

Description

The ekinex® gateway are modular devices for mounting in cabinets or distribution boards that allow the information exchange with one or several slave devices or with a master device that communicate on a serial differential RS485 (Modbus RTU/DMX/M-Bus/BACnet MSTP protocols) network or an Ethernet (Modbus TCP/BACnet IP/Profinet protocols) network. The role of the gateway is as Modbus/M-Bus/DMX communication master or BACnet/Profinet communication slave. The information exchanged on the Modbus/DMX/M-Bus/BACnet/Profinet network are updated on the KNX network with TP (twisted pair) transmission media.

Versions

Code	Version
EK-BH1-TP-485	Modbus RS485 master RTU - KNX
EK-BH1-TP-TCP	Modbus TCP/IP master - KNX
EK-BJ1-TP-IP	BACnet IP server - KNX
EK-BJ1-TP-MSTP	BACnet MS/TSP server - KNX
EK-BK1-TP	DMX - KNX
EK-BM1-TP-20	M-Bus Master - KNX (20 devices)
EK-BM1-TP-40	M-Bus Master - KNX (40 devices)
EK-BM1-TP-80	M-Bus Master - KNX (80 devices)
EK-BM1-TP-160	M-Bus Master - KNX (160 devices)
EK-BN1-TP	PROFINET - KNX

Application

The device manages a bidirectional data flow: the Modbus/DMX/M-Bus/BACnet/Profinet registers may be cyclically read and their value may be sent as a communication object on the KNX TP network to configured group addresses through a multicasting communication. The data updating on the KNX network may happen cyclically and/or on event at a change of the collected data from the Modbus/DMX/M-Bus/BACnet/Profinet network.

The ekinex gateway may likewise carry out cyclically reading requests of KNX communication objects or acquire the value during the telegram exchange on the bus. At event of communication objects changing or cyclically, the data are written on the Modbus/DMX/M-Bus/BACnet/Profinet registers of one or several configured devices. With regard to the KNX communication 1 bit, 1 byte, 2 bytes and 4 bytes communication objects can be acquired: functions of internal conversion allow to convert the information from and to 16 bit (DPT 9.xxx) floating-point values. The configuration is carried out through a dedicated software for PC that communicates through the Ethernet communication port integrated in the device.

Main functional characteristics

Modbus RTU side (EK-BH1-TP-485 version)

- Serial RS485 communication port galvanically isolated from power supply, line terminator (120 Ohm) to be inserted through 1-way DIP-switch
- Modbus master RTU (Remote Terminal Unit) communication
- Communication speed from 1200 to 115200 baud
- 0 ... 250 device addressing
- Register exchange of Coil, Input, Holding Register and Input Register types
- Reading and writing of single and multiple registers
- Volatile support memory with a 1440 byte buffer "Modbus image"

Modbus TCP side (EK-BH1-TP-TCP version)

- Ethernet (IEEE 802.3) communication port, RJ45 connector, cable of at least 5E class
- Modbus master RTU (Remote Terminal Unit) communication
- 0 ... 250 device addressing
- Register exchange of Coil, Input, Holding Register and Input Register types
- Reading and writing of single and multiple registers
- Volatile support memory with a 1440 byte buffer "Modbus image"

BACnet MSTP side (EK-BJ1-TP-MSTP version)

- Serial RS485 communication port galvanically isolated from power supply, line terminator (120 Ohm) to be inserted through 1-way DIP-switch
- BACnet slave communication
- Communication speed from 1200 to 115200 baud
- BACnet registers exchange
- Volatile support memory with a 1440 byte buffer "BACnet image"

BACnet IP side (EK-BJ1-TP-IP version)

- Ethernet (IEEE 802.3) communication port, RJ45 connector, cable of at least 5E class
- BACnet slave communication
- BACnet registers exchange

- Volatile support memory with a 1440 byte buffer "BACnet image"

DMX side (EK-BK1-TP version)

- Serial RS485 communication port galvanically isolated from power supply, Register exchange of Coil, Input, Holding Register and Input Register types
- DMX master communication
- Communication speed 250 kbaud
- 0 ... 512 device addressing
- Writing of 1 byte registers on a maximum of 512 DMX devices

M-Bus side (EK-BM1-TP version)

- M-Bus communication port
- M-Bus communication
- Communication speed from 300 to 9600 baud
- 1 ... 250 device addressing
- Reading and writing of single and multiple registers
- Volatile support memory with a 1440 byte buffer "M-Bus image"

Profinet side (EK-BN1-TP version)

