Vision™ OPLC™

V350-35-TR6/V350-J-TR6
Installation Guide

The Unitronics V350-35-TR6/V350-J-TR6 offers the following onboard I/Os:

- 8 Digital Inputs, configurable via wiring to include 2 Analog (current/voltage) and 1 HSC/Shaft-encoder
- 4 Analog Inputs (current)
- 6 Relay Outputs
- 2 high-speed npn Transistor Outputs

General Description

V350 OPLCs are micro-OPLCs, rugged programmable logic controllers that comprise:

- On-board I/O configuration
- Built-in operating panel containing a 3.5" Color Touchscreen and programmable function keys

Communications

- 1 built-in serial port: RS232/RS485
- Optional: the user may install -
  - Second RS232/RS485 port (V100-17-RS4/V100-17-RS4X)
  or
  - Ethernet (V100-17-ET2),or
  - Profibus Slave (V100-17-PB1) and
  - CANbus (V100-17-CAN)



Standard Kit Contents

Vision controller
I/O connectors (x2)
Battery (installed)
Programming cable + RS232 adapter
Mounting brackets (x2)
Rubber seal
Unitronics' Setup CD

Alert Symbols and General Restrictions

This document uses the following alert symbols to highlight notices that must be observed in order to ensure personal safety and/or prevent property damages.

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.
- Do not connect/disconnect the device when power is on.

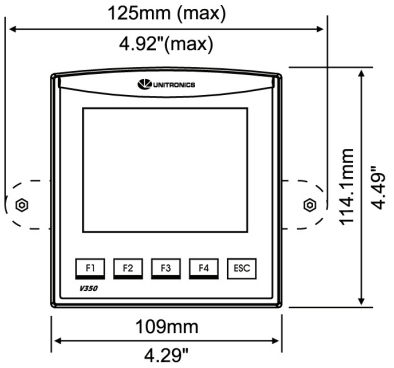
Environmental Considerations

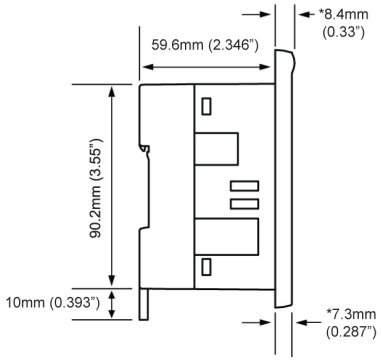
- Do not install in areas with: excessive or conductive dust, corrosive or flammable gas, moisture or rain, excessive heat, regular impact shocks or excessive vibration, in accordance with the standards given in the product's technical specification sheet.
- Do not place in water or let water leak onto 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

Dimensions



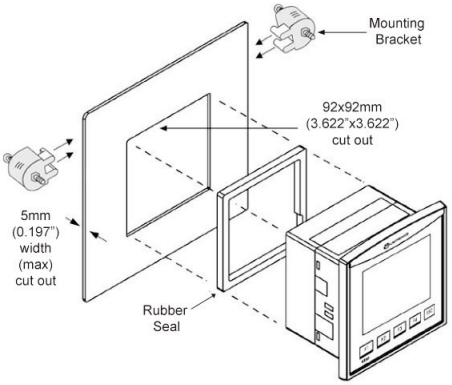


*Note that for V350-J modules those dimensions are 6.7 mm (0.26").

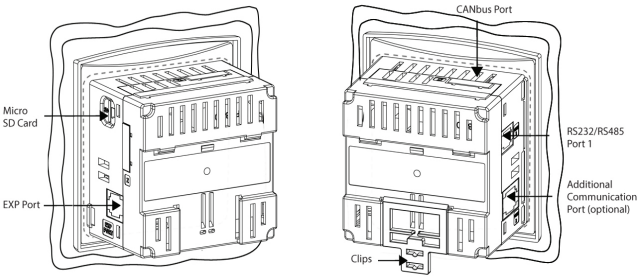
Panel Mounting

Before you begin, note that the mounting panel cannot be more than 5 mm thick.

1. Make a panel cut-out measuring 92x92 mm (3.622"x3.622").
1. Slide the controller into the cut-out, ensuring that the rubber seal is in place.
2. Push the mounting brackets into their slots on the sides of the panel as shown in the figure to the right.
3. Tighten the bracket's screws against the panel. Hold the bracket securely against the unit while tightening the screw.

