

## JACE-403

### MOUNTING AND WIRING INSTRUCTIONS

This document covers the mounting and wiring of the Wykon® JACE-403 series controller, and applies to the following products:

#### US Models

JACE-403-AX, JACE-403-EM-AX

#### International models

JACE-403I-AX, JACE-403I-EM-AX

This document assumes that you are an engineer, technician, or service person who is performing control system installation of the Niagara Framework®. Please read through this entire document before beginning the installation procedures.



**Note** Not covered in this document is the Niagara software installation and configuration required for a fully functioning unit. This includes host IP address and password, serial port configuration, and other parameters. Please refer to the *JACE NiagaraAX Install & Startup Guide* for this information.

These are the main topics included in this document:

- [Preparation](#), page 1
- [Precautions](#), page 2
- [Mounting](#), page 3
- [Board Layout](#), page 6
- [Wiring Details](#), page 7
- [Power Up and Initial Checkout](#), page 14

Also included in this document are several appendixes, as follows:

- [Using Status LEDs](#), page 15
- [Maintaining the JACE-403](#), page 16
- [Replacement Parts](#), page 17
- [Certifications](#), page 22
- [Declaration of Conformity](#), page 23



## Preparation

Unpack the JACE-403 and inspect the contents of the package for damaged or missing components. If damaged, notify the appropriate carrier at once and return any damaged components for immediate repair or replacement. See [“Returning a Defective Unit”](#) on page 21.

- [Included in this Package](#)
- [Tools Required](#)

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## Included in this Package

Included in this package you should find the following items:

- a JACE-403.
- These *JACE-403 Mounting and Wiring Instructions*, Part Number 10581, *Updated: March 15, 2007*
- a packing slip, which lists the factory settings for IP address, machine name, and host logon.
- a hardware bag containing the following items:
  - 499 ohm resistors (quantity 6).
  - 6-position I/O screw terminal connector plugs (quantity 4).
  - 3-position RS-485 screw terminal connector plug (quantity 1).
  - US models only—wire nuts (quantity 2).
  - 2-position LON screw terminal connector plug.
- Optional items (if ordered):
  - Factory installed modem.
  - RJ-45 to DB-9 adapter (for the RS-232 port).
  - Silver satin patch cable (used between the adapter and serial port).

## Tools Required

The following tools and supplies may be required for installation:

- 1/4-inch (7 mm) nut driver: used to remove the transformer shield.
- Small flat-blade screwdriver: used for I/O, LON, and RS-485 connectors (all models) and power terminal connections (JACE-403I only).

**Note**

If removing or installing the circuit board from the enclosure, a 1/4-inch thin-walled *socket* is required (*do not use a nut driver*). See [“Replacing the JACE-403 circuit board,”](#) page 20.

## Precautions

This document uses the following warning and caution conventions:

**Caution**

Cautions remind the reader to be careful. They alert readers to situations where there is a chance that the reader might perform an action that cannot be undone, might receive unexpected results, or might lose data. Cautions contain an explanation of why the action is potentially problematic.

**Warning**

Warnings alert the reader to proceed with extreme care. They alert readers to situations where there is a chance that the reader might do something that can result in personal injury or equipment damage. Warnings contain an explanation of why the action is potentially dangerous.

## Safety Precautions

The following items are warnings of a general nature relating to the installation and start-up of the JACE-403 controller. Be sure to heed these warnings to prevent personal injury or equipment damage.

**Warning**

- **A 120Vac (US models) or 240Vac (International models) circuit powers the JACE-403 controller. Disconnect power before installation or servicing to prevent electrical shock or equipment damage.**
- **Make all connections in accordance with national and local electrical codes. Use copper conductors only.**
- **To reduce the risk of fire or electrical shock, install in a controlled environment relatively free of contaminants.**
- **This device is only intended for use as a monitoring and control device. To prevent data loss or equipment damage, do not use it for any other purpose.**

## Static Discharge Precautions

Static charges produce voltages high enough to damage electronic components. The microprocessors and associated circuitry within a JACE-403 controller are sensitive to static discharge. Follow these precautions when installing, servicing, or operating the system:

**Caution**

- **Work in a static-free area.**
- **Discharge any static electricity you may have accumulated. Discharge static electricity by touching a known, securely grounded object.**
- **Do not handle the printed circuit board (PCB) without proper protection against static discharge. Use a wrist strap when handling PCBs. The wrist strap clamp must be secured to earth ground.**

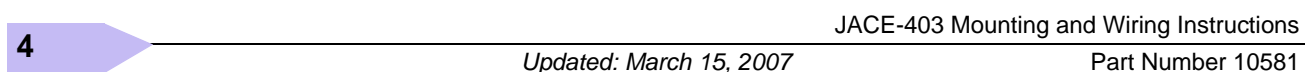
## Mounting

Mount the JACE-403 controller in a location that allows clearance for wiring, servicing, and module removal. For mounting details refer to [Figure 1](#) on page 4 (a drill template is provided on the [last page](#) of this document).

Pay attention to the following recommendations and precautions when mounting and installing the unit.

- This product is intended for indoor use only. The unit should not be exposed to ambient conditions outside of the range of 0°C (32° F) to 50°C (122° F) and relative humidity outside the range 5% to 95% non-condensing (pollution degree 1).
- If the controller is mounted inside an enclosure, that enclosure should be designed to keep the unit within its required operating range considering a 20-watt dissipation by the controller. This is especially important if the controller is mounted inside an enclosure with other heat producing equipment.
- Minimum clearance from the wall on which the unit is mounted is 0.2-inches (provided by the dimpled mounting feet). Ensure that this space is not compromised and that airflow is not blocked behind the unit.
- Do not mount the unit:
  - in an area where excessive moisture, corrosive fumes, or explosive vapors are present.

- Figure 1**      **Mounting details.**



## Removing and Replacing the Cover

The JACE-403 cover is removable. The cover is secured in place with a knurled-edge, *slotted-head* screw.



**Note** If you need a more secure installation for the cover, you can use a padlock through the security tab that protrudes through the cover.

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### Procedure 1 Removing the cover of a JACE-403.

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- Step 1** Loosen the cover screw and open the cover.  
(You may need a flat-blade screwdriver to loosen the cover screw, if previously tightened this way.)
  - Step 2** On the inside of the door, loosen and remove the nut and locking washer that secures the green grounding strap to the cover.
  - Step 3** Pull the grounding strap off the screw post.
  - Step 4** Replace the locking washer, then the nut on the screw post and tighten.
  - Step 5** Close the door about half way.
  - Step 6** Slide the cover toward the top of the unit until the tops of the hinge tabs on the cover hit the top of the hinge slots on the left wall of the metal enclosure.
  - Step 7** Slide the hinge tabs out of the slots.
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### Procedure 2 Replacing the cover of a JACE-403.

