Edge-10 Controller

Edge-10 Controller (14039)

Description

Edge-10 (14039)

DIN-mount, 24Vac/dc (50/60Hz) powered, Niagara® controller With 10 I/O points including:

- Five Universal Inputs (UIs) compatible with 0-10Vdc, 0-20mA, dry contacts, 0-100K ohm resistive, or Type 3 thermistor temperature sensors.

- Three digital triac outputs for on/off control of 24Vac loads upto 1/2 Amp

- Two 0-10Vdc Analog Outputs (AOs) for 0-10Vdc analog control of loads up to 2.5K ohm minimum or 4mA drain maximum.

 See the product data sheet and *Edge-10 Installation and Startup Guide* for complete specifications and product details.

Included in this package

- Edge-10 (14039) controller.

- Three-position RS485 connector plug

- Six-position connector for triac output

- Four-position connector for analog outputs

- Eight-position connector for analog inputs

- Two-position power connector, and a grounding wire

- 499 Ohm resistors (Qty. 5) for universal input use

- This *Edge-10 Controller Installation Sheet*.

Material & Tools Required

- One of the following:

  - UL listed, Class 2, 24Vac transformer, rated at minimum of 7VA. A dedicated transformer is required (cannot power additional equipment), or
  - User supplied UL Listed Class 2 or LPS AC power adapter: 24Vdc, capable of supplying at least 7W (24Vdc at 292mA).

- DIN rail, type NS35/7.5 (35mm x 7.5mm) and DIN rail end-clips (stop clips), recommended for installation. Controller is also panel-mountable.

- Suitable tools and fasteners for mounting the unit and any accessories.

Warnings

⚠️ Disconnect power before installation or servicing to prevent electrical shock or equipment damage.

⚠️ To reduce the risk of fire or electrical shock, install in a controlled environment relatively free of contaminants.

Cautions:

⚠️ Removal of the controller's cover is not required. No configurable or user-serviceable items require cover removal.

Mounting

Mount the controller in a location that allows clearance for wiring, servicing, and removal.

Environmental Requirements

NOTE: This product is for indoor use only.

Ambient conditions must be within the range of:

- Operating Temperature: -20°C to 60°C (-4°F to 140°F)

- Storage Temperature: -40°C to 85°C (-40°F to 185°F)

- Relative humidity: 5% to 95% non- condensing

- Supply voltage fluctuation and brownout tolerance:

  - Allowable voltage fluctuation to +/-10%.
  - 0-69% input voltage - 40ms
  - 70-79% input voltage - 1 second
  - 80 - 89% input voltage - 20 seconds
  - 90% - 100% input voltage - indefinitely

NOTE: Horizontal mounting is strongly recommended, to achieve maximum heat dissipation and meet the operating temperature upper limit. Any other mounting orientation reduces this upper limit.

Mounting On DIN Rail
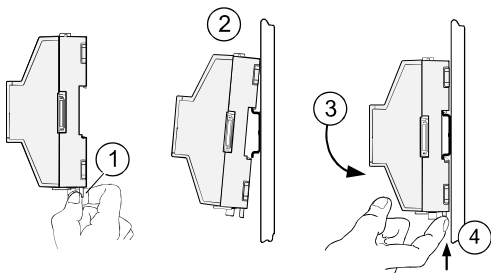
1. Pull the controller's locking clip down.
2. Tilt the controller to hook over the DIN rail.
3. Push down and in on the unit to fasten to the rail.
4. Push locking clip up and click into place to secure.
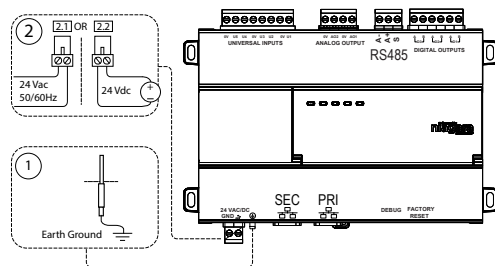5. Carefully secure both ends of the final assembly with DIN rail end-clips provided by the DIN rail vendor.
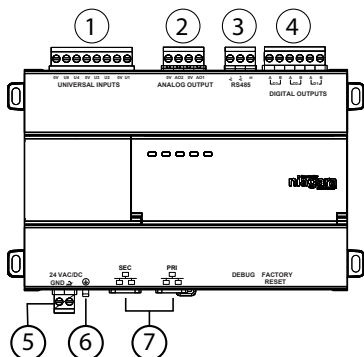