- Ethernet (IEEE 802.3) communication port, RJ45 connector, cable of at least 5E class
- Profinet slave communication
- Profinet registers exchange
- Volatile support memory with a 1440 byte buffer "Profinet image"

KNX side

- KNX TP (Twisted Pair) 9600 baud communication port, galvanically isolated from power supply
- Volatile support memory with a 1440 byte buffer "KNX image"

Ethernet port

- Ethernet (IEEE 802.3) communication port, RJ45 connector, cable of at least 5E class

Technical data

- Power supply: 8...24 Vac or 12...35 Vdc
- Power consumption at 24 Vdc: 3,5 VA

Other characteristics

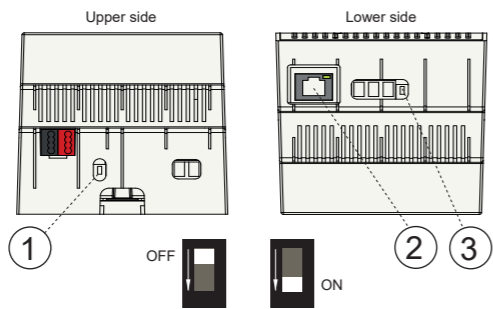
- Housing in plastic material
- Mounting on 35 mm rail (according to EN 60715)
- Protection degree IP20 (installed device)
- Safety class II
- Weight 145 g
- Modular device (1 MU = 18 mm)
- Dimensions 72 x 90 x 60 mm (WxHxD)

Environmental conditions

- Operating temperature: - 5 ... + 85°C
- Storage temperature: - 25 ... + 55°C
- Transport temperature: - 25 ... + 70°C
- Relative humidity: 93% not condensing

Control display and connection elements

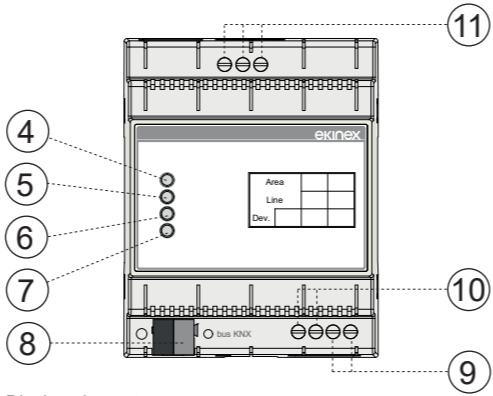
All the versions are provided with LED for status indication, a terminal block for the connection of the KNX bus line and a RJ45 connector for the device configuration through Ethernet. Depending on the version, terminal blocks for connection of a serial RS485 line or a M-Bus line and one or two 1-way DIP-switches may be present.



Control elements

The device may be in 2 operating status: Normal Mode (configuration uploaded and communication running) and Start or Boot mode (configuration missing or in process).

- DIP-switch (1) on the lower side (all the versions)
 - OFF: Normal Mode activated
 - ON: Start or Boot Mode activated
- DIP-switch (3) on the upper side (only for EK-BH1-TP-485, EK-BJ1-TP-MSTP, EK-BK1-TP versions)
 - OFF: open
 - ON: RS485 line terminator inserted (terminal resistance in parallel between RT+ and RT-)



Display elements

- LED (2) green: Ethernet port. In Normal Mode: ON = Ethernet plug connected; OFF = Ethernet plug not connected. In Start Mode: ON = Ethernet plug connected; OFF = Ethernet plug not connected
- LED (4) yellow: Modbus error (for EK-BH1-TP-485 and EK-BH1-TP-TCP versions). In Normal Mode: ON = at least one Modbus request did not receive a correct answer; OFF = no error present. In Start Mode: fast blinking if configuration is missing; very slow blinking (~0,5 Hz) if configuration uploading is in process. Other versions: not used
- LED (5) yellow: Communication on KNX side. In Normal Mode: blinking at telegram receiving. In Boot Mode: fast blinking if configuration is missing; very slow blinking (~0,5 Hz) if configuration uploading is in process
- LED (6) yellow: Communication on Modbus/BACnet/DMX/M-Bus/Profinet side. In Normal Mode: blinking when a telegram is received on the RS485 or Ethernet port. In Start Mode: fast blinking if configuration is missing; very slow blinking (~0,5 Hz) if configuration uploading is in process
- LED (7) green: Device Status. In Normal Mode: slow blinking (~1 Hz). In Start Mode: ON = powered device; OFF = not powered device

