

Unitronics' UniStream™ platform comprises control devices that provide robust, flexible solutions for industrial automation.

This guide provides basic installation information for the UniStream™ CPU-for-Panel.

Technical specifications may be downloaded from the Unitronics website.

The UniStream™ platform comprises CPU controllers, HMI panels, and local I/O modules that snap together to form an all-in-one Programmable Logic Controller (PLC).

Expand the I/O configuration using a Local Expansion Kit or remotely via CANbus.



CPU-for-Panel

CPUs are Programmable Logic Controllers (PLCs), the heart of the UniStream™ platform.

The CPU-for-Panel cannot operate independently. It must be plugged into the back of a UniStream™ HMI panel. The panel provides the CPU's power source. The CPU-for-Panel comprises:

- IO/COM Bus connector for interfacing Uni-I/O™ & Uni-COM™ modules
- Isolated RS485 and CANbus ports
- Backup battery

HMI Panels

Available in different dimensions

A high-resolution touch screen provides the operator interface for the system and the physical foundation for a PLC+HMI+I/Os all-in-one controller.

The DIN-rail structure on the panel's back is designed to physically support a CPU-for-Panel controller, Uni-I/O™ and/or Uni-COM™ modules.

Each panel comprises:

- AUX connector to support the CPU
- 1 audio-out 3.5mm jack
- 1 microSD slot
- 2 type A, USB host ports and 1 Mini-B USB device port
- 2 Ethernet ports, RJ45, 10/100 Mbps
- 1 power input connector, 12/24 VDC

I/O Options

Integrate I/Os into your system by using:

- On-board I/Os: snap onto the panel for an all-in-one configuration
- Local I/O via a Local Expansion Kit
- Remote I/O via EX-RC1

Programming Software

All-in-one UniLogic™ software, for hardware configuration, communications, and HMI/PLC applications, available as a free download from Unitronics web site.

Use of this product is subject to a Unitronics Controller License Agreement, a copy of which can be found at <http://unitronics.com/unistream/Agreements/UniLic1.pdf>

Before You Begin

Before installing the device, the installer must:

- Read and understand this document.
- Verify the Kit Contents.

Note that the CPU-for-Panel is intended to be installed on the back of an HMI panel.

Alert Symbols and General Restrictions

When any of the following symbols appear, read the associated information carefully.

Symbol	Meaning	Description
	Danger	The identified danger causes physical and property damage.
	Warning	The identified danger could cause physical and property damage.
Caution	Caution	Use caution.

- All examples and diagrams are intended to aid understanding, and do not guarantee operation. Unitronics accepts no responsibility for actual use of this product based on these examples.
- Please dispose of this product according to local and national standards and regulations.
- This product should be installed only by qualified personnel.



- Failure to comply with appropriate safety guidelines can cause severe injury or property damage.
- Do not attempt to use this device with parameters that exceed permissible levels.
- Do not connect/disconnect the device when power is on.

Environmental Considerations



- Ventilation: 10mm (0.4") of space is required between the device top/bottom edges and the enclosure's walls.
- Do not install in areas with: excessive or conductive dust, corrosive or flammable gas, moisture or rain, excessive heat, regular impact shocks or excessive vibration, in accordance with the standards and limitations given in the product's technical specification sheet.
- Do not place in water or let water leak onto the unit.
- Do not allow debris to fall inside the unit during installation.
- Install at maximum distance from high-voltage cables and power equipment.

UL Compliance

The following section is relevant to Unitronics' products that are listed with the UL.

The following models: USC-P-B10 is UL listed for Hazardous Locations.

The following models: USC-P-B10 is UL listed for Ordinary Location.

UL Ratings, Programmable Controllers for Use in Hazardous Locations.

Class I, Division 2, Groups A, B, C and D

These Release Notes relate to all Unitronics products that bear the UL symbols used to mark products that have been approved for use in hazardous locations, Class I, Division 2, Groups A, B, C and D.

Caution

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D, or Non-hazardous locations only.



- Input and output wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.



