M91-19-R2

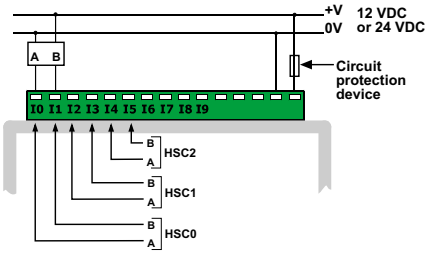
12/24 VDC, 10 pnp/npn digital inputs, 2 analog inputs, 3 high-speed counter/shaft encoder inputs, 6 relay outputs, I/O expansion port, RS232

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 For 24VDC	 <3VDC for Logic '0' >8VDC for Logic '1' <5VDC for Logic '0' >17VDC for Logic '1'
Input voltages for npn (sink): For 12VDC For 24VDC	 >8VDC/<1.2mA for Logic '0' <3VDC/>3mA for Logic '1' >17VDC/<2mA for Logic '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/shaft encoder. See Notes 4 and 5.
Resolution	16-bit
Input freq.	10kHz max.
Minimum pulse	40µs

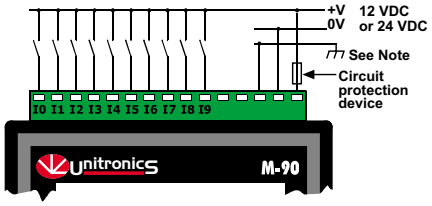
Notes:

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

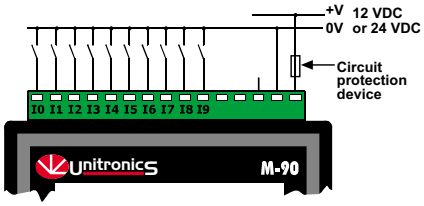


Power supply, pnp (source) inputs

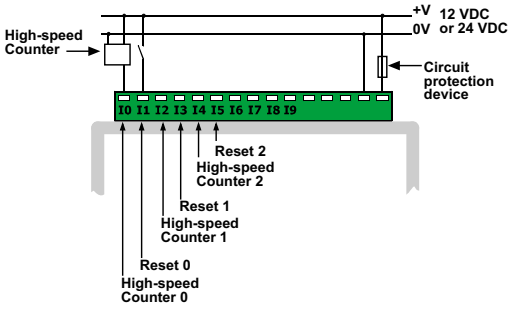


Note:
To avoid electromagnetic interference, mount the controller in a metal panel/cabinet and earth the power supply. Earth the power supply signal to the metal using a wire whose length does not exceed 10cm. Using a wire longer than 10cm will cause signal interference.

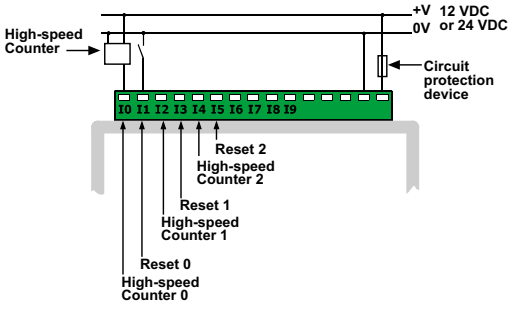
npn (sink) inputs



pnp (source) high-speed counter



npn (sink) high-speed counter



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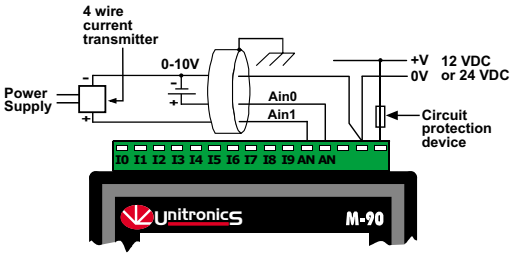
Analog Inputs	Two 10-bit, multi-range inputs: 0-10V 0-20mA, 4-20mA
Conversion method	Successive approximation
Input impedance	>100KΩ for voltage 500Ω for current
Galvanic isolation	None
Resolution (except 4-20mA)	10-bit (1024 units)
Resolution at 4-20mA	204 to 1023 (820 units)
Conversion time	Synchronized to scan time
Absolute max. rating	±15V
Full scale error	± 2 LSB
Linearity error	± 2 LSB
Status indication	Yes, see Note

