



## ENC-001 & ENC-002

### Enclosure Install Guide

This document covers the mounting and wiring of Vykon<sup>®</sup> ENC-series enclosures for housing the JACE-200 or JACE-600 series controller (JACE-2/6) and its expansion modules. It assumes you are an engineer, technician, or service person who is performing system design or installation. Instructions apply to the following models:

Models	Description	Thumbnails	
ENC-001	Small-sized enclosure (12" x 18" x 4") with integral DIN-rail, 24Vac, 40VA transformer, AC convenience outlet, removable door. Accommodates a JACE-2/6 controller and one IO-34, or a JACE-2/6, IO-16, and NPB-PWR.	ENC-001	ENC-002
ENC-002	Large-sized enclosure (12" x 28" x 4") with integral DIN-rail, 24Vac, 40VA transformer, AC convenience outlet, removable door. Accommodates a JACE-2/6 controller and up to four IO-16 and an NPB-PWR, or other possible combinations.		
ENC-BKP-1	Perforated backplate panel (8" x 11").	Optional backplate panel may be installed if ENC-002 is to house user-supplied ancillary items such as relays or other devices.	
ENC-BKP-2	Perforated backplate panel (11" x 11").		

These are the main topics included in this document:

- [Product Overview](#), page 2
- [Preparation](#), page 2
- [Precautions](#), page 3
- [Installation Summary](#), page 4
- [Pre-Installation](#), page 4
- [Mounting and Dimensions](#), page 7
- [Power Wiring](#), page 10
- [Mounting Devices on the DIN Rail](#), page 13
- [Grounding Devices and Connecting Power](#), page 14
- [Replacement Parts](#), page 15



- Notes**
- Separate documents cover the mounting and wiring of JACE-200 and JACE-600 series controllers (including the NPB-PWR and NPB-PWR-UN power supply modules), as well as documents for JACE-2/6 I/O expansion modules. See [“Related Documentation,”](#) page 2.
  - All certifications and listing information related to a JACE-2/6 controller can be found in its mounting and wiring document.



See [“UL Listing,”](#) page 15.

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## Product Overview

The ENC series includes two different enclosures used to house JACE-200 or JACE-600 (JACE-2/6) systems:

**ENC-001:** Small enclosure is 18-gauge steel, at 12" wide x 18" tall x 4" deep enclosure with a single DIN rail. DIN rail is mounted vertically. Small enclosure will hold one JACE-2/6 and one IO-34 module.

**ENC-002:** Large enclosure is 16-gauge steel, 12" wide x 28" tall x 4" deep enclosure with a single DIN rail, also mounted vertically. Large enclosure will hold one JACE-2/6, an NPB-PWR-UN, and up to four IO-16 modules.

If space permits, an optional perforated backplate: **ENC-BKP-1** (8" x 11") or **ENC-BKP-2** (11" x 11") may be installed if the enclosure is to house user supplied ancillary equipment such as relays or other control devices. For more details, see [“Install perforated backplate panel \(optional, ENC-002 only\)”](#) on page 8.

## Common Enclosure Features

Both enclosures (ENC-001 and ENC-002) provide the following features

- Construction of 18- or 16-gauge steel, hinged door with lift-off hinges, numerous ½" and ¾" conduit knockouts, thumbscrew door latch, with hasp to place a user-supplied padlock if desired.
- Wiring compartment with 5A switch/circuit breaker and single 115V AC receptacle (NEMA 5-15R) for test equipment, and a 40 VA, 24V transformer. The switch/breaker is for JACE equipment only. The AC receptacle is not controlled or protected by switch/breaker in the unit, and is rated for 5A maximum load.
- Units are designed for 120Vac service only.
- Provided 40 VA transformer may be used to power a user-provided IO-34 or NPB-PWR power supply.
- Transformer is not used for applications where a user-supplied NPB-PWR-UN supply is provided.
- JACEs, IO-16s, IO-34s, NPB-PWR, and NPB-PWR-UN lock on the DIN rail with #6-32 screws (provided). DIN rail clips are not necessary.
- Units are designed to accept Panduit G1X1.5LG6-1 wiring duct for cable management (Panduit with external cross-section dimensions of 1.25" wide x 1.63" high, with cover C1.5LG6 in place).

## Related Documentation

For more information on mounting and wiring a JACE-2/6 and expansion modules, refer to these documents:

- *JACE-2 Mounting & Wiring Instructions* (includes NPB-PWR, NPB-PWR-UN mounting/wiring details)
- *JACE-6 Mounting & Wiring Instructions* (includes NPB-PWR, NPB-PWR-UN mounting/wiring details)
- *IO-16 Installation and Configuration Instructions*
- *IO-34 Installation and Configuration Instructions*

## Preparation

Unpack the ENC-001 or -002 unit 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 the “Returning a Defective Unit” section in the JACE-2/6 mounting and wiring guide.

See the following sections: [“Included in this Package”](#) and [“Material and Tools Required.”](#)

## Included in this Package

Included in this package you should find the following items for an [ENC-001](#) or [ENC-002](#), or for backplates [ENC-BKP-1](#) or [ENC-BKP-2](#).

