IntesisBox® BACnet IP Server

Hitachi Air Conditioning

User Manual

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IntesisBox®

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Gateway for the integration of Hitachi air conditioning systems in BACnet/IP enabled monitoring and control systems.

Different models are available for this gateway, with the following **Order Codes**:

HI-AC-BAC-8
Model supporting up to 8 indoor units.

HI-AC-BAC-64
Model supporting up to 64 indoor units.

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1 Description

1.1 *Introduction*

This document describes the integration of Hitachi air conditioning systems into BACnet compatible devices and systems using gateway *IntesisBox BACnet/IP Server – Hitachi.*

The aim of this integration is to monitor and control your Hitachi air conditioning system, remotely, from your Control Center using any commercial SCADA or monitoring software that includes a BACnet/IP driver. To do it so, IntesisBox allows BACnet/IP communication, acting as a server, allowing polling or subscription requests (COV).

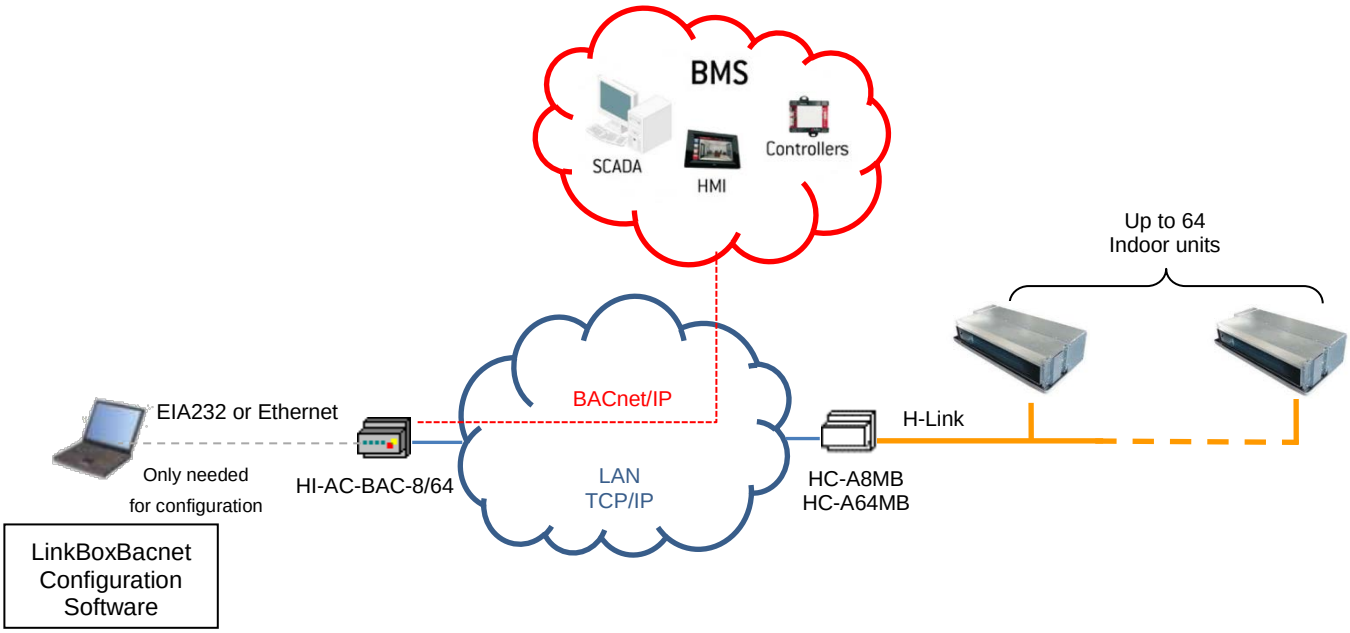
IntesisBox makes available the Hitachi air conditioning system indoor units through independent BACnet objects.

Abstraction of Hitachi air conditioning system properties and functionalities as fixed BACnet Objects. IntesisBox allows fixed BACnet object IDs mapping. Simple configuration is needed: just select the appropriate communication parameters (IP address, baud rate…).

IntesisBox connects to the Hitachi HC-A8MB or HC-A64MB communication adaptor[1].

Up to 64 indoor units supported.

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



[1] HC-A8MB and HC-A64MB are accessories provided by Hitachi and should be acquired separately.

1.2 *Functionality*

IntesisBox® continuously polls (reads) the Hitachi HC-A8/64MB communication adaptor for all configured signals and keeps the updated status of all of them in its memory, ready to be served when requested from the BACnet side.

The role of IntesisBox consists in associate the elements of the HC-A8/64MB communication adaptor with BACnet objects.

The control of the indoor units through the HC-A8/64MB communication adaptor is permitted, so commands toward the HC-A8/64MB communication adaptor are permitted.

Each indoor unit is offered in a set of BACnet objects.

Element	Object supported
Indoor Unit	• Status • Command • Error • Exist
Adaptor	• Error

1.3 *Capacity of IntesisBox*

IntesisBox is capable of integrating one single HC-A8/64MB communication adaptor and its associated elements.

Element	Max.	Notes
Number of adaptors	1	IntesisBox can only integrate one single HC-A8/64MB communication adaptor.
Number of indoor units	64 *	Number of indoor units that can be controlled through IntesisBox
Number of Objects	1792 *	Number of HC-A8/64MB objects available into IntesisBox.

* There are two different models of *IntesisBox® BAC – Hitachi AC* each one with different capacity. The table above shows the capacity for the top model (with maximum capacity).

Their order codes are:

- HI-AC-BAC-8: Model supporting up to 8 indoor units
- HI-AC-BAC-64: Model supporting up to 64 indoor units

Regarding the HC-A8/64MB communication adaptor, below there is a summary table indicating different capacities for each element.

Element	Value ranges	Description
Indoor Units	1 to 64	Number of indoor units supported by IntesisBox
Adaptor	1	Number of adaptors supported by IntesisBox

The number of *adaptors* is fixed. The number of *Indoor Units* may vary on each project. These parameters can be configured through LinkBoxBACnet (See section 7.2).

2 Protocol Implementation Conformance Statement

BACnet Protocol Implementation Conformance Statement (PICS)

Date: *2016-11-10*
Vendor Name: *Intesis Software SLU*
Product Name: *IntesisBox-BACnet-Hitachi AC*
Product Model Number: *HI-AC-BAC-8/64*
Application Software Version: *4.0.0*
Firmware Revision: *4.0.0*
BACnet Protocol Revision: *2*

Product Description:

Hitachi air conditioning system -BACnet/IP Gateway

Abstraction of Hitachi air conditioning system through HC-A8/64MB communication adaptor properties and functionalities as BACnet Objects.
Capacity of 1 HC-A8/64MB communication adaptor and all signals from associated indoor units.

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 ____
Segmented responses supported	☒ No	☐ Yes	Window Size ____

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):
☐ 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:

Hitachi HC-A8/64MB communication adaptor through Ethernet interface

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	☐	ReadProperty	☒	☐
DS-RP-B	Data Sharing-ReadProperty–B	☒	ReadProperty	☐	☒
DS-RPM-A	Data Sharing-ReadPropertyMultiple–A	☐	ReadPropertyMultiple	☒	☐
DS-RPM-B	Data Sharing-ReadPropertyMultiple–B	☐	ReadPropertyMultiple	☐	☒
DS-RPC-A	Data Sharing-ReadPropertyConditiona–A	☐	ReadPropertyConditional	☒	☐
DS-RPC-B	Data Sharing-ReadPropertyConditional–B	☐	ReadPropertyConditional	☐	☒
DS-WP-A	Data Sharing-WriteProperty–A	☐	WriteProperty	☒	☐
DS-WP-B	Data Sharing-WriteProperty–B	☒	WriteProperty	☐	☒
DS-WPM-A	Data Sharing-WritePropertyMultiple–A	☐	WritePropertyMultiple	☒	☐
DS-WPM-B	Data Sharing-WritePropertyMultiple–B	☐	WritePropertyMultiple	☐	☒
DS-COV-A	Data Sharing-COV–A	☐	SubscribeCOV	☒	☐
		☐	ConfirmedCOVNotification	☐	☒
		☐	UnconfirmedCOVNotification	☐	☒
DS-COV-B	Data Sharing-COV–B	☒	SubscribeCOV	☐	☒
		☒	ConfirmedCOVNotification	☒	☐
		☒	UnconfirmedCOVNotification	☒	☐
DS-COVP-A	Data Sharing-COVP–A	☐	SubscribeCOVProperty	☒	☐
		☐	ConfirmedCOVNotification	☐	☒
		☐	UnconfirmedCOVNotification	☐	☒
DS-COVP-B	Data Sharing-COVP–B	☐	SubscribeCOVProperty	☐	☒
		☐	ConfirmedCOVNotification	☒	☐
		☐	UnconfirmedCOVNotification	☒	☐
DS-COVU-A	Data Sharing-COV-Unsolicited–A	☐	UncofirmedCOVNotification	☐	☒
DS-COVU-B	Data Sharing-COV-Unsolicited-B	☐	UncofirmedCOVNotification	☒	☐

3.2 *Alarm and Event Management BIBBs*

BIBB Type		Active	BACnet Service	Initiate	Execute
AE-N-A	Alarm and Event-Notification–A	☐	ConfirmedEventNotification	☐	☒
		☐	UnconfirmedEventNotification	☐	☒
AE-N-I-B	Alarm and Event-Notification Internal–B	☐	ConfirmedEventNotification	☒	☐
		☐	UnconfirmedEventNotification	☒	☐
AE-N-E-B	Alarm and Event-Notification External–B	☐	ConfirmedEventNotification	☒	☐
		☐	UnconfirmedEventNotification	☒	☐
AE-ACK-A	Alarm and Event-ACK–A	☐	AcknowledgeAlarm	☒	☐
AE-ACK-B	Alarm and Event-ACK–B	☐	AcknowledgeAlarm	☐	☒
AE-ASUM-A	Alarm and Event-Summary–A	☐	GetAlarmSummary	☒	☐
AE-ASUM-B	Alarm and Event-Summary–B	☐	GetAlarmSummary	☐	☒
AE-ESUM-A	Event-Summary–A	☐	GetEnrollmentSummary	☒	☐
AE-ESUM-B	Event-Summary–B	☐	GetEnrollmentSummary	☐	☒
AE-INFO-A	Alarm and Event-Information–A	☐	GetEventInformation	☒	☐
AE-INFO-B	Alarm and Event-Information–B	☐	GetEventInformation	☐	☒
AE-LS-A	Alarm and Event-LifeSafety–A	☐	LifeSafetyOperation	☒	☐
AE-LS-B	Alarm and Event-LifeSafety–B	☐	LifeSafetyOperation	☐	☒

