### Power supply

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>12VDC or 24VDC</td>
</tr>
<tr>
<td>Permissible range</td>
<td>10.2VDC to 28.8VDC with less than 10% ripple</td>
</tr>
<tr>
<td>Maximum current consumption</td>
<td>180mA@24VDC (pnp inputs)</td>
</tr>
<tr>
<td></td>
<td>260mA@24VDC (npn inputs)</td>
</tr>
<tr>
<td></td>
<td>220mA@12VDC (pnp inputs)</td>
</tr>
<tr>
<td></td>
<td>330mA@12VDC (npn inputs)</td>
</tr>
</tbody>
</table>

### Digital inputs

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal input voltage</td>
<td>12VDC or 24VDC</td>
</tr>
<tr>
<td>Input voltages for pnp (source):</td>
<td></td>
</tr>
<tr>
<td>For 12VDC</td>
<td>&lt;3VDC for Logic '0'</td>
</tr>
<tr>
<td></td>
<td>&gt;8VDC for Logic '1'</td>
</tr>
<tr>
<td></td>
<td>&gt;5VDC for Logic '0'</td>
</tr>
<tr>
<td>Input voltages for npn (sink):</td>
<td></td>
</tr>
<tr>
<td>For 12VDC</td>
<td>&gt;8VDC&lt;1.2mA for Logic '0'</td>
</tr>
<tr>
<td></td>
<td>&lt;3VDC&lt;3mA for Logic '1'</td>
</tr>
<tr>
<td></td>
<td>&gt;17VDC&lt;2mA for Logic '0'</td>
</tr>
<tr>
<td>Input current</td>
<td>4mA@12VDC</td>
</tr>
<tr>
<td></td>
<td>8mA@24VDC</td>
</tr>
<tr>
<td>Input impedance</td>
<td>3KΩ</td>
</tr>
<tr>
<td>Response time (except high-speed inputs)</td>
<td>10ms Typical</td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td>None</td>
</tr>
<tr>
<td>Input cable length</td>
<td>Up to 100 meters, unshielded</td>
</tr>
</tbody>
</table>

### High-speed counter

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>16-bit</td>
</tr>
<tr>
<td>Input freq.</td>
<td>10kHz max.</td>
</tr>
<tr>
<td>Minimum pulse</td>
<td>40µs</td>
</tr>
</tbody>
</table>

**Notes:**

1. All 10 inputs can be set to pnp (source) or npn (sink) via a single jumper and appropriate wiring.
2. All 10 inputs can function in 12 VDC or 24 VDC; set via a single jumper and appropriate wiring.
3. npn (sink) inputs use voltage supplied from the controller’s power supply.
4. Inputs #0, #2 and #4 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, #3 and #5 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.

### Shaft encoder

![Shaft encoder diagram](image)

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

![Power supply, pnp (source) inputs diagram](image)

**nnp (sink) inputs**

![nnp (sink) inputs diagram](image)

**pnp (source) high-speed counter**

![pnp (source) high-speed counter diagram](image)

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

![npp (sink) high-speed counter diagram](image)
Analog Inputs

Two 10-bit, multi-range inputs:
- 0-10V
- 0-20mA, 4-20mA

Conversion method
Successive approximation

Input impedance
>100KΩ for voltage
500Ω for current

Galvanic isolation
None

Resolution (except 4-20mA)
10-bit (1024 units)

Resolution at 4-20mA
204 to 1023 (820 units)

Conversion time
Synchronized to scan time

Absolute max. rating
±15V

Full scale error
±2 LSB

Linearity error
±2 LSB

Status indication
Yes, see Note

Note:
The analog value can also indicate when the input is functioning out of range.
If an analog input deviates above the permissible range, its value will be 1024.

Voltage / Current connection

![Diagram showing voltage and current connections](image)

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 connection

![Diagram showing current connections](image)

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.

Digital outputs

6 relay outputs, 230VAC/ 12/24VDC

SPST-NO relay

Type of relay
Takamisawa (Fujitsu) JY-12H-K, or NAIS (Matsushita) JQ1A-12V or OMRON G6B-1114P-12VDC

Isolation
by relay

Output current
5A max. (resistive load)
1A max. (inductive load)

Max. frequency
10Hz

Contact protection
External precautions required

Display

STN, LCD display

Illumination
LED yellow-green backlight

Display size
1 line, 16 characters long

Character size
5 x 7 matrix, 3.07 x 5.73mm

Keypad
Sealed membrane

Number of keys
15

PLC program
2048 words

Bits/Counts
256

Integers/Registers
256

Timers
64

Execution time
12µsec. for bit operations

HMI displays
80 user-designed displays

HMI variables
50 HMI variables are available to conditionally display and modify text, numbers, dates, times & timer values. The user can also create a list of up to 120 variable text displays, totaling up to 2K.

RS232 serial port

Used for:
- Application Download/Upload
- Application Testing (Debug) mode
- Connect to GSM or standard telephone modem:
  - Send/receive SMS messages
  - Remote access programming
- RS485 Networking via adapter: up to 32 nodes

I/O expansion port

Up to 64 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.

Weight
310g (10.9 oz.)

Operational temperature
0 to 80°C (32 to 122°F)

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

Mounting method
DIN-rail mounted (IP20/ULNEMA1)
Panel mounted (IP65/NEMA4X)

Relay Outputs

![Diagram showing relay outputs](image)
Jumpers Settings

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.

### JP1
**Digital inputs type**

<table>
<thead>
<tr>
<th>To use as</th>
<th>JP1</th>
</tr>
</thead>
<tbody>
<tr>
<td>nnp (sink)</td>
<td>A</td>
</tr>
<tr>
<td>pnp (source)*</td>
<td>B</td>
</tr>
</tbody>
</table>

*Default factory setting

### JP5, JP6
**Power supply voltage**

<table>
<thead>
<tr>
<th>Range</th>
<th>JP5</th>
<th>JP6</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2 to 15.6VDC</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>15.6 to 28.8VDC*</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

### JP2
**Digital inputs voltage**

<table>
<thead>
<tr>
<th>To use as</th>
<th>JP2</th>
</tr>
</thead>
<tbody>
<tr>
<td>12VDC</td>
<td>A</td>
</tr>
<tr>
<td>24VDC*</td>
<td>B</td>
</tr>
</tbody>
</table>

### JP3, JP4
**Analog inputs type**

<table>
<thead>
<tr>
<th>To use as</th>
<th>JP3 for analog input #0</th>
<th>JP4 for analog input #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage input*</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Current input</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

In this figure, the jumper settings will cause the controller to function as follows:

- **Digital inputs**: nnp, 24VDC inputs
- **Analog input #0**: Voltage input
- **Analog input #1**: Current input
- **Power supply**: 24VDC

**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.