

Isolated Digital I/O
Terminal for Sub-GHz Wireless
EU model

DIO-0404LY-WQ-EU

USA model

DIO-0404LY -WQ-US



- * The photograph is a DIO-0404LY -WQ-US.
- * 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 November, 2021.

Features

- Supports Sub-GHz band wireless with excellent transmission distance

This product converts the I/O digital signals wirelessly in the Sub-GHz band and transmits to the gateway. From the LAN port of a PC, digital signals (12 - 24 VDC) can be easily input or output via the gateway. The Sub-GHz, with the good wraparound characteristics of radio waves, the transmission distance (about 1 km) can be extended even there are obstacles. Stable communication can be achieved even in the environment where radio waves are mixed. As the product is suitable for long distance communication, network can be constructed on the wide area in the facilities without cable wiring.

- Highly reliable mesh communication

With wireless mesh technology, the communication continues by changing the routes automatically even when disconnection occurs, for example. Communication stability enables the wireless network to be strong against obstacles.

- Adaptable to a wide range of temperature

This product is capable of operating in the temperature between -20 and + 60°C. It can be installed in the various environments.

- Compact design

Compact design, 62.0(W) x 64.0(D) x 24.0(H)mm features flexibility in installation.

- Easy mounting on DIN rail

This product can be mounted on DIN rail with an optional fixing bracket.

- Capable of adapting a wide-range power

This product is capable of dealing with a wide range of power in the differing environments.

This product is a digital I/O terminal that sends I/O digital signals wirelessly in the Sub-GHz band. *1 Data is sent to Ethernet gateway (Master) of the Wireless I/O series. Furthermore, without using the Master, a pair of terminals can transmit digital input signals to each other.

With strength against obstacles, capability of long-distance communications in the Sub-GHz band, and mesh support, it is suitable to control or monitor devices that are spread in the wide area.

The product supports I/O of 12 - 24VDC digital signals, contains opto-coupler isolated input (current sink output support) 4-channel and opto-coupler isolated open-collector output (current sink type) 4-channel.

Other features are a digital filter function which prevents wrong recognition of input signals, an ability to change outputting to the specified patterns when a communication error occurs.

With the provided driver library API-DIO (WDM), you can create application software for Windows using various programming languages supporting Win32 API functions such as Visual Basic and Visual C ++.

* The interval for transmitting data to the Master can be set to between 10 and 3600 seconds.

* This terminal should always be used along with Ethernet gateway (Master) of the Wireless I/O series, or with CONPROSYS M2M controller (Master) containing the Sub-GHz band support, or use two terminals as a pair.

* Driver library can be downloaded from the Contec website.

* DIO-0404LY-WQ-US can be used in the United States. DIO-0404LY-WQ-EU can be used in European countries.

* 1 Sub-GHz indicates frequency bands of 1GHz and below. Available frequency band of the product depends on the model. The DIO-0404LY-WQ-EU can be used in the 868MHz band (Europe), and the DIO-0404LY-WQ-US can be used in the 915MHz band (The United States).

1- Opto-coupler isolated inputs (compatible with current sink output), Opto-coupler isolated open-collector outputs (current sink type)

This product has the 4 channels of Opto-coupler isolated inputs (compatible with current sink output) and the 4 channels of Opto-coupler isolated open-collector outputs (current sink type) whose response speed is within 200μsec respectively.

- Digital filter to prevent input signals from carrying noise or a chattering.

This product has a digital filter to prevent wrong recognition of input signals from carrying noise or a chattering. All input terminals can be added a digital filter, and the setting can be performed by software.

- Output circuits include Zener diodes and protection circuits for surge voltage protection

Zener diodes are connected to the output circuits to protect against surge voltages. Similarly, protection circuits are fitted to 4channels of output. The output rating is max. 35VDC, 100mA per channel.

- Fail-safe function within

Outputting is changed to the specific pattern when a communication error such as disconnection with Ethernet gateway (Master) occurs.

- Counter function within *1

The number of digital input signal changes can be confirmed. The digital I/O signals and count value are simultaneously transferred to the Ethernet gateway (Master).

-P2P (Peer-to-Peer) mode within *1

Without using the Ethernet gateway (Master), a pair of terminals can transmit digital input signals to each other.

*1 Available with the firmware Ver1.20 or later versions.