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- Step 1** Align the hinge tabs on the cover with the hinge slots on the left wall of the metal casing.
  - Step 2** Slide the hinge tabs into the slots and slide the door toward the bottom of the unit, until the bottom of the hinge tabs hit the bottom of the slots.
  - Step 3** Loosen and remove the nut and locking washer on the grounding strap post on the door.
  - Step 4** Slide the ground strap onto the screw post and replace the locking washer, then the nut and tighten.
  - Step 5** Close the door and tighten the security screw.
-

Refer to [Figure 2](#) for location of communication ports, LEDs, and other features of the JACE-403.

## Wiring Details

See [Figure 2](#) on page 6 to locate connectors and other components on the JACE-403 controller.

Make connections to the JACE in the following order.

1. With the 6-position power connector disconnected from the board, wire the power to the transformer (US models) or the power terminal block (International models). See [“Power Wiring,”](#) page 7.
2. Connect communications cables. See [“Communications Wiring,”](#) page 8.
3. Connect the I/O wiring. See [“I/O Wiring,”](#) page 10.
4. Apply power to the unit. See [“Power Up and Initial Checkout,”](#) page 14.

## Power Wiring

Building power is wired directly to the transformer supplied with the JACE-403. There is no disconnect switch in the unit, therefore you should wire the JACE to an external switch or breaker. Some local codes require the switch to be in sight of the unit. The switch must be capable of 120Vac (or if a JACE-403I, 240Vac), plus sufficient capacity for test equipment.

- [About the Transformer](#)
- [Making the Power Connection to the Transformer](#)

### About the Transformer

The JACE-403 ships with a 120Vac, 50/60 Hz transformer and 12V battery. The JACE-403I ships with a 240Vac, 50/60 Hz transformer and 12V battery.

The transformer provides power to the controller in a 14-CT-14 configuration (28Vac center tapped). The power connector has been disconnected for shipping.

The following things should be noted about the JACE-403 transformer:



#### Warning

- **Wiring is to be made to the supplied transformer. All connections should be made in accordance with national and local electrical codes. Use copper conductors only.**
- **Do not power other devices from the transformer of the JACE. The transformer should be dedicated to running the JACE.**
- **Do not attempt to use any other power source or otherwise defeat the isolation provided by the integral transformer. A two-wire power source, including a 24V transformer, can cause permanent damage or greatly shorten the life of the unit.**
- **Verify that neither side of the transformer's secondary winding is connected to earth ground or building neutral.**

## Making the Power Connection to the Transformer

With the 6-position power connector disconnected from the PCB, unscrew the nut and locking washer and remove the metal enclosure of the transformer.



**Note** As typically required by code, high voltage “Class 1” wiring must be confined behind the transformer’s enclosure divider. Be sure to replace this barrier after completing the wiring. Do not pinch wires underneath the barrier when re-installing the barrier.

**JACE-403**—Using the provided wire nuts, connect 120Vac 60 Hz power to the transformer and power connector using the information in [Table 1](#).

**Table 1** US models—building power termination.

| Building Power Source (US) |                       | Termination point                   |
|----------------------------|-----------------------|-------------------------------------|
| Type of Wire               | Typical Color of Wire |                                     |
| Ungrounded—Hot             | Black                 | Either wire of the 120V transformer |
| Grounded—Neutral           | White                 | Other wire of the 120V transformer  |
| Grounding—Ground (Earth)   | Green or bare copper  | Grounding stud                      |

**JACE-403I**—Connect 240Vac 60 Hz power to the power terminal block using the information in [Table 2](#).

**Table 2** International models—building power termination.

| Building Power Source (International) |                             | Termination point                           |
|---------------------------------------|-----------------------------|---|
| Type of Wire                          | Typical Color of Wire       |   |
| Ungrounded—Hot                        | Brown                       | Either empty terminus of the terminal block |
| Grounded—Neutral                      | Blue                        | Other empty terminus of the terminal block  |
| Grounding—Protective Earth (Ground)   | Green/yellow or bare copper | Grounding stud                              |

## Communications Wiring

All communications wiring is made through knockouts adjacent to the communication ports. Prior to connecting cables, ensure that the grommet bushing has been installed for each knockout. Employ strain relief on the communication wiring to prevent damage to the controller.

### Ethernet

A single, female 10/100-Mbit Ethernet connection is provided on the controller. This connection is capable of running at either 10 Mbps or 100 Mbps—it automatically adjusts to either speed. This means the JACE-403 can exist on the same network with a mixture of 10BaseT and 100BaseTX hardware connected to a smart 10/100 hub capable of adjusting to the devices it supports.

Connection is made via a standard male RJ-45 (8-wire) connector. Using a Category 5 unshielded twisted pair (UTP) cable, connect one end of the cable through the knockout adjacent to the RJ-45 connector on the JACE, and the other end to a hub on the Ethernet LAN.

The maximum end-to-end distance from the controller to the hub is 328 feet (100m).



## Serial

There are two serial ports on the JACE-403. From the top of the board (see [Figure 2](#)), the top serial port is an [RS-232](#) port using an RJ-45 connector. Below this is a two-wire with shield, non-isolated [RS-485](#) port.

**RS-485**—RS-485 multi-point connections are made to the 3-position, screw terminal connector on the board. Wire to this connector with shielded 18-22AWG wiring (refer to the TIA/EIA-485 standard). The screw terminals (from top to bottom) are shield, plus (+), and minus (–).

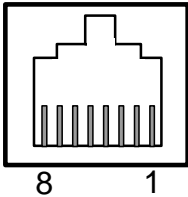
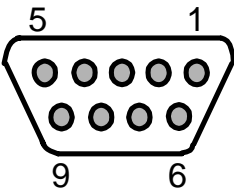
**RS-232**—An RS-232 serial port connection can be made to the female (socket) RJ-45 connector using an 8-conductor flat silver satin stranded cable with standard male (plug) RJ-45 connectors. Connect the flat satin cable (maximum distance 50 feet) through the enclosure knockout nearest the port. This “straight-through” cable is then connected to a socket-to-socket type RJ-45-to-DB-9 adapter.

The JACE-403 is a serial DTE device, such another DTE device (PC, for example) requires a “null modem” adapter (part number 10148, optional item). If connecting the JACE-403 to a DCE device (modem, for example), a straight-through adapter is used. [Table 3](#) provides pinouts for both types of RJ-45 to DB-9 adapters.



