Actuator / controller for electrothermal actuators

Code: EK-HE1-TP

KNX device for control of electrothermal actuators for zone valves in heating and / or cooling systems. It has to be used in KNX installations for control of homes and buildings.

Description
The EK-HE1-TP actuator / controller is an ekinex® KNX S-mode bus device for the control of electrothermal actuators and / or motors for zone valves installed on distribution manifolds of installations with radiant panels or radiators. The 8 output channels use TRIAC to ensure a noiseless command and a high number of cycles. The device may work in combination with NC (normally closed) or NO (normally opened) actuators and may be used in installations with 2 or 4-pipe hydraulic distribution; in the latter application it is possible to interlock the outputs, completely closing the active valve before the opening of the coupled valve, avoiding the mix of heating and cooling conveying fluids. The device is provided with a membrane keypad for manual control of the outputs and LED indicators for the diagnosis of the operation state and of alarms triggered by short-circuit of the outputs or power failure. The device can be configured as simple actuator, in combination with one or more KNX room temperature controllers, or as actuator / controller with acquisition of max 2 temperature values from KNX room temperature sensors. The device integrates a KNX bus communication module and is realized for mounting on a standard 35 mm rail. The device is supplied by the KNX bus and requires an additional 230 Vac or 24 Vac power supply for the electrothermal actuators.

Functional characteristics
- 8 configurable channels for use with NC (normally closed) or NO (normally opened) electrothermal actuators
- Independent configuration of each output channel as actuator or actuator / controller for 2 or 4-pipe systems, channel in parallel or as simple controlled output through communication object
- Detection and reporting of short-circuit through monitoring of the current absorbed by the electrothermal actuators connected to the outputs
- Detection and reporting of lack of supply voltage on the electrothermal actuators connected to the outputs (only if supplied at 230 Vac)
- Selective single channel enabling for only one conduction mode. In systems with radiant floor panels, the function allows to simulate different steps of laying of the pipes depending on the conduction mode in order to achieve a higher cooling power
- Valve protection function (anti-seizure) during long periods of inactivity
- Delayed activation of the outputs (in the range 5-40 s) in order to avoid power-absorption peaks by the electrothermal actuators
- Automatic evaluation of the energy demand, available as a communication object, to activate the thermal generators and / or a circulator
- 4-channel and 4 inputs each channel logic functions, to realize combinatorial building automation logic through AND, OR, NOT and exclusive OR blocks

Other characteristics
- Housing in plastic material
- 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)
- Dimensions 72 x 90 x 70 mm (WxHxD)

Use
The device may be used as simple actuator or as actuator / controller.

Actuator
The device receives controls and parameters via bus by one or more KNX room temperature controllers.
- 8 or 4 ON / OFF or PWM independent outputs respectively for 2-pipe or 4-pipe installations
- Heating / cooling changeover from bus

Actuator / controller
The device receives the temperature value via bus by one or more KNX temperature sensors.
- 8 independent regulators (2-pipe systems) or 4 independent regulators (4-pipe systems), ON / OFF or PWM
- Heating / cooling changeover from the bus (2 or 4-pipe systems) or automatic switching based on the room temperature (4-pipe systems)
- Management with single setpoint or absolute or relative setpoint with that may be activated through the HVAC system mode
- Acquisition of two room temperature values received via bus from other KNX devices with calculation of a weighted average
- Surface temperature limiting function through value received from the bus for heating applications with radiant panels
- Anti-condensation protection function through sensor status received from the bus for cooling applications with radiant panels
- Energy saving functions with limitations and / or extension of comfort mode, with status received via bus from window contacts or presence sensors
Technical data
Power supply
- 30 Vdc from bus (electronics)
- 230 Vac 50/60 Hz or 24 Vac (loads)
- Current consumption from bus < 30 mA
- Power consumption from bus 720 mW

TRIAC outputs
- Nr: 8 independent (2-pipe systems)
  - 4 coupled (4-pipe systems)
- Max current \(I_{\text{max}}\): 2(1) A
- Max 4 electrothermal actuators in parallel for each TRIAC output 0,5(0,3) A max

Environmental conditions
- Operating temperature: 0 ... + 55°C
- Storage temperature: - 25 ... + 55°C
- Transport temperature: - 25 ... + 70°C
- Relative humidity: 95% not condensing

Note. For controlling loads different than electrothermal drives and servomotors for zone valve or loads with rated current higher than the maximum current, interface relays must be used.

Switching, display and connection elements
The device is provided with a membrane front keypad with signalling LEDs and pushbuttons, programming LED and pushbutton, a terminal for connecting the KNX bus line and screw terminals for connecting the power supply and the outputs.