Specifications

Hardware specification

Item	DIO-0404LY-WQ-EU	DIO-0404LY-WQ-US
Wireless	Modulation system	GFSK
	Speed *1	10kbps (Low data rate) / 80kbps (High data rate)
	Output	13dBm
	Used frequency	863 - 870MHz
Digital input	Input type	Opto-coupler isolated input (current sink output support) (negative logic)
	Input resistance	4.7kΩ
	Input ON current	2.0mA or more
	Input OFF current	0.16mA or less
	Response time	Within 200μsec *2
	Number of input signal channels	4 (Common)
Digital output	Output type	Opto-coupler isolated open-collector output (current sink type) (negative logic)
	Rated output voltage	35VDC
	Rated output current	Up to 100mA
	Response time	Within 200μsec *2
	Residual Voltage with Output ON	0.5V or less (Output current ≤ 50mA), 1.0V or less (Output current ≤ 100mA)
	Number of output signal channels	4 (Common)
	Protection circuit	42.3V (Min.) Zener diode protection (each channel) 1 time fuse
Digital input/output common	Interface connector	14-pin terminal connector (screw type)
	External power voltage	12 - 24VDC (±10%)
	Voltage resistance	1000Vrms
	Applicable wire	AWG28 - 16
USB	Bus specification	USB Specification 2.0/1.1-compliant
	Data transmission speed	12Mbps (Full speed), 480Mbps (High speed)
	Function	USB device
	Connector	mini-B USB connector
Antenna	Non-directional dipole antenna (2.0±0.7dBi)	
Power supply	Input voltage range	12 - 24VDC ±5%
	Current consumption	110mA (at 12VDC input) (Max.), 50mA (at 24VDC input) (Max.)
	Power connector *3	European type terminal 3.5 pitch 3-pin jack connector
Physical dimensions (mm)	62.0(W) x 64.0(D) x 24.0(H) (No projection included)	
Weight	100g (Body), 150g (With bundled antenna, power connector, Interface connector)	

*1 It is a theoretical maximum value on wireless communication and does not indicate the actual data speed.

*2 Response time is given when input resistance 4.7kΩ and 12 - 24VDC (±10%)

*3 This product cannot be used with USB bus power. Make sure to use the external power that supplies 12VDC or 24VDC voltage. This is not the wireless communication response time.

Environmental Specifications

Item	DIO-0404LY-WQ-EU	DIO-0404LY-WQ-US
Operating ambient temperature	-20 - +60°C *4	
Operating ambient humidity	10 - 90%RH (No condensation)	
Floating dust particles	Not to be excessive	
Corrosive gases	None	
Line-noise resistance *5	Line noise	AC Line: ±2kV, Signal Line: ±1kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)
	Static electricity resistance	Touch: ±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Air: ±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
	Vibration resistance	10 - 57Hz /semi-amplitude vibration 0.15mm, 57 - 150Hz/2.0G 40minutes each in X, Y, and Z directions (JIS C60068-2-6-compliant, IEC60068-2-6-compliant)
Shock resistance	147m/s ² (15G)/11ms/half-sine shock (JIS C 60068-2-27 -compliant, IEC 60068-2-27 -compliant)	
Allowable length of instantaneous power failure *5	Within 17 milliseconds (100VAC@25°C). The product is automatically reset upon low voltage detection.	
Standard	CE Marking (EMC Directive Class A, RoHS Directive), UKCA	

*4 When using an optional AC adapter POA201-10-2, the ambient temperature is 0 - 40°C.

*5 When using an optional AC adapter POA201-10-2.

Packing List

- Product [DIO-0404LY-WQ-EU or DIO-0404LY-WQ -US] ...1
- Setup Guide ...1
- Warranty Certificate ...1
- Serial Number Label ...1
- Power Connector ...1
- Antenna ...1

List of Options

- POA201-10-2 AC-DC Power Adaptor (12VDC, 1A) *1
- BRK-WQ-Y Bracket for Wireless I/O Products
- CN6-Y14 14pin Screw Terminal Connector Set (6 pieces)

*1 The adaptor can be used in the temperature range between 0 and + 40°C. The support voltage of AC cable is 125 VAC 7 A.

* Visit CONTEC website regarding information on the optional products.

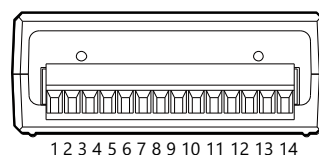
Supported OS

Windows version of digital I/O driver **API-DIO(WDM)**
Driver software for Windows with Win32API function (DLL) is ready to use.

The driver software contains sample programs such as VisualBasic and VisualC++, and the diagnosis program to check the software operation.