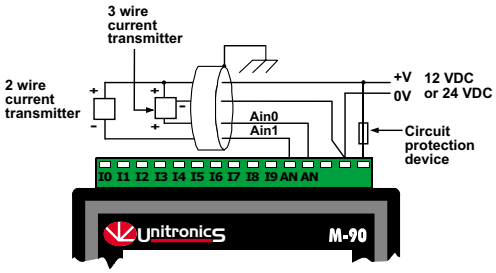
Note:
The analog value can also indicate when the input is functioning out of range.
If an analog input deviates above the permissible range, its value will be 1024.

Voltage / Current connection



Notes:
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.

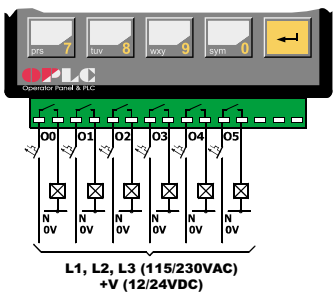
Current connection



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
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	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/Coils	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 50°C (32 to 122°F)
Storage temperature	-20 to 60°C (-4 to 140°F)
Mounting method	DIN-rail mounted (IP20/MENA1) Panel mounted (IP65/NEMA4X)

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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

To use as	JP1
npn (sink)	A
pnp (source)*	B

JP5, JP6
Power supply voltage

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

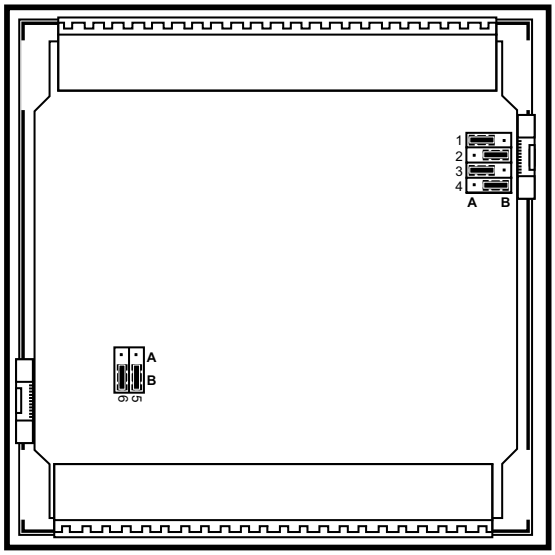
JP2
Digital inputs voltage

To use as	JP2
12VDC	A
24VDC*	B

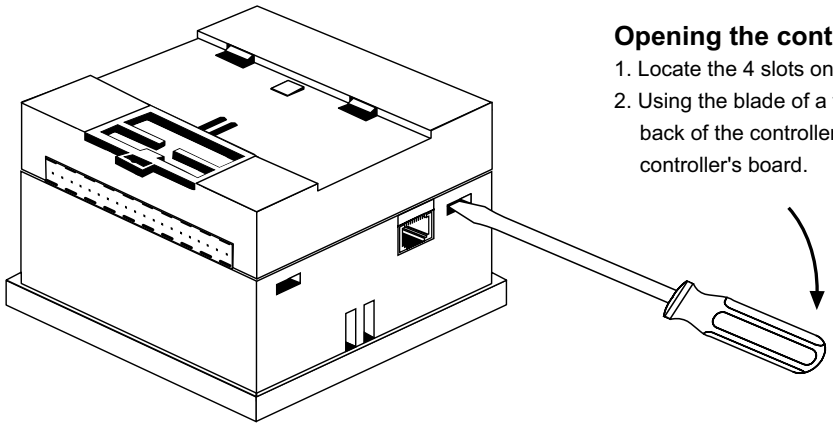
JP3, JP4
Analog inputs type

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

*Default factory setting



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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