- **WARNING—Explosion Hazard—**substitution of components may impair suitability for Class I, Division 2.
- **WARNING – EXPLOSION HAZARD –** Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

- WARNING – Exposure to some chemicals may degrade the sealing properties of material used in Relays.
- This equipment must be installed using wiring methods as required for Class I, Division 2 as per the NEC and/or CEC.

Removing / Replacing the battery

When a product has been installed with a battery, do not remove or replace the battery unless the power has been switched off, or the area is known to be non-hazardous.

Please note that it is recommended to back up all data retained in RAM, in order to avoid losing data when changing the battery while the power is switched off. Date and time information will also need to be reset after the procedure.

Certification UL des automates programmables, pour une utilisation en environnement à risques, Class I, Division 2, Groups A, B, C et D.

Cette note fait référence à tous les produits Unitronics portant le symbole UL - produits qui ont été certifiés pour une utilisation dans des endroits dangereux, Classe I, Division 2, Groupes A, B, C et D.

Attention ▪ Cet équipement est adapté pour une utilisation en Classe I, Division 2, Groupes A, B, C et D, ou dans Non-dangereux endroits seulement.



- Le câblage des entrées/sorties doit être en accord avec les méthodes de câblage selon la Classe I, Division 2 et en accord avec l'autorité compétente.



- AVERTISSEMENT: Risque d'Explosion – Le remplacement de certains composants rend caduque la certification du produit selon la Classe I, Division 2.
- AVERTISSEMENT - DANGER D'EXPLOSION - Ne connecter pas ou ne débranche pas l'équipement sans avoir préalablement coupé l'alimentation électrique ou la zone est reconnue pour être non dangereuse.
- AVERTISSEMENT - L'exposition à certains produits chimiques peut dégrader les propriétés des matériaux utilisés pour l'étanchéité dans les relais.
- Cet équipement doit être installé utilisant des méthodes de câblage suivant la norme Class I, Division 2 NEC et /ou CEC.

Retrait / Remplacement de la batterie

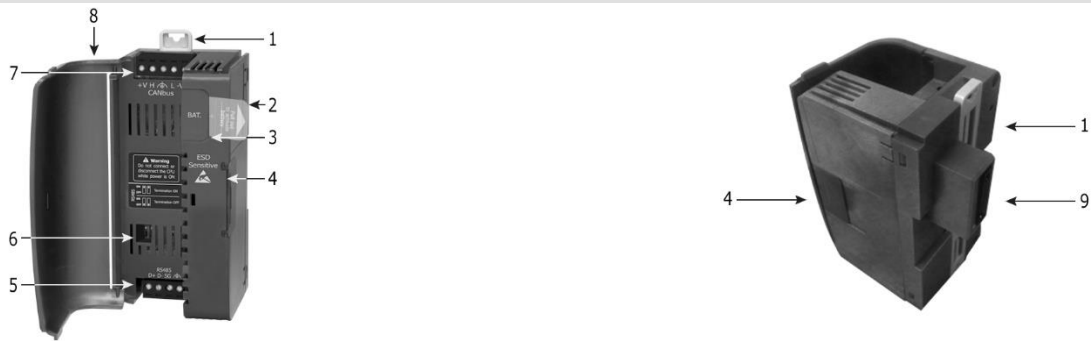
Lorsqu'un produit a été installé avec une batterie, retirez et remplacez la batterie seulement si l'alimentation est éteinte ou si l'environnement n'est pas dangereux.

Veuillez noter qu'il est recommandé de sauvegarder toutes les données conservées dans la RAM, afin d'éviter de perdre des données lors du changement de la batterie lorsque l'alimentation est coupée. Les informations sur la date et l'heure devront également être réinitialisées après la procédure

Kit Contents

- | | |
|--|--|
| ▪ 1 CPU-for-Panel | ▪ 1 CANbus terminal block |
| ▪ 1 lithium battery, 3V, CR2032.
The battery is installed; pull out plastic tab to activate it. | ▪ 1 CANbus termination resistor |
| ▪ 1 RS485 terminal block | ▪ 1 set of module numbering stickers.
Numbering instructions are in Uni-I/O™ & Uni-COM™ module installation guides. |

