

### PLC

Unitronics' UniStream® 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).

| USC-B3-R20   | USC-B3-T20  |
|--|---|
| <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>• 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>• 8 x Transistor outputs, isolated, pnp, including 2 PWM output channels</li> </ul> |

| Power Supply             | USC-B3-R20         | USC-B3-T20         |
|--------------------------|--------------------|--------------------|
| Input voltage            | 24VDC              | 24VDC              |
| Permissible range        | 20.4VDC to 28.8VDC | 20.4VDC to 28.8VDC |
| Max. current consumption | 0.37A@24VDC        | 0.33A@24VDC        |
| Isolation                | None               |                    |

| General             |   |
|---------------------|---|
| I/O support         |   |
| Built-in I/O        | According to model  |
| Remote I/O          | Support 1 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 2 ports to a single controller using Uni-COM™ UAC-CB Modules <sup>(1)</sup>   |
| Internal memory     | RAM: 256MB<br>ROM: 3GB system memory<br>1GB user memory   |
| Ladder memory       | 1 MB  |
| External memory     | No  |
| Bit operation       | 0.13 µs   |
| Battery             | Model: 3V CR2032 Lithium battery <sup>(2)</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 ports                 |   |
| 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 CAT-5e cable, up to 100 m (328 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  | 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   |

| Analog Inputs                             |   |                       |                            |
|---|---|-----------------------|----------------------------|
| Number of inputs                          | 2   |                       |                            |
| Input range <sup>(3)</sup> <sup>(4)</sup> | <b>Input Type</b>   | <b>Nominal Values</b> | <b>Over-range Values *</b> |
|   | 0 ÷ 10VDC   | 0 ≤ Vin ≤ 10VDC       | 10 < Vin ≤ 10.15VDC        |
|   | 0 ÷ 20mA  | 0 ≤ Iin ≤ 20mA        | 20 < Iin ≤ 20.3mA          |
|   | * <b>Overflow</b> <sup>(5)</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>(6)</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>(6)</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<br>(x=0 or 1) |                                  |                    |          |         |
| Cable  | Shielded twisted pair   |                                  |                    |          |         |
| Diagnostics <sup>(5)</sup>                                 | Analog input overflow   |                                  |                    |          |         |

### Relay Outputs (USC-B3-R20)

|                                |   |
|--------------------------------|---|
| 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<br>(Resistive load) |
| Voltage                        | 250VAC / 30VDC maximum                    |
| Minimum load                   | 1mA, 5VDC                                 |
| Switching time                 | 10ms maximum                              |
| Short-circuit protection       | None                                      |
| Life expectancy <sup>(7)</sup> | 100k operations at maximum load           |

| <b>Transistor Outputs (USC-B3-T20)</b> |  |
|--|--|
| Number of outputs                      | 8  |
| 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>(8)</sup>           | O0, O1:<br>3kHz max. (Load resistance < 4k $\Omega$ )          |
| Short-circuit protection               | Yes  |

| <b>Transistor Outputs Power Supply (USC-B3-T20)</b> |   |
|---|---|
| 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, <b>Error! Reference source not found.</b> , 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 <b>Error! Reference source not found.</b> and <b>Error! Reference source not found.</b> for details |   |
| USB                         | Green              | On                             | A USB drive is detected that contains valid action file(s). See <b>Error! Reference source not found.</b> 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  | 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 |                                |  | Indication  |
|                             | RUN                | ERROR                          | USB  | Indication  |
|                             |                    |                                | Green On   | USB drive detected with valid Action file(s) - press CONFIRM <sup>9)</sup> to start Action<br>or<br>USB Action finished successfully. |
|                             |                    |                                | Green blink  | USB Action in progress.   |

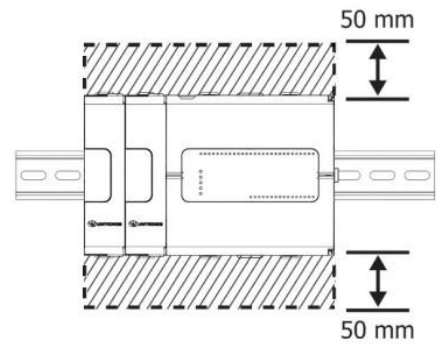
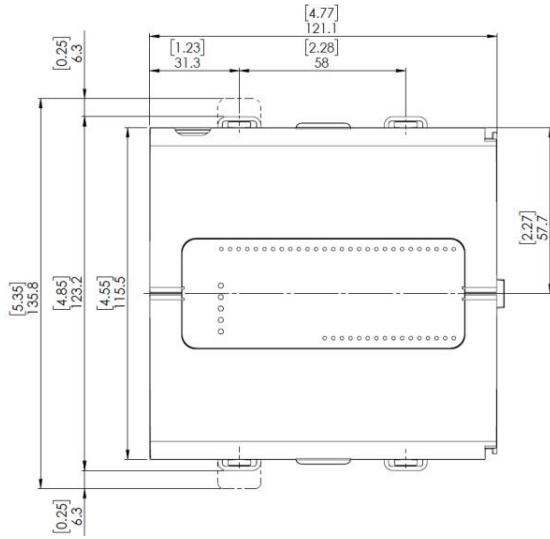
|  |             |           |           |  |
|--|-------------|-----------|-----------|--|
|  | Green blink |           | Green On  | USB Action requires reset; press CONFIRM to restart system                 |
|  |             | Red blink | Green Off | USB drive detected, but contains corrupt Action 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 |

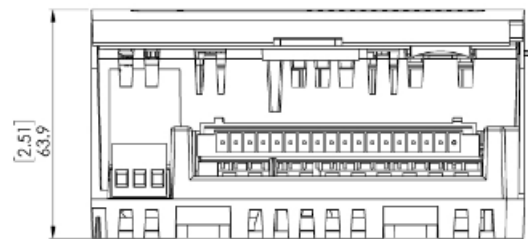
| Dimensions        |                   |                              |
|-------------------|-------------------|------------------------------|
|                   | Weight            | Size                         |
| <b>USC-B3-R20</b> | 0.36 Kg (0.79 lb) | As shown in the images below |
| <b>USC-B3-T20</b> | 0.35 Kg (0.77 lb) |                              |

**Mechanical Dimensions**

*Front View*



*Bottom View*



**Notes:**

1. Uni-COM™ CB modules plug directly into the Uni-COM Jack on the side of the controller. This controller supports Uni-COM modules as follows:
  - One serial module
  - One CANbus module, which may be followed by a single serial module.For more information, refer to the product's installation guide.
2. 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.
3. The 4-20mA input option is implemented using 0-20mA input range.
4. 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.
5. 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®.
6. Step response and update time are independent of the number of channels that are used.
7. 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.
8. 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.
9. This refers to the CONFIRM button on the controller USB Actions; press it if the indication requires.

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