**Power supply**

- 24VDC
- Permissible range: 20.4VDC to 28.8VDC with less than 10% ripple
- Maximum current consumption: 130mA@24VDC (pnp inputs)
  160mA@24VDC (npn inputs)

**Digital inputs**

- 6 pnp (source) or npn (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 npn (sink):
  - 0-5VDC/2mA for Logic ‘0’
  - 0-5VDC/6mA for Logic ‘1’
- Input current: 8mA@24VDC
- Input impedance: 75kΩ
- 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 3 and 4.
- Resolution: 16-bit
- Input frequency: 10kHz max.
- Minimum pulse: 40µs

Notes:
1. All 6 inputs can be set to pnp (source) or npn (sink) via a single jumper and appropriate wiring.
2. npn (sink) inputs use voltage supplied from the controller’s power supply.
3. Input #0 can function as either high-speed counter or as part of a shaft encoder. In either case, high-speed input specifications apply. When used as a normal digital input, normal input specifications apply.
4. Input #1 can function as either counter reset, or as a normal digital input; in either case, specifications are those of a normal digital input. This input 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.
Analog Inputs

Type of Input
AN0 - AN1 Two 10-bit, multi-range inputs: 0-10V, 0-20mA, 4-20mA
AN2 - AN5 Four 10-bit, current inputs: 0-20mA, 4-20mA. See Note 5

Conversion method Successive approximation
Input impedance
AN0 - AN1 >100KΩ for voltage 50KΩ for current
AN2 - AN5 243Ω for current

Galvanic isolation None
Resolution (except 4-20mA) 10-bit (1024 units)
Resolution at 4-20mA 204 to 1023 (820 units)
Conversion time According to filter
Absolute max. rating ±15V
Full scale error ± 2 LSB
Linearity error ± 2 LSB
Status indication Yes, See Note 6.

Notes:
5. Analog inputs AN2 - AN5 can function only as current inputs.
6. 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

Digital outputs 5 relay outputs, 230VAC / 24VDC
Output type SPST-NO relay
Type of relay Takamisawa JY-24H-K, or NAIS (Matsushita) JQ1A-24V or OMRON G6B-1114P-24VDC
Isolation by relay
Output current 5A max. (resistive load)
1A max. (inductive load)
Max. frequency 0.5Hz (at maximum rated load)
Contact protection External precautions required

Display

Illumination STN, LCD display
LED yellow-green backlight
Display size 2 lines, 16 characters long
Character size 5 x 8 matrix, 2.95 x 5.55mm

Keypad

Number of keys 15

PLC program

Ladder Code Memory (virtual) 36K
Memory Bits (coils) 256
Memory Integers (Registers) 256
Timers 64
Execution time 12μsec. for bit operations
Database 1024 integers (indirect access)
HMI displays 80 user-designed displays
HMI variables 64 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/RS485 serial ports

RS232 (See Note 8) 1 port
Galvanic isolation None
Voltage limits ±20V
RS485 (See Note 8) 1 port
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: 8. RS232/RS485 is determined by jumper settings and wiring as described in the document "M91 RS485 Port Settings" packaged with the controller.

I/O expansion port

Up to 64 additional I/Os, including digital & analog I/Os, RTD and more.

CANbus port

Up to 63 nodes
Baud rate range 10Kbps - 1Mbps
Cable length Up to 1000m for 24VDC network

CANbus connection

Miscellaneous

Clock (RTC) Real-time clock functions (Date and Time).
Battery back-up 7 years typical battery back-up for RTC and system data.
Weight 310g (10.93 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.

### Digital Inputs type

<table>
<thead>
<tr>
<th></th>
<th>npn (sink)</th>
<th>pnp (source)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP1</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

Note: Jumper #2 is not used.

### Analog Inputs type

<table>
<thead>
<tr>
<th></th>
<th>Voltage</th>
<th>Current*</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP3</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>JP4</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

*Default factory settings.

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

**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.