

KNX 4-output 4-input universal I/O module

Code: EK-FH1-TP-I



KNX S-mode bus device for panel mounting, equipped with 4 outputs and 4 digital inputs. The inputs can also be configured as analog inputs for NTC sensors. Use in KNX standard home and building automation systems.



REFLEKTH1TPI

Description

The ekinex® EK-FH1-TP-I universal I/O module is a modular KNX S-mode device for panel mounting with 4 outputs and 4 inputs. The outputs can control single or group electrical loads and motorized drives. To operate, the device receives a telegram from the bus, sent by a KNX sensor or another KNX control device, which determines the opening or closing of one or more relays. Each output uses a bistable relay and can also be controlled either via the KNX bus or manually using the buttons on the front of the device. On the front of the device there are LEDs that indicate the status of each output. The 4 inputs allow the connection to the bus of traditional controls and sensors (not natively communicating on the KNX bus) equipped with potential-free contacts, or passive NTC temperature sensors for the acquisition of air temperature values in indoor environments, therefore it can also be used as a room thermostat for up to 4 independent zones. The device requires only power supply from the KNX bus at 21-30Vdc.

Main functional features

Output

- Switching lights on and off
- Control of motorized drives
- Manual control via buttons on the front
- Status indication of outputs via LEDs
- Configuration as a normally open/closed switch
- Outputs and channels can be set via ETS as independent or with copy function from another output or channel
- Control of ON/OFF valves and three-way valves
- Up to 8 logic functions (AND, OR, XOR, etc.), object comparison and arithmetic
- Block and forcing function for each channel
- Timing: delay in switching on and off, stair light function with warning signal
- Integration into scenarios
- Energy and operating hours counter configurable via bus
- Automatic control of motorized drives for protection from direct sunlight and weather conditions (rain, wind, frost)

Input

- 4 independent digital inputs [DI] for potential-free contacts, for example, for connecting traditional switches or buttons for on/off control of appliances;
- 4 inputs individually configurable as analog [AI] for measuring room temperature using a passive temperature probe (NTC 10 kΩ at 25°C) to be connected to the input with the option of sending the value to the bus and thermostat functionality;
- 2 independent channels (2 coupled inputs), for example, for connecting double buttons to control dimmers or motorized drives;
- on/off control of individual and group appliances;
- detection of the status of signal contacts (from safety devices, alarms, etc.);
- scenario recall and storage;
- sending values (temperature, brightness, etc.) to the bus;
- lock function and shift register function.

Control of motor drives

The actuator can be used to control and command motorized drives dedicated to the movement of shading devices (such as roller shutters, awnings, Venetian blinds or roller shutters) or doors, windows or shutters. In this case, the number of independent channels is half compared to the use as a binary output. In addition to manual control via KNX buttons, the actuator can be programmed to perform a fully automatic control based on information such as the time of day, the intensity of solar radiation, temperature, presence of rain or wind speed; this information is contained in telegrams sent by other devices connected to the KNX bus, such as timers, sensors, weather stations or the ekinex® Delégo supervisor. Operation as an actuator for motorized drives offers additional dedicated functions.

- Complete up and down run
- Partial run with stop in position from 0 to 100 % of the run length
- Setting of position (change during the operation of the preset position)
- Adjustment of the slats inclination (for venetian blinds)
- Integration in scenes
- Automatic control for protection against direct sunlight and weather conditions (wind, rain, frost)
- Lock or forced operation
- Status feedback

The time interval between the change of direction can be set in the planning stage through a corresponding parameter.



Warning! Motor drives can be damaged by sudden and repeated changes of the direction of motion. In order to set the correct time interval for reversing the direction of motion, refer to the technical documentation of the drive.

