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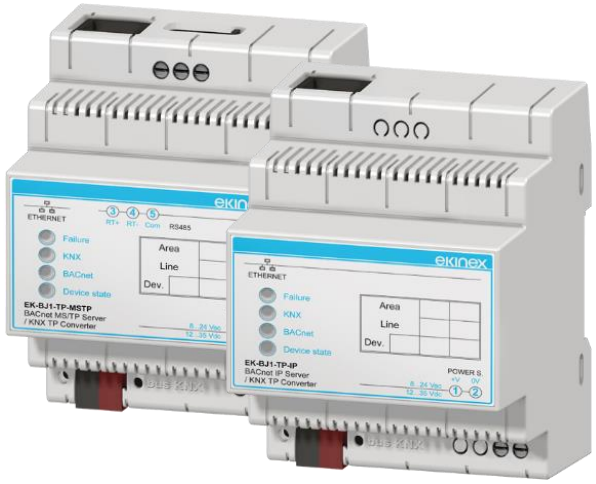

Gateway configuration manual
BACnet IP/MS-TP slave - KNX TP
EK-BJ1-TP-IP
EK-BJ1-TP-MSTP

Indice

Scope of the document

This document describes the gateway (protocol converter) BACnet IP-MS/TP slave – KNX TP. The gateway finds its ideal applicaton in the integration of BACnet slave devices over a RS485 serial or Ethernet network in a KNX-based automation system for homes and buildings. This product belongs to a broad line of ekinex® gateways designed to meet the needs for integration of the building automation most widely used protocols, based on serial, Ethernet or proprietary infrastructures. For further informations about the available technical solutions, please visit www.ekinex.com.

1 Product description

The BACnet IP-MS/TP slave ekinex® EK-BJ1-TP-IP/EK-BJ1-TP-MSTP gateway is a KNX modular unit for panel mounting. It allows you to exchange informations with a master device over a RS485 differential serial or Ethernet network through BACnet protocol. The ekinex gateway acts as BACnet slave. The informations exchanged over the BACnet network are updated over the KNX network by means of a twisted pair (TP) communication cable.

The device manages a two-way data stream: the BACnet registers can be cyclically read and their value sent as a communication object over the KNX TP network through a multicast communication to configured group addresses. The data update over the KNX network can be done cyclically and/or on event of change of the data acquired by the BACnet network.

Likewise, the ekinex gateway can make requests to cyclically readings KNX communication objects or acquire their values during data exchange over the bus. Cyclically or on event of change of the communication objects, data are written on the Modbus registers of one or more configured devices.

The ekinex gateway supports the entire Modbus RTU master protocol with the possibility of reading and writing single and multiple 1-bit registers (Coil and Status) as well as 16-bit registers (Holding and Input). It is also possible to read and write multiple registers containing 32-bit floating point values (IEEE 754 format).

As for KNX communication, 1-bit, 1-byte, 2-byte and 4-byte communication objects can be acquired: internal conversion functions allow you to convert the informations from and to 16-bit floating point values (DPT 9.xxx) starting from integer BACnet registers.

Configuration is performed through a PC application software which communicates through the integrated Ethernet port. The application software CGEKBJ1TPIP/CGEKBJ1TPMSTP is available for download at www.ekinex.com.

1.1 Main functions

The gateway acts as a bidirectional protocol converter. Data streams are the following:

- BACnet MS/TP or IP network – Register writing: the writing command is issued to the gateway by the BACnet master. The values of the read registers are stored in a 1440-byte volatile memory buffer ("BACnet image memory").
- KNX TP network – Sending of writing multicasting frames to configured group addresses. Data can be sent cyclically over the bus (configurable refresh time), on event of change of the data contained in the "BACnet memory image", or both cyclically and on change. Internal conversion functions to the most common types of KNX Datapoints are present.
- KNX TP network – Multicasting frame listening from configured group addresses (with selectable filters on the area or network of interest) or cyclical sending of read request frames. The values of the acquired communication objects are stored in a 1440-byte volatile memory buffer ("KNX image memory"). This buffer is independent from the "BACnet image memory" buffer.
- BACnet MS/TP or IP network – Register reading from one or more KNX slave devices by BACnet master's request.

1.2 Technical data

Characteristic	Value
Power supply	8…24 Vac 12…35 Vdc
Power Absorption	At 24 Vdc: 3,5 VA
Application area	dry indoor environment
Environmental conditions	• Operating temperature: - 40 ... + 85°C • Stock temperature: - 25 ... + 55°C • Transportation temperature: - 25 ... + 70°C • Relative humidity: 93% non-condensing
Programming elements	1 pushbutton and 1 LED (red) on the front
Display elements	4 status LEDs + 1 Ethernet connector LED
Configuration elements	2 1-way microswitches • Microswitch A: OFF normal mode; ON Boot mode • Microswitch B: OFF terminaton resistance not inserted; ON termination resistance (120 Ω) inserted between RT+ ad RT- on the BACnet port.
Safety class	II
Installation	35 mm DIN rail (according to EN 60529)
Protection degree	IP20
Dimensions (WxHxD)	82 x 75 x 35 mm
Ethernet interface (IEEE 802.3)	
Connector	RJ45, minimum cable category: 5E
BACnet interface	
Communication port MS/TP	RS485, electrically isolated from power supply and KNX communication port
Communication port IP	RJ45, minimum cable category: 5E
KNX TP interface	
Communication port	KNX TP (twisted pair), 9600 baud, electrically isolated from power supply and RS485 communication port
Power supply	SELV 30 Vdc through bus KNX
Current absorption from bus	< 13 mA

1.3 Supply

The supply includes the device and terminal blocks to connect to the KNX bus. An instruction sheet is also supplied within the package.

1.4 System requirements for configuration software

Configuration and commissioning of the ekinex® gateway must be performed using the application program CGEKBJ1TPIP/CGEKBJ1TPMSTP, available for download at www.ekinex.com.

