120-12-T1 Graphic Operator Panel & Programmable Logic Controller
12/24 VDC, 12 pnp/npn digital inputs, 2 high-speed counter/shaft encoder inputs, 12 transistor outputs, I/O expansion port, 2 RS232/RS485 ports

**Power supply**
12VDC or 24VDC
Permissible range 10.2VDC to 28.8VDC with less than 10% ripple
Maximum current consumption 130mA@24VDC (pnp inputs)
230mA@24VDC (nnp inputs)
240mA@12VDC (pnp inputs)
280mA@12VDC (nnp inputs)

**Digital inputs**
12 pnp (source) or nnp (sink) inputs. See Note 1.
Nominal input voltage 12VDC or 24VDC. See Notes 2 and 3.
Input voltages for pnp (source):
For 12VDC 0-3VDC for Logic ‘0’
8-15.6VDC for Logic ‘1’
For 24VDC 0-5VDC for Logic ‘0’
17-28.8VDC for Logic ‘1’
Input voltages for nnp (sink):
For 12VDC 8-15.6VDC<1.2mA for Logic ‘0’
0-3VDC>3mA for Logic ‘1’
For 24VDC 0-5VDC>6mA for Logic ‘1’
Input current 4mA@12VDC
8mA@24VDC
Input impedance 3KΩ
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 input/shaft encoder. See Notes 4 and 5.
Resolution 32-bit
Input frequency 10kHz max.
Minimum pulse 40μs

**Notes:**
1. All 12 inputs can be set to pnp (source) or nnp (sink) via a single jumper and appropriate wiring.
2. All 12 inputs can function in 12 VDC or 24 VDC; set via a single jumper and appropriate wiring.
3. nnp (sink) inputs use voltage supplied from the controller’s power supply.
4. Inputs #0 and #2 can each function as either high-speed counter or as part of a shaft encoder. In each case, high-speed input specifications apply. When used as a normal digital input, normal input specifications apply.
5. Inputs #1 and #3 can each function as either counter reset, or as a normal digital input; in either case, specifications are those of a normal digital input. These inputs may also be used as part of a shaft encoder. In this case, high-speed input specifications apply.

**Warnings:**
- 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.
Digital outputs
12 pnp (source) outputs
12VDC or 24VDC
Output type
P-MOSFET (open drain)
Isolation
None
Output current
0.5A max.
Total current: 3A max.
Max. frequency for normal outputs
50Hz (resistive load)
0.5Hz (inductive load)
High speed output maximum
2kHz (resistive load)
frequency
See Note 1.
Short circuit protection
Yes
Short indication
by software
On voltage drop
0.5VDC maximum
Power supply for outputs
Operating voltage
10.2 to 28.8VDC
Nominal operating voltage
12VDC or 24VDC

Note:
1. Output #0 and Output #1 may be used as high-speed outputs.

Transistor Outputs

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>NC</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
</tr>
<tr>
<td>5</td>
<td>NC</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
</tr>
<tr>
<td>9</td>
<td>Load</td>
</tr>
<tr>
<td>10</td>
<td>Ground</td>
</tr>
</tbody>
</table>

RS232/RS485 serial ports
Used for:
- Application Download/Upload
- Application Testing (Debug)
- Connect to GSM 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 & analog I/Os, RTD and more.

Miscellaneous
Clock (RTC)
Date and time-year 2000 compliant.
Battery back-up
7 years typical battery back-up for RTC and system data.
Battery
Coin type, 3V lithium battery, CR2450
Weight
280g (9.87 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 (IP66/NEMA4X)
The tables below show how to set a specific jumper to change the functionality of the inputs.

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.

**JP8**
Input type (for all digital inputs)

<table>
<thead>
<tr>
<th>To use as</th>
<th>JP8</th>
</tr>
</thead>
<tbody>
<tr>
<td>npn (sink)</td>
<td>A</td>
</tr>
<tr>
<td>pnp (source)*</td>
<td>B</td>
</tr>
</tbody>
</table>

**JP9**
Input voltage (for all digital inputs)

<table>
<thead>
<tr>
<th>To use as</th>
<th>JP9</th>
</tr>
</thead>
<tbody>
<tr>
<td>12VDC</td>
<td>A</td>
</tr>
<tr>
<td>24VDC*</td>
<td>B</td>
</tr>
</tbody>
</table>

*Default factory setting

In this figure, the jumper settings will cause the inputs to function as npn, 24VDC digital inputs

**Opening the controller’s enclosure**
1. Turn power off before opening the controller.
2. Locate the 4 slots on the sides of the enclosure.
3. 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.

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