is active.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, 4)	R	R
Object_Name	CharacterString	"ErrorAddress"	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL		R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	-	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.18 ErrorReset (Binary Output Object Type)

It resets the error signal.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Output, 5)	R	R
Object_Name	CharacterString	"ErrorReset"	R	R
Object_Type	BACnetObjectType	BINARY_OUTPUT (4)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Normal"	O	R
Active_Text	CharacterString	"Reset"	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Minimum_Off_Time	Unsigned32	-	O	-
Minimum_On_Time	Unsigned32	-	O	-
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	BACnetBinaryPV	INACTIVE (0)	R	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Feedback_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.19 OnTimeCounter (Analog Value Object Type)

It indicates the amount of time the units have been running.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Value, 0)	R	R
Object_Name	CharacterString	"OnTimeCounter"	R	R
Object_Type	BACnetObjectType	ANALOG_VALUE (2)	R	R
Present_Value	REAL	0 .. 65535	R	R
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	Hours (71)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.20 FilterSign (Binary Input Object Type)

It indicates the status of the filter sign.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Input, 6)	R	R
Object_Name	CharacterString	"FilterSign"	R	R
Object_Type	BACnetObjectType	BINARY_INPUT (3)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Disabled"	O	R
Active_Text	CharacterString	"Enabled"	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.21 FilterReset (Binary Output Object Type)

It resets the filter signal.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Output, 4)	R	R
Object_Name	CharacterString	"FilterReset"	R	R
Object_Type	BACnetObjectType	BINARY_OUTPUT (4)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Normal"	O	R
Active_Text	CharacterString	"Reset"	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Minimum_Off_Time	Unsigned32	-	O	-
Minimum_On_Time	Unsigned32	-	O	-
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	R
Relinquish_Default	BACnetBinaryPV	INACTIVE (0)	R	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Feedback_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.22 Occupancy (Multistate Value Object Type)

It indicates the use or not of the occupancy function. Check section 7.4 for more information.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, 0)	R	R
Object_Name	CharacterString	"Occupancy"	R	R
Object_Type	BACnetObjectType	MULTISTATE_VALUE (19)	R	R
Present_Value	Unsigned	1 ~ 3	W	W
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	3	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Occupancy setting table below</i>	O	R
Priority_Array	BACnetPriorityArray	-	R	-
Relinquish_Default	Unsigned	-	R	-
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Value	Unsigned	-	O	-
Fault_Value	Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Occupancy values table

Check possible Occupancy values in the following correspondence table.

Present_Value	Contents displayed in State_Text
1	Occupied
2	Unoccupied
3	Disabled

5.3.23 OccupiedCoolSetPoint (Analog Value Object Type)

It indicates the current Setpoint when both Cool mode and Occupancy are enabled and the room is occupied. Check section 7.4 for more information.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Value, 1)	R	R
Object_Name	CharacterString	"OccupiedCoolSetPoint"	R	R
Object_Type	BACnetObjectType	ANALOG_VALUE (2)	R	R
Present_Value	REAL	16...32 °C 60...90 °F	R	R
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units **	BACnetEngineeringUnits	Degrees Celsius (62) Degrees Fahrenheit (64)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

** Use of Celsius or Fahrenheit units can be selected through the switch configuration. Check section 6.1 for more information.

5.3.24 OccupiedHeatSetPoint (Analog Value Object Type)

It indicates the current Setpoint when both Heat mode and Occupancy are enabled and the room is occupied. Check section 7.4 for more information.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Value, 2)	R	R
Object_Name	CharacterString	"OccupiedHeatSetPoint"	R	R
Object_Type	BACnetObjectType	ANALOG_VALUE (2)	R	R
Present_Value	REAL	16...32 °C 60...90 °F	R	R
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units **	BACnetEngineeringUnits	Degrees Celsius (62) Degrees Fahrenheit (64)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

** Use of Celsius or Fahrenheit units can be selected through the switch configuration. Check section 6.1 for more information.

5.3.25 UnoccupiedCoolSetPoint (Analog Value Object Type)

It indicates the current Setpoint when both Cool mode and Occupancy are enabled and the room is unoccupied. Check section 7.4 for more information.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Value, 3)	R	R
Object_Name	CharacterString	"UnoccupiedCoolSetPoint"	R	R
Object_Type	BACnetObjectType	ANALOG_VALUE (2)	R	R
Present_Value	REAL	16...32 °C 60...90 °F	R	R
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units **	BACnetEngineeringUnits	Degrees Celsius (62) Degrees Fahrenheit (64)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

** Use of Celsius or Fahrenheit units can be selected through the switch configuration. Check section 6.1 for more information.

5.3.26 UnoccupiedHeatSetPoint (Analog Value Object Type)

It indicates the current Setpoint when both Heat mode and Occupancy are enabled and the room is unoccupied. Check section 7.4 for more information.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Value, 4)	R	R
Object_Name	CharacterString	"UnoccupiedHeatSetPoint"	R	R
Object_Type	BACnetObjectType	ANALOG_VALUE (2)	R	R
Present_Value	REAL	16...32 °C 60...90 °F	R	R
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Update_Interval	Unsigned	-	O	-
Units **	BACnetEngineeringUnits	Degrees Celsius (62) Degrees Fahrenheit (64)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

** Use of Celsius or Fahrenheit units can be selected through the switch configuration. Check section 6.1 for more information.

