

# M91-2-R6C

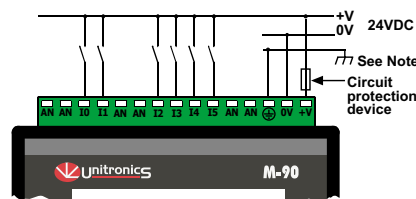
24VDC, 6 pnp/npn digital inputs, 6 analog inputs, 1 high-speed counter/shaft encoder input, 6 relay outputs, I/O expansion port, RS232/RS485, CANbus

|  |  |
|--|--|
| <b>Power supply</b>                      |  |
| Permissible range                        | 24VDC<br>20.4VDC to 28.8VDC with less than 10% ripple  |
| Maximum current consumption              | 130mA@24VDC (pnp inputs)<br>180mA@24VDC (npn inputs)   |
| <b>Digital inputs</b>                    |  |
|  | 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'<br>17-28.8VDC for Logic '1'   |
| Input voltages for npn (sink):           | 17-28.8VDC/<2mA for Logic '0'<br>0-5VDC/>6mA for Logic '1'   |
| Input current                            | 8mA@24VDC  |
| Input impedance                          | 3KΩ  |
| Response time (except high-speed inputs) | 10mS typical   |
| Galvanic isolation                       | None   |
| Input cable length                       | Up to 100 meters, unshielded   |
| <b>High-speed counter</b>                |  |
|  | 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:**

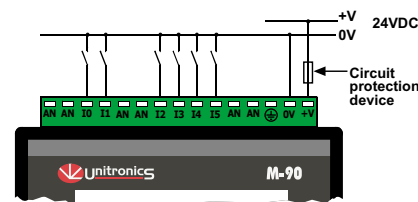
- All 6 inputs can be set to pnp (source) or npn (sink) via a single jumper and appropriate wiring.
- npn (sink) inputs use voltage supplied from the controller's power supply.
- Input #0 can function as either high-speed counter or as part of a shaft encoder. In either case, high-speed input specifications apply. When used as a normal digital input, normal input specifications apply.
- 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.

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

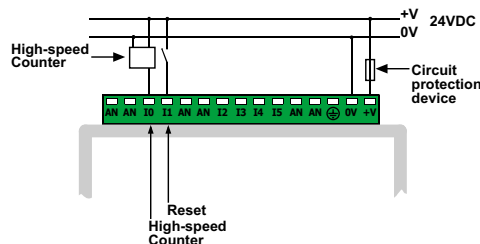


Note:  
To avoid electromagnetic interference, mount the controller in a metal panel/cabinet and earth the power supply. Earth the power supply signal to the metal using a wire whose length does not exceed 10cm. If your conditions do not permit this, do not earth the power supply.

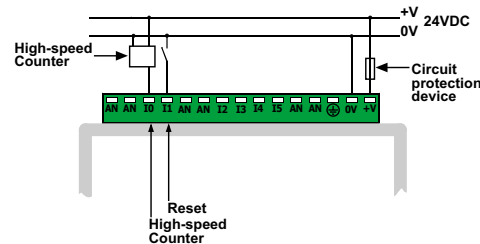
**npn (sink) inputs**



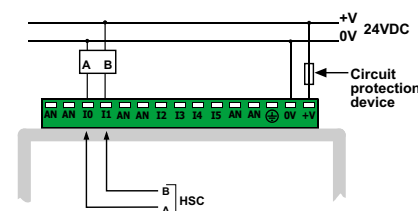
**pnp (source) high-speed counter**



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



**Shaft encoder**



**Warnings:**

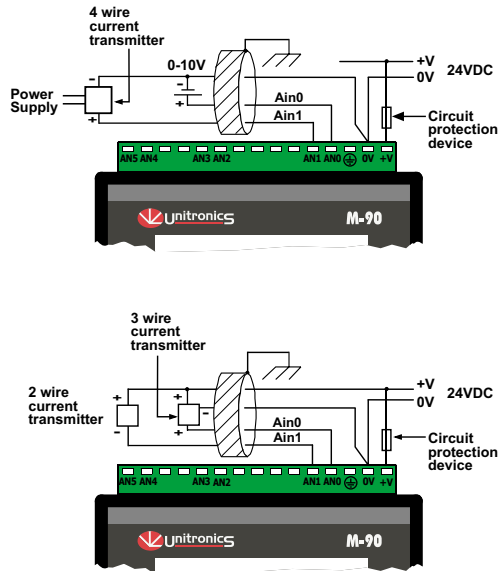
- Unused pins should not be connected. Ignoring this directive may damage the controller.
- Improper use of this product may severely damage the controller.
- Refer to the controller's User Guide regarding wiring considerations.
- Before using this product, it is the responsibility of the user to read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

| Analog Inputs              |  |
|----------------------------|--|
| Type of Input              |  |
| AN0 - AN1                  | Two 10-bit, multi-range inputs:<br>0-10V, 0-20mA, 4-20mA   |
| AN2 - AN5                  | Four 10-bit, current inputs:<br>0-20mA, 4-20mA. See Note 5 |
| Conversion method          | Successive approximation                                   |
| Input impedance            |  |
| AN0 - AN1                  | >100KΩ for voltage<br>500Ω 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:

- Analog inputs AN2 -AN5 can function only as current inputs.
- 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.

