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SUBJECT: **Utopia and Set Free systems connectivity to BACNET installations**

DATE: OCT.2014
PAGE 1/14

Summary:

This document provides information about how to connect a Set Free or Utopia system into a BACNET installation

Index:

1. CURRENT HITACHI BACNET ADAPTOR (HC-A64BNP) CANCELLATION.....	1
2. ALTERNATIVES BACNET ADAPTORS.....	1
2.1. PROPOSED CONCEPT.....	1
2.2. SOLUTION EXAMPLE.....	2
2.2.1 MODBUS-BACNET ADAPTORS.....	2
2.2.2 MODBUS-BACNET ADAPTORS SELECTION	3
2.3. EXAMPLE OF BACNET CONFIGURATION.....	4
2.3.1 BMS INSTALLATION CHARACTERISTICS	4
2.3.2 SOFTWARE CONFIGURATION	5
ANNEX I – PARAMETERS CONFIGURATION OF THE INSTALLATION SAMPLE	13

1. CURRENT HITACHI BACNET ADAPTOR (HC-A64BNP) CANCELLATION.

It is informed that HC-A64BNP, BACNET Adaptor for PAC systems, is not available for sales and, therefore, “SG201120AE: Product News, Introduction of Upgraded HC-A64BNP BACnet Adaptor” is cancelled.

Current HC-A64BNP was designed based on Japanese Market view. The design concept requires a complex commissioning procedure in order to correctly set up the BACNET adaptor and, it means BACNET adaptor is not standard and it requires 100% personalization for each installation. Due to this complexity, it is discontinued from the Hitachi catalogue.

2. ALTERNATIVES BACNET ADAPTORS

There are several BACNET adaptors that can be used for the integration of SET FREE/UTOPIA systems into a BACNET installation.

2.1. PROPOSED CONCEPT

Set Free or Utopia units can be connected into a BACNET installation by using a double gateway system:

- HITACHI Modbus gateway: HC-A(8/32/64)MB which provides HLINK data into a Modbus protocol
- Standard MODBUS-BACNET gateway available in the market which transfers Modbus data into a BACNET data

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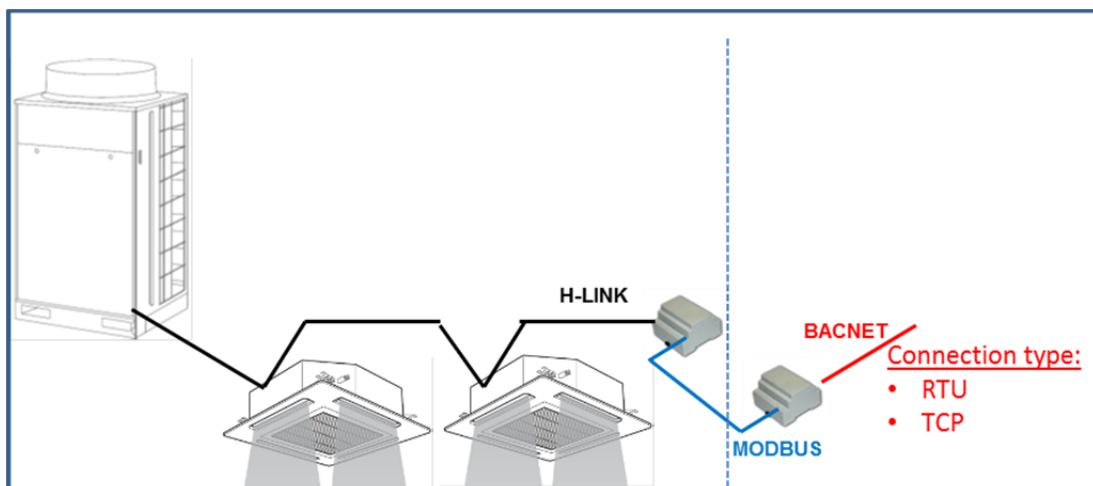
TECHNICAL BULLETIN

SUBJECT: **Utopia and Set Free systems connectivity to BACNET installations**

DATE: OCT.2014

PAGE 2/14

Concept diagram:



2.2. SOLUTION EXAMPLE

There are wide several solutions available in the market which should allow the transfer of Modbus collected data by Hitachi gateways into a BACNET data.

The following parts will describe the solution offered by Intesis Software company:

2.2.1 MODBUS-BACNET ADAPTORS

Intesis Software have 6 possible devices available for such application which are different in terms of nº of points (parameters) available and the type of Modbus channel desired:

MODEL	MODBUS CHANNEL	BACNET CHANNEL	TOTAL POINTS
IBOX-BAC-MBRTU-100	RTU 485	IP Server	100
IBOX-BAC-MBRTU-A			500
IBOX-BAC-MBRTU-B			3000
IBOX-BAC-MBTCP-100	ETHERNET TCP		100
IBOX-BAC-MBTCP-A			500
IBOX-BAC-MBTCP-B			3000

Note: BACnet ASHRAE 135 – 2001 Annex J - BACnet protocol compatible devices or systems using the gateway IntesisBox BACnet/IP Server

Therefore, when selecting devices for a certain installation, it is relevant:

1. The nº of parameters to be controlled by BACNET/each IU
2. Total No. I.U.--> Selection of Hitachi Modbus gateway
3. From 1.and 2. It is estimated the Total Nº of required points (parameters) --> Selection of Intesis adaptor
4. Desired intermediate Modbus channel: RTU or TCP --> Selection of Intesis

