# KNX bus power supply 1280 mA with 30 Vdc auxiliary output

Product code: EK-AM1-TP

Datasheet STEKAM1TP_EN

KNX device with function of power supply for a bus line with auxiliary output. It has to be used in KNX installations for control of homes and buildings.


## Description

The ekinex® power supply EK-AM1-TP is a KNX device for rail mounting which produces and monitors the 30 Vdc voltage required to operate the bus system. It has a 30 Vdc additional output, which can be used as a SELV (safety extra low voltage) auxiliary power for bus devices. The device has an integrated choke which provides the decoupling between the power supply and the information on the bus line. On a KNX bus line can be connected up to 256 KNX bus devices. The output is protected from overload, short circuit and overvoltage. The total current absorbed by the two outputs (KNX bus and auxiliary) cannot exceed 1280 mA. The device can support short interruptions of the mains voltage (max 200 ms at full load).

## Functions

- 30 Vdc SELV power supply for a KNX bus line with max 256 connected devices (depending on the current consumption of each device)
- Auxiliary power supply 30 Vdc
- Reset of the connected bus line with a dedicated pushbutton
- LED indicators for normal operation, bus reset and bus overload
- Protections: overload, short circuit, overvoltage
- Cooling by free air convection

## Main characteristics

- Housing in plastic material
- Mounting on 35 mm rail (according to EN 60715)
- Protection degree IP20 (installed device)
- Isolation class I
- Safety class II
- Overvoltage cathegory III (according to EN 61558, EN 50178, altitude up to 2000 m. s.l.m.)
- 4 modular units (1 UM = 18 mm)
- Dimensions 72 x 90 x 70 mm (WxHxD)
- Weight: 296 g

Environmental conditions

- Operating temperature: - 30 ~ + 70°C
- Storage temperature: - 40 ~ + 85°C
- Working humidity: 20 ~ 95% RH not condensing
- Storage humidity: 10 ~ 95% RH not condensing

## Technical data

Power supply

- Mains voltage range 180 ~ 264 Vac, 176 ~ 280 Vdc
- Frequency range 47 ~ 63 Hz
- Power consumption 38.4 W
- Input AC current (typical) 0.5 A @ 230 Vac
- Inrush current (typical): cold start 60 A ($t_{width}$=1200 µs measured at 50% $I_{peak}$) @ 230 Vac
- Leakage current: < 1 mA @ 240 Vac

Outputs

- Bus line voltage: 30 Vdc SELV
- Auxiliary voltage: 30 Vdc SELV
- Rated current (total outputs): 1280 mA
- Short circuit current: 2.8 A
- Setup, rise time: 1000 ms, 50 ms @ 230 Vac at full load
- Ripple & noise (max): 100 mVp-p (*)
- AC mains failure back-up time (typical): 200 ms @ 230 Vac at full load
- Bus line connection: KNX terminal block (black/red) included in delivery
- Auxiliary output connection: dedicated screw terminal block

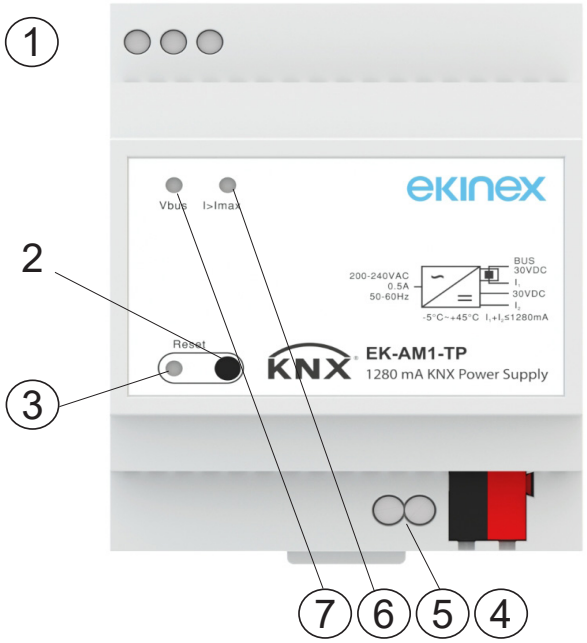
(*) Note: Ripple & noise are measured al 20 MHz of bandwidth by using a 12'' twisted pair-wire terminated with a 0,1 µF and 47 µF parallel capacitor. The measure is done before the decoupling choke.

