

Operation and installation manual

KNX PowerSupply USB 367

(Art. # 5219)

640 mA power supply for KNX bus with integrated bus choke, KNX node, diagnostic / logic functions and USB Interface



KNX PowerSupply USB 367

Application

The KNX PowerSupply USB 367 is a 640 mA power supply with high efficiency and a small footprint of only 4 units (72 mm). The device has a bus choke and additionally provides an output for auxiliary power. An integrated USB Interface (connector Micro USB) allows the easy connection of a laptop or PC.

The integrated KNX node monitors output current, bus voltage and the temperature in the enclosure. Various logic functions complete the feature set of this device. The configuration is done with the ETS®. An easy to read OLED display on the front panel enables you to display the operating parameters locally on the device.

USB Interface

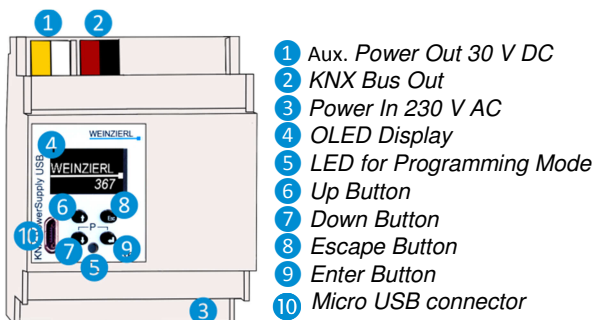
The KNX Power Supply USB 367 has an integrated KNX USB Interface for bus access. It is used for programming with ETS® (ETS3 or higher).

Via the integrated USB interface the KNX Power Supply USB 367 can be programmed locally with ETS5.5 (or higher).

The integrated USB interface supports KNX Long frames for a faster download in KNX devices that support long frames.

Installation and Connection

The KNX PS USB 367 is designed for installation on DIN rail with a width of 4 units (72 mm). It features the following controls (6 7 8 9) and displays (4 5):



Mains connection

When connecting the mains voltage, the protective conductor (PE) must be connected, as it is used to equalize the potential of the bus voltage.

Output bus voltage (KNX)

The bus voltage is used to supply KNX devices for the medium twisted pair. The integrated bus choke separates the DC supply voltage from the bus signals.

Output auxiliary voltage (30 V)

This output is used to supply additional equipment. The output is galvanically connected to the bus voltage, but is not at the same potential. This means that "minus" bus and "minus" of the auxiliary voltage are not the same and must not be connected to each other. If required, the auxiliary voltage can be routed to the load via the second wire pair (yellow / white) of the KNX cable.

All data on the output current relate, unless otherwise stated, to the sum of the currents of bus voltage and auxiliary voltage.

Access of settings/status

The settings/status of the device can be accessed/viewed via

1. Direct setting/status display on the device (partly)
2. ETS (Version 4.2 or higher)



The KNX Programming Mode is activated/deactivated by simultaneously pressing the buttons 7 9 – when activated the programming LED 5 lights up. Thanks to the integrated USB interface a laptop or PC can be connected via the micro USB connector.

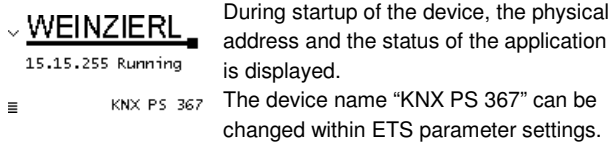
Programming and status LED 5

The red LED on the front panel is used to display the KNX programming mode and errors. The LED can have the following states:

- *LED off: The programming mode is not active and there is no error (normal operating mode).*
- *LED lights up: The programming mode is active, any errors are not visualized/notified by the LED, but can be read on the display.*
- *LED flashes quickly: The programming mode is not active. The rapid flashing indicates one of the following faults:*
 - *Overload (sum of the current of auxiliary and Bus power)*
 - *The device is not loaded correctly, for example, cancelled a download.*

1. Direct setting/status display on device

A. Startup and idle display



The status can be one of the following values:

- **Running:** Application is loaded and running
- **Stopped:** The application is stopped- **5** LED for Programming Mode is flashing
- **Unloaded:** The application is not loaded - **5** LED for Programming Mode is flashing
- **Loading:** The application is currently loading
- **Overload:** The output current is above the max. limit (900mA) - **5** LED for Programming Mode is flashing
- **USB:** USB Connection established
- **USB local:** local download via USB is executed

The power supply functionality (KNX and auxiliary voltage) is not dependent whether the application is running or not.

