

M91-2-R2C

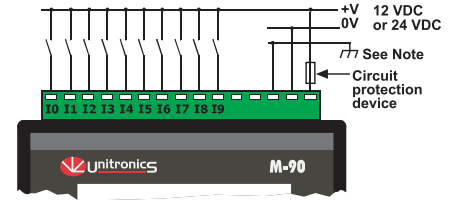
12/24 VDC, 10 pnp/npn digital inputs, 2 analog inputs, 3 high-speed counter/shaft encoder inputs, 6 relay outputs, I/O expansion port, RS232/RS485 port plus CANbus

| | |
|---|---|
| Power supply | 12VDC or 24VDC |
| Permissible range | 10.2VDC to 28.8VDC with less than 10% ripple |
| Maximum current consumption | 180mA@24VDC (pnp inputs) 260mA@24VDC (npn inputs) 220mA@12VDC (pnp inputs) 330mA@12VDC (npn inputs) |
| Digital inputs | 10 pnp (source) or npn (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 npn (sink): For 12VDC | 8-15.6VDC/<1.2mA for Logic '0' 0-3VDC/>3mA for Logic '1' |
| For 24VDC | 17-28.8VDC/<2mA for Logic '0' 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/shaftencoder. See Notes 4 and 5. |
| Resolution | 16-bit |
| Input freq. | 10kHz max. |
| Minimum pulse | 40μs |

Notes:

- All 10 inputs can be set to pnp (source) or npn (sink) via a single jumper and appropriate wiring.
- All 10 inputs can function in 12 VDC or 24 VDC; set via a single jumper and appropriate wiring.
- nnp (sink) inputs use voltage supplied from the controller's power supply.
- 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.
- 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.

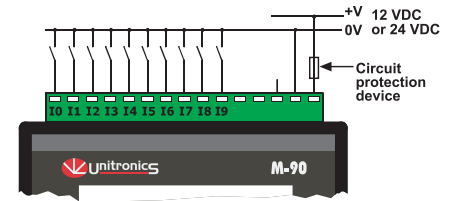
Power supply, pnp (source) inputs



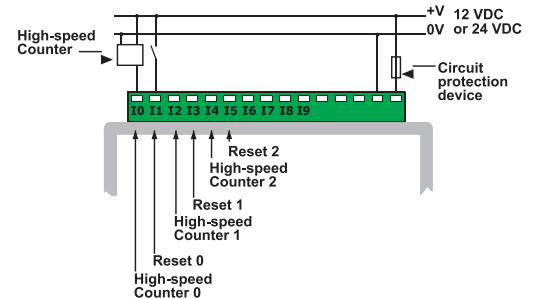
Note:

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.

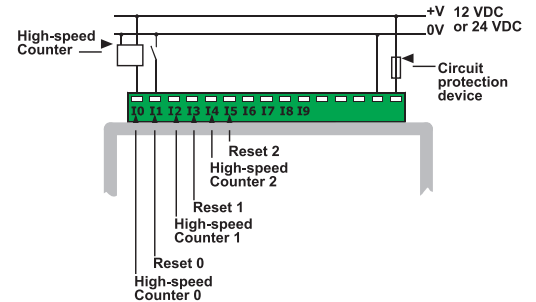
nnp (sink) inputs



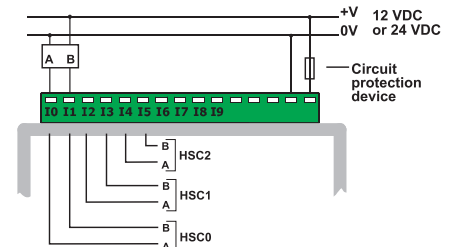
pnp (source) high-speed counter



nnp (sink) high-speed counter



Shaft encoder



Warnings:

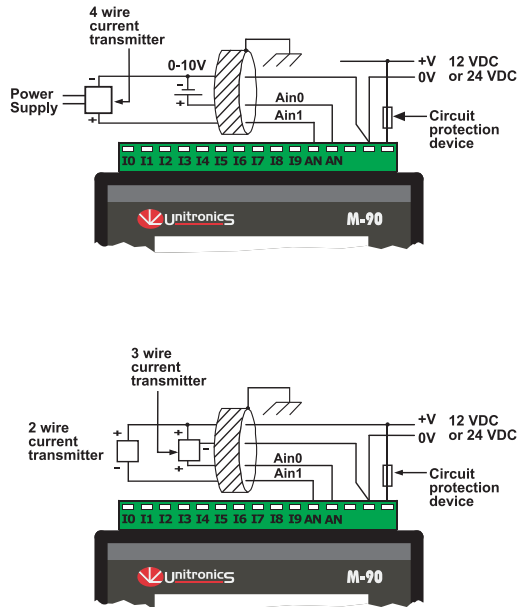
- Unused pins should not be connected. Ignoring this directive may damage the controller.
- Improper use of this product may severely damage the controller.
- Refer to the controller's User Guide regarding wiring considerations.
- Before using this product, it is the responsibility of the user to read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