The PC where the application program is installed must meet the following requirements:

- Desktop o laptop PC with Ethernet IEEE 802.3 port.
- 32/64 bit operating system, Microsoft Windows® XP, 7, 8.0, 8.1 e 10.

.NET Framework 4.0 system library installation is required.

1.5 Certifications

Compliance with the European directives is certified by the CE symbol on the product label and on the documentation.

2 Switching, display and connection elements

The device is equipped with a pushbutton and a KNX programming LED, with a status LED and terminal blocks for KNX network connection.

In EK-BJ1-TP-IP model, a port for RJ45 connector for BACnet IP network connection and device configuration via Ethernet as well as one 1-way microswitches are also present, while in EK-BJ1-TP-MSTP model a port for RJ45 connector for device configuration via Ethernet only as well as two 1-way microswitches are present.

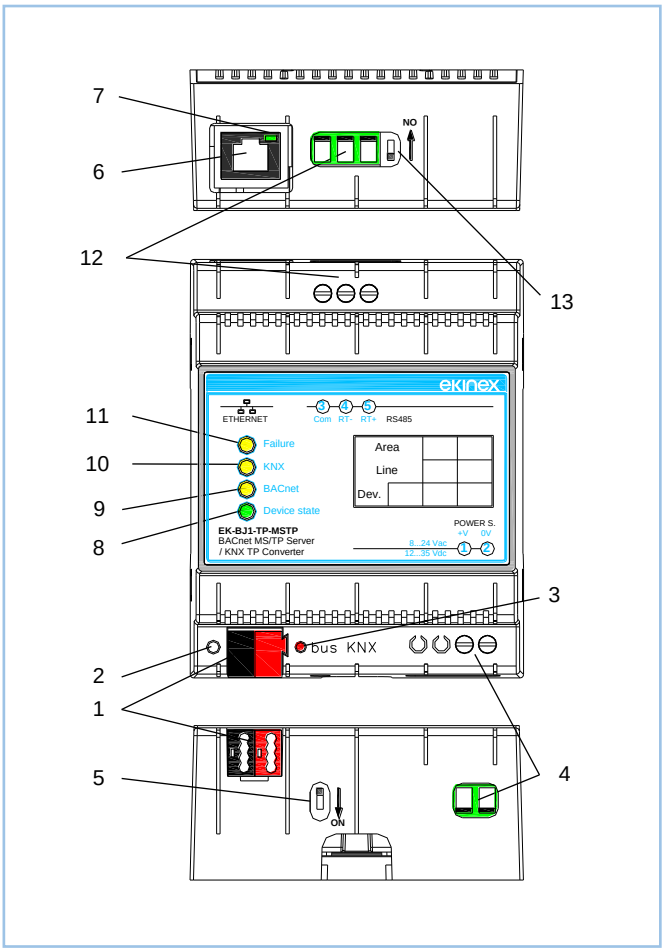

Figure 1a - Switching, display and connection elements EK-BJ1-TP-MSTP model

1)	KNX bus line terminal blocks
2)	KNX programming pushbutton
3)	KNX programming LED
4)	Power supply terminal blocks
5)	1-way microswitch A
6)	Ethernet port
7)	Ethernet port LED
8)	Device satus LED
9)	BACnet communication LED
10)	KNX communication LED
11)	Device error LED
12)	RS485 serial line terminal blocks
13)	1-way microswitch B

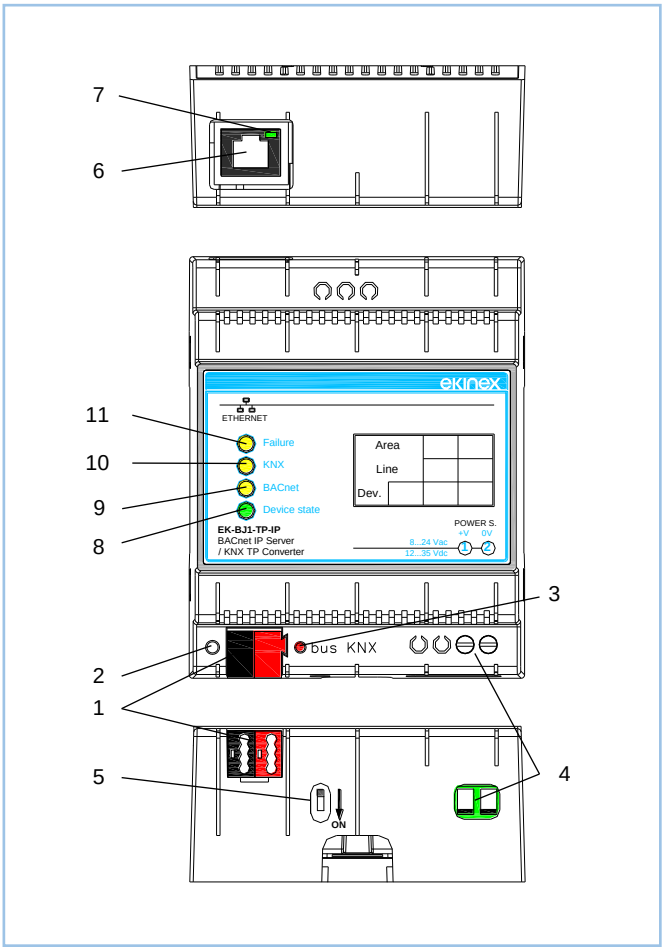

Figure 2b - Switching, display and connection elements EK-BJ1-TP-IP model

1)	KNX bus line terminal blocks
2)	KNX programming pushbutton
3)	KNX programming LED
4)	Power supply terminal blocks
5)	1-way microswitch A
6)	Ethernet port
7)	Ethernet port LED
8)	Device satus LED
9)	BACnet communication LED
10)	KNX communication LED
11)	Device error LED

Command elements

- Pushbutton that switches between normal mode and KNX physical address programming.