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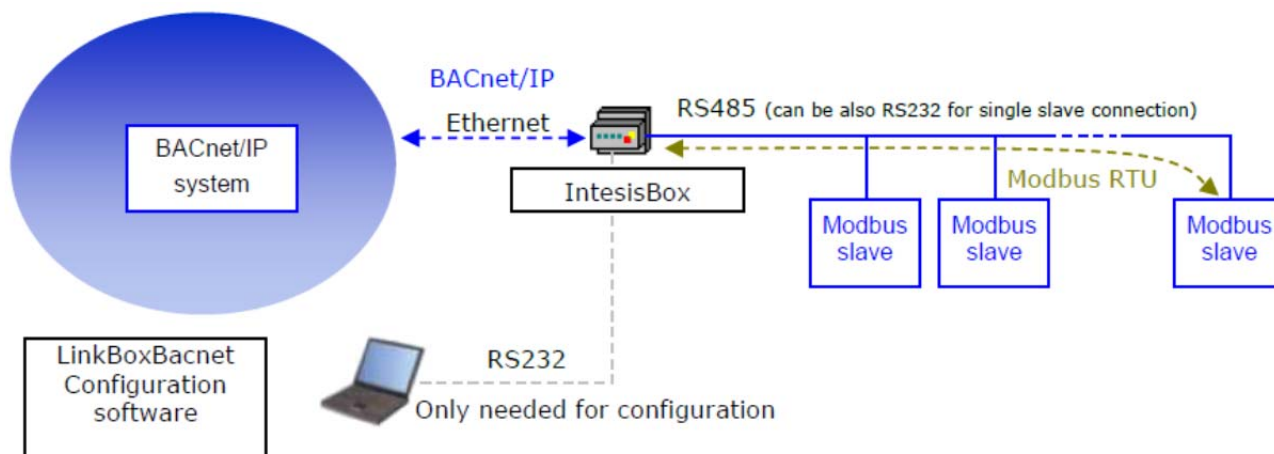
TECHNICAL BULLETIN

SUBJECT: **Utopia and Set Free systems connectivity to BACNET installations**

DATE: OCT.2014

PAGE 3/14

BMS ARCHITECTURE (case of Modbus RTU – BACnet/IP)



2.2.2 MODBUS-BACNET ADAPTORS SELECTION

The following table shows a representative table about recommended adaptors for different installation sizes depending on the selected parameters, nº of I.U., and Modbus channel:

INSTALLATION		HITACHI MODBUS GATEWAY				INTESIS BACNET ADAPTOR		
Nº of I.U.	Nº POINTS	MODEL	MODBUS CHANNEL	MAX. Nº of I.U.	TOTAL POINTS	MODEL	TOTAL POINTS	BACNET CHANNEL
up to 8	100	HC-A8MB	RTU 485	8	208	IBOX-BAC-MBRTU-100	100	IP Server
	100					IBOX-BAC-MBRTU-A	500	
	500		ETHERNET TCP		208	IBOX-BAC-MBTCP-100	100	IP Server
	500					IBOX-BAC-MBTCP-A	500	
up to 32	100	HC-A32MB	RTU 485	32	576	IBOX-BAC-MBRTU-100	100	IP Server
	500					IBOX-BAC-MBTCP-A	500	
up to 64	500	HC-A64MB	RTU 485	64	1664	IBOX-BAC-MBTCP-100	500	IP Server
	500					IBOX-BAC-MBTCP-A	500	
	1664		ETHERNET TCP			IBOX-BAC-MBRTU-B	3000	IP Server
	1664					IBOX-BAC-MBTCP-B	3000	
up to 128	3000	PSC-A160WEB1	ETHERNET TCP	128	4096	IBOX-BAC-MBTCP-B	3000	IP Server

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TECHNICAL BULLETIN

SUBJECT: **Utopia and Set Free systems connectivity to BACNET installations**

DATE: OCT.2014

PAGE 4/14

2.3. EXAMPLE OF BACNET CONFIGURATION

2.3.1 BMS INSTALLATION CHARACTERISTICS

This chapter provides a configuration example of:

- IBOX-BAC-MBRTU-100
- HC-A32MB

The representative installation consists in the following units:

- RAS-8FSXNH, 4*RCI-2.0FSN3
- RAS-12FSXN1E, 2*RPI-6.0FSN4E

The following parameters have been set up for the BACNET communication:

(Based on PMML0191 A, HC-A32MB)

Address	Name	Description	Values	Read/Write
0	EXIST	Exist	0: Not exist 1: Exist	Read
1	SYSTEM_ADDRESS	System Address	H-LINK 1: 0~ 15	Read
2	UNIT_ADDRESS	Unit Address	H-LINK 2: 0~ 63	
3	ONOFF_SET	On/Off setting order:	0: Stop 1: Run	Read/Write
4	MODE_SET	Mode Setting order	0: Cool 1: Dry 2: Fan 3: Heat 4: Auto	Read/Write
5	FAN_SET	Fan Setting order:	0: Low 1: Medium 2: High	Read/Write
6	TEMP_SET	Setting Temperature:	17°C ~ 30°C	Read/Write
7	LOUVER_SET	Louver Setting:	0 ~ 8 (8 is Auto)	Read/Write
8	CENTRAL_SET	Central Setting (2)	Bit 0: On/Off (always can be stopped) Bit 1: Mode Bit 2: Setting Temp Bit 3: Fan	Read/Write
...				
15	READ_TIN	Inlet temperature reading	-63°C ~ 63°C	Read
16 (1)	READ_TOUT	Outlet temperature reading	-63°C ~ 63°C	Read
17~18	(Not used)	(Not used)		(Not used)
19	ERROR_CODE	Alarm Code	Alarm unit from 7-segment	Read
20~21	(Not used)	(Not used)		(Not used)
22	OPER_CONDITION	Unit Operation Condition	0: OFF 1: Thermo OFF 2: Thermo ON 3: Alarm	Read
23~31	(Not used)	(Not used)		(Not used)