3.3 *Scheduling BIBBs*

BIBB Type		Active	BACnet Service	Initiate	Execute
SCHED-A	Scheduling–A *(must support DS-RP-A and DS-WP-A)*	☐			
		☐			
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)*	☐			
		☐			
SCHED-E-B	Scheduling-External–B *(shall support SCHED-I-B and DS-WP-A)*	☐			
		☐			
T-VMT-A	Trending - Viewing and Modifying Trends–A	☐	ReadRange	☐	☒
T-VMT-I-B	Trending - Viewing and Modifying Trends Inernal–B	☐	ReadRange	☐	☒
T-VMT-E-B	Trending - Viewing and Modifying Trends External–B	☐	ReadRange	☐	☒
T-ATR-A	Trending - Automated Trend Retrieval–A	☐	ConfirmedEventNotification	☐	☒
		☐	ReadRange	☒	☐
T-ATR-B	Trending - Automated Trend Retrieval–B	☐	ConfirmedEventNotification	☒	☐
		☐	ReadRange	☐	☒

3.4 *Trending BIBBs*

BIBB Type		Active	BACnet Service	Initiate	Execute
T-VMT-A	Trending - Viewing and Modifying Trends–A	☐	ReadRange	☒	☐
T-VMT-I-B	Trending - Viewing and Modifying Trends Inernal–B	☐	ReadRange	☐	☒
T-VMT-E-B	Trending - Viewing and Modifying Trends External–B	☐	ReadRange	☐	☒
T-ATR-A	Trending - Automated Trend Retrieval–A	☐	ConfirmedEventNotification	☐	☒
		☐	ReadRange	☒	☐
T-ATR-B	Trending - Automated Trend Retrieval–B	☐	ConfirmedEventNotification	☒	☐
		☐	ReadRange	☐	☒

3.5 *Network Management BIBBs*

BIBB Type		Active	BACnet Service	Initiate	Execute
NM-CE-A	Network Management - Connection Establishment–A	☐	Establish-Connection-To-Network	☒	☐
		☐	Disconnect-Connection-To-Network	☒	☐
NM-CE-B	Network Management - Connection Establishment– B	☐	Establish-Connection-To-Network	☐	☒
		☐	Disconnect-Connection-To-Network	☐	☒
NM-RC-A	Network Management - Router Configuration–A	☐	Who-Is-Router-To-Network	☒	☐
		☐	I-Am-Router-To-Network	☐	☒
		☐	I-Could-Be-Router-To-Network	☐	☒
		☐	Initialize-Routing-Table	☒	☐
		☐	Initialize-Routing-Table-Ack	☐	☒
NM-RC-B	Network Management - Router Configuration–B	☐	Who-Is-Router-To-Network	☒	☒
		☐	I-Am-Router-To-Network	☒	☒
		☐	Initialize-Routing-Table	☐	☒
		☐	Initialize-Routing-Table-Ack	☒	☐

3.6 *Device Management BIBBs*

BIBB Type		Active	BACnet Service	Initiate	Execute
DM-DDB-A	Device Management - Dynamic Device Binding–A	☐	Who-Is	☒	☐
		☐	I-Am	☐	☒
DM-DDB-B	Device Management - Dynamic Device Binding–B	☒	Who-Is	☐	☒
		☒	I-Am	☒	☐
DM-DOB-A	Device Management - Dynamic Object Binding–A	☐	Who-Has	☒	☐
		☐	I-Have	☐	☒
DM-DOB-B	Device Management - Dynamic Object Binding–B	☒	Who-Has	☐	☒
		☒	I-Have	☒	☐
DM-DCC-A	Device Management - DeviceCommunicationControl–A	☐	DeviceCommunicationControl	☒	☐
DM-DCC-B	Device Management - DeviceCommunicationControl–B	☐	DeviceCommunicationControl	☐	☒
DM-PT-A	Device Management - PrivateTransfer–A	☐	ConfirmedPrivateTransfer	☒	☐
		☐	UnconfirmedPrivateTransfer	☒	☐
DM-PT-B	Device Management - PrivateTransfer–B	☐	ConfirmedPrivateTransfer	☐	☒
		☐	UnconfirmedPrivateTransfer	☐	☒
DM-TM-A	Device Management - Text Message–A	☐	ConfirmedTextMessage	☒	☐
		☐	UnconfirmedTextMessage	☒	☐
DM-TM-B	Device Management - Text Message–B	☐	ConfirmedTextMessage	☐	☒
		☐	UnconfirmedTextMessage	☐	☒
DM-TS-A	Device Management - TimeSynchronization–A	☐	TimeSynchronization	☒	☐
DM-TS-B	Device Management - TimeSynchronization–B	☐	TimeSynchronization	☐	☒
DM-UTC-A	Device Management - UTCTimeSynchronization–A	☐	UTCTimeSynchronization	☒	☐
DM-UTC-B	Device Management - UTCTimeSynchronization–B	☐	UTCTimeSynchronization	☐	☒
DM-RD-A	Device Management - ReinitializeDevice–A	☐	ReinitializeDevice	☒	☐
DM-RD-B	Device Management - ReinitializeDevice–B	☒	ReinitializeDevice	☐	☒
DM-BR-A	Device Management - Backup and Restore–A	☐	AtomicReadFile	☒	☐
		☐	AtomicWriteFile	☒	☐
		☐	CreateObject	☒	☐
		☐	ReinitializeDevice	☒	☐
DM-BR-B	Device Management - Backup and Restore–B	☐	AtomicReadFile	☐	☒
		☐	AtomicWriteFile	☐	☒
		☐	ReinitializeDevice	☐	☒
DM-R-A	Device Management - Restart–A	☐	UnconfimedCOVNotification	☐	☒
DM-R-B	Device Management - Restart–B	☐	UnconfimedCOVNotification	☒	☐
DM-LM-A	Device Management - List Manipulation–A	☐	AddListElement	☒	☐
		☐	RemoveListElement	☒	☐
DM-LM-B	Device Management - List Manipulation–B	☐	AddListElement	☐	☒
		☐	RemoveListElement	☐	☒
DM-OCD-A	Device Management - Object Creation and Deletion–A	☐	CreateObject	☒	☐
		☐	DeleteObject	☒	☐
DM-OCD-B	Device Management - Object Creation and Deletion–B	☐	CreateObject	☐	☒
		☐	DeleteObject	☐	☒
DM-VT-A	Device Management - Virtual Terminal–A	☐	VT-Open	☒	☐
		☐	VT-Close	☒	☒
		☐	VT-Data	☒	☒
DM-VT-B	Device Management - Virtual Terminal–B	☐	VT-Open	☐	☒
		☐	VT-Close	☒	☒
		☐	VT-Data	☒	☒

4 Service Types

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

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	☒	IUxxx_System_Address IUxxx_Unit_Address IUxxx_Settemp_status IUxxx_Inlet_Temperature IUxxx_Outlet_Temperature IUxxx_GasPipeTemp IUxxx_LiquidPipeTemp IUxxx_ExpansionValveOpening IUxxx_AmbTemp IUxxx_RCSwitchTemp IUxxx_RemoteSensorTemp
Analog-Output	1	☒	IUxxx_Settemp_command
Analog-Value	2	☒	IUxxx_RCSwitchGroup
Averaging	18	☐	
Binary-Input	3	☒	Communication error Hitachi GW IUxxx_IU_Exist IUxxx_OnOff_status IUxxx_Defrost
Binary-Output	4	☒	IUxxx_OnOff_command
Binary-Value	5	☒	IUxxx_CentralSet_OnOff IUxxx_CentralSet_Mode IUxxx_CentralSet_SetT IUxxx_ CentralSet_Fan IUxxx_ CentralSet_Louver IUxxx_RCSwitchConfiguration_MA IUxxx_RCSwitchConfiguration_RC
Calendar	6	☐	
Command	7	☐	
Device	8	☒	HI-AC BACnet Gateway
Event-Enrollment	9	☐	
File	10	☐	
Group	11	☐	
Life-Safety-Point	21	☐	
Life-Safety-Zone	22	☐	
Loop	12	☐	
Multistate-Input	13	☒	IUxxx_Mode_status IUxxx_Fan_status IUxxx_Louver_status IUxxx_ErrorCode IUxxx_CompStopCause IUxxx_OperationCond
Multistate-Output	14	☒	IUxxx_Mode_command IUxxx_Fan_command IUxxx_Louver_command
Multistate-Value	19	☐	
Notification-Class	15	☐	
Program	16	☐	
Schedule	17	☐	
Trend-Log	20	☐	

5.2 *Member objects*

5.2.1 Type: Gateway

Object-name	Description	Object-type	Object-instance
HI-AC BACnet Gateway	HI-AC BACnet Gateway	Device	246
Communication error Hitachi GW	Communication error Hitachi GW	BI	0

