unitronics Jazz JZ20-UA24 Display Units and HMIs User Guide

unitronics Jazz JZ20-UA24 Display Units and HMIs

Contents

General Description

The products listed above are micro-PLC+HMIs, rugged programmable logic controllers that comprise built-in operating panels.
Detailed Installation Guides containing the I/O wiring diagrams for these models, technical specifications, and additional documentation are located in the Technical Library in the Unitrans's website:
https://unitronicsplc.com/support-technical-library/

Alert Symbols and General Restrictions

When any of the following symbols appear, read the associated information carefully.

Symbol	Meaning	Description
	Danger	The identified danger causes physical and property damage.
	Warning	The identified danger could cause physical and property damage.
Caution	Caution	Use caution.

- Before using this product, the user must read and understand this document.
- All examples and diagrams are intended to aid understanding, and do not guarantee operation.
- Unitronics accepts no responsibility for actual use of this product based on these examples.
- Please dispose of this product according to local and national standards and regulations.
- Only qualified service personnel should open this device or carry out repairs.

	• Failure to comply with appropriate safety guidelines can cause severe injury or property damage
	• Do not attempt to use this device with parameters that exceed permissible levels. • To avoid damaging the system, do not connect/disconnect the device when power is on.

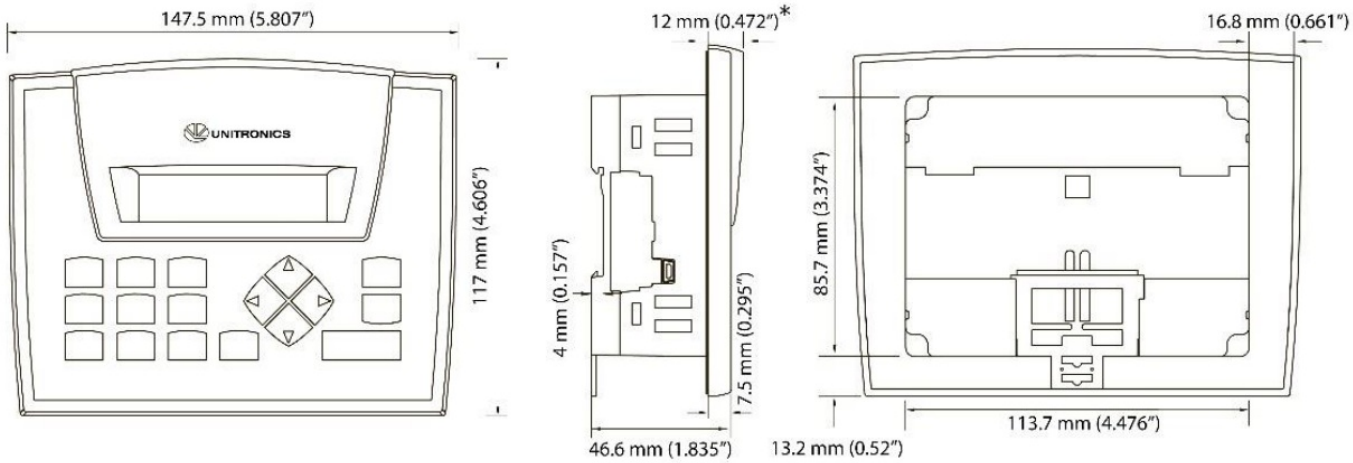
Environmental Considerations

	• Do not install in areas with: excessive or conductive dust, corrosive or flammable gas, moisture or rain, excessive heat, regular impact shocks or excessive vibration, in accordance with the standards given in the product's technical specification sheet. • Do not place in water or let water leak onto the unit. • Do not allow debris to fall inside the unit during installation
	• Ventilation: 10mm space required between controller's top/bottom edges & enclosure walls. • Install at maximum distance from high-voltage cables and power equipment.

Mounting

Note that figures are for illustrative purposes only.

Dimensions



* * Note that for JZ20-J modules those dimensions are 7.5 mm (0.295")

Model	Cut-out	View area
JZ20-xxx\JZ20-J-xxx	117 x 89mm (4.606"x 3.504")	66 x 19.2mm (2.598"x 0.755")

Add-on modules

Available by separate order for communication and cloning.

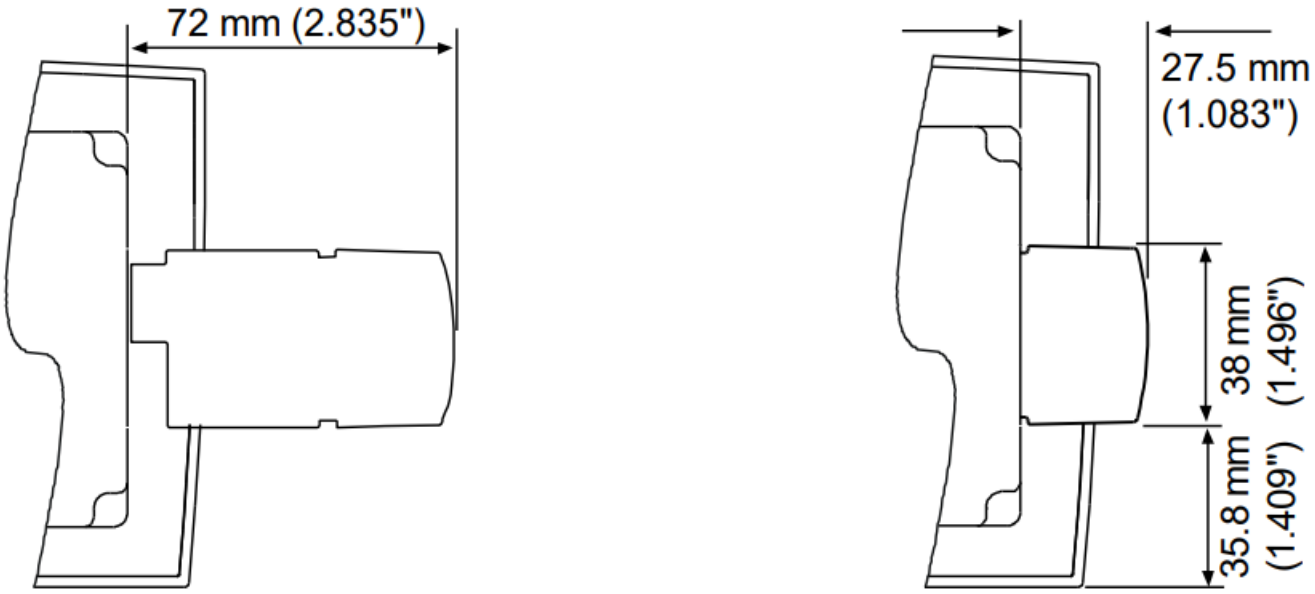
Integral USB Port

This may be used for programming purposes.

Note: the USB port and an Add-on module cannot be physically connected at the same time.