5.3.27 OccupancyContinuousCheck (Binary Value Object Type)

It indicates if the system is continuously checking the setpoint and occupancy conditions. Check section 7.4 for more information.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, 0)	R	R
Object_Name	CharacterString	“OccupancyContinuousCheck”	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Inactive_Text	CharacterString	"Disabled"	O	R
Active_Text	CharacterString	“Enabled”	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Minimum_Off_Time	Unsigned32	-	O	-
Minimum_On_Time	Unsigned32	-	O	-
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	-
Relinquish_Default	BACnetBinaryPV	INACTIVE (0)	R	-
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.28 UnoccupiedDeadbandAction (Binary Value Object Type)

It indicates the action to be performed by the system when Unoccupancy is enabled and Room Temperature is within the deadband. Check section 7.4 for more information.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, 1)	R	R
Object_Name	CharacterString	"UnoccupiedDeadbandAction"	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Inactive_Text	CharacterString	"Off"	O	R
Active_Text	CharacterString	"CurrentMode"	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Minimum_Off_Time	Unsigned32	-	O	-
Minimum_On_Time	Unsigned32	-	O	-
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	-
Relinquish_Default	BACnetBinaryPV	INACTIVE (0)	R	-
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.29 LockRemoteControl (Binary Value Object Type)

It is used to lock or unlock the Mitsubishi Heavy Industries wired Remote Controller.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, 2)	R	R
Object_Name	CharacterString	"LockRemoteControl"	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Inactive_Text	CharacterString	"Unlocked"	O	R
Active_Text	CharacterString	"Locked"	O	R
Change_Of_State_Time	BACnetDatetime	-	O	-
Change_Of_State_Count	Unsigned	-	O	-
Time_Of_State_Count_Reset	BACnetDatetime	-	O	-
Elapsed_Active_Time	Unsigned	-	O	-
Time_Of_Active_Time_Reset	BACnetDatetime	-	O	-
Minimum_Off_Time	Unsigned32	-	O	-
Minimum_On_Time	Unsigned32	-	O	-
Priority_Array	BACnetPriorityArray	BACnetPriorityArray	R	-
Relinquish_Default	BACnetBinaryPV	INACTIVE (0)	R	-
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Value	BACnetBinaryPV	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.30 OutdoorTemp Status (Analog Input Object Type)

Outdoor temperature measured at outdoor unit. This value is only available if unit is setup in Master mode (see switch configuration in installation sheet).

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, 8)	R	R
Object_Name	CharacterString	“OutdoorTemp Status”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL		R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE/TRUE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0), UNRELIABLE_OTHER (7)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	-	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	0	O	W
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
High_Limit	REAL	-	O	-
Low_Limit	REAL	-	O	-
Deadband	REAL	-	O	-
Limit_Enable	BACnetLimitEnable	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.31 CenterRemote (Multistate Input Object Type)

It indicates the current status of the center and remote control.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, 9)	R	R
Object_Name	CharacterString	"CenterRemote"	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT(13)	R	R
Present_Value	Unsigned	1 ~ 6	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	-	O	-
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE	R	R
Number_Of_States	Unsigned	6	R	R
State_Text	BACnetArray[N] of CharacterString	<i>Check Center Remote table below.</i>	O	R
Time_Delay	Unsigned	-	O	-
Notification_Class	Unsigned	-	O	-
Alarm_Values	List of Unsigned	-	O	-
Fault_Values	List of Unsigned	-	O	-
Event_Enable	BACnetEventTransitionBits	-	O	-
Acked_Transitions	BACnetEventTransitionBits	-	O	-
Notify_Type	BACnetNotifyType	-	O	-
Event_Time_Stamps	BACnetArray[N] of BACnetTimeStamp	-	O	-
Profile_Name	CharacterString	-	O	-

Center Remote values table

Check possible Occupancy values in the following correspondence table.

Present_Value	Contents displayed in State_Text
1	Center I
2	Remote I
3	Center/Remote I
4	Center II
5	Remote II
6	Center/Remote II

