W&T

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Manual

Startup and Application

USB-Isolator

valid for:

#33003 USB-Isolator 2kV HS

Release 07/2023

Subject to errors and changes:

Since we can make mistakes, none of our statements should be used without checking. Please let us know of any mistakes or misunderstandings you are aware of, so that we can recognize and eliminate them quickly.

Perform work on and with W&T products only as described here and only if you have read and understood the manual fully. Unauthorized use can result in hazards. We are not liable for the consequences of unauthorized use. When in doubt, check with us or consult you dealer!

Table of Contents

1. Legal notices

Warning notice system

This manual contains notices that must be observed for your personal safety as well as to prevent damage to equipment. The notices are emphasized using a warning sign. Depending on the hazard level the warning notices are shown in decreasing severity as follows:

⚠ DANGER
Indicates a hazard which results in death or severe injury if no appropriate preventive actions are taken.

⚠ WARNING
Indicates a hazard which can result in death or severe injury if no appropriate preventive actions are taken.

⚠ CAUTION
Indicates a hazard that can result in slight injury if no appro-priate preventive actions are taken.

⚠ NOTE
Indicates a hazard which can result in equipment damage if no appropriate preventive actions are taken.

If more than one hazard level pertains, the highest level of warning is always used. If the warning sign is used in a warning notice to warn of personal injury, the same warning notice may have an additional warning of equipment damage appended.

Qualified personnel

The product described in this manual may be installed and placed in operation only by personnel who are qualified for the respective task.

The documentation associated with the respective task must be followed, especially the safety and warning notices contained therein.

Qualified personnel are defined as those who are qualified by their training and experience to recognize risks when handling the described products and to avoid possible hazards.

Disposal

Electronic equipment may not be disposed of with normal waste, but must be brought to a proper electrical scrap processing facility.

Symbols on the product

Symbol	Explanation
CE	CE-Mark The product conforms to the requirements of the relevant EU Directives.
	WEEE-Mark The product may not be disposed of with normal waste, but rather in accordance with local disposal regulations for electrical scrap.

2. Safety Instructions

Intended Use

The USB Isolator 2 kV HS manufactured by Wiesemann & Theis galvanically isolates Low-, Full- and High-speed USB connections with an isolation voltage of at least 2,000 V. The isolator prevents compensating currents from flowing over the USB line due to potential differences between the connected devices. This way the risk of data transmission disturbances or destruction of the interfaces can be reduced. For this purpose the isolator can simply be inserted into the existing USB connection.

⚠ DANGER

The isolator described in this manual may only be used to protect the USB interfaces. It is not permitted to use the isolator to protect personnel against contact with dangerous voltages. If a safety-critical electrical isolation is required, please contact us.

Any other use or modification of the equipment is not authorized.

Electrical safety

Please make sure there is sufficient distance between upstream and downstream cable to avoid direct voltage flashovers between the cables.

The USB-Isolator may only be used in enclosed and dry areas. The device should not be exposed to high ambient temperatures and should not be operated near heat sources. Please note the restrictions regarding the maximum ambient temperature.

The power supply unit used to supply the respective USB-Isolator must guarantee a safe separation of the low voltage side from the grid in accordance with EN62368-1 and have „LPS“ characteristics.

EMC

Only shielded cables may be used for connecting the isolator.

In this case the isolator meets the noise immunity limits for industrial applications and the stricter emissions limits for households and small businesses. Therefore, there are no EMC-related limitations with respect to the usability of the devices in such environments.

Declarations of conformity
The complete Declarations of Conformity for the devices described in the manual can be found on the corresponding datasheet page on the W&T homepage:
http://www.wut.de/33003

3. Introduction

USB interfaces in stationary computers unfortunately have the drawback of having no galvanic isolation for the signal lines.

In many applications in the consumer world this limitation is irrelevant, since the USB devices connected to the PC are generally supplied through the bus and do not have any reference to a second ground or to the earth conductor.

In other areas, such as measurement equipment, process control or medical technology, galvanic isolation of the connected devices is essential in order to prevent ground loops over the USB lines.