5.2.2 Type: Indoor Unit

Object-name	Description	Object-type	Object-instance
IUxxx_IU_Exist	IUxxx_IU_Exist	BI	(xxx * 100) + 1
IUxxx_System_Address	IUxxx_System_Address	AI	(xxx * 100) + 2
IUxxx_Unit_Address	IUxxx_Unit_Address	AI	(xxx * 100) + 3
IUxxx_OnOff_status	IUxxx_OnOff_status	BI	(xxx * 100) + 4
IUxxx_OnOff_command	IUxxx_OnOff_command	BO	(xxx * 100) + 5
IUxxx_Mode_status	IUxxx_Mode_status	MI	(xxx * 100) + 6
IUxxx_Mode_command	IUxxx_Mode_command	MO	(xxx * 100) + 7
IUxxx_Fan_status	IUxxx_Fan_status	MI	(xxx * 100) + 8
IUxxx_Fan_command	IUxxx_Fan_command	MO	(xxx * 100) + 9
IUxxx_Settemp_status	IUxxx_Settemp_status	AI	(xxx * 100) + 10
IUxxx_Settemp_command	IUxxx_Settemp_command	AO	(xxx * 100) + 11
IUxxx_Louver_status	IUxxx_Louver_status	MI	(xxx * 100) + 12
IUxxx_Louver_command	IUxxx_Louver_command	MO	(xxx * 100) + 13
IUxxx_CentralSet_OnOff	IUxxx_CentralSet_OnOff	BV	(xxx * 100) + 14
IUxxx_CentralSet_Mode	IUxxx_CentralSet_Mode	BV	(xxx * 100) + 15
IUxxx_CentralSet_SetT	IUxxx_CentralSet_SetT	BV	(xxx * 100) + 16
IUxxx_CentralSet_Fan	IUxxx_CentralSet_Fan	BV	(xxx * 100) + 17
IUxxx_CentralSet_Louver	IUxxx_CentralSet_Louver	BV	(xxx * 100) + 18
IUxxx_Inlet_Temperature	IUxxx_Inlet_Temperature	AI	(xxx * 100) + 19
IUxxx_Outlet_Temperature	IUxxx_Outlet_Temperature	AI	(xxx * 100) + 20
IUxxx_GasPipeTemp	IUxxx_GasPipeTemp	AI	(xxx * 100) + 21
IUxxx_LiquidPipeTemp	IUxxx_LiquidPipeTemp	AI	(xxx * 100) + 22
IUxxx_ErrorCode	IUxxx_ErrorCode	MI	(xxx * 100) + 23
IUxxx_CompStopCause	IUxxx_CompStopCause	MI	(xxx * 100) + 24
IUxxx_ExpansionValveOpening	IUxxx_ExpansionValveOpening	AI	(xxx * 100) + 25
IUxxx_OperationCond	IUxxx_OperationCond	MI	(xxx * 100) + 26
IUxxx_Defrost	IUxxx_Defrost	BI	(xxx * 100) + 27
IUxxx_AmbTemp	IUxxx_AmbTemp	AI	(xxx * 100) + 28
IUxxx_RCSwitchTemp	IUxxx_RCSwitchTemp	AI	(xxx * 100) + 29
IUxxx_RCSwitchConfiguration_Ma	IUxxx_RCSwitchConfiguration_Ma	BV	(xxx * 100) + 30
IUxxx_RCSwitchConfiguration_RC	IUxxx_RCSwitchConfiguration_RC	BV	(xxx * 100) + 31
IUxxx_RCSwitchGroup	IUxxx_RCSwitchGroup	AV	(xxx * 100) + 32
IUxxx_RemoteSensorTemp	IUxxx_RemoteSensorTemp	AI	(xxx * 100) + 33

5.3 *Objects and properties*

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

Object_Identifier: In the **Device Object**, the value of object instance is configurable through LinkBoxBACnet. See Table 5.1 in order to obtain the name of each object.

Variable	Description
"xxx"	Indoor Unit identifier (1..64)

Table 5.1 Objects and properties variables and descriptions

Object_Name: In the **Device Object**, this string is configurable through LinkBoxBACnet. See Table 5.1 to obtain the name of each object.

Description: In the **Device Object**, this string is configurable through LinkBoxBACnet. See Table 5.1 to obtain the description of each object.

Relinquish_Default: In **Binary Outputs**, **Multistate Outputs** and **Multistate Values**, the value of *Present_Value* property will be read.

Priority_Array: In **Binary Outputs**, **Multistate Outputs** and **Multistate Values**, *Priority_Array[16]* will acquire the value of *Present_Value* property and *Priority_Array[1]~[15]* will be NULL.

State_Text: In **Multistate Outputs**, **Multistate Outputs** and **Multistate Values**, it cannot be read the whole array at once, so “Array Index” must be specified to obtain the text of the corresponding state.

5.3.1 HI-AC BACnet Gateway (Device Object Type)

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Device, 246)	R	R
Object_Name	CharacterString	"HI-AC BACnet Gateway"	R	R
Object_Type	BACnetObjectType	DEVICE (8) (Device Object Type)	R	R
System_Status	BACnetDeviceStatus	OPERATIONAL (0)	R	R
Vendor_Name	CharacterString	"Intesis Software"	R	R
Vendor_Identifier	Unsigned16	246	R	R
Model_Name	CharacterString	"IntesisBox_BACNET_HITACHI-xAC"[2]	R	R
Firmware_Revision	CharacterString	"4.0.1"	R	R
Application_Software_Version	CharacterString	"4.0.1"	R	R
Location	CharacterString	""	O	R
Description	CharacterString	"HI-AC BACnet Gateway"	O	R
Protocol_Version	Unsigned	1	R	R
Protocol_Revision	Unsigned	2	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	R	R
Segmentation_Supported	BACnetSegmentation	NO_SEGMENTATION (3)	R	R
Max_Segments_Accepted	Unsigned	-	O	-
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	-	O	-
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	-

[2] X stands for the corresponding number of AC units support in each specific model: 8 or 64 are the possible values.

Max_Master	Unsigned	-	O	-
Max_Info_Frames	Unsigned	-	O	-
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	-	O	-
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	-
Max_Segments_accepted	Unsigned	-	O	-
Profile_Name	CharacterString	-	O	-

5.3.2 Communication error with Hitachi GW (Binary Input Object Type)

It indicates the communication status between the HC-A8/64MB communication adaptor and the IntesisBox.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Input, 0)	R	R
Object_Name	CharacterString	“Communication error with Hitachi GW”	R	R
Object_Type	BACnetObjectType	BINARY_INPUT (3)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	R	R
Description	CharacterString	“Communication error with Hitachi GW”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Inactive"	O	R
Active_Text	CharacterString	“Active”	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	-

Status setting values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	No Error
1	Error

5.3.3 IUxxx_IU_Exist (Binary Input Object Type)

It indicates if the corresponding indoor unit is present in the system.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Input, (xxx * 100) + 1)	R	R
Object_Name	CharacterString	“IUxxx_IU_Exist”	R	R
Object_Type	BACnetObjectType	BINARY_INPUT (3)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	R	R
Description	CharacterString	“IUxxx_IU_Exist”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Inactive"	O	R
Active_Text	CharacterString	“Active”	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	-

Status values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	Not Exist
1	Exist

5.3.4 IUxxx_System_Address (Analog Input Object Type)

It indicates the system address for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 2)	R	R
Object_Name	CharacterString	“IUxxx_System_Address”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	0 … 63	R	R
Description	CharacterString	“IUxxx_System_Address”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.5 IUxxx_Unit_Address (Analog Input Object Type)

It indicates the current address in the Hitachi bus for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 3)	R	R
Object_Name	CharacterString	“IUxxx_Unit_Address”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	0 … 63	R	R
Description	CharacterString	“IUxxx_Unit_Address”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.6 IUxxx_OnOff_status (Binary Input Object Type)

It indicates if the corresponding indoor unit is set into On or Off.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Input, (xxx * 100) + 4)	R	R
Object_Name	CharacterString	“IUxxx_OnOff_status”	R	R
Object_Type	BACnetObjectType	BINARY_INPUT (3)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	R	R
Description	CharacterString	“IUxxx_OnOff_status”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Inactive"	O	R
Active_Text	CharacterString	“Active”	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	-

Status values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	Stop
1	Run

5.3.7 IUxxx_OnOff_command (Binary Output Object Type)

It sets the corresponding indoor unit into On or Off status.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Output, (xxx * 100) + 5)	R	R
Object_Name	CharacterString	“IUxxx_OnOff_command”	R	R
Object_Type	BACnetObjectType	BINARY_OUTPUT (4)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	“IUxxx_OnOff_command”	O	R
Device_Type	CharacterString	"HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	TRUE/FALSE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Inactive"	O	R
Active_Text	CharacterString	“Active"	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	-

Status values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	Stop
1	Run

5.3.8 IUxxx_Mode_status (Multistate Input Object Type)

It indicates the active mode for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, (xxx * 100) + 6)	R	R
Object_Name	CharacterString	“IUxxx_Mode_status”	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT (13)	R	R
Present_Value	Unsigned	1 ~ 5	R	R
Description	CharacterString	“IUxxx_Mode_status”	O	R
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	5	R	R
State_Text	BACnetArray[48] of CharacterString	-	O	-
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 values

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

Pesent_Value	Description
1	Cool
2	Dry
3	Fan
4	Heat
5	Auto

5.3.9 IUxxx_Mode_command (Multistate Output Object Type)

It allows control over the mode for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, (xxx * 100) + 7)	R	R
Object_Name	CharacterString	“IUxxx_Mode_command”	R	R
Object_Type	BACnetObjectType	MULTISTATE_OUTPUT (14)	R	R
Present_Value	Unsigned	1 ~ 5	W	W
Description	CharacterString	“IUxxx_Mode_command”	O	R
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	5	R	R
State_Text	BACnetArray[4] of CharacterString	-	O	-
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 values

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

Pesent_Value	Description
1	Cool
2	Dry
3	Fan
4	Heat
5	Auto

5.3.10 IUxxx_Fan_status (Multistate Input Object Type)

It indicates the fan speed mode for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, (xxx * 100) + 8)	R	R
Object_Name	CharacterString	“IUxxx_Fan_status”	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT (13)	R	R
Present_Value	Unsigned	1 ~ 5	R	R
Description	CharacterString	“IUxxx_Fan_status”	O	R
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	5	R	R
State_Text	BACnetArray[48] of CharacterString	-	O	-
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 status setting values

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

Pesent_Value	Description
1	Low
2	Medium
3	High
4	High2
5	Auto

5.3.11 IUxxx_Fan_command (Multistate Output Object Type)

It allows control over the fan mode for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, (xxx * 100) + 9)	R	R
Object_Name	CharacterString	“IUxxx_Fan_command”	R	R
Object_Type	BACnetObjectType	MULTISTATE_OUTPUT (14)	R	R
Present_Value	Unsigned	1 ~ 5	W	W
Description	CharacterString	“IUxxx_Fan_command”	O	R
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	5	R	R
State_Text	BACnetArray[4] of CharacterString	-	O	-
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	-

Fan Command setting values

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

Pesent_Value	Contents displayed in State_Text
1	Low
2	Medium
3	High
4	High2
5	Auto

5.3.12 IUxxx_Settemp_status (Analog Input Object Type)

It indicates the current set point temperature in the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 10)	R	R
Object_Name	CharacterString	“IUxxx_Settempstatus”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	17…30 (ºC)	R	R
Description	CharacterString	“IUxxx_Settemp_status”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.13 IUxxx_Settemp_command (Analog Output Object Type)

It sets the desired temperature in the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Output, (xxx * 100) + 11)	R	R
Object_Name	CharacterString	“IUxxx_Settemp_command”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	17…30 (ºC)	R	R
Description	CharacterString	“IUxxx_ Settemp _command”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.14 IUxxx_Louver_status (Multistate Input Object Type)

It indicates the active louver position for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, (xxx * 100) + 12)	R	R
Object_Name	CharacterString	“IUxxx_Louver_status”	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT (13)	R	R
Present_Value	Unsigned	1 ~ 8	R	R
Description	CharacterString	“IUxxx_Louver_status”	O	R
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	8	R	R
State_Text	BACnetArray[48] of CharacterString	-	O	-
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	-