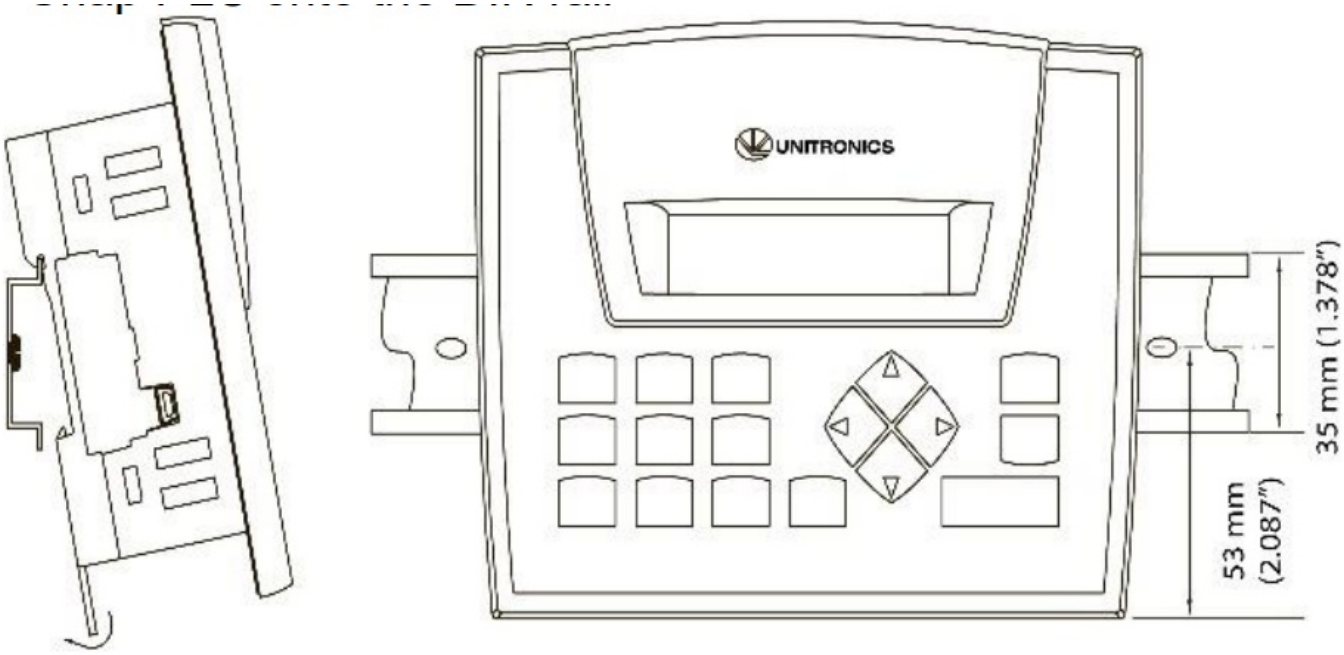
Add-on: during installation Add-on: after installation

Installing an Add-on module requires sufficient clearance space

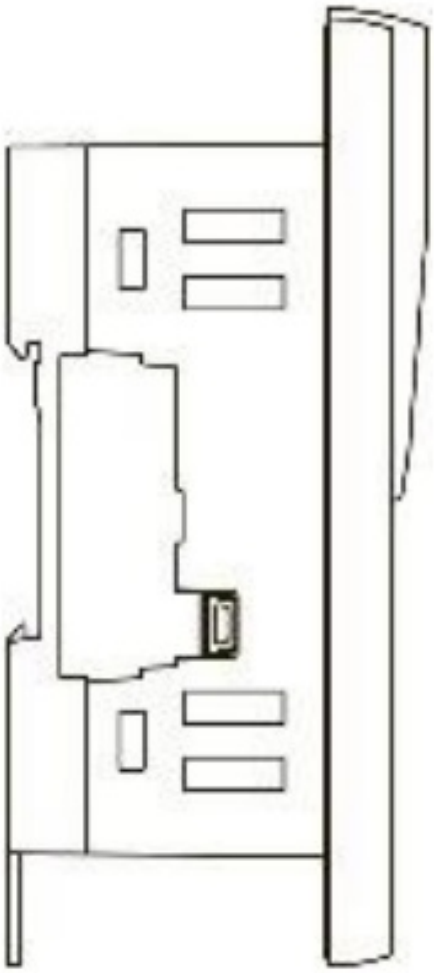


DIN-rail mounting

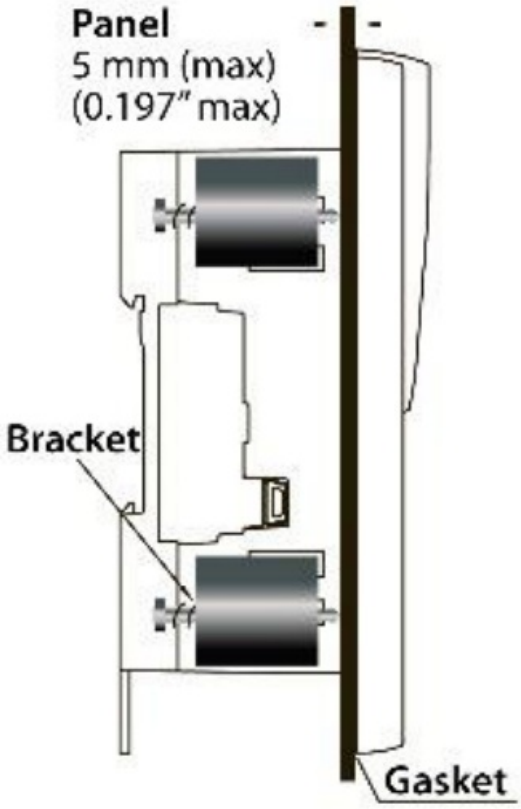
Snap PLC onto the DIN rail



USB Port



Panel mounting



Note: Removing the unit requires clearance space. Recommendation: approximately 40mm (1.58")

Wiring

	• Do not touch live wires.
	• This equipment is designed to operate only in SELV/PELV/Class 2/Limited Power environments. • All power supplies in the system must include double insulation. Power supply outputs must b e rated as SELV/PELV/Class 2/Limited Power. • Do not connect either the 'Neutral or 'Line' signal of the 110/220VAC to device's 0V pin. • All wiring activities should be performed while power is OFF. • Use over-current protection, such as a fuse or circuit breaker, to avoid excessive currents into the power supply connection point. • Unused points should not be connected (unless otherwise specified). Ignoring this directive may damage the device. • Double-check all wiring before turning on the power supply.
Caution	

Wiring Procedure

Use crimp terminals for wiring;

- Controllers offering a terminal block with pitch of 5mm: 26-12 AWG wire (0.13 mm2 3.31 mm2).
- Controllers offering a terminal block with pitch of 3.81mm: 26-16 AWG wire (0.13 mm2 – 1.31 mm2).

1. Strip the wire to a length of 7±0.5mm (0.270–0.300“).
2. Unscrew the terminal to its widest position before inserting a wire.
3. Insert the wire completely into the terminal to ensure a proper connection.
4. Tighten enough to keep the wire from pulling free.

Wiring Guidelines

- Use separate wiring ducts for each of the following groups:
  - Group 1: Low voltage I/O and supply lines, communication lines.
  - Group 2: High voltage Lines, Low voltage noisy lines like motor driver outputs. Separate these groups by at least 10cm (4″). If this is not possible, cross the ducts at a 90˚angle.
- For proper system operation, all 0V points in the system should be connected to the system 0V supply rail.
- Product-specific documentation must be fully read and understood before performing any wiring.
  Allow for voltage drop and noise interference with input lines used over an extended distance.
  Use wire that is properly sized for the load.

Earthing the product

To maximize system performance, avoid electromagnetic interference as follows:

- Use a metal cabinet.
- Connect the 0V and functional ground points (if exist) directly to the earth ground of the system.
- Use the shortest, less than 1m (3.3 ft.) and thickest, 2.08mm² (14AWG) min, wires possible

UL Compliance

The following section is relevant to Unitronics' products that are listed with the UL.
The following models: JZ20-R10,JZ20-J-R10,JZ20-R16,JZ20-J-R16,JZ20-J-R16HS, JZ20-R31, JZ20-J-R31,JZ20-J-R31L,JZ20-T10,JZ20-J-T10,JZ20-T18,JZ20-J-T18,JZ20-J T20HS,JZ20-T40, JZ20-J-T40,JZ20-UA24, JZ20-J-UA24, JZ20-UN20,JZ20-J-UN20, JZ20-J-ZK2. are UL listed for Ordinary Location.

