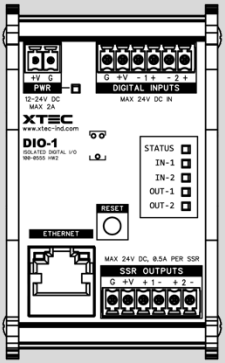
User Manual

DIO-1

Digital I/O Module



XTEC INDUSTRIES

Contents

Safety Information

- Not for use in life safety applications.
- Not for use in outdoor or high humidity environments, unless protected in a suitable enclosure.
- Never attempt to disassemble or repair this product yourself.
- Never connect voltages higher than 26v DC to any terminal of this product, unless otherwise specified. Higher voltages may void the warranty.
- Do not over-stress or over-tighten the terminals and other connectors when attaching the wiring.

Overview

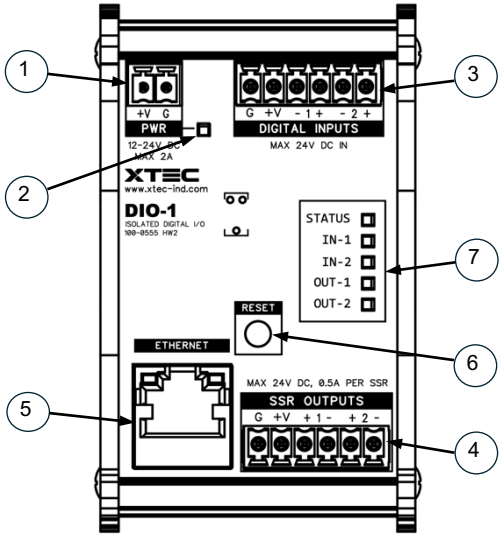
The XTEC **DIO-1** is an industrial grade remote digital I/O module. It features two isolated 12-24v DC digital inputs, and two isolated Solid State Relay (SSR) outputs rated up to 500mA at 60v DC each.

The I/O can be set and read via simple ASCII commands over Ethernet TCP/IP. Device configuration is via a web-browser interface.

The module is powered from 12 to 24v DC. This supply is also made available on the input and output connectors for ease of wiring when using volt free contacts or coils etc.

The DIO-1 is housed in a DIN rail mounting enclosure, and features pluggable connectors to simplify installation and maintenance. All terminals are protected against ESD and voltage spikes.

Front View



1	12 – 24v DC power supply input
2	Power LED
3	Digital Inputs connector
4	Solid State Relay Outputs connector
5	Ethernet connector
6	Reset button
7	LED indicators for status, inputs and outputs

Power Supply

Connect a regulated 12v to 24v DC power supply to the “+V” (positive) and “G” (negative) “PWR” terminals. The power LED will illuminate when power has been correctly applied.

For safety, the power input is protected from over current by a 2A fuse. If the fuse blows you must return the unit for factory repair.

Make sure you double check the polarity and voltage levels of the supply before switching on!

Ethernet

The DIO-1 supports 10/100BASE-T Ethernet networking for configuration, control and status. Use a standard 8 pin RJ45 Ethernet cable to connect the module to another device such as a network switch, PLC or computer.

See later in the manual for the Ethernet control protocol.

The network interface used in this module does not support auto-MDIX switching.

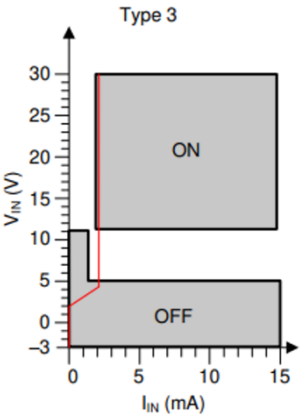
If you are connecting to a network switch this likely won’t be an issue, because almost every switch now supports auto-MDIX switching.

However, if you are connecting directly to another device that also does not support auto-MDIX switching, you will need to use a crossover network cable.

Digital Inputs

The DIO-1 has two isolated digital inputs, complying to IEC61131-2 Type 3. The inputs are protected against reverse polarity, and up to 4KV ESD.

These inputs are “sinking”, and hence require a **DC voltage** to be applied to the terminals to switch on. The graph on the right shows the voltages required for On and Off states, along with the input current (approx. 2.25mA to turn input On).