1-way microswitches

- A - OFF: normal mode active. ON: Boot mode active
- B - OFF: open. ON: RS485 line termination inserted (120 Ω termination resistance in parallel between RT+ and RT-) – model EK-BJ1-TP-MSTP only.

Display elements

The device can run according to two operating modes: Normal mode (configuration loaded, BACnet and KNX communication running) and Boot mode (no configuration or still loading configuration)

LED	Normal mode	Boot mode
Green LED (8) – Device status	Slow blinking (~1 Hz)	**ON**: device on **OFF**: device off
Yellow LED (9) – BACnet communication	Blinks when a frame is received on the RS485 port (model EK-BJ1-TP-MSTP) or Ethernet port (model EK-BJ1-TP-IP)	**Fast blinking**: no configuration **Very slow blinking (~0,5 Hz)**: loading configuration.
Yellow LED (10) – KNX communication	Blinks when a frame is received.	**Fast blinking**: no configuration **Very slow blinking (~0,5 Hz)**: loading configuration.
Yellow LED (11) – Device error	**ON**: at least one BACnet request did not get a correct answer **OFF**: no error	**Fast blinking**: no configuration **Very slow blinking (~0,5 Hz)**: loading configuration.
Green LED (7) – Ethernet port	**ON**: Ethernet connector plugged **OFF**: Ethernet connector unplugged	**ON**: Ethernet connector plugged **OFF**: Ethernet connector unplugged
Red LED (3) – KNX programming	**ON**: physical address programming mode on **OFF**: physical address programming mode off	**Fast blinking**: no configuration **Very slow blinking (~0,5 Hz)**: loading configuration.

In the current version of the device, both KNX physical address programming and configuration download must be performed through the configuration program: for KNX physical address please refer to “Communication parameters” paragraph, “ID Device” parameter.

3 Configuration and commissioning

The device configuration requires the following tools:

- The documentation of the BACnet master, the physical parameters of the RS485 serial communication for BACnet MS/TP (baud rate, parity check, delays, physical addresses of the devices to be integrated) or physical parameters of the Ethernet communication for BACnet IP (IP address, subnet mask, gateway, port, BACnet device ID and name).
- CGEKBJ1TPIP/CGEKBJ1TPMSTP application software to properly configure the gateway.
- Knowledge of the ETS automation project, with particular attention to communication objects and group addresses passing on the bus during the multicast communication between sensors and actuators.

Configuration and commissioning of the ekinex® gateway require specialized skills about KNX networks and knowledge of the specific ETS automation project. In order to acquire such skills, it is essential to attend trainings and workshops organized at KNX-certified training centers. For further information: www.knx.it.

4 BACnet protocol general information

BACnet (Building Automation and Control Networks) is the communication standard for building automation, developed in the 90's by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) which also registered the mark.

The standard is strongly oriented to interoperability of data over the communication network: it describes the structure and the interaction of standard communication objects, properties and events that those objects can generate over the network (services related to objects). The standard also defines several device profiles, it is based on ISO/OSI model and supports several standards and types of network. The standard, though, does not defines any architecture or functionality of the device, so it does not require any additional cost for specific licenses from the manifacturer's point of view.

The standard, by defining a network device as an abstract collection of communication objects, has been designed as a common language understandable by manifacturers, designers, system integrators, electricians and maintainers. The input/output schematics typical of the design of HVAC units are an example of how this common language can be used, starting from plant specifications to requirements definition and controller's offer.

4.1 The physical layer

The following table shows the BACnet communication layers and the corrispondence with the layers defined by ISO/OSI model.

<table>
<tr><td colspan="6">BACnet Application Layer</td><td rowspan="2">Application</td></tr>
<tr><td colspan="6">BACnet Network Layer</td><td>Network</td></tr>
<tr><td colspan="2">ISO 8802-2 (IEEE 8802.3) Type 1</td><td>MS/TP</td><td>PTP</td><td rowspan="2">LonTalk</td><td>BVLL(*)</td><td>Data Link</td></tr>
<tr><td>ISO 8802-3 (IEEE 802.3)</td><td>ARCNET</td><td>EIA-485</td><td>EIA-232</td><td>UDP/IP</td><td>Physical</td></tr>
</table>

(*) BACnet Virtual Link Layer

As shown in figure, several physical layers are supported: the gateway supports the Ethernet (BACnet IP) and the RS485 (MS/TP) physical layers.

BACnet IP uses a standard UDP/IP (User Datagram Protocol over IP) standard stack in order to send and receive frames. For most services, the same packet that could be sent over the MS/TP network is "incapsulated" in a UDP/IP packet. The devices use the IP address and the MAC address the same way as any device in a UDP/IP network. The master/slave concept does not apply with token passage, since Ethernet is automatically a "point-to-point" network by definition: the devices simply transmit their own frames and it will be up to the Ethernet newtork itself to manage collisions and frame repetitions.

Otherwise, BACnet MS/TP uses a differential serial RS485 network: MS/TP stands for Master Slave Token Passing. Each device is considered "master" when it receives the token. If there is no immediate need to use the token, the device passes the token to the next device. All the devices which don't have the token are considered as slaves and remain in waiting for the current master to send them the token. Since all devices can be masters, this kind of connection is a "point-to-point" by definition.

The ekinex gateway, both in BACnet IP and MS/TP version, is capable of receiving reading and writing frames on standard BACnet communication objects defined in the configuration grid.

So, it is possible to manage a bidirectional stream of data between BACnet and KNX networks. BACnet objects that are modified cause the sending of modified communication objects over KNX network. Viceversa, if KNX communication objects are updated, the corresponding BACnet communication objects are also updated and made available of reading services over the networkm, such as the most frequently used “read present value property”.

In this case the ekinex gateway acts as a data server over the BACnet network.