UL Ordinary Location
In order to meet the UL ordinary location standard, panel-mount this device on the flat surface of Type 1 or 4 X enclosures

Panel-Mounting
For programmable controllers that can be mounted also on panel, in order to meet the UL Haz Loc standard, panel-mount this device on the flat surface of Type 1 or Type 4X enclosures

Communication and Removable Memory Storage
When products comprise either USB communication port, SD card slot, or both, neither the SD card slot nor the USB port are intended to be permanently connected, while the USB port is intended for programming only

Removing / Replacing the battery
When a product has been installed with a battery, do not remove or replace the battery unless the power has been switched off, or the area is known to be non-hazardous.
Please note that it is recommended to back up all data retained in RAM, in order to avoid losing data when changing the battery while the power is switched off. Date and time information will also need to be reset after the procedure.

JZ20-UA24/JZ20-J-UA24 Inputs

This model comprises a total of 15 inputs in 4 groups.

1. I0 to I8 are digital inputs. They may be wired, in a group, as either npn or pnp.
2. I9 and I10 may be wired as either digital or analog inputs. These may be wired as either:
   - npn digital inputs
   - pnp digital inputs
   - analog (voltage) inputs

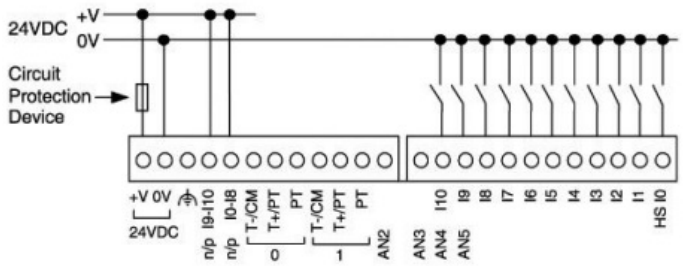
   In addition, 1 input may be wired as a pnp input, while the other is wired as an analog input.

   Note that if 1 input is wired as an npn input, the other may not be wired as an analog input.
3. AN2 and AN3 are analog (current) inputs that may be wired using 2, 3, or 4 wires.
4. Analog Input 0 and 1 can function as either thermocouple or PT100 inputs; each PT100 signal has its own CM signal.

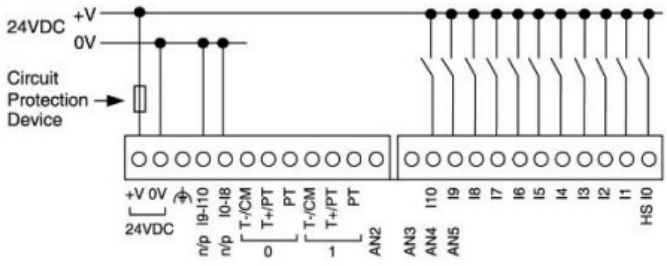
JZ20-UA24/JZ20-J-UA24 Digital Inputs, Controller's Power Supply

Note: The inputs are arranged in two groups. You can wire one group as npn and the other as pnp, or wire both groups as npn, or as pnp. In either case, the npn/pnp pins must be connected.

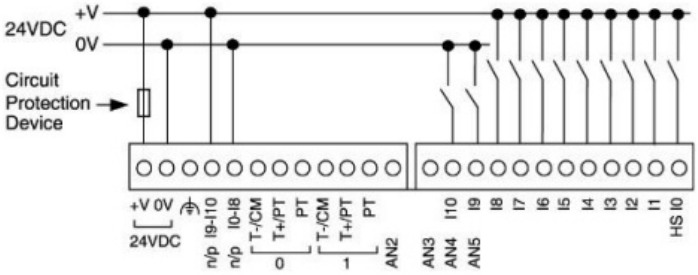
Input wiring, npn (sink)



Input wiring, pnp (source)



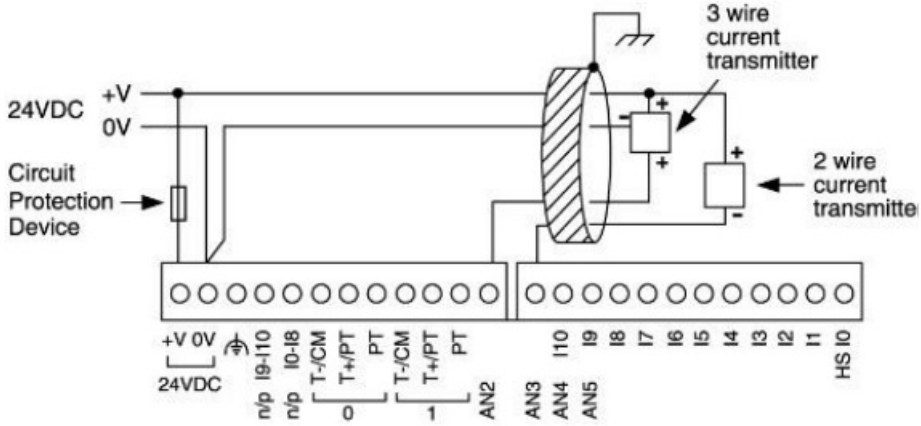
Input wiring (I0-I8), pnp (source), (I9-I10), npn (sink)



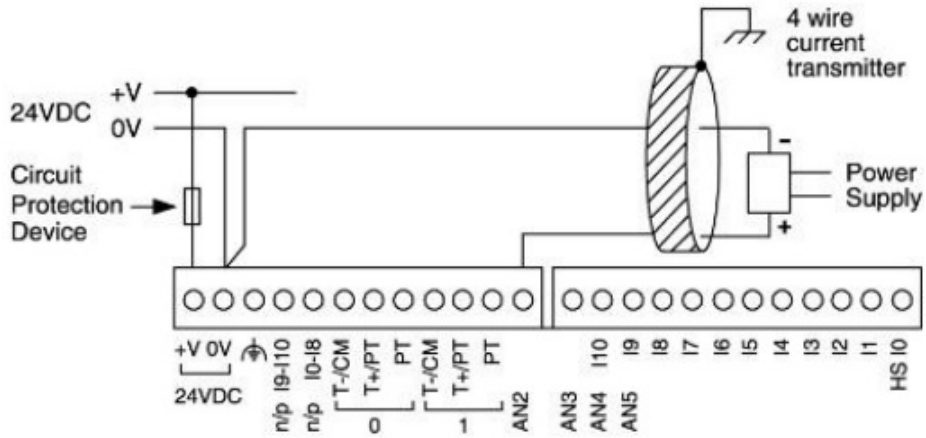
JZ20-UA24/JZ20-J-UA24 Analog Inputs

Note: Shields should be connected at the signal source.