- Notes**
- Silver satin cable is not standard Ethernet UTP cable, in which the pairs are twisted around each other. The twisting of the pairs may cause undesirable effects on the serial communication, therefore we recommend the use of flat silver satin cable instead.
  - Flat silver satin cable is unshielded. If installing this cable in a noisy electrical environment, run the cable through conduit.

**Table 3** RJ-45 to DB-9 adapter pinouts.

| RJ-45 and DB-9 Pinout References  | Type of Adapter   | RJ-45 Socket Pin | Signal                 |                     | DB-9 Socket Pin |
|---|---|------------------|------------------------|---------------------|-----------------|
| <b>RJ-45 Socket (female)</b><br> | <b>Null Modem</b><br>(for connecting to another DTE device)<br><b>Part number 10148</b> | 5                | DCD                    | Data carrier detect | 1               |
|   |   | 3                | TXD                    | Transmit data       | 2               |
|   |   | 6                | RXD                    | Receive data        | 3               |
|   |   | 8                | DSR                    | Data set ready      | 4               |
|   |   | 4                | GND                    | Ground              | 5               |
|   |   | 1                | DTR                    | Data terminal ready | 6               |
|   |   | 7                | CTS                    | Clear to send       | 7               |
|   |   | 2                | RTS                    | Request to send     | 8               |
|   |   | —                | not used on the JACE-4 |                     | 9               |
| <b>DB-9 Socket (female)</b><br>  | <b>Straight-through</b><br>(for connecting to a DCE device)                             | 5                | DCD                    | Data carrier detect | 1               |
|   |   | 6                | RXD                    | Receive data        | 2               |
|   |   | 3                | TXD                    | Transmit data       | 3               |
|   |   | 1                | DTR                    | Data terminal ready | 4               |
|   |   | 4                | GND                    | Ground              | 5               |
|   |   | 8                | DSR                    | Data set ready      | 6               |
|   |   | 2                | RTS                    | Request to send     | 7               |
|   |   | 7                | CTS                    | Clear to send       | 8               |
|   |   | —                | not used on the JACE-4 |                     | 9               |

## LonWorks (LON)

A single, two-pin, male LonWorks FTT-10A Weidmuller connection is provided on the controller. This connection supports twisted pair, unshielded, polarity-insensitive, peer-to-peer communications at 78 Kbps.

Refer to the *LonWorks FTT-10A Free Topology Transceiver User's Guide* (078-0156-01F) for technical guidelines associated with free topology restrictions and the *Junction Box and Wiring Guidelines for Twisted Pair LonWorks Networks* (005-0023-01) for more detailed information on wiring specifications. These documents are available on Echelon's web site ([www.echelon.com](http://www.echelon.com)).

## Modem (Optional)

The female RJ-11 connection for the modem is located below the RS-485 port. Connect one end of a standard flat satin telephone cable (4-conductor) through the adjacent knockout to the modem's RJ-11 connector and the other end to an analog telephone port.

This modem is approved for US use only, and must be tested for use in other countries.

## I/O Wiring

The JACE-403 provides six (6) universal [inputs](#) supporting analog inputs (temperature, resistance, voltage, and current) and digital inputs (contact closure, pulse count), as well as four (4) form-C (SPDT) relay [outputs](#).

See [Figure 2](#) on page 6 for the location of these inputs and outputs.



**Note** For proper operation, each input or output used requires a special Niagara Direct Input/Output (Ndio) object to be properly configured in the station database. These objects act as the station interface to the physical I/O points. For details, please refer to the appropriate JACE software configuration document:

- If Niagara<sup>AX</sup>, the *Ndio Users Guide*.
- If Niagara r2.x, the *JACE-4/5 Series Niagara r2 Configuration and Start-Up Guide*.

## Inputs

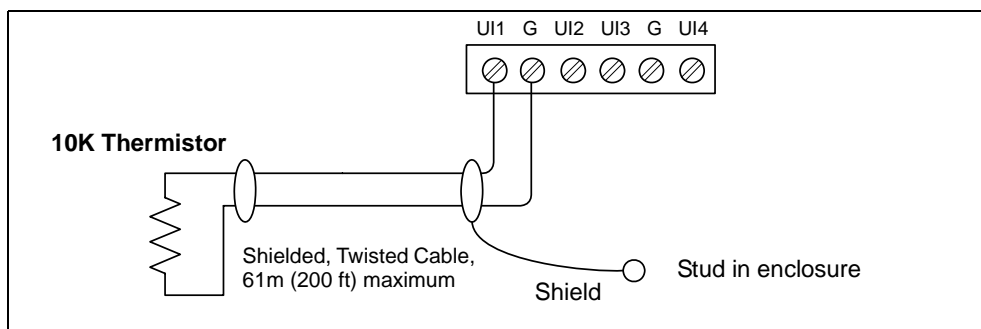
Each of the 6 universal inputs can support any one of the following:

- [Thermistor](#) Type 3 (10K)
- [Resistive](#)
- [0–10 Vdc](#)
- [4–20 mA](#)
- [Binary Input](#)

### Thermistor

The inputs support Type 3 10K Thermistor temperature sensors with a sensor range of -10° to 135°F (23.3° to 57.2°C), using the appropriate Niagara object. Input accuracy is in the range of ±1% of span.

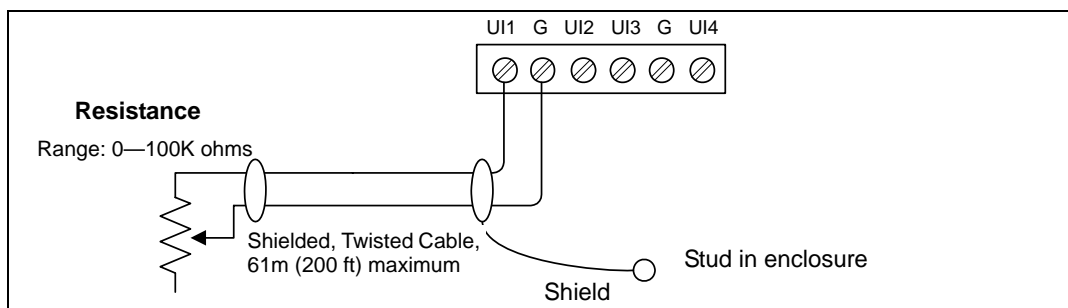
[Figure 3](#) shows the wiring diagram.

