

MODULUS

Discrete Input/Output Modules 1212

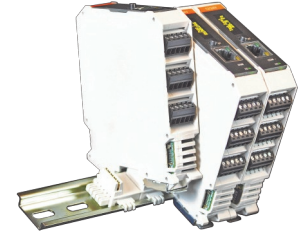
Modulus Discrete Input/Output (DIDO) modules extend the I/O capacity of Modulus SCADA controllers, as well as the many 3rd party devices that support industry standard communications protocols such as Modbus, DF1, and Ethernet IP.

DIDO modules are available as 12/24V or 120/240V Discrete Input models. Both AC and DC signals are supported.

Modulus DIDO modules have built-in web pages for configuration, programming, monitoring and manuals. No application software is needed; just a web browser. Custom user documentation can also be loaded into the module, so that drawings, datasheets, etc. are always available for site support and maintenance.



8x-1004 (12/24V)
8x-1104 (120/240V)



Modulus DIDO Discrete Input Module

- 12 DISCRETE INPUTS (OPTICALLY ISOLATED)
- 12 DISCRETE OUTPUTS (RELAY)
- 1 ETHERNET PORT
- 1 SERIAL PORT

STANDALONE OPERATION

Modulus DIDO modules can serve as standalone devices with SCADA communications, local and web human machine interfaces (HMIs), trending and data logging, alarming, reporting, and programmable logic control.

COMMUNICATIONS

DIDO modules have an Ethernet port and a serial port to communicate directly with Modbus devices, as well as Allen Bradley PLCs. Ethernet to Serial bridging is also supported. The module can also serve as a communications concentrator or master controller.

GRAPHICAL, MOBILE, AND LOCAL HMIs

Configurable graphical web and mobile device interfaces are built into DIDO modules. The front panel display can also be customized to show live process values and states, and make setting changes.

HISTORICAL TRENDING AND EVENT LOGGING

DIDO modules have an internal solid state flash disk, as well as a micro SD memory card slot to record over 100 years of data! You can retrieve and display historical data with built-in web tools and extract trend and event data as spreadsheet files.

REPORTING

Reports can be created in minutes showing live values, production totals, trend and event data, alarm summaries, etc. Customize reports with your own logos and graphics. Call up reports on demand, or have them automatically transferred to your computer.

ALARMING

A DIDO module can manage alarm conditions on any of its local inputs, as well as over 500 conditions monitored by communications with other devices. Alarms conditions can be displayed locally and annunciated by contact closure on one of its outputs, in tandem with other devices such as a Modulus Cellular Communications module (for text message and e-mail alerts). The module maintains a journal spreadsheet file of when alarms occurred, when they were acknowledged, by whom, and when the alarm conditions cleared.

PROGRAMMABLE LOGIC

Each DIDO module supports programmable logic written in any mix of ladder logic, function block and text languages. Programmable logic can be used for anything that can't be done with the built-in functions of the module.

PID AND PUMP CONTROL

DIDO modules support four Proportional, Integral and Derivative (PID) loops and have a built-in triplex Pump Controller (float or level control with alternation).

REDUNDANCY

DIDO modules support redundancy for enhanced reliability. If a module goes off-line, a designated backup can take over automatically.

Modulus DIDO 1212 Discrete Input/Output Module Specifications

FIELD I/O

Digital Inputs:

- Input Range: **[8x-1004]** 0 to 30V (OFF < 6V, ON>9V), **60V absolute maximum**
[81-1104] 0 to 240V (OFF < 60V, ON>90V), **300V absolute maximum**
[82-1104] 0 to 120V (OFF < 60V, ON>90V), **160V absolute maximum**
- Input Current: **[8x-1004]** 1.2mA @ 12V, 3mA @ 24V **[8x-1104]** 1.2mA @ 120V, 3mA @ 240V
- Filtering: Inputs 1 through 8: individually selectable—5Hz, 10Hz, 20Hz, 50Hz, 100Hz, 500Hz, 1KHz, 2KHz+
 Inputs 9 through 12: individually selectable—20Hz, 100Hz

Digital Outputs:

- Contact Output Rating: **12** Relay contacts, Form A (normally open)
 240/277 Vac, 30Vdc, 3A maximum per output (resistive load). **Do not exceed 8A on any group of 4 outputs on a terminal block.**
 A snubber diode (DC) or RC snubber (AC) must be used across the relay contacts or load connections for **any** inductive load.