Terminal Locations

The Edge-10 provides 5 Universal Inputs compatible with 0–10Vdc, 0–20mA, dry contacts, 0–100K ohm resistive, or Type 3 thermistor temperature sensors. Edge-10 includes five outputs as:

- Three digital triac outputs for on/off control of 24Vac loads up to 1/2 Amp
- Two 0-10Vdc Analog Outputs for 0-10Vdc analog control of loads at 2.5K ohm minimum or 4mA drain maximum.

Wiring terminal positions are shown below, along with LED locations.

Connector Locations

Field communications ports are as follows:

1. Universal inputs (5 inputs on 8-position connector)
2. Analog outputs (2 outputs on 4 position connector)
3. RS485 port (1 port on 3-position connector)
4. Digital (triac) outputs (3 outputs on 6-position connector)
5. 24Vac/dc input (1 input on 2-position connector)
6. Earth ground (1 tab for earth ground)
7. Ethernet ports (2, 10/100Mb, RJ-45 connectors with integrated LEDs)

Wiring

Refer to "Connector Locations" and the following images to locate connectors and other components. Descriptions are provided for wiring to ground, to power, RS-485, Ethernet, Inputs and Ouputs.

Wiring Earth Ground & Power

Because the Edge-10 uses a half-wave rectified power supply, it should not share a transformer with the JACE-8000, IO-R-34, or any legacy JACE.

Earth grounding provides protection from electrostatic discharge or other forms of EMI.

NOTE: Depending on power source used.

2.1 (AC): Dedicated 24V transformer required, with neither side of the transformer secondary tied to ground.

2.2 (DC): Polarity is critical (uses onboard half wave diode), - to ground and + to other terminal.

⚠️**Warning:** Before making power terminations, de-energize the 24V power source. Do not restore power until completing all other mounting and wiring. See "Power up and Initial Checkout".

Prerequiste: A nearby earth grounding point.

1. Install the included earth ground wire to the controller's earth ground spade lug, and terminate the other end to a nearby earth ground.
2. Unplug the controller's 2-position power connector plug and terminate the 24V supply source (AC or DC) to the connector. Leave connector unplugged for now.

RS485 Wiring
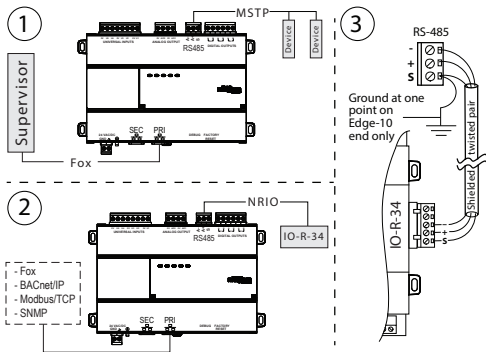
On the controller's top side, a single, non-isolated, RS485 port provides connection to IO-R-34 module or to other RS-485 devices (NRIO, MSTP, MODBUS). Do not use this port to connect to other JACE controllers.

Use shielded, twisted-pair, 18-22 AWG cabling to wire in a continuous multidrop fashion to other RS485 devices: "minus to minus", "plus to plus," and "shield to shield." 10K bias resistors are permanently connected. Note that there is no built in termination resistor. Maximum total cable length is 1,000 feet (304.8 meters).

Connect the shield wire to earth ground at Edge-10 end only. The image above shows example wiring.

(1) RS485 port supporting a trunk of MSTP devices (3 devices max).

(2) RS485 port connected to a single IO-R-34 module.

(3) Example wire terminations to IO-R-34 using RS-485.

NOTE: Do not mix an IO-R-34 with other types of RS485 devices on the same RS485 trunk.

NOTE: RS485 devices on the same network should use the same protocol and baud rate. Up to 3 external devices and 50 external points are supported.

