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Application manual

KNX-IP Interface
EK-BB1-TP

KNX-IP Router
EK-BC1-TP

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1. Document

This application manual refers to the release A1.0 of the ekinex® KNX-IP interface EK-BB1-TP and KNX-IP Router EK-BC1-TP.

Application manual and application program for ETS are available for download at www.ekinex.com.

Object	Filename	Device release	Update
Application Manual	MAEKBBC1TP_EN.pdf	A1.0	03 / 2016
Application program KNX-IP	APEKBB1TP01.knxproj		
Application program KNX-IP router	APEKBC1TP01.knxproj		

Other technical information on the device is available on the datasheet STEKBBC1TP_EN.pdf.

2. Product description

The Ekinex® EK-BB1-TP IP interface realizes the bidirectional data link between a PC or laptop and a KNX system via LAN. The interface supports IP tunneling protocol and enables addressing, setting parameters, viewing and diagnosis of KNX devices via ETS. The device has an integrated KNX bus communication module and is designed for 35mm rail mounting. Power is supplied via the KNX bus.

The Ekinex® EK-BC1-TP IP router realizes the bidirectional data link between a PC or laptop and a KNX system via LAN. The interface supports IP tunneling protocol and enables addressing, setting parameters, viewing and diagnosis of KNX devices via ETS.

The IP router also integrates the function of a line coupler; telegrams can be exchanged between TP bus lines through a bridge over TCP/IP. The device has an integrated KNX bus communication module and is designed for 35mm rail mounting.

Four LEDs show with precision the status of both KNX and Ethernet bus lines; this helps to find common communication problems caused to bus overload or multiple transmission on both lines.

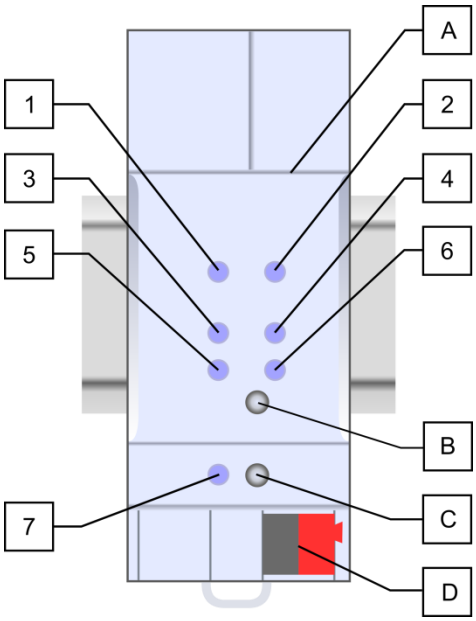
The device is powered by a 30 Vdc SELV voltage via the KNX bus and does not require auxiliary power but, when sizing the bus line, you need to consider this as a supply equivalent to 4 devices of 10 mA.

Following are the highlights characterizing the KNX-IP Interface:

- It provides the tunnelling protocol, a connection point for ETS in order to enable commissioning and monitoring (4 parallel connections are possible);
- It can be used to replace a line coupler or an area coupler. The best advantage of this change is using LAN as a fast medium to exchange telegrams between lines and/or areas.
- Routing of all physically addressed messages, regardless their physical address, by pressing a button on the device without reconfiguring the device with ETS;
- Detailed possibility for diagnosis by displaying all operational statuses with 4 dual LEDs;
- UPnP available to discover the device in IP networks. ETS can discover the device as a communication interface through a EIBnet/IP search request.
- WEB interface: currently providing device settings and the opportunity to activate the program mode.

3. Switching, display and connection elements

The line/area coupler is equipped with 4 LEDs and a function pushbutton located on the front of the device, 1 bus terminal for KNX bus line, 1 RJ45 connector for Ethernet LAN, a programming LED and a programming pushbutton.