### ENC-001 or ENC-002

- an ENC-001 or -002 metal enclosure with removable hinged door, and permanently mounted DIN rail, containing these pre-installed items:
  - a 40VA, 24V secondary / 120V primary transformer, pre-wired to a switch/circuit breaker and a terminal block for AC line input. A two-wire pigtail cable is connected to the transformer secondary.
  - AC convenience outlet (5A maximum rating) on wiring compartment cover.
- a hardware bag, containing #6-32 x ¼" screws, #6-32 keps nuts, one wire mounting clamp (for AC wire), a section of split loom tubing, and tie wraps.
- this document, *ENC-001 or -002 Enclosure Install Guide*, Part Number 10847

### ENC-BKP-1 or ENC-BKP-2

- a perforated backplate panel.
- four #6-32, 3/8" hex male-to-female standoffs.
- four #6-32 keps nuts.
- this document, *ENC-001 or -002 Enclosure Install Guide*, Part Number 10847

## Material and Tools Required

The following supplies and tools are required for installation:

- Suitable tools and supplies for mounting enclosure, JACE-2/6 and expansion modules, and for making all wiring terminations. A ¼" nut driver can be used to fasten all screws and keps nuts included with the unit.
- If using Panduit inside enclosure, suitable length of Panduit part number G1X1.5LG6 and Panduit cover part number C1.5LG6.

## Precautions

This document uses the following warning and caution conventions:



### Caution

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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.

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### Warning

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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.

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## Safety Precautions

The following items are warnings relating to the power supply wiring to an ENC-001 or -002 enclosure. Be sure to heed these warnings to prevent personal injury or equipment damage.



### Warning

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- **The circuit powering the ENC-001 or -002 is 115Vac at 60 Hz. Disconnect power before installation or servicing to prevent electrical shock or equipment damage.**
  - **The 115Vac convenience outlet on the enclosure's power wiring shield is rated for a 5A maximum load. Do not exceed this rating with any equipment powered from this outlet.**
  - **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 system 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.**
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## Installation Summary

Installation of an ENC-001 or -002 enclosure is covered in the following main sections:

- [Pre-Installation](#), page 4
- [Mounting and Dimensions](#), page 7
- [Power Wiring](#), page 10
- [Mounting Devices on the DIN Rail](#), page 13
- [Grounding Devices and Connecting Power](#), page 14

After completing these tasks, please refer to the appropriate “Mounting & Wiring” Guide for the devices you are installing in the enclosure. For example, refer to the *JACE-6 Mounting & Wiring Instructions*. See [Related Documentation](#), page 2.

## Pre-Installation

The following pre-installation tasks may be helpful:

- [Removing and replacing the enclosure door](#)
- [Locate and mark mounting holes](#)
- [Locate and remove enclosure knockouts](#)



### Notes

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- If using Panduit inside the enclosure, wait until after mounting the enclosure to the wall before mounting the Panduit track onto the enclosure studs (4" on center) on either side of the enclosure. Otherwise, the Panduit will interfere with access to the 4 main mounting holes.
  - Also wait until after mounting the enclosure before installing an optional ENC-BKP-1 or ENC-BKP-2 backplate at the enclosure's bottom. For more details, see the “[Install perforated backplate panel \(optional, ENC-002 only\)](#)” section on page 8.
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## Removing and replacing the enclosure door

The door on an ENC-001 or -002 enclosure is removable. It is often convenient to remove the enclosure door before other mounting and wiring. This also provides a lighter unit for initial mounting to the wall.



**Note** A short, green, grounding wire is pre-attached inside the enclosure, near the bottom left side. One end is shipped fastened to the back wall (to speed door removal). After replacing the door, *move that wire end to the door*—remove the #6-32 keps nut, move the wire end to the screw post inside the door, and refasten..

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### Procedure 1 Removing the door of a ENC-001 or -002 enclosure.

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- Step 1** Open the door about half way.
  - Step 2** If the green grounding wire near the bottom is fastened to the screw post on the inside of the door, remove the #6-32 keps nut from the post and set aside. Pull the grounding wire free from the door.
  - Step 3** Slide the door toward the top of the unit, until the hinge tabs on the door clear the hinge pins on the enclosure.
  - Step 4** Lift the door away from the enclosure.
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### Procedure 2 Replacing the door of a ENC-001 or -002 enclosure.

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- Step 1** Align the hinge tabs on the door above the hinge pins on the left wall of the metal casing.
  - Step 2** Slide the door toward the bottom of the unit, until the door hinge tabs fully seat onto the hinge pins.
  - Step 3** Near the bottom of the enclosure, slide the green grounding wire onto the door's screw post and fasten with a #6-32 keps nut. See [Figure 2](#) on page 7 (ENC-001) or [Figure 3](#) on page 8 (ENC-002).
  - Step 4** Close the door and latch, if necessary.
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## Locate and mark mounting holes

The ENC-001 or -002 enclosure has four main mounting holes on its back wall—the upper two holes are keyhole types. It is often convenient to mark the location of the mounting holes in the wall before beginning other enclosure assembly.

### Procedure 3 Locate and mark enclosure mounting holes.

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- Step 1** With the enclosure door opened or removed, position the enclosure on the wall in the location where it will be installed.



**Note** See [Figure 2](#) on page 7 (ENC-001) or [Figure 3](#) on page 8 (ENC-002) for locations and dimensions of enclosure mounting holes.

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- Step 2** Carefully mark the mounting hole locations, and remove the enclosure.
  - Step 3** Drill the needed pilot holes in the wall, for example to install wall anchors (if needed), and install wall anchors if used. For example, drill 5/16" holes for wall anchors.
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Locate and remove enclosure knockouts

## Locate and remove enclosure knockouts

The ENC-001 or -002 enclosure has numerous knockouts on the top, sides, and bottom (see [Figure 1](#)). Locate and remove any knockouts required for conduit and cabling entering the unit, before mounting it to the wall. In addition, install the appropriate conduit or cable clamps to the removed knockouts.