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DATE: OCT.2014

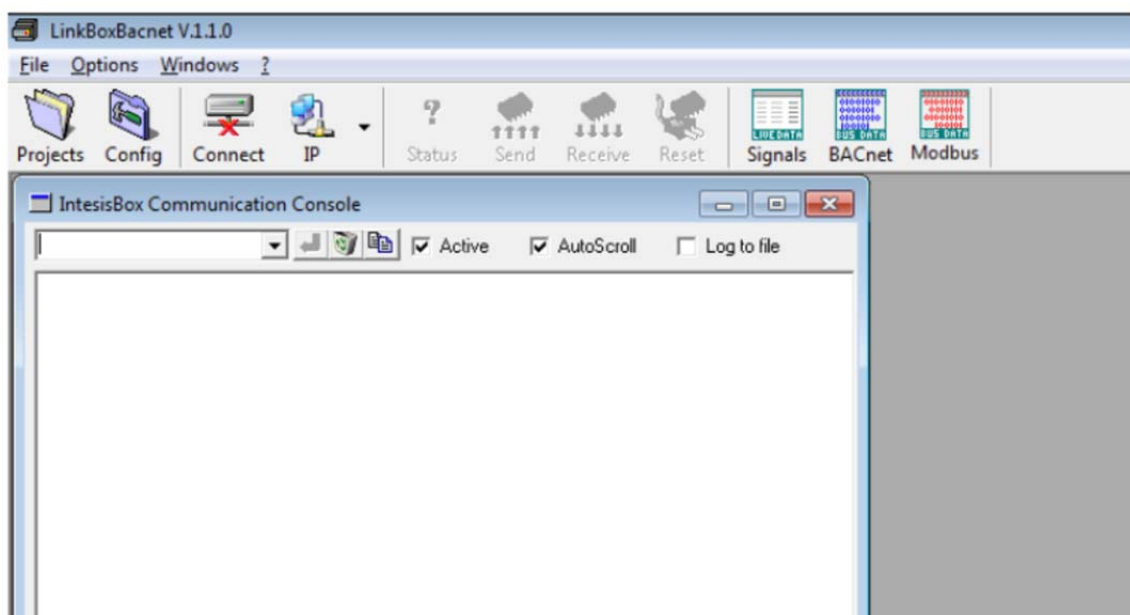
PAGE 5/14

2.3.2 SOFTWARE CONFIGURATION

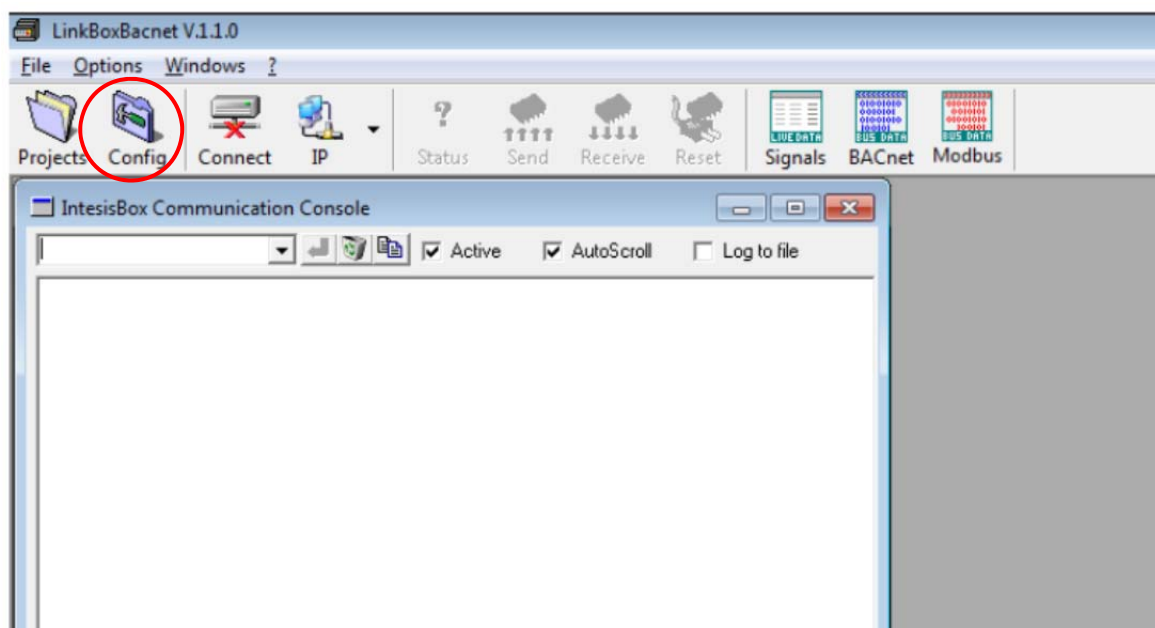
Install in a computer the following file for the system configuration:

“LinkBoxBacnet”: setupv_LinkBoxBacnet_1_1_28_eng.exe (version nº _1_1_28 could change)

- 1 start “LinkBoxBacnet” application and the following screen should appear:



- 2 Select “Config” button from the upper menu on LinkBoxBacnet



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SUBJECT: Utopia and Set Free systems connectivity to BACNET installations

DATE: OCT.2014

PAGE 6/14

The “Configuration Modbus” window will be opened. Bacnet and Modbus parameters must be configured from this screen

The screenshot shows the 'Configuration Modbus' window with the following settings:

- BACnet / IP:**
 - IP: 192.168.100.100
 - NetMask: 255.255.255.0
 - Gateway: 47808
 - Port: BACnet
 - Device: 100
 - Device Name: ModBus Gateway
 - Version: A-Basic
 - Firmware Version: V.4.1.x
- ModBus:**
 - Connection: RS485
 - Baud rate: 9600
 - Data Bits: 8
 - Parity: none
 - Timeout polling: 1000
 - Timeout interframe: 60
 - Byte order: MSB.LSB
- Devices:**
 - Device 1: ☒ (Selected)
 - Device 2: ☐
 - Device 3: ☐
 - Device 4: ☐
 - Device 5: ☐
- Slave #:** 1

Buttons: Save, Exit

③ BACNET IP configuration Parameters

The following parameters must be configured based on BACNET IP intended configuration

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SUBJECT: **Utopia and Set Free systems connectivity to BACNET installations**

DATE: OCT.2014

PAGE 7/14

The screenshot shows a configuration window titled "Bacnet / IP". It contains several input fields and dropdown menus, each with a numbered callout pointing to it:

- 1: IP Address field (containing 192.168.100.100)
- 2: NetMask field (containing 255.255.255.0)
- 3: Gateway field (empty)
- 4: Port Bacnet field (containing 47808)
- 5: Device field (containing 100)
- 6: Device Name field (containing ModBus Gateway)
- 7: Version dropdown menu (showing A-Basic)
- 8: Firmware Version dropdown menu (showing V.4.1.x)

- 1 IP Address for the gateway
- 2 IP Net Mask for the gateway
- 3 Fill it in case of a router is used
- 4 Enter the BACNET port number used by the gateway (by default 47808, which is BAC0).
- 5 Enter the BACNET device for the gateway (must be unique inside BACNET system)
- 6 BACNET device name
- 7 BACNET gateway model: Set tiny, basic or extended according to the adatpro device:

IntesisBox_Bacnet_Modbus-**100** → Tiny model
 IntesisBox_Bacnet_Modbus-**A** → Basic model
 IntesisBox_Bacnet_Modbus-**B** → Extended model

- 8 Select the gateway firmware version. If the configuration is not correctly done, the application will work.

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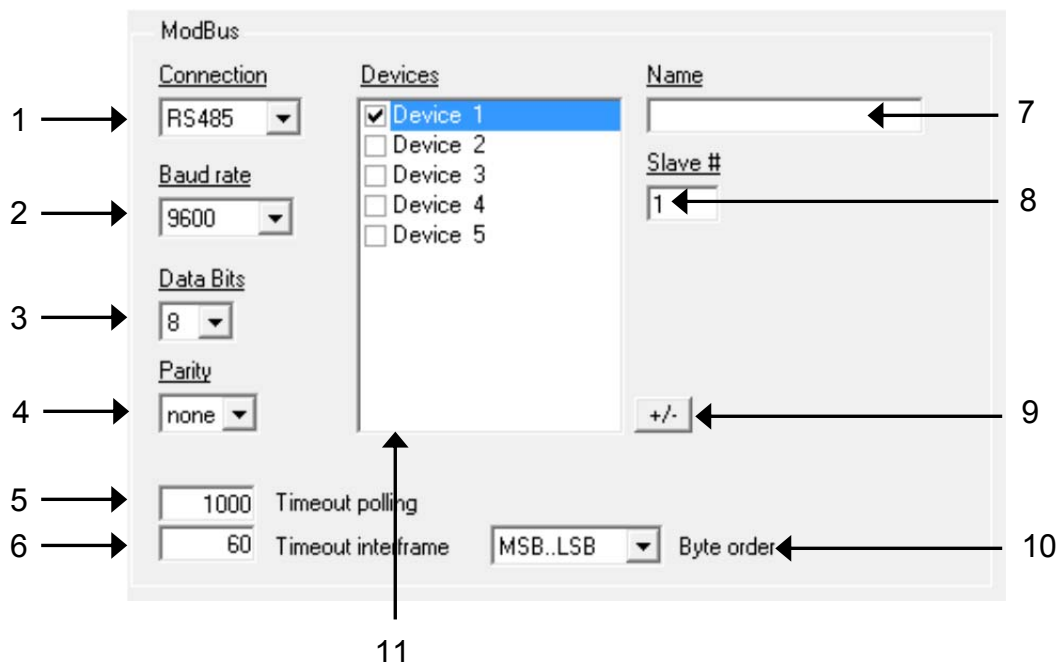
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DATE: OCT.2014

PAGE 8/14

④ MODBUS interface configuration parameters

The following parameters must be configured based on HITACHI Modbus gateway



Note: This BACnet adaptor allows communication with several Modbus gateways but it is recommended to used only on Modbus gateway.

- 1 Type of connection RS232 or RS485. [All Hitachi gateways can operate by RS485](#)
[Note: Since the adaptor device used for this example is a RS485, TCP option is not displayed.](#)
- 2 Baud rate used for communication, 19200 or 9600. [Both are available for Hitachi gateway](#)
- 3 Data Bits used: 8
- 4 Parity used: [Set according to the Hitachi gateway setting.](#)
- 5 Time in milliseconds between two consecutives polling cycles:
[≥ 100ms for HC-A\(8/32/64\)MB](#)
- 6 Interframe time (in milliseconds), some devices need interframe delay to communicate properly. Increase this timeout if you experience communication problems with slaves.
- 7 Name used for identification purposes
- 8 Enter the slave number configured on the Modbus: [Recommended 0](#)
- 9 To add or erase devices (Up to 254 devices)
- 10 Modbus endianism. Byte order for data fields inside Modbus communication (LSB..MSB or MSB..LSB. It will depend on the slaves, consult the slave documentation for details. If unknown just try the two possible choices and see if the read values make sense. This affects to all data fields of all slaves defined.
- 11 List of Modbus slave devices.