1. LAN status LED
2. KNX status LED
3. LAN traffic LED
4. KNX traffic LED
5. Not used
6. Not used
7. Programming LED

A. Ethernet connector
B. Function button
C. Programming button
D. KNX bus connector

3.1 Normal mode

No.	Display element	Status	Meaning
1	LAN status LED	Off On (green) On (red)	LAN error or line not connected LAN normal operation Manual override active
2	KNX status LED	Off On (green)	KNX error or line not connected KNX normal operation
3	LAN traffic LED	Blinking (green) Off Blinking (red)	Data exchange active on LAN No data exchange on LAN line LAN transmission error
4	KNX traffic LED	Blinking (green) Off Blinking (red)	Data exchange active on KNX No data exchange on KNX line KNX transmission error

3.2 Function pushbutton

Long press (3 seconds)

- Switch to manual override.
- Default function is set with LAN line and KNX line parameters.
- Manual override function is configured in “General parameters”.
- LAN status LED red
- On: manual override active
- Off: default configuration active

Note: the latest downloaded settings (parameters) and filter tables are still available after switching back from “Manual operation” to “Normal operation”.

Very long press (15 seconds)

- All LEDs are red
- Release button and press again for some seconds: resets all the parameter to factory default (incl. physical address).

3.3 Programming

No.	Switching/display element	Status	Meaning	Note
7	Programming LED	Off On	normal operating mode programming mode	After receiving the physical address, the line coupler automatically returns from addressing mode to the normal operating mode.
C	Programming pushbutton	-	-	Pushbutton for switching between normal operating mode and addressing mode for assigning the physical address.

3.4 KNX Telegrams in LAN network

The IP Router sends telegrams from/to KNX to/from the IP network in accordance with KNXnet/IP protocol specification. These telegrams are sent in default setting as multicast telegrams to the multicast IP address 224.0.23.12, port 3671. This IP address is defined by KNX Association in conjunction with IANA.

This address should stay as preset and changed only if necessary for the existing network.

During commissioning, it should be considered that all KNX IP devices communicating via IP must use the same IP routing multicast address.

Settings are to be changed in “General Parameters” window in ETS.

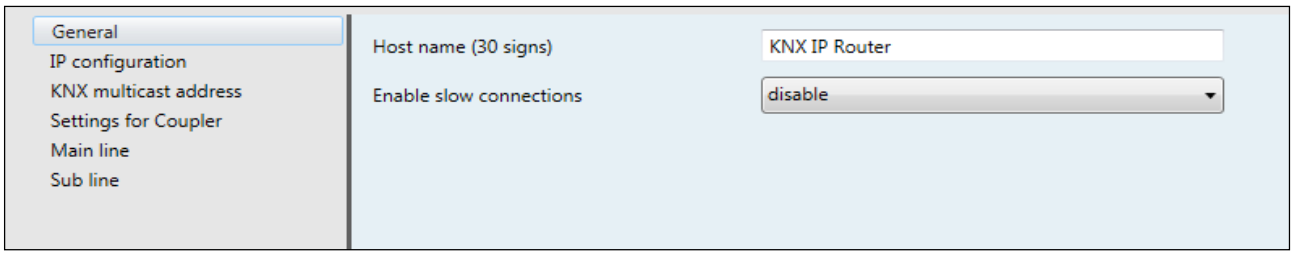
Note: The multicast IP address 224.0.23.12 may need to be enabled depending on network type and network components settings.

4. Application

If the line/area coupler receives telegrams (for example during commissioning) which use a physical address as destination address, it will compare the physical addresses of the receiver with its own physical address and then decide whether it must route the telegrams or not. The coupler reacts to telegrams with group addresses in accordance with its parameter settings. During normal operation (default setting), the coupler only routes those telegrams whose group addresses have been entered in its filter table. If the coupler routes a telegram and does not receive an acknowledgement, or if a bus device finds a transmission error, the coupler repeats the telegram three times. With the parameters “Repetitions if errors...”, this behaviour can be set separately for both lines. These parameters should not be modified.

