Samba™ OPLC™ OPLC Installation Guide

SM43-J-R20/SM35-J-R20	**12 Digital Inputs, include 1 HSC/Shaft-encoder Input, 2 Analog inputs (only when the digital inputs are set to pnp), 8 Relay Outputs**
SM43-J-T20/ SM35-J-T20	**12 Digital Inputs, include 3 HSC/Shaft-encoder Input, 2 Analog inputs, 8 Transistor Outputs**

General Description

The SAMBA SM43-J-R20/SM43-J-T20 OPLC is an All-in-One Programmable Logic Controller that Comprises a built-in 4.3" Color Touchscreen.

The SAMBA SM35-J-R20/SM35-J-T20 OPLC is an All-in-One Programmable Logic Controller that Comprises a built-in 3.5" Color Touchscreen.

Communications

- For SM43: USB device programming port (Mini-B)
  For SM35: 1 build-in serial port:RS232
- Optional: the user may install -
  RS232/RS485 port (V100-17-RS4/V100-17-RS4X) or Ethernet (V100-17-ET2)
  & CANbus (V100-17-CAN)

Standard Kit Contents

Samba controller
I/O connectors (x2)
Battery (installed)
Mounting brackets (x2)
Rubber seal

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.

- Before using this product, the user must read and understand this document.
- 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.
- Only qualified service personnel should open this device or carry out repairs.

⚡ 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.
- To avoid damaging the system, do not connect/disconnect the device when power is on.

Environmental Considerations

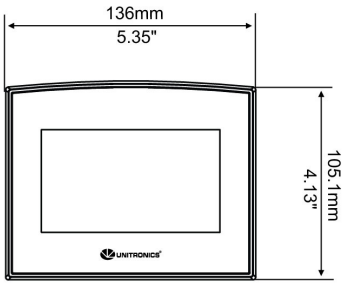
⚡
- Do not install in areas with: excessive or conductive dust, corrosive or flammable gas, moisture or rain, excessive heat, regular impact shocks or excessive vibration, in accordance with the standards given in the product's technical specification sheet.
- Do not place in water or let water leak onto the unit.
- Do not allow debris to fall inside the unit during installation.

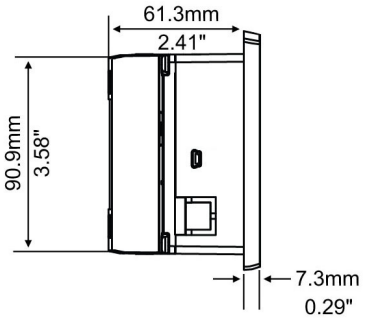
⚠
- Ventilation: 10mm space required between controller's top/bottom edges & enclosure walls.
- Install at maximum distance from high-voltage cables and power equipment.

Mounting

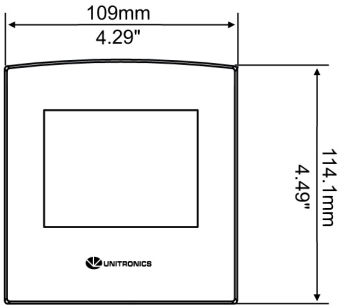
Dimensions

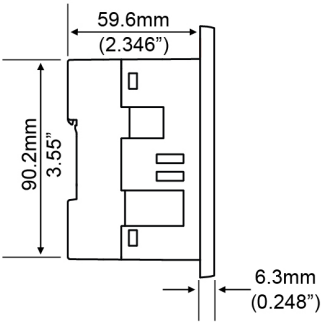
SM43-J-R20/SM43-J-T20





SM35-J-R20/SM35-J-T20





Panel Mounting SM43-J-R20/SM43-J-T20

Before you begin, note that the mounting panel cannot be more than 5 mm thick.

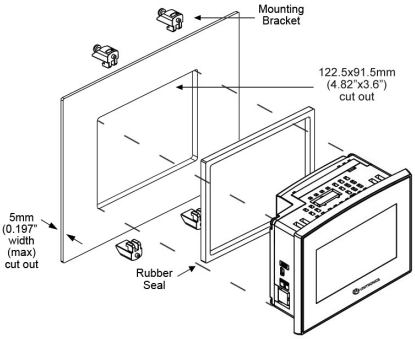
1. Make a panel cut-out measuring 122.5x91.5 mm (4.82"x3.6").

