

# UniStream<sup>®</sup> PLC

**Technical Specifications:**  
**USC-B5-B1, USC-B10-B1, USC-B5-TR22,**  
**USC-B10-TR22, USC-B5-T24, USC-B10-T24**

Unitronics' UniStream<sup>®</sup> PLCs 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](http://www.unitronicsplc.com).

| USx-Bx-TR22   | USx-Bx-T24   |
|---|--|
| <ul style="list-style-type: none"> <li>• 10 x Digital inputs, isolated, 24VDC, sink/source</li> <li>• 2 x Analog inputs, 0÷10V / 0÷20mA, 12 bits</li> <li>• 2 x Transistor outputs, isolated, npn, including 2 High speed PWM output channels</li> <li>• 8 x Relay outputs, isolated</li> </ul> | <ul style="list-style-type: none"> <li>• 10 x Digital inputs, isolated, 24VDC, sink/source</li> <li>• 2 x Analog inputs, 0÷10V / 0÷20mA, 12 bits</li> <li>• 12 x Transistor ,isolated outputs, pnp, including 2 PWM output channels</li> </ul> |

| Power Supply             | USC-Bx-B1                  | USC-Bx-TR22        | USC-Bx-T24         |
|--------------------------|----------------------------|--------------------|--------------------|
| Input voltage            | 12VDC or 24VDC             | 24VDC              | 24VDC              |
| Permissible range        | 10.2VDC to 28.8VDC         | 20.4VDC to 28.8VDC | 20.4VDC to 28.8VDC |
| Max. current consumption | 0.65A@12VDC<br>0.38A@24VDC | 0.42A@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 <sup>(1)</sup> | Up to 8 I/O modules with no additional power supply<br>Up to 16 I/O modules with a Local Expansion <sup>(2)</sup> 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 <sup>(3)</sup> .                                     |

|                 |   |   |
|-----------------|---|---|
| Internal memory | <b>Standard (B5)</b>  | <b>Pro (B10)</b>                                      |
|                 | RAM: 512MB<br>ROM: 3GB system memory<br>1GB user memory   | RAM: 1GB<br>ROM: 6GB system memory<br>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 $\mu$ s  |   |
| Battery         | Model: 3V CR2032 Lithium battery <sup>(4)</sup><br>Battery lifetime: 4 years typical, at 25°C<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 <sup>(5)</sup> |  |
| 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  |

| <b>Digital Inputs</b> |   |
|-----------------------|---|
| Number of inputs      | 10  |
| Type                  | Sink or Source  |
| Isolation voltage     |   |
| Input to bus          | 500VAC for 1 minute   |
| Input to input        | None  |
| Nominal voltage       | 24VDC @ 6mA   |
| Input voltage         |   |
| Sink/Source           | On state: 15-30VDC, 4mA min.<br>Off state: 0-5VDC, 1mA max. |
| Nominal impedance     | 4kΩ   |
| Filter                | 6ms typical   |

| <b>Analog Inputs</b>                      |   |                            |                             |
|---|---|----------------------------|-----------------------------|
| Number of inputs                          | 2   |                            |                             |
| Input range <sup>(6)</sup> <sup>(7)</sup> | <b>Input Type</b>   | <b>Nominal Values</b>      | <b>Over-range Values *</b>  |
|   | 0 ÷ 10VDC   | $0 \leq V_{in} \leq 10VDC$ | $10 < V_{in} \leq 10.15VDC$ |
|   | 0 ÷ 20mA  | $0 \leq I_{in} \leq 20mA$  | $20 < I_{in} \leq 20.3mA$   |
|   | * <b>Overflow</b> <sup>(8)</sup> 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<br>(25°C / -20°C to 55°C)        | ±0.3% / ±0.9% of full scale   |                            |                             |
| Input impedance                           | 541kΩ (Voltage), 248Ω (Current)   |                            |                             |
| Noise rejection                           | 10Hz, 50Hz, 60Hz, 400Hz   |                            |                             |

|  |  |                                  |                    |         |          |
|--|--|----------------------------------|--------------------|---------|----------|
| Step response <sup>(9)</sup><br>(0 to 100% of final value) | <b>Smoothing</b>   | <b>Noise Rejection Frequency</b> |                    |         |          |
|  |  | 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 <sup>(9)</sup>                                 | <b>Noise Rejection Frequency</b>   |                                  | <b>Update Time</b> |         |          |
|  | 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 <sup>(8)</sup>                                 | Analog input overflow  |                                  |                    |         |          |

| <b>Relay Outputs (USC-Bx-TR22)</b> |  |
|------------------------------------|--|
| Number of outputs                  | 8 (O0 to O7)                           |
| Output type                        | Relay, SPST-NO (Form A)                |
| Isolation groups                   | Two groups of 4 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) |
| Voltage                            | 250VAC / 30VDC maximum                 |
| Minimum load                       | 1mA, 5VDC                              |
| Switching time                     | 10ms maximum                           |
| Short-circuit protection           | None                                   |
| Life expectancy <sup>(10)</sup>    | 100k operations at maximum load        |