Analog Input wiring, current, 2 or 3 wire, AN2 and AN3

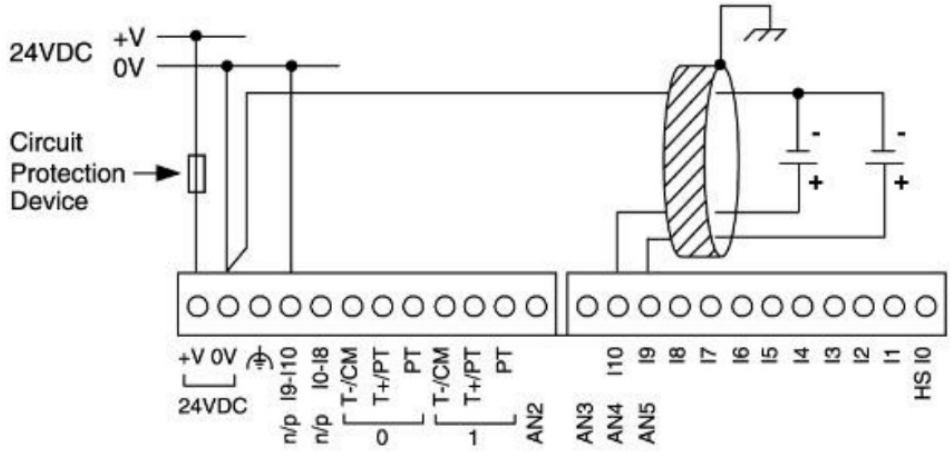


Analog Input wiring, current, 4 wire, AN2 and AN3

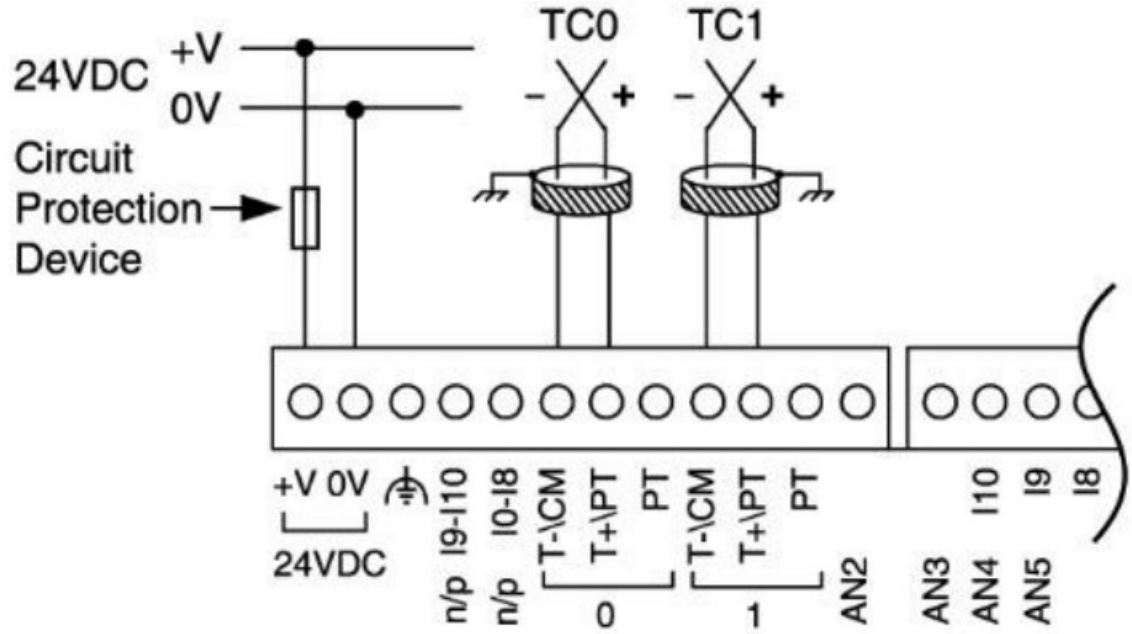


Analog Input wiring, voltage, AN4 and AN5

Note: If either I9 or I10 is wired as an npn digital input, the remaining input may not be wired as an analog input.



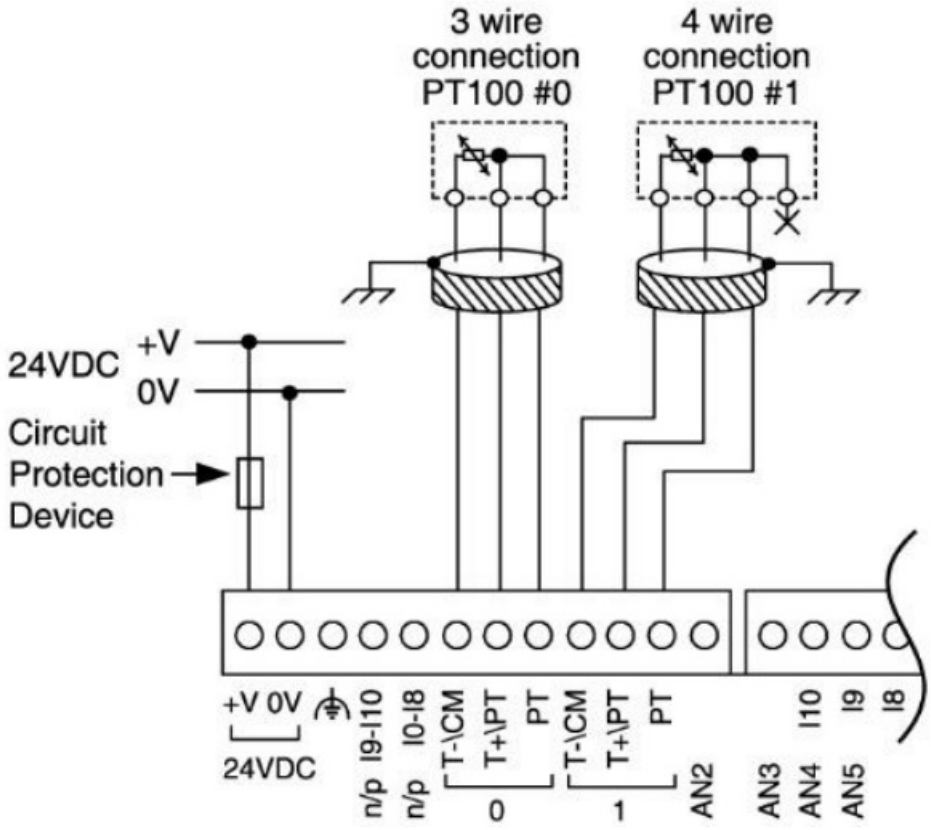
Thermocouple



Type	Temp. Range	Wire Color	
		ANSI (USA)	BS1843 (UK)
mV	-5 to 56mV		
B	200 to 1820˚C (300 to 3276˚F)	+Grey -Red	+None -Blue

E	-200 to 750˚C (-328 to 1382˚F)	+Violet -Red	+Brown -Blue
J	-200 to 760˚C (-328 to 1400˚F)	+White -Red	+Yellow -Blue
K	-200 to 1250˚C (-328 to 2282˚F)	+Yellow -Red	+Brown -Blue
N	-200 to 1300˚C (-328 to 3214˚F)	+Orange -Red	+Orange -Blue
R	0 to 1768˚C (32 to 3214˚F)	+Black -Red	+White -Blue
S	0 to 1768˚C (32 to 3214˚F	+Black -Red	+White -Blue
T	-200 to 400˚C (-328 to 752˚F)	+Blue -Red	+White -Blue

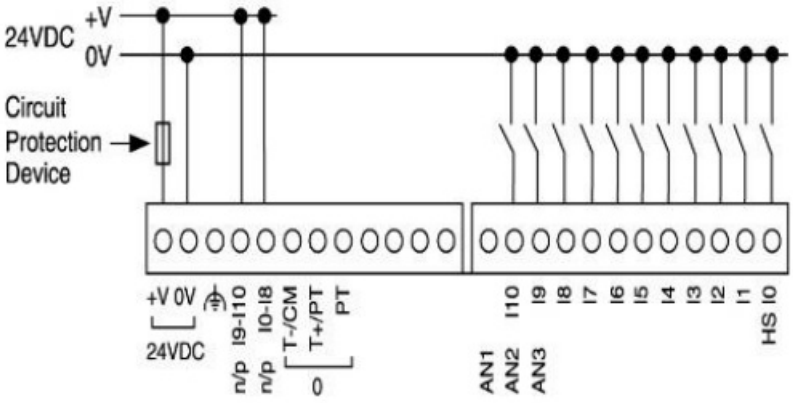
RTD



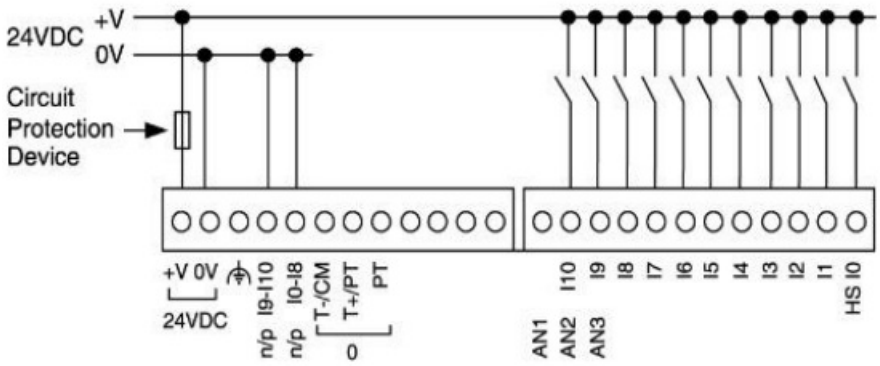
- PT100 (Sensor 0): use both inputs related to CM signal
- PT100 (Sensor 1): use both inputs related to CM signal
- 4 wire PT100 can be used by leaving one of the sensor leads unconnected.