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|----------------------------|--|
| 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

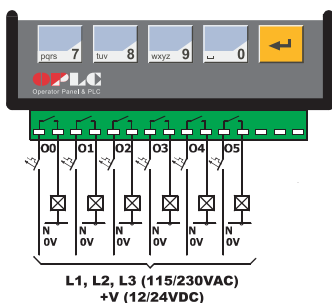


Notes:

- 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 | 6 relay outputs, 230VAC/ 12/24VDC |
| Output type | 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 |

Relay Outputs



| | |
|----------------|-----------------------------|
| 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 |

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

| | |
|-------------------------|--------|
| RS232 (see note) | 1 port |
| Galvanic isolation | None |
| Voltage limits | ±20V |

| | |
|-------------------------|---|
| RS485 (see note) | 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 150m for 12VDC network 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 (10.9 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.

JP1
Digital inputs type

| To use as | JP1 |
|---------------|-----|
| nnp (sink) | A |
| pnp (source)* | B |

JP2
Digital inputs voltage

| To use as | JP2 |
|-----------|-----|
| 12VDC | A |
| 24VDC* | B |

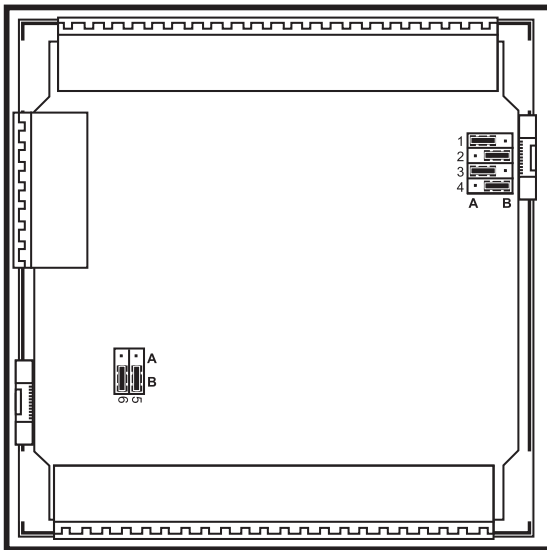
*Default factory setting

JP5, JP6
Power supply voltage

| Range | JP5 | JP6 |
|------------------|-----|-----|
| 10.2 to 15.6VDC | A | A |
| 15.6 to 28.8VDC* | B | B |

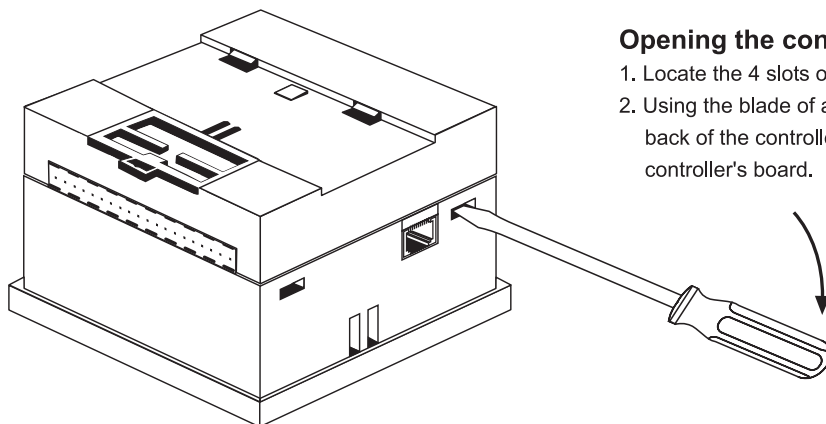
JP3, JP4
Analog inputs type

| To use as | JP3 for analog input #0 | JP4 for analog input #1 |
|----------------|-------------------------|-------------------------|
| Voltage input* | A | A |
| Current input | B | B |



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

- Digital inputs: npn, 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.

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