CPU-for-Panel Diagram



CPU-for-Panel Front and Rear View

1	DIN-rail clips	5	RS485 connector
2	Battery pull-tab (remove during installation)	6	RS485 termination selection DIP switch
3	Battery compartment cover	7	CANbus connector
4	IO/COM Bus connector, shipped covered. Leave covered when not in use.	8	CPU door
		9	CPU connector to panel

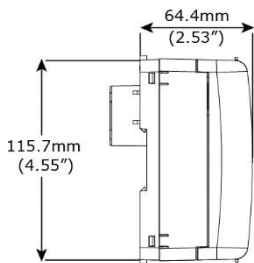
Installation Space Considerations

Allocate space for:

- The HMI Panel including the CPU and any modules that will be installed on it
- Opening the doors of the CPU and modules

For exact dimensions, please refer to the Mechanical Dimensions shown below.

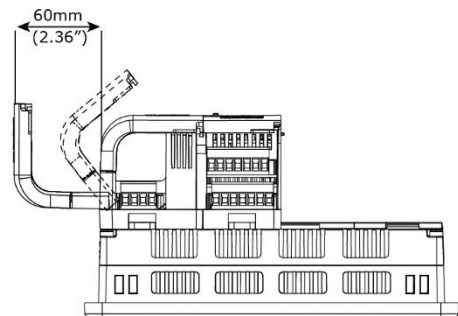
CPU-for-Panel Mechanical Dimensions



Side View



Front View



Battery: Back-up, Installation, and Replacement

Backup

In order to preserve back-up values for RTC and system data in the event of power off, the battery must be connected.

Battery Installation

The CPU is shipped with a battery installed, but with a plastic Battery pull-tab inserted in the battery compartment. Pull out the Battery pull-tab during installation in order to connect the battery.

Battery Replacement

- Use proper precautions to prevent Electro-Static Discharge (ESD) while servicing the battery.

Caution

- To preserve back-up values for RTC and system data during battery replacement, the CPU-for-Panel must be powered from the HMI Panel.

1. Open the CPU door and remove the battery cover.
2. Remove the used battery and insert the new one, ensuring that the polarity is aligned with the polarity drawing as shown in the accompanying figure.
3. Replace the battery cover.
4. Dispose of the used battery according to local and national standards and regulations.

**Battery Polarity****Installation**

- Turn off system power before connecting or disconnecting any modules or devices.
- Use proper precautions to prevent Electro-Static Discharge (ESD).

The AUX connector on the back of the HMI panel provides the connection point for the CPU-for-Panel, including power.

The DIN-rail type structure on the back of the panel provides the physical support.

1. Remove the AUX connector cover from the panel (the cover may be saved for future use).
2. If a Uni-I/O™ or Uni-COM™ module, or a Local Expansion Kit is to be connected to the CPU-for-Panel, remove the IO/COM Bus connector cover.
3. Plug the CPU-for-Panel into the HMI Panel AUX connector. If an adjacent module is already installed, slide the CPU-for-Panel into place via the guide tunnels shown in the accompanying figure.
4. Verify that the DIN-rail clips located on the top and bottom of the CPU-for-Panel have snapped onto the DIN-rail structure on the back of the panel.

**Removing the CPU-for-Panel**

1. Power off the HMI Panel before removing the CPU-for-Panel.
2. Disconnect the RS485 and the CANbus connectors (if relevant).
3. Disconnect the module connected to the CPU (by pushing its Bus Connector lock to the right).
4. On the CPU-for-Panel pull the top DIN-rail clip up and the bottom clip down.
5. Pull the CPU-for-Panel out of its place.

About the CPU's IO/COM Bus Connector

The IO/COM Bus connector on right side of the CPU-for-Panel provides the electrical connection point for a Uni-I/O™ or Uni-COM™ module or Local Expansion kit. The connector is shipped covered by a protective cover, protecting the connector from debris, damage, and ESD.



- When no module is connected to the CPU, its IO/COM Bus Connector Cover must remain installed.
- Turn off system power before connecting or disconnecting modules.