Connection elements

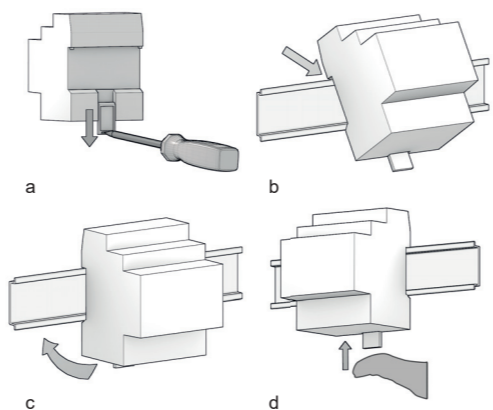
- RJ45 connector (2) for device configuration with Ethernet. In the EK-BH1-TP-TCP, EK-BJ1-TP-IP and EK-BN1-TP versions the Ethernet port is used also for the communication
- Terminal block (8) for connection of a KNX bus line
- Terminal blocks (9) for power supply (all versions)
- Terminal blocks (10) for connection of a M-Bus line (only for EK-BM1-TP... versions)
- Terminal blocks (11) for connection of a serial RS485 line (only for EK-BH1-TP-485, EK-BJ1-TP-MSTP and EK-BK1-TP versions)

Mounting

The device has degree of protection IP20, and is therefore suitable for use in dry interior rooms. The housing is made for rail mounting according to EN 60715 in boards or cabinets for electrical distribution. For the installation of the device on the rail proceed as follows:

- with the aid of a tool bring the locking device in the fully lowered position (a);
- place the upper edge of the rear inner profile on the upper edge of the rail (b);
- rotate the device towards the rail (c);
- push the locking device upward until it stops (d).

Before removing the device, be sure the power supply and the signal networks have been disconnected and the bus terminal has been extracted from its slot. Use a screwdriver to slide down the locking device and remove the device from the rail.



Note. When mounting the device in boards and cabinets it shall be provided the necessary ventilation so that the temperature can be kept within the operating range of the device.

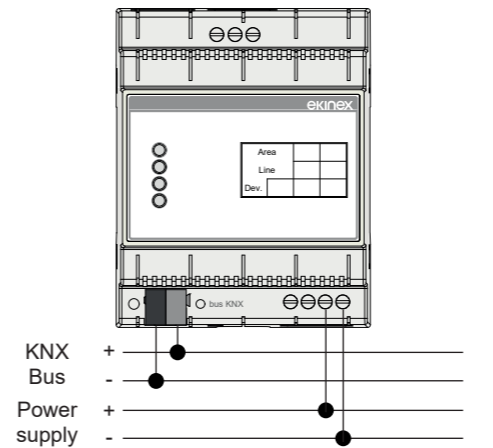
Connection of the KNX bus line

The connection of the KNX bus line is made with the terminal block (8) included in delivery and inserted into the slot of the housing.

Characteristics of the KNX terminal block

- spring clamping of conductors
- 4 seats for conductors for each polarity
- terminal suitable for KNX bus cable with single-wire conductors and diameter between 0.6 and 0.8 mm
- recommended wire stripping approx. 5 mm
- color codification: red = + (positive) bus conductor, black = - (negative) bus conductor

Warning! In order to supply the KNX bus lines use only a KNX bus power supply (e.g. ekinex EK-AB1-TP or EK-AG1-TP). The use of other power supplies can compromise the communication and damage the devices connected to the bus.



Connection of the power supply

The connection of the power supply is made with the terminal blocks (9) located at the bottom. The device supports a wide range of supply voltages, both alternate and direct.

Power supply	Min value [V]	Max value [V]
AC	8	24
DC	12	35

Caratteristiche dei morsetti

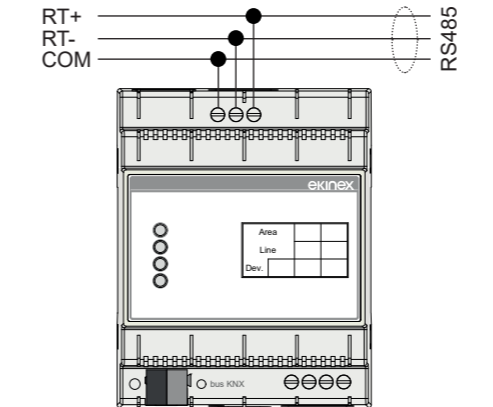
- Screw clamping of conductors
- Maximum cross section of conductor 2,5 mm²
- Recommended wire stripping approx. 6 mm
- Torque max 0,5 Nm

Warning! The electrical connection of the device can be carried out only by qualified personnel. The incorrect installation may result in electric shock or fire. Before making the electrical connections, make sure the power supply has been turned off.