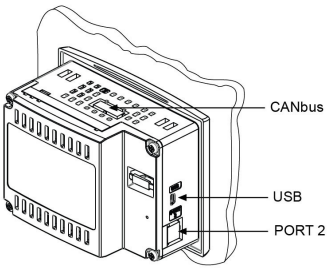
2. Slide the controller into the cut-out, ensuring that the rubber seal is in place.

3. Push the mounting brackets into their slots on the sides of the panel as shown in the figure to the right.

4. Tighten the bracket's screws against the panel. Hold the bracket securely against the unit while tightening the screw.

5. When properly mounted, the controller is squarely situated in the panel cut-out as shown in the figure to the right.



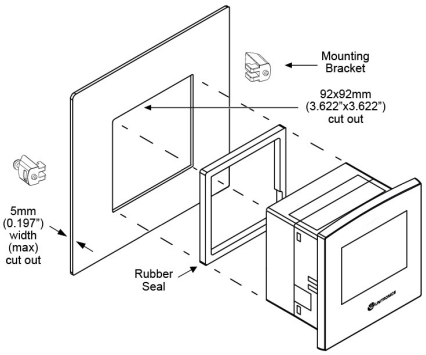


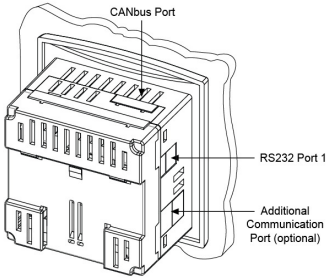
Note: For UL listed module, in order to meet the UL508 standard, panel-mount this device on the flat surface of a Type 1 enclosure.

Panel Mounting SM35-J-R20/SM35-J-T20

Before you begin, note that the mounting panel cannot be more than 5 mm thick.

1. Make a panel cut-out measuring 92x92 mm (3.622”x3.622”).
2. Slide the controller into the cut-out, ensuring that the rubber seal is in place.
3. Push the mounting brackets into their slots on the sides of the panel as shown in the figure to the right.
4. Tighten the bracket’s screws against the panel. Hold the bracket securely against the unit while tightening the screw.
5. When properly mounted, the controller is squarely situated in the panel cut-out as shown in the figure to the right.





Note: For UL listed module, in order to meet the UL508 standard, panel-mount this device on the flat surface of a Type 1 enclosure.

Wiring

- Do not touch live wires.

- Install an external circuit breaker. Guard against short-circuiting in external wiring.
- Use appropriate circuit protection devices.
- Unused pins should not be connected. Ignoring this directive may damage the device.
- Double-check all wiring before turning on the power supply.

Caution

- To avoid damaging the wire, do not exceed 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 3.31 mm ² –0.13 mm² wire (12-16 AWG):

1. Strip the wire to a length of 7±0.5mm (0.270–0.300“).
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.

- Input or output cables should not be run through the same multi-core cable or share the same wire.
- Allow for voltage drop and noise interference with I/O lines used over an extended distance. Use wire that is properly sized for the load.
- The controller and I/O signals must be connected to the same 0V signal.

I/Os

SM43-J-R20/**SM35-J-R20** comprises a total of 12 inputs and 8 relays.
Input functionality can be adapted as follows:

1. 12 inputs may be used as digital inputs. They may be wired in a group via a single jumper as either npn or pnp.

   According to jumper settings and appropriate wiring:

   - Inputs 5 and 6 can function as either digital or analog inputs.
     - If the digital inputs function as npn, analog option is not available.
   - Input 0 can function as a high-speed counter, as part of a shaft-encoder, or as a normal digital input.
   - Input 1 can function as either a counter reset, normal digital input, or as part of a shaft-encoder.
   - If input 0 is set as a high-speed counter (without reset), input 1 can function as a normal digital input.

SM43-J-T20/**SM35-J-T20** comprises a total of 12 inputs and 8 transistor outputs.
Input functionality can be adapted as follows:

1. 12 inputs may be used as digital inputs. They may be wired in a group via a single jumper as either npn or pnp.