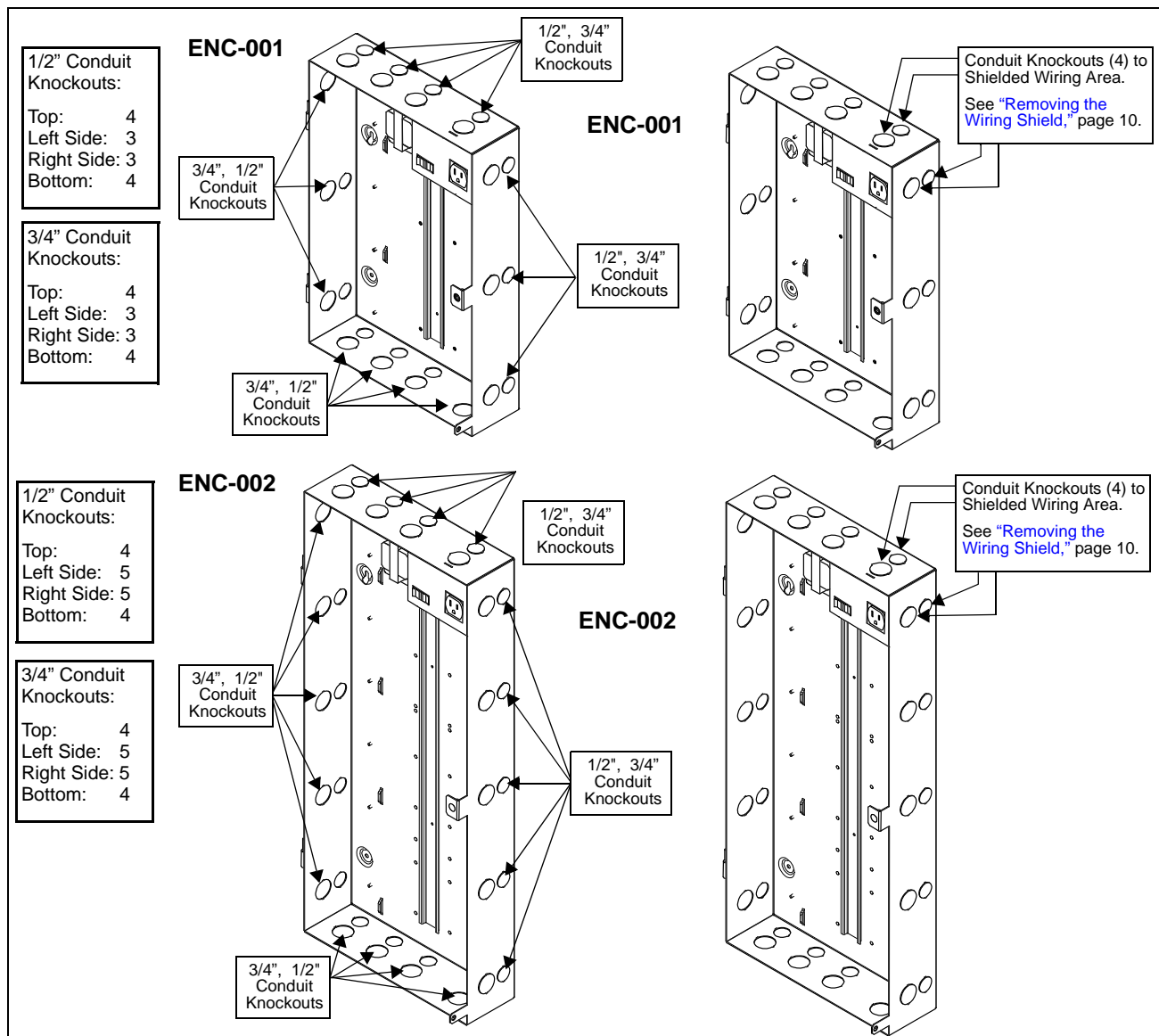
### Procedure 4 Locate and mark enclosure mounting holes.

**Step 1** Depending on which direction the conduit and cabling will be brought to the enclosure, remove the appropriate knockouts. Note that four (4) knockouts are available going into the shielded wiring area.

**Step 2** Install the appropriate conduit or cable clamps in the knockout holes.

[Figure 1](#) provides the locations of knockouts in both the ENC-001 and ENC-002 enclosure models. Two knockout sizes are used: 0.95" for 1/2" conduit, and 1.20" for 3/4" conduit.