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SUBJECT: Utopia and Set Free systems connectivity to BACNET installations

DATE: OCT.2014

PAGE 9/14

- ⑤ Select “Signals” folder on Configuration Modbus window to configure the signals list (the IntesisBox internal points)

#	Dev.	Modbus code	Format	Add.	Bit	Frac	Bac.Name	Bac.Ty	Bac.ID	Active	Units
1	1	0-Communication Error	-	-	-	0	Communication Error Dev.1	3-BI		0-No	
2	2	0-Communication Error	-	-	-	0	Communication Error Dev.2	3-BI		0-No	
3	3	0-Communication Error	-	-	-	0	Communication Error Dev.3	3-BI		0-No	
4	4	0-Communication Error	-	-	-	0	Communication Error Dev.4	3-BI		0-No	
5	5	0-Communication Error	-	-	-	0	Communication Error Dev.5	3-BI		0-No	
1	1	3-Read analog registers	2 - 16 bits uns	20000		0	EXIST1	1-AO	0	1-Yes	no_units (95)
2	1	3-Read analog registers	2 - 16 bits uns	20001		0	SYST ADD1	1-AO	1	1-Yes	no_units (95)
3	1	3-Read analog registers	2 - 16 bits uns	20002		0	IU ADDR1	1-AO	2	1-Yes	no_units (95)
4	1	6-Write 1 analog register	2 - 16 bits uns	20003		0	ONOFF SET 1	0-AI	3	1-Yes	no_units (95)
5	1	6-Write 1 analog register	2 - 16 bits uns	20004		0	MODE SET 1	0-AI	4	1-Yes	no_units (95)
6	1	6-Write 1 analog register	2 - 16 bits uns	20005		0	FAN SET 1	0-AI	5	1-Yes	no_units (95)
7	1	6-Write 1 analog register	2 - 16 bits uns	20006		0	TEMP SET 1	0-AI	6	1-Yes	degrees_Celsius (62)
8	1	6-Write 1 analog register	2 - 16 bits uns	20008		0	CENTRAL SET 1	0-AI	7	1-Yes	no_units (95)
9	1	3-Read analog registers	3 - 16 bits sig	20015		0	TI 1	1-AO	8	1-Yes	degrees_Celsius (62)
10	1	3-Read analog registers	3 - 16 bits sig	20016		0	TO 1	1-AO	9	1-Yes	degrees_Celsius (62)
11	1	3-Read analog registers	2 - 16 bits uns	20019		0	ERROR CODE 1	1-AO	10	1-Yes	no_units (95)
12	1	3-Read analog registers	2 - 16 bits uns	20022		0	OPER. COND. 1	1-AO	11	1-Yes	no_units (95)

Rows 1~5 about Communication Error are set by default

Signals (rows in the grid) can be added or deleted selecting the desired row and clicking Add or Delete buttons. Multiple consecutive rows can be deleted too.

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TECHNICAL BULLETIN

SUBJECT: **Utopia and Set Free systems connectivity to BACNET installations**

DATE: OCT.2014

PAGE 10/14

- 1 Signal number
- 2 Device number related with list of devices on Configuration Modbus window.
- 3 Modbus function code:

Hitachi recommendation:

Select 3- Read analogue register (Read only) for all monitoring parameters

Select 6- Write1 analogue register (Read/write) for all input signals

Read Hitachi Modbus gateway manual in order to find out which parameters are read only or both read/write.

e.g.:

- Systems Address and Unit Address must be set as "3", Read only
- TEMP_SET must be set as "6", Read/Write

From the HC-A32MB Manual

3.1.1 Data available

Address	Name	Description	Values	Read/Write
0	EXIST	Exist	0: Not exist 1: Exist	Read
1	SYSTEM_ADDRESS	System Address	H-LINK 1: 0~ 15	Read
2	UNIT_ADDRESS	Unit Address	H-LINK 2: 0~ 63	
3	ONOFF_SET	On/Off setting order:	0: Stop 1: Run	Read/Write
4	MODE_SET	Mode Setting order	0: Cool 1: Dry 2: Fan 3: Heat 4: Auto	Read/Write
5	FAN_SET	Fan Setting order:	0: Low 1: Medium 2: High	Read/Write
6	TEMP_SET	Setting Temperature:	17°C ~ 30°C	Read/Write
7	LOUVER_SET	Louver Setting:	0 ~ 8 (8 is Auto)	Read/Write

- 4 Modbus data Format ;

Hitachi recommendation:

Select 2. 16 bits uns: 16 bits unsigned for all parameters except Tin and Tout

Select 3. 16 bits sig: 16 bits signed. The MSbit represents the sign just for Tin and Tout

- 5 Modbus register address to use by Intesis/Box to read or write the variable into the Modbus device.
Refer to the Modbus documentation to identify the variables available and its register address

e.g: Following the previous same example (3)

- Systems Address and Unit Address must be set as 20001, 20002 for the IU nº1, 20033, 20034 for the IU nº2, etc
- TEMP_SET address must be set as 20006 for the IU nº1, 20037 for the IU nº2, etc

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**SUBJECT: Utopia and Set Free systems connectivity to
BACNET installations**

DATE: OCT.2014

PAGE 11/14

6 Bit used inside the Modbus register to encode the digital value for the point.

Not used.