5.3.15 IUxxx_Louver_command (Multistate Output Object Type)

It allows control over the louver position for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Output, (xxx * 100) + 13)	R	R
Object_Name	CharacterString	“IUxxx_Mode_command”	R	R
Object_Type	BACnetObjectType	MULTISTATE_OUTPUT (14)	R	R
Present_Value	Unsigned	1 ~ 8	W	W
Description	CharacterString	“IUxxx_Mode_command”	O	R
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	8	R	R
State_Text	BACnetArray[4] of CharacterString	-	O	-
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	-

5.3.16 IUxxx_CentralSet_OnOff (Binary Value Object Type)

Locks or unlocks the On/Off setting on the Remote Controller.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, (xxx * 100) + 14)	R	R
Object_Name	CharacterString	“IUxxx_CentralSet_OnOff_command”	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	“IUxxx_CentralSet_OnOff_command”	O	R
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	"Inactive"	O	R
Active_Text	CharacterString	“Active"	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	-
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	-

Setting values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	On/Off from RC allowed
1	On/Off from RC not allowed

5.3.17 IUxxx_CentralSet_Mode (Binary Value Object Type)

Locks or unlocks changing the mode setting from the Remote Controller.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, (xxx * 100) + 15)	R	R
Object_Name	CharacterString	“IUxxx_CentralSet_Mode_command”	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	“IUxxx_CentralSet_Mode_command”	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	"Inactive"	O	R
Active_Text	CharacterString	“Active"	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	-
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	-

Setting values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	Mode change from RC allowed
1	Mode change from RC not allowed

5.3.18 IUxxx_CentralSet_SetT (Binary Value Object Type)

Locks or unlocks changing the set point temperature from the Remote Controller.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, (xxx * 100) + 16)	R	R
Object_Name	CharacterString	“IUxxx_CentralSet_SetT_command”	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	“IUxxx_CentralSet_SetT_command”	O	R
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	"Inactive"	O	R
Active_Text	CharacterString	“Active"	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	-
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	-

Setting values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	Set Point Temp change from RC allowed
1	Set Point Temp change from RC not allowed

5.3.19 IUxxx_CentralSet_Fan (Binary Value Object Type)

Locks or unlocks changing the Fan Speed setting from the Remote Controller.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, (xxx * 100) + 17)	R	R
Object_Name	CharacterString	“IUxxx_CentralSet_Fan_command”	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	“IUxxx_CentralSet_Fan_command”	O	R
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	"Inactive"	O	R
Active_Text	CharacterString	“Active"	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	-
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	-

Setting values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	Fan Speed change from RC allowed
1	Fan Speed change from RC not allowed

5.3.20 IUxxx_CentralSet_Louver (Binary Value Object Type)

Locks or unlocks changing the Louver position from the Remote Controller.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, (xxx * 100) + 18)	R	R
Object_Name	CharacterString	“IUxxx_CentralSet_Louver”	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	“IUxxx_CentralSet_Louver”	O	R
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	"Inactive"	O	R
Active_Text	CharacterString	“Active"	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	-
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	-

Setting values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	Louver Position change from RC allowed
1	Louver Position change from RC not allowed

5.3.21 IUxxx_InletTemperature (Analog Input Object Type)

It indicates the temperature from the inlet sensor of the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 19)	R	R
Object_Name	CharacterString	“IUxxx_InletTemperature”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-63…63 (ºC)	R	R
Description	CharacterString	“IUxxx_InletTemperature”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.22 IUxxx_OutletTemperature (Analog Input Object Type)

It indicates the temperature from the outlet sensor of the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 20)	R	R
Object_Name	CharacterString	“IUxxx_OutletTemperature”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-63…63 (ºC)	R	R
Description	CharacterString	“IUxxx_OutletTemperature”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.23 IUxxx_GasPipeTemp (Analog Input Object Type)

It indicates the Gas Pipe temperature from the sensor in the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 21)	R	R
Object_Name	CharacterString	“IUxxx_GasPipeTemp”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-63…63 (ºC)	R	R
Description	CharacterString	“IUxxx_GasPipeTemp”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.24 IUxxx_LiquidPipeTemp (Analog Input Object Type)

It indicates the Liquid Pipe temperature from the sensor in the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 22)	R	R
Object_Name	CharacterString	“IUxxx_LiquidPipeTemp”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-63…63 (ºC)	R	R
Description	CharacterString	“IUxxx_LiquidPipeTemp”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.25 IUxxx_ErrorCode (Multistate Input Object Type)

It indicates the error code of the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, (xxx * 100) + 23)	R	R
Object_Name	CharacterString	“IUxxx_ErrorCode”	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT (13)	R	R
Present_Value	Unsigned	1 ~ 255	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	255	R	R
State_Text	BACnetArray[48] of CharacterString	-	O	-
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	-

ErrorCode values

ErrorCode interpretation is possible using the unit service manual. Please check the AC unit service manual for specific information about the casuses of the issue.

Pesent_Value	Description
255	`Off`
Any other	`Check AC service manual`

5.3.26 IUxxx_CompStopCause (Multistate Input Object Type)

It indicates the cause for the compressor to stop working.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, (xxx * 100) + 24)	R	R
Object_Name	CharacterString	“IUxxx_CompStopCause”	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT(13)	R	R
Present_Value	Unsigned	1 ~ 255	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	255	R	R
State_Text	BACnetArray[32] of CharacterString	-	O	-
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	-

CompStopCause values

CompStopCause interpretation is possible using the unit service manual. Please check the AC unit service manual for specific information about the casuses of the issue.

Pesent_Value	Description
255	Operation Off, Powe Off
Any other	Check AC service manual

5.3.27 IUxxx_ExpansionValveOpening (Analog Input Object Type)

It indicates the opening for the Expansion Valve of the corresponding Indoor Unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 25)	R	R
Object_Name	CharacterString	“IUxxx_ExpansionValveOpening”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	0 … 100	R	R
Description	CharacterString	“IUxxx_ ExpansionValveOpening”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.28 IUxxx_OperationCond (Multistate Input Object Type)

It indicates the current Operation Condition for the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Multi-state Input, (xxx * 100) + 26)	R	R
Object_Name	CharacterString	“IUxxx_OperationCond”	R	R
Object_Type	BACnetObjectType	MULTISTATE_INPUT (13)	R	R
Present_Value	Unsigned	1 ~ 255	R	R
Description	CharacterString	-	O	-
Device_Type	CharacterString	"HI-AC BACnet Gateway"	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Number_Of_States	Unsigned	255	R	R
State_Text	BACnetArray[48] of CharacterString	-	O	-
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	-

OperationCond values

OperationCond interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
1	Off
2	Thermo Off
3	Thermo On
4	Alarm

5.3.29 IUxxx_Defrost (Binary Input Object Type)

It indicates the Defrost sign status.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Input, (xxx * 100) + 27)	R	R
Object_Name	CharacterString	“IUxxx_Defrost”	R	R
Object_Type	BACnetObjectType	BINARY_INPUT (3)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	R	R
Description	CharacterString	“IUxxx_Defrost”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Polarity	BACnetPolarity	NORMAL (0)	R	R
Inactive_Text	CharacterString	"Inactive"	O	R
Active_Text	CharacterString	“Active”	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	-

5.3.30 IUxxx_AmbTemp (Analog Input Object Type)

It indicates the room temperature from the sensor in the corresponding indoor unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 28)	R	R
Object_Name	CharacterString	“IUxxx_AmbTemp”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-63…63 (ºC)	R	R
Description	CharacterString	“IUxxx_ AmbTemp”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.31 IUxxx_RCSwitchTemp (Analog Input Object Type)

It indicates the Remote Controller Switch temperature.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 29)	R	R
Object_Name	CharacterString	“IUxxx_RCSwitchTemp”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-63…63 (ºC)	R	R
Description	CharacterString	“IUxxx_ RCSwitchTemp”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

5.3.32 IUxxx_RCSwitchConfiguration_MasterSlave (Binary Value Object Type)

It indicates the Master Slave setting on the Remote Controlle Switch.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, (xxx * 100) + 30)	R	R
Object_Name	CharacterString	“IUxxx_RCSwitch_Configuration_Ma”	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	“IUxxx_RCSwitch_Configuration_Ma”	O	R
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	"Inactive"	O	R
Active_Text	CharacterString	“Active"	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	-
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	-

Setting values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	Master
1	Slave

5.3.33 IUxxx_ RCSwitchConfiguration_RCNotPresent (Binary Value Object Type)

It indicates if the Remote Controller Swithc is Present or Not.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Binary Value, (xxx * 100) + 31)	R	R
Object_Name	CharacterString	“IUxxx_RCSwitch_Configuration_RC”	R	R
Object_Type	BACnetObjectType	BINARY_VALUE (5)	R	R
Present_Value	BACnetBinaryPV	INACTIVE (0) / ACTIVE (1)	W	W
Description	CharacterString	“IUxxx_RCSwitch_Configuration_RC”	O	R
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	"Inactive"	O	R
Active_Text	CharacterString	“Active"	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	-
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	-

Setting values

Status interpretation is possible using the value in the following correspondence table.

Pesent_Value	Description
0	With RCS
1	Without RCS

5.3.34 IUxxx_RCSwitchGroup (Analog Value Object Type)

It indicates the current Remote Controller Switch Group for the corresponding Indoor Unit.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Value, (xxx * 100) + 32)	R	R
Object_Name	CharacterString	“IUxxx_RCSwitchGroup”	R	R
Object_Type	BACnetObjectType	ANALOG_VALUE (2)	R	R
Present_Value	REAL	0…255	W	W
Description	CharacterString	“IUxxx_RCSwitchGroup”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	R
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

Setting values

Status interpretation is possible using the value in the following correspondence table.

