Vision™ OPLC™

V350-35-TA24/V350-J-TA24
Technical Specifications

The Unitronics V350-35-TA24/V350-J-TA24 offers the following onboard I/Os:

- 12 Digital Inputs, configurable via wiring to include 2 Analog, 2 PT100/TC, and 1 HSC/ Shaft-encoder Input
- 10 Transistor Outputs, 2 Analog Outputs

I/O configurations can be expanded to include up to 512 I/Os via Expansion Modules.
Available by separate order: Ethernet, additional RS232/RS485, CANbus, Profibus Slave.

You can find additional information, such as wiring diagrams, in the product's installation guide located on the Unitronics' Setup CD and in the Technical Library at www.unitronics.com.

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	240mA@24VDC
pnp inputs	200mA@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:

Backlight	Ethernet card	Relay Outputs (per output)	All Analog Outputs, voltage/current
20mA	35mA	5mA	48mA/30mA*

*If the analog outputs are not configured, then subtract the higher value.

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	6.5KΩ
Response time	10ms typical, when used as normal digital inputs
Input cable length	
Normal digital input	Up to 100 meters
High Speed Input	Up to 50 meters, shielded, see Frequency table below

High speed inputs	Specifications below apply when wired as HSC/shaft-encoder. See Note 2
Frequency (max)	See Note 3

Cable length (max.)	HSC	Shaft-encoder pnp	Shaft-encoder npn
10m	30kHz	20kHz	16kHz
25m	25kHz	12kHz	10kHz
50m	15kHz	7kHz	5kHz

Duty cycle	40-60%
Resolution	32-bit

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.
   - If input 0 is set as a high-speed counter (without reset), input 1 can function as a normal digital input.
   - Inputs 7-8 and 9-10 can function as digital, thermocouple, or PT100 inputs; input 11 can also serve as the CM signal for PT100.
3. pnp/npn maximum frequency is at 24VDC.

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	37Ω	12.77kΩ
Maximum input rating	30mA, 1.1V	±15V
Galvanic isolation	None	
Conversion method	Voltage to frequency	
Normal mode		
Resolution, except 4-20mA	14-bit (16384 units)	
Resolution, at 4-20mA	3277 to 16383 (13107 units)	
Conversion time	100ms minimum per channel. See Note 4	
Fast mode		
Resolution, except 4-20mA	12-bit (4096 units)	
Resolution, at 4-20mA	819 to 4095 (3277 units)	
Conversion time	30ms minimum per channel. See Note 4	
Full-scale error	±0.4%	
Linearity error	±0.04%	
Status indication	Yes. See Note 5	

Notes:

4. Conversion times are accumulative and depend on the total number of analog inputs configured. For example, if only one analog input (fast mode) is configured, the conversion time will be 30ms; however, if two analog (normal mode) and two RTD inputs are configured, the conversion time will be 100ms + 100ms + 300ms + 300ms = 800ms.
5. 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

RTD Type	PT100
Temperature coefficient α	0.00385/0.00392
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. See Note 4 above
Input impedance	>10MΩ
Auxillary current for PT100	150µA typical
Full-scale error	±0.4%
Linearity error	±0.04%
Status indication	Yes. See Note 6

Notes:

6. 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

Input range	See Note 7
Isolation	None
Conversion method	Voltage to frequency
Resolution	0.1°C/ 0.1°F maximum
Conversion time	100ms minimum per channel. See Note 4 above
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	Yes. See Note 6 above

Notes:

7. 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
mV	-5 to 56mV
B	200 to 1820˚C (300 to 3276˚F)
E	-200 to 750˚C (-328 to 1382˚F)
J	-200 to 760˚C (-328 to 1400˚F)
K	-200 to 1250˚C (-328 to 2282˚F)

Type	Temp. Range
N	-200 to 1300˚C (-328 to 2372˚F)
R	0 to 1768˚C (32 to 3214˚F)
S	0 to 1768˚C (32 to 3214˚F)
T	-200 to 400˚C (-328 to 752˚F)