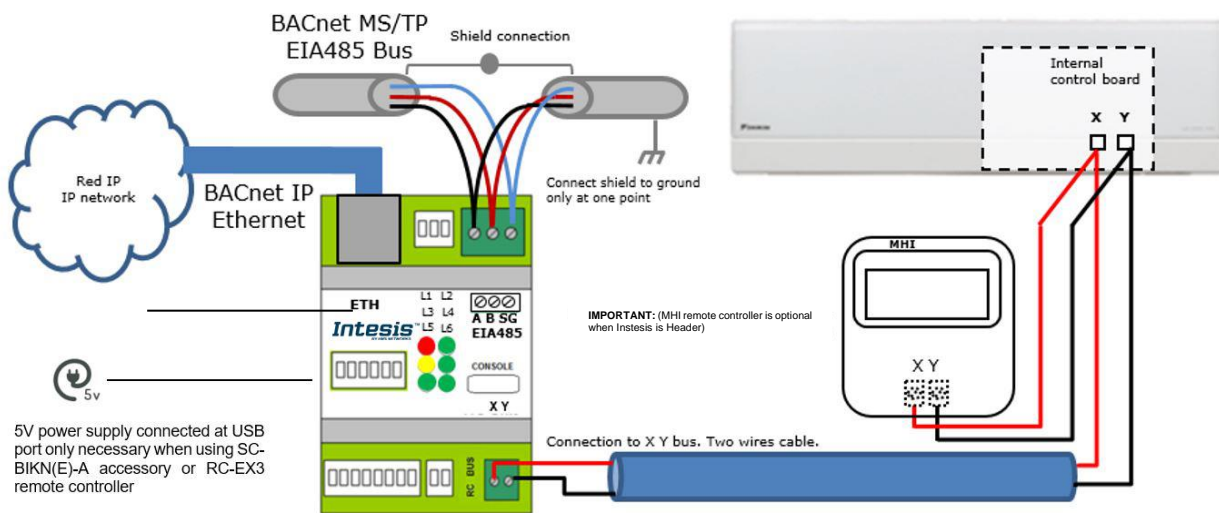
6 Connections and switches

6.1 Connect to the Remote Controller bus

Disconnect the Mitsubishi Heavy Industries system from Mains Power

Connect the interface to XY bus in any point of the bus. The XY bus is the bus that connects the AC indoor unit and the wired remote controller, is a two-wire bus connecting terminals XY of both. This XY connection has no specific polarity.

⚠ Important: If a wired remote controller of the AC manufacturer is connected in the same bus, communication may shut down. In case this happens, please use the USB connector to power the device to overcome this situation.



Connection diagram

If a Mitsubishi Heavy Industries remote controller (RC) is present and connected to the XY bus, there are two configuration options:

- If we want to use the RC as master, its PCB switch must be set as Master and the INBACMHI001R000 must be configured as Slave.
- If we want to use the RC as slave, its PCB switch must be set as Slave and the INBACMHI001R000 must be configured as Master.

SW4 – Master/Slave settings

Binary value b ₁ ...b ₀	Decimal value	Switches 1 2	Description
0x	0	↓ x	Slave in X-Y bus (default value)
1x	1	↑ x	Master in X-Y bus

SW4 – Vanes Up-Down settings

Binary value b ₁ ...b ₀	Decimal value	Switches 1 2	Description
x0	0	x ↓	Indoor unit has no Vanes Up-Down (default value)
x1	1	x ↑	Indoor unit has Vanes Up-Down

Use **SW3** for the Celsius/Fahrenheit degrees selection.

SW3 - Celsius/Fahrenheit selection

Binary value b ₇ ...b ₀	Decimal value	Switches 1 2 3 4 5 6 7 8	Description
--	---------------	-----------------------------	-------------

xxxx0xxx	0	x x x x ↓ x x x	Celsius degrees (default value)
xxxx1xxx	1	x x x x ↑ x x x	Fahrenheit degrees

⚠ Important: Remember that switch changes only apply after an Intesis power cycle

6.2 Connect to BACnet MS/TP

Connect the EIA485 bus wires to the plug-in terminal block (EIA485) of INBACMHI001R000; respect the polarity on this connection (A+ and B-).

Connect the ground signal to the plug-in terminal block (SG).

Respect the maximum distance of 1.200 meters for the bus, no loop or star topologies are allowed for EIA485 bus.

Remember that a terminator resistor of 120 Ω must be present at each end of the bus to avoid signal reflections and also a polarization mechanism. Please, use switch **SW1** in order to configure these parameters.

Binary value b ₂ ...b ₀	Decimal value	Switches 1 2 3	Description
0xx	0	↓ x x	EIA485 bus without termination resistor. The gateway is not at one end of the EIA485 bus (default value)
1xx	1	↑ x x	120 Ω termination resistor active. The gateway is at one end of the EIA485 bus
x00	0	x ↓ ↓	No bus polarization
x11	3	x ↑ ↑	Bus polarization active

Please, check configuration as well on **SW2** and **SW3** before connecting to BACnet MS/TP.

6.2.1 MS/TP MAC address switch configuration

MAC address can be configured using **SW2** DIP-Switch

Binary value b ₇ ...b ₀	Decimal value	Switches 1 2 3 4 5 6 7 8	MAC address
000000x	0	↓ ↓ ↓ ↓ ↓ ↓ ↓ x	0
100000x	1	↑ ↓ ↓ ↓ ↓ ↓ ↓ x	1
010000x	2	↓ ↑ ↓ ↓ ↓ ↓ ↓ x	2
110000x	3	↑ ↑ ↓ ↓ ↓ ↓ ↓ x	3
....
101111x	125	↑ ↓ ↑ ↑ ↑ ↑ ↑ x	125
011111x	126	↓ ↑ ↑ ↑ ↑ ↑ ↑ x	126
111111x	127	↑ ↑ ↑ ↑ ↑ ↑ ↑ x	127

The MAC address selected may affect on the Device Instance. If the “Auto Device Instance” is used, keep in mind that the Device Instance will be build using the “Device Instance Base” + the address selected in SWP2 P1-P7. Please, check section 7.5 for more information.

6.2.2 MS/TP activation and baudrate

Select the right baudrate for BACnet MS/TP communication using switch **SW3**.