**Figure 1 Knockout numbers and locations for ENC-001 and ENC-002 enclosures.**



## Mounting and Dimensions

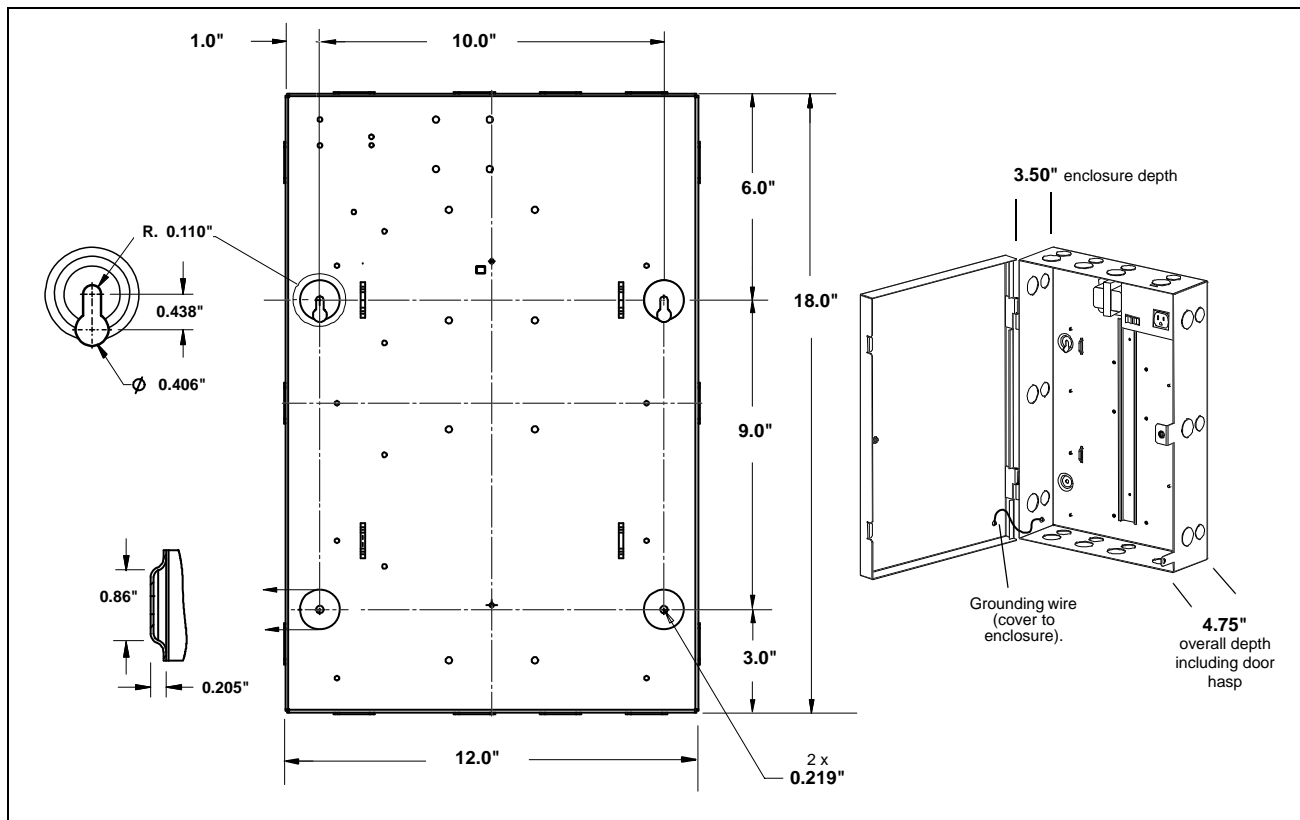


**Note** Mount the ENC-001 or -002 enclosure in an indoor location only. For further environmental requirements, see the “Mounting” section in the *JACE-6 Mounting & Wiring Instructions* document or the *JACE-2 Mounting & Wiring Instructions* document.

Following [pre-installation](#) tasks, the enclosure is ready for wall mounting. Install fasteners in all 4 mounting holes, tightening securely. For example, if wall anchors were installed in 5/16" holes, use four #14 anchor bolts, or other appropriate fasteners, as needed to securely fasten. After mounting, replace the enclosure door if still removed, see [“Removing and replacing the enclosure door,”](#) page 5.

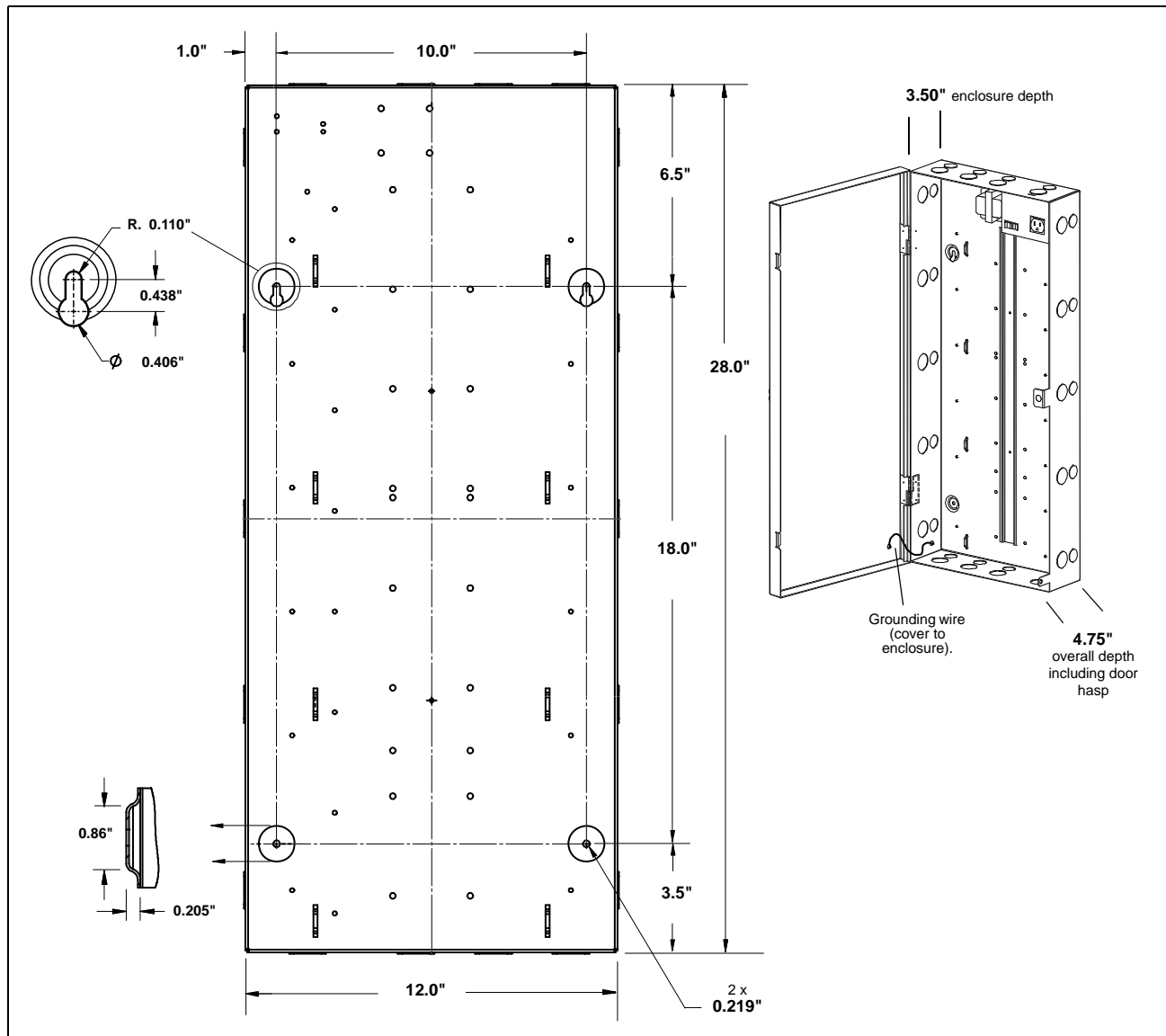
- See [Figure 2](#) for ENC-001 enclosure wall mounting dimensions.
- See [Figure 3](#) for ENC-002 enclosure wall mounting dimensions.