7 Fractional part to consider for the points value when read/write.

It is recommended to use always "0" in all parameters

8 BACNET object name for the signal, recommended to give a descriptive name.

9 BACNET object type for the signal.

Hitachi recommendation:

There is a correspondence between Modbus configuration and BACnet object

Select 3- Read analogue register (Read only) for all monitoring parameters → 0-AI

Select 6- Write1 analogue register (Read/write) for all input signals → 1-AO

e.g: Following the previous same example (3):

- Systems Address and Unit Address must be set as: 1-AO

- TEMP_SET object type must be set as: 0-AI

10 BACNET object number for the point. It can be manually entered by the user, but is recommended to let LinkBoxBacnet assign automatically object instance numbers for the points when saving the auto configuration

11 Indicates if the signal is active or not for the integration. Select Yes (1: Active)

12 Units

For parameters which figures can be expressed in units like temperatures

Set "No units (95)" for all parameters except Temperature parameters (TI, Tout, Temp_SET)

Set: "degrees_Celsius(62)" for all Temperature parameters (TI, Tout, Temp_SET)

⑥ Saving Configuration

- Click the button Save. Once accepted the pop-up message, that will save the project in the folder on hard disk.
- You will be prompted to generate the configuration file to be sent to the gateway,
 - If YES is selected, the binary file (Modbus.LBOX) containing the configuration for the gateway will be generated and saved also into the project folder.
 - If NO is selected the binary file needs to be created before following the next steps. To do so open the Configuration window and restart from step 1
- A pop-up message will show up asking if you want to preserve the Object instance numbers. BE CAREFUL using this feature.
 - If NO is selected all the object instance numbers for the points will be automatically reconstructed and thus losing previous instance numbers, if defined. ONLY USE this option for a brand new

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TECHNICAL BULLETIN

SUBJECT: Utopia and Set Free systems connectivity to BACNET installations

DATE: OCT.2014

PAGE 12/14

configuration not previously running in the gateway and therefore not yet integrated into the BACnet system

- o Select Yes for configurations previously running in the gateway and already integrated into the BACnet system that had been extended with a few more points that must respect the previously defined object instance numbers. All the points with object instance numbers defined will be respected. LinkBoxBacnet will automatically assign object instance numbers to ones without it.
- As the final step, a pop-up message will ask if you want to see the BACnet points list report, If you select Yes, a text file called Modbus- BACNET OBJECT LIST.TXT will be generated and saved into the project folder containing a report of all the point's BACnet information (for informative purposes at user level). The file will be also opened in the notepad, it looks like this:

```
ObjIdent ObjType OInst ObjName
00000000 0-AI 0000 AI_1_read
00000001 0-AI 0001 AI_2_read
04194304 1-AO 0000 AO_1_read_write
04194305 1-AO 0001 AO_2_read
04194306 1-AO 0002 AO_3_write
08388608 2-AV 0000 AV_1_read_write
08388609 2-AV 0001 AV_2_read
12582912 3-BI 0000 Communication Error Dev.1
12582913 3-BI 0001 BI_1_read
12582914 3-BI 0002 BI_2_read
12582915 3-BI 0003 BI_10
12582916 3-BI 0004 BI_11
16777216 4-BO 0000 BO_1_read_write
16777217 4-BO 0001 BO_2_read_write
20971520 5-BV 0000 BV_1_read_write
20971521 5-BV 0001 BV_2_read_write
```

- Once in the configuration window again, click on exit. The configuration is ready to be sent to the IntesisBox

The configuration cannot be received from the gateway to LinkBoxBacnet, it can only be sent.

NOTE: This document just explains the concept of how to use an Intesis BACnet adaptor into a Hitachi air conditioning installation. For further installation details please check product manuals of both Hitachi Modbus gateway and Intesis BACnet Adaptor

