USB 2.0 Isolator with Repeater IC

USB-029H2-RP

User's Manual

Ver. 1.0

HuMANDATA LTD.

Table of Contents

● Precautions

⊘ **Do Not**	1	This product uses ordinary off-the-shelf electronic components, and is therefore inappropriate for use in applications that require special quality or reliability and are expected to protect human lives or prevent accidents, such as safety mechanisms in fields including space, aeronautics, medicine, and nuclear power.
	2	Do not be used underwater or in high-humidity environments.
	3	Do not be used in the presence of corrosive gases, combustible gases, or other flammable gases.
	4	Do not turn on power when circuit board surface is in contact with other metal.
	5	Do not apply voltage higher than rated voltage.

⚠ **Attention**	6	This manual may be revised in the future without notice owing to improvements.
	7	All efforts have been made to produce the best manual possible, but if users notice an error or other problem, we ask that they notify us.
	8	Item 7 notwithstanding, HuMANDATA cannot be held liable for the consequences arising from use of this product.
	9	HuMANDATA cannot be held liable for consequences arising from using this product in a way different from the uses described herein, or from uses not shown herein.
	10	This manual, circuit diagrams, sample circuits, and other content may not be copied, reproduced, or distributed without permission.
	11	If the product emits smoke, catches fire, or becomes unusually hot, cut the power immediately.
	12	Do not install the control cables or communication cables together with the main circuit lines or power cables. In such an environment, it may result in malfunction due to noise.
	13	Be careful of static electricity.

● Revision History

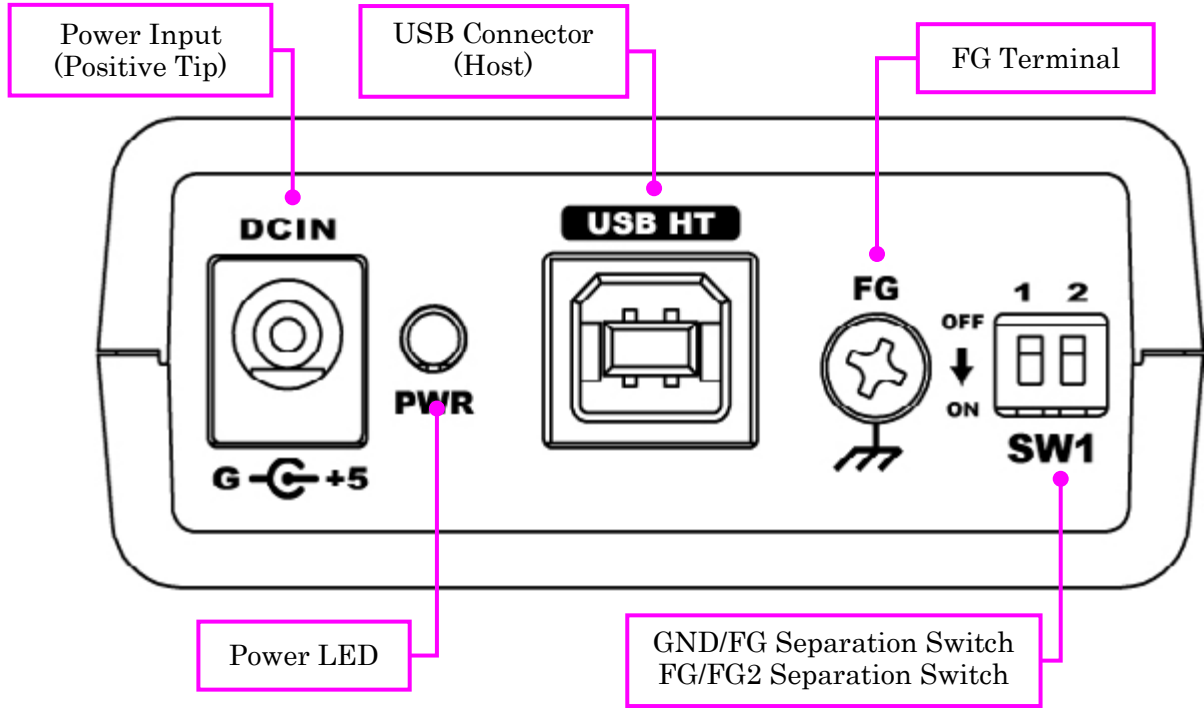| Date	Revision	Description
Oct. 11, 2017	v1.0	Initial release

