Unitronics UIS-08TC Uni-I O Modules Installation Guide

Contents

Unitronics UIS-08TC Uni-I O Modules Installation Guide

Uni-I/O™ is a family of Input/Output modules that are compatible with the UniStream™ control platform. This guide provides basic installation information for the UIS-08TC module. Technical specifications may be downloaded from the Unitronics website

The UniStream™ platform comprises CPU controllers, HMI panels, and local I/O modules that snap together to form an all-in-one Programmable Logic Controller (PLC).

Install Uni-I/O™ modules:

- Onto the back of any UniStream™ HMI Panel comprising a CPU-for-Panel.
- Onto a DIN-rail, using a Local Expansion Kit.

The maximum number of Uni-I/O™ modules that can be connected to a single CPU controller is limited. For details, please refer to the specification sheets of the UniStream™ CPU or any of the relevant Local Expansion Kits.

Before You Begin
Before installing the device, the installer must:

- Read and understand this document.
- Verify the Kit Contents.

Installation option requirements

- If you are installing a Uni-I/O™ module onto:
- A UniStream™ HMI Panel; the Panel must comprise a CPU-for-Panel, installed according to the CPU-forPanel

installation guide.

- A DIN-rail; you must use a Local Expansion Kit, available by separate order, to integrate the Uni-I/O™ modules on the DIN-rail into a UniStream™ control system.

Alert Symbols and General Restrictions
When any of the following symbols appear, read the associated information carefully

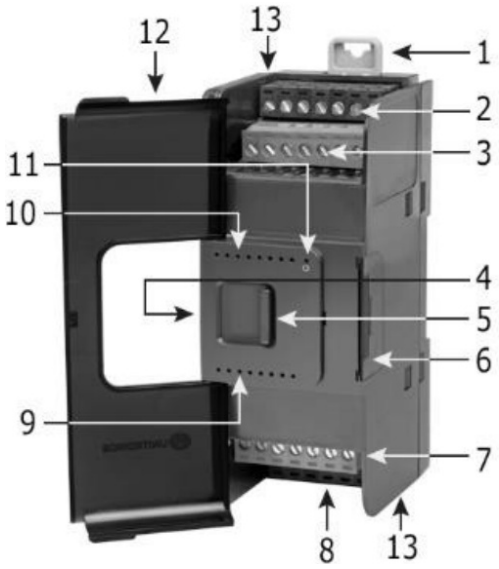
Symbol	Meaning	Description
⚠	Danger	The identified danger causes physical and property damage.
⚠	Warning	The identified danger could cause p hysical and property damage.
Caution	Caution	The identified danger could cause p hysical and property damage.

- 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.
- This product should be installed only by qualified personnel.
- 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.

Kit Contents

- 1 UIS-08TC module
- 4 I/O terminal blocks (2 black and 2 gray)

UIS-08TC Diagram



1	DIN-rail clips	Provide physical support for CPU and modules. There are two clips: one at t he top (shown), one at the bottom (not shown).
2	Inputs 0-1	Input connection points
3	Inputs 2-3	
4	I/O Bus – Left	Left-side Connector
5	Bus Connector Lock	Slide the Bus Connector Lock to the left, to electrically connect the Uni-I/O ™ module to the CPU or adjacent module.
6	I/O Bus – Right	Right-Side Connector, shipped covered. Leave covered when not in use.
	Bus Connector Cover	
	Inputs 6-7	Input connection points
8	Inputs 4-5	
9	Input LEDs (4-7)	Red LEDs
10	Input LEDs (0-3)	Red LEDs
11	Status LED	Tricolor LED, Green/Red/Orange

The I/O Bus connectors provide the physical and electrical connection points between modules. The connector is shipped covered by a protective cover, protecting the connector from debris, damage, and ESD.

The I/O Bus – Left (#4 in diagram) can be connected to either a CPU-for-Panel, a Uni-COM™ module, to another Uni-I/O™ module or to the End Unit of a Local Expansion Kit.

The I/O Bus – Right (#6 in diagram) can be connected to another I/O module, or to the Base Unit of the Local Expansion Kit.