For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

Interface Connector

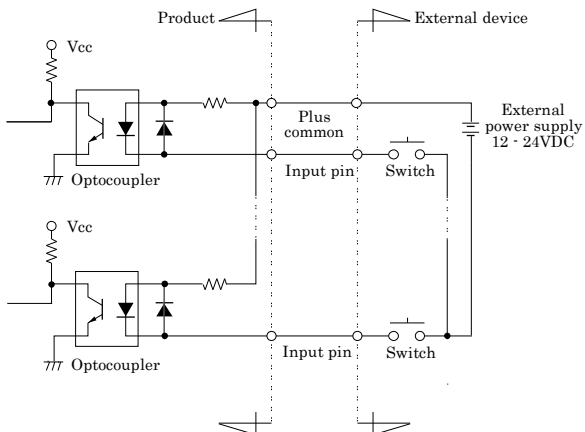


Attached connector: European type terminal 3.5 pitch 14-pin jack connector
Supplied connector: European type terminal 3.5 pitch 14-pin plug connector
Compatible cable: AWG28-16 (Cable length should satisfy the power specification including the cable voltage drop)

Pin number	Signal name	Description
14	O-PC (Positive common for output)	This connects to the positive side of external power, and shares with 4 channels of output signal.
13	O-03	These are four channels of output signals. Each connects to the input signal of external device.
12	O-02	
11	O-01	
10	O-00	
9	O-NC (Negative common for output)	This connects to the negative side of external power and shares with 4 channels of output signal.
8	N.C.	This is left unconnected.
7	N.C.	This is left unconnected.
6	I-PC (Positive common for input)	This connects to the positive side of external power and shares with 4 channels of input signal.
5	I-03	These are four channels of input signals. Each connects to the output signal of external device.
4	I-02	
3	I-01	
2	I-00	
1	N.C.	This is left unconnected.

Input signal connection

Input circuit

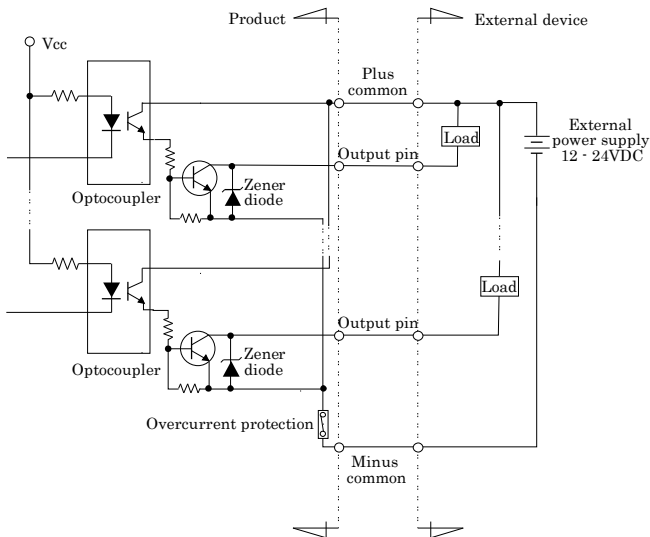


*Input terminal is I-xx.

Input circuit of interface is listed above. Signal input is opto-coupler isolated input (current sink output support), therefore, external power supply is required to drive input in this board. The power requirement is about 5.1mA per input channel at 24VDC. (abt 2.6mA at 12VDC)

Output signal connection

Output circuit

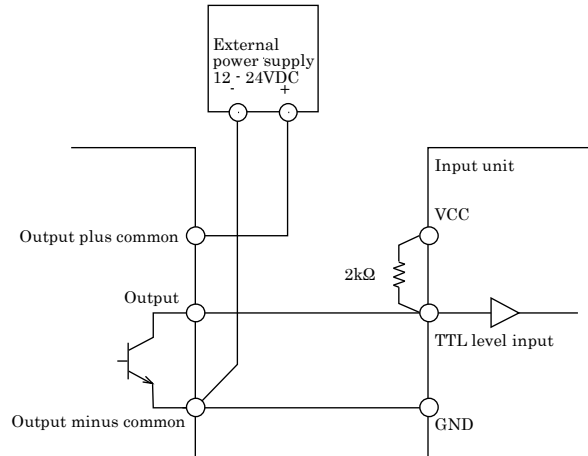


*Output terminal is O-xx.

Output circuit of interface is listed above. Signal output is opto-coupler isolated open-collector output (current sink type), therefore, external power supply is required to drive output. The rated output current per channel is 100mA at maximum. The output section can also be connected to a TTL level input as it uses a low-saturated transistor for output. The residual voltage (low-level voltage) between the collector and emitter with the output on is 0.5V or less at an output current within 50mA or at most 1.0V at an output current within 100mA.

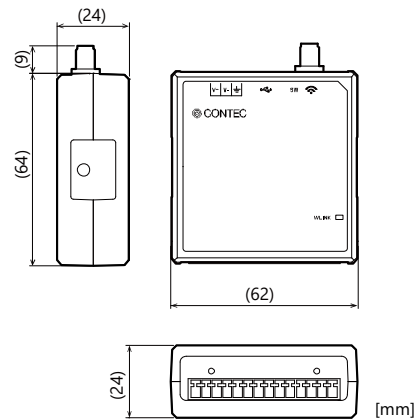
A zener diode is connected to the output transistor for protection from surge voltages. An overcurrent protection circuit is provided for every 8 output transistors.