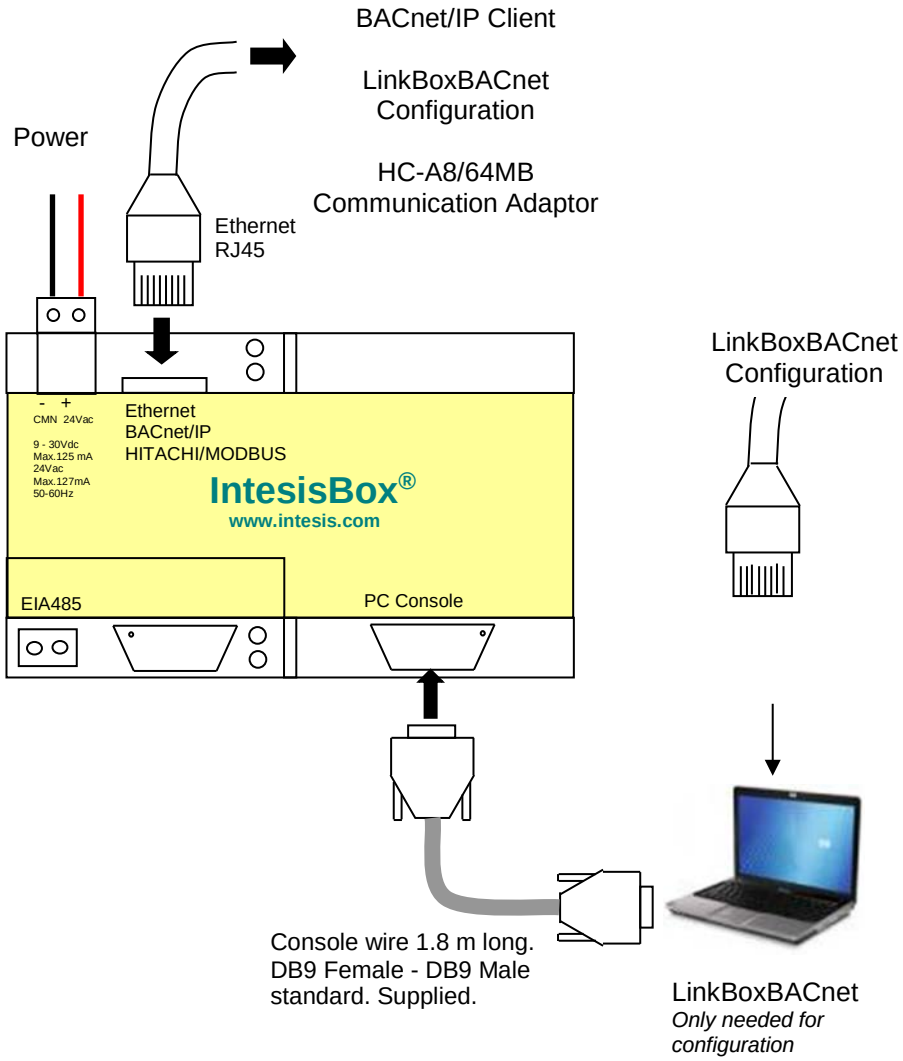
Pesent_Value	Description
0	No Group
1...255	Current Group

5.3.35 IUxxx_RemoteSensorTemp (Analog Input Object Type)

It indicates the temperature af a remote temperature sensor.

Property Identifier	Property Datatype	Value	ASHRAE	IBOX
Object_Identifier	BACnetObjectIdentifier	(Analog Input, (xxx * 100) + 33)	R	R
Object_Name	CharacterString	“IUxxx_RemoteSensorTemp”	R	R
Object_Type	BACnetObjectType	ANALOG_INPUT (0)	R	R
Present_Value	REAL	-63…63 (ºC)	R	R
Description	CharacterString	“IUxxx_ RemoteSensorTemp”	O	R
Device_Type	CharacterString	“HI-AC BACnet Gateway”	O	R
Status_Flags	BACnetStatusFlags	{FALSE, FALSE, FALSE, TRUE/FALSE}	R	R
Event_State	BACnetEventState	STATE_NORMAL (0)	R	R
Reliability	BACnetReliability	NO_FAULT_DETECTED (0)	O	R
Out_Of_Service	BOOLEAN	FALSE/TRUE	R	R
Update_Interval	Unsigned	-	O	-
Units	BACnetEngineeringUnits	NO_UNITS (95)	R	-
Min_Pres_Value	REAL	-	O	-
Max_Pres_Value	REAL	-	O	-
Resolution	REAL	-	O	-
COV_Increment	REAL	1	O	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	-

6 Connections



Ensure proper space for all connectors when mounted.

The items supplied by Intesis Software for this integration are:

- IntesisBox BACnet/IP Server.
- Console cable. Standard DB9F-DB9M cable 1.8 meter long.
- Installation sheet, containing a link to the LinkBoxBACnet software and this manual.

6.1 *Power device*

The first step to perform is to power up the device. To do so, a power supply working with any of the voltage range allowed is needed (check section 8). Once connected the ON led will turn on.

WARNING! In order to avoid earth loops that can damage the gateway and/or any other equipment connected to it, we strongly recommend:

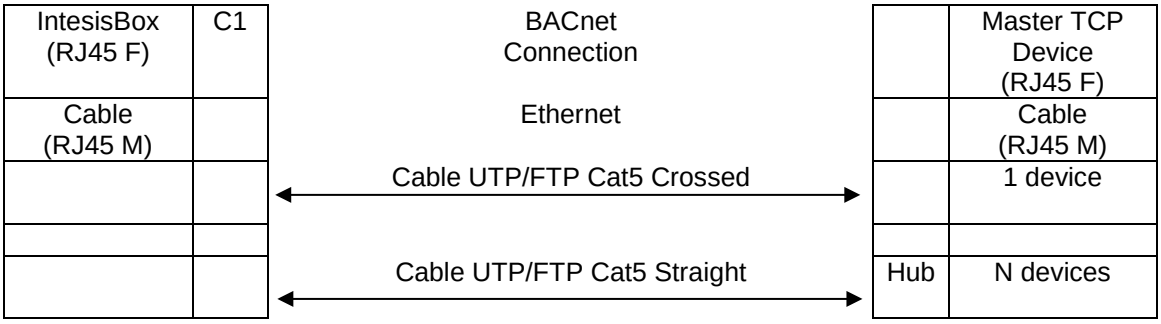
- The use of DC power supplies, floating or with the negative terminal connected to earth. **Never use a DC power supply with the positive terminal connected to earth**.
- The use of AC power supplies only if they are floating and not powering any other device.

6.2 *Connect to BACnet / HC-A8/64MB communication adaptor interface*

Connect the communication cable coming from the network hub or switch to the ETH port (Figure above) of IntesisBox. The cable to be used depends on where the IntesisBox is being connected:

- Connecting directly to a BACnet/IP device: crossover Ethernet UTP/FTP CAT5 cable
- Connecting to a hub or switch of the LAN of the building: a straight Ethernet UTP/FTP CAT5 cable

In case there is no response from the BACnet devices to the frames sent by IntesisBox, check that they are operative and reachable from the network connection used by IntesisBox. Check the IntesisBox Ethernet interface sending Pings to its IP address using a PC connected to the same Ethernet network.

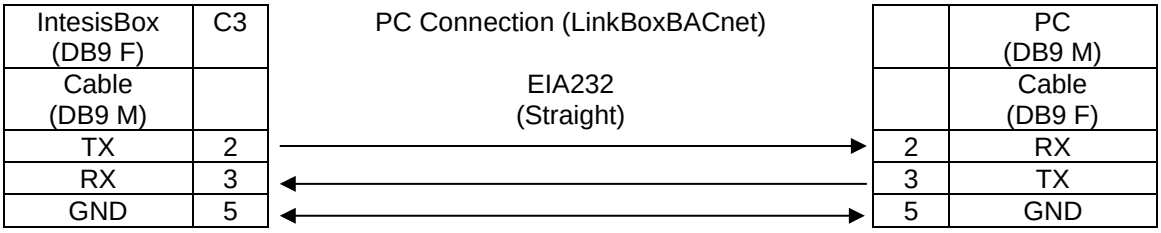


Remember to follow all safety precautions indicated by Hitachi.

6.3 *Connect to PC (LinkBoxBACnet)*

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

- Ethernet: Using the ETH port of IntesisBox. How to check connectivity is explained in section 6.2.
- Serial cable: To connect the device to the PC the serial cable supplied should be plugged to the PC console port
  The cable is a RS-232 straight cable and its pinout is at explained in table below.



7 Set-up process and troubleshooting

7.1 *Pre-requisites*

It is necessary to have the BACnet/IP device operative and well connected to the BACnet/IP port of IntesisBox and the HC-A8/64MB communication adaptor with the Ethernet port operative.

Connectors, connection cables, PC for LinkBoxBACnet and other auxiliary material, if needed, are not supplied by Intesis Software for this standard integration.

Items supplied by Intesis Software for this integration are:

- IntesisBox BACnet/IP Server device with Hitachi AC external protocol firmware loaded.
- LinkBoxBACnet software to configure IntesisBox.
- Console cable needed to download the configuration to IntesisBox.
- Product documentation.

7.2 *LinkBoxBACnet. Configuration & monitoring tool for IntesisBox BACnet series*

7.2.1 Introduction

LinkBoxBACnet is a Windows® compatible software developed specifically to monitor and configure IntesisBox BACnet series.

The installation procedure and main functions are explained in the *LinkBoxBACnet User Manual*. This document can be found in the Doc folder, or can be downloaded from the link indicated in the installation sheet supplied with the IntesisBox device.

In this section, only the specific case of Hitachi AC integration to BACnet systems will be covered.

7.2.2 Connections configuration

To configure the IntesisBox connection parameters and to see the points list, press on the ***Config*** button in the *menu bar* (see Figure 7.1). The *Hitachi AC Configuration* window will open (see Figure 7.2).

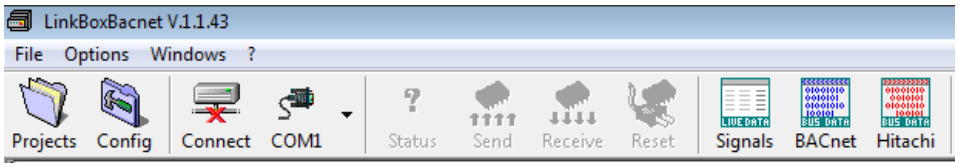


Figure 7.1 LinkBoxBACnet *menu bar*

7.2.2.1 Connnection tab

Select the ***Connection*** tab to configure the connection parameters. Two subsets of information are shown in this window: BACnet/IP (BACnet interface and IP interface for configuration) and HC-A8/64MB communication adaptor parameters (see Figure 7.2).