Binary value b ₇ ...b ₀	Decimal value	Switches 1 2 3 4 5 6 7 8	Description
0xxxxxxx	0	↓ x x x x x x x	BACnet MS/TP active (default value)
1xxxxxxx	1	↑ x x x x x x x	BACnet IP active
x000xxxx	0	x ↓ ↓ ↓ x x x x	Autobaudrate (default value) *
x100xxxx	1	x ↑ ↓ ↓ x x x x	9600 bps
x010xxxx	2	x ↓ ↑ ↓ x x x x	192000 bps
x110xxxx	3	x ↑ ↑ ↓ x x x x	38400 bps
x001xxxx	4	x ↓ ↓ ↑ x x x x	57600 bps
x101xxxx	5	x ↑ ↓ ↑ x x x x	76800 bps
x011xxxx	6	x ↓ ↑ ↑ x x x x	115200 bps

x111xxxx	7	x ↑ ↑ ↑ x x x x	Autobaudrate *
xxxx0xxx	0	x x x x ↓ x x x	Celsius degrees (default value)
xxxx1xxx	1	x x x x ↑ x x x	Fahrenheit degrees

⚠ Important: Remember that switch changes only apply after an Intesis power cycle

* Note: If Autobaudrate is selected, the INBACMHI001R000 will look for another BACnet MS/TP device with a fixed baudrate in order to match this value. Once detected, the baudrate will not be modified until a device reset is produced.

6.3 Connect to BACnet IP

Connect the RJ45 connector to the Ethernet connection (ETH) of INBACMHI001R000.

Respect same recommendations as per any other Ethernet communication network.

Remember to activate the IP interface through the **SW3** switch.

Binary value b ₇ ...b ₀	Decimal value	Switches								Description
		1	2	3	4	5	6	7	8	
0xxxxxxx	0	↓	x	x	x	x	x	x	x	BACnet MS/TP active (default value)
1xxxxxxx	1	↑	x	x	x	x	x	x	x	BACnet IP active

By default, the INBACMHI001R000 comes with a static IP address: **192.168.100.246**.

In order to change it, please use the configuration tool and select either DHCP or another static IP (recommended) that suits your integration project requirements. Check section 7.5 for more information.

6.3.1 BACnet Device Instance

If the “Auto Device Instance” is used, keep in mind that the Device Instance will be build using the “Device Instance Base” + the address selected in SWP2 P1-P7.

Binary value b ₇ ...b ₀	Decimal value	Switches								MAC address
		1	2	3	4	5	6	7	8	
000000x	0	↓	↓	↓	↓	↓	↓	↓	x	0
100000x	1	↑	↓	↓	↓	↓	↓	↓	x	1
010000x	2	↓	↑	↓	↓	↓	↓	↓	x	2
110000x	3	↑	↑	↓	↓	↓	↓	↓	x	3
....
101111x	125	↑	↓	↑	↑	↑	↑	↑	x	125
011111x	126	↓	↑	↑	↑	↑	↑	↑	x	126
111111x	127	↑	↑	↑	↑	↑	↑	↑	x	127

⚠ Important: Remember that switch changes only apply after an Intesis power cycle

7 Set-up process and troubleshooting

7.1 Pre-requisites

In a BACnet MS/TP integration, it is necessary to have the BACnet MS/TP Master device operative and well connected to the BACnet MS/TP port of the INBACMHI001R000.

In a BACnet IP integration, it is necessary to have the BACnet IP client operative and well connected to the IP network and the INBACMHI001R000 connected to this same IP network through the ETH port.

Items supplied by HMS Networks for this integration are:

- Intesis INBACMHI001R000 interface with Mitsubishi Heavy Industries AC external protocol firmware loaded.
- Specific connection cable to connect Mitsubishi Heavy Industries AC unit with INBACMHI001R000 gateway.
- MiniUSB cable for console communication and testing power supply usage.
- Product documentation.

7.2 Physical checking

First point to look at to make sure that gateway is working properly is to check physical connections:

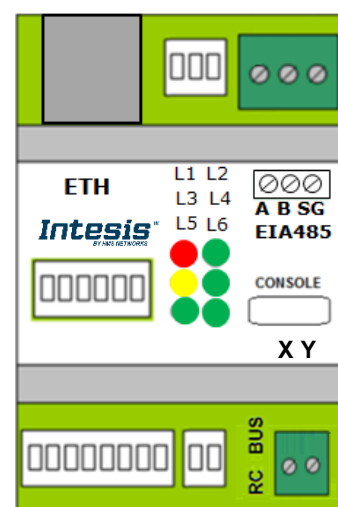
- 1.- Make sure that the supplied cable is correctly connected between the AC unit and the gateway. INBACMHI001R000 needs to be connected to the AC unit or externally powered before starting the device configuration. USB port can be used, along with an external USB power converter, to power the device for testing purposes if the AC unit is not present.
- 2.- Check that the AC unit is connected to mains.
- 3.- If using BACnet MS/TP, check the EIA485 connection from the gateway to the BACnet MS/TP. Remember to verify polarity and terminal resistors configuration. If using BACnet IP, check the IP network connections.

7.3 LED status

On start up, all leds blink once and then turn off. After that, depending on the type of connection (MS/TP or IP) and the processes carried out, LED status may change.

Please, check the table below for more information:

LED	Status	Description
L1 (red)	ON Steady	AC communication error
	Blinking	AC error
	Off	No errors present
L5 (green)	ON Steady	BACnet MS/TP link
	Blinking	Activity on the BACnet MS/TP bus
L6 (green)	ON Steady	Ethernet link
	Blinking	Activity on BACnet IP
L1+L4+L5	Blinking	Device in Bootloader mode
All	Blinking	Fatal Error
All	On Steady 1 sec	On start up (for testing purposes)

