UniStream®
PLC

Technical Specifications:
USC-B5-R38, USC-B10-R38,
USC-B5-T42, USC-B10-T42

Unitronics' UniStream® s are DIN-rail mounted Programmable Logic Controllers (PLCs) with a built-in I/O configuration. This document provides the specifications for the built-in I/O configurations for the models USC-Bx-RA28 and USC-Bx-TA30.

The series is available in three versions: Pro, Standard, and Basic.

Note that a model number that includes:

- **B10** refers to Pro version (e.g. USC-B**10**-T24)
- **B5** refers to Standard version (e.g. USC-B**5**-RA28)
- **B3** refers to Basic version (e.g. only for USC-B**3**-T20)

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

USC-Bx-R38	USC-Bx-T42
• 24 x Digital inputs, isolated, 24VDC, sink/source, including 4 High speed counter input channels (1) • 2 x Analog inputs, 0÷10V / 0÷20mA, 12 bits • 12 x Relay outputs, isolated	• 24 x Digital inputs, isolated, 24VDC, sink/source, including 4 High speed counter input channels (1) • 2 x Analog inputs, 0÷10V / 0÷20mA, 12 bits • 16 x Transistor outputs, isolated, pnp, including 2 PWM output channels

Power Supply	**USC-Bx-R38**	**USC-Bx-T42**
Input voltage	24VDC	24VDC
Permissible range	20.4VDC to 28.8VDC	20.4VDC to 28.8VDC
Max. current consumption	0.46A@24VDC	0.38A@24VDC
Isolation	None	

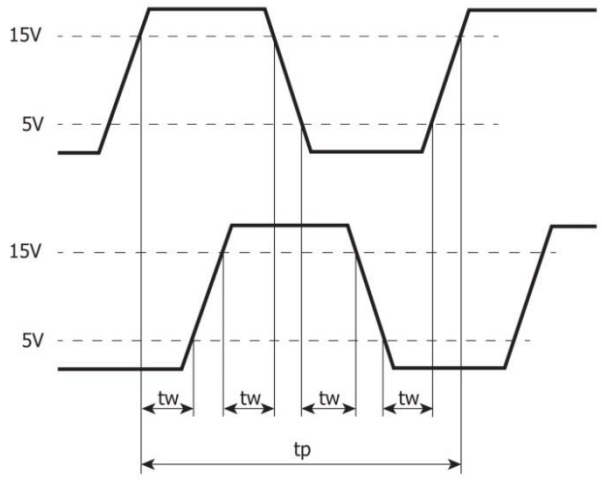
General	
I/O support	Up to 2,048 I/O points
Built-in I/O	According to model
Local Uni-I/O™ support (2)	Up to 8 I/O modules with no additional power supply Up to 16 I/O modules with a Local Expansion(3) Power Kit
Remote I/O	Up to 8 Remote I/O Adapters (URB)
Communication ports	
Built-in COM ports	Specifications are provided below in the section Communications
Add-on Ports	Add up to 3 ports to a single controller using Uni-COM™ UAC-CB Modules(4).

Internal memory	**Standard (B5)**	**Pro (B10)**
	RAM: 512MB ROM: 3GB system memory 1GB user memory	RAM: 1GB ROM: 6GB system memory 2GB user memory
Ladder memory	1 MB	
External memory	microSD or microSDHC card Size: up to 32GB Data Speed: up to 200Mbps	
Bit operation	0.13 µs	
Battery	Model: 3V CR2032 Lithium battery (5) Battery lifetime: 4 years typical, at 25°C Battery Low detection and indication (via BATT. LOW indicator and via System Tag).	