Ethernet Wiring

Two RJ-45 10/100Mb Ethernet connectors are labeled PRI for primary, and SEC for secondary. Use a standard Ethernet patch cable to an Ethernet switch. These ports are suitable for daisy-chaining Edge-10 controllers (see image below) or for connection to either a JACE-8000 or directly to a network.

Daisy Chain using Ethernet
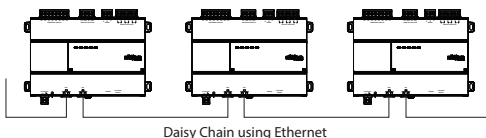
Upon first startup when IP connectivity is detected, the Edge-10 initially requests an IP address via DHCP. If a DHCP address is not found, the controller reverts to a static IP address based on its serial number. The fallback IP address is 192.168.1xx.xx, where xx.xx is the last 4 digits of the serial number. For example, if the serial number is 123456789, the fallback IP address would be 192.168.167.89.

The default subnet mask is 255.255.0.0.

Inputs

Each of the 5 UI inputs supports any of the following:

- Type-3 10K ohm Thermistor (see Caution on page 12)
- Resistive 0-100K ohms
- 0–10 Vdc
- 4–20 mA
- Binary Input

Thermistor

The inputs support 10K Thermistor temperature sensors. Input accuracy is in the range of ±1% of span. By default, conversion is for a standard Type 3 thermistor sensor with a sensor range of -10° to 135°F (-23.3° to 57.2°C). Using a conversion type of "Tabular Thermistor," you can specify a different thermistor response curve by importing a thermistor curve .xml file. The Niagara kitIo module contains an xml folder with thermistor curves for a various thermistor temperature sensors. You can also edit and export (for reuse) customized thermistor curve xml files. See the *NRIO Driver Guide* for details.
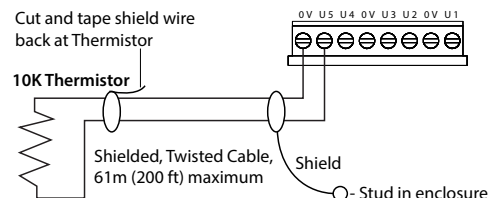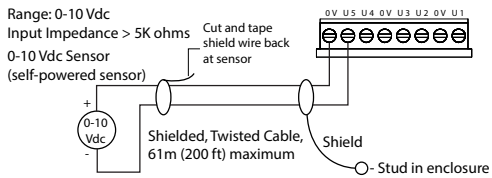

Resistive 0-100K ohms

The inputs can read a resistive signal within a range from 0 to 100,000 ohms. Wiring is the same as shown for a Thermistor temperature sensor, above.

⚠ **Caution:** UI inputs provide optimum resistive-to-temperature resolution in the 10K ohm range. For a sensor with a range far from 10K ohms (such as a 100-ohm or 1000-ohm sensor), resolution is so poor as to be unusable! To successfully use such a sensor, install a transmitter that produces a Vdc or mA signal, and then wire the transmitter to the UI according to the 0–10 Vdc or 4–20 mA instructions.

0-10Vdc

The inputs support self-powered 0–10 Vdc sensors. Input impedance is greater than 5K ohms.

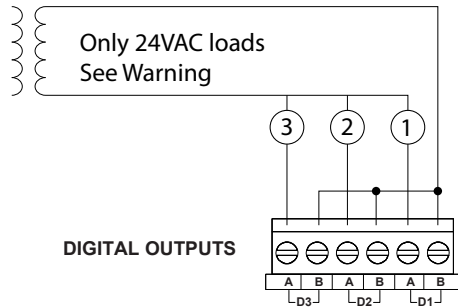0–10 volt accuracy is ±2% of span, without user calibration. 0–10.

Range: 0-10 Vdc
Input Impedance > 5K ohms
0-10 Vdc Sensor
(self-powered sensor)

Cut and tape
shield wire back
at sensor

0V U5 U4 0V U3 U2 0V U1

+
0-10
Vdc
-

Shielded, Twisted Cable,
61m (200 ft) maximum

Shield
- Stud in enclosure

4-20 mA

The inputs support self-powered 4–20 mA sensors. Input accuracy is ±2% of span, without user calibration. Use a 499 ohm resistor wired across the input terminals.