4.2 Standard objects and services

Currently the BACnet standard (ANSI/ASHRAE 135-2004) defines 25 standard communication objects. These objects can be divided into sub-groups. Datapoint oriented objects that can be used in the ekinex gateway are:

- Analog Input Eg.: outdoor temperature
- Analog Output Eg.: valve opening
- Analog Value Eg.: temperature set point
- Binary Input Eg.: window contact
- Binary Output Eg.: actuator command
- Binary Value Eg.: plant status (On/Off)
- Multistate Input Eg.: manual selector position
- Multistate Output Eg.: step control
- Multistate Value Eg.: current operating mode (building protection, stand-by, economy, comfort)

There are also other communication objects, oriented to data management:

- Calendar
- Schedule
- Group
- Trenlog

Other objects are oriented to the program loaded into the device:

- Device
- Command
- Program
- Loop
- Notification Class

Other objects are file-oriented or alarm-oriented:

- Life Safety objects
- Life Safety Point
- Life Safety Zone

Each communication object is defined by a specific number and type of properties. For example, the following table shows the propertis of the Analog Output object:

PROPERTY	CONFORMANCE CODE	ACCESS
Object_Identifier	R	R
Object_Name	R	R
Object_Type	R	R
Present_Value	R	R/W

PROPERTY	CONFORMANCE CODE	ACCESS
Description	O	-
DeviceType	O	-
Status_Flags	R	R
Event_State	R	R
Reliability	O	-
Out_Of_Service	R	R
Units	R	R
Min_Pres_Value	O	R
Max_Pres_Value	O	R
Resolution	O	-
Priority_Array	R	-
Relinquish_Default	R	-
COV_Increment	O	-
Time_Delay	O	-
Notification_Class	O	R
High_Limit	O	R/W
Low_Limit	O	R/W
Deadband	O	R/W
Limit_Enable	O	R/W
Event_Enable	O	R/W
Acked_Transitions	O	-
Notify_Type	O	R/W

Accordingly to the access code of each object, properties can be read-only (R) or read/write (R/W). The “Present Value” property of the Analog Ouput object is read/write.

The Analog Input, Binary Input and Multistate Input objects have the “Present Value” property in read-only mode. In ekinex gateway these communication objects are fit to represent those values acquired over the KNX network which are made available or reading operations by a BACnet supervisor.

The available services on BACnet devices act as client-server applications. Each device can simultaneously act as client or server. BACnet services are divided into 5 segments and each device profile must implement a specific number of services.

1) Object access
2) File transfer
3) Alarm functions
4) Remote control
5) Virtual terminal

4.3 Device profile

Currently there are 6 BACnet device profiles:

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

Each profile must implement a specific number of services for the defined communication objects. The ekinex gateway can act as data server between a KNX network (on TP fieldbus) and a B-OWS supervisor device. The BACnet Operator Workstation can monitor all field variables such as temperature and relative humidity; it is also possible to modify all setpoints currently set on the KNX network.

4.4 Device description

Each BACnet device manufacturer publishes a document called PICS (Protocol Implementation and Conformance Statement) which describes, in conformity to the standard, the foreseen features of their products, profile, physical layer, supported objects and services. This a useful tool to compare devices from different manufacturers and evaluate their features and interoperability characteristics.

5 Configuration software

The ekinex® configuration software CGEKBJ1TPIP/CGEKBJ1TPMSTP allows you to perform the following operations:

- Selection of physical parameters of the BACnet communication;
- Selection of physical address of the device over the KNX TP network;
- Selection of Ethernet parameters (for configuration download only);
- KNX network: communication objects definition and relative group addresses to be acquired;
- KNX network: communication objects definition and relative group addresses to be sent over the KNX network;
- BACnet network: definition of the registers to be read from the network devices;
- BACnet network: definition of the registers to be written on the network devices;
- Firmware and/or configuration update.

The application program consists in multiple modal windows called “forms”: each form must be closed before accessing the following form. The buttons on the main form (see Figure 2 – Main form of the application program) are ordered according to the proper sequence to follow in order to perform a correct configuration.

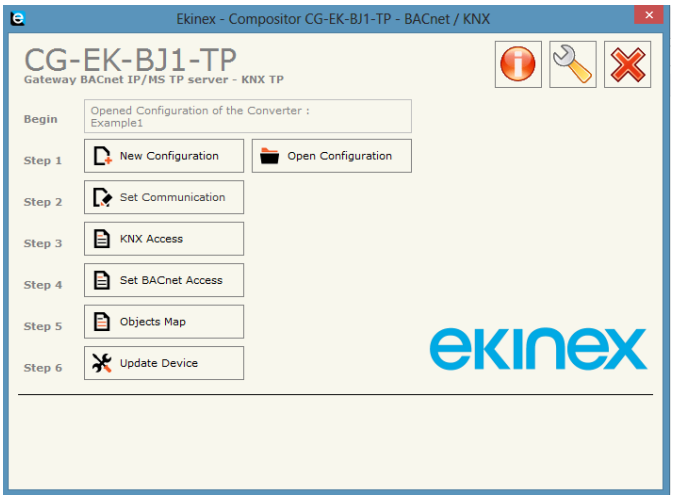

Figure 3 - Form principale del programma applicativo

Starting from the main form, by accessing the *About...* window, you can check the current version of the installed program.

Figure 4 - Form About

Please visit the section about communication gateways on www.ekinex.com in order to check the current version of the application program and download the latest version.

5.1 Memory image structure

The proper configuration of the device refers to a support volatile memory area where the acquired data are temporarily copied, both on BACnet and KNX side: this memory area is divided into 2 buffers, “BACnet image” and “KNX image”, each one composed of 1440 bytes.

Each support byte can be individually addressed (see *Position* field in *KNX Set Access* and *Set BACnet Access* forms) or you can target a specific support bit in each buffer (*Bit Mode* field in *KNX Set Access* fom and *Start Bit* field in *Set BACnet Access* form).