JZ20-UA24/JZ20-J-UA24 Digital Outputs, Outputs' Power Supply

PNP Outputs
+VO is the power supply input for pnp outputs O5–O6.



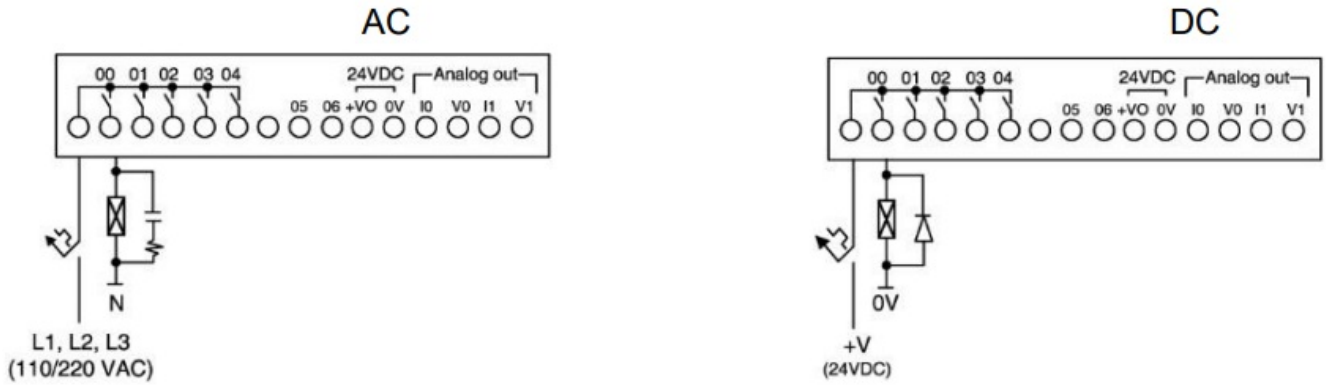
Relay Outputs



Increasing contact life span

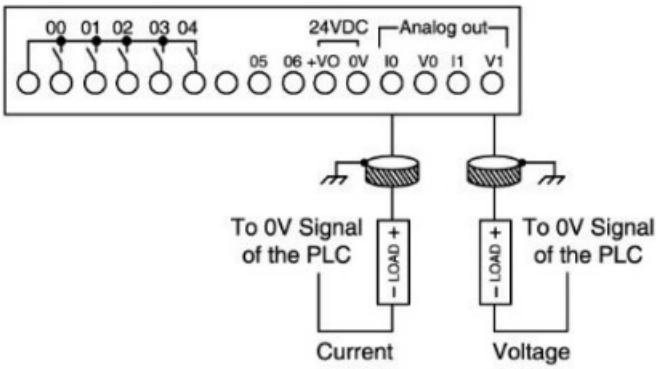
To increase the life span of your contacts & protect the unit from potential damage by reverse-EMF, connect:

- A clamping diode in parallel with each inductive DC load
- An RC snubber circuit in parallel with each inductive AC load



Analog Outputs

Current/voltage connections



JZ20-UN20/JZ20-J-UN20 Inputs

This model comprises a total of 13 inputs in 4 groups.

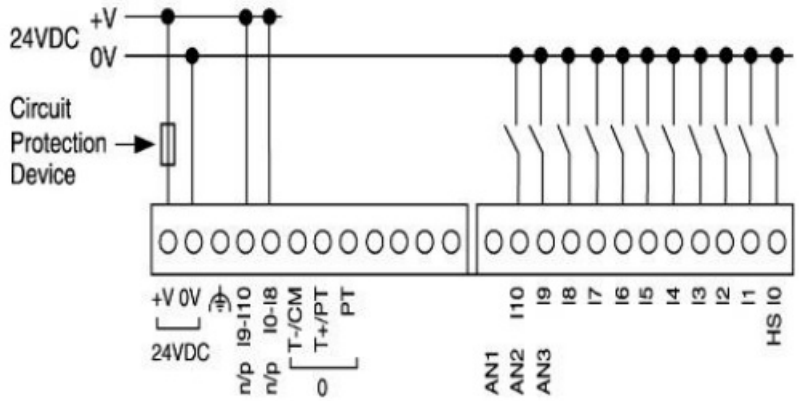
5. I0 to I8 are digital inputs. They may be wired, in a group, as either npn or pnp.
6. I9 and I10 may be wired as either digital or analog inputs. These may be wired as either:
▪ npn digital inputs

▪ pnp digital inputs
▪ analog (voltage) inputs
In addition, 1 input may be wired as a pnp input, while the other is wired as an analog input.
Note that if 1 input is wired as an npn input, the other may not be wired as an analog input.
7. AN1 is an analog (current) input that may be wired using 2, 3, or 4 wires.
8. Analog Input 0 can function as either thermocouple or PT100 input.

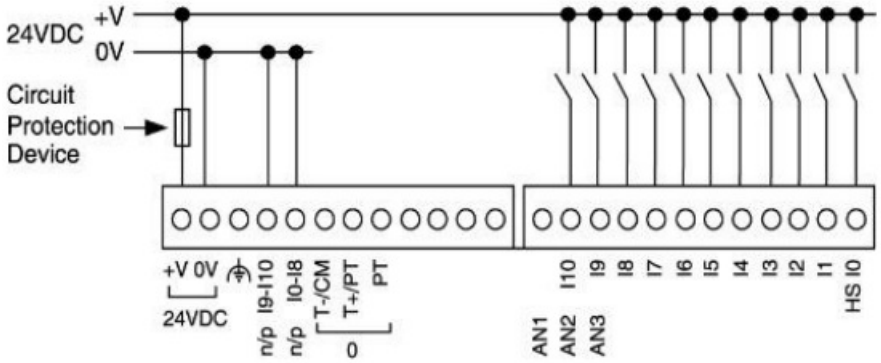
JZ20-UN20/JZ20-J-UN20 Digital Inputs

Note: The inputs are arranged in two groups. You can wire one group as npn and the other as pnp, or wire both groups as npn, or as pnp. In either case, the npn/pnp pins must be connected.

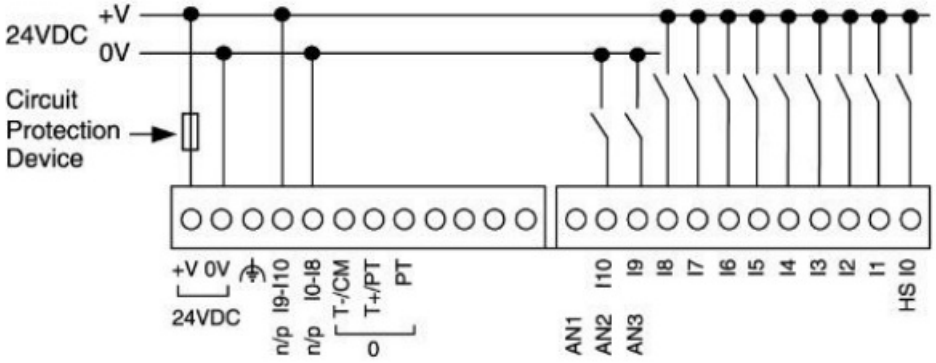
- Input wiring, npn (sink)