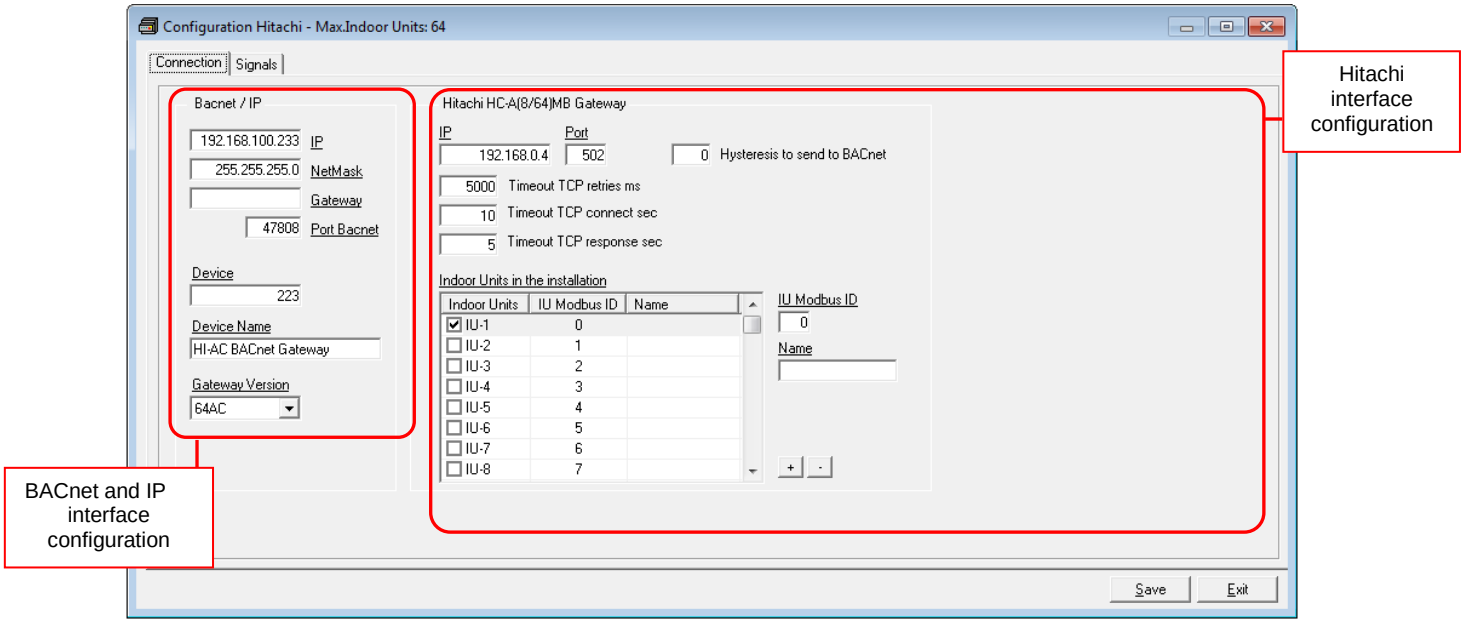


Figure 7.2 LinkBoxBACnet connection tab

Next, there is an explanation for each of the configuration parameters in each mode.

- BACnet/IP interface configuration parameters:

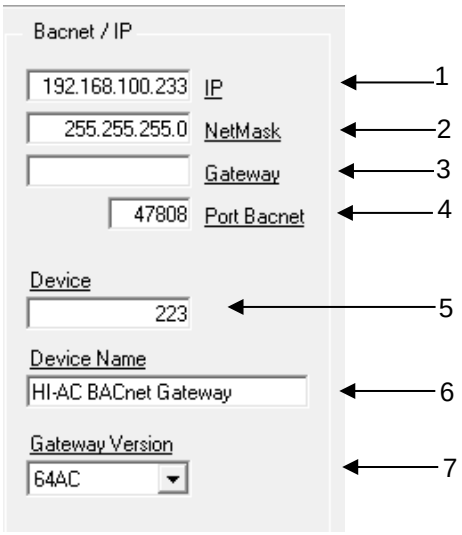


Figure 7.3 BACnet/IP interface configuration

1. **IP:** Enter the IP address for the gateway (192.168.0.246 by default).
2. **NetMask:** Enter the IntesisBox net mask address (255.255.255.0 by default).
3. **Gateway:** Enter the router or default gateway address if needed. In case you don't want to use it, left blank.
4. **Port BACnet:** Used port for BACnet communications (47808 by default)

5. **Device:** Device BACnet number (246 by default).
6. **Device Name:** Device BACnet name and description (HI-AC BACnet Gateway by default).
7. **Gateway Version:** Select here the gateway version you have: 8 AC for HI-AC-BAC-8 or 64 AC for HI-AC-BAC-64. It will affect the maximum number of AC units available.

- Hitachi AC side configuration parameters:

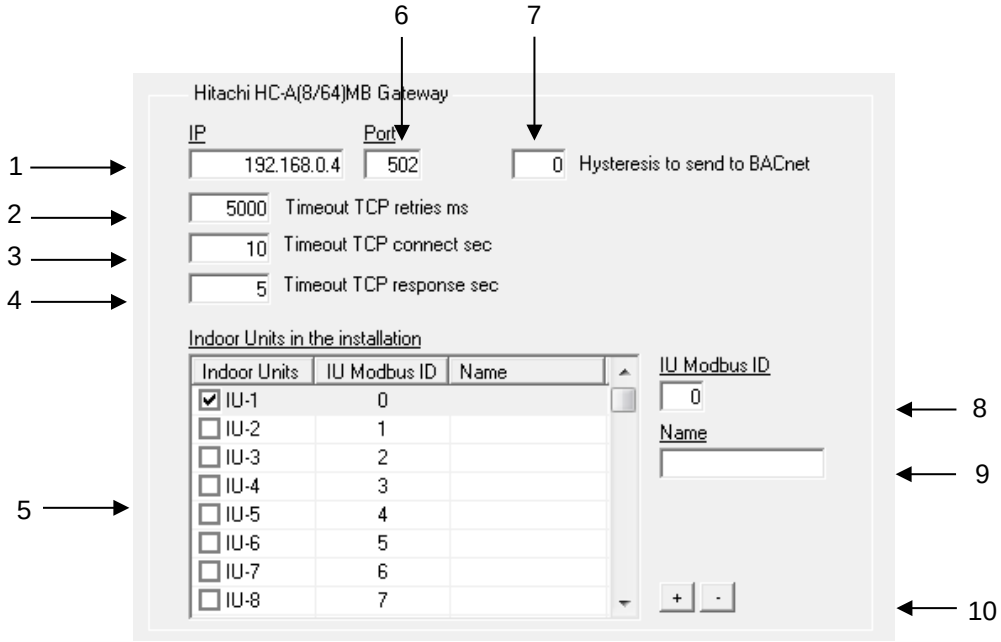


Figure 7.4 Hitachi interface configuration.

1. **IP:** IP address of the HC-A8/64MB gateway. By default, it is set to 192.168.0.4
2. **Timeout TCP retrires ms:** Timeout between TCP connection retrires. Value ranges go from 100 to 30000 ms. Default value is 5000 ms.
3. **Timeout TCP connected sec:** Time waiting for a TCP connection before launching a timeout error. Value ranges from 1 to 120 seconds. Default value is 10 seconds.
4. **Timeout TCP response sec:** Time waiting for a TCP response before launching a timeout error. Value ranges go from 1 to 120 seconds. Default value is 5 seconds.
5. **Indoor Units:** List of all indoor units as per gateway capacity. In this list, you can individually enable each of the 64 indoor units available on the system. Use the check box, on the ***Indoor Units*** column, to identify active units in the project.

   The index in the column “Indoor Units” (i.e. the number x in “Indoor Unit xxx”) is the reference that will be used later (in tab “Signals”) to refer to this AC indoor unit. You can also change the description name of the Indoor Unit Modbus ID and its address to facilitate integration tasks using **Unit_Modbus_ID** and **Name** text boxes. Select an indoor unit row to edit its properties (fields 8 and 9 of this same section).
6. **Port:** TCP port to be used for the Modbus TCP communication with the HC-A8/64MB gateway.
7. **Hystersis to send to BACnet:** Minimum difference in the new data received from Modbus TCP to send it to BACnet. Value ranges go from 0 to 1 in 0.x steps, for example, 0,5. Default value is 0 (all values sent).

8. **IU_Modbus_ID:** Address of the selected indoor unit. It depends on the values set on the HC-A8/64MB. Address range vary from 01 to 64.

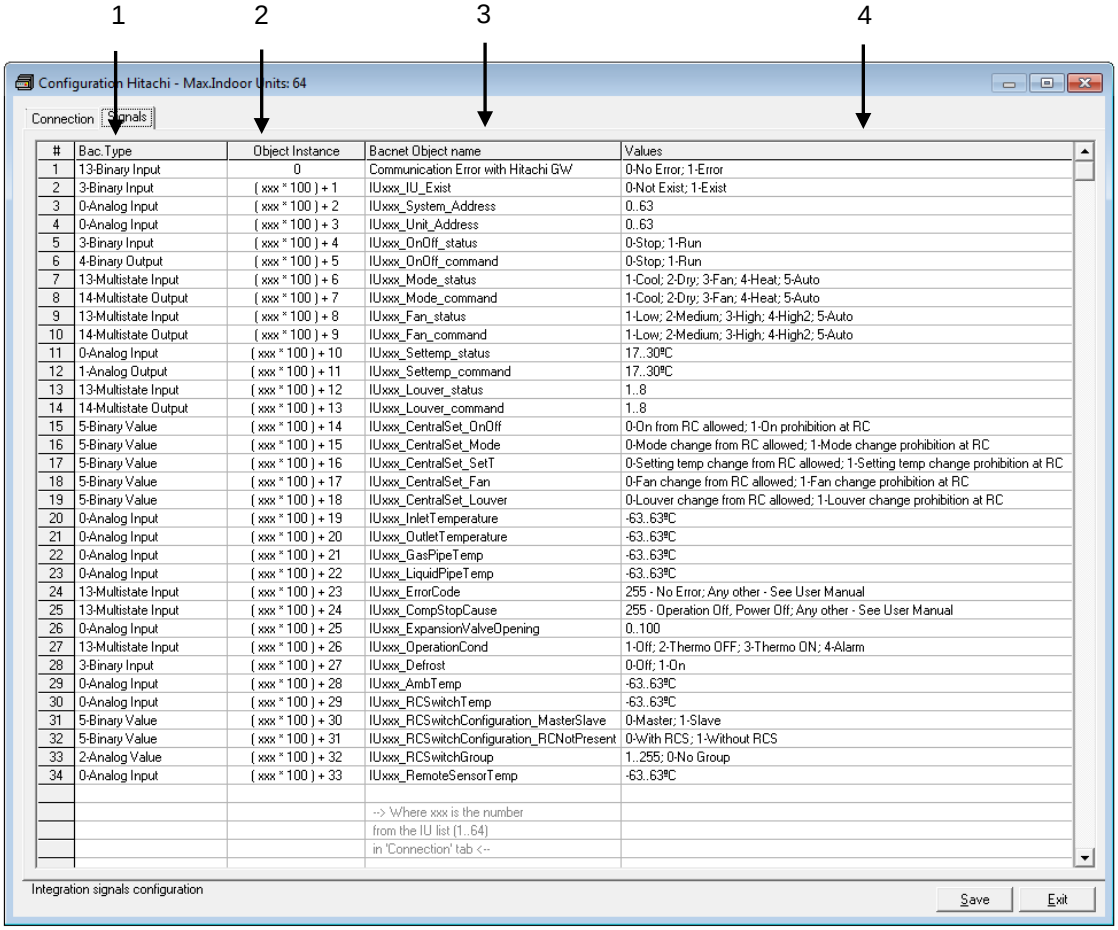
9. **Name:** Descriptive name for each indoor unit. It is optional, but recommended to help identifying each indoor unit uniquely.