Technical data

Supply

- Power supply 21-30 Vdc via KNX bus
- Bus current draw at start-up: 54 mA @30 Vdc, 49 mA @21 Vdc
- Bus current draw in stand-by: 10 mA @30 Vdc, 13 mA @21 Vdc
- Bus current draw during relay movement: 32 mA @21-30 Vdc

Output

- Number: 4 independent outputs, 2 combined in channels (depending on use)
- Bistable relays with tungsten pre-contact
- Rated current (I_n) per output: AC 16(6) A @250 Vac (4000 VA); DC 7 A @30 Vdc (210 W)
- Maximum load per output: resistive 4000 W, inductive 1500 VA, LED lamps 90-230 Vac max. 400 W
- Maximum inrush current: 800 A / 200 μ s, 165 A / 20 ms
- Maximum capacitive load: 200 μ F
- Possibility of connecting different phases in adjacent outputs
- Total maximum current in device: 64 A
- Short-circuit protection: not present
- Overload protection: not present
- Connection method: screw terminal block (0.5 Nm torque max.)
- Cable cross-section: 4 mm² / 2 x 2,5 mm² (0,5 mm² min.)
- Common poles for outputs: 1



Note. Electrical lifetime values may change depending on the type of load.

Input

- Number: 4 (2 coupled, depending on use)
- Common poles for inputs: 1
- Input voltage: 3.3 Vdc
- Number of [AI] input with NTC 10 k Ω at 25 °C: 8
- Maximum connection cable length: 100 m. If the length is > 1.5 m, use shielded cable
- Cable cross-section (also for NTC probe): 0.5 mm²

Environmental conditions

- Operating temperature: - 5 ... + 45°C
- Storage temperature: - 25 ... + 55°C
- Transport temperature: - 25 ... + 70°C
- Relative humidity: 95% not condensing

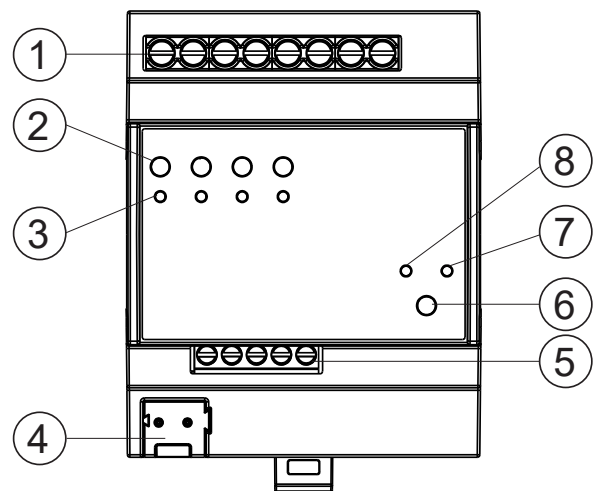
Other characteristics

- Housing in plastic material, 4 UM (1 UM = 18 mm)
- Mounting on 35 mm rail (according to EN 60715)
- Protection degree IP20 (installed device)

- Overvoltage class III (according to EN 60664-1)
- Classification climatic 3K5 and mechanical 3M2 (according to EN 50491-2)
- Pollution degree 2 (according to IEC 60664-1)
- Mechanical lifetime (min. cycles): 3 000 000
- Electrical lifetime (min. cycles): 100000 @8A / 25000 @16 A (Vac)
- Dimensions (LxHxP): 71 x 90 x 63 mm
- Weight: 277 g

Control, signaling and connection elements

The device is equipped with a button, whose short press activates the KNX programming mode and the relative red LED; the long press > 2s of the same button also allows to activate the forced (manual) output control mode, confirmed by the flashing of the green LED. There are buttons for the activation/deactivation of each output, with relative signaling LEDs, terminals for connecting the outputs, the inputs or NTC probes and the KNX bus.



1. Connection terminals for outputs A-1 to B-4
2. Buttons for forced operation of the outputs
3. Green LEDs for indicating the status of the outputs
4. Connection terminal for KNX bus line
5. Connection terminals for inputs 1,2,3,4 / NTC probes
6. Button for switching between forced and automatic operation of the outputs / KNX programming
7. Red LED for indicating KNX programming mode
8. Green LED for indicating the operating mode (on = forced operation, off = automatic operation)

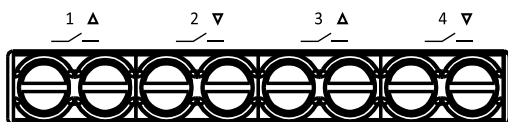
Switching elements

- Pushbuttons (2) for forced operation of the outputs
- Pushbutton (6) for switching between forced operation modes (buttons on the front active) or automatic (buttons on the front inactive) and for the KNX programming mode

Display elements

- Green LEDs (3) for displaying the switching status of the output channels (on = closed contact, off = open contact)
- Red LED (7) for displaying the active operating mode of the device (on = KNX programming, off = normal operation)
- Green LED (8) for displaying the operating mode (on = forced operation, off = automatic operation)

Below is the diagram for the output terminals.