5. KNX-IP ETS parameters

5.1 General



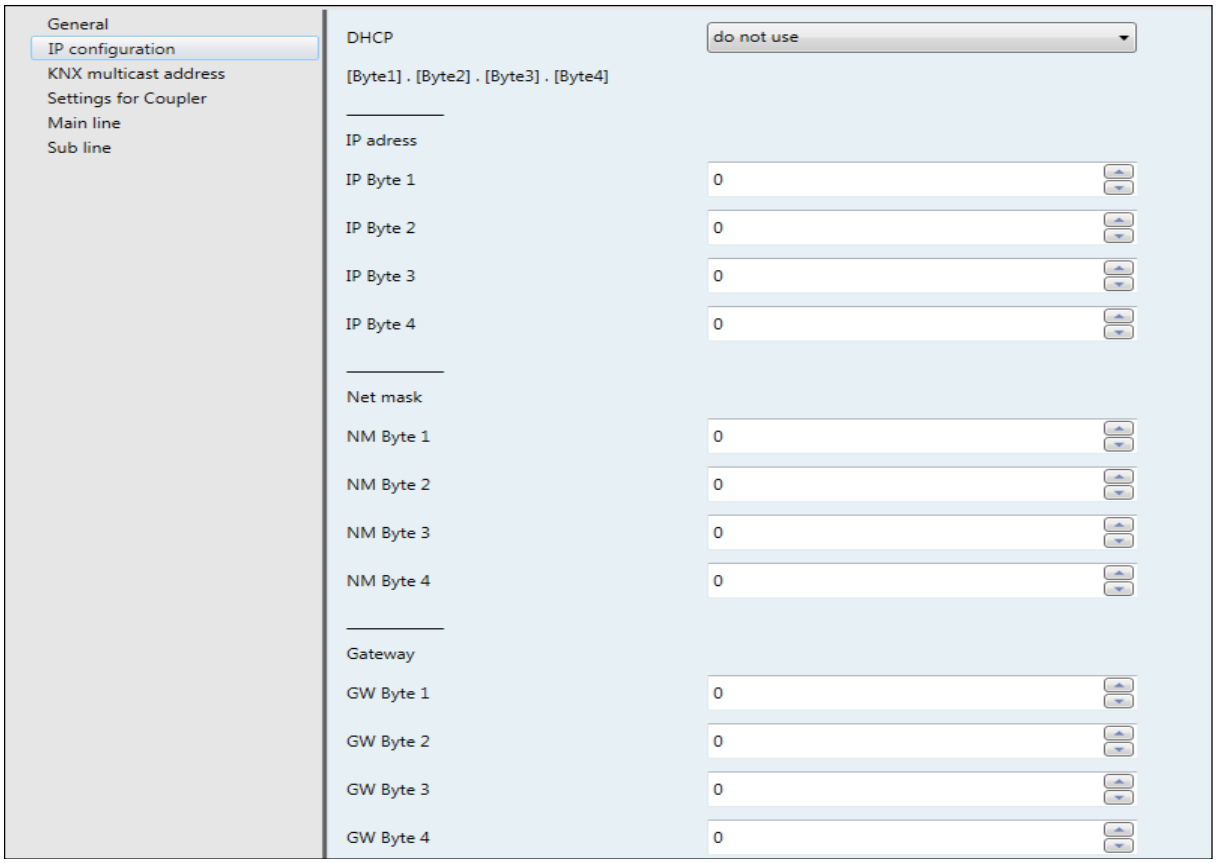
ETS text	Range	Note
Host name	KNX IP Router	Field for the name (30 characters max.). To easily search the device with ETS or with a KNXnet/IP visualization system.
Enable slow connections	enable disable	Enable slow tunnelling connections

Table 5.1: General parameters

5.2 DHCP

ETS text	Range	Note
DHCP	use not use	If DHCP is used, no parameterization is needed. If DHCP is not used, the following parameters are to be set.