**Figure 2** ENC-001 enclosure wall mounting details.



Install perforated backplate panel (optional, ENC-002 only)

Figure 3 ENC-002 enclosure wall mounting details.



## Install perforated backplate panel (optional, ENC-002 only)

If sufficient room is available in the bottom of an ENC-002 (apart from what is used by the JACE and any attached modules), you can install one of the two available backplate panels. Auxiliary gear such as relays or transducers can then be mounted to the backplate using #8 x 3/8" self-taping sheet metal screws (not provided).

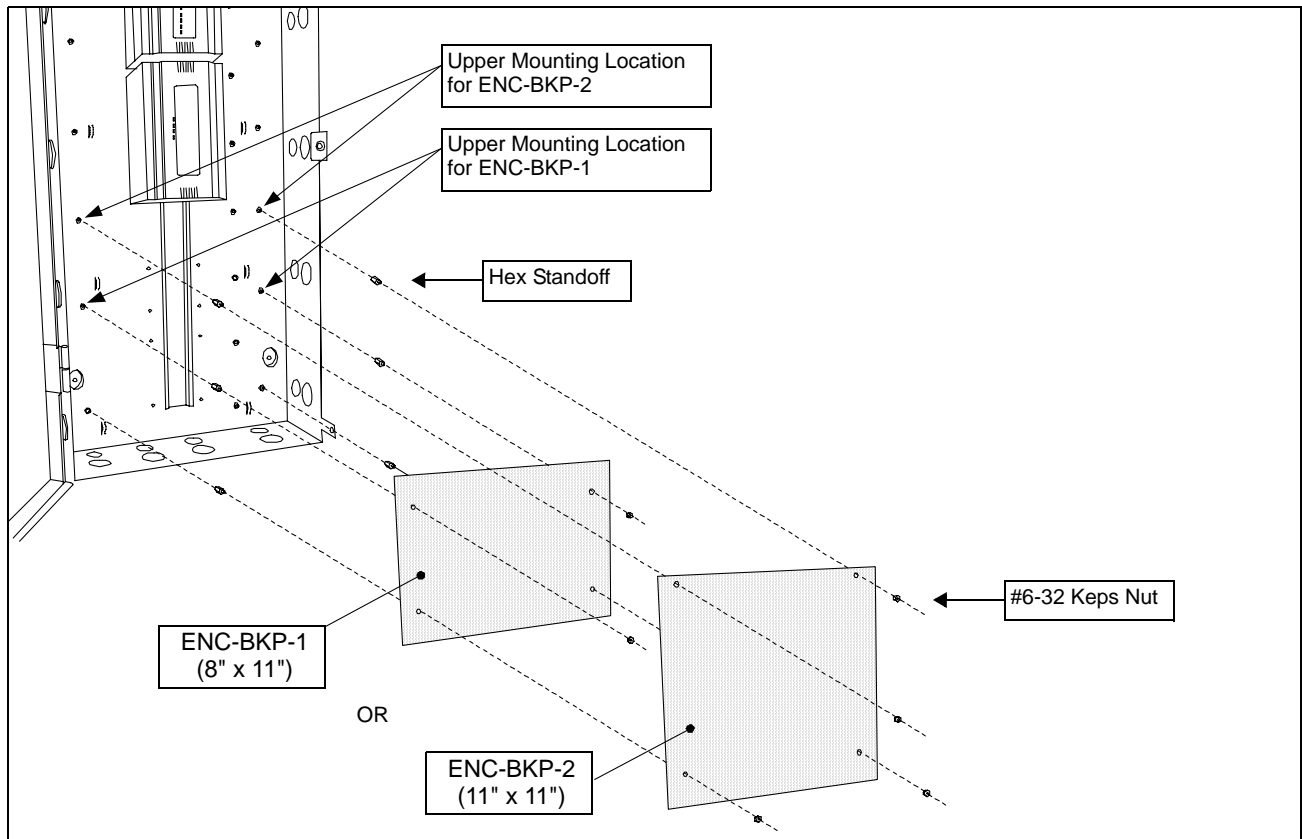
The two backplate panel options are:

- ENC-BKP-1 (8" x 11"): Space available if installing a maximum of JACE-2/6, an IO-34, and *one* IO-16 module in the ENC-002 (requires minimum bottom clearance of 8.5").
- ENC-BKP-2 (11" x 11"): Space available if installing a maximum of JACE-2/6 and an IO-34 module in the ENC-002 (requires minimum bottom clearance of 11.5").