⚠️ **Caution:** When using an externally powered 4–20 mA sensor, be sure to de-energize its power supply before making or changing any wiring connections to the Edge-10 module. This is in addition to removing power from the Edge-10 module. DO NOT apply external power to the UI inputs without the 499 ohm resistor in place. Otherwise, even a momentary application of power (say, 24Vdc) to the UI terminals without the resistor may damage circuitry on the Edge-10. Only after completing all input wiring should you restore power to such external power supplies.

4-20 mA Sensor
(self powered sensor)
Range: 0-20 mA

Cut and tape
shield wire back
at Thermistor

0V U5 U4 0V U3 U2 0V U1

499 Ohm resistor
(supplied with unit)

+
i
-

Shielded, Twisted Cable,
61m (200 ft) maximum

Shield
- Stud in enclosure

Binary Input

The universal inputs support normal dry (equipment status) contacts. Standard dry contacts must have a 1 Hz. (or less) COS frequency, with minimum dwell time > 500ms. (Contacts must remain open at least 500ms and be closed at least 500ms.) Dry contacts support 11 Vdc open circuits or 733 μA short-circuit current.

Dry Contacts

Cut and tape
shield wire back
at sensor

0V U5 U4 0V U3 U2 0V U1

Shielded, Twisted Cable,
61m (200 ft) maximum

Shield
- Stud in enclosure

Outputs

The Edge-10 provide 3 triac digital outputs and 2 0-10Vdc analog outputs

Binary Triac Outputs

Each digital triac output is rated at 24 Vac +/- 15%, 50/60Hz, at 0.5A max. Relays are not rated for AC mains (line level) powered loads (instead, 24V maximum).

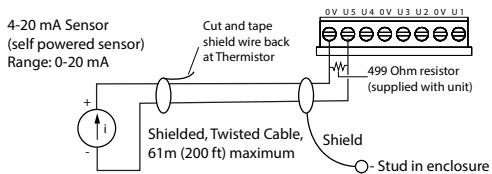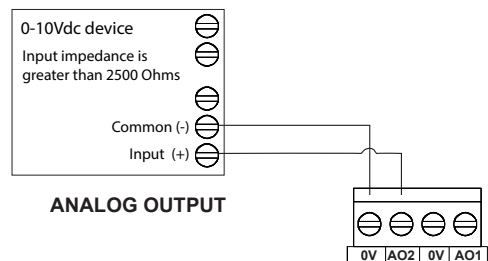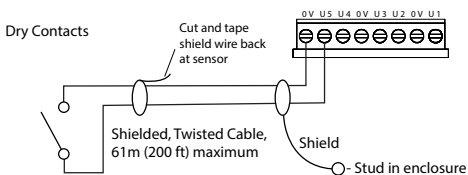Outputs are normally open, floating and do not share a common pin.

NOTE: Triac outputs are suitable for AC only. DC loads and dry contacts require an intermediate relay.

⚠️ **Warning:** Never use a controller's power transformer to power I/O loads. Using the controller's transformer introduces potentially damaging switching transients into the unit.

Only 24VAC loads
See Warning

3   2   1

DIGITAL OUTPUTS

A B A B A B
D3   D2   D1

Analog Outputs

Analog outputs (AO) are referenced by the terminals labeled AO*n* and 0V (ground). Each AO can supply a maximum of 4 mA over the entire 0 to 10Vdc range. The minimum input impedance of a device controlled by an AO must be greater than 2500 ohms.

0-10Vdc device

Input impedance is
greater than 2500 Ohms

Common (-)
Input (+)

ANALOG OUTPUT

0V AO2 0V AO1

Power up and Checkout

Power Up and Initial Checkout

① Apply power by inserting the 2-position 24V power connector plug.

② Check the green STAT (Status) and yellow BEAT (Heart- beat) LEDs.