Wiring



- This equipment is designed to operate only at SELV/PELV/Class 2/Limited Power environments.
- All power supplies in the system must include double insulation. Power supply outputs must be rated as SELV/PELV/Class 2/Limited Power.
- Do not connect either the 'Neutral' or 'Line' signal of the 110/220VAC to device's 0V point.
- Do not touch live wires.
- All wiring activities should be performed while power is OFF.
- Unused points should not be connected (unless otherwise specified). Ignoring this directive may damage the device.
- Double-check all wiring before turning on the power supply.

Caution

- To avoid damaging the wire, use a maximum torque of 0.5 N·m (5 kgf·cm).
- Do not use tin, solder, or any substance on stripped wire that might cause the wire strand to break.
- Install at maximum distance from high-voltage cables and power equipment.

Wiring Procedure

Use crimp terminals for wiring; use 26-12 AWG wire (0.13 mm² –3.31 mm²).

1. Strip the wire to a length of 7±0.5mm (0.250–0.300 inches).
2. Unscrew the terminal to its widest position before inserting a wire.
3. Insert the wire completely into the terminal to ensure a proper connection.
4. Tighten enough to keep the wire from pulling free.

Wiring Guidelines

In order to ensure that the device will operate properly and to avoid electromagnetic interference:

- Use a metal cabinet. Make sure the cabinet and its doors are properly earthed.
- Use wires that are properly sized for the load.

NOTE

For detailed information, refer to the document System Wiring Guidelines, located in the Technical Library in the Unitronics' website.

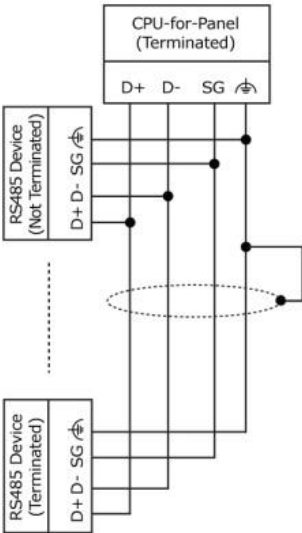
Communication Ports

- 
- Turn off power before making any communications connections.

RS485

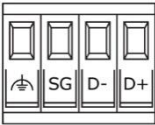
Use the RS485 port to create a multi-drop network.

The CPU-for-Panel is shipped with a 4 pin RS485 terminal block. This connector is marked with a pin assignment that is identical to the corresponding marking on the RS485 Device.



RS485 Wiring

- D+
- Tx/Rx+ (B)
- D-
- Tx/Rx- (A)
- SG
- Signal Ground
- 
- Functional Ground



- Use shielded twisted-pair cable, in compliance with EIA RS485 specifications.
- When wiring each node, connect the cable shield to the functional ground point of the RS485 terminal block.

Caution

▪ In order to avoid ground-loops, do not connect the RS485 functional ground terminal to the earth of the system, as it is internally connected to the HMI panel's functional ground point.

RS485 Termination

Use the DIP switches shown in the panel diagram on page 4 to set the RS485 termination according to the accompanying table.

The device is shipped with both its DIP switches set to ON; change settings if the device is not at one of the ends of the RS485 network.

Position		DIP Switch State
1	2	
ON	ON	Terminated (factory default)
OFF	OFF	Not Terminated

CANbus

Use the CANbus port for all CANbus communications including integration of Remote I/Os via EX-RC1.

The CPU-for-Panel is shipped with a 5 pin CANbus terminal block. This connector is marked with a pin assignment that is identical to the corresponding marking on the CPU-for-Panel.

CANbus Wiring

+V CANbus Power Supply (see Note)

H CAN High

⏏ Functional Ground

L CAN Low

-V CANbus Power & Signal Common

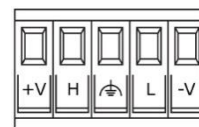
- Use a shielded twisted-pair cable. DeviceNet®, shielded twisted-pair cable is recommended.
- When wiring each node, connect the cable shield to the functional ground point of the CANbus terminal block.
- Connect the CANbus cable shield to the system earth at only one point near the power supply.

