Power supply
- 24VDC
- Permissible range: 20.4VDC to 28.8VDC with less than 10% ripple
- Maximum current consumption: 290mA @ 24VDC

Digital inputs
- 22 pnp (source) or npn (sink) inputs. See Notes 1 and 2
- Nominal input voltage: 24VDC. See Note 3.
- Input voltages for pnp (source):
  - 0-5VDC for Logic ‘0’
  - 17-28.8VDC for Logic ‘1’
- Input voltages for npn (sink):
  - 17-28.8VDC/1mA for Logic ‘0’
  - 0-5VDC/3mA for Logic ‘1’
- Input current: 3.7mA @ 24VDC
- Input impedance: 6.5kΩ
- Response time (except high-speed inputs): 10mS typical
- Galvanic isolation: None
- Input cable length: Up to 100 meters, unshielded

High-speed counter
- Specifications below apply when inputs are wired for use as a high-speed counter/encoder. See Notes 4 and 5.
  - Resolution: 32-bit
  - Input freq.: 10kHz max.
  - Minimum pulse: 40μs

**Warning:**
- Unused pins should not be connected. Ignoring this directive may damage the controller.
- Improper use of this product may severely damage the controller.
- Refer to the controller's User Guide regarding wiring considerations.
- Before using this product, it is the responsibility of the user to read the product's User Guide and all accompanying documentation.
**Analog Inputs**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Inputs</td>
<td>Two 10-bit, multi-range inputs: 0-10V, 0-20mA, 4-20mA See Note 1 on page 1</td>
</tr>
<tr>
<td>Conversion method</td>
<td>Successive approximation</td>
</tr>
<tr>
<td>Input impedance</td>
<td>&gt;150KΩ for voltage 243Ω for current</td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td>None</td>
</tr>
<tr>
<td>Resolution (except 4-20mA)</td>
<td>10-bit (1024 units)</td>
</tr>
<tr>
<td>Resolution at 4-20mA</td>
<td>204 to 1023 (820 units)</td>
</tr>
<tr>
<td>Conversion time</td>
<td>Synchronized to scan time</td>
</tr>
<tr>
<td>Absolute max. rating</td>
<td>±15V/30mA</td>
</tr>
<tr>
<td>Full scale error</td>
<td>± 2 LSB</td>
</tr>
<tr>
<td>Linearity error</td>
<td>± 2 LSB</td>
</tr>
<tr>
<td>Status indication</td>
<td>Yes, See Note</td>
</tr>
</tbody>
</table>

**Relay Outputs**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay outputs</td>
<td>12 relay (in 3 groups) See Note</td>
</tr>
<tr>
<td>Output type</td>
<td>SPST-NO (Form A)</td>
</tr>
<tr>
<td>Type of relay</td>
<td>Tyco PCN-124D3MHZ or compatible</td>
</tr>
<tr>
<td>Isolation</td>
<td>by relay</td>
</tr>
<tr>
<td>Output current (resistive load)</td>
<td>3A max per output 8A max total for common</td>
</tr>
<tr>
<td>Rate voltage</td>
<td>250VAC / 30VDC</td>
</tr>
<tr>
<td>Minimum load</td>
<td>1mA@5VDC</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>100k operations at maximum load</td>
</tr>
<tr>
<td>Response time</td>
<td>10ms (typical)</td>
</tr>
<tr>
<td>Contact protection</td>
<td>External precautions required (see below)</td>
</tr>
</tbody>
</table>

**Voltage connection**

- **Notes:**
  a. Shields should be connected at the signals’ source.
  b. The 0V signal of the analog input must be connected to the controller’s 0V.

**Current connections**

- **Notes:**
  a. Shields should be connected at the signals’ source.
  b. The 0V signal of the analog input must be connected to the controller’s 0V.

**Increasing Contact Life Span**

To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

- a clamping diode in parallel to each inductive DC load.
- an RC snubber circuit in parallel with each inductive AC load.
### Graphic Display
- STN, LCD display

### Illumination backlight
- LED, yellow-green, software-controlled

### Display resolution
- 128x64 pixels

### Keypad
- Sealed membrane
- Number of keys: 16

### Program
- Application memory: 448K
- Memory Bits (coils): 4096
- Memory Integers (registers): 2048
- Long Integers (32 bit): 256
- Double Word (32 bit unsigned): 64
- Floats: 24
- Timers: 192
- Counters: 24
- Data Tables: 120K (RAM) / 64K (FLASH)
- HMI displays: Up to 255
- Execution time: 0.8μs for bit operations

### RS232/RS485 serial ports
- Used for:
  - Application Download/Upload
  - Application Testing (Debug)
  - Connect to GSM/GPRS or standard telephone modem.
  - Send/receive SMS messages
  - Remote access programming
  - RS485 Networking

#### RS232 (see note)
- 2 ports
- Galvanic isolation: None
- Voltage limits: ±20V

#### RS485 (see note)
- 2 ports
- Input voltage: -7 to +12V differential max.
- Cable type: Shielded twisted pair, in compliance with EIA RS485
- Galvanic isolation: None
- Baud rate: 110 – 57600 bps
- Nodes: Up to 32

**Note:**
RS232/RS485 is determined by jumper settings and wiring. Refer to the controller’s User Guide regarding communications.

### I/O expansion port
- Up to 128 additional I/Os, including digital and analog I/Os, temperature and weight inputs and more (number of I/Os may vary according to expansion model)

### Miscellaneous
- **Clock (RTC)**
  - Real-time clock functions (Date and time).

- **Battery back-up**
  - 7 years typical at 25°C, battery back-up for RTC and system data.

- **Battery**
  - Coin type, 3V lithium battery, CR2450

- **Weight**
  - 310g (10.9 oz.)

- **Operational temperature**
  - 0 to 50°C (32 to 122°F)

- **Storage temperature**
  - -20 to 60°C (-4 to 140°F)

- **Relative Humidity (RH)**
  - 5% to 95% (non-condensing)

- **Mounting method**
  - DIN-rail mounted (IP20/NEMA1)
  - Panel mounted (IP65/NEMA4X)
The tables below show how to set a specific jumper to change the functionality of the controller. To open the controller and access the jumpers, refer to the directions at the end of these specifications.

**Important:** Incompatible jumper settings and wiring connections may severely damage the controller.

<table>
<thead>
<tr>
<th>Jumper #</th>
<th>NPN</th>
<th>PNP*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Inputs</td>
<td>JP3</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jumper #</th>
<th>Voltage</th>
<th>Current</th>
<th>Digital*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog 1/14</td>
<td>JP1</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Analog 1/14</td>
<td>JP4</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Analog 0/15</td>
<td>JP2</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Analog 0/15</td>
<td>JP5</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

*Default factory setting

In this figure, the jumper settings will cause the controller to function as follows:
- Digital inputs: npn, 24V/DC inputs
- Analog input 1: Voltage input
- Analog input 0: Current input

Opening the controller enclosure
1. Locate the 4 slots on the sides of the enclosure
2. Using the blade of a flat-bladed screwdriver, gently pry off the back of the controller as shown in the figure below, exposing the controller's board.