   According to jumper settings and appropriate wiring:

   - Inputs 10 and 11 can function as either digital or analog inputs.
   - Inputs 0, 2, and 4 can function as high-speed counters, as part of a shaft-encoder, or as normal digital inputs.
   - Inputs 1, 3, and 5 can function as either counter reset, as part of a shaft-encoder, or as normal digital inputs.
   - If inputs 0, 2, 4 are set as high-speed counters (without reset), inputs 1, 3, 5 can function as normal digital inputs.

Input and Output Jumper Settings

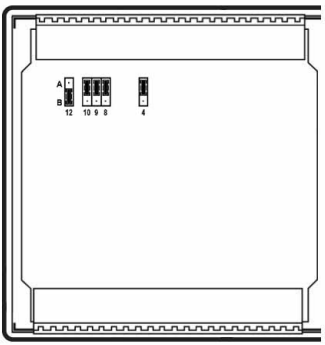
The tables below show how to set a specific jumper to change input functionality. To access the I/O jumpers, you must open the controller according to the instructions below.

⚠ ▪ Incompatible jumper settings and wiring connections may seriously damage the controller.

SM43-J-R20/SM35-J-R20

Digital Inputs 0-11: Set Type		
Set to	**JP12 (all Inputs)**	
npn (sink)	A	
pnp (source)*	B	
Input 5: Set Type - Digital or Analog #1		
Set to	**JP4**	**JP10**
Digital*	A	A
Voltage	B	A
Current	B	B
Input 6: Set Type - Digital or Analog #0		
Set to	**JP8**	**JP9**
Digital*	A	A
Voltage	B	A
Current	B	B

*Default settings

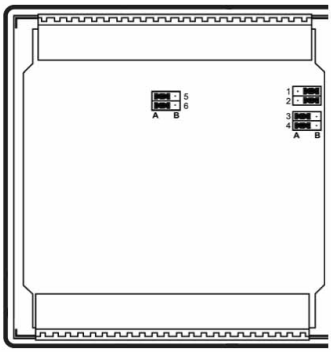


SM43-J-T20/SM35-J-T20

⚠ Do not move JP2.

Digital Inputs 0-11: Set Type		
Set to	**JP1 (all Inputs)**	
npn (sink)	A	
pnp(source)*	B	
Inputs 10/11: Set as Digital or Analog		
Set to	**JP5 (Input 10)**	**JP6 (Input 11)**
Digital*	A	A
Analog	B	B
Analog Inputs AN0/AN1: Set Type		
Set to	**JP3 (AN0)**	**JP4 (AN1)**
Voltage*	A	A
Current	B	B

*Default settings

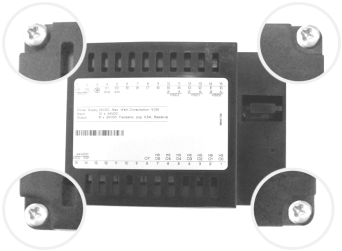


Opening the Controller

Note: Photo is for illustration purposes only. (Using SM43)

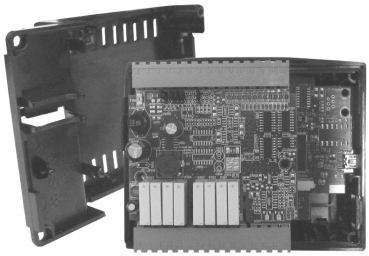
⚠
- Before performing these actions, touch a grounded object to discharge any electrostatic charge.
- Avoid touching the PCB board directly. Hold the PCB board by its connectors.

1. Turn off the power supply, disconnects, and dismounts the controller.
2. The back cover of the controller comprises 4 screws, located in the corners. Remove the screws, and pull off the back cover.



Changing I/O Settings

1. The I/O board of the controller is now exposed, enabling you to change I/O settings according to the jumpers above.



Closing the Controller

1. Replace the back cover of the controller and fasten the corner screws.

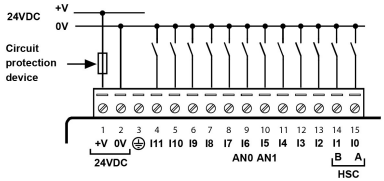
Note that you must replace the back cover securely before powering up the controller.