**Procedure 5 Install optional ENC-BKP perforated backplate panel.**

- Step 1** At the bottom back of the ENC-002 enclosure, fasten the four male-to-female hex standoffs on the appropriate enclosure studs, as shown in [Figure 4](#).
- Step 2** Position the ENC-BKP-1 or ENC-BKP-2 backplate onto the threaded studs of the standoffs, and fasten securely with the four provided #6-32 keps nuts.
- Following all other enclosure installation and mounting of the JACE and expansion modules, install auxiliary gear as needed onto the backplate.

**Figure 4 ENC-BKP-1 and ENC-BKP-2 backplate mounting details.**

## Power Wiring

The ENC-001 or -002 enclosure comes pre-wired with a 24Vac, 40VA transformer with a combination circuit breaker/switch on the transformer primary side, to allow shutting down of connected 24V equipment for service. In addition, an un-switched 115V convenience outlet is provided. The secondary (24V) side of the transformer is pre-wired with a pigtailed two-lead harness for connection to the 24V module powering the JACE-2/6.



### Warning

**Input voltage is 115Vac only. Disconnect power to this circuit before installation to prevent electrical shock or equipment damage.**



### Caution

The 115V convenience outlet is rated for a 5A maximum load. Do not exceed this rating with any devices (service equipment, etc.) powered from this outlet.

The following sections provide more details:

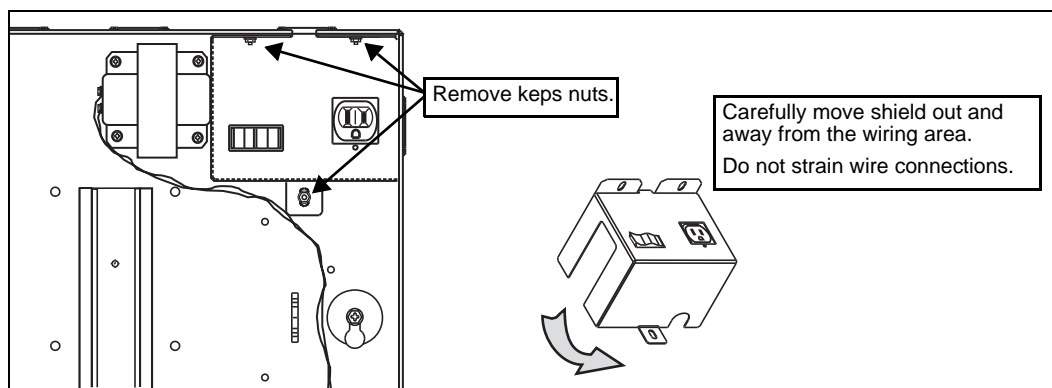
- [Removing the Wiring Shield](#)
- [Earth Grounding](#)
- [Connecting the 120Vac Power Circuit](#)
- [Re-routing wiring for 120V module \(NPB-PWR-UN\)](#)

## Removing the Wiring Shield

The wiring shield is fastened by mounting tabs and three keps nuts. The nuts are screwed on enclosure studs, two that extend down from the top, and one from the back below the wiring shield area ([Figure 5](#)).

Use a 1/4" nutdriver to remove the three keps nuts, and set them aside.

**Figure 5** Power wiring shield for ENC-001 or -002 enclosure.



Carefully move the shield out and away from the power wiring area. Being careful not to strain any wires.



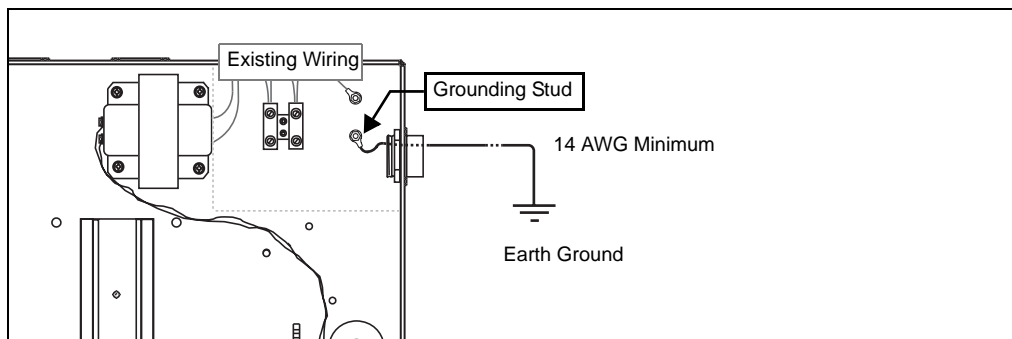
### Note

To replace the wire shield when finished, first carefully stuff all contained wiring back in the wiring area, then replace the shield assembly and refasten the three keps nuts previously removed.

## Earth Grounding

Inside the wiring area, locate the grounding stud (Figure 6). Connect to a nearby earth ground, using 14 AWG or larger wire.

**Figure 6** Connect nearby earth ground to grounding stud in power wiring area.



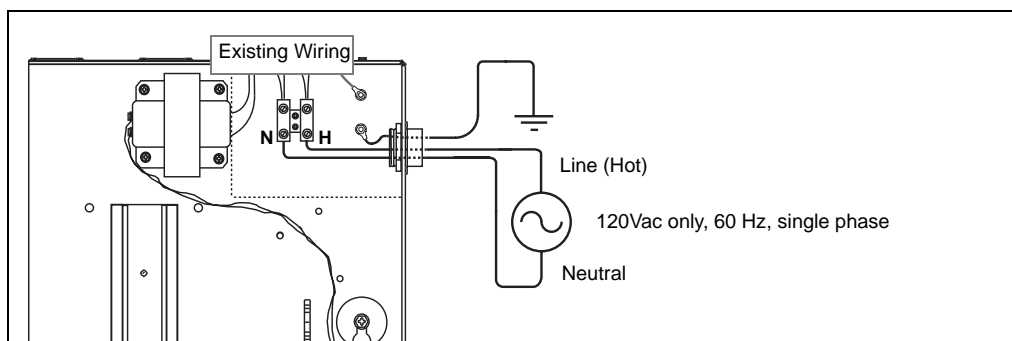
Also, ensure that the cover of the enclosure has its grounding wire connected. See the [Note](#) in “[Removing and replacing the enclosure door,](#)” page 5.