- Input wiring, pnp (source



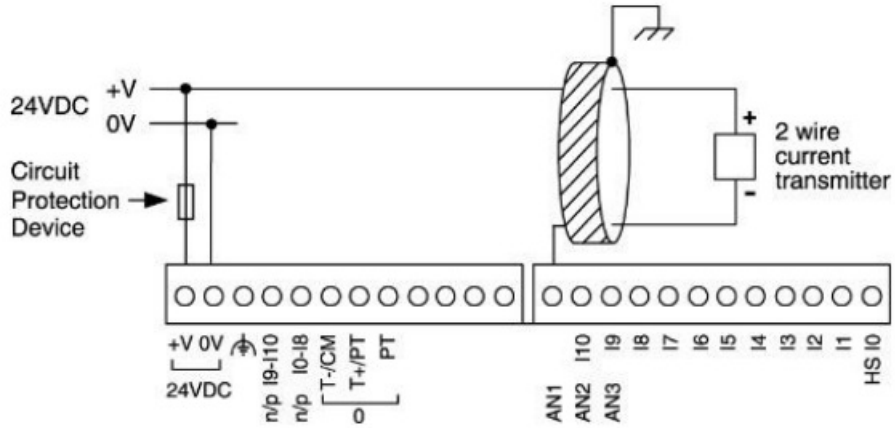
- Input wiring (I0-I8), pnp (source), (I9-I10), npn (sink)



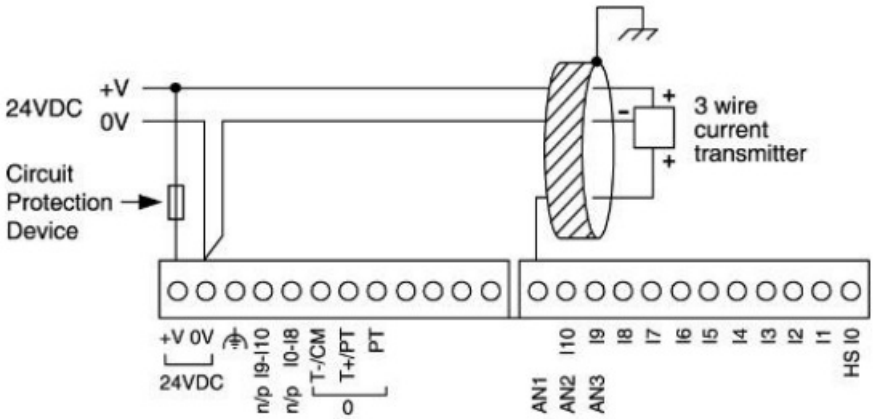
JZ20-UN20/JZ20-J-UN20 Analog Inputs

Note: Shields should be connected at the signal source.

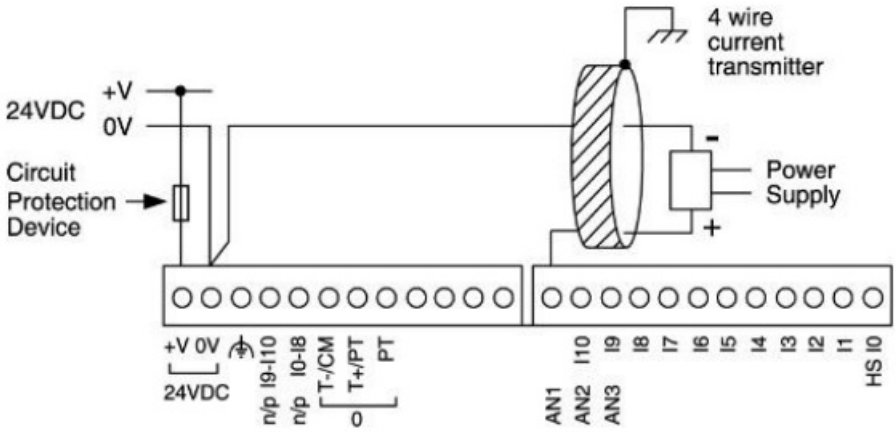
- Analog Input wiring, current, 2 wire, AN1



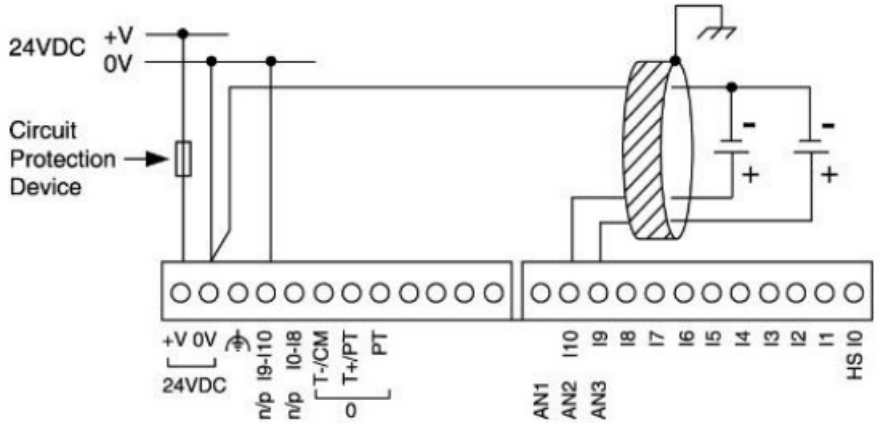
- Analog Input wiring, current, 3 wire, AN1



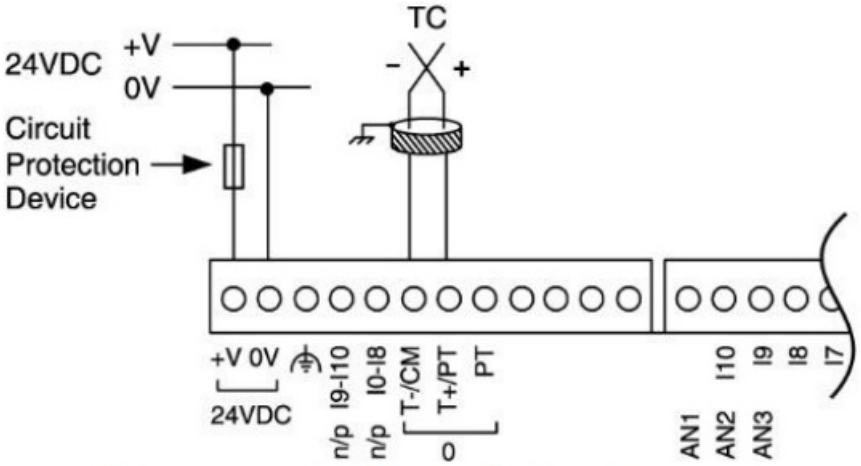
- Analog Input wiring, current, 4 wire, AN1



- Analog Input wiring, voltage, AN2 and AN3



- Thermocouple

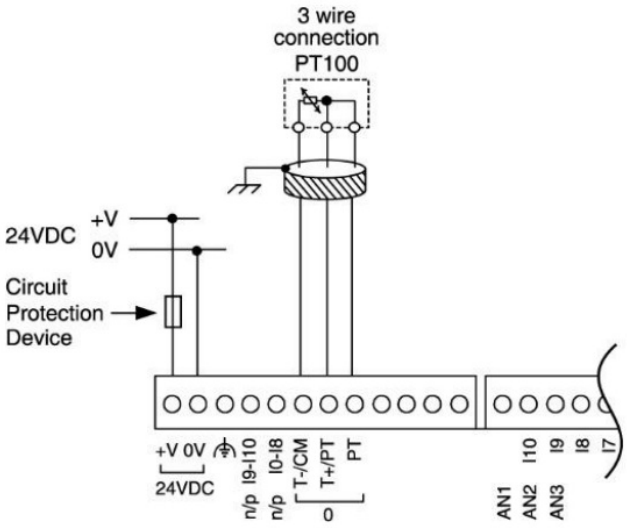


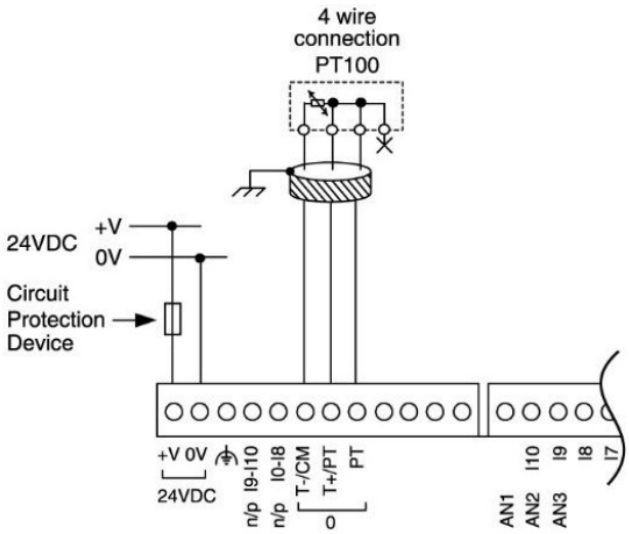
- Thermocouple 0: use T- Input as negative input and T+ as positive.