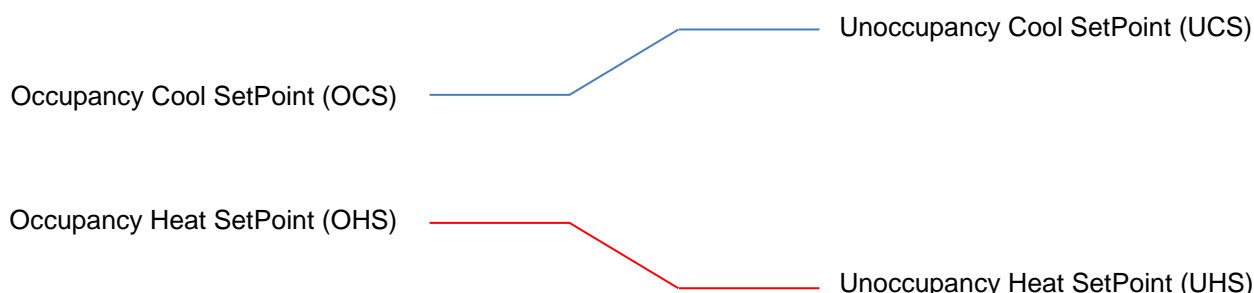


7.4 Occupancy

Occupancy function is used to determine how the Air Conditioner unit will be set depending on the presence or absence of people in the room. Remember that the occupancy signal needs to be fed by an external sensor which indicates if there is presence or not (occupancy). This signal is processed directly in the Intesis and modifies 3 parameters from the AC system: Setpoint, Mode and On/Off.

In order to adjust the settings to the current mode (Heat or Cool), the gateway offers 6 different BACnet objects:

- OccupiedCoolSetPoint
- OccupiedHeatSetPoint
- UnoccupiedCoolSetPoint
- UnoccupiedHeatSetPoint
- OccupancyContinuousCheck
- UnoccupiedDeadbandAction



Occupancy/Unoccupancy Cool Setpoint (OCS/UCS): Default value for setpoint temperature to be set when Occupancy/Unoccupancy is enabled and current mode is cool. UCS must always be greater or equal to OCS. Difference between OCS and OHS must be greater or equal to 2°C/4°F.

Occupancy/Unoccupancy Heat Setpoint (OHS/UHS): Default value for setpoint temperature to be set when Occupancy/Unoccupancy is enabled and current mode is heat. UHS must always be smaller or equal to OHS. Difference between OCS and OHS must be greater or equal to 2°C/4°F.

Occupancy Continuous check: This checkbox is used to determine if the gateway will check the occupancy conditions constantly (check) or not (unchecked) by default. That means that with the the checkbox active, conditions are checked on each change of the temperature too, while if unchecked, this is only checked when the occupancy status changes.

Unoccupied Deadband Action: This determines the action to be taken while the ambient temperature is in between the deadband. If unchecked, indoor unit will turn off and if checked it will remain on.

When **occupancy mode is active** (there is presence in the room), according to current room temperature, **mode**, **setpoint** and **on/off** will be set to:

Condition	Setpoint	Mode	On/Off
Room temperature > OCS	Current OCS value	Cool	On
Room temperature < OHS	Current OHS value	Heat	On
OCS < Room temperature > OHS	OCS/OHS depending on current mode (If Fan or Dry mode is active, no setpoint is sent)	Current mode	On

When **unoccupancy mode is active** (there is no presence in the room), according to current room temperature, **mode**, **setpoint** and **on/off** will be set to:

Condition	Setpoint	Mode	On/Off
Room temperature > OCS	Current UCS value	Cool	On
Room temperature < OHS	Current UHS value	Heat	On
OCS < Room temperature > OHS	UCS/UHS depending on current mode (If Fan or Dry mode is active, no setpoint is sent)	Current mode	On (Deadband action =1)
			Off (Deadband action =0)

These checks will be done each time the indoor unit occupancy status is changed, and if **check continuously** checkbox is checked, also each time the room temperature changes.

The configuration set on the occupancy signals is applied from the very first moment the occupancy signal is enabled until the user changes the setpoint, mode or the On/Off signal, which disables occupancy functionality.