Protections

- Overload: 205 ~ 235% rated output power. Protection type: constant current limiting, recovers automatically after fault condition is removed
- Overvoltage: 33 ~ 35 V. Protection type : Hiccup mode, recovers automatically after fault condition is removed

Safety and EMC

- Safety standards: EN 61558-1, EN 61558-2-16; EN 50491-3
- Withstand voltage I/P-O/P: 4, 2KVAC I/P-FG: 2KVAC
- Isolation resistance: I/P-O/P, I/P-FG: 100 MΩ @ 500 Vdc @ 25 °C @ 70% RH
- EMC emission: compliance to BS EN 50491-5-2, -5-3; BS EN 61000-3-2, -3-3
- EMC immunity: compliance to BS EN 50491-5-2, -5-3; BS EN 61000-4-2, 3, 4, 5, 6, 8, 11.




1) Terminal blocks for input power supply 180 ~ 264 Vac, 176 ~ 280 Vdc
2) Reset pushbutton
3) Reset LED (red)
4) Terminal block for KNX bus line
5) Terminal block for auxiliary 30 Vdc output
6) KNX output voltage LED (green/orange/red)
7) Output current LED (green/orange/red)

## Switching, display and connection elements

The device is equipped with a reset pushbutton, 3 LEDs and terminal blocks for mains voltage 180 ~ 264 Vac (or 176 ~ 280 Vdc), KNX bus line and auxiliary output.

The LEDs behaviour is as follows:

| LED | Type | LED colour / display | Meaning |
|---|---|---|---|
| 3 | KNX reset | Red / solid | KNX bus restart |
| 6 | KNX output voltage, $V_{bus}$ | Green / solid | 28 < $V_{bus}$ < 31 Vdc |
| | | Orange / solid | $V_{bus}$ < 28 Vdc |
| | | Red / solid | $V_{bus}$ > 31 Vdc |
| 7 | Output current, I > $I_{max}$ | Green / solid | I < 1280 mA |
| | | Orange / solid | I = 1280mA ~ 1600mA |
| | | Red / solid | I > 1600mA (overload) |

## Planning

Planning a KNX bus installation, the use of a 1280 mA power supply unit requires to take into account the following guidelines:

- the maximum number of bus devices connected is 256;
- the maximum length of a line segment is 350 m, measured along the line between the power supply and the furthest bus device;
- the maximum distance between two bus devices cannot exceed 700 m;
- the maximum length of a bus line is 1000 m, keeping into account all segments.

At the same bus line can be connected not more than two power supplies. A second power supply may be necessary when the installation in distribution boards requires a particular concentration of the bus devices (tipically more than 30 units installed within 10 m). In this case a power supply has to be installed near the group of devices. Between two power supplies installed on the same bus line a minimum distance of 200 m is required, measured along the line.

***Warning!*** *In order to supply the KNX bus lines use only KNX bus power suppliers. The use of different power suppliy units can compromise the communication and damage the devices connected to the bus.*

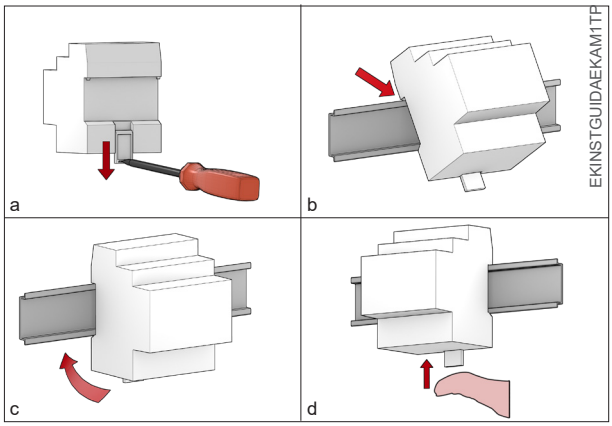
## Mounting

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 terminals for KNX bus line and auxiliary output are located at the bottom and the terminals ( ⏚ , L, N) for connecting the input mains power supply Vac, Vdc are located at the top. For the installation of the device on the rail proceed as follows:

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.*




***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.*

Before removing the device, be sure the inputs 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.

