V120-22-T38  Graphic Operator Panel & Programmable Logic Controller
24VDC, 22 pnp/npn digital inputs, 2 high-speed counter/Shaft encoder inputs, 16 transistor outputs, I/O expansion port, 2 RS232/RS485 ports

**Power supply**
- 24VDC
- Permissible range: 20.4VDC to 28.8VDC with less than 10% ripple
- Maximum current consumption: 110mA@24VDC (pnp inputs) 300mA@24VDC (nnp inputs)

**Digital inputs**
- 22 pnp (source) or nnp (sink) inputs. See Note 1.
- Nominal input voltage: 24VDC. See Note 2.
- Input voltages for pnp (source): 0-5VDC for Logic ‘0’ 17-28.8VDC for Logic ‘1’
- Input voltages for nnp (sink): 17-28.8VDC<2mA for Logic ‘0’ 0-5VDC>2mA for Logic ‘1’
- Input current: 8mA@24VDC
- Input impedance: 3KΩ
- Response time (except high-speed inputs): 10μS 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 3 and 4.
- Resolution: 32-bit
- Input frequency: 10kHz max.
- Minimum pulse: 40μs

**Power supply, pnp (source) inputs**

**nnp (sink) inputs**

**npn (sink) high-speed counter**

**Shaft encoder**

**Notes:**
1. All 22 inputs can be set to pnp (source) or nnp (sink) via a single jumper and appropriate wiring.
2. nnp (sink) inputs use voltage supplied from the controller’s power supply.
3. 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.
4. When used as a normal digital input, normal input specifications apply.
5. To avoid electromagnetic interference, mount the controller in a metal panel/cabinet and earth the power supply. Earth the power supply signal to the metal using a wire whose length does not exceed 10cm.
   If your conditions do not permit this, do notearth the power supply.

**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**

- Output type: P-MOSFET (open drain)
- Output current: 0.5A max.
- Max. frequency for normal outputs: 50Hz (resistive load), 0.5Hz (inductive load)
- High speed output maximum frequency: 2kHZ (resistive load)
- Short circuit protection: Yes
- On voltage drop: 0.5VDC maximum

**Power supply for outputs**

- Operating voltage: 20.4 to 28.8VDC
- Nominal operating voltage: 24VDC

**Note:**

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

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**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.

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**Transistor Outputs**

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**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): 2048
- Memory Integers (registers): 1600
- 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

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**I/O expansion port**

- Up to 128 additional I/Os, including digital & analog I/Os, RTD and more.

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**Miscellaneous**

- Clock (RTC): Real-time clock functions (Date and time).
- Battery back-up: 7 years typical battery back-up for RTC and system data.
- Battery: Coin type, 3V lithium battery, CR2450
- Weight: 270g (9.52 oz.)
- Operational temperature: 0 to 60°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 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.

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

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

*Default factory setting

In this figure, the jumper settings will cause the inputs to function as pnp.

**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.