Type	**Temp. Range**	**Wire Color**	
		ANSI (USA)	BS1843 (UK)
mV	-5 to 56mV		
B	200 to 1820˚C (300 to 3276˚F)	+Grey -Red	+None -Blue
E	-200 to 750˚C (-328 to 1382˚F)	+Violet -Red	+Brown -Blue
J	-200 to 760˚C (-328 to 1400˚F)	+White -Red	+Yellow -Blue
K	-200 to 1250˚C (-328 to 2282˚F)	+Yellow -Red	+Brown -Blue
N	-200 to 1300˚C (-328 to 3214˚F)	+Orange -Red	+Orange -Blue
R	0 to 1768˚C (32 to 3214˚F)	+Black -Red	+White -Blue
S	0 to 1768˚C (32 to 3214˚F	+Black -Red	+White -Blue
T	-200 to 400˚C (-328 to 752˚F)	+Blue -Red	+White -Blue

RTD

- PT100 (Sensor 0): use both inputs related to CM signal

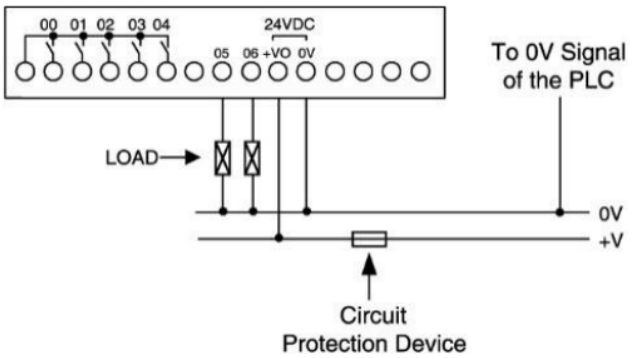




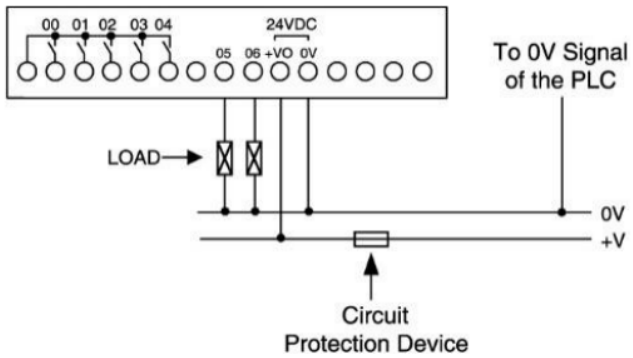
JZ20-UN20/JZ20-J-UN20 Digital Outputs, Outputs' Power Supply

PNP Outputs

+VO is the power supply for pnp outputs O5–O6.



Relay Outputs

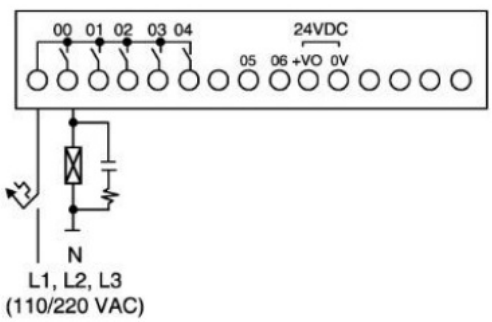


Increasing contact life span

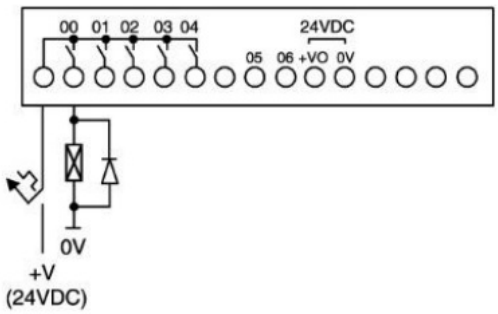
To increase the life span of your contacts and protect the unit from potential damage by reverseEMF, connect:

- A clamping diode in parallel with each inductive DC load
- An RC snubber circuit in parallel with each inductive AC load

AC



DC



Technical Specifications

Power supply

Input voltage: 24VDC
Permissible range: 20.4VDC to 28.8VDC with less than 10% ripple
Current Consumption: See Note 1

	JZ20-UA24 JZ20-J-UA24	JZ20-UN20 JZ20-J-UN20
Max. current consumption	230mA@24VDC	185mA@24VDC

Notes:

1. To calculate the actual power consumption, subtract the current for each unused element from the maximum current consumption value according to the values below:

Max. current per element	Per relay output	LCD backlight	Per Analog Output, (JZ20-UA24/ JZ20-J-UA24 only)
	5.5mA@24VDC	35mA@24VDC	23mA

Digital Inputs

Number of inputs 11 (Two groups) – see Note 2 & 3
Input type pnp (source) or npn (sink)
Galvanic isolation None
Nominal input voltage 24VDC
Input voltage
pnp (source) 0-5VDC for Logic '0' 17-28.8VDC for Logic '1' npn (sink) 17-28.8VDC for Logic '0' 0-5VDC for Logic '1'

	I0-I8	I9-I10
Input current	3.7mA@24VDC	1.2mA@24VDC
Response time	10mSec typical	20mSec typical

Input cable length: Up to 100 meters, unshielded
High speed inputs: Specifications below apply when wired as H.S.C. See Note 4.
Resolution: 16-bit
Frequency: 5kHz maximum
Minimum pulse width: 80μs

Notes

2. JZ20-UN20/ JZ20-J-UN20 and JZ20-UA24/ JZ20-J-UA24 comprise I0-I8; these inputs are arranged in a single group. Via wiring, the entire group may be set to either pnp or npn.

3. JZ20-UN20/ JZ20-J-UN20 and JZ20-UA24/ JZ20-J-UA24 comprise I9 & I10. These may be wired as either digital or analog inputs, as shown in the JZ20-UA24/ JZ20-J-UA24 and JZ20-UN20/ JZ20-J-UN20 Installation guides. I9 & I10 may be wired as npn, pnp, or 0-10V analog inputs. one input may be wired as pnp, while the other is wired as analog. If one input is wired as npn, the other may not be wired as analog..
4. I0 can function as either a high-speed counter or as a normal digital input. When used as a normal digital input, normal input specifications apply.

