N Series for USB
Isolated Digital I/O Unit(8ch Relay, 8ch DI)
DIO-0808RN-USB

This product is an USB 2.0-compliant digital I/O unit that extends the input function of digital signal from the USB port of PC and output signals to SPDT relay contacts.

This product is compatible with input digital signals at 12 - 24VDC which features 8 channels of Opto-coupler isolated inputs (compatible with current sink output/current source output) and 8 channels of SPDT relay outputs with independent common.

Compact design not restricting installation location (188.0(W) x 78.0(D) × 30.5(H)) makes it easy to install the product within the panel or device using DIN rail mounting jigs, or on the floor or wall.

Windows/Linux device driver is supported with this product.

* Specifications, color and design of the products are subject to change without notice.

*The contents in this document are subject to change without notice.
*Visit the CONTEC website to check the latest details in the document.
*The information in the data sheets is as of July, 2024.

Features

- Opto-coupler isolated input (compatible with current sink output/current source output)
This product has 8 channels of Opto-coupler isolated inputs (compatible with current sink output/current source output) whose response time is 200μsec, supporting driver voltages of 12 - 24 VDC for input. 8 channels share one common.

- Relay outputs (Form C) with independent common
This product has 8 channels of SPDT relay outputs (Form C) with independent common. Independent common terminal provided per channel, capable of supporting a different external power supply. High-capacity output rating is designed to be a maximum of 6A 240V (AC), 5A 28V (DC) per channel.

- Opto-coupler bus isolation
As the USB (PC) is isolated from the input interfaces by opto-couplers and output interfaces by relays, this product has excellent noise performance.

- Compact design not restricting installation location (188.0(W)×78.0(D)×30.5(H))
Compact design of 188.0(W) × 78.0(D) × 30.5(H) does not require special installation location.

- Compatible to USB 2.0/USB 1.1
Compatible to USB 2.0/USB 1.1 and capable to achieve high speed transfer at High Speed (480 Mbps)

- Diverse installations such as screw fastening, magnet, DIN rail are possible
Installation on the floor / wall /ceiling is possible by screw fastening, magnet, rubber feet, etc.　In addition, DIN rail mounting mechanism is equipped as standard with the product, making it easy to install the product within the panel or the device.

- Easy-to-wire terminal connector adopted
Adoption of terminal connector (with screws) enables to achieve easy wiring.

- Windows/Linux support device driver
Using the device driver API-TOOL makes it possible to create applications of Windows/Linux. In addition, a diagnostic program by which the operations of hardware can be checked is provided.

Hardware specifications

Function Specifications

Item		Specifications
Input		
	Type	Opto-isolated input (Compatible with current sink / current source output) (Negative logic *1)
	Number of Channels	8 channels (1 common)
	Input resistance	4.7kΩ
	Current required to turn ON	2.0mA or more
	Current required to turn OFF	0.16mA or less
	Response time	200μsec within *2
	Isolated voltage	500Vrms
	External circuit power supply *3	12 - 24VDC(±10%)
Output		
	Type	SPDT Relay Output (Form C)
	Number of Channels	8 channels (independent common)
	Relay Contact Spec.	
	Max. rating capacity	6A 240VAC, 5A 28VDC (load resister)
	Max. permitted voltage	240V (Max.) *4, *5
	Max. Carry Current	5A (Max.)
	Contact resistance (Initial state)	100mΩ Max.
	Operate time	Within 10ms
	Release time	Within 5ms
	Mechanical Life Expectancy	10,000,000 operations min or more Switching times : 300 operations/min
	Electrical Lifetime	50,000 operations min. Switching times : 30 operations/min
	Relay Type	G6RL-1
USB section		
	Bus specification	USB Specification 2.0/1.1standard
	USB transfer rate	12Mbps (Full-speed), 480Mbps (High-speed) *6
	Power supply	Bus power
Common		
	Number of terminals used at the same time	127 terminals (Max.) *7
	Allowable distance of signal extension	Approx. 50m (depending on wiring environment)
	Current consumption	5VDC　430mA (Max.)
	Physical dimensions (mm)	188.0(W)×78.0(D)×30.5(H) (No protrusions)
	Weight	300g (Not including the USB cable, attachment, connector)
	Attached cable	USB cable 1.8m

*1　Data "0" and "1" correspond to the High and Low levels, respectively.