● Introduction

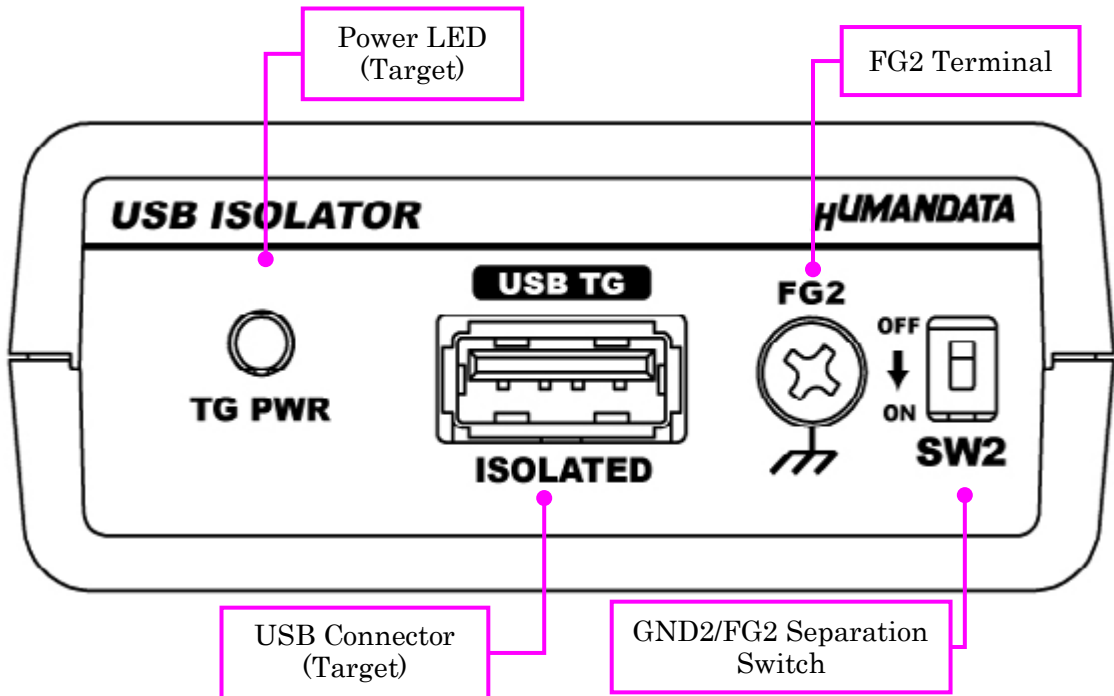Thank you very much for purchasing our product.

USB-029H2-RP is a USB 2.0 High Speed (480Mbps), Full Speed (12Mbps) and Low Speed (1.5Mbps) compliant isolator that isolates between a USB host and a USB peripheral device.

1. Overview

USB Host side

Power Input
(Positive Tip)

USB Connector
(Host)

FG Terminal

DCIN

USB HT

FG

PWR

OFF

ON

SW1

G ⊖ +5

1 2

Power LED

GND/FG Separation Switch
FG/FG2 Separation Switch

USB Target side

Power LED
(Target)

FG2 Terminal

USB ISOLATOR

HUMANDATA

USB TG

FG2

TG PWR

ISOLATED

OFF

ON

SW2

USB Connector
(Target)

GND2/FG2 Separation
Switch

TOP side (Block diagram)

2. Feature

USB-029H2-RP is a USB 2.0 High Speed (480Mbps), Full Speed (12Mbps) and Low Speed (1.5Mbps) compliant isolator that between a USB host and a USB peripheral device are isolated.