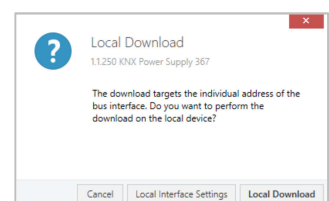
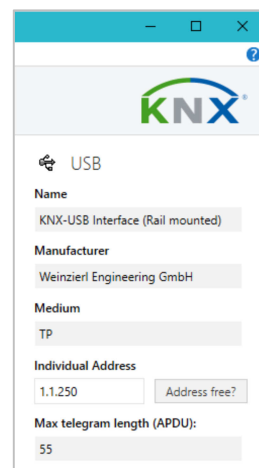
i After 10 minutes of inactivity the display will turn into screensaver mode (blank screen with a bouncing dot) to save display life time. Press any key to turn the display on again. The activation of the display can be synchronized between all devices of this device line of Weinzierl via a group object. See parameter section for details.

Local download via USB

The internal application can be loaded both with an additional interface via the KNX bus or locally via the integrated USB interface. When using an additional interface the download is done conventionally but there may not be any USB connection on KNX Power Supply USB 367.

For local download via the integrated USB interface, the following differences should be noted:

Reaction with the ETS 5.5	
via ETS menu "connection/interfaces"	
Physical address	Possible without programming mode but no automatic adoption into ETS project (see picture of ETS below)
via project "programming"	
Physical address & application program	The complete download is executed over the bus at slow speed. The change of the physical address may not be taken over with the connection and may cause inconsistencies later on.
Partial	The download is executed automatically at high speed.
Physical address	The download is executed over the bus. The change of the physical address may not be taken over with the connection.
Application program	The download is executed automatically at high speed.

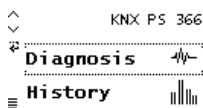


Local download in the ETS 5.5

Setting of local addresses in the ETS menu "connection / Interfaces"

i The integrated USB Interface does not support the bus monitor mode.

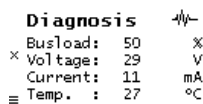
B. Main Menu



By pressing **7** (arrow down) you enter the main menu of the device. By pressing **9** (enter) you enter the submenu. Within the menus you can use **6** (arrow up) and **7** (arrow down) for navigation; **9** (enter) is for confirmation and **8** (escape) is to cancel / go back / one level higher.

Diagnosis <-> History <-> Functions <-> Bus Errors <-> Bus Reset <-> System Info <-> Dev Reset <-> Contrast

C. Submenu Diagnosis



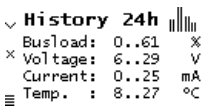
This submenu shows actual values of **busload** (%), **voltage** (V), **current** (mA), and **temperature** (°C).

The busload is an indication of number of telegrams in a time span.

A value of 100 % busload is achieved by about 50 telegrams per second (Group Value Write, 1 Byte data). Voltage is the bus voltage, current the sum of bus and auxiliary current.

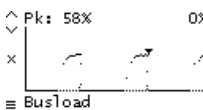
The temperature is measured within the device and can reach up to 100°C.

D. Submenu History

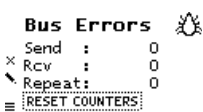


History displays the value range (min and max) for **busload**, **voltage**, **current** and **temperature** over the last 24 hours.

By pressing the **7** (arrow down) several times a graphical visualization for each value is displayed: for busload, voltage, current, and temperature. To go back to the main menu, press **8** (escape). The time span of each graph is approximately 2 minutes.



E. Submenu Bus Errors

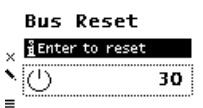


In this submenu, you can display **bus errors** and reset the bus error counters by pressing **9** (enter).

The following errors are counted:

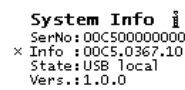
- **Send errors:** Send failed after final repetition due to missing ACK, NACK or BUSY.
- **Receive errors:** Misformed telegrams or telegram fragments received.
- **Repetitions:** Number of received repeated telegrams. Also own repetitions are counted.