Table 5.2: DHCP configuration

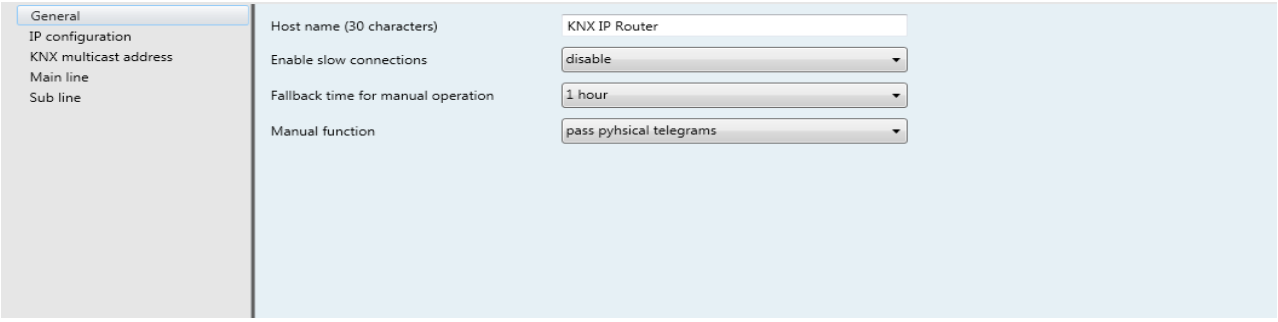


ETS text	Range	Note
DHCP [Byte1]. [Byte2]. [Byte3]. [Byte4]	do not use	If DHCP is not used, the following parameters are to be set.
IP Address IP Byte 1 IP Byte 2 IP Byte 3 IP Byte 4	 0…255 0…255 0…255 0…255	IP Byte 1 to 4: manual input.
Net Mask IP Byte 1 IP Byte 2 IP Byte 3 IP Byte 4	 0…255 0…255 0…255 0…255	Net mask Byte 1 to 4: manual input.
Gateway IP Byte 1 IP Byte 2 IP Byte 3 IP Byte 4	 0…255 0…255 0…255 0…255	Gateway Byte 1 to 4: manual input.

Table 5.3: DHCP manual setting

6. KNX-IP Router ETS parameters

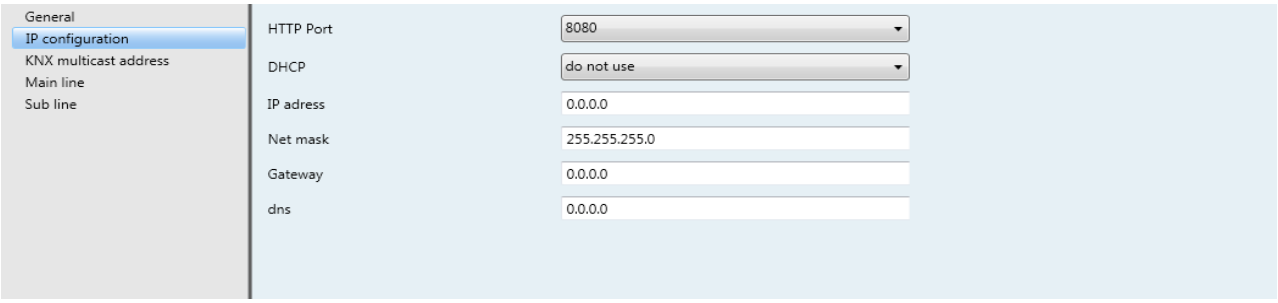
6.1 General



ETS text	Range	Note
Host name	KNX IP Router	Field for the name (30 characters max.). To easily search the device with ETS or with a KNXnet/IP visualization system.
Enable slow connectiom	disable enable	Enable or disable HTTP connection
Fallback time for manual operation	10 min 1 hour 4 hours 8 hours	Fallback time for manual operation
Manual function	disable pass all telegrams pass physical telegrams pass group telegrams	Manuale mode configuration