As shown in figure, the same address can refer to both buffers:

- “BACnet image” used in *Set BACnet Access* form, *Read* tab and in *KNX Set Access* form for writing frames.
- “KNX image” used in *KNX Set Access* form for reading frames and in form *Set BACnet Access*, *Write* tab.

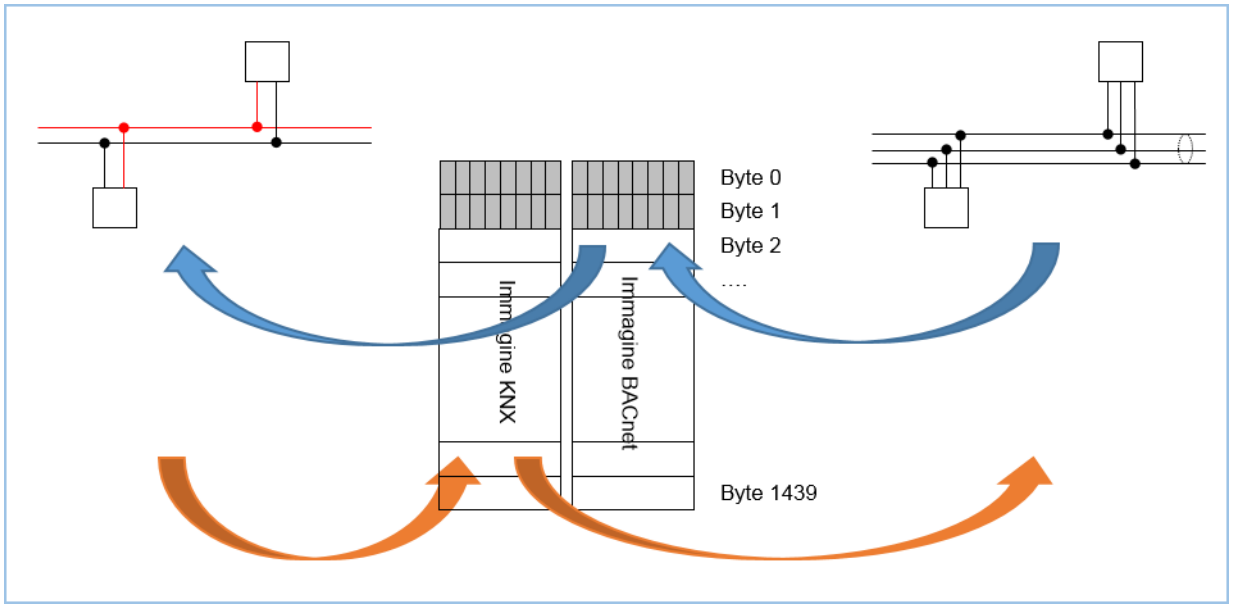

Figure 5 – Support memory with “KNX image” and “BACnet image” buffers

The proper addressing of the support buffers must be manually performed by the user, based on the size of the data to be acquired. Overlapping support data may end up in a protocol converter mulfunction.

5.2 Creating a new project or modifying a saved project

The application program allows you to create a new configuration or open an existing one using the buttons called *New Configuration* and *Open Configuration* (see Figure 3 - Form principale del programma applicativoMain form of the application program): the configuration files are stored on the hard drive in XML format.

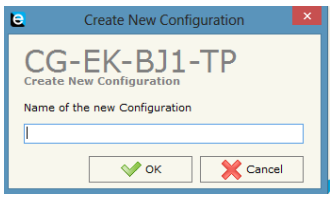

Figure 6 – Create new configuration form

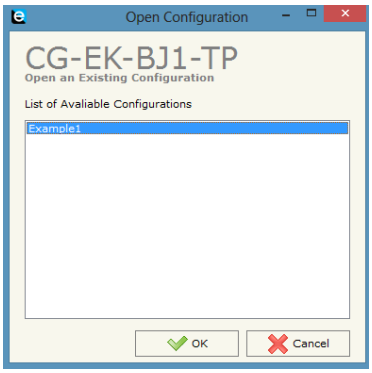

Figure 7 – Open configuration form

In order to duplicate an existing project, you must find the project folder containing the XML files and copy them in a new folder. Project files can be found by the following path:

"C:\Program Files (x86)\Ekinex\Compositor CGEKBJ1TP \Projects".

Once the project has been duplicated, simply restart the application program and open the form *Open configuration* (see Figure 6 - Open configuration form): you will see the name of the duplicated project in the list of available configurations.

5.1 Software Options

The *Software Options* form allows you to select a different language for the application program.

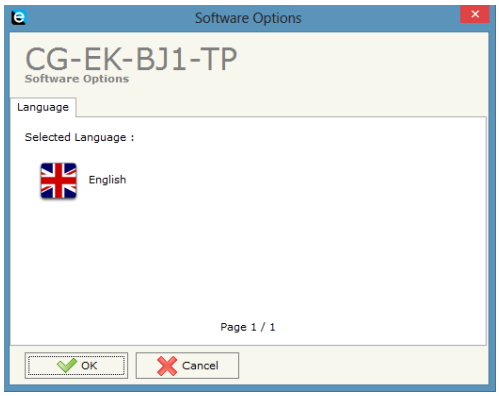

Figure 8 – Options form, Language tab

5.2 Communication parameters

In this section we define the basic communication parameters for the KNX TP network and for the BACet network. Ethernet connection is required in order to perform the configuration update on the device and to communicate over the BACnet IP network in model EK-BJ1-TP-IP.