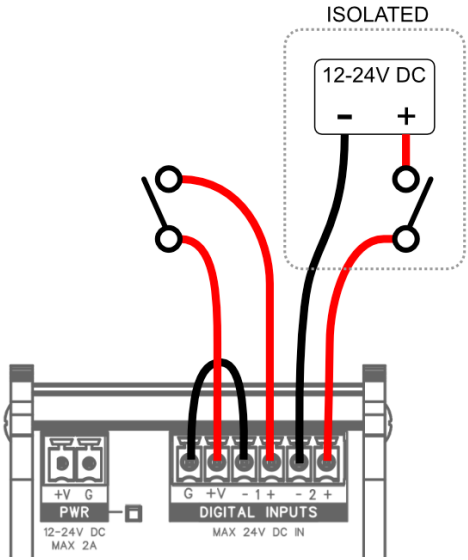


When an input is turned on, the relevant **IN-1** or **IN-2** LED will illuminate on the front of the module.

The input connector includes extra terminals connected to the module ground (“G”) and positive supply input (“+V”). These may be useful if you have a voltage-free switch or relay contact to connect, and are not concerned about isolation.

The “G” and “+V” supplies on the connector are not isolated. Using them for an input will mean that input is no longer isolated. This may or may not be a concern in your application.

Example input wiring:



- Input 1 *is not* isolated, since the switch uses the +V and G terminals of the input connector.
- Input 2 *is* fully isolated, since it uses its own power source for the switch.

SSR Outputs

The DIO-1 has two isolated Solid State Relay (SSR) outputs, each of which can switch up to 500mA at up to 60v DC.

Each SSR is protected with a PTC automatic reset fuse, and provides up to 1.5KV of isolation.

Outputs are Normally Open, and have an On resistance of approx. 0.5Ω. Off state leakage current is max 1μA. The outputs are reverse polarity protected.

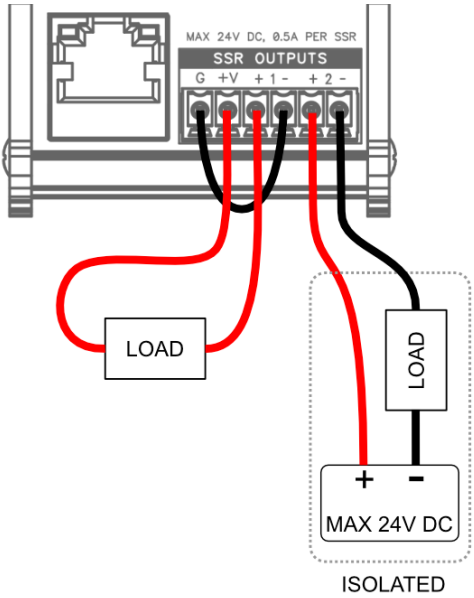
When an SSR output is turned on, the relevant **OUT-1** or **OUT-2** LED will be illuminated on the front of the module.

The SSR connector includes power supply terminals connected to the module ground ("G") and positive supply input ("+V"). These may be useful if you need to drive an indicator or external relay, and are not concerned with output isolation.

The "G" and "+V" supplies on the connector are not isolated. Using them for an output will mean that output is no longer isolated. This may or may not be a concern in your application.

Solid State Relays are polarized. You must ensure you connect the SSR outputs with the correct polarity.

Example SSR output wiring:



- Output 1 is not isolated, since the load uses the +V and G terminals of the output connector.
- Output 2 is fully isolated, since it uses its own power source for the load.

Reset Button

A recessed Reset button is located on the front panel. Press and hold this button for 1 second to reset the DIO-1 back to the original factory default settings:

IP Address:	192.168.1.100
Sub-net mask:	255.255.255.0
Gateway:	192.168.1.1
TCP Port:	2000

Status LED

The Status LED on the front of the DIO-1 flashes once a second to indicate the module is operating correctly.

If the Status LED does not flash, but the power LED is on, it indicates a hardware fault, and the DIO-1 may need to be returned for repair.

I/O LED's

There are LED's for the two inputs and two outputs. If an LED is ON it indicates that I/O state is currently on.

Ethernet Protocol and Commands

The control protocol is Ethernet TCP/IP.

In the following table, items in **`Bold Courier`** font are literal "as is" text. Other items are variable.