Tabella 6.1: General parameters

6.2 DHCP

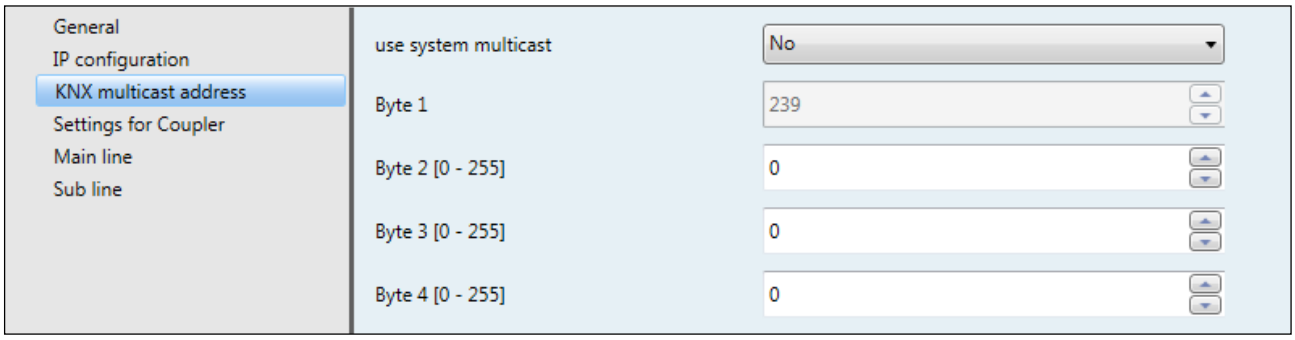


ETS text	Range	Note
HTTP Port	80 8080	Port if http mode is enable
DHCP	used not used	If DHCP is used, no parameterisation needed. If DHCP is not used, following parameters are to be set.
DHCP [Byte1]. [Byte2]. [Byte3]. [Byte4]	do not use	Se DHCP non viene utilizzato, devono essere fissati i seguenti parametri
IP Address IP Byte 1 IP Byte 2 IP Byte 3 IP Byte 4	0…255 0…255 0…255 0…255	If DHCP is not used, the following parameters are to be set.
Net Mask IP Byte 1 IP Byte 2	0…255 0…255 0…255	IP Byte 1 to 4: manual input.

IP Byte 3 IP Byte 4	0…255	
Gateway IP Byte 1 IP Byte 2 IP Byte 3 IP Byte 4	 0…255 0…255 0…255 0…255	Net mask Byte 1 to 4: manual input.
DNS IP Byte 1 IP Byte 2 IP Byte 3 IP Byte 4	 0…255 0…255 0…255 0…255	DNS (Domain Name System)

Tabella 6.2: DHCP parameters

6.3 KNX multicast address



ETS text	Range	Note
Use system multcast	Yes No	Yes: use multicast address default 224.0.23.12 No: the following parameters are to be set.
Byte 1	239	Fixed Value
Byte 2	0…255	Manual input
Byte 3	0…255	Manual input
Byte 3	0…255	Manual input