   Digital Outputs

   Relay

   Number of Outputs :5

   Output type SPST-NO: (Form A)

   Galvanic isolation: By relay

   Type of relay: Tyco pcn-124D3MHZ or compatible

   Output current: 3A maximum per output (resisitve load) 8A maximum total for common

   Rated voltage: 250VAC / 30VDC

   Minimum load: 1mA@5VDC

   Life expectancy: 100k operations at maximum load

   Response time: 10mS (typical)

   Contact protection: External precautions required (see Increasing Contact Life Span in the product's Installation Guide)

   Transistor

   Number of Outputs: 2 pnp (source) – see Note 5

   Output type: P-MOSFET (open drain)

   Galvanic isolation: None

   Output current (resistive load): 0.5A maximum per output 1A maximum total for common

   Maximum frequency: 50Hz (resistive load) 2Hz (inductive load)

   PWM frequency: 1.57Hz, 8 bit duty cycle resolution

   Short circuit protection: Yes

   Short circuit indication: Via software

   On voltage drop: 0.5VDC maximum

   Power supply for outputs

   Operating voltage: 20.4 to 28.8VDC

   Nominal voltage: 24VDC

   Notes

5. Outputs 05-06 can function as a PWM output, or as a normal digital output.

Analog Inputs

	JZ20-UA24 / JZ20-J-UA24		JZ20-UN20 / JZ20-J-UN20	
Number of inputs	4		3	
	AN2 and AN3	AN4 and AN5	AN1	AN2 and AN3
Input range	0-20mA, 4-20mA	0-10VDC	0-20mA, 4-20mA	0-10VDC
Input impedance	154Ω	20KΩ	154Ω	20KΩ
Maximum input rating	30mA	28.8V	30mA	28.8V

Galvanic isolation: None
Conversion method: Succesive approximation
Resolution (except 4-20mA): 10-bit (0 to 1023) or 12-bit (0-4095) – via software
Resolution (at 4-20mA): 204 to 1023 (820 units) or 819 to 4095 (3277 units) – via software
Conversion time: 20mSec per channel, Synchronized to cycle time
Accuracy: ± 3%
Status indication: Yes – if an analog input deviates above the permissible range, its value will be 1024/4096 (depends on the selected resolution).
Input cable length: Up to 30 meters, shielded twisted pair

RTD Inputs

Number of inputs	JZ20-UA24 / JZ20-J- UA24	JZ20-UN20 / JZ20-J-UN20
	2	1

RTD Type: PT100
Input range -200 to 600°C/-328 to 1100° F. 1 to 320Ω. See Note 6
Galvanic isolation: None
Conversion method: Voltage to frequency
Resolution: 0.1° C/0.1° F – See Note 7
Conversion time: 300mS minimum per channel, depending on software filter type
Input impedance: >10MΩ
Auxillary current: 150µA typical
Accuracy: ±0.44%
Status indication: Yes. See Note 8

Notes:

6. The device can also measure resistance within the range of 1-320Ω at a resolution of 0.1Ω.
7. The input analog value represents the temperature value as follows: Analog Value: 260 Actual measured temperature: 26.0° C
8. The analog value can indicate faults as shown below:

Value: Possible Cause
32767: Sensor is not connected to input, or value exceeds permissible range
-32767: Sensor is short-circuited

Thermocouple Inputs		
Number of inputs	JZ20- UA24/ JZ20-J-UA24	JZ20-UN20 / JZ20-J-UN20
	2	1
Input range	See Note 9	
Isolation	None	
Conversion method	Voltage to frequency	
Resolution	0.1°C/ 0.1°F maximum. See Note 10	
Conversion time	100mS minimum per channel, depending on software filter type	
Input impedance	>10MΩ	
Cold junction compensation	Local, automatic	
Cold junction compensation error	±1.8°C / ±3.24°F maximum	
Absolute maximum rating	±0.6VDC	
Accuracy	±0.44%	
Warm-up time	½ hour typically, ±1°C/±1.8°F repeatability	

Status indication	Yes. See Note 11	

Notes:

9. The device can also measure voltage within the range of -5 to 56mV, at a resolution of 0.01mV. The device can also measure raw value frequency at a resolution of 14-bits (16384). Input ranges are shown in the following table:

Type	**Temp. Range**		**Type**	**Temp. Range**
mV	-5 to 56mV		N	-200 to 1300˚C (-328 to 3214˚F)
B	200 to 1820˚C (300 to 3276˚F)		R	0 to 1768˚C (32 to 3214˚F)
E	-200 to 750˚C (-328 to 1382˚F)		S	0 to 1768˚C (32 to 3214˚F
J	-200 to 760˚C (-328 to 1400˚F)		T	-200 to 400˚C (-328 to 752˚F)
K	-200 to 1250˚C (-328 to 2282˚F)			

The input analog value represents the temperature value as follows:
Analog Value: 260 Actual measured temperature: 26.0 C

The analog value can indicate faults as shown below:

Value:Possible Cause
32767: Sensor is not connected to input, or value exceeds the maximum value
-32767: Sensor value is under the minimum value

Analog Outputs	(JZ20-UA24 / JZ20- J-UA24 only)
Number of Outputs Output range Resolution Conversion time Load impedance	2 ±10V, 4-20mA 12-bit sign(8192 units) for ±10V 12-bit (4096 units) for 4-20mA Synchroni zed to scan time. 1kO minimum- voltage 5000 maximum-current

Galvanic isolation Accuracy	None ±0.3%
Display	
Type	STN LCD
Illumination backlight	LED, yellow-green, software controlled
	(LCD backlight; enables the display to be viewed In the dark)
Display size	2 lines, 16 characters long
Character size	5×8 matrix, 2.95×5.55mm
Keyboard	
Number of keys Key type Slides	16 keys, including 10 user-labeled keys Metal dome, sealed membrane s witch Slides may be installed in the operating panel faceplate to custom-label t he keys and logo picture. An extra logo slide is included. A complete set of blank slides is available by separate order.
Program	
Ladder code memory	48K (virtual)
Execution time	1.5 µSec for bit operations (typical)
Memory bits (coils)	256

Memory integers (registers), 16 bit	256
Timers	64
HMI displays HMI variables	60 user-designed displays available 64 HMI variables are available to conditionally display text and data. List variables add up to 1.5K's worth of HMI capacity.

Communication	Via a built-in USB port or – Add-On module.See Note 12-15 SMS messages to/from 6 phone GSM numbers, up to 1K of user- designed me ssages. Supports Remote Access. Supports MODBUS protocol, Master-Slave According to add-on port module
GSM-support	
MODBUS Baud rate	
USB	
Port type	Mini-B
Galvanic isolation	No
Specification	USB 2.0 compliant; full speed
Baud rate range	300 to 115200 bps
Cable	USB 2.0 compliant; up to 3m

Notes:

12. The JZ20 built-in USB port may be used for programming. Add-on Modules are available by separate order for communication and cloning. Note that the USB port and an Add-on module cannot be physically connected at the same time.
13. Add-on module JZ-PRG, with 6-wires communication cable (supplied in PRG kit – see the JZ-PRG Installation Guide) can be used:
• for programming
• to connect a modem
14. Add-on module JZ-RS4 (RS232/485), with a standard 4-wire communication cable can be used:
• for programming
• to communicate with other devices (including modems/GSM)
• for RS485 networking.
15. Add-on module MJ20-ET1 enables communication over 100 Mbit/s TCP/IP network:
• Programming/data exchange with Unitronics software;
• Data exchange via MODBUS TCP as Master or Slave.

Miscellaneous

Clock (RTC): Real-time clock functions (date and time).

Environmental

Operating temperature: 0° to 50° C (32° to 122° F)
Storage temperature: -20° to 60° C (-4° to 140° F)
Relative humidity (RH): 10% to 95% (non-condensing)
Mounting method: Panel mounted (IP65/NEMA4X) DIN-rail mounted (IP20/NEMA1)

Dimensions

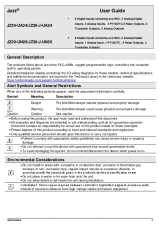
Size	147.5X117X46.6mm *(5 .807″* X4.606″ X 1.835″).See Note 16	
Weight	JZ20-UA24 JZ20-J-UA24	JZ20 -UN20 JZ20-J-UN20
	296 a (10.4 oz)	294 a (10.3 oz)

Notes:
16. For exact dimensions, refer to above

Mounting

Panel mounting: Insert into cut-out: 117 x 89mm (WxH) 4.606”x 3.504” DIN-rail mounting: Snap unit onto the DIN rail

Documents / Resources

	unitronics Jazz JZ20-UA24 Display Units and HMIs [pdf] User Guide Jazz JZ20-UA24 Display Units and HMIs, Jazz JZ20-UA24, Display Units and HMIs, Units and HMIs

References

- Technical library- about PLC Controllers, HMI panels, automation & control