**Overview**

The PICOBOX Modbus Data Acquisition (DAQ) is digital and analog I/O modules which are connected together on a RS485 network and is applicable for any HMI / SCADA solution. Communicating via the Modbus RTU protocol, PICOBOX DAQ is equipped with a 32-bit ARM CPU to provide high speed data processing and fast communication turn around times. Comes in 14 different module types to cater different I/O requirements. PICOBOX DAQ is a simple and cost-effective solution for any distributed I/O requirements in SCADA environment.

**How Modbus DAQ Works**

![Diagram of Modbus DAQ](image)

**Features**

- Portable device, DIN-rail mounting for easy installation
- Modbus connectivity
- Simple setup and easy handling on RS485 network
- Isolated modules available for special applications
- Low-cost IO modules for future expansion
- Works with MCONEX and other Modbus Master devices
- Easy module configuration and troubleshooting
- Data storage and close to real-time analysis on PC
- IO modules compatible with third party software via Modbus RTU Protocol
- Interface with field devices to provide real-time data for SCADA / PLC / HMI
- LEDs on every module for digital I/O status, communication and power supply
- Different types of IO Modules AI, AO, DI, DO, RTD, Thermocouples are available
- Direct reading of temperature without scaling by using RTD and Thermocouple Modules

**Applications**

- **Data Centre**
  - (UPS, Air-con, Router, Server, Fire alarm panel, Generator, Water leakage detector, Security, Lighting, Power quality/distribution, Etc)
- **Manufacturing Process**
  - (Process error, PLC, Sensor, Machine status, Vision, Alarm signals, Vacuum, Electric transformer, Pressure valve, Gas tank, Over voltage, Etc)
- **Telecommunication**
  - (Power, Water leakage detector, Air-con, UPS, Etc)
- **Fire and Security**
  - (Door Sensor, Temperature, Smoke detector, Alarm panel, Annunciator)
- **Facility Maintenance**
  - (Lift, Elevator, Pump, ATS, Gen Set, Chiller, HVAC, HT/LT, Oil temperature, Oil pressure, Water level, Etc)
- **Energy & Power Management**
  - (Voltage Sag, Over voltage, Under voltage, Power outage, DC system)
- **Environmental**
  - (Temperature, Humidity, CO2, Wind speed, Water, Etc)
- **HVAC**
  - (Run, Trip, Fault, Etc)
- **M & E Facility Management**
  - (Tracking, Maintenance, Etc)
- **Other mission critical applications**
## Digital Modules

### PB-16DI
- **Input**: 16
- **No. of Counters**: 16
- **Counter Resolution**: 32 Bit
- **Counter Frequency**: 1 KHz
- **Counter Mode**: Up/Down
- **Pulse Width**: 500 Micro Sec
- **Input Impedance**: 2200 ohms
- **Isolation (Field & Logic)**: 1500 V RMS
- **Status Indication**: LED for each channel
- **Power Supply**: 12-24V DC

### PB-16DO
- **Input**: NA
- **No. of Counters**: NA
- **Counter Resolution**: NA
- **Counter Frequency**: 32 Bit
- **Counter Mode**: Up/Down
- **Pulse Width**: NA
- **Input Impedance**: NA
- **Isolation (Field & Logic)**: NA
- **Status Indication**: NA
- **Power Supply**: 12-24V DC

### PB-4RO
- **Input**: 8
- **No. of Counters**: 8
- **Counter Resolution**: 16
- **Counter Frequency**: NA
- **Counter Mode**: Up Down
- **Pulse Width**: 500 Micro Sec
- **Input Impedance**: 2200 ohms
- **Isolation (Field & Logic)**: 1500 V RMS
- **Status Indication**: LED for each channel
- **Power Supply**: 12-24V DC

### PB-8DIO
- **Input**: 4
- **No. of Counters**: 8
- **Counter Resolution**: 16
- **Counter Frequency**: NA
- **Counter Mode**: Up Down
- **Pulse Width**: 500 Micro Sec
- **Input Impedance**: 2200 ohms
- **Isolation (Field & Logic)**: 1500 V RMS
- **Status Indication**: LED for each channel
- **Power Supply**: 12-24V DC