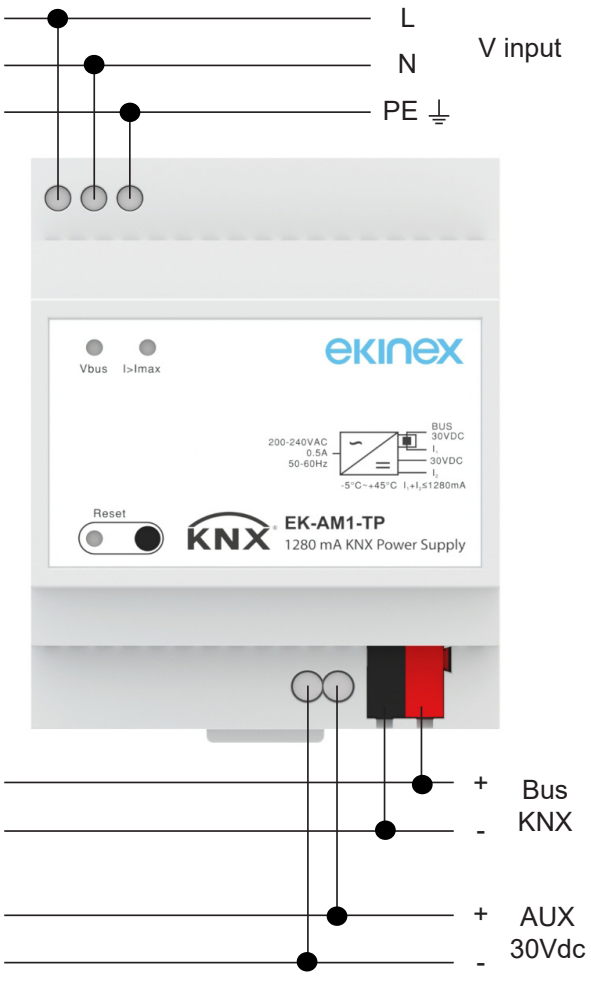
## Electrical connections

Input main supply

The connection to the input main supply 180 ~ 264 Vac, 176 ~ 280 Vdc is made with screw terminals ( ⏚ , L, N) located on the upper front of the device.

Characteristics of the terminal blocks:

- screw clamping of conductors (use a slotted screwdriver 2.5*0.4-3.5*0.6)
- Conductor wiring size: 0.5 ~ 4.0 mm solid core or 0.5 ~ 2.5mm finely stranded
- recommended wire stripping approx. 6 mm
- torque max 0.8 Nm




KNX bus line

The connection to the KNX bus line is made with the terminal block (black/red) included in delivery and inserted into the slot located on the left bottom part of the front. 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 (20 ~ 22AWG)
- recommended wire stripping approx. 5 mm
- color codification: red = + (positive) bus conductor, black = - (negative) bus conductor

Auxiliary output

The 30 Vdc auxiliary output has a dedicated connection screw terminal block.

Characteristics of the terminal block for the auxiliary output:

- screw clamping of conductors
- conductor wiring size: solid 0.5 ~ 4.0 mm2 or stranded 0.5 ~ 2.5 mm2 (12 ~ 26AWG)
- recommended wire stripping approx. 6 mm
- torque max 0.8 Nm

For the connection of the auxiliary output and the powered devices it is recommended to use a cable with a sheath of a different color than the cable connecting the KNX bus line.

***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.*

## Configuration and commissioning

Configuration

The device does not require any configuration with ETS® (Engineering Tool Software) tool. The application softwares APEKAM1TP##.knxprod (## = version) is available in order to add the power supply to an ETS project.

Commissioning

For the commissioning of the device turn on the input mains power supply to which the device is connected. The LED marked “Vbus” solid green indicates the device operating in the normal range.

## Reset

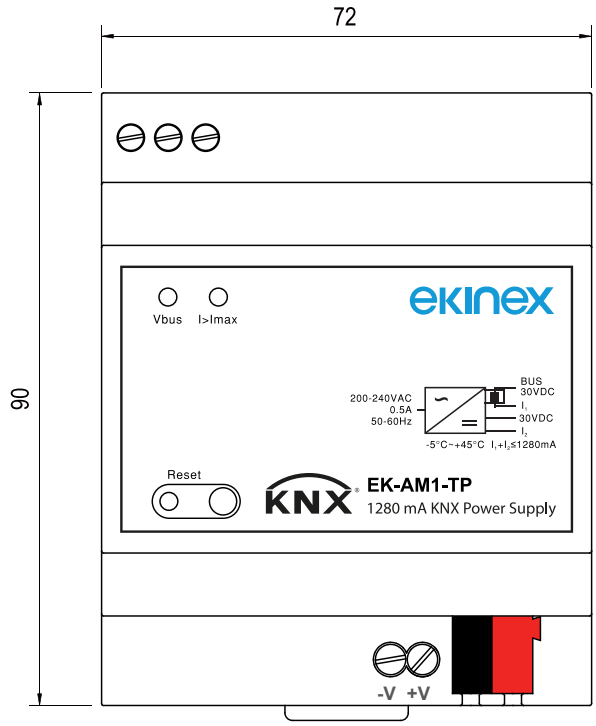
The device has a reset pushbutton. By keeping it pressed for at least 20 seconds, the bus line is not powered for 20 seconds and the bus devices connected are restored to their original condition. During this interval of time the reset LED (red) is turned permanently on.