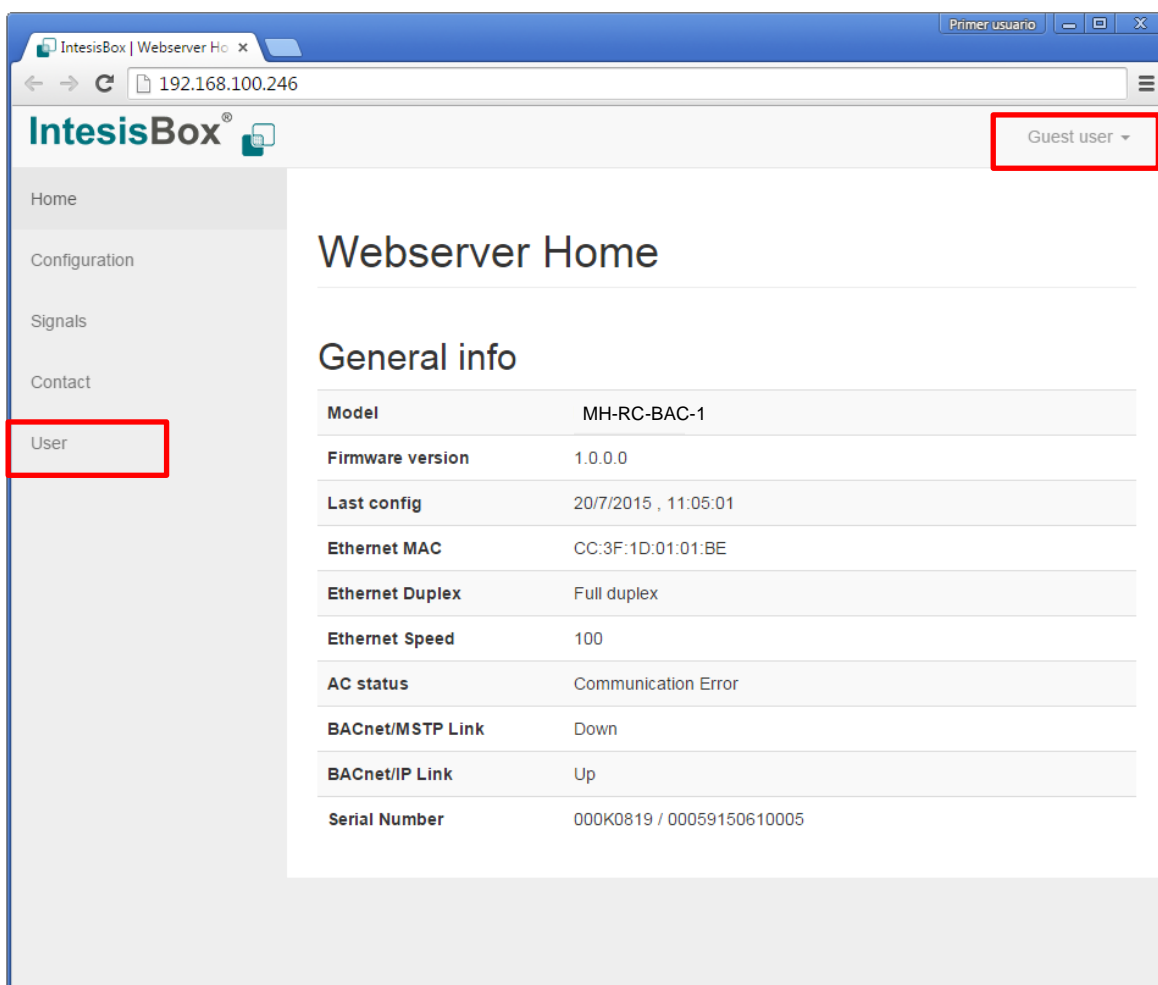
7.5 Configuration tool

In order to check the status of the device, signals values and general configuration, the INBACMH1001R000 includes a configuration tool. This tool is accessible only through the Ethernet port, so keep in mind that you need to switch SW3 P1 'ON'.

By default the device comes with a static IP, so please check that you are in the same network domain in order to connect. The default IP is: **192.168.100.246**.

7.5.1 Home

Once you reach the page, remember to login with your user and password. To access the login site, click on “User” or use the drop-down menu on the top right corner for user selection.



There are two access levels: **admin** and **operator**. The default password value for each user is **admin** → admin and **operator** → operator.

Admin has total control on the device configuration and it can control the AC unit from the web app itself. On the contrary, operator can only read information from the current configuration and can operate the AC. Priority used when using the operator mode is always set to 8.

IMPORTANT: Once configuration is done, we recommend changing the passwords to ensure access control on the gateway.

7.5.2 Configuration

On the configuration section, general **BACnet settings**, specific **BACnet MS/TP** and **BACnetIP settings**, **IP settings** and **AC settings** can be configured. Each type of parameter is grouped in different blocks.

The screenshot displays the IntesisBox Configuration web interface. The browser address bar shows the URL 192.168.100.246/configuration.html. The interface is divided into several configuration blocks:

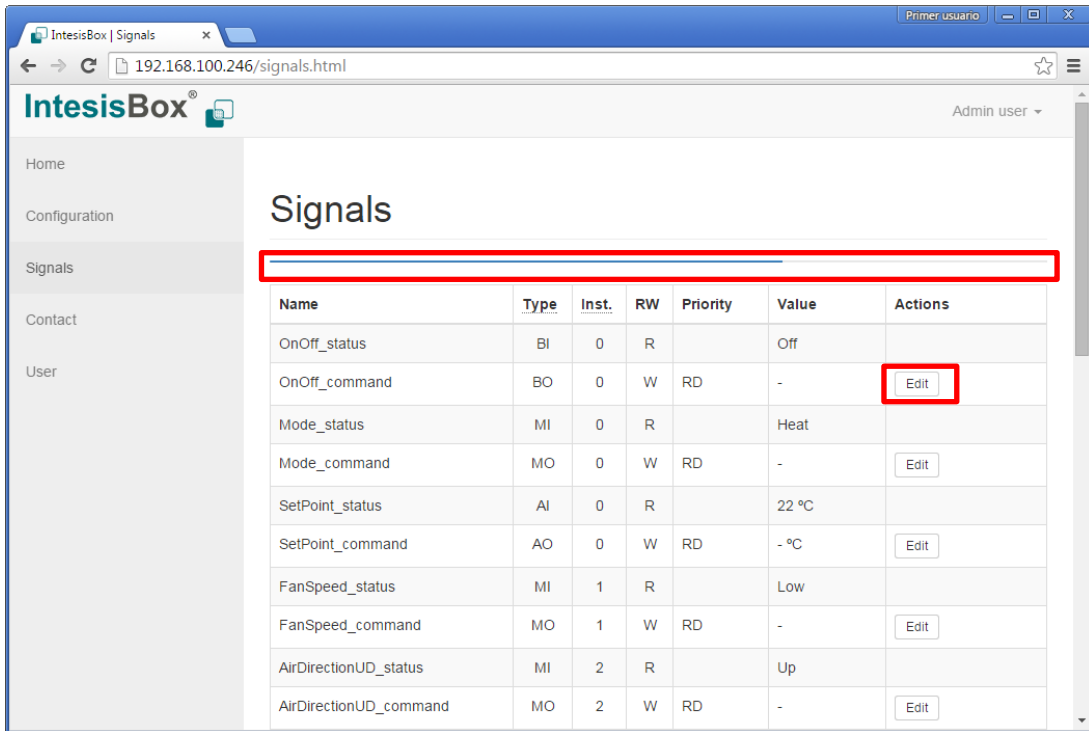
- BACnet settings:**
 - Device Name: MH-RC-BAC-1
 - Device description: Dakin RC interface
 - Device password: Change BACnet password
 - Auto device instance:
 - Device instance: 246000 (Instance base + address selected in SW2 P1..P7)
 - Device instance base: 246000 (to be used when Auto device instance is selected)
 - Media: MS/TP BACnetIP (Only configurable through SW3 P1 switch)
 - Temperature units: °C °F (Only configurable through SW3 P5 switch)
- BACnet MS/TP settings:**
 - MAC Address: 0 (Only configurable through SW2 P1..P7 switch)
 - Baud Rate: 0 (auto) (Only configurable through SW3 P2..P4 switch)
 - Max Masters: 127 (1..127)
 - Max Info Frames: 1 (1..255)
- BACnet IP settings:**
 - UDP Port: 47808 (default 47808 or 0xBAC0)
 - Foreign Device Registration:
 - BBMD IP Address: 0.0.0.0
 - Registration TTL: 300 (default 300 seconds)
- IP settings:**
 - IP Address: 192.168.100.246
 - IP Netmask: 255.255.255.0
 - IP Gateway: 192.168.100.9
 - DHCP:
- AC settings:**
 - AC bus configuration: Master / Main Slave / Sub (Only configurable through SW4 P1 switch)
 - Room temperature reference: Remote Control Indoor Unit (Only configurable through SW4 P2 switch)