## Combination Module

### Specifications
- **Analog Inputs**: 2
  - Range: 0-20 mA/0-10V DC
  - Resolution: 12 bit
  - I/P Impedance: 250 ohms for current I/P, 190 K Ohms for Voltage I/P
- **Analog Outputs**: 1
  - Range: 0(4)-20 mA/0(2)-10V DC
  - Resolution: 12 bit
  - Drift: 100 PPM/DegC
  - Accuracy: 0.05% of span
  - Load: 1000 ohms at 24V for current, 2000 Ohms for voltage output
- **Digital Inputs**: 4
  - Range: Counter 32 bit, Frequency: 50Hz
  - Pulse width: 20ms
  - Voltage: 10-26V DC
- **Digital Outputs**: 2
  - Range: Open collector, 36V DC
  - (Max) 100mA/Output
- **RTD Inputs**: 2
  - Range: Connection: 2/3 wire, Types: PT100/Ni120/PT1000
  - Resolution: 0.1 DegC
  - Isolation: 1500 V RMS
- **Power Supply**: 12-24V DC

### PB-DAIO
### Analog Modules RTD and Thermocouple Inputs

#### Specifications

<table>
<thead>
<tr>
<th></th>
<th>PB-6RTD</th>
<th>PB-8TC</th>
<th>PB-8TCs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inputs</strong></td>
<td>6, RTD Inputs</td>
<td>8, Thermocouple Inputs</td>
<td>8, Isolated Thermocouple Inputs</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>PT100, Ni 120, PT1000, Ni1000-DIN, NI1000 Landys &amp; Gyr</td>
<td>J,K,E,T,N,B,S,R,mV, C, D and G</td>
<td>J,K,E,T,N,B,S,R,mV, C, D and G</td>
</tr>
<tr>
<td><strong>Connection</strong></td>
<td>2/3 wire</td>
<td>2 wire</td>
<td>2 wire</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>0.1 DegC</td>
<td>0.1 DegC</td>
<td>0.1 DegC</td>
</tr>
<tr>
<td><strong>Sample Rate</strong></td>
<td>31 samples/min</td>
<td>42 samples/min</td>
<td>37 samples/min</td>
</tr>
<tr>
<td><strong>Drift</strong></td>
<td>100 PPM/DegC</td>
<td>100 PPM/DegC</td>
<td>100 PPM/DegC</td>
</tr>
<tr>
<td><strong>Isolation (Field &amp; Logic)</strong></td>
<td>1500 V RMS</td>
<td>1500 V RMS</td>
<td>1500 V RMS</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>12V to 24V DC</td>
<td>12V to 24V DC</td>
<td>12V to 24V DC</td>
</tr>
</tbody>
</table>

### Current & Voltage Inputs

#### Specifications

<table>
<thead>
<tr>
<th></th>
<th>PB-8AI1</th>
<th>PB-8AI4</th>
<th>PB-8AI5</th>
<th>PB-8AI5S</th>
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<tbody>
<tr>
<td><strong>Analog Inputs</strong></td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Single-Ended</td>
<td>Single-Ended</td>
<td>Differential</td>
<td>Differential</td>
</tr>
<tr>
<td><strong>Voltage</strong></td>
<td>0-10V DC / 0-5V DC</td>
<td>NA</td>
<td>0(2) - 10V / 0(1) - 5V DC</td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td>0-20 mA</td>
<td>NA</td>
<td>0-20 mA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Offset by Switch</strong></td>
<td>4 mA</td>
<td>2V DC (0-10)/ 1V DC (0-5)</td>
<td>4 mA</td>
<td>2V DC (0-10)/ 1V DC (0-5)</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>12 bit (0-4095)</td>
<td>12 bit (0-4095)</td>
<td>12 bit (0-4095)</td>
<td>12 bit (0-4095)</td>
</tr>
<tr>
<td><strong>Sample Rate</strong></td>
<td>12.5 samples/sec</td>
<td>12.5 samples/sec</td>
<td>12.5 samples/sec</td>
<td>12.5 samples/sec</td>
</tr>
<tr>
<td><strong>I/P Impedance</strong></td>
<td>250 Ohms</td>
<td>20 K Ohms</td>
<td>250 Ohms</td>
<td>110 K Ohms</td>
</tr>
<tr>
<td><strong>Isolation (Ch-Ch)</strong></td>
<td>NA</td>
<td>NA</td>
<td>350 V (P,P)</td>
<td>350 V (P,P)</td>
</tr>
<tr>
<td><strong>Drift</strong></td>
<td>50 ppm/DegC</td>
<td>50 ppm/DegC</td>
<td>100 ppm/DegC</td>
<td>100 ppm/DegC</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>0.2% of span</td>
<td>0.2% of span</td>
<td>0.2% of span</td>
<td>0.2% of span</td>
</tr>
<tr>
<td><strong>Isolation (Field &amp; Logic)</strong></td>
<td>1500 V RMS</td>
<td>1500 V RMS</td>
<td>1000 V RMS</td>
<td>1500 V RMS</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>12V - 24V DC</td>
<td>12V - 24V DC</td>
<td>12V - 24V DC</td>
<td>12V - 24V DC</td>
</tr>
</tbody>
</table>