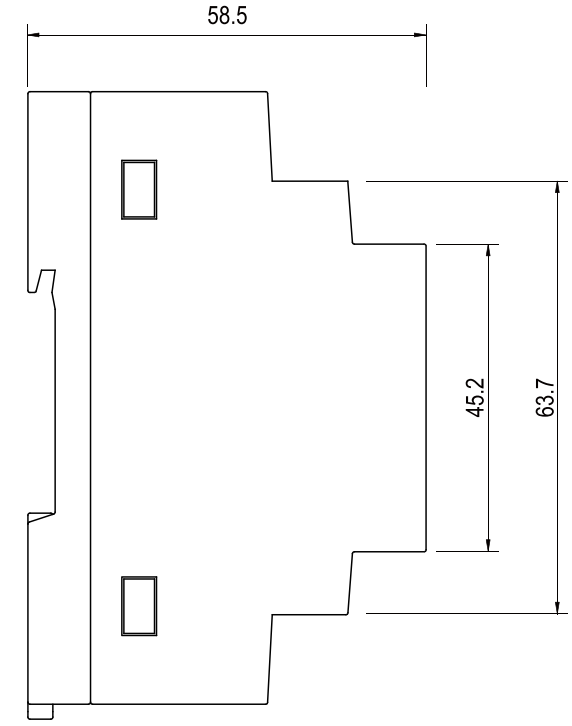
## Failure

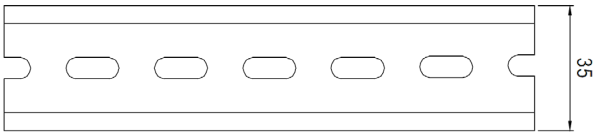
When the LED labeled “I > Imax”, is turned on solid orange or red, this means that the KNX output is overloaded or short-circuited. The problem can be solved by removing the cause of the short circuit or by reducing the number of KNX devices connected to the line. After the removal of the problem only the green LED “$V_{bus}$” is turned on, at this time it is recommended to reset the line.

***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.*

## Dimensions [mm]




## Marks

- KNX
- CE: the device complies with the Low Voltage Directive (2014/35/EU) and the Electromagnetic Compatibility Directive (2014/30/EU).
- Tests carried out according to BS EN 61558-1:2005+A1:2009, BS EN 61558-2-16:2009+A1:2013, BS EN 50491-5-2:2010, BS EN 50491-5-3:2010, BS EN 61000-3-2:2014, BS EN 61000-3-3:2013, BS EN 61000-4-2, 3, 4, 5, 6, 8, 11

## 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/UE (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.*

## Documentation

This datasheet refers to the release A1.0 of the ekinex® device EK-AM1-TP and it is available for download at www.ekinex.com as a PDF (Portable Data Format) file.

| File name | Device release | Updating |
|---|---|---|
| STEKAM1TP_EN.pdf | 1.0 | 04 / 2022 |