*2　The Opto-coupler's response time comes.

*3　External circuit power supply is required.

*4　Please don't exceed either max. permitted voltage or max. rating capacity of the use relay when using it by the voltage that exceeds 28VDC. Doing so can cause a malfunction.

*5　The potential difference between channels must not exceed 240V in the maximum. Doing so can cause a malfunction.

*6　This depends on the PC environment used (OS and USB host controller).

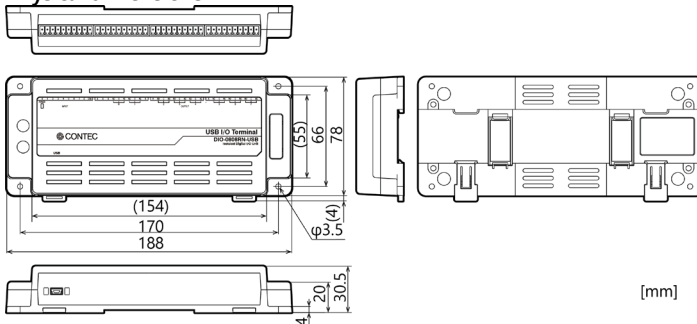*7　As a USB hub is also counted as one device, you cannot just connect 127 USB unit.

Installation Environment Requirements

Item	Specifications
Operating ambient temperature *1	0 - +50℃
Operating ambient humidity *1	10 - 90%RH (No condensation)
Floating dust particles	Not to be excessive
Corrosive gases	None
Standard	VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

*1　To suppress the heating, ensure that there are spaces for ventilation (about 5cm) around this product.

Physical Dimensions

Physical dimensions

(154)
170
188
φ3.5
55 66 78
20 30.5
4

[mm]

Support Software

Name	Contents	How to get
Windows Version Digital I/O Driver software API-DIO(WDM)	T The Windows device driver is provided as a form of Windows API functions. Various sample programs such as C# and Visual Basic .NET , Visual C++, Python etc. and diagnostic program useful for checking operation is provided.	Download from the CONTEC website *1
Linux Version Digital I/O Driver software API-DIO(LNX)	The Linux device driver is provided as a shared library. The software includes various sample programs such as gcc (C, C++) and Python programs, as well as a configuration tool to configure the device settings.	Download from the CONTEC website *1
Software Development Tool Kits (SDK) and Support Software	In addition to the device drivers, we offer many software programs for using CONTEC devices in an easier manner.	Download from the CONTEC website *2

*1　Download the files from the following URL.
　　https://www.contec.com/download/
*2　For supported software, search the CONTEC website for this product and view the product page.
　　https://www.contec.com/

Included Items

Product...1

Interface Connector...4

USB Cable Attachment on the main unit's side (For Mini B connector side)...1
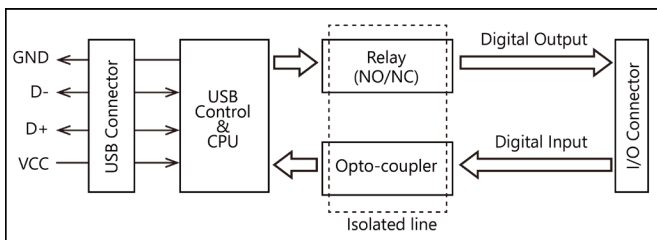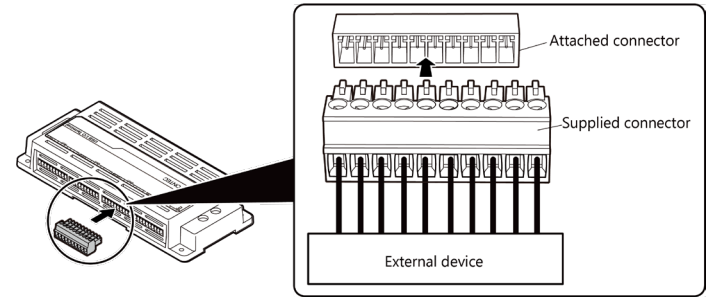
Rubber feet...4

USB Cable (1.8m)...1

Magnet ...2

Please read the following...1

Block Diagram

Connecting an Interface Connector

Use the supplied interface connector (plug connector) to connect the product to an external device. The following example describes how to make the connecting cable with the interface connector (connector plug).