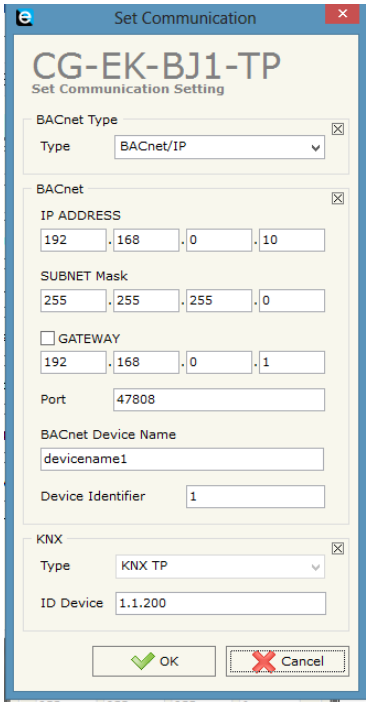

Figure 8a - Set communication form model EK-BJ1-TP-IP

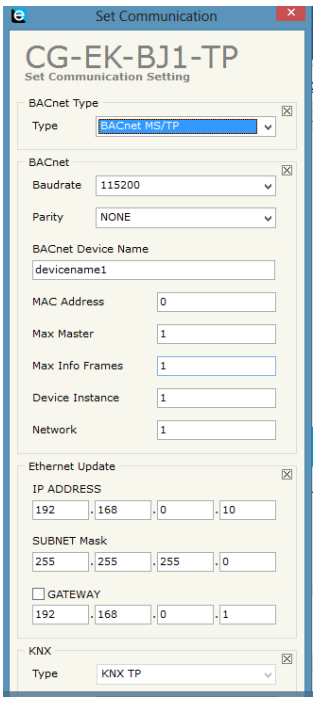

Figure 8b - Set communication form model EK-BJ1-TP-MSTP

You can access the form by pressing the *Set Communication* button in the main form (see Figure 2 – Main form of the application program).

Description of fields in *Set communication* form.

Parameter name	*Values*	*Description*
BACnet IP		
IP ADDRESS		IP Address (4-octet format) assigned to the device. Each octet is set in an Edit box. Default IP Address is: **192.168.2.205**. This is the address assigned to the device before the first configuration or after a complete restore.
SUBNET Mask		Subnet mask assigned to the device.
GATEWAY		Gateway address used for Ethernet communication. The gateway can be enabled or disabled through the control check-box placed at the right side of the field.
Port		Port number used in BACnet communication. Default port is 47808, but any value is possible (except 10000 and 10001).
BACnet Device Name		BACnet node name
Device Identifier		BACnet node number
BACnet MS/TP		
Baudrate	1200 2400 4800 **9600** 19200 38400 57600 115200	Baudrate of the serial communication.
Parity	**NONE** ODD EVEN	Parity check.
MAC Address		BACnet node physical address
BACnet Device Name		BACnet node name
KNX		
Type	**KNX TP**	Type of connection used for KNX communication. The parameter has a constant value “KNX TP”. The device supports KNX communicaton over a twisted pair communication cable.
ID Device		This parameter identifies the physical address assigned to the KNX device. The format requires the use of a dot “.” as a separator beween the 3 fields: area, line and device address. Here are the conventions used for physical addressing and the values used for each field: Area field: = 0 reserved for backbone, values [1...15] Line field: = 0 reserved for main line, values [1...15] Device address field: = 0 reserved for coupler, values [1...255], range [1..64] for devices belonging to the line, above 64 for device belonging to extensions or other segments of the line. Example: 1.3.5: Area = 1; Line = 3; Device address = 5.

Please refer to the technical documentation of the slave device in order to set the correct parameters of the serial communication. Incompatible values of these parameters may prevent the correct exchange of frames.

5.3 KNX communication object configuration

In this section we define communication objects exchanged over the KNX network. You can access the form by pressing the *KNX Access* button in the main form (see Figure 2 – Application program main form).

The form contains a configurable grid. Each record allows you to assign the properties for each communication object exchanged over the KNX network. In order to make the management of a significant number of data easier, after selecting a record it is possible to delete it from the project, insert a new record in a specific position and perform copy/paste of a previously configured record.

