Vision™ OPLC™

V130-33-TRA22
Technical Specifications

The Unitronics V130-33-TRA22 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
- 4 Relay Outputs, 2 Analog Outputs, and 4 high-speed npn Transistor Outputs

I/O configurations can be expanded to include up to 256 I/Os via Expansion Modules. Available by separate order: Ethernet, additional RS232/RS485, CANbus.

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	245mA@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
10mA	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	Normal digital input	High Speed Input. See Note 3
pnp (source)	0-5VDC for Logic '0' 17-28.8VDC for Logic '1'	0-3VDC for Logic '0' 20.4-28.8VDC for Logic '1'
npn (sink)	17-28.8VDC for Logic '0' 0-5VDC for Logic '1	20.4-28.8VDC for Logic '0' 0-3VDC for Logic '1
Input current	I0, I1: 5.4mA@24VDC I2-I11: 3.7mA@24VDC	
Input impedance	I0, I1: 4.5KΩ I2-I11: 6.5KΩ	
Response time	10mS typical, when used as normal digital input	
Input cable length		
Normal digital input	Up to 100 meters	
High Speed Input	Up to 50 meters, shielded	

High speed inputs — Specifications below apply when wired as HSC/shaft-encoder. See Note 2

Frequency

Driver type	pnp/npn	Push-pull
HSC	100kHz maximum	200kHz maximum
Shaft-encoder	50kHz maximum	100kHz maximum

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. If you configure an input as high-speed, you can use an end-device that comprises push-pull drive type. In this case, the high-speed input voltage ratings for npn/pnp apply.

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
Galvanic 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
Galvanic 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)

Relay Outputs

Number of outputs	4. See Note 8
Output type	SPST-NO (Form A)
Galvanic isolation	By relay
Type of relay	Tyco PCN-124D3MHZ or compatible
Output current (resistive load)	3A maximum per output 8A maximum total per 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)

Notes:

8. Outputs 4, 5, 6, and 7 share a common signal.

Transistor Outputs

Number of outputs	4 npn (sink). See Note 9
Output type	N-MOSFET, (open drain)
Galvanic Isolation	None
Maximum output current (resistive load)	100mA per output
Rated voltage	24VDC
Maximum delay OFF to ON	1μS
Maximum delay ON to OFF	10μS
HSO freq. range with resistive load	5Hz-200kHz (at maximum load resistance of 1.5kΩ)
Maximum ON voltage drop	1VDC
Short-circuit protection	None
Voltage range	3.5V to 28.8VDC

Notes:

9. Outputs 0, 1, 2 and 3 share a common 0V signal.
   The 0V signal of the output must be connected to the controller's 0V.

Analog Outputs

Number of outputs	2
Output range	0-10V, 4-20mA. See Note 10
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:

10. Note that the range of each I/O is defined by wiring, jumper settings, and within the controller's software.
    The 0V signal of the output must be connected to the controller's 0V.

Graphic Display Screen

LCD Type	STN, LCD display
Illumination backlight	White LED, software-controlled
Display resolution	128x64 pixels
Viewing area	2.4"
Screen contrast	Via software (Store value to SI 7). Refer to VisiLogic Help topic *Setting LCD Contrast*.

Keypad

Number of keys	20 keys, including 10 user-labeled keys
Key type	Metal dome, sealed membrane switch
Slides	Slides may be installed in the operating panel faceplate to custom-label the keys and logo picture. A complete set of blank slides is available by separate order. Refer to *V130 Keypad Slides.pdf.*

Program

Memory size: Application Logic – 512kb, Images – 256 kb, Fonts – 128 kb

Operand type	Quantity	Symbol	Value
Memory Bits	4096	MB	Bit (coil)
Memory Integers	2048	MI	16-bit signed/unsigned
Long Integers	256	ML	32-bit signed/unsigned
Double Word	64	DW	32-bit unsigned
Memory Floats	24	MF	32-bit signed/unsigned
Timers	192	T	32-bit
Counters	24	C	16-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	20µS per 1kb of typical application

Removable Memory

Micro SD card	Micro SD card: store datalogs, Alarms, Trends, Data Tables; export to Excel; backup Ladder, HMI & OS and use this data to 'clone' PLCs. See Note 11

Notes:

11. User must format via Unitronics SD tools utility.

Communication Ports

Port 1	1 channel, RS232/RS485. See Note 12
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 13
CANbus (optional)	See Note 13

Notes:

12. 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.
13. The user may order and install one or both of the following modules:
    - An additional port (Port 2). Available port 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-A1).
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 256 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	109 x 114.1 x 68mm (4.29 x 4.49 x 2.67”). See Note 14
Weight	227g (8 oz)

Notes:

14. 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/NEMA4X)
	DIN-rail mounted (IP20/NEMA1)