**Figure 3 Thermistor wiring.**

**Note** UI inputs are optimized to provide the best resolution around the 10K ohm range. For a sensor with a range far from 10K ohms (such as a 100-ohm or 1000-ohm type), resolution will be poor. To use such a sensor, it is recommended you 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.

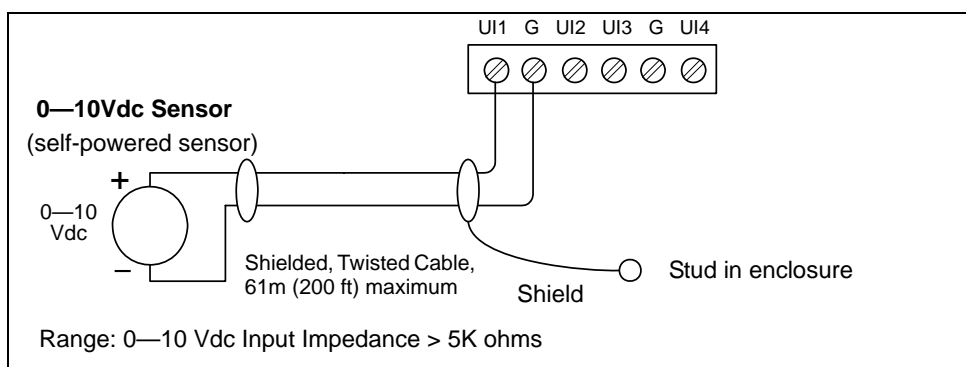
## Resistive

The inputs support resistance inputs with a range of 0–100K ohms. Input accuracy is in the range of  $\pm 1\%$  of span.

**Figure 4 Resistive wiring.**

## 0–10 Vdc

The inputs support self-powered 0–10 Vdc sensors. Input impedance must be greater than 5K ohms. 0–10 volt accuracy is  $\pm 2\%$  of span, without user calibration. [Figure 5](#) shows the wiring diagram.

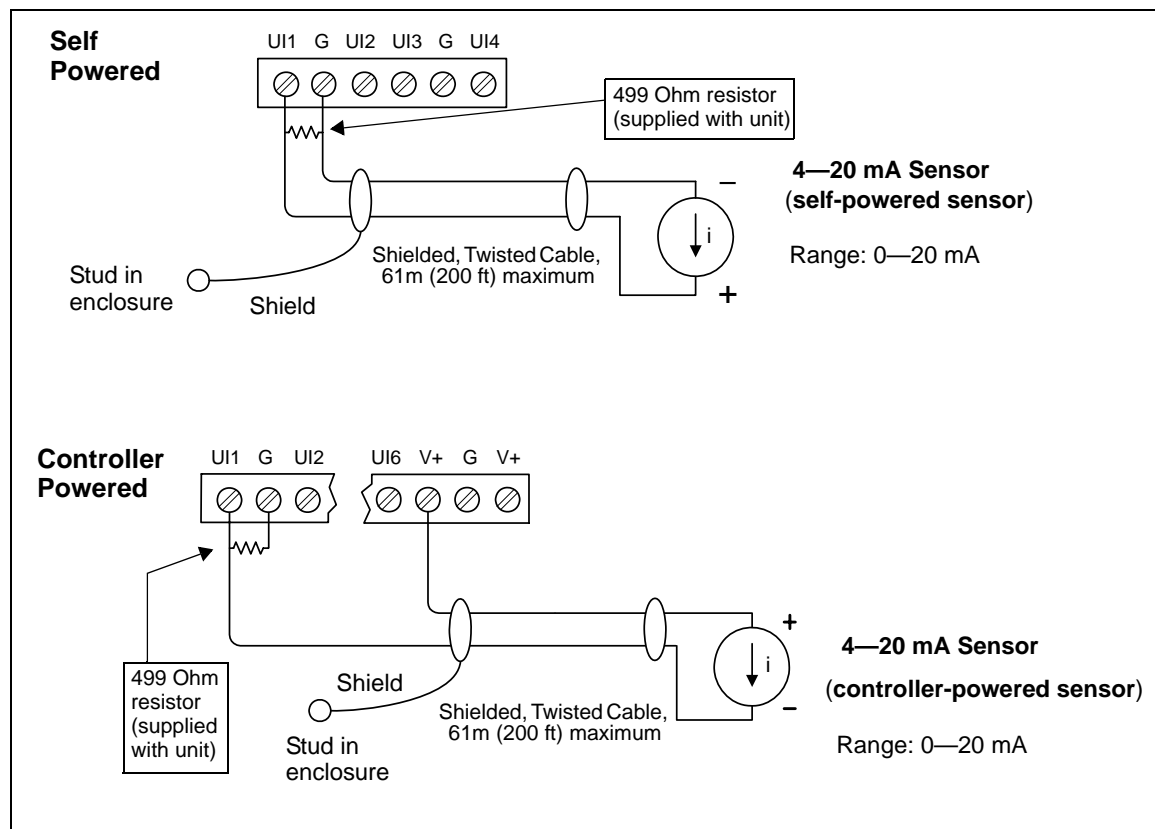
**Figure 5 0–10 Vdc wiring.**

## 4–20 mA

The inputs support self-powered or controller-powered 4–20 mA sensors. For controller-powered sensors, the controller's two V+ terminals supply 20 Vdc, at up to 80 mA combined. Input accuracy is  $\pm 2\%$  of span, without user calibration. The input requires an external 499-ohm resistor for current input (six are supplied with the unit).

Figure 6 shows wiring used for a self-powered sensor (top) and a 2-wire controller-powered sensor (bottom).

Figure 6 4 to 20 mA wiring.