Caution ▪ If the I/O module is located last in the configuration, and nothing is to be connected to it, do not remove its Bus Connector Cover.

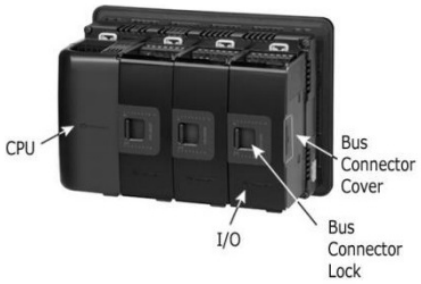
Installation

- Turn off system power before connecting or disconnecting any modules or devices.
- Use proper precautions to prevent Electro-Static Discharge (ESD)

Installing a Uni-I/O™ Module onto a UniStream™ HMI Panel
NOTE The DIN-rail type structure on the back of the panel provides the physical support for the Uni-I/O™ module

1. Check the unit to which you will connect the Uni-I/O™ module to verify that its Bus Connector is not covered. If the Uni-I/O™ module is to be the last one in the configuration, do not remove the cover of its I/O Bus Connector – Right.
2. Open the door of the Uni-I/O™ module andhold it as shown in the accompanying figure.
3. Use the upper and lower guide-tunnels (tongue & groove) to slide the Uni-I/O™ module into place.
4. Verify that the DIN-rail clips located at the top and bottom of the Uni-I/O™ module have snapped onto the DIN-rail.

5. Slide the Bus Connector Lock all the way to the left as shown in the accompanying figure.
6. If there is already a module located to its right, complete the connection by sliding the Bus Connector lock of the adjacent unit to the left.
7. If the module is the last in the configuration, leave the I/O bus connector covered.



Removing a Module

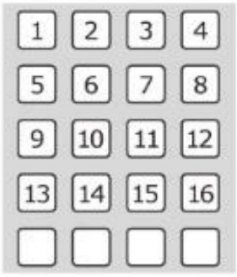
1. Turn off the system power.
2. Disconnect the I/O terminals (#2,3,7,8 in the diagram).
3. Disconnect the Uni-I/O™ module from the adjacent units: slide its Bus Connector Lock to the right. If there is a unit located on its right, slide the lock of this module to the right as well.
4. On the Uni-I/O™ module, pull the top DIN-rail clip up and the bottom clip down.
5. Open the door of the Uni-I/O™ and hold it with two fingers as shown in the figure on page
6. then pull it carefully from its place.

Installing Uni-I/O™ modules onto a DIN-rail
To mount modules onto a DIN-rail, follow steps 1-7 in Installing a Uni-I/O™ Module onto a UniStream™ HMI Panel on page 3.

In order to connect the modules to a UniStream™ controller, you must use a Local Expansion Kit.

These kits are available with and without power supplies, and with cables of varying lengths. For complete information, please refer to the installation guide of the relevant Local Expansion Kit.

Numbering Modules
You can number modules for reference purposes. A set of 20 stickers is provided with every CPU-for-Panel; use these stickers to number the modules.



- The set contains numbered and blank stickers as shown in the figure to the left.
- Place them on the modules as shown in the figure to the right

UL Compliance
The following section is relevant to Unitronics' products that are listed with the UL. The following models: UIA-0006, UID-0808R, UID-W1616R,UIS-WCB1 are UL listed for Hazardous Locations.

The following models: UIA-0006, UIA-0402N,UIA-0402NL, UIA-0800N, UID-0016R, UID 0016RL, UID-0016T, UID-0808R, UID-0808RL, UID-0808T, UID-0808THS, UID-0808THSL, UID 0808TL, UID-1600, UID-1600L, UID-W1616R, UID-W1616T, UIS-04PTKN, UIS-04PTN, UIS-08TC, UIS-WCB1, UIS WCB2 are UL listed for Ordinary Location.

UL Ratings, Programmable Controllers for Use in Hazardous Locations, Class I, Division 2, Groups A, B, C and D

These Release Notes relate to all Unitronics products that bear the UL symbols used to mark products that have been approved for use in hazardous locations, Class I, Division 2, Groups A, B, C and D.