When power is applied, the green "STAT" LED will light. This indicates the system is OK, with power applied. During bootup, the "BEAT" LED may blink at 3 Hz with a 50%/50% on/off duty cycle. When bootup completes, the platform daemon is started, and the normal 1 Hz flash at 50%/50% on/ off duty cycle of the "BEAT" LED returns.
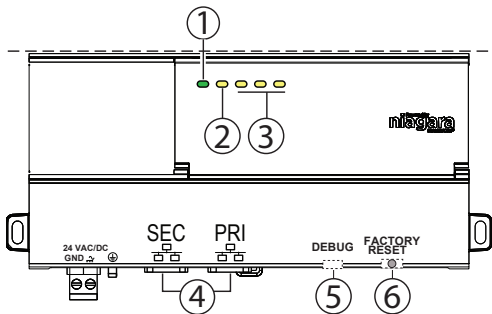
Status LEDs, Debug Port and Factory Reset
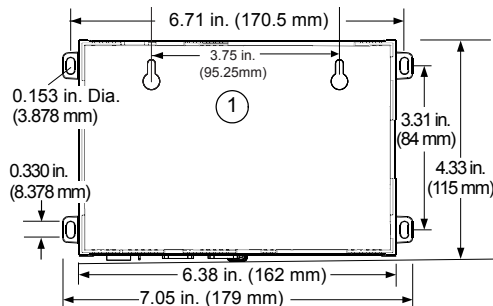
The controller has three yellow triac status LEDs, one yellow heartbeat LED, and a single green controller status LED located on the top of the controller. It also includes two LEDs for each Ethernet port which are located on the Ethernet connectors and are visible from the side of the controller.

① STAT (Green) - Remains illuminated while controller is powered.

② BEAT (Yellow) - "Heartbeat", normally 1Hz, 50% duty cycle.

③ D3, D2, D1:Active (Yellow), Inactive: (Off).

④ SEC and PRI Ethernet , 2 LEDs for each port:

– Green LED on left: Link (On) / Activity (Flicker)
– Yellow LED on right: Speed; 100Mb(On) / 10 Mb(Off).

If the "BEAT" LED stays illuminated constantly, does not light, or blinks very fast, contact System Engineering for technical support.

⚠The 3Hz, 50%/50% on/off "BEAT" flash at bootup also occurs during other critical operations, such as a firmware upgrade to the controller and/or any attached modules. To be safe, do not remove power from the controller while its "BEAT" LED flashes with a 90%/10% on/off duty cycle. Wait for the normal (50%/50%) flash to return before removing power.

Along the bottom side of the controller is a debug port for serial debug communications and a Factory Reset button.

⑤ DEBUG - Micro-A USB for serial debug communications.

⑥ FACTORY RESET - Pushbutton switch to return the controller to a factory default settings.

The DEBUG port is a standard Micro-A/B type USB port for serial debug communications to the controller. Use a serial terminal program (for example: PuTTY) to access the controller "system shell" menu. This provides access to some basic platform settings.

Default DEBUG port settings are: 115200, 8, N, 1 (baud rate, data bits, parity, stop bits). For details on using a serial connection to the DEBUG port, see the *Edge-10 Install and Startup Guide* or the *JACE-8000 Install and Startup Guide*.

NOTE: Login requires admin-level platform credentials. Default platform credentials are: username: "tridium" password: "niagara".

Tab Mounting option

DIN rail mounting is recommended. Where tab mounting is required, use dimensions in the illustration to mount the controller.

⚠ **Caution**: Do not mount hardware on both a DIN Rail and with tab mounts to another surface. This causes physical stress on equipment and prevents good connections between controller and modules.

① Edge-10 controller. Allow at least 1.5" (38mm) clearance around all sides.

部件名称与型号 Assembly Name and Model		有害物质 Hazardous Substances					
型号 Model	部件名称 Assembly Name	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
14039	PWB 组件 PWB Assemblies	X	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制。
This table is prepared in accordance with the provisions of SJ/T 11364.

O: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
   Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。
   Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572

"未列入表内的其他部件，皆不含任何超出限量要求的限制使用物质。

All other components, not listed in the table, do not contain restricted substances above the threshold level

电子电气产品的环保使用期限依据SJ/T11388 标准的规定确定。

The EPUP value of EEP is defined according to SJ/T 11388 standard.

WEEE (Waste of Electrical and Electronic Equipment)

This symbol on our product shows a crossed-out "wheelie-bin" as required by law regarding the Waste of Electrical and Electronic Equipment (WEEE) disposal. This indicates your responsibility to contribute in saving the environment by proper disposal of this Waste i.e. Do not dispose of this product with your other wastes. To know the right disposal mechanism please check the applicable law.