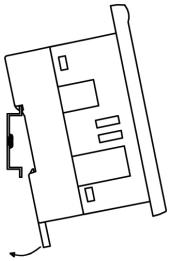


4. When properly mounted, the controller is squarely situated in the panel cut-out as shown in the figure to the right.

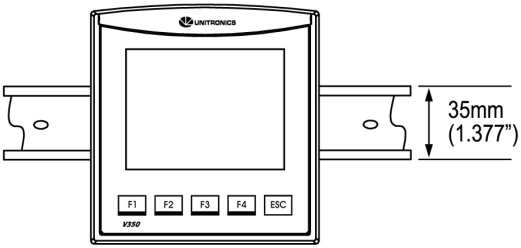


DIN-rail Mounting

1. Snap the controller onto the DIN rail as shown in the figure to the right.



2. When properly mounted, the controller is squarely situated on the DIN-rail as shown in the figure to the right.



Wiring

⚡	▪ Do not touch live wires.
⚠	▪ Install an external circuit breaker. Guard against short-circuiting in external wiring. ▪ Use appropriate circuit protection devices. ▪ Unused pins should not be connected. Ignoring this directive may damage the device. ▪ Double-check all wiring before turning on the power supply.
Caution	▪ To avoid damaging the wire, do not exceed a maximum torque of 0.5 N·m (5 kgf·cm). ▪ Do not use tin, solder, or any substance on stripped wire that might cause the wire strand to break. ▪ Install at maximum distance from high-voltage cables and power equipment.

Wiring Procedure

Use crimp terminals for wiring; use 3.31 mm ² –0.13 mm² wire (12-16 AWG):

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.

- Input or output cables should not be run through the same multi-core cable or share the same wire.
- Allow for voltage drop and noise interference with I/O lines used over an extended distance. Use wire that is properly sized for the load.
- The controller and I/O signals must be connected to the same 0V signal.

I/Os

This model comprises a total of 12 inputs, 6 relay and 2 npn outputs. Input functionality can be adapted as follows:

1. 8 inputs may be used as digital inputs. They may be wired, in a group, and set to either npn or pnp via a single jumper. 4 inputs may be used as analog inputs, current (AN2-AN5).
   In addition, according to jumper settings and appropriate wiring:
   - Inputs 6 and 7 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 a normal digital input.
   - Input 1 can function as either counter reset, as part of a shaft-encoder, or as a normal digital input.
   - If input 0 is set as a high-speed counter (without reset), input 1 can function as a normal digital input.

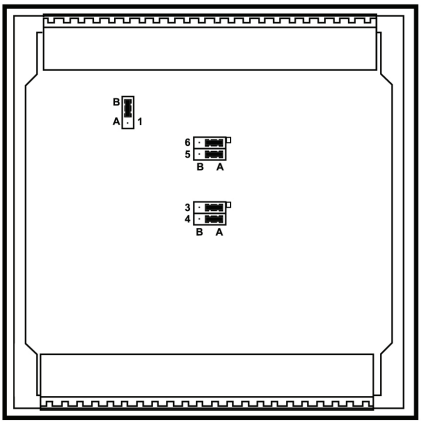
Input Jumper Settings

The tables below show how to set a specific jumper to change input functionality. To access the I/O jumpers, you must open the controller according to the instructions beginning on page 9.

⚠ ▪ Incompatible jumper settings and wiring connections may seriously damage the controller.

Digital Inputs 0-7: Set Type	
Set to	**JP1 (all Inputs)**
npn (sink)	A
pnp (source)*	B

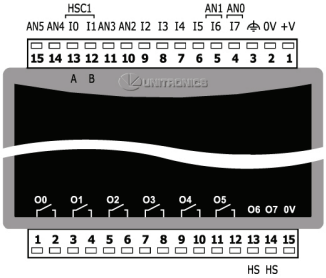
Inputs 6/7: Set as Digital or Analog		
Set to	**JP5 (Input 6)**	**JP6 (Input 7)**
Digital*	A	A
Analog	B	B
Analog Inputs AN0/AN1: Set Type		
Set to	**JP3 (AN0)**	**JP4 (AN1)**
Voltage*	A	A
Current	B	B



*Default settings

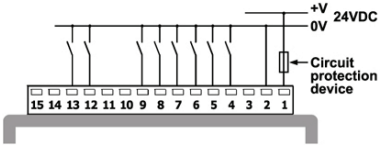
I/O Wiring

I/O Configuration

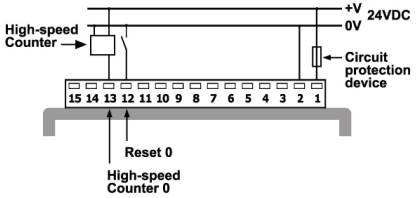


npn Input Wiring

Input wiring npn (sink)