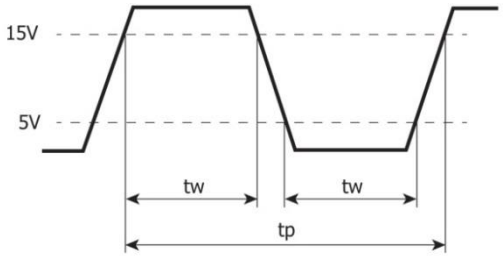
Communication (Built-in Ports)	
Ethernet port	
Number of ports	2
Port type	10/100 Base-T (RJ45)
Auto crossover	Yes
Auto negotiation	Yes
Isolation voltage	500VAC for 1 minute
Cable	Shielded CAT5e cable, up to 100 m (328 ft)
USB device (6)	
Number of ports	1
Port type	Mini-B
Data rate	USB 2.0 (480Mbps)
Isolation	None
Cable	USB 2.0 compliant; < 3 m (9.84 ft)
USB host	
Number of ports	1
Port type	Type A
Data rate	USB 2.0 (480Mbps)
Isolation	None
Cable	USB 2.0 compliant; < 3 m (9.84 ft)
Over current protection	Yes

Digital Inputs	
Number of inputs	24
Type	Sink or Source
Isolation voltage	
Input to bus	500VAC for 1 minute
Input to input	None
Nominal voltage	I0-I9, I18-I23: 24VDC @ 6mA I10-I17: 24VDC @ 8mA
Input voltage	
Sink/Source	On state: 15-30VDC, 4mA min. Off state: 0-5VDC, 1mA max.
Nominal impedance	I0-I9, I18-I23: 4kΩ I10-I17: 3kΩ
Filter	I0-I9, I18-I23: 6ms typical I10-I17: 5.5µs, 50µs, 0.5ms, 6ms, 12ms

High speed inputs (1)	
Frequency / Period	Pulse/Direction mode: 90kHz max. / 11.1µs min (t_p in the Pulse/Dir Mode figure below). Quadrature mode: 80kHz max. / 12.5µs min (t_p in the Quadrature Mode figure below).
Pulse width	Pulse/Direction mode: 5.1µs min. for each state (t_w in Pulse/Dir Mode figure below). Quadrature mode: 2.5µs min. for each state (t_w in Quadrature Mode figure below).
Cable	Shielded twisted pair



Quadrature Mode



Pulse/Direction mode

Analog Inputs					
Number of inputs	2				
Input range [7] [8]	**Input Type**	**Nominal Values**	**Over-range Values ***		
	0 ÷ 10VDC	0 ≤ Vin ≤ 10VDC	10 < Vin ≤ 10.15VDC		
	0 ÷ 20mA	0 ≤ Iin ≤ 20mA	20 < Iin ≤ 20.3mA		
	***** Overflow** [9] is declared when an input value exceeds the Over-range boundary.				
Absolute maximum rating	±30V (Voltage), ±30mA (Current)				
Isolation	None				
Conversion method	Successive approximation				
Resolution	12 bits				
Accuracy (25°C / -20°C to 55°C)	±0.3% / ±0.9% of full scale				
Input impedence	541kΩ (Voltage), 248Ω (Current)				
Noise rejection	10Hz, 50Hz, 60Hz, 400Hz				
Step response [10] (0 to 100% of final value)	**Smoothing**	**Noise Rejection Frequency**			
		400Hz	60Hz	50Hz	10Hz
	None	2.7ms	16.86ms	20.2ms	100.2ms
	Weak	10.2ms	66.86ms	80.2ms	400.2ms
	Medium	20.2ms	133.53ms	160.2ms	800.2ms
	Strong	40.2ms	266.86ms	320.2ms	1600.2ms
Update time [10]	**Noise Rejection Frequency**	**Update Time**			
	400Hz	5ms			
	60Hz	4.17ms			
	50Hz	5ms			
	10Hz	10ms			
Operational signal range (signal + common mode)	Voltage mode – AIx: -1V ÷ 10.5V ; CM1: -1V ÷ 0.5V Current mode – AIx: -1V ÷ 5.5V ; CM1: -1V ÷ 0.5V (x=0 or 1)				
Cable	Shielded twisted pair				
Diagnostics [9]	Analog input overflow				

Relay Outputs (USC-Bx-R38)	
Number of outputs	12 (O0 to O11)
Output type	Relay, SPST-NO (Form A)
Isolation groups	Two groups of 6 outputs each
Isolation voltage	
Group to bus	1,500VAC for 1 minute
Group to group	1,500VAC for 1 minute
Output to output within group	None
Current	2A maximum per output (Resistive load) 8A maximum per group
Voltage	250VAC / 30VDC maximum
Minimum load	1mA, 5VDC
Switching time	10ms maximum
Short-circuit protection	None
Life expectancy (11)	100k operations at maximum load