F. Submenu Bus Reset



This submenu allows you to reset the KNX Bus line. Press **9** (enter) to switch off the KNX voltage. The default reset time is 30 seconds. To stop the countdown, press **8** (escape)

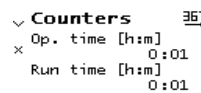
G. Submenu System Info



This submenu displays **information about the device:** serial number (SN), App ID, App status (App ST), and Firmware Revision (Fw Rev).

H. Sub menu Counters

The operating status is logged automatically in the device and can be viewed in this sub menu. All times as displayed in the format "h:m".



Operation Time: summed up the complete operation time of the device

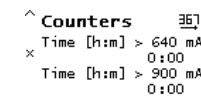
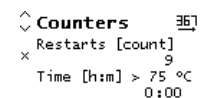
Run time: Time since the last device reboot; counter starts new when device is powered on

Restarts: Number of restarts; timer counts up when device is powered on

Time > 75°C: summed up operation time with in-device temperature above 75°C

Time > 640mA: summed up operation time with current load over 640mA; current load of both outputs is logged

Time > 900mA: summed up operation time with current load over 640mA; current load of both outputs is logged



To extend the lifespan of the internal memory the counter writes the log files only every 6 hours. Thus the log files may be lower if the device power was cut during the logging.

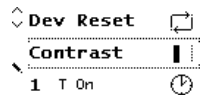
I. Submenu Device Reset



This submenu allows you to restart the device or to **reset to factory settings** (master reset). Select one option and keep **9** pressed until the small animation is finished and the option is executed.

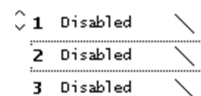
Master reset will make a new ETS application download necessary.

J. Submenu Contrast

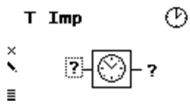


To set the contrast of the display, select this entry in the menu. By pressing **9** (enter) several times you can set the contrast to different levels.

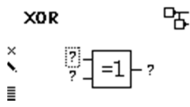
K. Submenu Timer and Logic functions



The device supports **up to 16 Timer and Logic functions**. These functions have to be defined within ETS parameter settings. After application download, the freely selectable function label will be shown in each function menu entry as well as within the function submenu as headline.

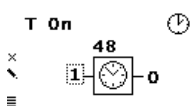


All logical inputs and outputs correspond with a group object. The current values are shown in the graphical representation. A question mark (?) is shown if the value is not yet valid because it was not yet received from bus or is not yet sent to the bus.



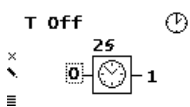
A logical gate sends output values only if all input values are valid. Within the function submenus, each input of the function can be set / reset by pressing the 9 (enter) button for testing purpose. The associated group telegram of the output will then be sent on the bus. Use 6 (arrow up) and 7 (arrow down) to navigate between the inputs.

L. Timer Switch-on delay



Timer that switches ON after defined duration (in seconds, set via the ETS). After pressing 9 (enter) countdown will start. To stop countdown, press 9 (enter) again during countdown.

M. Timer Switch-off delay



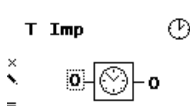
Timer that switches OFF after defined duration (in seconds, set via the ETS). After pressing 9 (enter) countdown will start. To stop countdown, press 9 (enter) again during countdown.

N. Timer Switch-on and -off delay



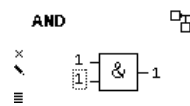
Timer that switches ON & OFF after defined duration (in seconds, set via the ETS). After pressing 9 (enter) countdown will start and the timer will turn on. After first countdown is finished, press 9 (enter) again to start countdown to turn off. To stop countdown, press 9 (enter) again during countdown.

O. Timer Impulse (Staircase function)



Timer with impulse that – after being switched ON – automatically switches OFF after a defined duration (in seconds, set via the ETS). Press 9 (enter) to start impulse timer. To stop a countdown, press 9 (enter) again during countdown.

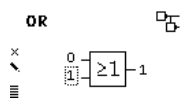
P. Logic AND gate



The output is triggered on (1) if both inputs are switched on (1).

Input A	Input B	Output
0	0	0
0	1	0
1	0	0
1	1	1

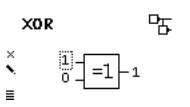
Q. Logic OR gate



The output is triggered on (1) if one or both inputs are switched on (1).