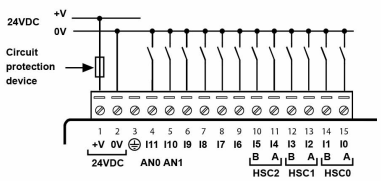
I/O Wiring

npn Input Wiring

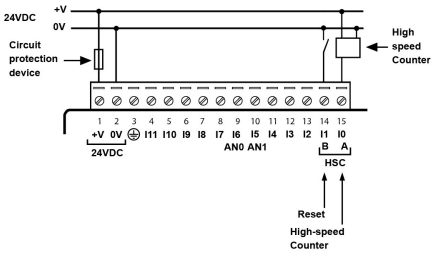
SM43-J-R20/SM35-J-R20 **SM43-J-T20/SM35-J-T20**

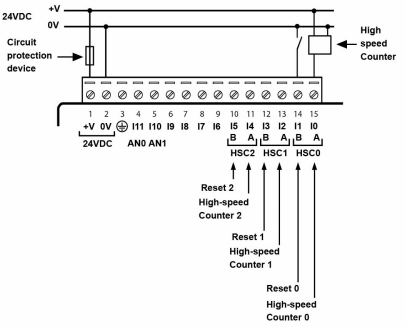
Input wiring, npn (sink)





HSC input wiring, npn (sink)



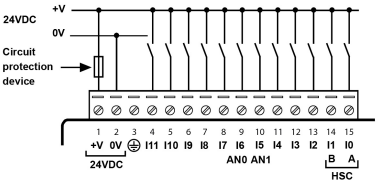


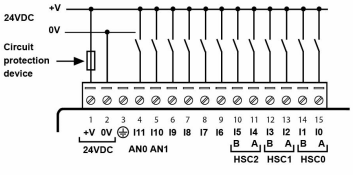
pnp Input Wiring

SM43-J-R20/SM35-J-R20

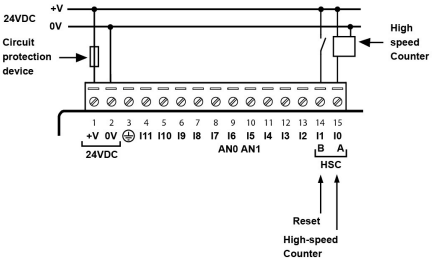
SM43-J-T20/SM35-J-T20

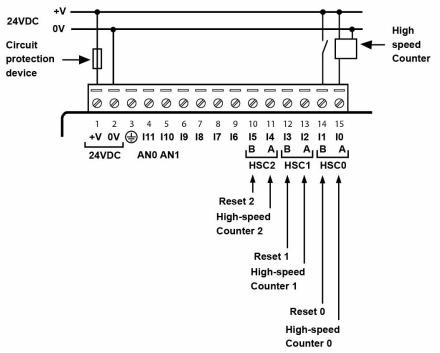
Input wiring, pnp (source)





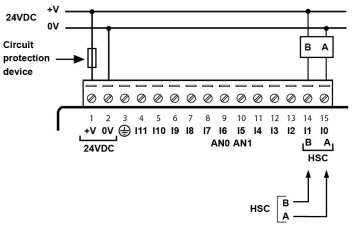
HSC input wiring, pnp (source)