Digital Outputs

Number of outputs	10 transistor pnp (source)
Output type	P-MOSFET (open drain)
Isolation	None
Output current (resistive load)	0.5A maximum per output 3A maximum total per common
Maximum frequency	50Hz (resistive load) 0.5Hz (inductive load)
PWM maximum frequency	0.5KHz (resistive load). See Note 8
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:

8. Outputs 0 to 4 can be used as PWM outputs.

Analog Outputs

Number of outputs	2
Output range	0-10V, 4-20mA. See Note 9
Resolution	12-bit (4096 units)
Conversion time	Both outputs are updated per scan
Load impedance	1kΩ minimum—voltage 500Ω maximum—current
Galvanic isolation	None
Linearity error	±0.1%
Operational error limits	±0.2%

Notes:

9. 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	320x240 pixels
Viewing area	3.5"
Colors	65,536 (16-bit)
Touchscreen	Resistive, analog
'Touch' indication	Via buzzer
Screen brightness control	Via software (Store value to SI 9).
Virtual Keypad	Displays virtual keyboard when the application requires data entry.

Keypad

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 – 6Mb, 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
Fast Bits	1023	XB	Fast Bits (coil) – not retained
Fast Integers	512	XI	16 bit signed/unsigned (fast, not retained)
Fast Long Integers	256	XL	32 bit signed/unsigned (fast, not retained)
Fast Double Word	64	XDW	32 bit unsigned (fast, not retained)
Timers	384	T	Res. 10 ms; max 99h, 59 min, 59.99 s
Counters	32	C	32 bit

Data Tables	120K dynamic data (recipe parameters, datalogs, etc.) 192K fixed data (read-only data, ingredient names, etc) Expandable via SD card. See Removable Memory below
HMI displays	Up to 1024
Program scan time	15µS per 1kb of typical application

Removable Memory

Micro SD card	Compatible with standard SD and SDHC; up to 32GB store datalogs, Alarms, Trends, Data Tables, backup Ladder, HMI, and OS. See Note 10

Notes:

10. User must format via Unitronics SD tools utility.

Communication Ports

Port 1	1 channel, RS232/RS485. See Note 11
Galvanic isolation	No
Baud rate	300 to 115200 bps
RS232	
Input voltage	±20VDC absolute maximum
Cable length	15m maximum (50')
RS485	
Input voltage	-7 to +12VDC differential maximum
Cable type	Shielded twisted pair, in compliance with EIA 485
Cable length	1200m maximum (4000')
Nodes	Up to 32
Port 2 (optional)	See Note 12
CANbus (optional)	See Note 12

Notes:

11. 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.
12. 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

	Additional I/Os may be added. Configurations vary according to module. Supports digital, high-speed, analog, weight and temperature measurement I/Os.
Local	Via I/O Expansion Port. Integrate up to 8 I/O Expansion Modules comprising up to 128 additional I/Os. Adapter required (P.N. EX-A2X).
Remote	Via CANbus port. Connect up to 60 adapters to a distance of 1000 meters from controller; and up to 8 I/O expansion modules to each adapter (up to a total of 512 I/Os). Adapter required (P.N. EX-RC1).

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

Dimensions

Size	V350	109 x 114.1 x 68mm (4.29 x 4.49 x 2.67"). See Note 13
	V350-J	109 x 114.1 x 66mm (4.92 x 4.49 x 2.59"). See Note 13
Weight		227g (8 oz)

Notes:

13. For exact dimensions, refer to the product's Installation Guide.

Environment

Operational temperature	0 to 50ºC (32 to 122ºF)
Storage temperature	-20 to 60ºC (-4 to 140ºF)
Relative Humidity (RH)	10% to 95% (non-condensing)
Mounting method	Panel mounted (IP65/66/NEMA4X)
	DIN-rail mounted (IP20/NEMA1)

DTS-V350-TA24 07/13