COMMUNICATIONS

Ethernet:

- 1 10/100mb/s (10/100 Base-T)
 SCADA Protocols Modbus TCP & UDP (master/slave), Ethernet IP (master/slave PLC5 & SLC5/05 emulation), Ethernet to Serial bridging
 Internet Protocols HTTP (server), FTP (server & client), ICMP (ping; server and client), NTP (client), DHCP (server & client), DNS, DDNS

- Serial:** 1 RS-485 (115K, 38.4K, 19.2K, 9600, 4800, 2400, 1200 baud). This port is available if not used for bus communications with other modules.
 Protocols Modbus RTU (master/slave), DF1 (slave)

HMIs

- Local:** 128x32 graphical, wide temperature range yellow OLED and single pushbutton
Graphical: Web based, graphic library included. Compatible with most browsers, including Internet Explorer, Firefox, Chrome, Safari, Android
Mobile: Web based, text only, up to 50 registers. Compatible with most browsers, including Internet Explorer, Firefox, Chrome, Safari, Android

PROGRAMMING

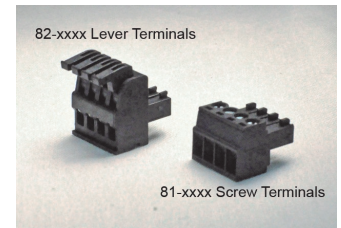
- Languages:** Ladder Logic, Function Block, Text—built-in web based graphical and text editor and debugger
Capacity: 64KB logic, 2MB source code

STORAGE

- Registers:** 504 Numeric registers, 504 Boolean registers
Internal Flash disk: 32MB
Removable disk: Micro SD Card (up to 256GB, supplied by customer)

GENERAL

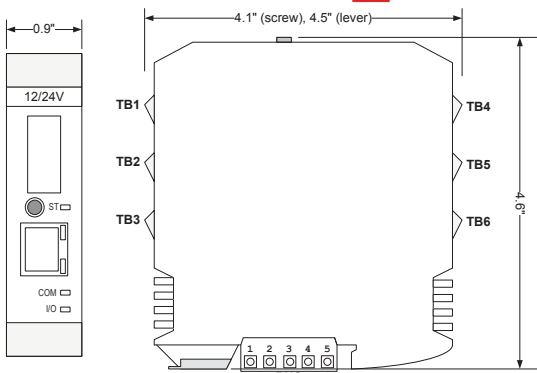
- Input Power:** 10Vdc to 30Vdc
Power Consumption (average)
 Not using Ethernet, relays OFF 18mA @ 12Vdc / 13mA @ 24Vdc (Ethernet power saver enabled)
 Using Ethernet, relays OFF 78mA @ 12Vdc / 43mA @ 24Vdc
 Additional current per relay ON 10mA @ 12Vdc / 5mA @ 24Vdc
- Field Wiring Termination:** **[81-1x04]** screw terminal blocks **[82-1x04]** lever terminal blocks, 3.5mm, 22 to 14GA wires
Temperature: -40°C to 70°C (operating), -40°C to 85°C (storage)
Humidity: <95% RH (non-condensing)
Enclosure: Polyamide, light gray (RAL 7035)
Mounting: 35mm DIN rail with bus connector block



Specifications subject to change without notice. Consult factory to ensure that you are working with current information.

DIMENSIONS and WIRING

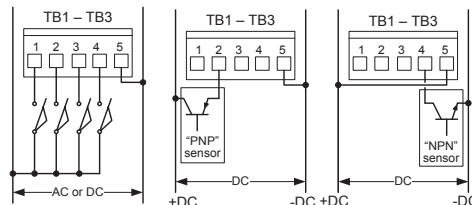
Refer to the installation manual for additional installation details and precautions.



Terminal	Function
1	-485
2	+485
3	RESET#
4	GND
5	+V

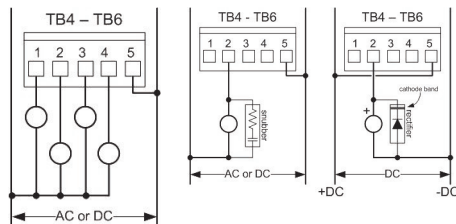
Terminal Block	Inputs/Outputs
TB1	DI1 - DI4
TB2	DI5 - DI8
TB3	DI9 - DI12
TB4	DO1 - DO4
TB5	DO5 - DO8
TB6	DO9 - DO12

OPTICALLY ISOLATED DISCRETE INPUTS



The discrete inputs on a terminal block share a common with only the inputs on that same block and are isolated from all other I/O points. All inputs are bipolar (not polarity sensitive).

RELAY OUTPUTS



The relay outputs on a terminal block share a common with only the other outputs on that same block and are isolated from all other I/O points.

A snubber diode (DC) or RC snubber (AC) must be used across the relay contacts or load connections for **any** inductive load.