Caution

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D, or Nonhazardous locations only.
- Input and output wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.
- ⚠ **WARNING—Explosion** Hazard—substitution of components may impair suitability for Class I,Division 2.
- ⚠ **WARNING** – EXPLOSION HAZARD – Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- **WARNING** – Exposure to some chemicals may degrade the sealing properties of material used in Relays.
- This equipment must be installed using wiring methods as required for Class I, Division 2 as per the NEC and/or CEC.

Wiring

- This equipment is designed to operate only at SELV/PELV/Class 2/Limited Power environments.
- All power supplies in the system must include double insulation. Power supply outputs must be rated as SELV/PELV/Class 2/Limited Power.
- Do not connect either the ‘Neutral’ or ‘Line’ signal of the 110/220VAC to device’s 0V point.
- Do not touch live wires.
- ⚠ All wiring activities should be performed while power is OFF.
- Use over-current protection, such as a fuse or circuit breaker, to avoid excessive currents into the UIS-08TC supply port.
- Unused points should not be connected (unless otherwise specified). Ignoring this directive may damage the device.
- Double-check all wiring before turning on the power supply.

Caution

- To avoid damaging the wire, use 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 26-12 AWG wire (0.13 mm 2 –3.31 mm2).

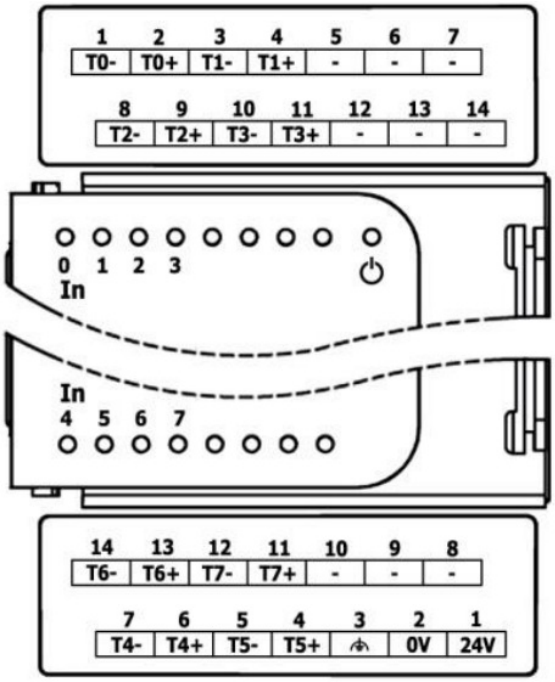
1. Strip the wire to a length of 7±0.5mm (0.250–0.300 inches).
2. Unscrew the terminal to its widest position before inserting a wire.
3. Insert the wire completely into the terminal to ensure a proper connection.
4. Tighten enough to keep the wire from pulling free.

UIS-08TC Connection Points
All wiring diagrams and instructions in this document refer to the UIS-08TC connection points.

These points are arranged in four groups of seven points as shown in the figure to the right.

Two top groups
Input connection points (0,1,2,3)

Two bottom groups
Input connection points (4,5,6,7) and power supply connection points



Wiring Guidelines
In order to ensure that the device will operate properly and to avoid electromagnetic interference:

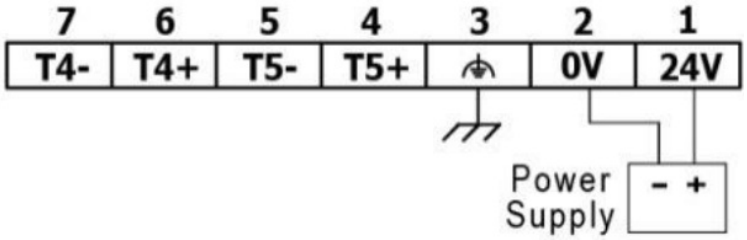
- Use a metal cabinet. Make sure the cabinet and its doors are properly earthed.
- Use shielded cables for wiring thermocouple signals and shielded twisted pair cables for wiring analog input voltage signals; do not use the cable shield as a signal common / return path.
- It is recommended to short unused analog inputs (Tx- to Tx+).
- Route each I/O signal with its own dedicated common wire. Connect common wires at their respective common points (Tx-) at the I/O module.
- Individually connect each functional ground point ( ) to the earth of the system (preferably to the metal cabinet chassis). Use the shortest and thickest wires possible: less than 1m (3.3') in length, minimum thickness 14 AWG (2 mm2).
- Connect the power supply 0V to the earth of the system.
- Earthing the cables' shield:
    - Connect the cable shield to the earth of the system – preferably to the metal cabinet chassis. Note that the shield must be connected only at one end of the cable; typically, earthing the shield at the UIS-08TC end performs better.
    - Keep shield connections as short as possible.
    - Ensure shield continuity when extending shielded cables

NOTE For detailed information, refer to the document System Wiring Guidelines, located in the Technical Library in the Unitronics' website.

Wiring the Power Supply
This module requires an external 24VDC power supply

- In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.

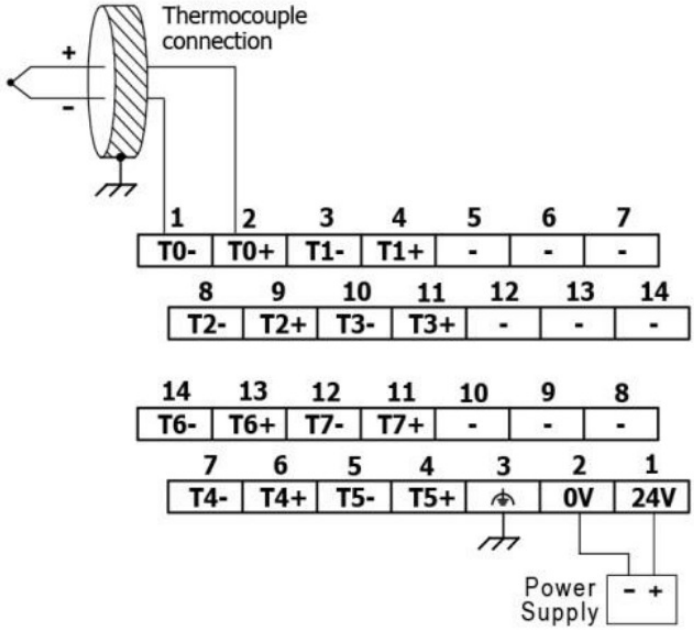
Connect the 24V and 0V terminals as shown in the accompanying figure

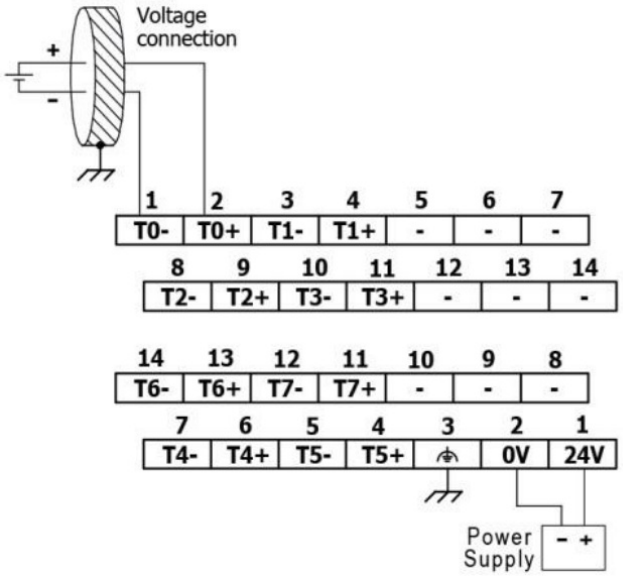


Wiring the Inputs

NOTE

- Each input offers two modes: thermocouple or voltage. You can set each input independently. The mode is determined both by wiring and by the hardware configuration within the software application.