10. **+/-: Use** the '+' button to select all indoor units (all checkbox active) or use the '-' button to deselect all indoor units (uncheck all checkboxes).

Additional configuration parameters should generally be left to their default value. They only might need to be tuned in some very specific cases (installations with large number of units, scenarios with large bursts of commands sent at once …).

7.2.2.2 Signals

All available objects, Object Instance and its possible values are listed in the signals tab.



#	Bac.Type	Object Instance	Bacnet Object name	Values
1	13-Binary Input	0	Communication Error with Hitachi GW	0-No Error; 1-Error
2	3-Binary Input	(xxx * 100) + 1	IUxxx_IU_Exist	0-Not Exist; 1-Exist
3	0-Analog Input	(xxx * 100) + 2	IUxxx_System_Address	0..63
4	0-Analog Input	(xxx * 100) + 3	IUxxx_Unit_Address	0..63
5	3-Binary Input	(xxx * 100) + 4	IUxxx_OnOff_status	0-Stop; 1-Run
6	4-Binary Output	(xxx * 100) + 5	IUxxx_OnOff_command	0-Stop; 1-Run
7	13-Multistate Input	(xxx * 100) + 6	IUxxx_Mode_status	1-Cool; 2-Dry; 3-Fan; 4-Heat; 5-Auto
8	14-Multistate Output	(xxx * 100) + 7	IUxxx_Mode_command	1-Cool; 2-Dry; 3-Fan; 4-Heat; 5-Auto
9	13-Multistate Input	(xxx * 100) + 8	IUxxx_Fan_status	1-Low; 2-Medium; 3-High; 4-High2; 5-Auto
10	14-Multistate Output	(xxx * 100) + 9	IUxxx_Fan_command	1-Low; 2-Medium; 3-High; 4-High2; 5-Auto
11	0-Analog Input	(xxx * 100) + 10	IUxxx_Settemp_status	17..30ºC
12	1-Analog Output	(xxx * 100) + 11	IUxxx_Settemp_command	17..30ºC
13	13-Multistate Input	(xxx * 100) + 12	IUxxx_Louver_status	1..8
14	14-Multistate Output	(xxx * 100) + 13	IUxxx_Louver_command	1..8
15	5-Binary Value	(xxx * 100) + 14	IUxxx_CentralSet_OnOff	0-On from RC allowed; 1-On prohibition at RC
16	5-Binary Value	(xxx * 100) + 15	IUxxx_CentralSet_Mode	0-Mode change from RC allowed; 1-Mode change prohibition at RC
17	5-Binary Value	(xxx * 100) + 16	IUxxx_CentralSet_SetT	0-Setting temp change from RC allowed; 1-Setting temp change prohibition at RC
18	5-Binary Value	(xxx * 100) + 17	IUxxx_CentralSet_Fan	0-Fan change from RC allowed; 1-Fan change prohibition at RC
19	5-Binary Value	(xxx * 100) + 18	IUxxx_CentralSet_Louver	0-Louver change from RC allowed; 1-Louver change prohibition at RC
20	0-Analog Input	(xxx * 100) + 19	IUxxx_InletTemperature	-63..63ºC
21	0-Analog Input	(xxx * 100) + 20	IUxxx_OutletTemperature	-63..63ºC
22	0-Analog Input	(xxx * 100) + 21	IUxxx_GasPipeTemp	-63..63ºC
23	0-Analog Input	(xxx * 100) + 22	IUxxx_LiquidPipeTemp	-63..63ºC
24	13-Multistate Input	(xxx * 100) + 23	IUxxx_ErrorCode	255 - No Error; Any other - See User Manual
25	13-Multistate Input	(xxx * 100) + 24	IUxxx_CompStopCause	255 - Operation Off, Power Off; Any other - See User Manual
26	0-Analog Input	(xxx * 100) + 25	IUxxx_ExpansionValveOpening	0..100
27	13-Multistate Input	(xxx * 100) + 26	IUxxx_OperationCond	1-Off; 2-Thermo OFF; 3-Thermo ON; 4-Alarm
28	3-Binary Input	(xxx * 100) + 27	IUxxx_Defrost	0-Off; 1-On
29	0-Analog Input	(xxx * 100) + 28	IUxxx_AmbTemp	-63..63ºC
30	0-Analog Input	(xxx * 100) + 29	IUxxx_RCSwitchTemp	-63..63ºC
31	5-Binary Value	(xxx * 100) + 30	IUxxx_RCSwitchConfiguration_MasterSlave	0-Master; 1-Slave
32	5-Binary Value	(xxx * 100) + 31	IUxxx_RCSwitchConfiguration_RCNotPresent	0-With RCS; 1-Without RCS
33	2-Analog Value	(xxx * 100) + 32	IUxxx_RCSwitchGroup	1..255; 0-No Group
34	0-Analog Input	(xxx * 100) + 33	IUxxx_RemoteSensorTemp	-63..63ºC
			--> Where xxx is the number	
			from the IU list (1..64)	
			in 'Connection' tab <--	

Figure 7.5 Signal list

1. **BACnet type:** Type of BACnet object.
2. ***Object Instance*:** BACnet object instance. This can be a fixed number or a formula for the identification of each element.
3. **Object BACnet name:** Signal's descriptive name that identifies the signal.
4. **Values:** Possible vaues for each signal.

7.2.3 Sending the configuration to IntesisBox

When the configuration is finished, follow the next steps.

1.- Click on ***Save*** button to save the project to the project folder on your hard disk (more information in LinkBoxBACnet User Manual).

2.- You will be prompted to generate the configuration file to be sent to the gateway.

a.- If ***Yes*** is selected, the binary file (HITACHI.Lbox) containing the configuration for the gateway will be generated and saved also into the project folder.

b.- If ***NO*** is selected, remember that the binary file with the project needs to be generated before the IntesisBox starts to work as expected.

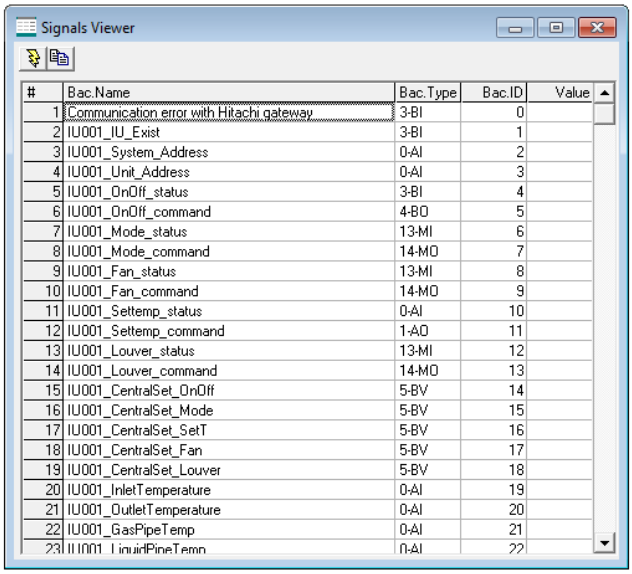
3.- Once in the configuration window again, click on ***exit***. Configuration file is ready to be sent to the IntesisBox device.

4.- Press the ***Send File*** button to send the binary file to the IntesisBox device. The process of file transmission can be monitored in the IntesisBox Communication Console window. IntesisBox will reboot automatically once the new configuration is loaded.

After any configuration change, do not forget to send the configuration file to the IntesisBox using button Send File.

7.2.4 Signals viewer

Once the gateway is running with the correct configuration, to supervise the status of the configured signals, press the ***Signals*** button on the *menu* bar (see Figure 7.1). The Signals Viewer window will open (see Figure 7.6). This window shows all signals active within the gateway with its main configuration parameters and its real time value[3] in the ***Value*** column.



#	Bac.Name	Bac.Type	Bac.ID	Value
1	Communication error with Hitachi gateway	3-BI	0	
2	IU001_IU_Exist	3-BI	1	
3	IU001_System_Address	0-AI	2	
4	IU001_Unit_Address	0-AI	3	
5	IU001_OnOff_status	3-BI	4	
6	IU001_OnOff_command	4-BO	5	
7	IU001_Mode_status	13-MI	6	
8	IU001_Mode_command	14-MO	7	
9	IU001_Fan_status	13-MI	8	
10	IU001_Fan_command	14-MO	9	
11	IU001_Settemp_status	0-AI	10	
12	IU001_Settemp_command	1-AO	11	
13	IU001_Louver_status	13-MI	12	
14	IU001_Louver_command	14-MO	13	
15	IU001_CentralSet_OnOff	5-BV	14	
16	IU001_CentralSet_Mode	5-BV	15	
17	IU001_CentralSet_SetT	5-BV	16	
18	IU001_CentralSet_Fan	5-BV	17	
19	IU001_CentralSet_Louver	5-BV	18	
20	IU001_InletTemperature	0-AI	19	
21	IU001_OutletTemperature	0-AI	20	
22	IU001_GasPipeTemp	0-AI	21	
23	IU001_LiquidPipeTemp	0-AI	22	

Figure 7.6 LinkBoxBACnet Signals Viewer

The signals viewer can be used even though only one system is connected to the IntesisBox, BACnet or Hitachi AC. Therefore, it becomes convenient for supervision and testing the system.

In order to force a specific value to a signal, double-click its row in the table. This will display a dialog in which the desired value can be entered (see Figure 7.7). Changing its value in this way, will make:

- The content of the corresponding object will be changed to this value.

[3] In case you connect to the IntesisBox® when it's been running for a certain time, you should press the *Refresh* button to get updated values. After pressing *Refresh*, all signal values will keep continuously updated until the connection is closed.

- If the signal is write-enabled, it will trigger a suitable command to Hitachi AC system.

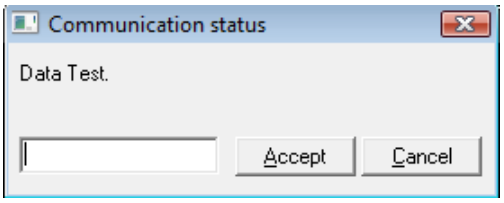


Figure 7.7 Signal value change window

7.2.5 Files

LinkBoxBACnet saves the integration configuration in the following files inside the project folder:

File name	File description
Project.ini	INI file containing general information related to the project.
HITACHI.ini	INI file containing information related with the values configured through the "Connection" tab in IntesisBox configuration.
HITACHI.Lbox	Binary file created from the information in the files described above. This is the file downloaded to the IntesisBox.
HITACHI.dat	ASCII file containing the summary object list.