Later, after mounting the JACE-2/6 controller and any DIN-mounted modules, you must connect the earth ground wire of each device to *other* enclosure studs (located outside of the shielded area). See “[Grounding Devices and Connecting Power,](#)” page 14.

## Connecting the 120Vac Power Circuit

After [removing the wiring shield](#) and making the [earth grounding](#) termination, connect the 120V line and neutral wires to the two-position screw terminal block. See [Figure 7](#).

**Figure 7** ENC-001 or -002 enclosure power supply connections.



This is the extent of connections required under the shield if using either of the 24V powered modules (IO-34, NPB-PWR). If using either of these modules, replace the shield assembly and refasten using the three keps nuts (see “[Removing the Wiring Shield](#)” on page 10).



**Caution** The supplied transformer is for powering the JACE-2/6 and directly attached modules only. Any other 24Vac powered equipment should be powered from a different source.

If using an NPB-PWR-UN (120V powered) module instead of a 24V powered module, you need to make some additional wiring changes. See the next section “[Re-routing wiring for 120V module \(NPB-PWR-UN\).](#)”

## Re-routing wiring for 120V module (NPB-PWR-UN)

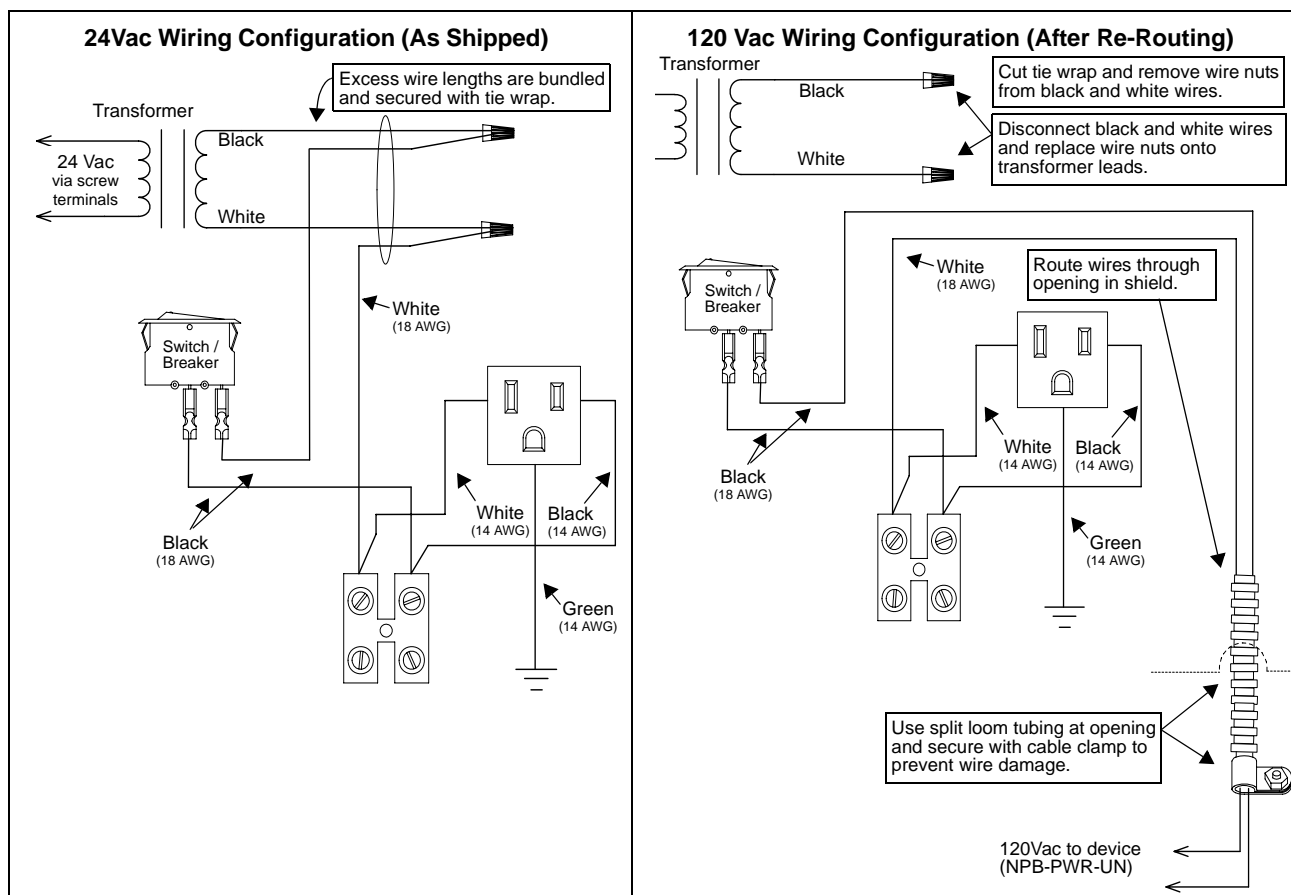
In addition to [removing the wiring shield](#), making the [earth grounding](#) termination, and [Connecting the 120Vac Power Circuit](#), you must re-route the wiring to the transformer primary side to change it to the NPB-PWR-UN input circuit, including the circuit breaker/switch. Do this by removing and replacing two wire nuts, and re-routing wire as shown in [Figure 8](#) and described in [Procedure 6](#).