Label	Connection
x Δ x ▽ — — — —	Relay for binary output x (x=1,...,4) or 2-channel actuator

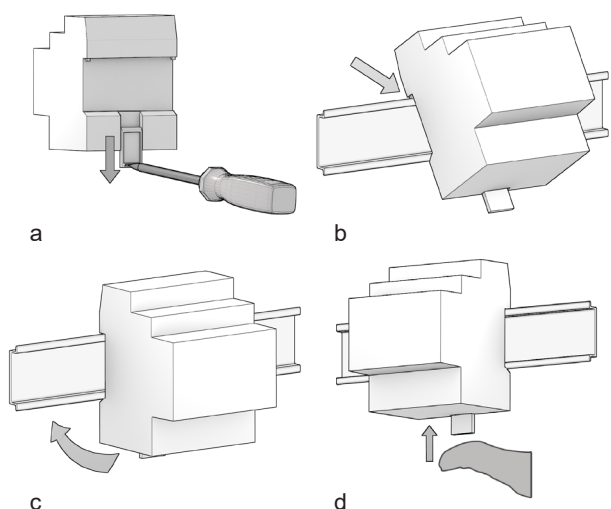
Input terminals:



Label	Connection
X	Input x (x=1,...,4)
C	Common pole

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. The installation is in horizontal position, the correct position is when the KNX bus terminal is located at the bottom of the device. 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).



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.

Before removing the device, be sure that inputs, outputs, and the input power supply have been disconnected. Use a screwdriver to slide down the locking device and remove the device from the rail.



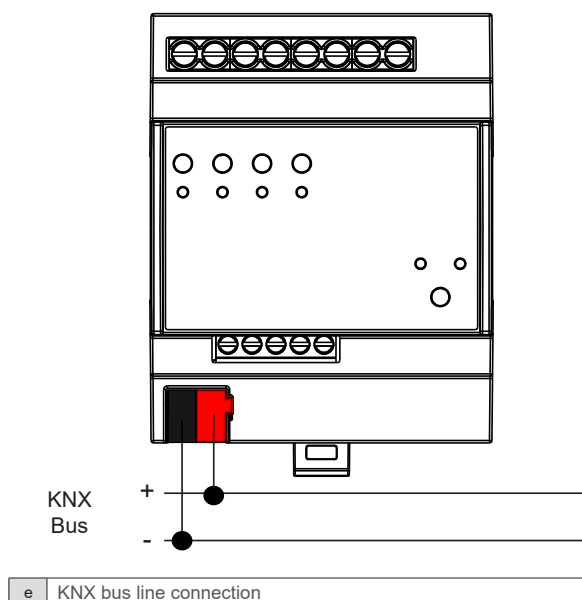
Note. It is recommended that the installation of the device always ensure the full accessibility of the front side to allow the operation of the pushbuttons.

Connection of the KNX bus line

The connection to the bus network takes place via the KNX terminal included in the delivery and inserted in the special housing located on the front of the device in the lower part.

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! To power the KNX bus lines, use exclusively KNX bus power supplies (e.g. ekinex EK-AH1-TP or EK-AM1-TP). The use of other power devices can compromise communication and damage the devices connected to the bus.



Warning! The electrical connection of the appliance must be carried out exclusively by qualified personnel. Incorrect installation can cause electrocution or fire. Before making the electrical connections, make sure you have deactivated the mains voltage.