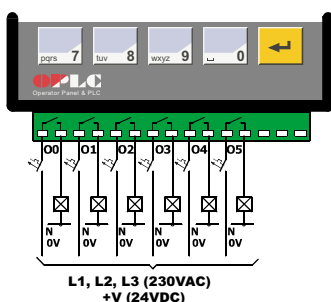
**Voltage / Current connection**



- Note:
- Shields should be connected at the signals' source. The 0V signal of the analog input must be connected to the controller's 0V.

| Digital outputs    |   |
|--------------------|---|
| Output type        | 6 relay outputs, 230VAC / 24VDC   |
| Type of relay      | SPST-NO relay   |
|                    | Takamisawa JY-24H-K, or NAIS (Matsushita) JQ1A-24V or OMRON G6B-1114P-24VDC |
| Isolation          | by relay  |
| Output current     | 5A max. (resistive load)<br>1A max. (inductive load)                        |
| Max. frequency     | 0.5Hz (at maximum rated load)   |
| Contact protection | External precautions required   |

**Relay Outputs**



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

| Keypad         |                 |
|----------------|-----------------|
| Keypad         | Sealed membrane |
| 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 |   |
|--------------------------|---|
| Used for:                | <ul style="list-style-type: none"> <li>Application Download/Upload</li> <li>Application Testing (Debug)</li> <li>Connect to GSM or standard telephone modem:                             <ul style="list-style-type: none"> <li>Send/receive SMS messages</li> <li>Remote access programming</li> </ul> </li> <li>RS485 Networking</li> </ul> |

|                           |   |
|---------------------------|---|
| <b>RS232</b> (See Note 8) | 1 port  |
| Galvanic isolation        | None  |
| Voltage limits            | ±20V  |
| <b>RS485</b> (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  |

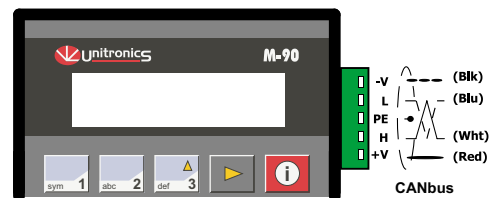
Note:

- 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)<br>Panel mounted (IP65/NEMA4X) |

# M91-2-R6C

## I/O Jumper 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.

#### Digital Inputs type

|     | npn (sink) | pnp (source)* |
|-----|------------|---------------|
| JP1 | A          | B             |

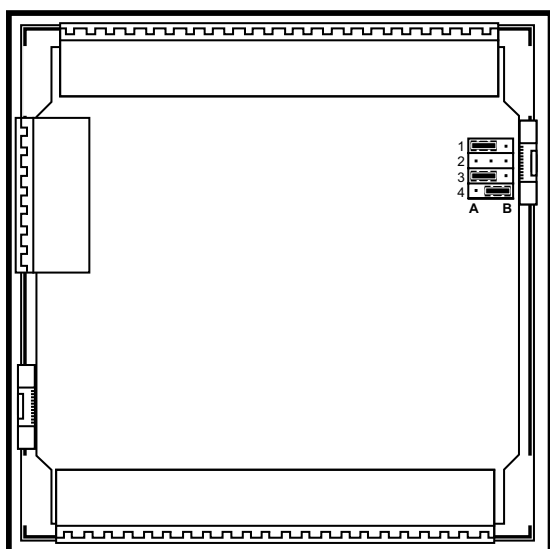
Note:

Jumper #2 is not used.

#### Analog Inputs type

|     | Voltage | Current* |
|-----|---------|----------|
| JP3 | A       | B        |
| JP4 | A       | B        |

\*Default factory settings.

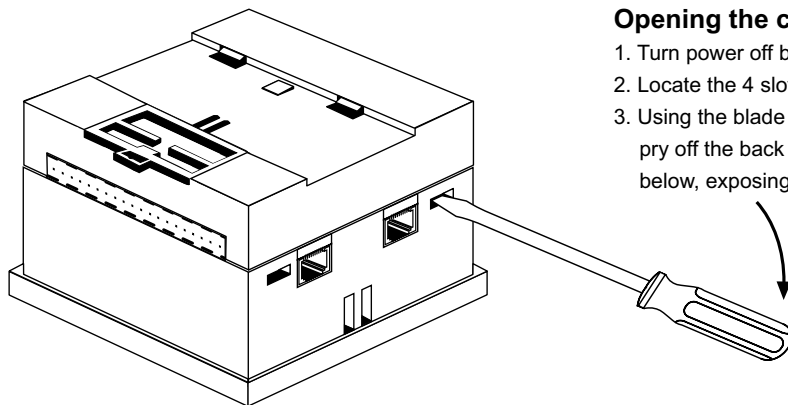


In this figure, the jumper settings will cause the controller to function as follows:

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.

Unitronics reserves the right to revise this publication from time to time and to amend its contents and related hardware and software at any time.

Technical updates (if any) may be included in subsequent editions (if any).

Unitronics product sold hereunder can be used with certain products of other manufacturers at the user's sole responsibility.