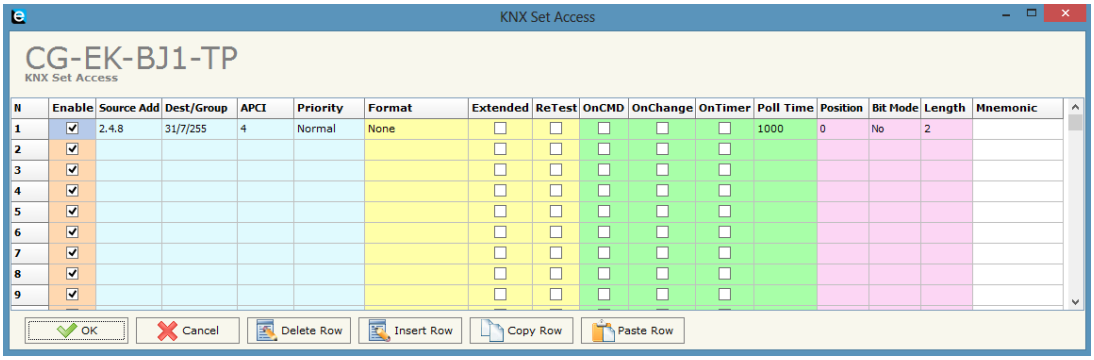

Figure 11 - KNX Set Access form

Description of fields in *KNX Set Access* form

Field name	*Values*	*Description*
N		Progressive number of the configuration record
Enable	**checked** / unchecked	Configuration record enabling. If a record is disabled, the corresponding data points will not be acquired or changed over the KNX bus
Source Address		In case of writing frames (field APCI=write) the physical address may correspond to the physical address of the gateway (*Device ID* field in the *Set Communication* form), in the format Area.Line.Address (each field must be separated by a dot). In case of reading frames (field APCI=read), *Source Address* acts as a filter. Through this field you can acquire datapoints of all lines over the KNX bus (0.0.0 value) or you can select one specific line (e.g. 4.3.0) or a single device identified by a specific physical address (e.g. 4.3.1).
Dest/Group		A Group Address (2-level, 3-level or free structure) or a Physical Address can be set. In case of a group address the fields must be separated through a "/", while in case of physical address the separator will be a ".".
APCI	read / write / specific value	The "read" option is used to send a request in order to read a communication object over the KNX bus. The "write" option must be selected if you want to change the value of a communication object over the KNX bus. Other services can be configured by editing the value of the corresponding service. The name used in the field refers to a 4-bit code (APCI = Application Layer Protocol Control Information) which defines the type of service required in KNX communication standard.
Priority	System/ Urgent / Normal / Low	KNX frames priority. In multicast communication (exchange of frames from/to group addresses), the default priority is Low.
Format	None / Swap16 / Swap32 / Swap All / Int to Float / Float to Int / Float 16 to Float 32	In case of a frame containing a data (in response to a reading request frame APCI = read), the Format field determines the data type conversion from the received frame to the support internal memory area. In case of a writing frame (APCI = write), the Format field determines the data type conversion from the support internal memory area to the frame.
Extended	**checked** / unchecked	Enables extended frame format for KNX communication (cEMI = Common Extended Message Interface)

Field name	*Values*	*Description*
ReTest	**checked** / unchecked	Enables the re-send of a frame in case of wrong response message
OnCMD	**checked** / unchecked	Not used
OnChange	**checked** / unchecked	Event which enables the automatic sending of command frames over the KNX bus when the data on the BACnet device changes their values.
OnTimer	**checked** / unchecked	Event which enables the cyclical sending of command frames over the KNX bus.
Poll Time		Cyclic poll time (in ms) when OnTimer event is enabled.
Position	Value in range [0…1439]	Position of the first byte where a data is stored, in the internal support memory buffer. In case of a record where APCI=read, *Position* refers to the "KNX image" buffer; in case of APCI=write, *Position* refers to the "BACnet image" buffer. Please refer to the paragraph concerning the structure of the memory image to perform a correct addressing and avoid overlaps between the two data buffers.
Bit Mode	No / 0 / 1 / 2 / 3 / 4 / 5 / 6 / 7	Position, inside the first byte of the internal support memory buffer, where a 1-bit data is stored.
Lenght		Size (in number of bytes) of the data stored inside the internal memory.
Mnemonic		Text to comment the record and/or the datapoint over the KNX bus.

5.4 BACnet registers configuration

In this section we define the registers read or written over the BACnet network. You can access the form by pressing the *Set Access* button in the main form (see Figure 2 – Application program main form).

The form is divided into 2 tabs, *BACnet in Read* tab (see Figure 12 – BACnet Set Access form, BACnet in Read tab) and *BACnet in Write* tab (see Figure 13 - BACnet Set Access form, BACnet in Write tab). The *BACnet in Read* tab contains the configuration grid of the registers whose values are acquired over the BACnet network and made available over the KNX network. The *BACnet in Write* tab, instead, contains the configuration grid of the registers whose values are acquired over the KNX network and must be written over the BACnet network.

In order to make the management of a significant number of data easier, after selecting a record it is possible to delete it from the project, insert a new record in a specific position and perform copy/paste of a previously configured record.

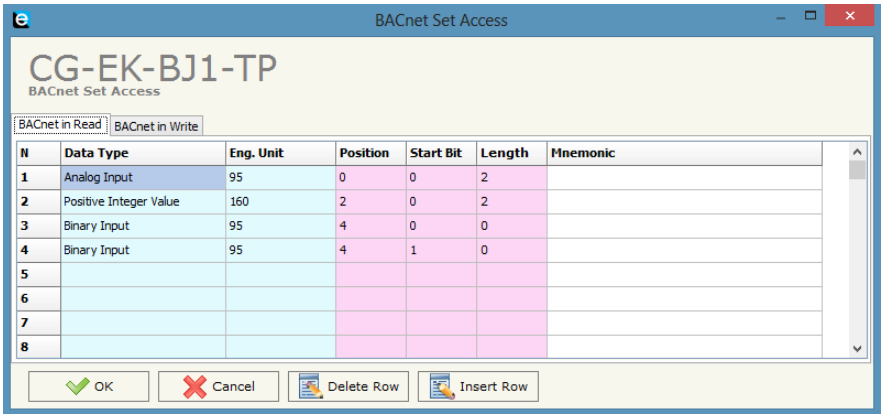

Figure 12 – BACnet Set Access form, BACnet in Read tab

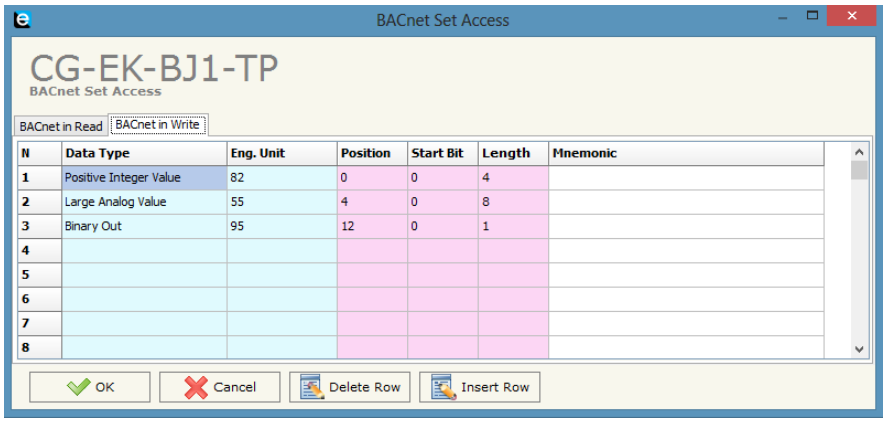

Figure 13 - BACnet Set Access form, BACnet in Write tab

Description of fields in *BACnet Set Access* form, *BACnet in Read* and *BACnet in Write* tabs

Field name	*Values*	*Description*
N		Progressive number of the configuration record
Data Type	Analog Input Analog Value Binary Input Binary Value	Data type of the BACnet object.