At the bottom of the configuration page, there are buttons for "Save / Reboot", "Reboot", "Restore defaults", and "Reboot".

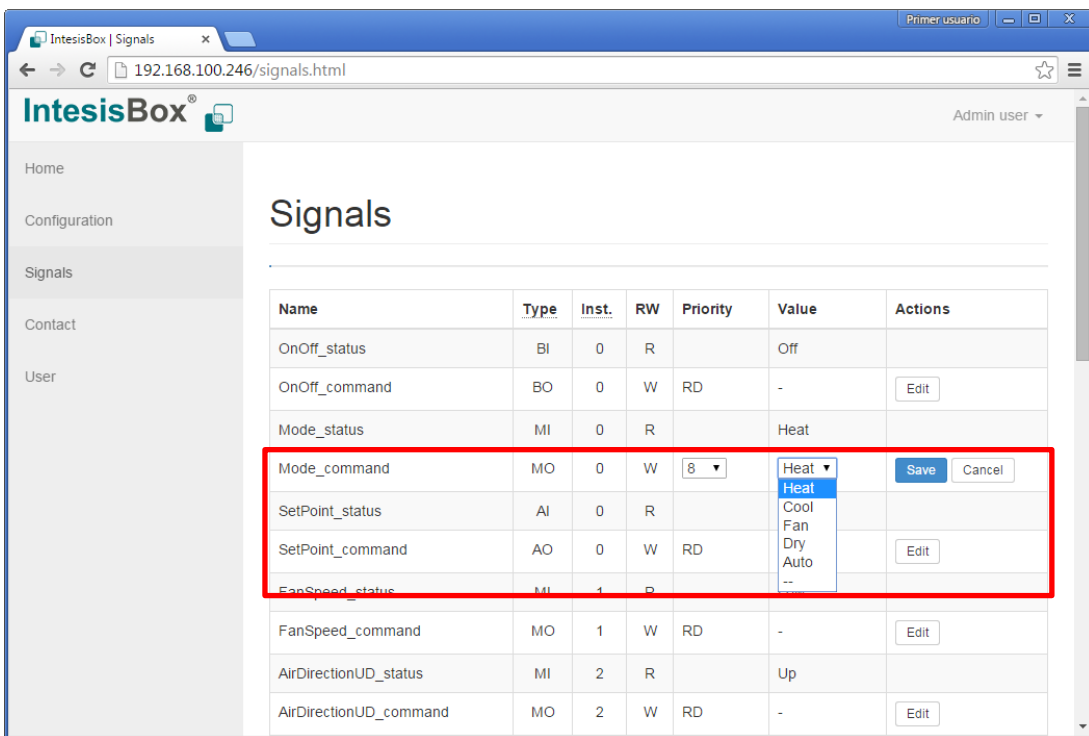
7.5.3 Signals

On this section a complete list of the available BACnet objects, their **type**, **Object Instance**, **priority** and current **value** is shown. Clicking on the **"Edit"** button, users will be able to command the system having feedback from both BACnet and AC system.

It also allows continuous monitoring of the current status of the variables. The refresh time for the AC information is shown using a progression bar in the top and the bottom of the signals list.



When you click on “Edit”, you will have the change of introducing a new **value** to be applied and also the **priority**.



NOTE: If you want to relinquish the selected priority, please use the '--' command.