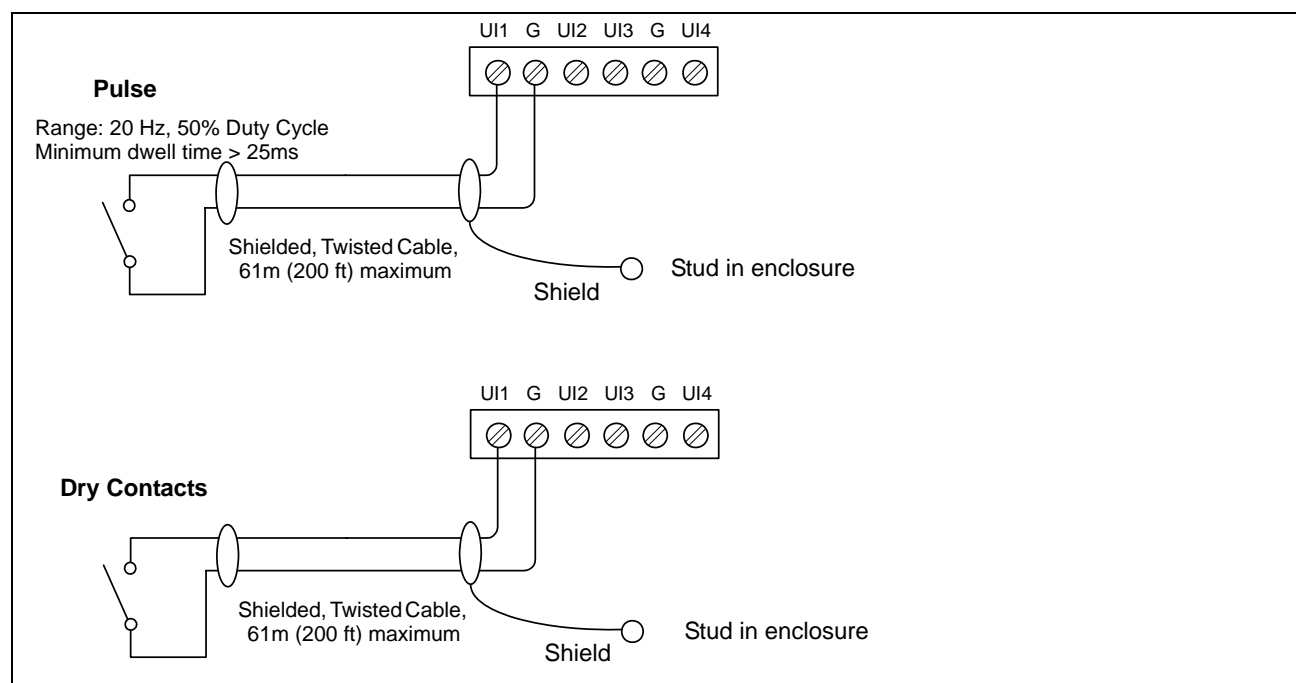
## Binary Input

The inputs support both pulse contacts and normal dry (equipment status) contacts.

- Pulse contacts may have a change-of-state (COS) frequency of up to 20 Hz with a 50% duty cycle.  
**Note:** Minimum dwell time must be  $> 25\text{ms}$ .
- Standard dry contacts must have a 1 Hz. (or less) COS frequency, with minimum dwell time  $> 500\text{ms}$ .

Both types of dry contacts support 3.3 Vdc open circuits or  $330\text{ }\mu\text{A}$  short-circuit current.

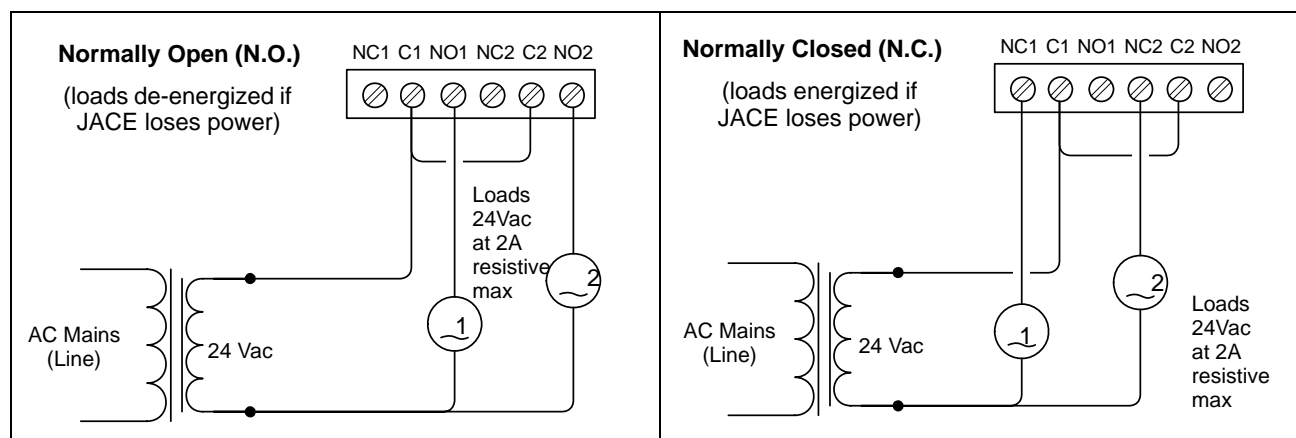
Figure 7 shows the wiring diagram.

**Figure 7 Binary input wiring.**

## Outputs

Four (4) form-C relay outputs provide isolated dry-contact control of 24 VAC/DC loads at up to 2A resistive. An LED indicator for each relay is located between the relay and the wiring connection point (see the “[Relay Output Status](#)” section on page 16).

Figure 8 shows example wiring diagrams.

**Figure 8 Example DO (relay) output wiring.**

## Power Up and Initial Checkout

Ensure power wiring to the transformer has been completed before proceeding (see the [“Power Wiring”](#) section on page 7). The JACE-403 controller does not include an on/off switch. To apply power, insert the 6-position power connector to the board.

Refer to [Figure 2](#) for the locations of the power connector and status LEDs on the JACE-403 controller.

### Checking the Heartbeat LED

When power is first supplied to the controller, the red heartbeat LED will come on solid for approximately 10 seconds, then begin to blink. The blink pattern of the heartbeat LED under normal operation will differ for each installation (depending on station activity). But, in general, the LED should blink about once per second. The rate will be slower when the control engine is executing the station database and as more objects are added.

After applying power to the controller, if the heartbeat LED comes on (steady) and stays lit longer than two minutes, contact Systems Engineering for technical assistance. See also the [“Using Status LEDs”](#) section on page 15.

### About the Battery

The JACE-403 is provided with a sealed lead acid battery, which is nearly fully charged. Therefore, the JACE-403 has battery back up protection immediately upon installation. If battery trouble messages are generated upon power up, contact Systems Engineering for technical support.

For more information on the use and replacement of the battery, refer to the [“Required Battery Maintenance”](#) section on page 16.

## Related Documentation

For more information on configuring and using the JACE-403 controller, consult the following documents:

### JACE-403 with Niagara<sup>AX</sup>

- *JACE NiagaraAX Install and Startup Guide*
- *NiagaraAX Platform User Guide*
- *NiagaraAX Ndio User Guide*
- *NiagaraAX User Guide*

## Using Status LEDs

The JACE-403 controller includes a series of LEDs that can be used to determine the status of a variety of normal operating parameters for the unit. They are located on the circuit board. From the top of the board to the bottom, these include the following:

- [LON \(LonWorks\) Port](#)
- [Ethernet Port](#)
- [Heartbeat](#)
- [Serial Ports](#)
- [Modem](#)
- [Relay Output Status](#)

Refer to [Figure 2](#) on page 6 for the exact locations of status LEDs on the JACE-403 controller.