Field name	*Values*	*Description*
	Positive Integer Value Large Analog Value Integer Value Multi State Input Multi State Value Life Safety Point Life Safety Zone Access Door Accumulator	
Eng. Unit		By double-clicking over the desired cell you enter the BACnet engineering unit configuration window. It is possible to directly insert the unit (with a unique number) by compiling the “Selected BACnet Engineering Unit” field; or by selecting the desired unit through the “Select the type” and “Select unit” fields. In the latter case, it is necessary to press the “Select Engineering Unit” button to confirm the choice.
Position	Value in range [0…5999]	Position of the first byte where a data is stored, in the internal support memory buffer. Please refer to the paragraph concerning the structure of the memory image to perform a correct addressing and avoid overlaps with the “KNX image” buffer.
Start Bit	0 / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	Position, inside the first byte of the internal support memory buffer, where a 1-bit data is stored. Only for “Binary In” and “Binary Out” objects.
Length		Size (in number of bytes) of the read data
Mnemonic		Testo di commento al registro letto sulla rete seriale BACnet

5.5 Configuration update

The implemented configuration and possibly the updated firmware can be downloaded by pressing the *Update Device* button in the main form of the application program (see Figure 2 – Main form of the application program).

There can be 2 possible update sequences, the first in case the IP address assigned to the device is unknown, the second in case the IP address is known.

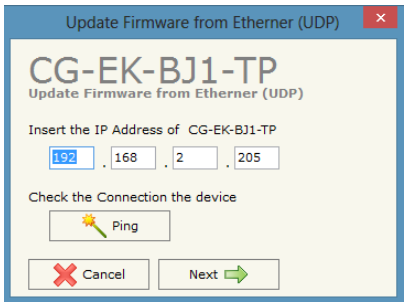

Figure 12 - Update configuration form

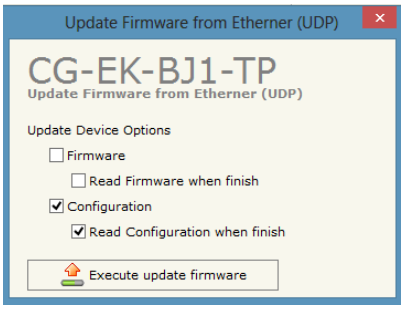

Figure 13 – Download options form

Sequence to follow in case of unassigned or unknown IP address:

- Power off the device
- Set the 1-way microswitch A (see Figure 1 – Switching, display and connection elements) to ON position
- Power on the device
- Connect PC and device by means of an Ethernet cable. Make sure that the PC's network parameters are consistent with the IP address assigned to the device in Boot Mode **192.168.2.205.** Otherwise, change the PC's network settings
- Write the IP address **192.168.2.205** inside the Update Configuration form (see Figure 12 – Update configuration form)
- Press *Ping* button; if you correctly applied the procedure, the text "*Device found!*" will appear
- Press *Next* button
- Select the desired options (see Figure 13 – Download options form): firmware update, configuration update or both
- Press *Execute update firmware* button
- When all operations are completed (see Figure 14 – Update in progress) shut down the device
- Set the 1-way microswitch A (see Figure 1 – Switching, display and connection elements) to OFF position
- Power on the device

If the sequence is successful, this means that firmware and/or configuration has been correctly downloaded on the device.

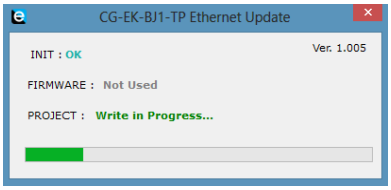

Figure 14 - Update in progress

Sequence to follow in case of known IP address:

- Power on the device with PC and device connected by means of an Ethernet cable
- Provide the device IP address (see Figure 12 – Update configuration form). Make sure that the PC's network parameters are consistent with the IP address assigned to the device**.** Otherwise, change the PC's network settings
- Press *Ping* button; if you correctly applied the procedure, the text "*Device found!*" will appear (see Figure 12 – Update configuration form)
- Press *Next* button (see Figure 12 – Update configuration form)
- Select the desired options (see Figure 13 – Download options form): firmware update, configuration update or both
- Press *Execute update firmware* button
- When all operations are completed (see Figure 14 – Update in progress) the device automatically switches back to Normal mode.

If the sequence is successful, this means that firmware and/or configuration has been correctly downloaded on the device.

It is recommended to update the firmware when a new version of the application program is installed or when configuring the device for the first time.

In case the update procedure goes into PROTECTION mode (see Figure 15 – Update error, "Protection" mode), you may want to check the following:

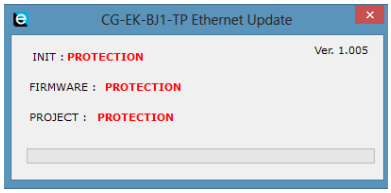

Figure 15 – Update error, "Protection" mode

- Repeat the update sequence
- Reboot your PC
- When running the program on a Virtual Machine, close it and rerun the program using the primary OS
- When using Windows 7 or later, make sure the user has administrator privileges
- Pay attention to firewall settings
- Check LAN configuration

In case of manual firmware update, replace “Sim67802.sim” file in the system folder “C:\Program Files (x86)\Ekinex\Compositor CGEKBJ1TP\Master”. After replacing, open *Update configurazione* form (see Figure 12 – Update configuration form) in the application program and start the proper sequence.

6 Warning

- Installation, electrical connection, configuration and commissioning of the device can only be carried out by qualified personnel.
- Opening the housing of the device causes the immediate end of the warranty period.
- ekinex® KNX defective devices must be returned to the manufacturer at the following address:

SBS S.p.A. Via Circonvallazione s / n, I-28010 Miasino (NO) Italy.

7 Other information

- This application manual is aimed at installers, system integrators and planners
- For further information on the product, please contact the ekinex® technical support at the e-mail address: support@ekinex.com or visit the website www.ekinex.com
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