Example of Connection to TTL Level Input

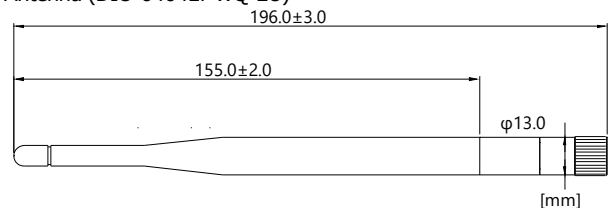


Physical Dimensions

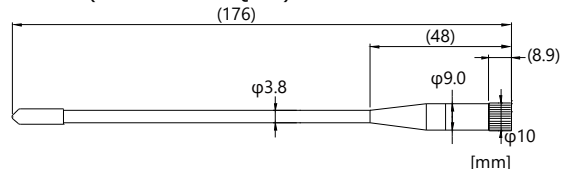
Product



Antenna (DIO-0404LY-WQ-EU)



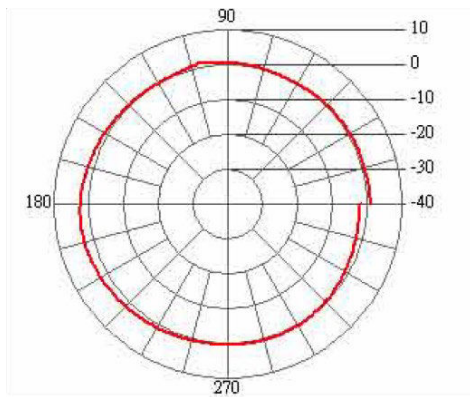
Antenna (DIO-0404LY-WQ-US)



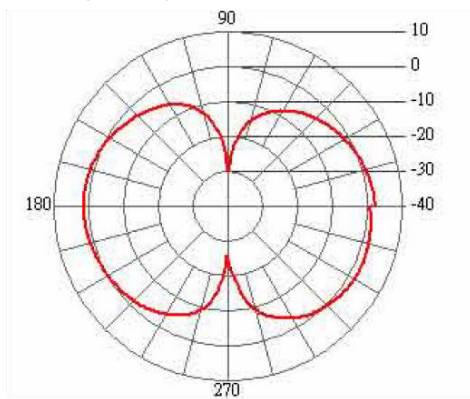
Antenna Directivity

DIO-0404LY-WQ-EU

H-Plane (868MHz)

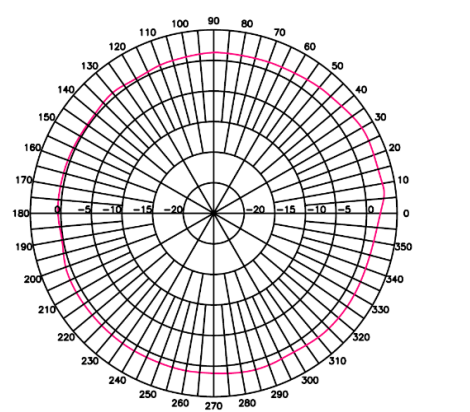


E-Plane (868MHz)

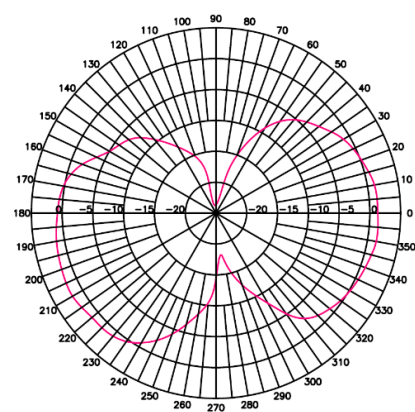


DIO-0404LY-WQ-US

H-Plane (925MHz)

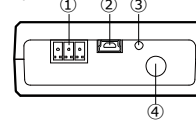


E-Plane (925MHz)

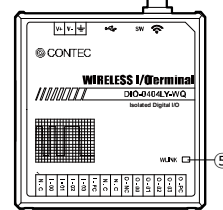


Component Name

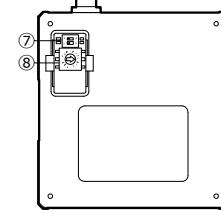
Top



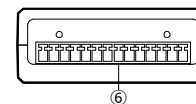
Front



Back



Bottom



No.	Name
1	Power connector
2	mini-B USB connector
3	INIT button
4	Antenna connector
5	WLINK LED
6	Interface connector
7	DIP switch (for maintenance) *1
8	Rotary switch

*1 Do not touch DIP switch since this is not used for usual operations.
There is a cover for the switch on the back side of the product.