### LON (LonWorks) Port

Two LEDs are located below the LON port and show transmit and receive activity.

- The **yellow** transmit LED (TxD) indicates that the JACE is *transmitting* a message on the LON trunk.
- The **green** receive LED (RxD) indicates that *another* LonWorks device is transmitting a message.

### Ethernet Port

The Ethernet port has two green LEDs, located below the Ethernet connector.

- The LED marked “100” indicates whether the JACE-403 is operating at 10 Mbps (Ethernet) or 100 Mbps (Fast Ethernet). If the 100 LED is on, the network connection is operating at 100 Mbps. Otherwise, the port is communicating at 10 Mbps.
- The “ACT” LED indicates activity on the port as follows:
  - **Off**—No Ethernet link is made
  - **On**—Ethernet link is present, but no activity on the LAN
  - **Blinking**—Ethernet link is present with data activity on the LAN.

### Heartbeat

The “BEAT” LED is located below the Ethernet status LEDs, and is red. Under normal operation, this LED should blink about once per second. The blink pattern will differ as station activity increases, but any pulse rate from once per second to 10 blinks per minute usually indicates normal control engine activity. If the heartbeat LED stays on constantly or does not light, contact System Engineering for technical support.



#### Caution

During boot-up, the heartbeat LED blinks in a 90% on — 10% off pattern. Do not remove power during this time, or data loss may result (I/O module's firmware upgrade may be in progress).

### Serial Ports

The status LEDs for the serial ports are located below the respective RS-232 and RS-485 ports. They are marked COM1 and COM2 and correspond to the software configuration of the COM ports. They show the transmit and receive information for the serial ports and optional modem.

- The **yellow** transmit LED indicates that the JACE-403 is *sending* data out the serial port over a communications line to a connected device.
- The **green** receive LED indicates that the JACE-403 is *receiving* data from a connected device.

These LEDs are driven by pulse detectors that provide a fixed on-time when data is detected on the port. If the receive LED is on constantly, this indicates a problem with the communications channel, such as a shorted wire or reversed wiring.

## Modem

The modem LED is located directly above the RJ-11 connector for the modem, and is green. When lit, it indicates that the modem is connected to another modem (a carrier is detected). In this case, the serial port LEDs for COM2 should indicate transmit and receive activity—see “[Serial Ports](#)” above.

## Relay Output Status

There are four (4) relay output status LEDs. These are yellow LEDs, with each one located below the associated form-C relay (just above the screw terminals for each output’s wiring).

Under normal operation, a relay status LED indicates activity as follows:

- **Off**—Relay coil is not energized
- **On**—Relay coil is energized

Therefore, for a circuit with a normally open contact, an On status indicates that the contact is closed. For a circuit with a normally closed contact, an On status indicates that the contact is open.

## Maintaining the JACE-403

This section provides information on the following topics:

- [Cleaning](#)
- [Required Battery Maintenance](#)
- [Replacement Parts](#)
- [Replacing the JACE-403 circuit board](#)
- [Returning a Defective Unit](#)

## Cleaning

If dust or metal filings are present inside the unit, clean with vacuum or compressed air. Otherwise, no cleaning inside the unit is required. Optionally, if the outside of the metal enclosure becomes dirty, you can wipe it with a damp cloth and mild detergent.

## Required Battery Maintenance

Battery life expectancy is a function of its discharge cycles (the number of discharges and their depth) and the ambient temperature of the battery during normal operation. In most applications, the battery should see relatively few discharges. Therefore, ambient temperature has more to do with determining the life expectancy of the battery than does any other factor. If the JACE-403 is installed in a conditioned space, the battery should provide dependable service for approximately three years (average). In an environment where the operating temperature is higher (that is, 50°C or 122°F), you should only expect the battery to last approximately one year.



The sealed lead acid battery in the JACE-403 controller is nearly fully charged before shipping. The battery is automatically float-charged during normal operation (while power is applied to the unit). The JACE-403 monitors the battery and periodically loads the battery to test its ability to maintain battery-backed functions. You should investigate any battery trouble message. Check the voltage level and its connections to the unit. Replace the battery as required.

To order a new battery, see the “[Standard Replacement Parts](#)” section on page 18.

## Replacing the Battery



### Warning

**When replacing the battery or harness, maintain proper polarity as marked on the label inside the unit. Although the JACE-403 is fully protected against shorted battery terminals, the battery itself is not internally protected. Use extreme care to not short circuit the battery. A shorted battery may overheat rapidly and damage the power wiring harness or cause other physical harm to the hardware.**

To replace the battery, proceed as follows:

### Procedure 3 Replacing a JACE-403 battery.

- Step 1** Unplug the 6-position power connector. Do not remove the male connector from the wiring harness.
- Step 2** Using a 7 mm (1/4-inch) nut driver, unscrew the lock nut from the bracket that is holding the battery.
- Step 3** Hold the battery in place while you remove the bracket that secures it to the bottom of the unit.
- Step 4** Disconnect the two quick connect terminals on the battery.



### Note

The JACE-403 will lose its time and date settings if it is disconnected from both battery and AC power for more than one hour.

- Step 5** Remove the old battery and recycle as defined by your regional codes. For recycling within the US, see the labelling on the battery.
- Step 6** Connect the quick connect terminals to the new battery. Make sure the RED (+) wire is connected to the positive terminal of the battery and the BLACK (–) wire is connected to the negative terminal.
- Step 7** Secure the new battery to the bottom of the unit with the bracket and tighten the lock nut.
- Step 8** Plug the power connector in and verify normal operation.

## Replacement Parts

Servicing the JACE-403 may call for replacement parts. There are three categories of parts:

- [Non-replaceable Parts](#)
- [Standard Replacement Parts](#)
- [Field Replacement Units](#)

## Non-replaceable Parts

Other than the parts listed in the replacement parts sections, there are no serviceable components on the base assembly.

### Memory

Any addition, modification, or replacement of memory components requires software configuration and is not a field upgrade. For additional information on modifying the memory capacity of the JACE-403, consult your regional Tridium office.