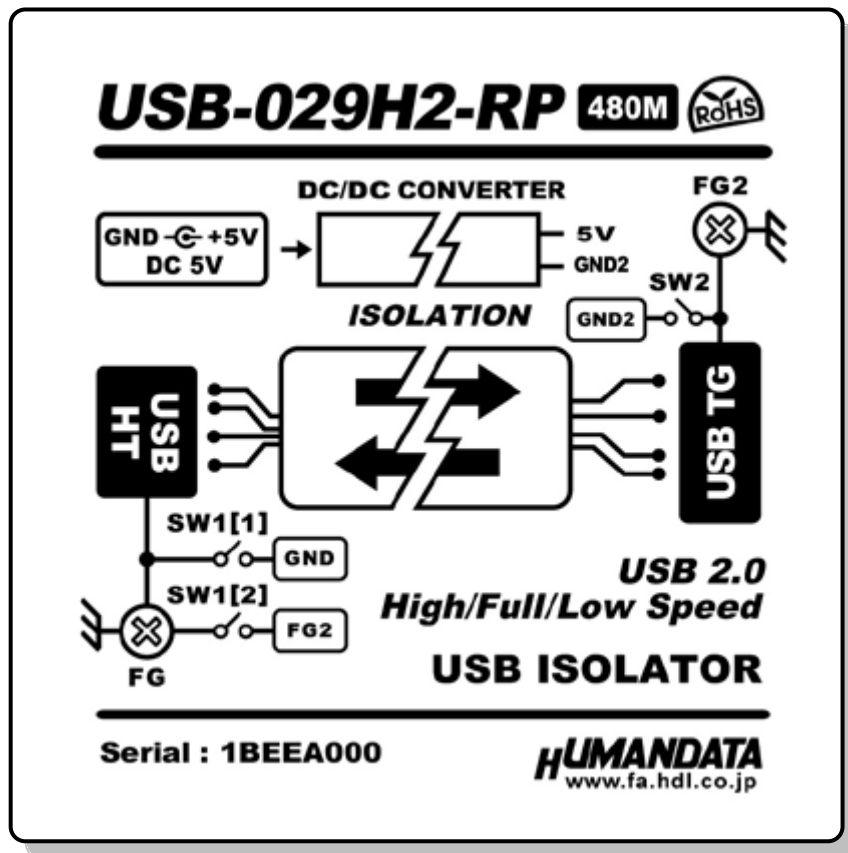With USB-029H2-RP, it can be expected to eliminate ground loops that can cause measurement errors and equipment from surges, common-mode voltage, static discharge, magnetic fields, and radio frequency interference.

There is no need to install any drivers. It works with every operating system of Windows, Linux, Mac OS X, and others.

USB-029H2-RP consists with additional built-in USB signal repeaters and a FG separation switch to USB-029H2. The USB signal repeater ICs are installed in both host and target side respectively that regenerates USB signal expecting stable USB communication.

3. Connection

You can use an included USB cable to the host side connector to the host (such as a personal computer), and connect a USB peripheral device to the target side connector.

4. Power Supply

USB-029H2-RP is powered through a USB port (Bus-powered) or an AC adapter (Self-powered). An AC adapter has higher priority when both supplies are applied.
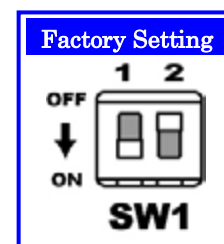
5. SG/FG Separation switch

5.1. SW1

You can separate between GND (signal ground) and FG (frame ground) by the dip-switch each USB host and USB target.

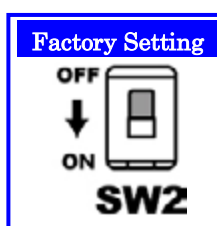| SW1[1] Pos.	GND - FG
OFF	Open
ON	Connection

SW1[2] Pos.	FG - FG2
OFF	Open
ON	Connected

Factory Setting — SW1

* Host and target is same function.