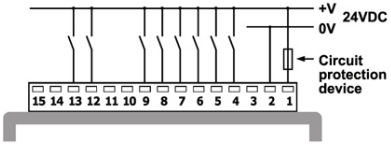


HSC input wiring, npn (sink)

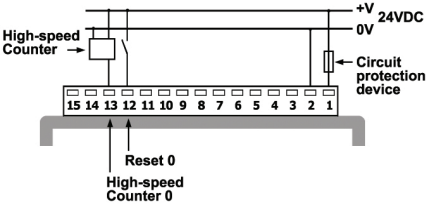


pnp Input Wiring

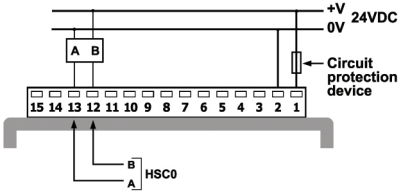
Input wiring pnp (source)



HSC input wiring, pnp (source)

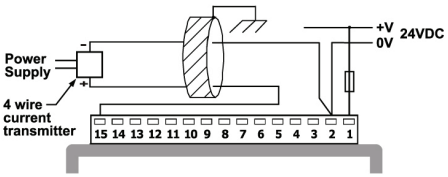


Shaft-encoder

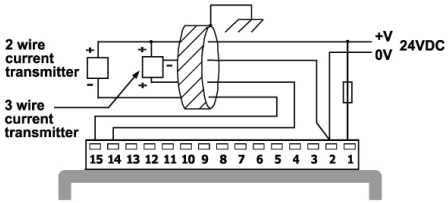


Analog Input (current) Wiring

Current connections (4 wire)

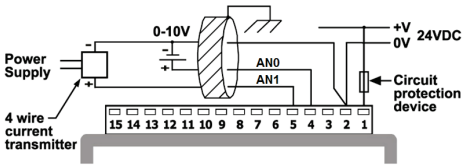


Current connections (2/3 wire)

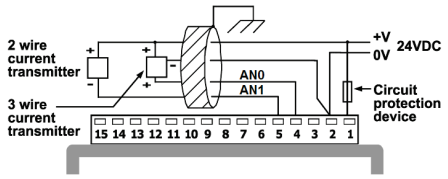


Analog Input (current/voltage) Wiring

Analog input wiring, current/voltage (4-wire)

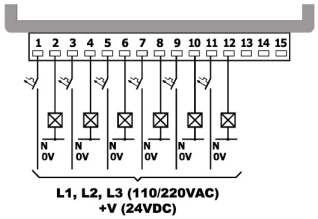


Analog input wiring, current (2/3 wire)



- Shields should be connected at the signal's source.
- The 0V signal of the analog input must be connected to the controller's 0V.

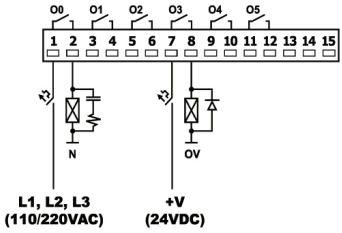
Relay Outputs



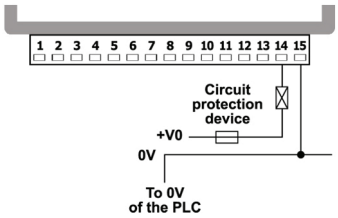
Increasing Contact Life Span

To increase the life span of the relay output contacts and protect the device 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



npn Outputs

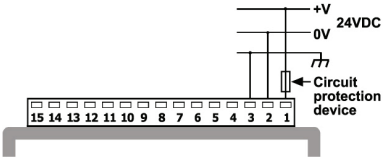


Power Supply

The controller requires an external 24VDC power supply.

- The power supply must include double insulation. Outputs must be rated as SELV/PELV/Class 2/Limited Power.

- Use separate wires to connect the functional earth line (pin 3) and the 0V line (pin 2) to the system earth ground.
- Install an external circuit breaker. Guard against short-circuiting in external wiring.
- Double-check all wiring before turning on the power supply.
- Do not connect either the 'Neutral' or 'Line' signal of the 110/220VAC to device's 0V pin.
- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.



Earthing the OPLC

To maximize system performance, avoid electromagnetic interference by:

- Mounting the controller on a metal panel.
- Connect each common and ground connection directly to the earth ground of your system.