Input A	Input B	Output
0	0	0
0	1	1
1	0	1
1	1	1

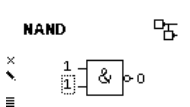
R. Logic XOR gate



The output is triggered on (1), if the two inputs are not equal.

Input A	Input B	Output
0	0	0
0	1	1
1	0	1
1	1	0

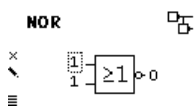
S. Logic NAND gate



The output is triggered on (1) if one or both inputs are switched off (0).

Input A	Input B	Output
0	0	1
0	1	1
1	0	1
1	1	0

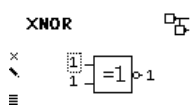
T. Logic NOR gate



The output is triggered on (1) if both inputs are switched off (0).

Input A	Input B	Output
0	0	1
0	1	0
1	0	0
1	1	0

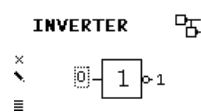
U. Logic XNOR gate



The output is triggered on (1) if both inputs are equal.

Input A	Input B	Output
0	0	1
0	1	0
1	0	0
1	1	1

V. Logic INVERTER



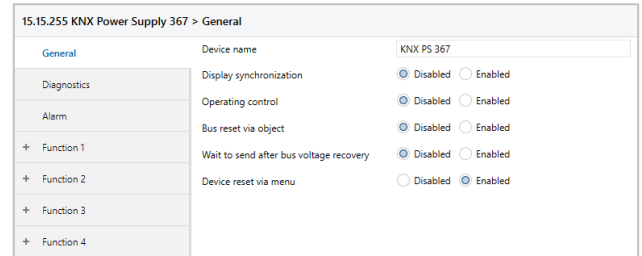
Input on (1) is converted into output off (0). Input off (0) is converted into output on (1).

Input	Output
0	1
1	0

2. ETS Setup

The ETS database entry (ETS 4.2 and ETS 5) can be downloaded on the KNX PowerSupply 366 product website (www.weinzierl.de).

A. General



This parameter allows setting of general functions of the device:

Device name (free text input)

The device name can be chosen freely. The maximum length of the name is 30 characters. After the ETS application download the name will be shown within the devices startup and idle display.

Display synchronization (Enabled / Disabled)

If enabled, a communication object 'Display synchronization – Trigger' appears. Each Weinzierl device with a display of this product range provides this parameter. As soon as the device wakes up, the associated group telegram will be sent to the KNX bus which wakes up every other device whose display synchronization group object is associated to the same group address.

Group Object	Type KNX	Size	Direction
1: Display synchronization – Trigger	1.017	1 Bit	From / To KNX

Operating control (Enabled / Disabled)

If enabled, a parameter 'Cycle time' (10 s – 24 h) and a group object 'Operating control – Monitor' appears. This group object allows to implement a 'heart beat'. If associated with a group address, the group telegram will be sent to the KNX bus according to the set 'Cycle time'.

The telegram can then be used to detect whether the device is still connected and working.

Group Object	Type KNX	Size	Direction
2: Operating control – Monitor	1.017	1 Bit	To KNX

Bus reset via object (Enabled / Disabled)

If enabled, the parameter provides the group object 'Bus reset – Trigger'. If associated with a group address a bus reset can be forced by sending a group telegram.

Group Object	Type KNX	Size	Direction
3: Bus reset – Trigger	1.017	1 Bit	To KNX

Wait to send after bus voltage recovery (Enabled / Disabled)

If enabled, the parameter 'Waiting time' (10 s – 120 s) appears. The set value determines the waiting time, until diagnostic telegrams will be sent after bus voltage recovery. The telegrams of the following group objects will be restrained:

- Diagnostics – Voltage [V] – Value
- Diagnostics – Current [A] – Value
- Diagnostics – Current max. – Value
- Diagnostics – Temperature [°C] – Value
- Diagnostics – Temperature max. – Value
- Diagnostics – Busload [%] – Value

Device reset via menu (Enabled / Disabled)

By disabling this option, the function for resetting the device by its local menu is deactivated.

Diagnostics

This parameter sets basic diagnostic functions.

