

This guide provides specifications for Unitronics model V350-35-RA22. General features include: 12 pnp/npn Digital, including 2 Analog, 2 PT100/TC, 1 HSC/Shaft-encoder Inputs; 2 Analog, 8 Relay Outputs, I/O Expansion Port, built-in RS232/RS485. Available by separate order: Ethernet, additional RS232/RS485, CANbus

## Technical Specifications

### Power Supply

Input voltage	24VDC
Permissible range	20.4VDC to 28.8VDC with less than 10% ripple
Max. current consumption	See Note 1
npn inputs	265mA@24VDC
pnp inputs	230mA@24VDC

#### Notes:

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

Backlight	Ethernet card	Relay Outputs (per output)	All Analog Outputs, voltage/ current
20mA	35mA	5mA	48mA / 68mA

### Digital Inputs

Number of inputs	12. See Note 2
Input type	See Note 2
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
Input current	3.7mA@24VDC
Input impedance	6.5K
Response time	10mSec typical, when used as normal digital inputs
Input cable length	Up to 100 meters, unshielded
High speed inputs	Specifications below apply when wired as HSC / shaft-encoder. See Note 2.
Resolution	32-bit
Frequency	10kHz maximum
Minimum pulse width	40µs

**Notes:**

2. This model comprises a total of 12 inputs. Input functionality can be adapted as follows:  
All 12 inputs may be used as digital inputs. They may be wired in a group via a single jumper as either npn or pnp.

In addition, according to jumper settings and appropriate wiring:

- Inputs 5 and 6 can function as either digital or analog inputs.
- Input 0 can function as a high-speed counter, as part of a shaft-encoder, or as normal digital inputs.
- Input 1 can function as either counter reset, normal digital input, or as part of a shaft-encoder.
- Inputs 9 and 10 can function as either digital, thermocouple, or PT100 inputs; Input 11 can also serve as the CM signal for PT100.

**Digital Outputs**

Number of outputs	8 relay (in 2 groups). See Note 3
Output type	SPST-NO (Form A)
Isolation	By relay
Type of relay	Tyco PCN-124D3MHZ or compatible
Output current	3A maximum per output 8A maximum total for all outputs
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)

Notes:

3. Outputs # 0, 1, 2 and 3 share a common signal. Outputs #4, 5, 6, and 7 share a common signal.

**Analog Inputs**

Number of inputs	2, according to wiring as described above in Note 2	
Input type	Multi-range inputs: 0-10V, 0-20mA, 4-20mA	
Input range	0-20mA, 4-20mA	0-10VDC
Input impedance	37 $\Omega$	12.77k $\Omega$
Maximum input rating	30mA, 1.1V	$\pm$ 15V
Galvanic isolation	None	
Conversion method	Voltage to frequency	
Normal mode		
Resolution, except 4-20mA	14-bit (16383 units)	
Resolution, at 4-20mA	3277 to 16383 (13107 units)	
Conversion time	100mSec minimum per input (according to filter type)	
Fast mode		
Resolution, except 4-20mA	12-bit (4096 units)	
Resolution, at 4-20mA	819 to 4095 (3277 units)	
Conversion time	30mSec minimum per input (according to filter type)	
Full-scale error	$\pm$ 0.4%	
Linearity error	$\pm$ 0.04%	
Status indication	Yes. See Note 4.	

**Notes:**

4. The analog value can indicate faults as shown below:

Value: 12-bit	Value: 14-bit	Possible Cause
-1	-1	Deviates slightly below the input range
4096	16384	Deviates slightly above the input range
32767	32767	Deviates greatly above or below the input range

**RTD Inputs**

Input range	-200 to 600°C/-328 to 1100°F. 1 to 320Ω.
Isolation	None
Conversion method	Voltage to frequency
Resolution	0.1°C/0.1°F
Conversion time	300mS minimum per channel, depending on software filter type
Input impedance	>10MΩ
Auxillary current for PT100	150μA typical
Full-scale error	±0.4%
Linearity error	±0.04%
Status indication	Yes. See Note 5.

