# Vision™ PLC+HMI

**V130/V130J-TRA22**
**V350/V350J-TRA22**
**V430J-TRA22**
**Technical Specifications**

## Order Information

| Item | |
|---|---|
| V130-33-TRA22 | PLC with Classic panel, Monochrome display 2.4" |
| V130-J-TRA22 | PLC with Flat panel, Monochrome display 2.4" |
| V350-35-TRA22 | PLC with Classic panel, Color touch display 3.5'' |
| V350-J-TRA22 | PLC with Flat panel, Color touch display 3.5'' |
| V430-J-TRA22 | PLC with Flat panel, Color touch display 4.3'' |

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

## Power Supply

| Item | V130-TRA22<br>V130J-TRA22 | V350-TRA22<br>V350J-TRA22 | V430J-TRA22 |
|---|---|---|---|
| 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 | 270mA@24VDC | 270mA@24VDC |
| pnp inputs | 200mA@24VDC | 230mA@24VDC | 230mA@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 |
|---|---|---|---|---|
| V130/J | 10mA | 35mA | 5mA | 48mA/30mA* |
| V350/J/V430J | 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 | Normal digital input | High Speed Input. See Note 3 |
| pnp (source) | 0-5VDC for Logic '0'<br>17-28.8VDC for Logic '1' | 0-3VDC for Logic '0'<br>20.4-28.8VDC for Logic '1' |
| npn (sink) | 17-28.8VDC for Logic '0'<br>0-5VDC for Logic '1 | 20.4-28.8VDC for Logic '0'<br>0-3VDC for Logic '1 |
| Input Current | I0, I1: 5.4mA@24VDC<br>I2-I11: 3.7mA@24VDC | |
| Input impedance | I0, I1: 4.5KΩ<br>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, see Frequency table below | |

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

Frequency, HSC

| Driver type | pnp/npn | Push-pull |
|---|---|---|
| Cable length (max.) | | |
| 10m | 95kHz maximum | 200kHz maximum |
| 25m | 50kHz maximum | 200kHz maximum |
| 50m | 25kHz maximum | 200kHz maximum |

Frequency, Shaft-encoder

| Driver type | pnp/npn | Push-pull |
|---|---|---|
| Cable length (max.) | | |
| 10m | 35kHz maximum | 100kHz maximum |
| 25m | 18kHz maximum | 100kHz maximum |
| 50m | 10kHz maximum | 100kHz maximum |

| | |
|---|---|
| Duty cycle | 40-60% |
| Resolution | 32-bit |

**Notes:**

2. V130/V350/V130J/V350J/V430J-TRA22 models comprise a total of 12 inputs.
   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 (16384units) | |
| 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 $\alpha$ | 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 |
| Cable length | Up to 50 meters, shielded |

**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 | 4 relay. See Note 8 |
| Output type | SPST-NO (Form A) |
| Isolation | By relay |
| Type of relay | Tyco PCN-124D3MHZ or compatible |
| Output current (resistive load) | 3A maximum per output<br>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<br>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.

## Graphic Display Screen

| Item | V130-TRA22<br>V130J-TRA22 | V350-TRA22<br>V350J-TRA22 | V430J-TRA22 |
|---|---|---|---|
| LCD Type | STN, LCD display | TFT, LCD display | TFT, LCD display |
| Illumination backlight | White LED | White LED | White LED |
| Display resolution | 128x64 pixels | 320x240 pixels | 480x272 pixels |
| Viewing area | 2.4" | 3.5" | 4.3" |
| Colors | Monochrome | 65,536 (16-bit) | 65,536 (16-bit) |
| Screen Contrast | Via software<br>(Store value to SI 7,<br>values range: 0 to 100%) | Fixed | Fixed |
| Touchscreen | None | Resistive, analog | Resistive, analog |
| 'Touch' indication | None | Via buzzer | Via buzzer |
| Screen brightness control | Via software<br>(Store value to SI 9,<br>0 = Off, 1 = On) | Via software<br>(Store value to SI 9, values range: 0 to 100%) | |
| Virtual Keypad | None | Displays virtual keyboard when the application requires data entry. | |