Wiesemann & Theis therefore offers the USB Isolator which is described on the following pages along with its technical specifications and wiring examples.

i **Keep up to date**
For up-to-date information on new developments visit
https://www.wut.de/

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4. USB Isolator 2 kV HS, #33003

Function

The USB-Isolator 2 kV HS #33003 provides galvanic isolation for USB connections. The isolator is simply inserted into the existing USB connection and powered by an external power supply.

The isolator of type #33003 isolates Low-, Full- and HighSpeed USB connection galvanically with an isolation voltage of at least 2,000 V DC.

The bus speed is detected fully automatically.

Supply voltage

The USB-isolator requires an external power supply for powering the galvanically isolated circuitry of the isolator in addition to the bus-powered USB device.

A suitable wall mount adapter is included with the isolator, though any 5 V DC power supply with a USB output can be used as long as it provides an output current of at least 1 A and fulfills the requirements as outlined in the safety instructions.

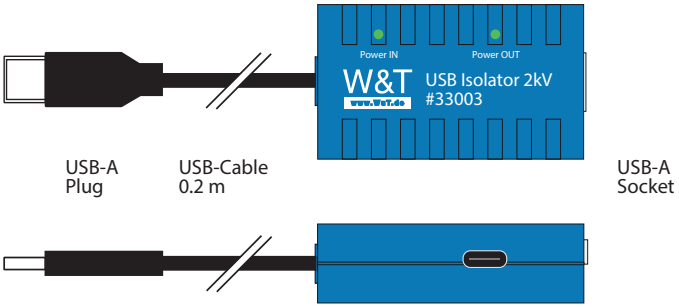
The supply voltage is supplied to the isolatod side via a USB type-C socket. An appropriate adapter cable for connecting the power supply is also included with the Isolator.

⚠ NOTE

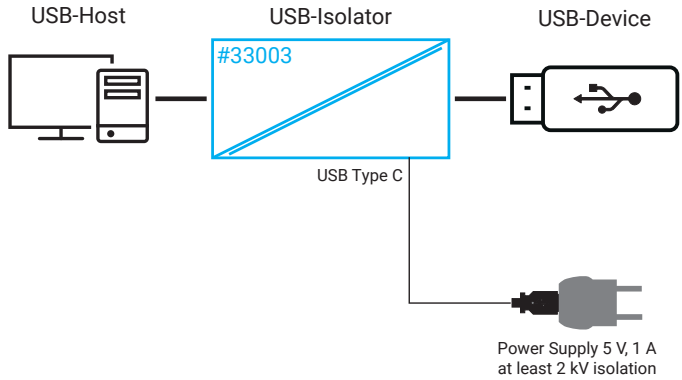
The USB A plug on the power cable must not be connected to a second USB port on the USB host or hub which is connected to the upstream port of the isolator. Such a connection would short-circuit the galvanic isolation and render it useless. A galvanically isolated voltage source is therefore mandatory.

Display elements

The isolator features two green LEDs for indicating the correct supply voltage for the isolator. The Power IN LED indicates correct power for the upstream side from the USB host or hub, whereas the Power OUT LED indicates the correct power supply of the downstream side.



Wiring example



Technical data

Isolation voltage:	min. 2,000 V DC	
USB speed:	High-Speed (480 Mbit/s) Full-Speed (12 Mbit/s), Low-Speed (1.5 Mbit/s)	
Power supply:		
Upstream-Port:	USB supplied	
Downstream-Port:	5 V DC using included power supply	
Current draw:		
Upstream-Port:	max. 100 mA	
Downstream-Port:	max. 120 mA plus current draw of the USB device	
USB connections:		
Upstream-Port:	USB A plug with 20 cm cable	
Downstream-Port:	USB A socket integrated in housing	
Ambient temperature:		
Isolator:	Storage:	-40..+70 °C,
	Operating:	0..+70 °C
Power supply:	Storage:	-40..+70 °C,
	Operating:	0..+40 °C
Humidity:	5..90 % relative humidity (non-condensing)	
Housing:	Plastic compact housing, 55 x 30 x 16 mm	
Weight:	approx. 35 g	
Scope of delivery:	USB Isolator USB power supply 5 V / 1 A power cable USB-C, USB 2.0	

Wiesemann & Theis GmbH
Porschestraße 12
D-42279 Wuppertal

Mail info@wut.de
Web www.wut.de

Tel. +49 (0)202 2680-110
Fax +49 (0)202 2680-265