### Fuses

The JACE has two 250V, 2.5A delay (series 372) fuses on the printed circuit board. These fuses are Wickman F015-2.5A250V fuses. However, on-board power circuit protection is not user-serviceable. If this circuitry is suspect, contact your regional Tridium office for technical support. See the [“Returning a Defective Unit”](#) section on page 21.

## Standard Replacement Parts

Standard replacement parts are listed in [Table 4](#) and can be ordered from stock without restriction. Standard replacement parts cannot be returned for credit and should be disposed of in an appropriate manner.

**Table 4** Standard replacement parts.

| Part Number | Description   |
|-------------|---|
| 10023       | Battery, 12 Vdc, 1.2 AH (see <a href="#">“Replacing the Battery,”</a> page 17.)             |
| 10026       | LON (LonWorks) Trunk Connector Plug, 2-position   |
| 10140       | RS-485 connector plug, 3-position   |
| 10139       | I/O connector plug, 6-position  |
| 10149       | Resistor, 499 ohm, 1%, 0.6w   |
| 10138       | Battery/ground harness (also includes 6-position power connector)                           |
| 10148       | Adapter, RJ-45 to DB-9 null modem, for serial port to connect to DTE device                 |
| 10180       | Silver satin patch cable, 4 feet (used between adapter and serial port)                     |
| 10181       | Silver satin patch cable, 10 feet (used between adapter and serial port)                    |
| 10182       | Silver satin patch cable, 25 feet (used between adapter and serial port)                    |
| MDM-403     | On-board auto dial/auto answer 56k modem (see <a href="#">“Replacing the Modem,”</a> below) |

## Replacing the Modem



### Caution

Before handling board components, discharge any accumulated static by touching the metal surface of the JACE. For more information, see the [“Static Discharge Precautions”](#) section on page 3.

To replace the modem, proceed as follows:

### Procedure 4 Replacing the on-board modem.

- Step 1** Open the cover of the unit.
- Step 2** Unplug the 6-position power connector. Do not remove the male connector from the wiring harness.

**Step 3** Unplug the RJ-11 telephone wire from the modem's RJ-11 connector.

**Step 4** Remove the old modem as follows:

- a. Locate the on-board modem (see [Figure 2](#) on page 6) and note the following:
  - Orientation of the sockets for the pins on the modem. The sockets are two parallel lines. The socket for pin 1 (noted on [Figure 2](#)) is the left-most pin on the bottom line.
  - Orientation of the writing on the modem. Writing on the replacement modem will be the same.
- b. Place the blade of a flat-blade screwdriver under the left end of the modem between the pin sockets.
- c. Gently pry the modem up about 3 mm (1/8th inch).



**Caution** Do not try to completely remove the modem with this step. Doing so may damage the pins.

- d. Place the blade of the screwdriver under the right end of the modem and gently pry the modem up about 3 mm (1/8th inch).
- e. Repeat steps b–d until the modem is out of its socket.

**Step 5** Insert a new modem as follows:

- a. Locate pin 1 on the modem. If you are reading the writing on the modem, pin 1 is the first pin in the lower left corner. It is marked with a small black dot on the top of the modem.
- b. Locate the socket for pin 1 on the board (see [Figure 2](#)).
- c. Orient the modem so that pin 1 of the modem is over the socket for pin 1.



**Tip** Use the white trace lines on the board to help you align the modem. When the modem is correctly aligned, the trace lines will outline the modem completely.

- d. Push the modem into the sockets using your thumbs. All pins should be properly inserted.

**Step 6** Plug the RJ-11 telephone wire into the modem's RJ-11 connector.

**Step 7** Plug the power connector in and verify normal operation.

## Field Replacement Units

To replace a faulty unit, order from the field replacement units (FRUs) listed in [Table 5](#). An FRU consists of only the JACE-403 circuit board, without connector plugs.



- Notes**
- When ordering, you must specify whether the JACE-403 is running Niagara<sup>AX</sup> or Niagara r2.3.x.
  - To replace a faulty modem, order it using the part number listed in [Table 4](#), and see the “[Replacing the Modem](#)” section on page 18.

FRU parts can be ordered from stock, but the replaced circuit board (removed from the JACE-403) must be returned to your regional Tridium office for credit.



- Notes**
- Before ordering an FRU, it is strongly recommended that you contact your normal technical support resource to eliminate the possibility of a software issue or mis-configuration problem.
  - Be sure to contact Tridium for a return authorization (RA) number (see [“Returning a Defective Unit,”](#) page 21) before shipping an item for return credit or repair. To allow proper licensing of the replacement unit, please have information ready about the existing unit, including its serial number, model number, and license information, when placing the order.

**Table 5** Field replacement units for JACE-403.

| Part Number   | Description   |
|---------------|---|
| R-JACE-403-AX | Circuit board, JACE-403 or JACE-403-I, Niagara AX     |
| R-JACE-403-R2 | Circuit board, JACE-403 or JACE-403-I, Niagara r2.3.x |

## Replacing the JACE-403 circuit board



- Caution**
- Be aware of small surface-mounted components on the circuit board near each mounting point! Use a 1/4" (7mm) thin-walled socket, **not a nut driver**, to carefully loosen or tighten the nuts that secure the JACE-403 circuit board to the 7 mounting studs. A **nut driver** invariably **causes board damage** to adjacent components, while a socket (if used carefully) typically does not.
  - Retain and reuse metal spacers on all mounting studs (between the board's back and enclosure).
  - Before handling circuit boards, discharge any accumulated static by touching the metal surface of the JACE-403. For details, see the [“Static Discharge Precautions”](#) section on page 3.

To replace the JACE-403 circuit board with an FRU circuit board in the field, proceed as follows:

### Procedure 5 Replacing an FRU circuit board.

- Step 1** Using the appropriate Niagara software tool, back up the station database to your PC.
- Step 2** Open the cover of the unit.
- Step 3** If any of your I/O points have voltage, turn the devices off or disconnect power to them.
- Step 4** Turn off building power to the unit. The unit should power down automatically.
- Step 5** Unplug the 6-position power connector from the board.
- Step 6** Note positions of all communications and I/O connectors going to the circuit board. If necessary, label connectors to avoid mis-connection later (after circuit board is replaced).



**Note** The software that runs on the unit expects the terminal positions to be the same to collect data from or to control the attached devices.

- Step 7** Unplug all Ethernet, serial, LON, modem, and I/O connectors from the circuit board.