Other connections

Connection to the RS485 bus network

The connection is made with the terminal blocks (10) located on the top. In order to terminate the RS485 line and balance the line impedance, the terminal resistance has to be inserted, setting the 1-way DIP-switch (3) to ON. The maximum extension of the RS485 network is 1200 m.



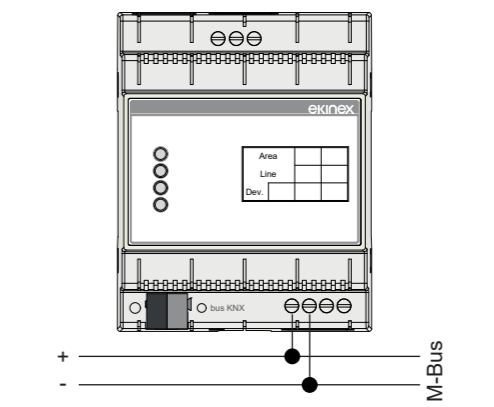
Recommended cables consigliati for RS485 networks

- Belden 8132. 2x28 AWG
- Belden 82842. 2x24 AWG
- Tasker C521. 1x 24 AWG
- Tasker C522. 2x24 AWG

All cables have pairs of twisted wires, foil shielding and braided shield.

Connection to the M-Bus network

The connection of the M-Bus network is made with the terminal blocks (10) located at the bottom. The M-Bus network does not require the insertion of any terminal resistance. The maximum extension of the M-Bus network is 1000 m.



Connection to the Ethernet network

The connection is made with the RJ45 connector (2) located on the upper side.

Configuration

The device is carried out with an application program for PC that communicates through the Ethernet communication port integrated in the device. These activities must be carried out according to the design of the building automation system done by a qualified planner.

Code	Configuration program
EK-BH1-TP-485	CGEKBH1TP485
EK-BH1-TP-TCP	CGEKBH1TPTCP
EK-BJ1-TP-IP	CGEKBJ1TPIP
EK-BJ1-TP-MSTP	CGEKBJ1TPMSTP
EK-BK1-TP	CGEKBK1TP
EK-BM1-TP-20	CGEKBM1TP20
EK-BM1-TP-40	CGEKBM1TP40
EK-BM1-TP-80	CGEKBM1TP80
EK-BM1-TP-160	CGEKBM1TP160
EK-BN1-TP	CGEKBN1TP

Note. To use the configuration software the installation on the PC of the .NET Framework 4.0 system libraries is necessary

System requirements for the application software

- Desktop or laptop PC with Ethernet IEEE 802.3 port
- 32/64 bit operation system, Microsoft Windows® XP, 7, 8.0, 8.1 and 10

For detailed information on configuration options, refer to the application manual of the device available on the website www.ekinex.com.

Warning! In Normal Mode the DIP-switch (1) must stay in OFF position. If switched to ON, switching then off and on the power supply, the device switches automatically to Boot Mode and has to be reprogrammed.

Marks

- CE: the device complies with the Low Voltage Directive (2014 / 35 / UE) and the Electromagnetic Compatibility Directive (2014 / 30 / UE)

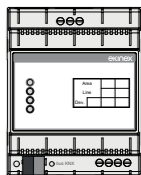
- RoHS: the device complies with the 2002/95/CE Directive restricting the use of hazardous substances in electrical and electronic equipment

Maintenance

The device is maintenance-free. To clean use a dry cloth. It must be avoided the use of solvents or other aggressive substances.

ekinex KNX (TP) gateway

Code: EK-BX1-TP-...



EK-BX1-TP-...

EKINEX S.p.A.

Via Novara 37
I-28010 Vaprio d'Agogna (NO), Italia
Tel. +39 0321 1828980
info@ekinex.com
www.ekinex.com

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Disposal

At the end of its useful life the product described in this datasheet is classified as waste from electronic equipment, and cannot be disposed together with the municipal undifferentiated solid waste.

Warning! Incorrect disposal of this product may cause serious damage to the environment and human health. Please be informed about the correct disposal procedures for waste collecting and processing provided by local authorities.

Warnings

- Installation, electrical connection, configuration and commissioning of the device can only be carried out by qualified personnel in compliance with the applicable technical standards and laws of the respective countries
- Opening the housing of the device causes the immediate end of the warranty period
- In case of tampering, the compliance with the essential requirements of the applicable directives, for which the device has been certified, is no longer guaranteed
- ekinex® defective devices must be returned to the manufacturer at the following address: EKINEX S.p.A. Via Novara 37, I-28010 Vaprio d'Agogna (NO) Italy

Other information

- The instruction sheet must be delivered to the end customer with the project documentation
- 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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