5.2. SW2

Position	GND - FG
OFF	Open
ON	Connection

Factory Setting — SW2

When the all the switches are turned to ON, signal GND of host side and target side are connected. In that case, your system is not isolated.

When only SW1-2 is tuned to ON, shield of USB cable of host side is extended to the target device. As a result, an improvement of noise tolerance can be expected, but in some cases the common connection makes loops that would be noise routes. You need to find the best way of the GND connection in your system that depends on your target device's specification and wiring conditions.

6. FG, FG2 Terminal

FG

You can connect a ground wire to this terminal when needed.

Noise tolerance may be improved by connecting terminals of FG and FG2 to the grounds.

1.25 mm^2 or thicker wires are good to connect between the solderless FG terminal and housing of the host computer or power strips.

Suitable solderless terminal: R1.25-3.5 (1.25-M3)

7. Specifications

7.1. Product Specification

Item	Description	Remarks
Model	USB-029H2-RP	
Input Power	5VDC Supplied through a USB port (Bus-powered) or AC adapter (Self-powered)	Recommend the use of an AC adapter for stably supply An AC adapter supply to the host side.
Current Consumption	Less than 100 mA (Bus-powered) Less than 400 mA (AC adapter)	
HOST interface	USB 2.0 Compliant Supports High (480 Mbps), Full (12 Mbps) and Low (1.5 Mbps) Speed	USB 1.1 compatible ESD protection
Isolation Method	Bus isolation	
Isolation Protection	3000VDC	Designed value
Support OS	OS-Independent (No drivers required)	
LED	PWR: Power LED TG PWR: Target Power LED	
Operating Ambient Temperature	-10 to 60 [°C] (14 to 140 [°F])	No condensation permitted
Operating Ambient Humidity	30 to 85%RH	
Storage Ambient Temperature	-20 to 60 [°C] (-4 to 140 [°F])	
Storage Ambient Humidity	30 to 85%RH	
Weight	Approx. 90 [g]	Only main body
Dimensions	67 x 67 x 28 [mm] (2.638" x 2.638" x 1.102")	Without projections

7.2. AC adapter (Japan's specifications)

Item	Description	Remarks
Output	5VDC 2.0A	
Plug	2.1mm inner diameter	Positive Tip
Compatible DC Jack	2.1mm inner diameter	
Operating Ambient Temperature	0 to 40 [°C] (32 to 104 [°F])	No condensation permitted
Operating Ambient Humidity	30 to 85 % RH	
Storage Ambient Temperature	-20 to 80 [°C] (-4 to 176 [°F])	
Storage Ambient Humidity	10 to 95 % RH	
Wire Length	1.6m	
Weight	approx. 70 [g]	
Dimensions	46 x 34 x 25 [mm] 1.811" x 1.339" x 0.984"	Without projections

* This AC adapter is attached for use mainly in Japan. If you use in the other countries,
  please check the specifications above and plug shape.

* There may be cases that this part and specifications are changed.

7.3. Optional Accessories

Model	Image	Description
PEN-003		USB series Attachment with clamping screw JAN : 4937920800709
PEN-003-DIN		USB series Attachment for 35mm DIN rail JAN : 4937920800716
PEN-003-MG		USB series Attachment with neodymium magnet JAN : 4937920801201

8. Additional Documentation and User Support

The following documents and other supports are available at
http://www.hdl.co.jp/en/faspc/USB/usb-029h2-rp

- User's Manual
  … and more.

9. Attachment Documentations

- Outline drawing of the USB-029H2-RP
- Outline drawing of the AC Adapter

10. Warranty and Compensation

Please refer to the following URL for the warranty.
http://www.fa.hdl.co.jp/en/fa-warranty.html

USB 2.0 Isolator with Repeater IC

USB-029H2-RP

User's Manual

Ver. 1.0 .... Oct. 11, 2017