## Warnings

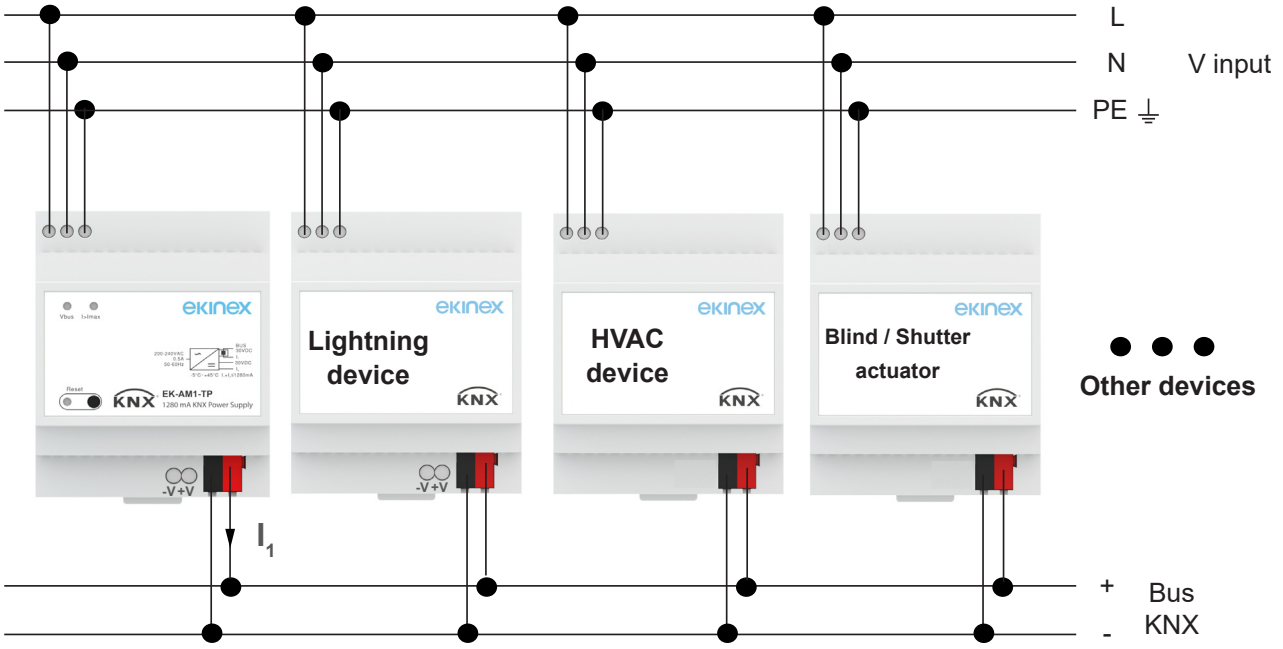
- Installation, electrical connection, configuration and commissioning of the device can only be carried out by qualified personnel in compliance with the applicable technical standards and laws of the respective countries
- The use of the device in security applications is not allowed.The device may however be used for auxiliary signaling functions
- 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
- KNX® and ETS® are registered trademarks of KNX Association cvba, Brussels