[Attached connector]: European type terminal 3.5 pitch 10-pin jack connector
[Supplied connector]: European type terminal 3.5 pitch 10-pin plug connector
[Compatible cable]: AWG28 - 16

⚠ CAUTION

-　Removing the connector plug by grasping the cable can break the wire. Always grasp the interface connector to remove it.

-　Do not set or remove the interface connector when the power is on or during the communication.

Layout on the Interface Connector
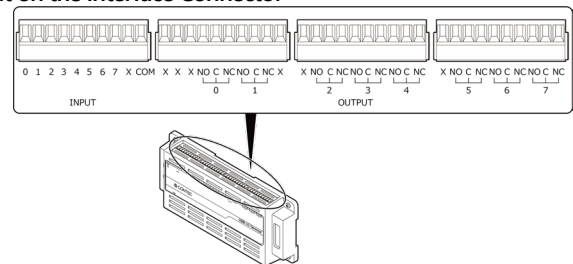
Connector name	Pin No.	Signal Name	Meaning	Connector name	Pin No.	Signal Name	Meaning
INPUT0	0	IN00	Input	OUTPUT1	X	N.C.	Not Connected
	1	IN01			NO-2	NO-2	Output
	2	IN02			C-2	C-2	
	3	IN03			NC-2	NC-2	
	4	IN04			NO-3	NO-3	
	5	IN05			C-3	C-3	
	6	IN06			NC-3	NC-3	
	7	IN07			NO-4	NO-4	
	X	N.C.	Not Connected		C-4	C-4	
	COM	COM	Plus/ Minus Common for INPUT0		NC-4	NC-4	
OUTPUT0	X	N.C.	Not Connected	OUTPUT2	X	N.C.	Not Connected
	X	N.C.	Not Connected		NO-5	NO-5	Output
	X	N.C.	Not Connected		C-5	C-5	
	NO-0	NO-0	Output		NC-5	NC-5	
	C-0	C-0			NO-6	NO-6	
	NC-0	NC-0			C-6	C-6	
	NO-1	NO-1			NC-6	NC-6	
	C-1	C-1			NO-7	NO-7	
	NC-1	NC-1			C-7	C-7	
	X	N.C.	Not Connected		NC-7	NC-7	

| IN00 - IN07	8 input signal pins. Connect output signals from the external device to these pins.
NO0 - NO7	8 output signal pins (Normally Open [NO]). Connect these pins to the input signal pins of the external device.
NC0 - NC7	8 output signal pins (Normally Close [NC]). Connect these pins to the input signal pins of the external device.
C0 - C7	Common pins for 8 output signals (Common for Normally Open [NO] and Normally Close [NC]).
N.C.	This pin is left unconnected.
COM	Common pins for 8 input signals. These pins are common to either positive side or negative side of external signals.

⚠ CAUTION

To perform input/output using this product with the CONTEC device driver, specify logical ports and logical bits when calling each function. For details, refer to the "Relationships between API-TOOL Logical Ports/Bits and Connector Signal Pins".