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TECHNICAL BULLETIN

SUBJECT: Utopia and Set Free systems connectivity to
BACNET installations

DATE: OCT.2014

PAGE 13/14

ANNEX I – Parameters configuration of the installation sample

				MODBUS ADDRESS					BACNET				
OU	IU	NAME	DEV. N°	MODBUS CODE	FORMAT	MODBUS ADDRESS	BIT	FRAC	BAC NAME (1)	BAC TY	BAC ID	ACTIVE	UNITS
0	1	Exist	1	3-Read analogue registers	2.16 bits uns	20000	-	0	Exist1	1-AO	(2)1	1-YES	No units (95)
0	1	Syst. Add.	1	3-Read analogue registers	2.16 bits uns	20001	-	0	Syst. Add.1	1-AO	(2)2	1-YES	No units (95)
0	1	Unit Add.	1	3-Read analogue registers	2.16 bits uns	20002	-	0	Unit Add.1	1-AO	(2)3	1-YES	No units (95)
0	1	ONOFF_set	1	6-Write1 analogue registers	2.16 bits uns	20003	-	0	ONOFF_set.1	O-AI	(2)4	1-YES	No units (95)
0	1	Mode_set	1	6-Write1 analogue registers	2.16 bits uns	20004	-	0	Mode_set.1	O-AI	(2)5	1-YES	No units (95)
0	1	Fan_set	1	6-Write1 analogue registers	2.16 bits uns	20005	-	0	Fan_set.1	O-AI	(2)6	1-YES	No units (95)
0	1	Temp_set	1	6-Write1 analogue registers	2.16 bits uns	20006	-	0	Temp_set.1	O-AI	(2)7	1-YES	degree_Celsius (62)
0	1	Central_set	1	6-Write1 analogue registers	2.16 bits uns	20008	-	0	Central_set.1	O-AI	(2)8	1-YES	No units (95)
0	1	Read_Tin	1	3-Read analogue registers	3.16 bits sig	20015	-	0	Read_Tin.1	1-AO	(2)9	1-YES	degree_Celsius (62)
0	1	Read_Tout	1	3-Read analogue registers	3.16 bits sig	20016	-	0	Read_Tout.1	1-AO	(2)10	1-YES	degree_Celsius (62)
0	1	Oper_Condition	1	3-Read analogue registers	2.16 bits uns	20022	-	0	Oper_Condition.1	1-AO	(2)11	1-YES	No units (95)
0	2	Exist	1	3-Read analogue registers	2.16 bits uns	20032	-	0	Exist2	1-AO	(2)12	1-YES	No units (95)
0	2	Syst. Add.	1	3-Read analogue registers	2.16 bits uns	20033	-	0	Syst. Add.2	1-AO	(2)13	1-YES	No units (95)
0	2	Unit Add.	1	3-Read analogue registers	2.16 bits uns	20034	-	0	Unit Add.2	1-AO	(2)14	1-YES	No units (95)
0	2	ONOFF_set	1	6-Write1 analogue registers	2.16 bits uns	20035	-	0	ONOFF_set.2	O-AI	(2)15	1-YES	No units (95)
0	2	Mode_set	1	6-Write1 analogue registers	2.16 bits uns	20036	-	0	Mode_set.2	O-AI	(2)16	1-YES	No units (95)
0	2	Fan_set	1	6-Write1 analogue registers	2.16 bits uns	20037	-	0	Fan_set.2	O-AI	(2)17	1-YES	No units (95)
0	2	Temp_set	1	6-Write1 analogue registers	2.16 bits uns	20038	-	0	Temp_set.2	O-AI	(2)18	1-YES	degree_Celsius (62)
0	2	Central_set	1	6-Write1 analogue registers	2.16 bits uns	20040	-	0	Central_set.2	O-AI	(2)19	1-YES	No units (95)
0	2	Read_Tin	1	3-Read analogue registers	3.16 bits sig	20047	-	0	Read_Tin.2	1-AO	(2)20	1-YES	degree_Celsius (62)
0	2	Read_Tout	1	3-Read analogue registers	3.16 bits sig	20048	-	0	Read_Tout.2	1-AO	(2)21	1-YES	degree_Celsius (62)
0	2	Oper_Condition	1	3-Read analogue registers	2.16 bits uns	20054	-	0	Oper_Condition.2	1-AO	(2)22	1-YES	No units (95)
0	3	Exist	1	3-Read analogue registers	2.16 bits uns	20064	-	0	Exist3	1-AO	(2)23	1-YES	No units (95)
0	3	Syst. Add.	1	3-Read analogue registers	2.16 bits uns	20065	-	0	Syst. Add.3	1-AO	(2)24	1-YES	No units (95)
0	3	Unit Add.	1	3-Read analogue registers	2.16 bits uns	20066	-	0	Unit Add.3	1-AO	(2)25	1-YES	No units (95)
0	3	ONOFF_set	1	6-Write1 analogue registers	2.16 bits uns	20067	-	0	ONOFF_set.3	O-AI	(2)26	1-YES	No units (95)
0	3	Mode_set	1	6-Write1 analogue registers	2.16 bits uns	20068	-	0	Mode_set.3	O-AI	(2)27	1-YES	No units (95)
0	3	Fan_set	1	6-Write1 analogue registers	2.16 bits uns	20069	-	0	Fan_set.3	O-AI	(2)28	1-YES	No units (95)
0	3	Temp_set	1	6-Write1 analogue registers	2.16 bits uns	20070	-	0	Temp_set.3	O-AI	(2)29	1-YES	degree_Celsius (62)
0	3	Central_set	1	6-Write1 analogue registers	2.16 bits uns	20072	-	0	Central_set.3	O-AI	(2)30	1-YES	No units (95)
0	3	Read_Tin	1	3-Read analogue registers	3.16 bits sig	20079	-	0	Read_Tin.3	1-AO	(2)31	1-YES	degree_Celsius (62)
0	3	Read_Tout	1	3-Read analogue registers	3.16 bits sig	20080	-	0	Read_Tout.3	1-AO	(2)32	1-YES	degree_Celsius (62)
0	3	Oper_Condition	1	3-Read analogue registers	2.16 bits uns	20086	-	0	Oper_Condition.3	1-AO	(2)33	1-YES	No units (95)

(1) This field is contents free. For this example, it is used the same Modbus name as BACnet name

(2) It is recommended to use the automatic assignment made by LinkBoxBacnet.

Hitachi Air Conditioning Products Europe, S. A.U
Barcelona (Spain)