Transistor Outputs (USC-Bx-T42)	
Number of outputs	16
Output type	Transistor, Source (pnp)
Isolation voltage	
Output to bus	500VAC for 1 minute
Output to output	None
Outputs power supply to bus	500VAC for 1 minute
Outputs power supply to output	None
Current	0.5A maximum per output Total cumulative output current cannot exceed 6A
Voltage	See Transistor Outputs Power Supply specfication below
ON state voltage drop	0.5V maximum
OFF state leakage current	10µA maximum
Switching times	Turn-on/off: 80µs max. (Load resistance < 4kΩ)
PWM Frequency (12)	O0, O1: 3kHz max. (Load resistance < 4kΩ)
Short-circuit protection	Yes

Transistor Outputs Power Supply (USC-Bx-T42)	
Nominal operating voltage	24VDC
Operating voltage	20.4 – 28.8VDC
Maximum current consumption	30mA@24VDC Current consumption does not include load current

LED Indications				
I/O LEDs	**Color**	**Indication**		
Digital Input	Green	Input state		
Analog Input	Red	On: Input value is in Overflow		
Relay and Transistor Output	Green	Output state		
Status LEDs	**Color & State**		**Indication**	
RUN	Green	On	Run mode	
		Blink	This indication is in conjunction with the USB LED. See table below, USB Actions Indications, for details	
	Orange	On	Start-up mode	
		Blink	Stop mode	
ERROR	Red	On/Blink	The Error LED can give indications in conjunction with the RUN and/or USB LED. See the next tables Error Indications and USB Actions Indications for details	
USB	Green	On	A USB drive is detected that contains valid action file(s). See [13] for details	
		Blink	USB Action in progress	
BATT. LOW	Red	On	Battery is low or missing	
FORCE	Red	On	I/O Force on	
Error Indications	**LED, Color & State**			
	RUN	**ERROR**	**USB**	**Indication**
		Red blink	Off	USB Action has failed – disconnect the USB drive to dismiss the error
		Red blink		HW Configuration Mismatch – the HWC in the UniLogic application does not match the Uni-I/O modules physically connected to the PLC
	Orange blink	Red blink		Application Invalid or Version Mismatch (UniLogic version is not supported by device firmware)
		Red On		Uni-I/O Error (check wiring connections)
	Orange blink	Red On		OS/Application error

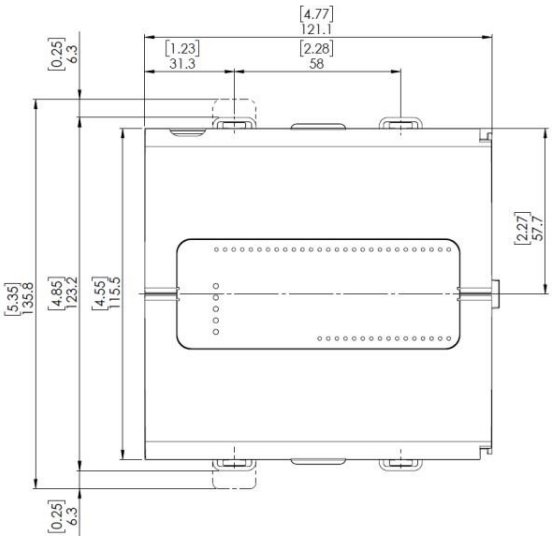
USB Actions Indications	LED, Color & State			
	RUN	**ERROR**	**USB**	**Indication**
			Green On	USB drive detected with valid Action file(s) - press CONFIRM (13) to start Action or USB Action finished successfully.
			Green blink	USB Action in progress.
	Green blink		Green On	USB Action requires reset; press CONFIRM to restart system
		Red blink	Green Off	USB drive detected, but contains corrupt Action file(s)
		Red blink	Green ON	USB Action ran with error – disconnect the USB drive to dismiss the error.