## Keypad

| Item | V130-TRA22<br>V130J-TRA22 | V350-TRA22<br>V350J-TRA22 | V430J-TRA22 |
|---|---|---|---|
| Number of keys | 20 keys,including 10 user-labeled 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 *V130 Keypad Slides.pdf*.<br>A complete set of blank slides is available by separate order | Slides may be installed in the operating panel faceplate to custom-label the keys. Refer to *V350 Keypad Slides.pdf*.<br>Two sets of slides are supplied with the controller: one set of arrow keys, and one blank set. | None |

## Program

| Item | V130-TRA22<br>V130J-TRA22 | V350-TRA22<br>V350J-TRA22 | V430J-TRA22 |
|---|---|---|---|
| Memory size | | | |
| Application Logic | 512KB | 1MB | 1MB |
| Images | 128KB | 6MB | 12MB |
| Fonts | 128KB | 512KB | 512KB |

| Operand type | Quantity | | Symbol | Value |
|---|---|---|---|---|
| **Item** | **V130-TRA22<br>V130J-TRA22** | **V350-TRA22<br>V350J-TRA22<br>V430J-TRA22** | | |
| Memory Bits | 4096 | 8192 | MB | Bit (coil) |
| Memory Integers | 2048 | 4096 | MI | 16-bit signed/unsigned |
| Long Integers | 256 | 512 | ML | 32-bit signed/unsigned |
| Double Word | 64 | 256 | DW | 32-bit unsigned |
| Memory Floats | 24 | 64 | MF | 32-bit signed/unsigned |
| Fast Bits | 1024 | 1024 | XB | Fast Bits (coil) – not retained |
| Fast Integers | 512 | 512 | XI | 16 bit signed/unsigned (fast, not retained) |
| Fast Long Integers | 256 | 256 | XL | 32 bit signed/unsigned (fast, not retained) |
| Fast Double Word | 64 | 64 | XDW | 32 bit unsigned (fast, not retained) |
| Timers | 192 | 384 | T | Res. 10 ms; max 99h, 59 min, 59.99s |
| Counters | 24 | 32 | C | 32-bit |

| | | |
|---|---|---|
| Data Tables | 120K dynamic data (recipe parameters, datalogs, etc.)<br>192K fixed data (read-only data, ingredient names, etc)<br>Expandable via SD card. See Removable Memory below | |
| HMI displays | Up to 1024 | |
| Program scan time | 20µs per 1kb of typical application | 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.<br>See Note 11 |

**Notes:**

11.User must format via Unitronics SD tools utility.

## Communication Ports

| | |
|---|---|
| Port 1 | 1 channel, RS232/RS485 and USB device (V430/V350/V350J only). 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 |
| USB device **(V430/V350/V350J only)** | |
| Port type | Mini-B, See Note 14 |
| Specification | USB 2.0 complaint; full speed |
| Cable | USB 2.0 complaint; up to 3m |
| 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.
14. Note that physically connecting a PC to the controller via USB suspends RS232/RS485 communications via Port 1. When the PC is disconnected, RS232/RS485 resumes.

## 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

| Item | | V130-TRA22<br>V130J-TRA22 | V350-TRA22<br>V350J-TRA22 | V430J-TRA22 |
|---|---|---|---|---|
| Size | Vxxx | 109 x 114.1 x 68mm (4.29 x 4.49 x 2.67"). See Note 15 | 109 x 114.1 x 68mm (4.29 x 4.49 x 2.67"). See Note 15 | |
| | Vxxx-J | 109 x 114.1 x 66mm (4.92 x 4.49 x 2.59"). See Note 15 | 109 x 114.1 x 66mm (4.92 x 4.49 x 2.59"). See Note 15 | 136 x 105.1 x 61.3mm (5.35 x 4.13 x 2.41"). See Note 15 |
| Weight | | 300g (10.58 oz) | 325g (11.46 oz) | 355g (12.52 oz) |

**Notes:**

15. 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)<br>DIN-rail mounted (IP20/NEMA1) |
| Operating Altitude | 2000m (6562 ft) |
| Shock | IEC 60068-2-27, 15G, 11ms duration |
| Vibration | IEC 60068-2-6, 5Hz to 8.4Hz, 3.5mm constant amplitude,<br>8.4Hz to 150Hz, 1G acceleration. |



11/15