Technical Specifications

This guide provides specifications for Unitronics' Uni-I/O™ module UIS-08TC. This module comprises:

- 8 Thermocouple inputs

Uni-I/O modules are compatible with UniStream™ family of Programmable Logic Controllers. They may be either snapped onto the back of a UniStream™ HMI Panel next to a CPU-for-Panel to create an all-in-one HMI + PLC controller, or installed on a standard DIN Rail using a Local Expansion Adapter.

Installation Guides are available in the Unitronics Technical Library at **www.unitronics.com**

Inputs			
Number of inputs	8		
Input range (1)	**Input type**	**Nominal values**	**Over/Under-range Values ***
	Thermocouple type J	-200°C ≤ T ≤ 1,200°C (-328 °F ≤ T ≤ 2,192°F)	**Under-range:-**210°C ≤ T < -200° C (-346°F ≤ T < -328°F) **Over-range:**1,200°C < T ≤ 1,250° C(2,192°F < T ≤ 2,282°F)
	Thermocouple type K	-200°C ≤ T ≤ 1,372°C(-328 °F ≤ T ≤ 2,501.6°F)	**Under-range:**-270°C ≤ T < -200° C (-454°F ≤ T < -328°F) **Over-range:**1,372°C < T ≤ 1,400° C(2,501.6°F < T ≤ 2,552°F)
	Thermocouple type T	-200°C ≤ T ≤ 400°C(-328°F ≤ T ≤ 752°F)	**Under-range:-**270°C ≤ T < -200° C (-454°F ≤ T <-328°F) **Over-range:**400°C < T ≤ 430°C(7 52°F < T ≤ 806°F)
	Thermocouple type E	-200°C ≤ T ≤ 1,000°C (-328 °F ≤ T ≤ 1,832°F)	**Under-range:**-270°C ≤ T < -200° C (-454°F ≤ T < -328°F) **Over-range:**1,000°C < T ≤ 1,010° C(1,832°F < T ≤ 1,850°F)
	Thermocouple type R	0°C ≤ T ≤ 1,768°C (32°F ≤ T ≤ 3,214.4°F)	**Under-range:**-50°C ≤ T < 0°C(-5 8°F ≤ T < 32°F) **Over-range**:1,768°C < T ≤ 1,800° C (3,214.4°F < T ≤ 3,272°F)
	Thermocouple type S	0°C ≤ T ≤ 1,768°C (32°F ≤ T ≤ 3,214.4°F)	**Under-range:**-50°C ≤ T < 0°C(-5 8°F ≤ T < 32°F)

			Over-range:1,768°C < T ≤ 1 ,800°C (3,214.4°F < T ≤ 3,2 72°F)
	Thermocouple type B	200°C ≤ T ≤ 1,820°C (392°F ≤ T ≤ 3,308°F)	Under-range:100°C ≤ T < 2 00°C(212°F ≤ T < 392°F)Ov er-range:1,820°C < T ≤ 1,87 0°C (3,308°F < T ≤ 3,398°F)
	Thermocouple type N	-210°C ≤ T ≤ 1,300°C (-346°F ≤ T ≤ 2,372°F)	Under range:-270°C ≤ T < - 210°C (-454°F ≤ T < -346°F)Over-range:1,300°C < T ≤ 1,350°C (2,372°F < T ≤ 2,4 62°F)