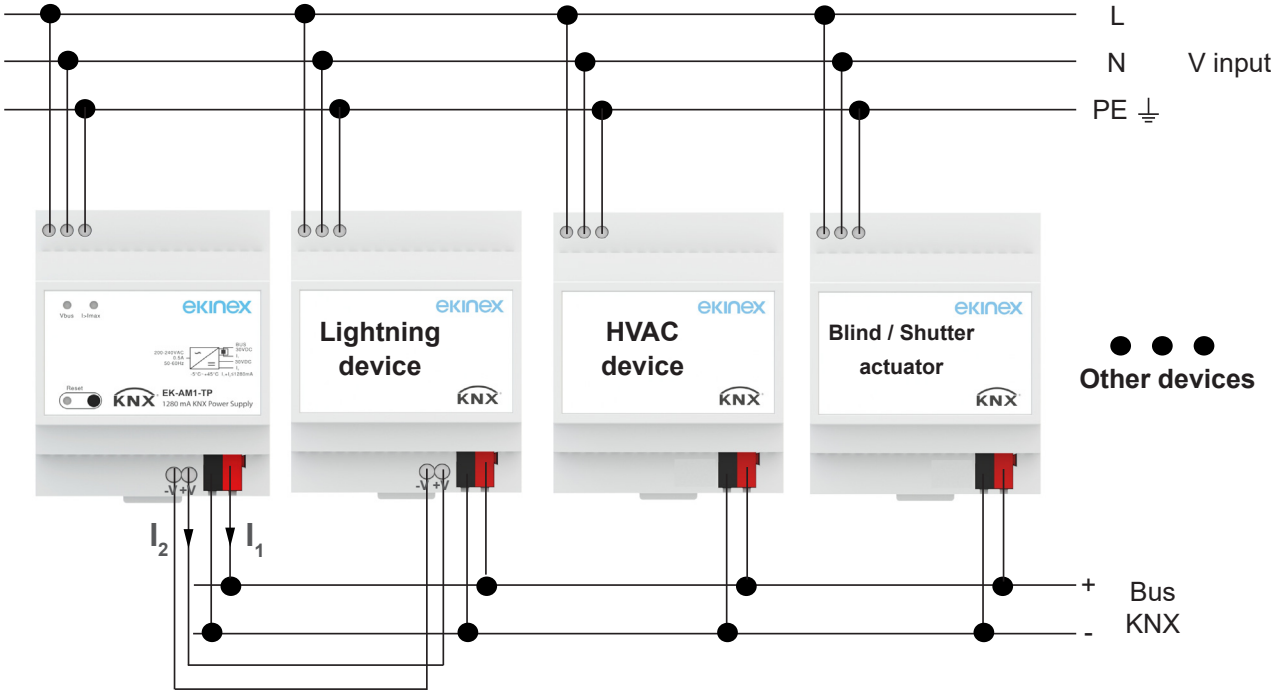
## Annex 1 - Powering KNX bus only




Bus wiring consideration:

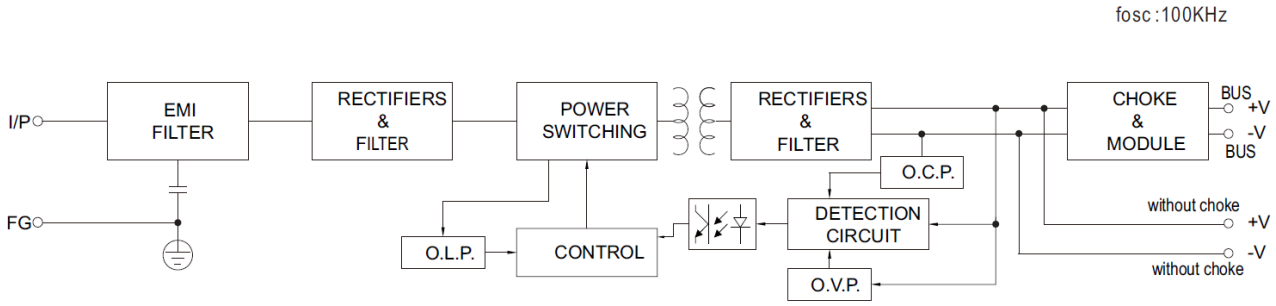
- the maximum number of bus devices connected is 256 for TP1-256 topology;
- the maximum length of a line segment is 350 m, measured along the line between the power supply and the furthest device bus;
- the maximum distance between two bus devices cannot exceed 700 m;
- the maximum length of a bus line is 1000 m, keeping into account all segments;
- It is possible to connect two EK-AM1-TP in parallel with the following conditions: two chokes installed in one line with at least 200m apart.

## Annex 2 - Powering KNX bus and KNX devices

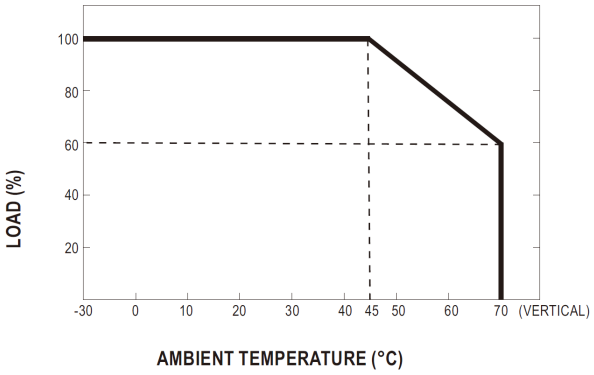



- Use the auxiliary output of EK-AM1-TP only to power the KNX device;
- The total current $I_1$+$I_2$ should be equal or less than 1280 mA;
- The above bus wiring consideration (Annex 1) is still applicable.

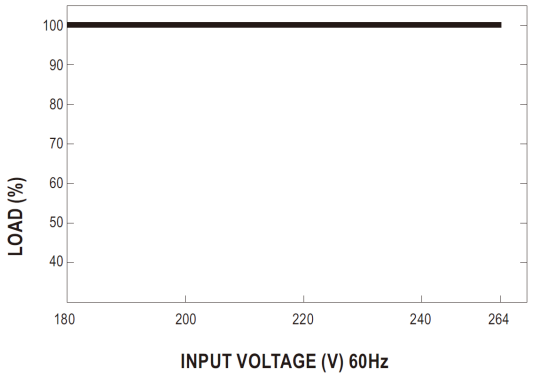
## Annex 3 - Block diagram




## Annex 4 - Characteristics




Derating curve




Static characteristics