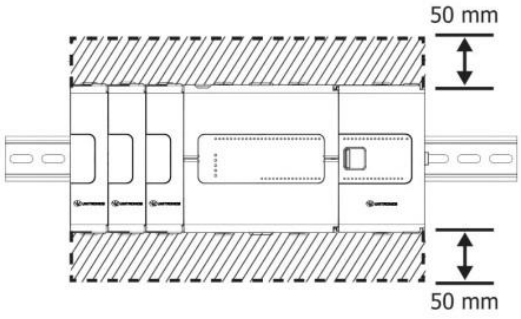
Environmental	
Protection	IP20, NEMA1
Operating temperature	-20°C to 55°C (-4°F to 131°F)
Storage temperature	-30°C to 70°C (-22°F to 158°F)
Relative Humidity (RH)	5% to 95% (non-condensing)
Operating Altitude	2,000 m (6,562 ft)
Shock	IEC 60068-2-27, 15G, 11ms duration
Vibration	IEC 60068-2-6, 5Hz to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

Dimensions		
	Weight	Size
USC-Bx-R38	0.39 Kg (0.86 lb)	As shown in the images below
USC-Bx-T42	0.36 Kg (0.79 lb)	

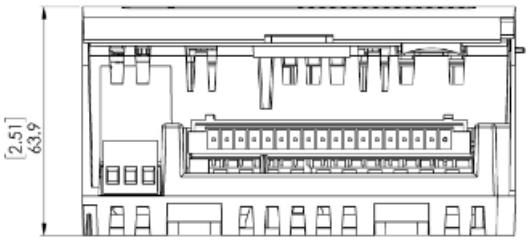
Mechanical Dimensions

Front View





Bottom View



Notes:

1. Eight of the digital inputs (I10-I17) may be configured to function either as normal, or as high speed digital inputs, that can receive high speed pulse signals from up to two sensors or shaft encoders.
2. The controller, without any additional power supply, can support up to 8 Uni-I/O™ modules, either plugged directly into the I/O Bus connector on the side of the controller, or via a Local Expansion Kit. If more Uni-I/O™ modules are required, you must use a Local Expansion Kit with a power supply, this enables a single controller to support up to 16 modules.
3. The Local Expansion Kits comprise a Base unit, an End unit, and a connecting cable. You must plug the Base Unit into the last Uni-I/O™ module plugged into the controller.
   If no module is present, plug the Base unit into the I/O Bus connector.
4. Uni-COM™ CB modules plug directly into the Uni-COM Jack on the side of the controller.
   Uni-COM modules may be installed in the following configurations:
   - If a module comprising a serial port is plugged directly into the controller, it may be followed only by another serial module, for a total of 2.
   - If your configuration includes a CANbus module, it must be plugged directly into the controller. The CANbus module may be followed by up to two serial modules, for a total of 3.
   For more information, refer to the product's installation guide.
5. When replacing the unit's battery, make sure that the new one has environmental specifications that are similar or better than the one specified in this document.
6. The USB device port is used to connect the device to a PC.
7. The 4-20mA input option is implemented using 0-20mA input range.
8. The analog inputs measure values that are slightly higher than the nominal input range (Input Over-range).

   Note that when the input overflow occurs, it is indicated in the corresponding I/O Status tag as well as by the respective input LED (see LED Indications), while the input value is registered as the maximum permissible value. For example, if the specified input range is 0 ÷ 10V, the Over-range values can reach up to 10.15V, and any input voltage higher than that will still register as 10.15V while the Overflow system tag is turned on.
9. See LED Indications Table for description of the relevant indications. Note that the diagnostics results are also indicated in the system tags and can be observed through the UniApps™ or the online state of the UniLogic®.
10. Step response and update time are independent of the number of channels that are used.
11. Life expectancy of the relay contacts depends on the application that they are used in. The product's installation guide provides procedures for using the contacts with long cables or with inductive loads.
12. Outputs O0 and O1 can be configured as either normal digital outputs or as PWM outputs.
    PWM outputs specifications apply only when outputs are configured as PWM outputs.
13. This refers to the CONFIRM button on the controller USB Actions; press it if the indication requires.

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