8 AC Unit Types compatibility

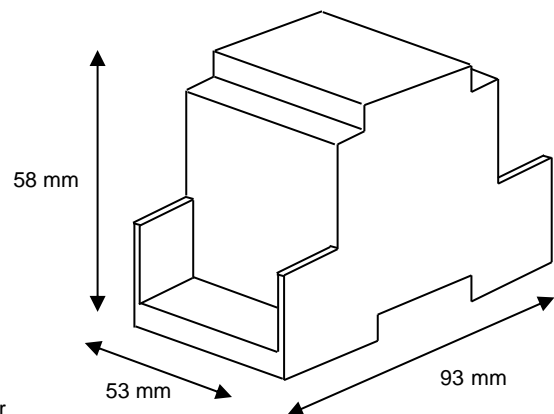
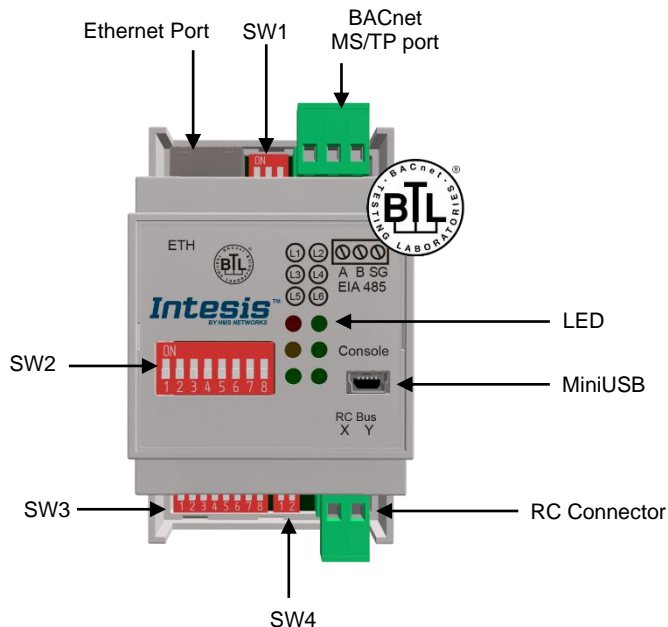
Please, check compatibility list at to know which Mitsubishi Heavy Industries units are compatible with our gateway.

https://www.intesis.com/docs/compatibilities/inxxmhi001rx00_compatibility

9 Mechanical & electrical characteristics

Enclosure	Plastic, type PC (UL 94 V-0). Dimensions: 93mm x 53mm x 58mm. Weight: 85 g
Color	Light Grey. RAL 7035.
Power supply	5VDC mini-USB power source, 250mA *Required only when using RC-EX3 remote controller and/or SC-BIKN(E)-A accessory
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)
BACnet IP port	1 x Ethernet 100BT RJ45.
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 USB)
Protection	IP20 (IEC60529).
RoHS conformity	Compliant with RoHS directive (2002/95/CE).

10 Dimensions



11 Error codes

Below you can find a list of error codes from Mitsubishi Heavy Industries air conditioning system.

ErrorCode	Error CodeM	Error in RC	Error Description
0	01	N/A	No active error
-1	02	Com Err.	Comm Error between INBACMHI001R000 and MHI Indoor Unit
1	03	E1	Remote controller communication error
2	04	E2	Duplicated indoor unit address
3	05	E3	Outdoor unit signal line error
5	07	E5	Communication error during operation
6	08	E6	Indoor heat exchanger temperature thermistor anomaly
7	09	E7	Indoor return air temperature thermistor anomaly
8	10	E8	Heating overload operation
9	11	E9	Drain trouble
10	12	E10	Excessive number of indoor units (more than 17) by controlling one remote controller
12	14	E12	Address setting error by mixed setting method
14	16	E14	Communication error between master and slave indoor units
16	18	E16	Indoor fan motor anomaly
19	21	E19	Indoor unit operation check, drain motor check setting error
28	30	E28	Remote controller temperature thermistor anomaly
30	32	E30	Unmatched connection of indoor and outdoor unit
31	33	E31	Duplicated outdoor unit address No.
32	34	E32	Open L3 Phase on power supply at primary side
33	35	E33	Inverter primary current error
35	37	E35	Cooling overload operation
36	38	E36	Discharge pipe temperature error
37	39	E37	Outdoor heat exchanger temperature thermistor anomaly
38	40	E38	Outdoor/Ambient air temperature thermistor anomaly
39	41	E39	Discharge pipe temperature thermistor anomaly
40	42	E40	High pressure error
41	43	E41	Power transistor overheat
42	44	E42	Current cut
43	45	E43	Excessive number of indoor units connected, excessive total capacity of connection
45	47	E45	Communication error between inverter PCB and outdoor control PCB
46	48	E46	Mixed address setting methods coexistent in same network
47	49	E47	Inverter over-current error
48	50	E48	Outdoor DC fan motor anomaly
49	51	E49	Low pressure anomaly
51	53	E51	Inverter anomaly

53	55	E53	Suction pipe temperature thermistor anomaly
54	56	E54	High/Low pressure sensor anomaly
55	57	E55	Underneath temperature thermistor anomaly
56	58	E56	Power transistor temperature thermistor anomaly
57	59	E57	Insufficient in refrigerant amount or detection of service valve closure
58	60	E58	Anomalous compressor by loss of synchronism
59	61	E59	Compressor startup failure
60	62	E60	Rotor position detection failure / Anomalous compressor rotor lock
61	63	E61	Communication error between the master unit and slave units
63	65	E63	Emergency stop

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