| <b>Sink Transistor Outputs (USC-Bx-TR22)</b> |  |
|--|--|
| Number of outputs                            | 2 (O8 and O9)  |
| Output type                                  | Transistor, Sink   |
| Isolation                                    |  |
| Output to bus                                | 1,500VAC for 1 minute  |
| Output to output                             | None   |
| Current                                      | 50mA max. per output   |
| Voltage                                      | Nominal: 24VDC<br>Range: 3.5V to 28.8VDC   |
| On state voltage drop                        | 1V max   |
| Off state leakage current                    | 10 $\mu$ A max   |
| Switching times                              | Turn-on: 1.6 $\mu$ s max. (4k $\Omega$ load, 24V)<br>Turn-off: 13.4 $\mu$ s max. (4k $\Omega$ load, 24V) |
| High speed outputs                           |  |
| PWM Frequency                                | 0.3Hz min.<br>30kHz max. (4k $\Omega$ load)  |
| Cable  | Shielded twisted pair  |

| <b>Source Transistor Outputs (USC-Bx-T24)</b> |  |
|---|--|
| Number of outputs                             | 12   |
| 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  |
| Voltage                                       | See Source Transistor Outputs Power Supply specification below |
| ON state voltage drop                         | 0.5V maximum   |
| OFF state leakage current                     | 10 $\mu$ A maximum   |
| Switching times                               | Turn-on/off: 80 $\mu$ s max. (Load resistance < 4k $\Omega$ )  |
| PWM Frequency <sup>(11)</sup>                 | O0, O1:<br>3kHz max. (Load resistance < 4k $\Omega$ )          |
| Short-circuit protection                      | Yes  |

| Source Transistor Outputs Power Supply (USC-Bx-T24) |   |
|---|---|
| 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. 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 <sup>(12)</sup> 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 |           |     | Indication   |
|-------------------|--------------------|-----------|-----|--|
|                   | RUN                | ERROR     | USB |  |
|                   |                    | 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 |           |             | Indication  |
|-------------------------|--------------------|-----------|-------------|---|
|                         | RUN                | ERROR     | USB         |   |
|                         |                    |           | Green On    | USB drive detected with valid Action file(s) - press CONFIRM <sup>(12)</sup> 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

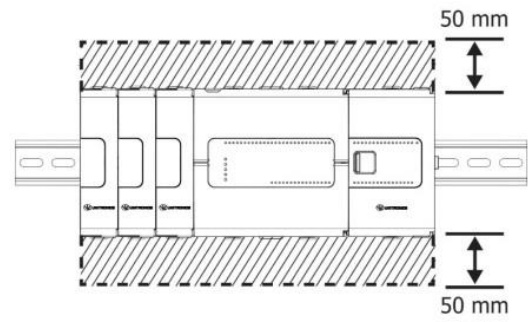
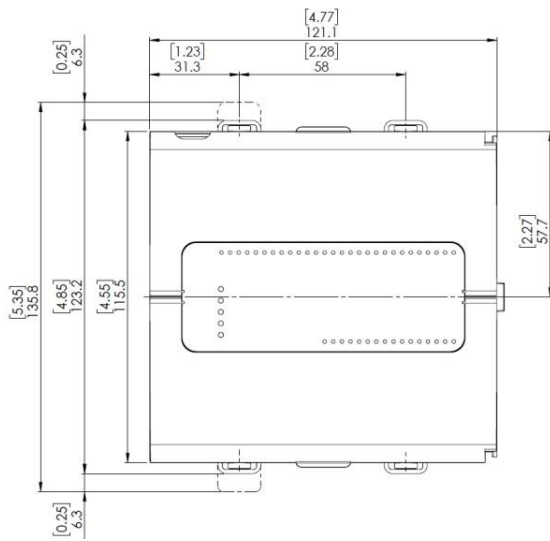
|                        |  |
|------------------------|--|
| Protection             | IP20, NEMA1  |
| Operating temperature  | -20°C to 55°C (-4°F to 131°F)  |
| Storage temperature    | -30°C to 70°C (-22°F to 158°F)   |
| Relative Humidity (RH) | 5% to 95% (non-condensing)   |
| Operating Altitude     | 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                         |
|--------------------|-------------------|------------------------------|
| <b>USC-Bx-B1</b>   | 0.31 Kg (0.68 lb) | As shown in the images below |
| <b>USC-Bx-TR22</b> | 0.36 Kg (0.79 lb) |                              |
| <b>USC-Bx-T24</b>  | 0.35 Kg (0.77 lb) |                              |

**Mechanical Dimensions**

*Front View*



*Bottom View*