Table 7.1 LinkBoxBACnet generated files during Project creation

It is strongly recommended to back up the project folder containing these files in external media, once the installation process is finished. This way you will be able to do future configuration changes in case of reinstallation of LinkBoxBACnet due, for example, to a failure of the hard disk in the PC where LinkBoxBACnet was installed.

The configuration cannot be uploaded from the gateway to LinkBoxBACnet, it can only be downloaded.

7.2.6 Set-up procedure

1. Install LinkBoxBACnet on your laptop, use the setup program supplied for this and follow the instructions given by the Installation wizard.

2. Install IntesisBox in the desired installation site. The mounting can be on DIN rail or on a stable not vibrating surface (DIN rail mounted inside a metallic industrial cabinet connected to ground beside the Panel is recommended).

3. Connect the communication cable coming from the BACnet IP network to the port marked as **BACnet/IP** of IntesisBox (More details in section 6).

4. Connect the communication cable coming from the EIA485 port of the HC-A8/64MB communication adaptor to the port marked as **HC-A8/64MB** of IntesisBox (More details in section 6).

5. Power up IntesisBox. The supply voltage can be 9 to 30 Vdc or just 24 Vac. Take care of the polarity of the supply voltage applied.

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

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

6. Connect the communication cable coming from the serial port of your laptop PC to the port marked as **PC Console** of IntesisBox.

7. Open LinkBoxBACnet, create a new project selecting a copy of the one named **DEMO Hitachi** and give it the desired name, select the serial port used to connect to IntesisBox and switch working mode to *on-line*. The IntesisBox identification must appear in the *IntesisBox communication console* window as showed below.

8. Modify the configuration as desired, save it and download the configuration file to IntesisBox as explained before.

9. Open the *BACnet Communication Viewer* window and check that there is communication activity, some TX frames and some other RX frames. This means that the communication with the BACnet master device is OK. In case there is no communication activity between IntesisBox and the BACnet device check that it is operative, check the baud rate, and the communication cable used to connect both devices.

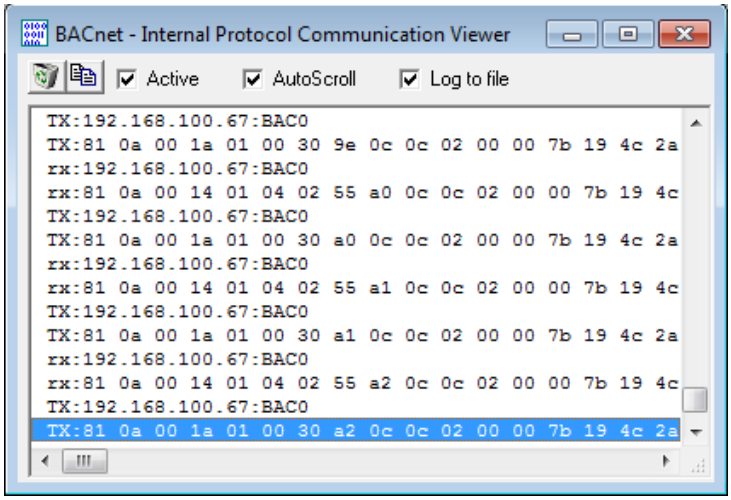


Figure 7.8 BACnet Protocol Communication Viewer

10. Open the *Hitachi Communication Viewer* window and check that there is communication activity, some RX frames. This means that the communication with the HC-A8/64MB communication adaptor is OK. In case of no communication activity between IntesisBox and HC-A8/64MB communication adaptor, check that the EIA485 port of HC-A8/64MB communication adaptor is operative and well configured and check also the communication cable used to connect both devices.

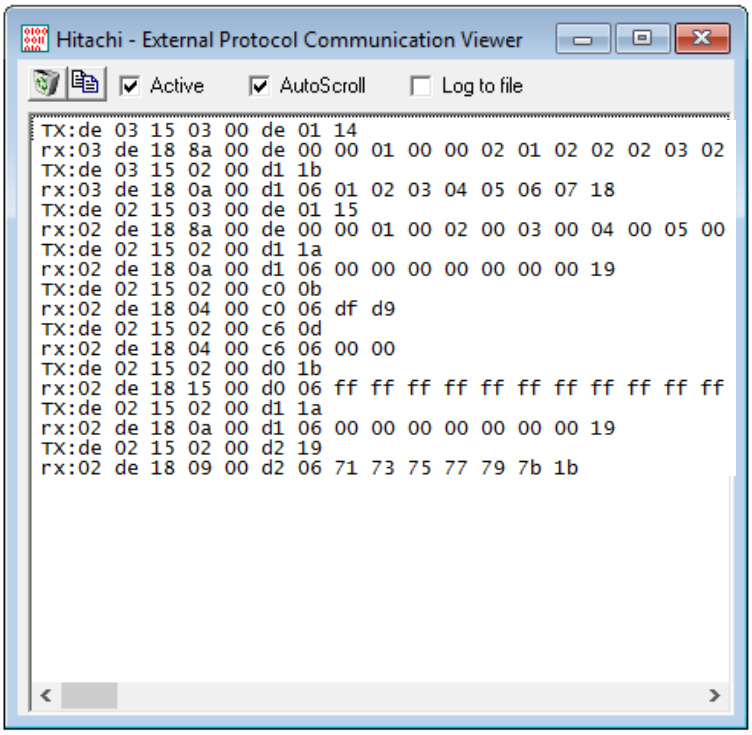


Figure 7.9 Hitachi AC Protocol Communication Viewer

7.3 *Physical checking*

First point to look at to make sure that IntesisBox® is not working properly is to check physical connections:

1.- Make sure that the power plug is correctly connected and current is available in the power line.

2.- Check Ethernet cable connection.

7.4 *Software checking*

Once physical connections have been checked, if functioning problems remain, please use the LinkBoxBACnet tool to monitor the working status of the device.

- To check the BACnet communication status, click on the ***BAC*** button in the *menu bar* (see Figure 7.1).
- To check the HITACHI communication status, click on the ***HITACHI*** button, also in the *menu bar* (see Figure 7.1).
- To check the signal values in the BACnet objects, click on the ***Signals*** button, also in the *menu bar* (see Figure 7.1).

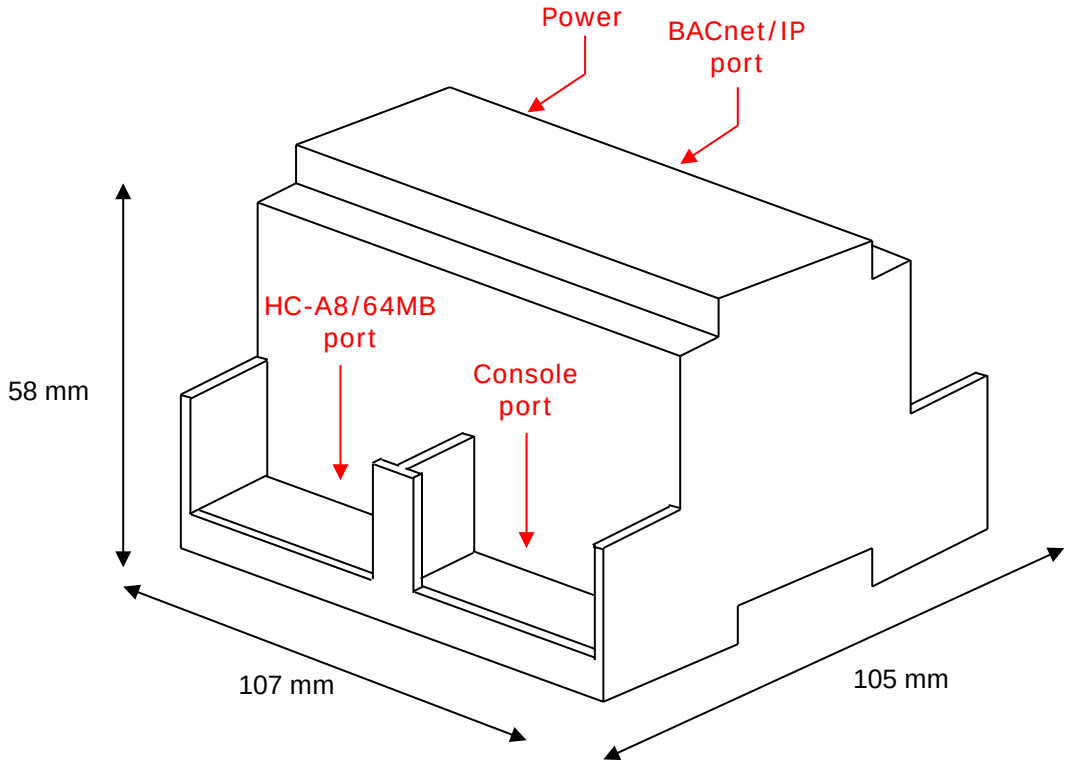
Further information regarding the monitoring procedure and the information provided in each window can be consulted in the LinkBoxBACnet Manual.

8 Mechanical & electrical characteristics

Enclosure	Plastic, type PC (UL 94 V-0). Dimensions: 107mm x 105mm x 58mm.
Color	Light Grey. RAL 7035.
Power	9 to 30Vdc +/-10% 1.4W. 24Vac +/-10% 1.4VA. Must use a NEC Class 2 or Limited Power Source (LPS) and SELV rated power supply. Plug-in terminal bloc for power connection (2 poles).
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
Mounting	Wall. DIN rail EN60715 TH35.
BACnet/IP port HC-A8/64MB port	1 x Ethernet 10BT RJ45.
LED indicators	1 x Power. 2 x Ethernet port link and activity (LNK, ACT).
Console port	EIA232. DB9 female connector (DCE).
Configuration	Via console port.[1]
Firmware	Allows upgrades via console port.
Operational temperature	0°C to +40°C
Operational humidity	5% to 95%, non-condensing
Protection	IP20 (IEC60529).
RoHS conformity	Compliant with RoHS directive (2002/95/CE).

[1] Standard cable DB9male-DB9female 1,8 meters long is supplied with the device for connection to a PC COM port for configuring and monitoring the device. The configuration software, compatible with Windows® operating systems, is also supplied.

9 Dimensions



Recommended available space for its installation into a cabinet (wall or DIN rail mounting), with space enough for external connections