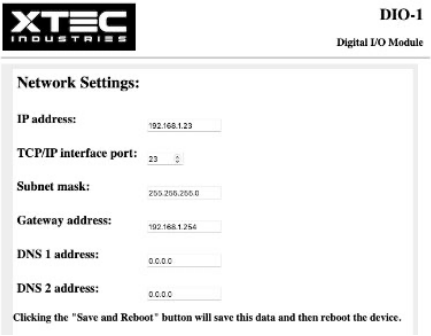
All commands MUST be terminated with a Carriage Return (CR, Character 13, Hex 0x0D).

Cmd sent to DIO-1	DIO-1 Returns	Description
Sns *Terminate with CR*	**S**ns *+CR*	Set SSR output: • "**S**" is literal capital S • "n" is the output, 1 or 2 • "s" is the state, 0 or 1 Eg: Send "S11" to switch ON output 1. Send "S20" to switch OFF output 2.
?n *Terminate with CR*	**?**ns *+CR*	Get Input state: • "**?**" is literal ? • "n" is the input number, 1 or 2 The DIO-1 will return: • "**?**" is literal ? • "n" is the input number, 1 or 2 • "s" is the state, 0 or 1 Eg: Send "?1" will return "?11" if input 1 is ON. Send "?2" will return "?20" if input 2 is OFF.

Note: The DIO-1 web browser configuration uses port 80.

Configuration

The DIO-1 is configured using a web browser.



1. Connect a laptop or other computer to the DIO-1 Ethernet port.
2. Set the IP address of your computer to be in the same subnet range as the DIO-1.
3. Open your web browser, and type the IP address of the DIO-1 in the address bar. You should see the configuration page similar to above.
4. Set the IP address, subnet mask, gateway and DNS as required. Click Save and Reboot.

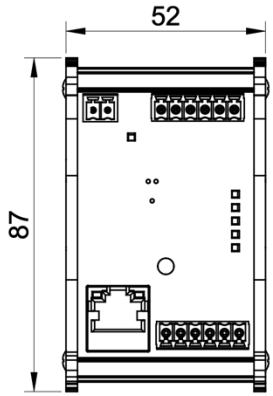
After you change the DIO-1 network settings, you may need to reconfigure your PC network settings if you wish to reconnect.

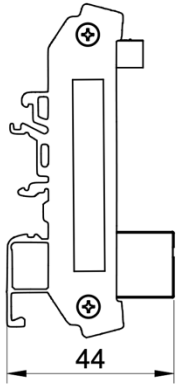
Specifications

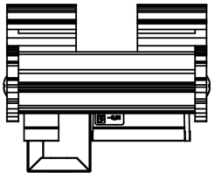
Digital Inputs	Voltage Range	12-24v DC
	Type	IEC61131-2 Type 3
	Min ON current	~2.25mA
	Isolation *	2500Vrms
Digital Outputs	Max Voltage	60v DC
	Max Current	500mA
	Switch Speed	5mS
	Isolation *	1500Vrms
Control	Ethernet	10/100BASE-T
	Protocols	TCP/IP, HTTP
	Connector	RJ-45 copper
UI	LED's	Power, status, DI-1/2 state, DO1/2 state, Network activity and link
	Controls	Reset button
Physical	Temperature	-20C to +85C
	Heat	~1w
	Weight	0.2Kg
	Dimensions (WxHxD)	40 x 87 x 50mm

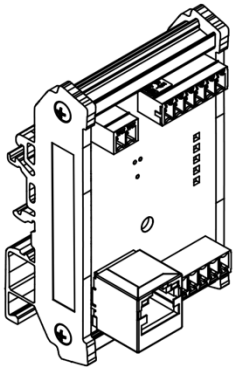
* Only when not using local power supply.

Drawing









Notes

Limited Warranty

This product is warranted to be free from defects in materials and workmanship under normal use for a period of three (3) years from the date of purchase. This Limited Warranty is valid only for the original purchaser and is non-transferable.

During the warranty period, if this product is found to be defective, we will repair or replace it, at our discretion, without charge. This warranty does not cover damage caused by misuse, abuse, accidents, unauthorized repairs, or alterations.

To obtain warranty service, please contact our customer service team and provide proof of purchase. We reserve the right to request the return of the defective product for inspection.

This Limited Warranty is the sole and exclusive warranty for the product, and no other warranties, express or implied, are made. In no event shall we be liable for any incidental, consequential, or special damages.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or country to country.

For more information on our products, please visit:
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