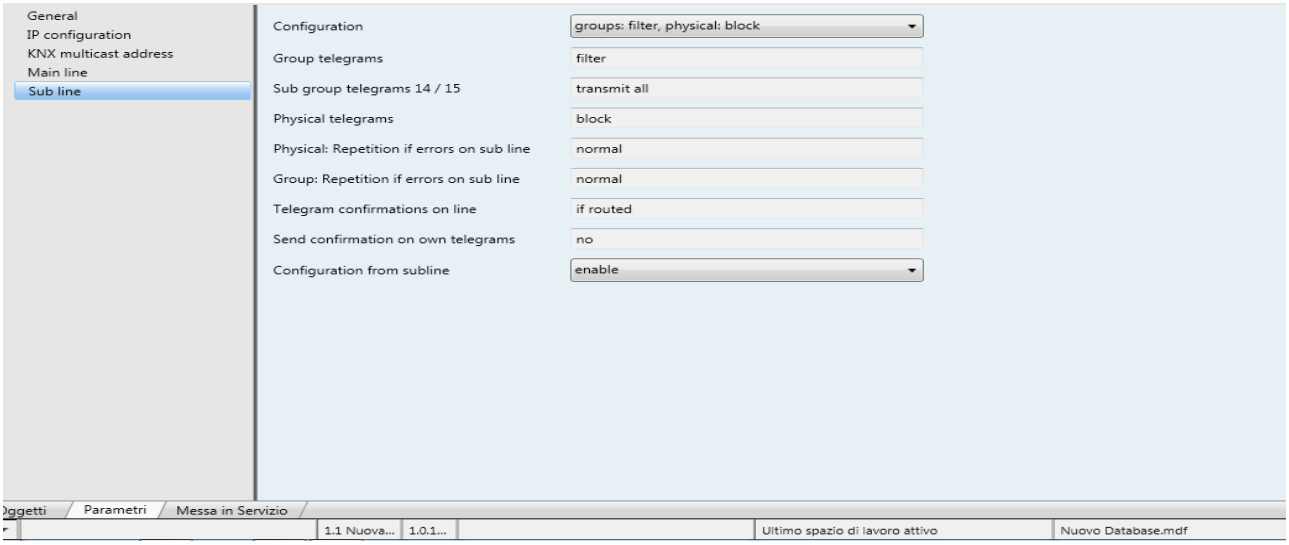
Tabella 6.3: Multicast Address

6.4 Main line

ETS text	Range	Note
Configuration	Configuration groups: filter, physical: block groups, physical: filter groups: route, physical: filter groups, physical: route configure groups, physical: filter	- Block: no telegram is routed. - Filter: Only telegrams in the filter table are routed. - Route: the telegrams are routed. - Configure: the following parameters can be set individually. This parameter has to be set depending on the planned configuration.
Group telegrams	1. transmit all 2. block 3. filter	1. All group telegrams are transmitted. 2. No group telegram is transmitted. 3. Only group telegrams in the filter table are routed. The ETS 3/4 produces the filter table automatically.
Main group telegrams 14/15	1. block 2. transmit all	1. Group telegrams with the main group 14 or 15 (e.g. 14/1) are not routed. 2. Group telegrams with the main group 14 or 15 (e.g. 14/1) are routed.
Physical telegrams	1. transmit all 2. block 3. filter	1. All physical telegrams are transmitted. 2. No physical telegram is transmitted. 3. Only physical telegrams based on physical address are routed.
Physical: Repetition if errors on main line	1. no 2. reduced 3. normal	If a transmission error (e.g. due to missing receiver) is found when sending a physical telegram on the main line: 1. The physical telegram is not repeated. 2. The physical telegram will be repeated only one time. 3. The physical telegram is repeated up to 3 times.
Group: Repetition if errors on main line	1. no 2. reduced 3. normal	If a transmission error (e.g. due to missing receiver) is found when sending a group telegram on the main line: 1. The group telegram is not repeated. 2. The group telegram will be repeated only one time. 3. The group telegram is repeated up to 3 times.
Telegram confirmations on line	1. always 2. if routed	1. Each telegram on the main line is confirmed (ACK). 2. Only telegrams to be routed are confirmed on the main line (ACK).
Send confirmation on own telegrams	1. yes 2. no	1. Every telegram on the main line is confirmed with its own ACK (from the Line coupler). 2. No confirmation with own ACK

Table 6.4: Main line parameters

6.5 Sub line



ETS text	Range	Note
Configuration	groups: filter, physical: block groups, physical: filter groups: route, physical: filter groups, physical: route configure groups, physical: filter	- Block: no telegram is routed. - Filter: Only telegrams in the filter table are routed. - Route: the telegrams are routed. - Configure: the following parameters can be set individually. This parameter has to be set depending on the planned configuration.
Group telegrams	1. transmit all 2. block 3. filter	1. All group telegrams are transmitted. 2. No group telegram is transmitted. 3. Only group telegrams in the filter table are routed. The ETS 3/4 produces the filter table automatically.
Sub group telegrams 14/15	1. block 2. transmit all	1. Group telegrams with the main group 14 or 15 (e.g. 14/1) are not routed. 2. Group telegrams with the main group 14 or 15 (e.g. 14/1) are routed.
Physical telegrams	1. transmit all 2. block 3. filter	1. All physical telegrams are transmitted. 2. No physical telegram is transmitted. 3. Only physical telegrams based on physical address are routed.
Physical: Repetition if errors on sub line	1. no 2. reduced 3. normal	If a transmission error (e.g. due to missing receiver) is found when sending a physical telegram on the main line: 1. The physical telegram is not repeated. 2. The physical telegram will be repeated only one time. 3. The physical telegram is repeated up to 3 times.
Group: Repetition if errors on sub line	1. no 2. reduced 3. normal	If a transmission error (e.g. due to missing receiver) is found when sending a group telegram on the main line: 1. The group telegram is not repeated. 2. The group telegram will be repeated only one time. 3. The group telegram is repeated up to 3 times.
Telegram confirmations on line	1. always 2. if routed	1. Each telegram on the main line is confirmed (ACK). 2. Only telegrams to be routed are confirmed on the main line (ACK).
Send confirmation on own telegrams	1. yes 2. no	1. Every telegram on the main line is confirmed with its own ACK (from the Line coupler). 2. No confirmation with own ACK

Table 6.5: Sub line parameters