No

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TECHNICAL BULLETIN

SUBJECT: Utopia and Set Free systems connectivity to BACNET installations

DATE: OCT.2014

PAGE 14/14

OU			MODBUS ADDRESS										BACNET			
System Add.	IU №	NAME	DEV. №	MODBUS CODE	MODBUS ADDRESS	FORMAT	MODBUS ADDRESS	BIT	FRAC	BAC NAME (1)	BAC TY	BAC ID	ACTIVE	UNITS		
0	4	Exist	1	3- Read analogue registers	20096	2.16 bits uns	20096	-	0	Exist4	1-AO	(2) 34	1-YES	No units (95)		
0	4	Syst. Add.	1	3- Read analogue registers	20097	2.16 bits uns	20097	-	0	Syst. Add.4	1-AO	(2) 35	1-YES	No units (95)		
0	4	Unit Add.	1	3- Read analogue registers	20098	2.16 bits uns	20098	-	0	Unit Add.4	1-AO	(2) 36	1-YES	No units (95)		
0	4	ONOFF_set	1	6- Write1 analogue registers	20099	2.16 bits uns	20099	-	0	ONOFF_set.4	O-AI	(2) 37	1-YES	No units (95)		
0	4	Mode_set	1	6- Write1 analogue registers	20100	2.16 bits uns	20100	-	0	Mode_set.4	O-AI	(2) 38	1-YES	No units (95)		
0	4	Fan_set	1	6- Write1 analogue registers	20101	2.16 bits uns	20101	-	0	Fan_set.4	O-AI	(2) 39	1-YES	No units (95)		
0	4	Temp_set	1	6- Write1 analogue registers	20102	2.16 bits uns	20102	-	0	Temp_set.4	O-AI	(2) 40	1-YES	degree_Celsius (62)		
0	4	Central_set	1	6- Write1 analogue registers	20104	2.16 bits uns	20104	-	0	Central_set.4	O-AI	(2) 41	1-YES	No units (95)		
0	4	Read_Tin	1	3- Read analogue registers	20111	3.16 bits sig	20111	-	0	Read_Tin.4	1-AO	(2) 42	1-YES	degree_Celsius (62)		
0	4	Read_Tout	1	3- Read analogue registers	20112	3.16 bits sig	20112	-	0	Read_Tout.4	1-AO	(2) 43	1-YES	degree_Celsius (62)		
0	4	Oper_Condition	1	3- Read analogue registers	20118	2.16 bits uns	20118	-	0	Oper_Condition.4	1-AO	(2) 44	1-YES	No units (95)		
1	1	Exist	1	3- Read analogue registers	20128	2.16 bits uns	20128	-	0	Exist5	1-AO	(2) 45	1-YES	No units (95)		
1	1	Syst. Add.	1	3- Read analogue registers	20129	2.16 bits uns	20129	-	0	Syst. Add.5	1-AO	(2) 46	1-YES	No units (95)		
1	1	Unit Add.	1	3- Read analogue registers	20130	2.16 bits uns	20130	-	0	Unit Add.5	1-AO	(2) 47	1-YES	No units (95)		
1	1	ONOFF_set	1	6- Write1 analogue registers	20131	2.16 bits uns	20131	-	0	ONOFF_set.5	O-AI	(2) 48	1-YES	No units (95)		
1	1	Mode_set	1	6- Write1 analogue registers	20132	2.16 bits uns	20132	-	0	Mode_set.5	O-AI	(2) 49	1-YES	No units (95)		
1	1	Fan_set	1	6- Write1 analogue registers	20133	2.16 bits uns	20133	-	0	Fan_set.5	O-AI	(2) 50	1-YES	No units (95)		
1	1	Temp_set	1	6- Write1 analogue registers	20134	2.16 bits uns	20134	-	0	Temp_set.5	O-AI	(2) 51	1-YES	degree_Celsius (62)		
1	1	Central_set	1	6- Write1 analogue registers	20136	2.16 bits uns	20136	-	0	Central_set.5	O-AI	(2) 52	1-YES	No units (95)		
1	1	Read_Tin	1	3- Read analogue registers	20143	3.16 bits sig	20143	-	0	Read_Tin.5	1-AO	(2) 53	1-YES	degree_Celsius (62)		
1	1	Read_Tout	1	3- Read analogue registers	20144	3.16 bits sig	20144	-	0	Read_Tout.5	1-AO	(2) 54	1-YES	degree_Celsius (62)		
1	1	Oper_Condition	1	3- Read analogue registers	20150	2.16 bits uns	20150	-	0	Oper_Condition.5	1-AO	(2) 55	1-YES	No units (95)		
1	2	Exist	1	3- Read analogue registers	20160	2.16 bits uns	20160	-	0	Exist6	1-AO	(2) 56	1-YES	No units (95)		
1	2	Syst. Add.	1	3- Read analogue registers	20161	2.16 bits uns	20161	-	0	Syst. Add.6	1-AO	(2) 57	1-YES	No units (95)		
1	2	Unit Add.	1	3- Read analogue registers	20162	2.16 bits uns	20162	-	0	Unit Add.6	1-AO	(2) 58	1-YES	No units (95)		
1	2	ONOFF_set	1	6- Write1 analogue registers	20163	2.16 bits uns	20163	-	0	ONOFF_set.6	O-AI	(2) 59	1-YES	No units (95)		
1	2	Mode_set	1	6- Write1 analogue registers	20164	2.16 bits uns	20164	-	0	Mode_set.6	O-AI	(2) 60	1-YES	No units (95)		
1	2	Fan_set	1	6- Write1 analogue registers	20165	2.16 bits uns	20165	-	0	Fan_set.6	O-AI	(2) 61	1-YES	No units (95)		
1	2	Temp_set	1	6- Write1 analogue registers	20166	2.16 bits uns	20166	-	0	Temp_set.6	O-AI	(2) 62	1-YES	degree_Celsius (62)		
1	2	Central_set	1	6- Write1 analogue registers	20168	2.16 bits uns	20168	-	0	Central_set.6	O-AI	(2) 63	1-YES	No units (95)		
1	2	Read_Tin	1	3- Read analogue registers	20175	3.16 bits sig	20175	-	0	Read_Tin.6	1-AO	(2) 64	1-YES	degree_Celsius (62)		
1	2	Read_Tout	1	3- Read analogue registers	20176	3.16 bits sig	20176	-	0	Read_Tout.6	1-AO	(2) 65	1-YES	degree_Celsius (62)		
1	2	Oper_Condition	1	3- Read analogue registers	20182	2.16 bits uns	20182	-	0	Oper_Condition.6	1-AO	(2) 66	1-YES	No units (95)		

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