Data Acquisition and Distributed IO Modules
High Resolution Modbus RTU Protocol IO Modules for PLC, HMI, SCADA, etc.

A line of Modbus based IO modules (Modbus RTU slave) for data acquisition and other applications offering reliable low-cost solution for distributed IO applications to PLC’s, HMI’s and/or PC based SCADA systems. All modules have LED indicators for visualization of IO status (digital), fault diagnostic analysis and easy DIP Switch configuration for Modbus addressing from 1 to 127.

PC based configuration software, IO Studio, is provided and used for module configuration, viewing real time data and when necessary to check IO status. The optional IO Studio Plus, a data acquisition PC software allowing IO modules to be connected directly to a PC [RS232/485], provides Real Time Viewer to display real-time data in digital values, bar graphs, trends, etc. as well as a Historical Data Viewer; a maximum of 1024 tags.

Connect IO Modules via Ethernet? The PC-E Serial Modbus to Modbus TCP Ethernet converter provides an easy & cost effective manner to connect Serial Modbus devices to Ethernet TCP networks; for additional information refer to PC-E sales brochure.

Digital Input & Output Modules

- Digital Input Modules:
  - 16 digital inputs & counters
  - 8 Digital inputs and counters

- Digital Output Modules:
  - 16 digital output (24VDC)
  - 4-relay output (form C)

- Digital Input & Output Modules
  - 8 Digital Input / 8 Digital Output (24VDC)

Analog Input & Output Modules

- Analog Input Modules
  - 8 Thermocouple Input & 0-50mV & 0-100
  - 6 RTD Input (PT100/1000, NI120/1000, etc.)
  - 8 Analog Input (mA & VDC Modules)

- Analog Output Modules
  - 8 Analog Outputs (mA & VDC modules)

Combined Analog & Digital I/O Module

- Input: Analog - 2 mA/VDC and 2 RTD
  Digital - 4 digital inputs (counter)

- Output: Analog - 1 mA/VDC
  Digital - 2 digital outputs (24VDC)
COMMON MODULE SPECIFICATIONS

POWER: 12 to 24 VDC power (Logic); consumption varies by module type - refer to manual. Consumption @24VDC varies 14 to max of 58mA

Weight: 105 grams (0.23 lbs)  Interface: 2-wire RS485 Modbus RTU  Modbus Maximum Address: 127

Operating Temperature: -10C to +50C  Baud Rate: 2400 – 115,200.  Modbus Addressing: DIP Switch

Storage Temperature: -40C to +85C  Parity: None, Even or Odd  Stop Bits: 1 or 2

Dimensions [W x H x D]: 23 x 109 x 98mm  Mounting: DIN Rail  Data Bits: 8

DIGITAL MODULES

Common Specifications

Counter Resolution : 32-Bit  Pulse Width: Min 500micro second  Input filter: Maximum 6553 millisecones

Counter Frequency: 1Khz  Counter Mode: Up / Down  Input Impedence: 2200 ohms

Digital Input 0 Level: 0 – 6.5VDC  Digital Input 1 Level: 12 to 24VDC  Note: 4-Relay Output Module is available with 24VDC input only.

Type of Module: 16 Digital Input 16-Digital Output 4-Relay Output 8-Digital Input/Output

<table>
<thead>
<tr>
<th>Number of Counters</th>
<th>Status Indicator for each channel</th>
<th>Watchdog Timer (1-255 seconds)</th>
<th>Type of Digital Output (36VDC)</th>
<th>Maximum Load Current (per channel)</th>
<th>Isolation  [Field IO &amp; Logic (module)]</th>
<th>Isolation (channel to channel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>100mA</td>
<td>1500 Vrms</td>
<td>Optional: 350 V (P-P)</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>N/A</td>
<td>0.5A (220VAC/1A(28VDC)</td>
<td>1500 Vrms</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>Open Collector</td>
<td>0.5A</td>
<td>1500 Vrms</td>
<td>350 V (P-P)</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>Form C Relay</td>
<td>100mA</td>
<td>1500 Vrms</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>Open Collector</td>
<td>100mA</td>
<td>1500 Vrms</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
<td>1500 Vrms</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
<td>1500 Vrms</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
<td>1500 Vrms</td>
<td>N/A</td>
</tr>
</tbody>
</table>

RTD & THERMOCOUPLE INPUT MODULES

Module Type 6 RTD Inputs (2/3 wire)  8 Thermocouple Inputs

Configurable Input Types PT100, PT1000, Ni1120, 10-400 & 100-4000 ohms  J, K, E, T, N, S, R, C, D, G, mV