- Step 8** Using a 1/4" socket (see previous [Caution](#) •), carefully remove and retain the seven 1/4" nuts securing the circuit board. Be mindful of small surface-mount components located near board mounting points.
- Step 9** Remove the circuit board.  
Make sure that metal spacers (behind the board) remain on the seven mounting studs.
- Step 10** Replace the FRU circuit board on the mounting studs and spacers, carefully securing with the seven 1/4" nuts. Again, be mindful of small surface-mount components located near board mounting points.
- Step 11** Turn on building power to the unit.
- Step 12** Plug the 6-position power connector in and verify normal operation.
- Step 13** Reconnect any Ethernet, serial, LON, and modem connectors.
- Step 14** Reconnect all I/O connectors.
- Step 15** If any of your I/O points have voltage, turn the devices back on, or reconnect power to them.
- Step 16** Using the appropriate Niagara software tool, re-commission the JACE-403, including the following:
- Install the correct Niagara release and set the date and time.
  - Install the new license file.
  - Restore the station database and start the station.
- 

## Returning a Defective Unit

For proper credit on the returned unit, ship the defective module to Tridium within 30 days.

Prior to returning the unit, contact one of the following Tridium offices to obtain a return authorization (RA) number and other instructions. Please provide:

- Product model
- Serial number
- Project currently licensed to
- Nature of the defect
- Whether running Niagara<sup>AX</sup> or Niagara r2.3.x

### United States

**Phone:** 804-254-7086, ext. 11

**Return to:**

Tridium, Inc.  
2256 Dabney Road, Suite C  
Richmond, VA 23230  
Attn: Return Department RA# \_\_\_\_\_

### Europe

**Phone:** +44 (0) 1403 740290

**Fax:** +44 (0) 1403 741804

## Federal Communications Commission (FCC)

**Return to:**

Tridium Europe Ltd  
 1, The Grainstore  
 Brooks Green Road  
 Coolham  
 West Sussex  
 RH13 8GR  
 United Kingdom  
 Attn: Return Department RA# \_\_\_\_\_

**Email for technical support:**

[supportuk@tridium.com](mailto:supportuk@tridium.com)

**Email for product orders:**

[ordersuk@tridium.com](mailto:ordersuk@tridium.com)

**Asia/Pacific**

**Phone:** +65 6887 5154

**Fax:** +65 6887 5342

**Mobile:** +65 9665 6024

**Address:**

Tridium Asia Pacific Pte Ltd  
 101 Cecil Street,  
 #10-11, Tong Eng Building,  
 Singapore 069533  
 Attn: Mr Lim Hoon Chiat, Engineering Manager RA# \_\_\_\_\_

**Email for technical support:**

[hclim@tridium.com](mailto:hclim@tridium.com)

**Sales:** (Australia): **Phone:** +61 7 5539 1211

**Fax:** +61 7 5597 2334

(Japan): **Phone:** +81 044 829 1750

## Certifications

### Federal Communications Commission (FCC)

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference with radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case, users at their own expense will be required to take whatever measures may be required to correct the interference. Any unauthorized modification of this equipment may result in the revocation of the owner's authority to continue its operation.

### Canadian Department of Communications (DOC)



**Note** This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.



**Note** Cet appareil numerique de la classe A respecte toutes les exigences du Reglement sur le material brouilleur du Canada.

# Declaration of Conformity

## JACE-403 JACE-403I

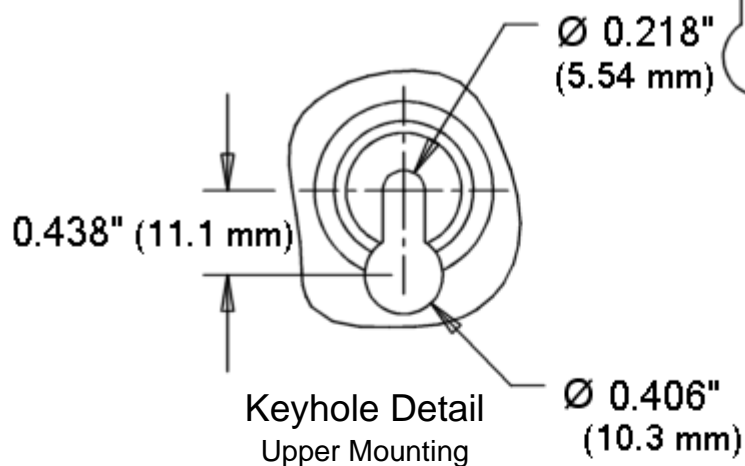
|  |  |  |
|--|--|--|
| <b>Application of Council Directive:</b> | 89/336/EEC, 92/31/EEC, 73/23/EEC, 93/68/EEC  |  |
| <b>Manufacturer's Name:</b>              | Tridium, Inc.  |  |
| <b>Manufacturer's Address:</b>           | 3951 Westerre Parkway, Suite 350<br>Richmond, Virginia 23233<br>United States of America   |  |
| <b>Manufacturer's Representative:</b>    | Terry Casey, President<br>Tridium Europe Ltd<br>1, The Grainstore<br>Brooks Green Road<br>Coolham, West Sussex, RH13 8GR<br>United Kingdom |  |
| <b>Product Model Number:</b>             | JACE-403I and JACE-403I-UI   |  |
| <b>Type of Equipment:</b>                | Information Technology Equipment   |  |
| <b>EMC Standards Applied:</b>            | <b>EN 50081-1:</b>   | <b>Emissions</b>                       |
|  | EN 55022   | Power Line Conducted Emissions         |
|  | EN 55022   | Electric Field Radiated Emissions      |
|  | <b>EN 55082-1:</b>   | <b>Immunity</b>                        |
|  | EN 61000-4-2   | Electro-Static Discharge               |
|  | EN 61000-4-3   | Radiated Field Immunity                |
|  | EN 61000-4-4   | Electrical Fast Transient Immunity     |
|  | EN 61000-4-5   | Surge Immunity                         |
|  | EN 61000-4-6   | Power Line Conducted Immunity          |
|  | EN 61000-4-11  | Voltage Dips                           |
|  | EN 61000-4-11  | Voltage Interrupts                     |
|  | IEC 61010-1  | Safety, Requirements Electrical Equip. |

I, **Terry Casey**, hereby declare that the equipment specified above conforms to the above Directives and Standards.

Place: Coolham, West Sussex, United Kingdom

May, 2002

Position: President, Tridium Europe Ltd.



## JACE-403 Mounting Guide

9.84" or  $9\frac{27}{32}$ "  
(250 mm)



Mount with this end up.

**Note:** Electronic and printed versions of this guide may not show the mounting guide to scale. Verify all measurements before drilling.

Lower mounting holes are 0.221" (5.61 mm) dia.

5.94" or  $5\frac{15}{16}$ "  
(151 mm)