Connecting Digital I/O Signals
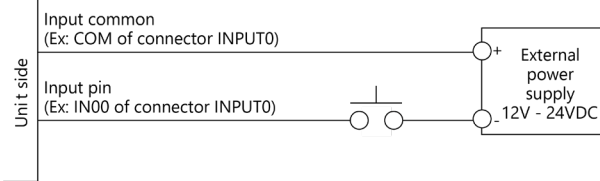
Input Circuit

Connect the input signals to a device which can be current-driven, such as a switch or transistor output device. The product inputs the ON/OFF state of the current-driven device as a digital value.
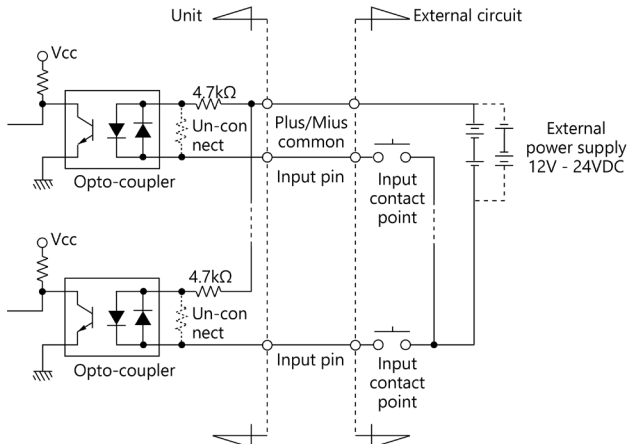
The signal inputs are isolated by Optocouplers (compatible with both current sink type and current source type output).

The board therefore requires an external power supply to drive the inputs. The power capacity required for driving each input channel is about 5.1mA when the signal voltage is 24 VDC or about 2.6mA when the signal voltage is 12 VDC.

Example of Connection (An Example to use Bit0 of INPUT0)

Output Circuit

Connect the output signals to a current-driven controlled device such as a relay or LED. The product controls turning on/off the current-driven controlled device using a digital value.
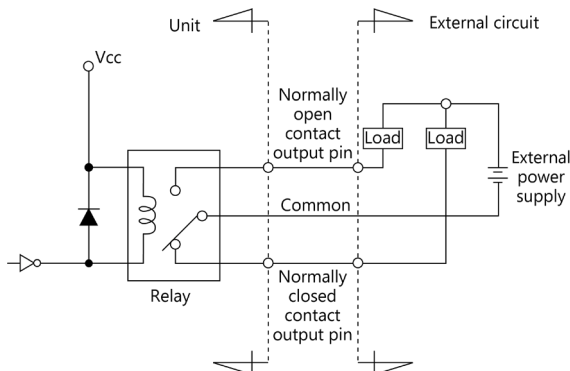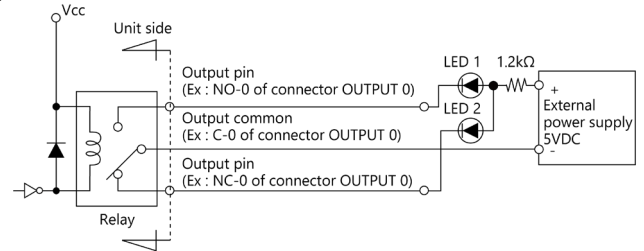

The signal outputs are independent common relay outputs (Form C) using a rated output current of up to 6A 240V (AC), 5A 28V (DC) per channel.
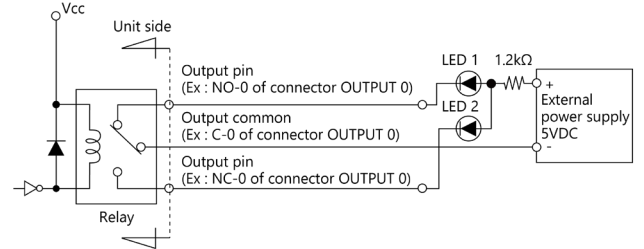
⚠ **CAUTION**

When power on, normally open (NO) outputs are OFF status (break status) and normally close (NC) outputs are ON status (make status).

Connection to the LED (An Example to use Output NO-0, NC-0 (bit0 is 1))

As a result, setting output NC-0 to "ON" state (make status), LED1 goes out and LED2 comes on.

Connection to the LED (An Example to use Output NO-0, NC-0 (bit0 is 0))

As a result, setting output NO-0 to "ON" state (make status), LED1 comes on and LED2 goes out.