Group Object	Type KNX	Size	Direction
11: Diagnostics – Request values - Trigger	1.017	1 Bit	From KNX
12: Diagnostics – Reset max. values - Trigger	1.017	1 Bit	From KNX
13: Diagnostics – Voltage [V] - Value	14.027	4 Byte	To KNX
14: Diagnostics – Current [A] - Value	14.019	4 Byte	To KNX
15: Diagnostics – Current max. [A] - Value	14.019	4 Byte	To KNX
16: Diagnostics – Temperature [°C] - Value	9.001	2 Byte	To KNX
17: Diagnostics – Temperature max. [°C] - Value	9.001	2 Byte	To KNX
18: Diagnostics – Busload [%] - Value	5.001	8 Bit	To KNX

Send diagnostic values (Disabled)

No group objects for diagnostic values are available.

Send diagnostic values (Cyclic)

The group object for diagnostic values are available. The associated group telegrams will be sent in dependence of the set cycle time.

Send diagnostic values (On change)

The group objects for diagnostic values are available. The group telegrams will only be sent if the value changes.

Send diagnostic values (Cyclic and on change)

The group objects for diagnostic values are available. The group telegrams will be sent in dependence of the set cycle time as well as when the value changes.

Send diagnostic values (On request only)

The group objects for diagnostic values are available.

The telegrams will only be sent if triggered by a telegram to group object

- Diagnostics – Request values – Trigger.

If the diagnostic values are activated, the group objects

- Diagnostics – Request values – Trigger
 - Diagnostics – Reset max. values – Trigger
- are always available.

If a group telegram is sent to 'request values trigger' all diagnostics values will be sent to the bus.

If 'Reset max. values' is triggered, the values of diagnostic objects "Current max." and "Temperature max." are reset to the actual values and sent to the bus for confirmation.

B. Alarm

This parameter sets basic alarm functions.

Group Object	Type KNX	Size	Direction
20: Alarm – Current min. - State	1.005	1 Bit	To KNX
21: Alarm – Current max. - State	1.005	1 Bit	To KNX
22: Alarm – Temperature – State	1.005	1 Bit	To KNX

Send alarm (Disabled)

No group object for alarm states are available.

Send alarm (On alarm / On alarm and alarm end)

If activated the alarm state group objects as well as the threshold options appear.

'Threshold current min. [mA]' option declares the minimum amount of current. If the actual current falls below the chosen threshold, the message associated to group object 'Alarm – Current min. – State' will be sent.

'Threshold current max. [mA]' option declares the maximum amount of current. If the actual current rises above the chosen threshold, the message associated to group object 'Alarm – Current max. – State' will be sent.

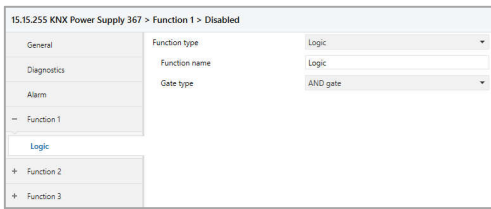
'Threshold temperature [°C]' determines the maximum of allowed temperature. If the actual temperature within the housing rises above the chosen threshold, the message associated to group object 'Alarm - Temperature – State' will be sent.

If the actual values return into the 'no alarm zone' only a message will be sent if option 'On alarm and alarm end' is chosen.



The measured current is the combined value of bus and auxiliary output.

C. Function 1 – 16 (Timer / Logic)



These parameters set the additional functions such as timer and logic. The logic gate truth tables can be found in the device menu section.

Function type (Disabled)

If set to 'Disabled', no timer specific parameter and group object is available.

Function type (Timer)

The timer specific parameters and group objects are available.

Function name (free text input)

The function name can be chosen freely. The maximum length of the name is 10 characters.

The name will be shown in the group object entry within the ETS software. After the ETS application download the name will be shown within the devices function menu entry as well as in the function submenu as a headline.

Timer type (Switch-on delay)

A timer that switches ON after duration defined in 'Delay time [s]' parameter.

The output value can be inverted by parameter 'Output'. (Not inverted / Inverted).

Input -----1-----0-----

Output ----- | -T-1-----0-----

Group Object	Type KNX	Size	Direction
Timer – Switch-on delayed - Input	1.002	1 Bit	From KNX
Timer – Switch-on delayed - Output	1.002	1 Bit	To KNX

Timer type (Switch-off delay)

A timer that switches OFF after duration defined in 'Delay time [s]' parameter.