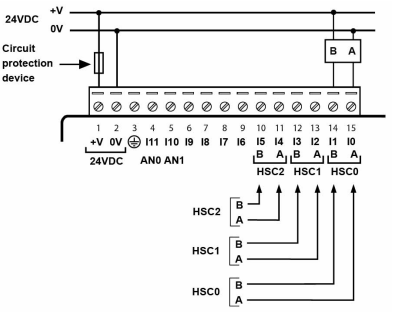


Shaft-encoder

SM43-J-R20/SM35-J-R20



SM43-J-T20/SM35-J-T20

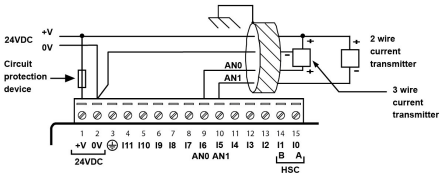


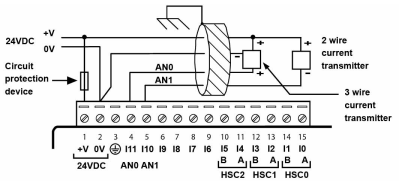
Analog Input Wiring

SM43-J-R20/SM35-J-R20

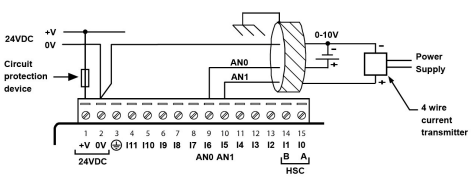
SM43-J-T20/SM35-J-T20

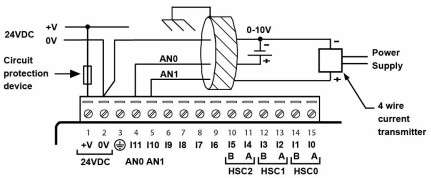
Analog input wiring, current (2/3 wire)





Analog input wiring, current/voltage (4-wire)

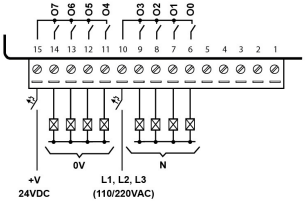




- Shields should be connected at the signal's source.
- The 0V signal of the analog input must be connected to the controller's 0V.

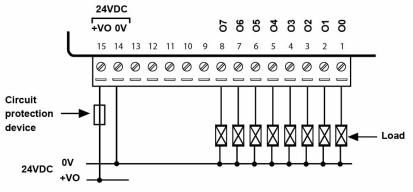
Relay Outputs

SM43-J-R20/SM35-J-R20



Transistor Outputs

SM43-J-T20/SM35-J-T20

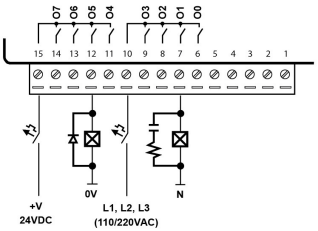


Increasing Contact Life Span

SM43-J-R20/SM35-J-R20- Only

To increase the life span of the relay output contacts and protect the device from potential damage by reverse EMF, connect:

- A clamping diode in parallel with each inductive DC load
- An RC snubber circuit in parallel with each inductive AC load

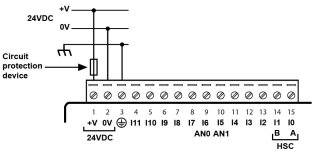


Power Supply

The controller requires an external 24VDC power supply.

Note: Photo is for illustration purposes only.

1. The power supply must include double insulation. Outputs must be rated as SELV/PELV/Class 2/Limited Power.
2. Use separate wires to connect the functional earth line (pin 3) and the 0V line (pin 2) to the system earth ground.
3. Install an external circuit breaker. Guard against short-circuiting in external wiring.
4. Double-check all wiring before turning on the power supply.
5. Do not connect either the 'Neutral' or 'Line' signal of the 110/220VAC to device's 0V pin.
6. In the event of voltage fluctuations or non-conformity to voltage power supply specifications, connect the device to a regulated power supply.



Earthing the OPLC

To maximize system performance, avoid electromagnetic interference by:

- Mounting the controller on a metal panel.
- Connect each common and ground connection directly to the earth ground of your system.

For ground wiring use the shortest and thickest possible wire.

Communication Port

⚠	▪ Turn off power before making communications connections.
Caution	▪ Always use the appropriate port adapters.

SM43-J-R20/SM43-J-T20

This series comprises a USB port.

Caution	▪ The USB port is not isolated. Make sure that the PC and the controller are grounded to same potential.

The USB port may be used for programming, OS download, and PC access.

SM35-J-R20/SM35-J-T20

This series comprises a build-in RS232 port.

Caution	▪ Signals are related to the controller's 0V; the same 0V is used by the power supply. ▪ The serial port is not isolated. If the controller is used with a non-isolated external device, avoid potential voltage that exceeds ± 10V.

Use RS232 to download programs from a PC, and to communicate with serial devices and applications, such as SCADA.

Pinouts

The pinouts below show the PLC port signals.

RS232	
Pin #	Description
1	Not connected
2	0V reference
3	TXD signal
4	RXD signal
5	0V reference
6	Not connected

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