**Notes:**

5. The analog value can indicate faults as shown below:

<u>Value</u>	<u>Possible Cause</u>
32767	Sensor is not connected to input, or value exceeds permissible range
-32767	Sensor is short-circuited

**Thermocouple Inputs**

Input range	See Note 6.
Isolation	None
Conversion method	Voltage to frequency
Resolution	0.1°C/ 0.1°F maximum
Conversion time	100mS minimum per channel, depending on software filter type
Input impedance	>10MΩ
Cold junction compensation	Local, automatic
Cold junction compensation error	±1.5°C / ±2.7°F maximum
Absolute maximum rating	±0.6VDC
Full-scale error	±0.4%
Linearity error	±0.04%
Warm-up time	½ hour typically, ±1°C/±1.8°F repeatability
Status indication	None

**Notes:**

6. 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)		

**Analog Outputs**

Number of outputs	2
Output range	0-10V, 4-20mA. See Note 7.
Resolution	12-bit (4096 units)
Conversion time	Synchronized to scan time.
Load impedance	1kΩ minimum—voltage 500Ω maximum—current
Galvanic isolation	None
Linearity error	±0.1%
Operational error limits	±0.2%

**Notes:**

7. Note that the range of each I/O is defined by wiring, jumper settings, and within the controller's software.

**Graphic Display Screen**

LCD Type	TFT, LCD display
Illumination backlight	White LED, software-controlled
Display resolution	320 x 240 pixels
Viewing area	3.5"
Colors	256
Touchscreen	Resistive, analog
'Touch' indication	Via buzzer
Screen brightness	Via software (Store value to SI 9).
Keypad	Displays virtual keyboard when the application requires data entry.

**Keys**

Number of keys	5 programmable function keys
Key type	Metal dome, sealed membrane switch
Slides	Slides may be installed in the operating panel faceplate to custom-label the keys. Refer to V350 Keypad Slides.pdf. Two sets of slides are supplied with the controller: one set of arrow keys, and one blank set.

**Program**

Memory size	Application Logic – 1Mb, Images – 3Mb, Fonts – 512 Kb		
Operand type	Quantity	Symbol	Value
Memory Bits	8192	MB	Bit (coil)
Memory Integers	4096	MI	16-bit signed/unsigned
Long Integers	512	ML	32-bit signed/unsigned
Double Word	256	DW	32-bit unsigned
Memory Floats	64	MF	32-bit signed/unsigned
Timers	384	T	32-bit
Counters	32	C	16-bit
Data Tables	120K dynamic data (recipe parameters, datalogs, etc.), 192K fixed data (read-only data, ingredient names, etc)		
HMI displays	Up to 1024		
Program scan time	15µs per 1kb of typical application		

**Communication Ports**

Port 1	1 channel, RS232/RS485. See Note 8
Galvanic isolation	No
Baud rate	300 to 115200 bps
RS232	
Input voltage	±20VDC absolute maximum
Cable length	15m maximum (50 feet)
RS485	
Input voltage	-7 to +12VDC differential maximum
Cable type	Shielded twisted pair, in compliance with EIA 485
Cable length	1200m maximum (4000 feet)
Nodes	Up to 32
Port 2 (optional)	See Note 9
CANbus (optional)	See Note 9

**Notes:**

- This model is supplied with a serial port: RS232/RS485 (Port 1). The standard is set to either RS232 or RS485 according to jumper settings. Refer to the product's Installation Guide.
- The user may order and install one or both of the following modules:
  - An additional port (Port 2). Available types: RS232/RS485 isolated/non-isolated, Ethernet
  - A CANbus port
 Port module documentation is available on the Unitronics website.

**I/O Expansion Port**

Expansion modules	Via adapter, use up to 8 I/O Expansion Modules comprising up to 128 additional I/Os. Number of I/Os and types vary according to module.
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**Miscellaneous**

Clock (RTC)	Real-time clock functions (date and time).
Battery back-up	7 years typical at 25°C, battery back-up for RTC and system data, including variable data.
Battery replacement	Yes. Coin-type 3V, lithium battery, CR2450

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**Dimensions**

Size	109 x 114.1 x 68mm (4.29 x 4.49 x 2.67"). See Note 10
Weight	227g (8 oz)

**Notes:**

10. For exact dimensions, refer to the product's Installation Guide.
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**Environment**

Operational 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)

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