The output value can be inverted by parameter 'Output'. (Not inverted / Inverted)

Input -----1-----0-----

Output -----1----- | -T-0-----

Group Object	Type KNX	Size	Direction
Timer – Switch-off delayed - Input	1.002	1 Bit	From KNX
Timer – Switch-off delayed - Output	1.002	1 Bit	To KNX

Timer type (Switch-on and -off delay)

A timer that switches ON and OFF after duration defined in 'Delay time [s]' parameter.

The output value can be inverted by parameter 'Output'. (Not inverted / Inverted)

Group Object	Type KNX	Size	Direction
Timer – Switch-on/off delayed - Input	1.002	1 Bit	From KNX
Timer – Switch-on/off delayed - Output	1.002	1 Bit	To KNX

Input -----1-----0-----

Output ----- | -T-1----- | -T-0-----

Timer type (Impulse (Staircase))

Timer with impulse that – after being switched ON – automatically switches OFF after a defined duration defined in 'Delay time [s]' parameter.

The output value can be inverted by parameter 'Output'. (Not inverted / Inverted)

Input -----1-----0-----

Output -----1-T-0-----

Group Object	Type KNX	Size	Direction
Timer – Switch-impulse (staircase) - Input	1.002	1 Bit	From KNX
Timer – Switch-impulse (staircase) - Output	1.002	1 Bit	To KNX

i Each timer can be stopped by sending the opposite value to its input group object. For example:
An already started switch on timer can be stopped by sending OFF (0) to its input group object.

Function type (Logic)

The logic specific parameters and group objects are available.

Group Object	Type KNX	Size	Direction
Logic – Gate input A - Input	1.002	1 Bit	From KNX
Logic – Gate input B - Input	1.002	1 Bit	From KNX
Logic – Gate output – Output	1.002	1 Bit	To KNX

Function name (free text input)

The function name can be chosen freely. The maximum length of the name is 10 characters.

The name will be shown in the group object entry within the ETS software. After the ETS application download the name will be shown within the devices function menu entry as well as in the function submenu as a headline.

Gate type (AND gate)

The output is triggered on (1), if both inputs are switched on (1).

Gate type (OR gate)

The output is triggered on (1), if one or both inputs are switched on (1).

Gate type (XOR gate)

The output is triggered on (1), if the two inputs are not equal.

Gate type (NAND gate)

The output is triggered on (1), if one or both inputs are switched off (0).

Gate type (NOR gate)

The output is triggered on (1), if both inputs are switched off (0).

Gate type (XNOR gate)

The output is triggered on (1), if both inputs are equal.

Gate type (INVERTER)

Input on (1) is converted into output off (0). Input off (0) is converted into output on (1).

Group Object	Type KNX	Size	Direction
Logic – Gate input – Input	1.002	1 Bit	From KNX
Logic – Gate output – Output	1.002	1 Bit	To KNX

KNX Long Frames

Standard KNX telegrams are limited to an APDU length of 15. The APDU length is the number of bytes in the payload. A group telegram holding a 14 byte string (KNX data point type 16) results in an APDU length of 15.

To increase the efficiency of KNX communication mainly for the download an extended format has been defined. It can be used to send longer telegrams on the bus. To use this feature it must be supported by

- The tool (ETS)
- The bus interface (USB)
- All couplers in between
- The addressed device

ETS starting with version 5 is able to detect automatically whether long frames can be used and optimizes the download accordingly.

The max APDU length of the KNX USB Interface and which is used by ETS is 55. This length has been specified as requirement for new KNX system devices. An APDU length of 55 results in total length of a KNX telegram on twisted pair of 64 bytes and occupies the bus for about 90 ms.



The download is much faster if the USB interface is installed in the same line as the target device. With each line coupler in-between the download time grows.



WARNING

- The device must be mounted and commissioned by an authorized electrician.
- The prevailing safety rules must be heeded.
- The device must not be opened.
- For planning and construction of electric installations, the relevant guidelines, regulations and standards of the respective country are to be considered.
- The device is a permanently connected equipment: A readily accessible disconnect device shall be incorporated external to the equipment.
- The installation requires a 16 A fuse for external overcurrent protection.
- The power rating is indicated on the side of the product.