# UniStream®

## PLC

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] <br> • 2 x Analog inputs, 0÷10V / 0÷20mA, 12 bits <br> • 12 x Relay outputs, isolated | • 24 x Digital inputs, isolated, 24VDC, sink/source, including 4 High speed counter input channels [1] <br> • 2 x Analog inputs, 0÷10V / 0÷20mA, 12 bits <br> • 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 <br> 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]. |

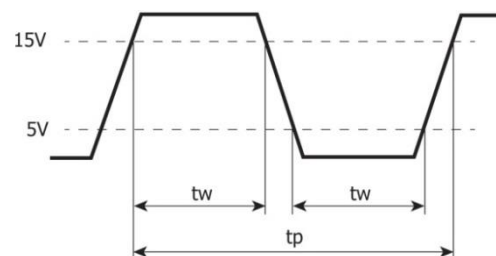| Internal memory | Standard (B5) | | Pro (B10) |
|---|---|---|---|
| | RAM: 512MB | | RAM: 1GB |
| | ROM: 3GB system memory | | ROM: 6GB system memory |
| | 1GB user memory | | 2GB user memory |
| Ladder memory | 1 MB | | |
| External memory | microSD or microSDHC card<br>Size: up to 32GB<br>Data Speed: up to 200Mbps | | |
| Bit operation | 0.13 µs | | |
| Battery | Model: 3V CR2032 Lithium battery [5]<br><br>Battery lifetime: 4 years typical, at 25°C<br><br>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<br>I10-I17: 24VDC @ 8mA |
| Input voltage | |
| Sink/Source | On state: 15-30VDC, 4mA min.<br>Off state: 0-5VDC, 1mA max. |
| Nominal impedance | I0-I9, I18-I23: 4kΩ<br>I10-I17: 3kΩ |
| Filter | I0-I9, I18-I23: 6ms typical<br>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).<br>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).<br>Quadrature mode: 2.5μs min. for each state ($t_w$ in Quadrature Mode figure below). |
| Cable | Shielded twisted pair |
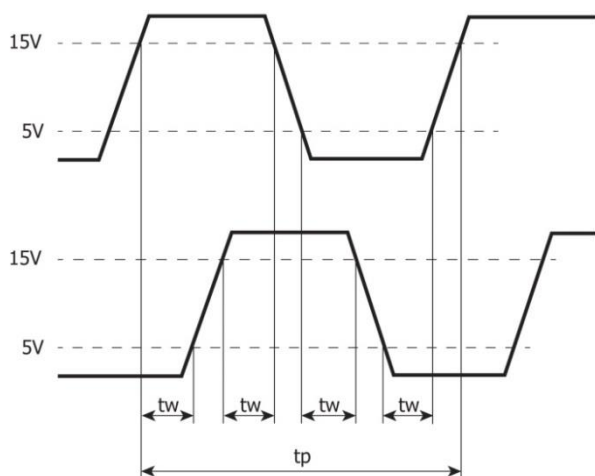


Quadrature Mode



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<br>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) <br> 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 <br> 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: 80$\mu$s max. (Load resistance < 4k$\Omega$) |
| PWM Frequency [12] | O0, O1: <br> 3kHz max. (Load resistance < 4k$\Omega$) |
| 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<br>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.<br>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 |

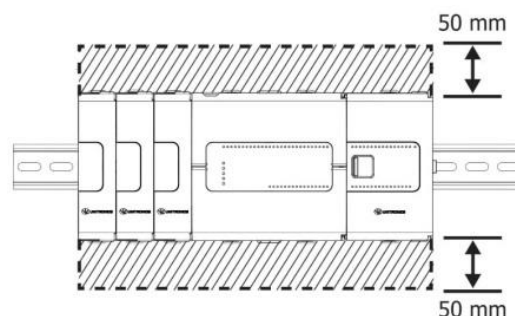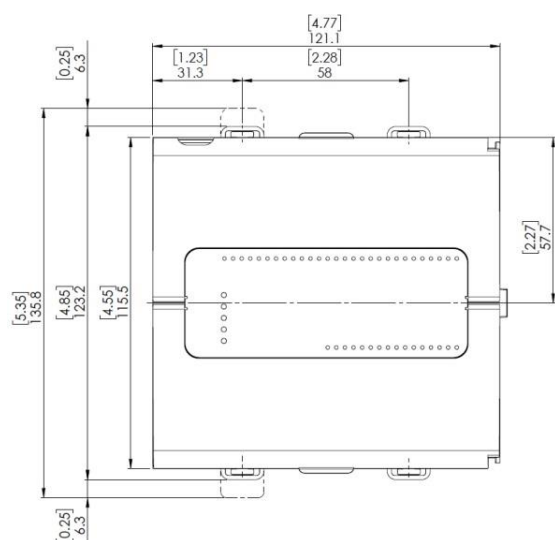| Error Indications | LED, Color & State | | | |
|---|---|---|---|---|
| | RUN | ERROR | USB | Indication |
| | | Red blink | Off | USB Action has failed – disconnect the USB drive to dismiss the error |
| | | Red blink | | HW Configuration Mismatch – the HWC in the UniLogic application does not match the Uni-I/O modules physically connected to the PLC |
| | Orange blink | Red blink | | Application Invalid<br> or<br>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*