Connection of the outputs

The connection of the controlled loads (fig. f) is made with the screw terminals located at the top and at the bottom. In case of use as an actuator for the control of motorized drives, the terminals must be used in pairs respecting the combination between the channels indicated in figure “g”.

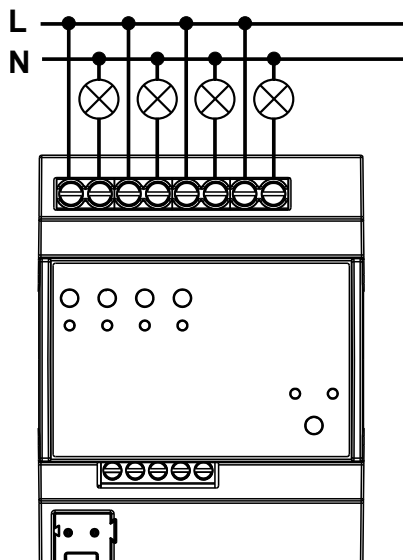


Warning! Sockets controlled via bus must be clearly identified. Controlling loads with mobile installation (e.g. household appliances connected to mains sockets) must be planned and realized with a careful evaluation of the risks that may arise in the case of control without direct visual contact with the load (remote control). Connecting loads different than those planned, remote controlling without direct verification of the current conditions of the connected load or automatic controlling based on scenes or time-scheduling can cause serious damage to people and objects.

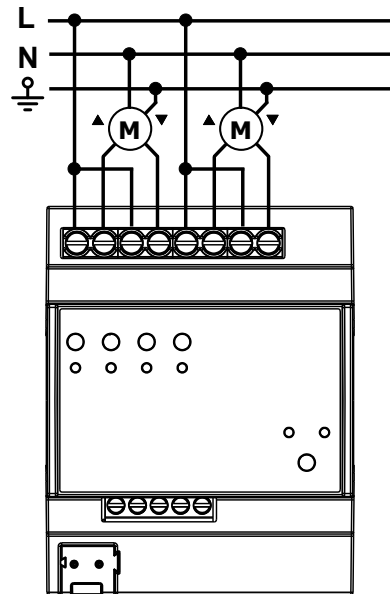
Characteristics of the terminals

- screw clamping of conductors
- maximum cross section of conductor 4 mm² / 2 x 2,5 mm² (0,5 mm² min.)
- recommended wire stripping approx. 6 mm
- torque max 0.5 Nm

The output contacts for the up/down sliding directions are interlocked so that there is no voltage on both at the same time.



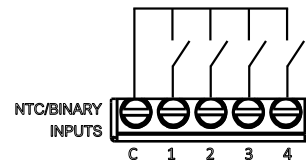
f Connection of the loads (device EK-FH1-TP-I used as 4-fold binary output).



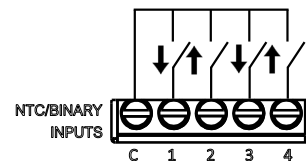
g Connection of the loads (device EK-FH1-TP-I used as 2-fold blind actuator).

Connection of the inputs

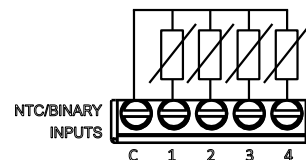
The inputs (fig. h, i, j) are connected via the screw terminals located on the front of the device in the central part.



h Connection as 4 independent inputs (connection of traditional switches or buttons dedicated to the on/off control of utilities).



i Connection as 2 pairs of inputs (e.g., coupled buttons for controlling dimmers or motorized drives). Also connect the outputs as in (g).



j Connection as 4 individually configurable inputs for passive temperature probes (NTC 10 kΩ at 25 °C).

Configuration and commissioning

Configuration and commissioning of the device require the use of the ETS® (Engineering Tool Software) program V5 or later releases. These activities must be carried out according to the design of the building automation system done by a qualified planner.



Note. The configuration and commissioning of KNX devices require specialized skills. To acquire these skills, you should attend the workshops at KNX certified training centers.

Configuration

For the configuration of the device parameters the corresponding application program or the whole ekinex® product database must be loaded in the ETS program. For detailed information on configuration options, refer to the application manual of the device available on the website www.ekinex.com.