Ni11000 DIN, Ni1000 Landsys & Gyr

Sample Rate per Second 0.52

Isolation [Field IO & Logic (module)] 1500 Vrms

Isolation (channel to channel) Optional: 350 V (P-P)

Accuracy 0.3C

Typical 0.3C/ CJC 0.5C: refer to manual

Resolution & Drift All Models: Resolution 0.1C / Drift 0.01% of span/C from reference 25C

ANALOG CURRENT & VOLTAGE INPUT MODULES

Module Type (8-channels) mA VDC mA Isolated VDC Isolated

Type Single Ended Single Ended Differential Differential

Input mA / VDC 0-20mA 0-10/0-5VDC 0-20mA 0-10/0-5VDC

Offset by Switch 4mA 2 / 1VDC 4mA 2 / 1VDC

Sample Rate per Second 12.5 Samples 12.5 Samples 12.5 Samples 12.5 Samples

Impedance 250 ohms 20 K ohms 250 ohms 110 K ohms

Isolation [Field IO & Logic (module)] 1500 Vrms 1500 Vrms 1000 Vrms 1000 Vrms

Isolation (channel to channel) N/A N/A 350 V (P-P) 350 V (P-P)

Accuracy All Models: 0.2% of Span

Resolution & Drift All models: Resolution 12-Bit (4,095) / Drift 50 ppm/C or 0.05% of span/C from reference 25C

ANALOG CURRENT & VOLTAGE OUTPUT MODULES

Module Type (8-channels) mA VDC

Input mA / VDC 0-20mA 0-10VDC

Offset by Switch 4mA 2 VDC

Accuracy All Models: Resolution 12-Bit (4,098) / Drift 100 ppm/C or 0.01% of span/C from reference 25C

Load 500 ohms @12VDC/1 K ohms @24VDC 2K minimum ohms

Isolation [Field IO & Logic (module)] 1500 Vrms 1500 Vrms

Combination Module: Analog / Digital Input & Output

Analog Inputs - quantity 2: 0-20mA/0-10VDC; Resolution 12-Bit (4,098); Impedance: mA = 250 ohms, VDC = 190K ohms

Analog Outputs - quantity 1: 0(4)-20mA/0(2)-10VDC; Resolution 12-Bit; Drift 100 ppm/C; Accuracy 0.05% of span;

Load: mA = 1K ohms @24VDC; VDC = 2K ohms

Digital Inputs - quantity 4: Counter; 32-Bit, Frequency 50 Hz, Pulse Width 20ms, Input Voltage 10-26VDC

Digital Outputs - quantity 2: Open Collector, 36VDC maximum, 100mA/Output

RTD Inputs - quantity 2: Types PT100, PY1000, Ni120, Resolution 0.1C, Isolation 1500 V RMS

Ordering Code

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
<th>Model Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO-16DI</td>
<td>16 Digital Input Module including Counters</td>
<td>IO-8AIIS</td>
<td>8 Analog Input 0-20mA / 4-20mA</td>
</tr>
<tr>
<td>IO-16DO</td>
<td>16 Digital Output Module</td>
<td>IO-8AIIV</td>
<td>8 Analog Input 0-20mA / 4-20mA; Isolated</td>
</tr>
<tr>
<td>IO-4RO</td>
<td>4 Relay Output Module</td>
<td>IO-8AIYVS</td>
<td>8 Analog Input 0-5/1-5/0-10/2-10VDC; Isolated</td>
</tr>
<tr>
<td>IO-8DIO</td>
<td>8 Digital Input /8 Digital Output Module</td>
<td>IO-8A0I</td>
<td>8 Analog Output 0-20mA/4-20mA</td>
</tr>
<tr>
<td>IO-8AOV</td>
<td>8 Analog Output 0-10/2-10VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO-6RTD</td>
<td>6 RTD Input Module</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO-8TC</td>
<td>8 Thermocouple Input Module &amp; 0-50mV and +/- 100mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO-8TC5</td>
<td>8 Thermocouple Input Module &amp; 0-50mV and +/- 100mV; Isolated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO-DAIO</td>
<td>Combination Input/Output Module: 2 RTD &amp; 2 Analog Inputs (mA/VDC), 1 Analog Output, 4 Digital Inputs &amp; 2 Digital Outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO-Studio</td>
<td>Standard PC Software to set Module communication parameters, read IO status and when used for diagnosis force outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO-Studio Plus</td>
<td>Optional Data Acquisition Software connecting directly to IO Modules with maximum of 1,024 tags; available 2008</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

http://www.futuredesigncontrols.com