Signalling LED

<table>
<thead>
<tr>
<th>LED</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single channel</td>
<td>on</td>
<td>Presence of power supply</td>
</tr>
<tr>
<td></td>
<td>off</td>
<td>Absence of power supply</td>
</tr>
<tr>
<td>Group of 4 channels</td>
<td>slow blinking (1 s)</td>
<td>Absence of power supply for a 4-channels group</td>
</tr>
<tr>
<td>Single channel</td>
<td>fast blinking (1 / 4 s)</td>
<td>Short-circuit alarm*</td>
</tr>
<tr>
<td>Pushbutton manual / automatic</td>
<td>on</td>
<td>Manual mode active</td>
</tr>
<tr>
<td></td>
<td>off</td>
<td>Automatic mode active</td>
</tr>
</tbody>
</table>

*) To acknowledge a short-circuit alarm, keep pressed the corresponding pushbutton for a time > 3 s.

Note. Use only servomotors for zone valve equipped with stroke-end microswitches.

Terminal blocks for power supply and outputs

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Sign</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1A</td>
<td>TRIAC output for valve drive</td>
</tr>
<tr>
<td>2</td>
<td>1B</td>
<td>TRIAC output for valve drive</td>
</tr>
<tr>
<td>3</td>
<td>2A</td>
<td>TRIAC output for valve drive</td>
</tr>
<tr>
<td>4</td>
<td>2B</td>
<td>TRIAC output for valve drive</td>
</tr>
<tr>
<td>9</td>
<td>3A</td>
<td>TRIAC output for valve drive</td>
</tr>
<tr>
<td>10</td>
<td>3B</td>
<td>TRIAC output for valve drive</td>
</tr>
<tr>
<td>11</td>
<td>4A</td>
<td>TRIAC output for valve drive</td>
</tr>
<tr>
<td>12</td>
<td>4B</td>
<td>TRIAC output for valve drive</td>
</tr>
<tr>
<td>6, 14</td>
<td>L</td>
<td>Power supply phase (230 Vac or 24 Vac)</td>
</tr>
<tr>
<td>7, 8, 15, 16</td>
<td>N</td>
<td>Power supply neutral (230 Vac or 24 Vac)</td>
</tr>
</tbody>
</table>

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 correct mounting is when the KNX bus terminal is located at the bottom. When installing be sure to leave accessible only the front panel; all other sides must not be accessible.

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 (1);
- place the upper edge of the rear inner profile on the upper edge of the rail (2);
Connection of the power supply
The connection of the 230 Vac or 24 Vac power supply is made with the screw terminals (L, N) located at the top front of the device.

Characteristics of the terminals
• 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.

Connection of the outputs
The connection of the outputs is made with the screw terminals located at the top front of the device.

Characteristics of the terminals
• screw clamping of conductors
• maximum cross section of conductor 2.5 mm² (single-wire) or 1.5 mm² (multi-wire)
• recommended wire stripping approx. 6 mm
• torque max 0.8 Nm

To reduce the total starting current, in case of simultaneous activation of two or more output channels, it is preferable to enable the delayed start function during configuration via the ETS; in this case, each output channel is activated with a delay time after the previous channel. The delay is adjustable in the range 5 … 40 s and is equal for all channels.

Warning! The number of electrothermal actuators that can be connected in parallel to each output is limited by the rated current and the starting current of the device. Carefully check the information on the technical documentation of the manufacturer of actuators.

Connection in 4-pipe systems

Warning! In order to supply the KNX bus lines use only KNX bus power supplies (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.
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.

Reset of the device
To reset the device remove the bus connection by extracting the bus terminal from its seat. Keeping pressed the programming pushbutton, reinsert the bus terminal in his seat; the programming LED blinks fast. Release the programming button and remove the bus terminal again; the reset was carried out. Now you need to address and configure again the device via ETS.

Warning! The reset restores the device back to the state of delivery from the factory. The address and the value of the parameters set during configuration will be lost.

Dimensions [mm]

Marks
- KNX

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

Connection in 2-pipe systems

Configuration and commissioning
Configuration and commissioning of the device require the use of the ETS® (Engineering Tool Software) program V4 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.

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 located on the front side of the housing. In this mode of operation, the programming LED is turned on;
- download into the device the physical address and the configuration with the ETS® program.

Note. When using in installations with 4-pipe hydraulic distribution, the outputs have to be used respecting the coupling between the channel pairs 1A-1B, 2A-2B, 3A-3B, 4A-4B.

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.

Disposal
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.
Documentation
This datasheet refers to the release A1.0 of the ekinex® device EK-HE1-TP, and is available for download at www.ekinex.com as a PDF (Portable Data Format) file.

<table>
<thead>
<tr>
<th>File name</th>
<th>Device release</th>
<th>Updating</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEKHE1TP_IT.pdf</td>
<td>A1.0</td>
<td>11 / 2016</td>
</tr>
</tbody>
</table>

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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