	Thermocouple type C	10°C ≤ T ≤ 2,315°C (50°F ≤ T ≤ 4,199°F)		Under-range:0°C ≤ T < 10 °C (32°F ≤ T < 50°F)Over-range:2,315 °C < T ≤ 2,370 °C (4,199°F < T ≤ 4,298°F)
	Voltage	-70mV ≤ Voltage ≤70mV		Under-range:-71.05mV ≤ Voltage < -70mVOver-range:70mV ≤ Voltage < 71.05mV
	*** Overflow or Underflow** (1) is declared when an input value exceeds the Over-range or Under-range boundaries respectively.			
Absolute maximum rating	±36 V			
Isolation voltage				
Input to bus	500 VAC for 1	minute		
Input to input	120 VAC for 1	minute		
Input power supply to Bus	500 VAC for 1	minute		
Input power supply to input	500 VAC for 1	minute		
Conversion method	Delta-sigma			
Resolution	Thermocouple – 0.1°C (0.1°F) (4)Voltage – 15 bits plus sign			
Accuracy (4)(25°C / -20°C to 55°C)	**Input type**		**Accuracy**	
	Thermocouple	type J	± 0.4°C / ± 0.7°C (± 0.72°F / ± 1.26°F)	
	Thermocouple	type K	± 0.5°C / ± 1.0°C (± 0.9°F / ± 1.8°F)	
	Thermocouple	type T	± 0.6°C / ± 1.2°C (± 1.08°F / ± 2.16°F)	
	Thermocouple	type E	± 0.4°C / ± 0.8°C (± 0.72°F / ± 1.44°F)	
	Thermocouple	type R	± 1.2°C / ± 2.4°C (± 2.16°F / ± 4.32°F)	
	Thermocouple	type S	± 1.2°C / ± 2.4°C (± 2.16°F / ± 4.32°F)	
	Thermocouple	type B	± 2.0°C / ± 3.8°C (± 3.46°F / ± 6.84°F)	

	Thermocouple type N		± 1.0°C / ± 1.5°C (± 1.8°F / ± 2.7°F)		
	Thermocouple type C		± 0.8°C / ± 2.0°C (±1.44°F / ± 3.46°F)		
	Voltage		± 0.05% / ± 0.1% of full scale		
Noise rejection	10Hz, 50 Hz, 60 Hz, 400 Hz				
Step response (4)(0 to 100 % of final value)	**Smoothing (filter)**	**Noise Rejection Frequency**			
		400Hz	**60Hz**	**50Hz**	**10Hz**
	None	310ms	470ms	550ms	2,470ms
	Weak	1,236ms	1,875ms	2,195ms	9,875ms
	Medium	2,470ms	3,750ms	4,390ms	19,750ms
	Strong	4,940ms	7,500ms	8,780ms	39,500ms
Update time (4)	**Noise Rejection Frequency**		**Update Time**		
	400Hz		310ms		
	60Hz		470ms		
	50Hz		550ms		
	10Hz		2,470ms		
Cold junction error	±1.5°C (±2.7°F)				
Cable	Shielded, see installation guide for details				
Diagnostics (6) (7)	Input Overflow or Underflow, sensor connection fault (6) (7)				

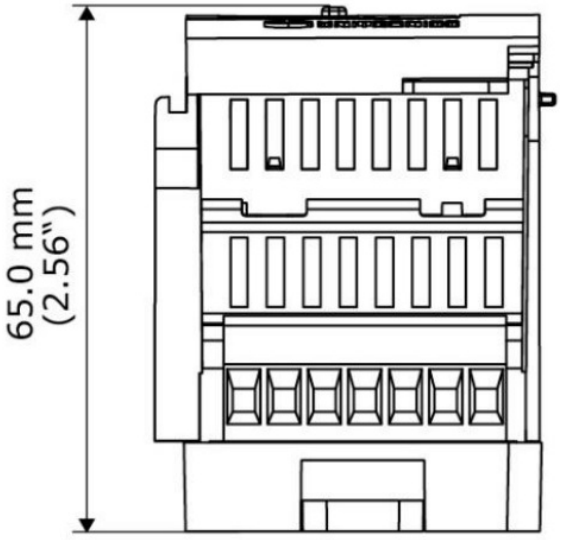
IO/COM Bus	
Bus current consumption	80mA maximum

LED Indications			
Input LEDs	Red	On: Input value is in Overflow, Underflow, or a connection fault occurs	
Status LED	A triple color LED. Indications are as follows:		
	Color	**LED State**	**Status**
	Green	On	Operating normally
		Slow blink	Boot
		Rapid blink	OS initialization
	Green/Red	Slow blink	Configuration mismatch
	Red	Slow blink	No IO exchange
		Rapid blink	Communication error
	Orange	Rapid Blink	OS Upgrade