Code	Application software (## = release)	Communication objects (max nr.)	Group addresses (max nr.)
EK-FH1-TP-I	APEKFH1TPI##.knxprod	357	254

Commissioning

For commissioning the device the following activities are required:

- make the electrical connections as described above;
- turn on the bus power supply;
- switch the device operation to the programming mode by pressing the programming pushbutton (5) located on the front side of the housing. In this operating mode, the programming LED is turned on;
- download into the device the physical address and the configuration with the ETS® program.

At the end of the download the operation of the device automatically returns to normal mode; in this mode the programming LED is turned off. Now the bus device is programmed and ready for use.

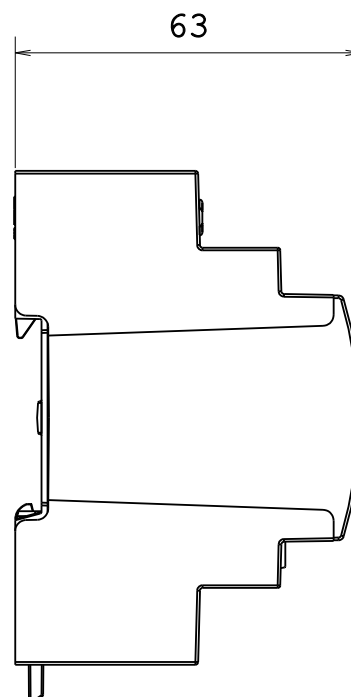
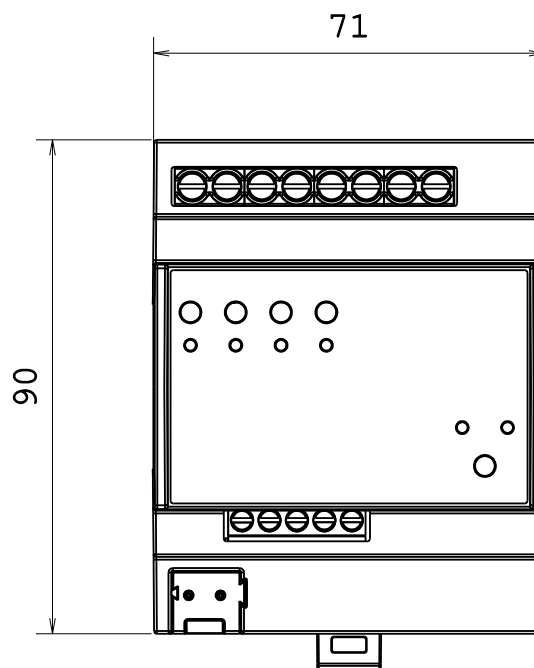
Device reset

To reset the device, press and hold the programming button for at least 10 seconds, until the programming LED flashes quickly: the reset is complete. You will now need to re-address and re-configure the device via ETS.



Warning! The reset operation brings back the device to its factory delivery state. The addressing and value of the parameters set during configuration are lost.

Dimensions [mm]



Marks

- KNX
- CE, UKCA: the device complies with the Electromagnetic Compatibility Directive (2014/30/EU), the Low Voltage Directive (2014/35/EU) and the RoHS 2 Directive (2011/65/EU).
- Reference Standards: EN 63044-5-1:2019, EN 63044-5-2:2019, EN 63044-3:2017, EN 62368-1:2020.

Maintenance

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

Disposal



At the end of its useful life the product described in this datasheet is classified as waste from electronic equipment in accordance with the European Directive 2012/19/EU (WEEE recast), 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.

Document

This technical datasheet refers to the A1.0 release of the ekinex® device code. EK-FH1-TP-I and is available for download on the website www.ekinex.com in PDF format (Portable Data Format).

File name	Device release	Update
STEFH1TPI_EN.pdf	A1.0	07 / 2026

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® KNX 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

- This datasheet 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
- Each ekinex® device has a unique serial number on the label. The serial number can be used by installers or system integrators for documentation purposes and has to be added in each communication addressed to the EKINEX technical support in case of malfunctioning of the device
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