UniStream™ Uni-I/O™ Modules

Technical Specifications
UIS-08TC

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 (752°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 (-58°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 (-58°F ≤ T < 32°F) Over-range: 1,768°C < T ≤ 1,800°C (3,214.4°F < T ≤ 3,272°F)

	Thermocouple type B	200°C ≤ T ≤ 1,820°C (392°F ≤ T ≤ 3,308°F)	Under-range: 100°C ≤ T < 200°C (212°F ≤ T < 392°F) Over-range: 1,820°C < T ≤ 1,870°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 ≤ 2,462°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 < -70mV Over-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

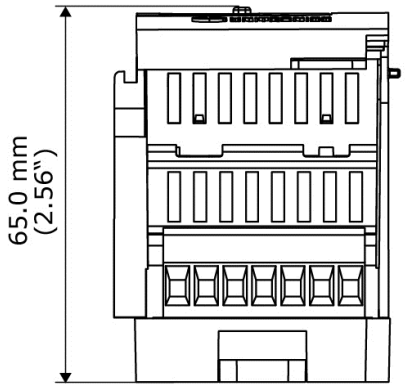
Noise rejection	10Hz, 50 Hz, 60 Hz, 400 Hz				
Step response [4] (0 to 100% of final value)	**Smoothing (filter)**	**Noise Rejection Frequency**			
		400Hz	**60Hz**	**50Hz**	**10Hz**
	None	310ms	470ms	550ms	2,470ms
	Weak	1,236ms	1,875ms	2,195ms	9,875ms
	Medium	2,470ms	3,750ms	4,390ms	19,750ms
	Strong	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

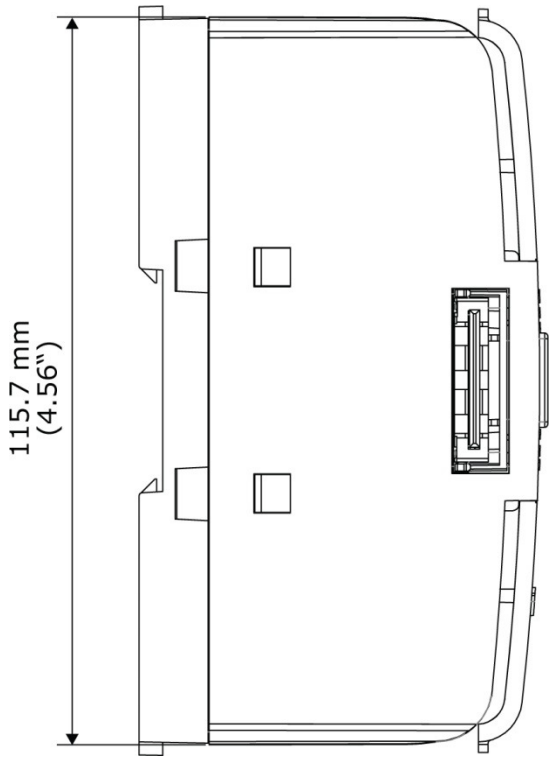
LED Indications			
Input LEDs	Red	On: Input value is in Overflow, Underflow, or a connection fault occurs	
Status LED	A triple color LED. Indications are as follows:		
	Color	LED State	Status
	Green	On	Operating normally
		Slow blink	Boot
		Rapid blink	OS initialization
	Green/Red	Slow blink	Configuration 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

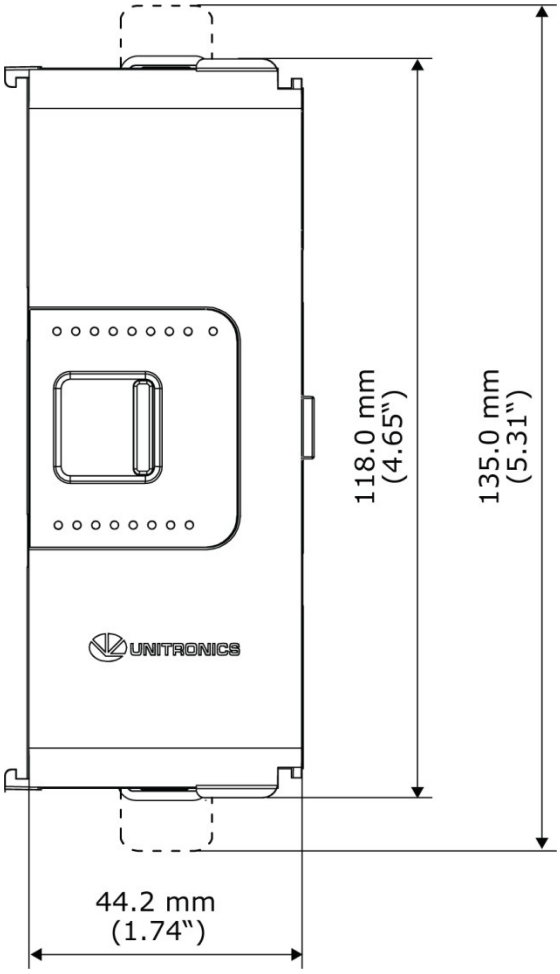
Dimensions	
Weight	100 g (0.220 lb)
Size	Refer to the images below



Bottom View



Side View



Front View

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 thermocouple/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.

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