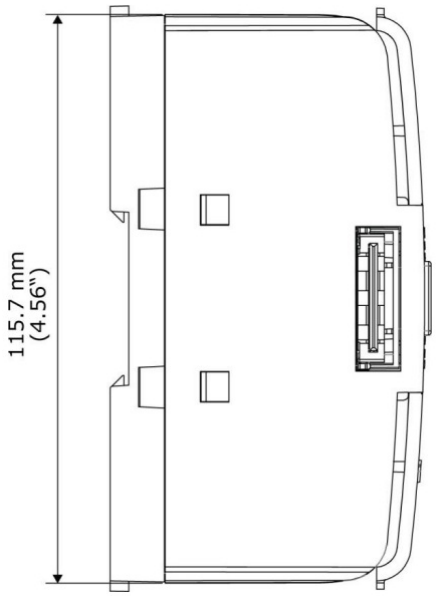
Environmental	
Protection	IP20, NEMA1
Operating temperature	-20°C to 55°C (-4°F to 131°F)
Storage temperature	-30°C to 70°C (-22°F to 158°F)
Relative Humidity (RH)	5% to 95% (non-condensing)
Operating altitude	2,000 m (6,562 ft)
Shock	IEC 60068-2-27, 15G, 11ms duration
Vibration	IEC 60068-2-6, 5Hz to 8.4Hz, 3.5mm constant amplitude, 8.4Hz to 150Hz, 1G acceleration

Dimensions	
Weight	100 g (0.220 lb)
Size	Refer to the images below

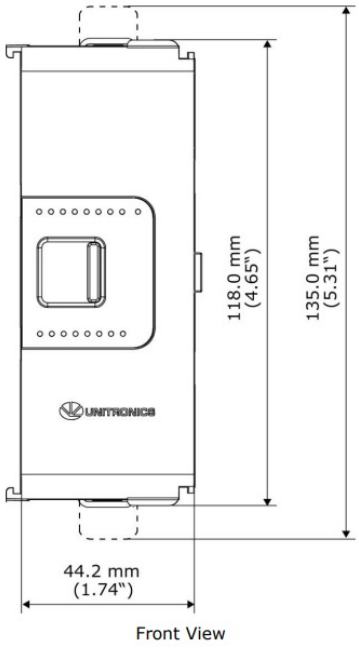
Bottom View



Side View



Front View



Front View

Notes

1. The UIS-08TC measures values that are slightly higher or lower than the nominal input range(i.e. Input

Over/Under-range respectively).

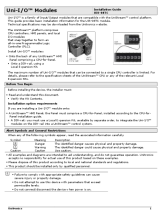
Note that when input Overflow, Underflow or a connection fault occurs, it is indicated in the corresponding I/O Status tag (refer to the UniLogic™ help for details) as well as by the respective input LED (see LED Indications), while the input value is registered as follows:

Fault Type	Registered Value in the Input Tag
Overflow	32,767
Underflow	-32,767
Connection fault	-32,768

2. For temperature measurement, the value is represented in 0.1° units. For example, a temperature Of 12.3° is represented as 123 at the Value tag.
3. The internal cold junction accuracy is ±1°C for all thermocouple types. This accuracy adds to the accuracy in the table. The module requires at least 30 minutes of warm-up in order to meet the table specifications.
4. Step response and update time are independent of the number of inputs that are used.
5. See LED Indications Table above for description of the relevant indications. Note that the diagnostics results are also indicated in the I/O tags and can be observed through the UniApps™ or the online state of the UniLogic™.
6. Sensor connection fault check is active by default for both temperature and voltage measurements.
7. Sensor connection fault check may interfere with some test equipment like the rmocouple/voltage simulators and thus may induce reading errors or cause malfunction of the test equipment and/or the UIS-08TC.

In order to interoperate correctly with such equipment, you may set the Disable Fault Detection I/O tag. This will disable connection fault check for all inputs. Note that when this tag is set, the UIS-08TC will not check, or report, connection faults; thus, the reading in such case is unpredictable.

Documents / Resources



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UIS-08TC Uni-I O Modules, UIS-08TC, Uni-I O Modules, Modules