For ground wiring use the shortest and thickest possible wire.

Communication Port

- **Turn off power before making communications connections.**

Caution

- Signals are related to the controller's 0V; the same 0V is used by the power supply.
- Always use the appropriate port adapters.
- The serial port is not isolated. If the controller is used with a non-isolated external device, avoid potential voltage that exceeds ± 10V.

Port 1 is type RJ-11 and may be set to either RS232 or RS485 via jumper as shown below.

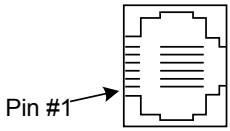
Pinouts

The pinouts below show the PLC port signals.

RS232	
Pin #	Description
1*	DTR signal
2	0V reference
3	TXD signal
4	RXD signal
5	0V reference
6*	DSR signal

RS485**	
Pin #	Description
1	A signal (+)
2	(RS232 signal)
3	(RS232 signal)
4	(RS232 signal)
5	(RS232 signal)
6	B signal (-)

Controller Port



*Standard programming cables do not provide connection points for pins 1 and 6.

**When a port is adapted to RS485, Pin 1 (DTR) is used for signal A, and Pin 6 (DSR) signal is used for signal B.

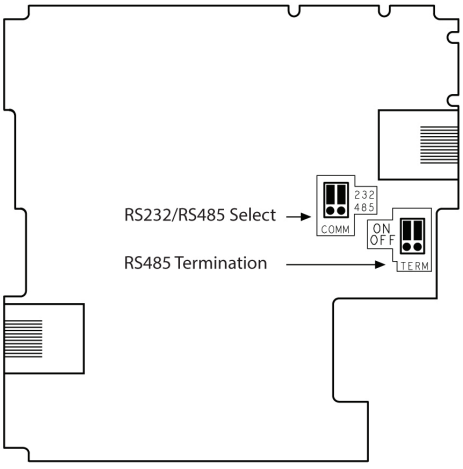
RS232 to RS485 Jumper Settings

The figure to the right shows the jumper factory default settings.

Note that in order:

- To change the communication setting to RS485, set both COMM jumpers to '485'.
- To change the RS485 termination, set both TERM jumpers to 'OFF'.

To access the jumpers, you must open the controller according to the instructions below.



Note: it is possible to establish a PC to PLC connection using RS232 even when the PLC is set to RS485 (this will eliminate the need to open the controller for jumper setting). To do so, removes the RS485 connector (pins 1 & 6) from the PLC and connect a standard RS232 programming cable instead. Note that this is possible only if DTR and DSR signals of RS232 are not used (which is the standard case).

Opening the Controller

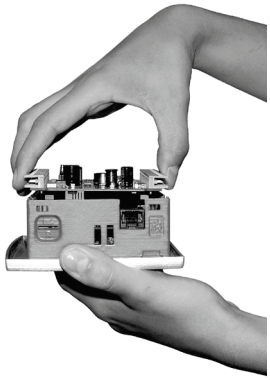
⚠
- Before performing these actions, touch a grounded object to discharge any electrostatic charge.
- Avoid touching the PCB board directly. Hold the PCB board by its connectors.

1. Turn off the power supply, disconnect, and dismount the controller.
2. The back cover of the controller comprises 4 screws, located in the corners. Remove the screws, and pull off the back cover.

Changing I/O settings

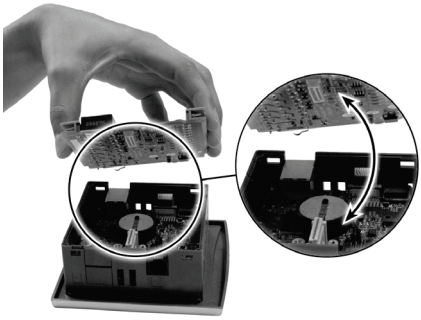
1. The I/O board of the controller is now exposed, enabling you to change I/O settings according to the jumpers shown on page 4.

Changing Communication Settings



1. To access the communication jumpers, locate the screw close to COM port 1, and remove it.
2. Hold the I/O PCB board by its top and bottom connectors and steadily pull the board off.
3. Locate the jumpers, and then change the settings as required. Jumper settings are shown on page 7.

Closing the Controller



1. Gently replace the board. Make certain that the pins fit correctly into their matching receptacle.
   Do not force the board into place; doing so may damage the controller.
2. Replace the back cover of the controller and fasten the corner screws.

Note: You must replace the back cover securely before powering up the controller.

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