NOTE The CPU-for-Panel CANbus port is internally powered and does not require an external power-supply. This means that you can either connect the +V point in the CPU's CANbus connector to an external power supply, or leave it unconnected.

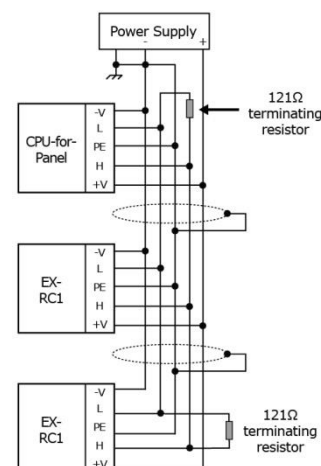
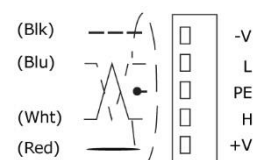
Do not use the +V point for any other purpose.

CANbus Termination

Place termination resistors at each end of the CANbus network. Resistance must be set to 121Ω, 1/4W, 1%.



DeviceNet®
cable connection:



UniStream® CPU-for-Panel

Technical Specifications

USC-P-B10

The UniStream® USC-P-B10 is designed to be plugged onto the back of a UniStream® HMI Panel. The USC-P-B10 is powered directly from the HMI Panel. Uni-I/O™ or Uni-COM™ modules may be snapped next to the CPU to create an all-in-one HMI + PLC controller with an onboard I/O configuration.

You can expand the onboard I/O configuration of the all-in-one controller via a Local Expansion Kit ⁽¹⁾.

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

General

I/O support	Up to 2,048 I/O points
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 Power Kit
Local Uni-COM™ support ⁽³⁾	Up to 4 Uni-COM™ modules
Note that the numbers above relate to Uni-I/O and Uni-COM modules. You can mix Uni-I/O and Uni-COM modules with Uni-I/O Wide modules, considering that 1 Uni-I/O Wide module equals 1½ Uni-I/O module. For example, the USC-P-B10 can support 10 Uni-I/O Wide and 1 Uni-I/O modules in any order, with a local Expansion Power Kit.	
Ladder Memory	1 MB
Bit operation	0.13 µs
Battery	Model: 3V CR2032 Lithium battery ⁽⁴⁾ Battery lifetime: 4 years typical, at 25°C Battery Low detection and indication (via the HMI Panel and via System Tag).
Connectors	IO/COM Bus connector – internal bus interface to a Uni-I/O™, a Uni-COM™ or to the Base Unit of a Local Expansion Kit. System connector – interface to the Aux connector of the UniStream® HMI Panel

Communication

RS485

Voltage limits	-7 to +12 VDC maximum, Common+Differential
Baud rate range	1,200 – 115,200 bps
Nodes	Up to 32
Isolation voltage	500VAC for 1 minute
Cable type	Shielded twisted pair, in compliance with EIA RS485
Cable length	Maximum 1,200 m (4,000 ft)
Termination	Set using DIP Switches ⁽⁵⁾

CANbus

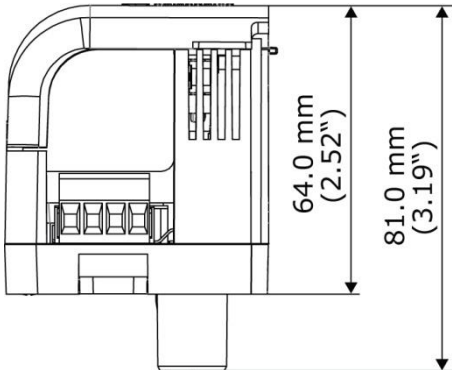
Power requirement	None. The CANbus port is internally powered.
Isolation voltage	500VAC for 1 minute
Cable type	DeviceNet® shielded twisted pair