### Analog Outputs

#### Specifications

<table>
<thead>
<tr>
<th></th>
<th>PB-8AOI</th>
<th>PB-8AOV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog Outputs</strong></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Voltage</strong></td>
<td>NA</td>
<td>0-10V DC</td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td>0-20 mA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Offset</strong></td>
<td>4 mA</td>
<td>2V DC</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>12 bits (0-4095)</td>
<td>12 bits (0-4095)</td>
</tr>
<tr>
<td><strong>Drift</strong></td>
<td>100 ppm/DegC</td>
<td>100 ppm/DegC</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>0.05% of span</td>
<td>0.05% of span</td>
</tr>
<tr>
<td><strong>Load</strong></td>
<td>1000 Ohms @ 24V DC</td>
<td>2000 Ohms</td>
</tr>
<tr>
<td><strong>Isolation (Field &amp; Logic)</strong></td>
<td>1500 V RMS</td>
<td>1500 V RMS</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>12V - 24V DC</td>
<td>12 - 24V DC</td>
</tr>
</tbody>
</table>
Typical DAQ Setup

Environmental & Physical
- Operating Temperature: -10°C to + 50°C
- Storage Temperature: -40°C to + 85°C
- Dimension (W x H x D): 23 x 109 x 98mm
- Weight: 105 grams
- Mounting: DIN Rail
- Power Supply: 12 - 24V DC
- Isolation (Field & Logic): 1500 V RMS

Communication
- Interface: 2 Wire, RS485
- Modbus Address Setting: By Dip Switch
- Modbus Max Address: 127 only
- Baud Rate: 2400, 4800, 9600, 19200, 38400, 57600, 115200
- Parity: None, Even, Odd
- Stop Bits: 1, 2
- Data Bits: 8

Model & Description
- PB-16DI: 16 Digital Input Module Including Counters
- PB-16DO: 16 Digital Output Module
- PB-4RO: 4 Relay Output Module
- PB-8DIO: 8 Digital Input & 8 Digital Output Module
- PB-8TC: 8 Thermocouple Input Module Incl. 0-50mV & ±100mV I/P
- PB-8TCS: 8 TC Input Module Incl. 0-50mV & ±100mV I/P Fully Isolated
- PB-6RTD: 6 RTD Input Module - PT100, Ni120, PT1000, Ni1000, Ni1000LG & Ohms
- PB-8AI: 8 Analog Input 0-20mA / 4-20mA
- PB-8AIV: 8 Analog Input 0-5V / 1-5V / 0-10V / 2-10V
- PB-8AIIS: 8 Analog Input 0-20mA / 4-20mA / ± 20mA Fully Isolated
- PB-8AIVS: 8 Analog Input 0-1V / 0-10V / ± 1V / ± 10V Fully Isolated
- PB-8AOI: 8 Analog Output Module 4-20mA
- PB-8AOV: 8 Analog Output Module 2-10V
- PB-DAIO: 2 RTD I/P, 2 Analog Input 4-20mA / 2-10V, 1 Analog Output 4-20mA / 2-10V, 4 Digital Input, 2 Digital Output