	Baud rate (bps)	Trunk line length (Thick cable)	Trunk line length (Mid cable)	Trunk line length (Thin cable)
Baud rate and maximum trunk line length (at different DeviceNet® cable thickness)	1M	25m (82 ft)	25m (82 ft)	10m (32 ft)
	500k	100m (328 ft)	100m (328 ft)	100m (328 ft)
	250k	250m (820 ft)	250m (820 ft)	100m (328 ft)
	125k, 100k	500m (1,640 ft)	300m (984 ft)	100m (328 ft)
	50k, 20k,10k	1,000m (3,280 ft)	300m (984 ft)	100m (328 ft)
Maximum drop line (stub) length	The maximum cable distance from any device on a branching drop line to the trunk line is 2 m (6.5 ft) with any DeviceNet® cable thickness.			
Maximum cumulative drop line (stub) length	Baud rate (bps)	Cumulative drop line length		
	1M	5m (16 ft)		
	500k	25m (32 ft)		
	250k	60m (197 ft)		
	125k, 100k	100m (328 ft)		
	50k, 20k,10k	100m (328 ft)		
Nodes	Up to 64			
Termination	The trunk line must terminate at both ends with 121Ω, 1%, 1/4W terminating resistors. One CANbus termination resistor is included in every CPU-for-Panel kit.			

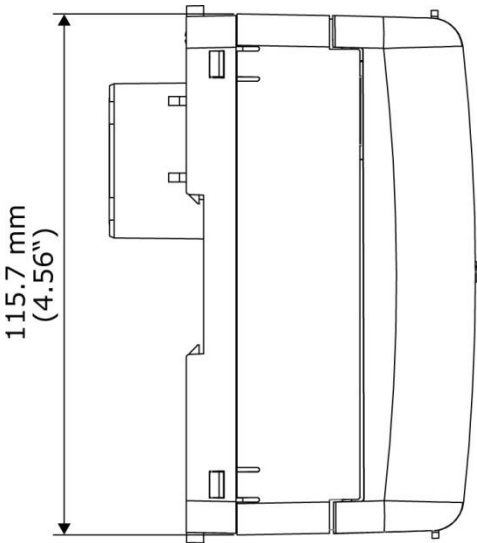
Environmental

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 140°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

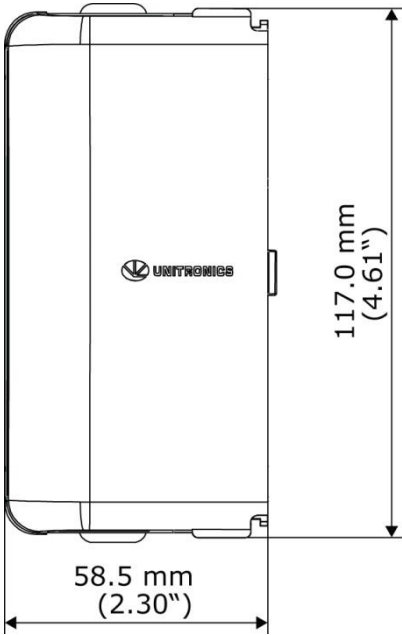
Dimensions	
Weight	0.175 Kg (0.386 lb)
Size	Refer to the images below



Top View



Side View



Front View

Notes

1. The Local Expansion Kit comprises a Base unit, an End unit, and a connecting cable. You must plug the Base Unit into the last element on the back of the UniStream® HMI Panel. This may be a Uni-COM™ or Uni-I/O™ module.
If the CPU-for-Panel is the only element that is plugged onto the back of the HMI Panel, plug the Base unit into it.
2. The CPU-for-Panel, without any additional power supply, can support up to 8 Uni-I/O™ or Uni-COM™ modules, either on-board the HMI panel 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 CPU to support up to 16 modules.
Note that the number of on-board Uni-I/O™ or Uni-COM™ modules is dependent on the HMI Panel model, please refer to the specification document of the corresponding HMI panel.
3. Uni-COM™ modules can only be mounted on an HMI panel. Uni-COM™ modules must be connected either directly to the CPU-for-Panel or to another Uni-COM™ module on the back of the HMI Panel. Please refer to the specification document of the corresponding HMI panel for the maximum amount of modules that can be physically plugged on it.
4. 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.
5. Please refer to the CPU-for-Panel installation guide.

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