### Caution

The supplied transformer becomes *disconnected* in this case. Leave the transformer mounted in place, to block access to the 120Vac connections in the power wiring area under the metal shield.

**Figure 8** Schematics of 24Vac wiring (as shipped) and re-routed 120Vac wiring (optional).



### Procedure 6 Re-routing wiring for 120Vac module.

- Step 1** With the wire shield positioned out of the way, carefully cut the tie wrap that bundles the transformer's primary wires (black and white) to the two 18 AWG black and white lead wires.
- Step 2** Remove the two wire nuts connecting the black and white wires, and disconnect the wires so that the 18 AWG black and white lead wires are free.  
Replace the wire nuts onto the black and white primary leads of the transformer (capping each wire).
- Step 3** Route both freed AC lead wires through a piece of split loom tubing and secure with a cable clamp, fastened to the enclosure stud immediately below the shielded wiring area. See [Figure 8](#) above.

- Step 4** Replace the shield cover as previously noted (see “[Removing the Wiring Shield](#)” on page 10). The AC lead wires are now available to power an NPB-PWR-UN, and are connected to the switch in the face of the shield assembly.

## Mounting Devices on the DIN Rail

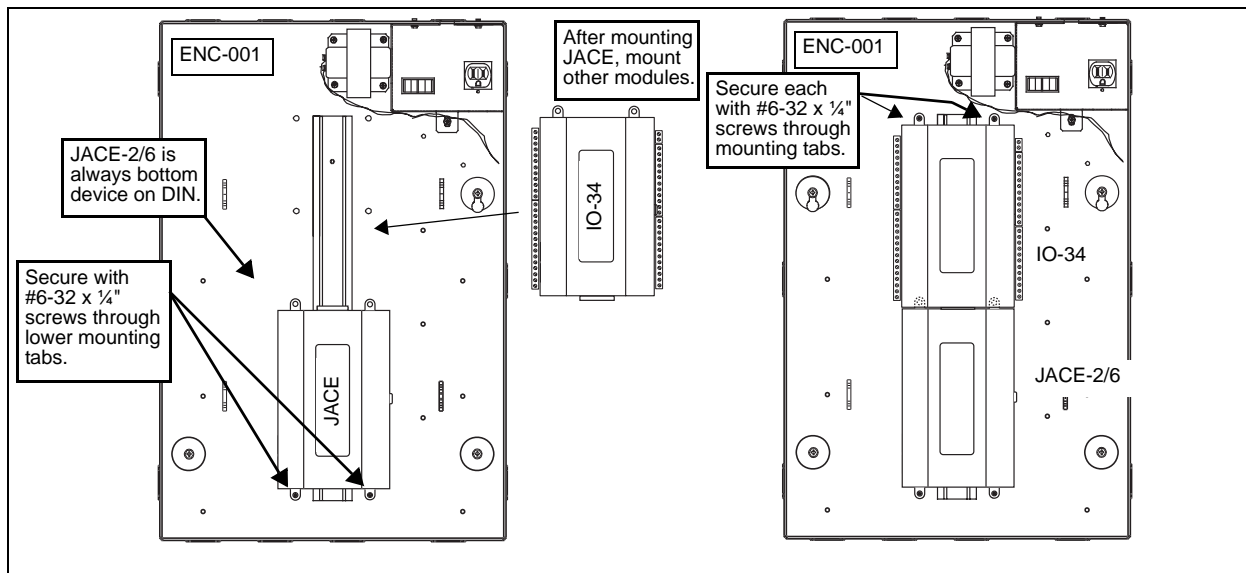


- Notes**
- Before mounting a JACE-2/6 controller in the enclosure, install any communications option cards first. Refer to the mounting and wiring sheet included with any option card.
  - For general DIN mounting details, see the mounting and wiring guide for the JACE and its modules.

In the ENC-001 or -002 enclosure, the JACE-2/6 controller and all attached modules mount on the vertical DIN rail. Each device fastens in place using two #6-32 x 1/4" screws through the mounting tabs of its base, secured into specially-aligned holes in the back of the enclosure (note DIN rail end-clips are *not needed* or used).

As shown in [Figure 9](#), the JACE controller is always mounted first, at the bottom of the module assembly.

**Figure 9** JACE is always bottom device on DIN rail, and first to be secured with screws.



Also note the following:

- The power module (IO-34, NPB-PWR, or NPB-PWR-UN) is always the top device on the DIN rail.
- IO-16 modules, if any, mount in-between the JACE-2/6 and the top-most power module.
- You can fit all (or nearly all) of the devices onto the DIN rail to start, and slide them around as needed. However, because of the way the mounting tabs work, you must *start fastening devices* with the screws starting at *the bottom*, meaning the JACE-2/6 is the *first* device you secure with two screws ([Figure 9](#)). Then, you mate the next module with the JACE, secure it with two screws, and continue to the next module. The last module you secure with the #6-32 x 1/4" screws is top power module (IO-34, NPB-PWR, or NPB-PWR-UN).

## Grounding Devices and Connecting Power



**Note** Complete details on terminating earth ground and supply power are found in the mounting and wiring guides for each JACE controller and expansion module. This section provides an overview, along with notes that apply to mounting in an ENC-001 or -002 enclosure.

See the following subsections: [Grounding wires](#), [Module power](#), [Final Wiring and Startup](#).

### Grounding wires

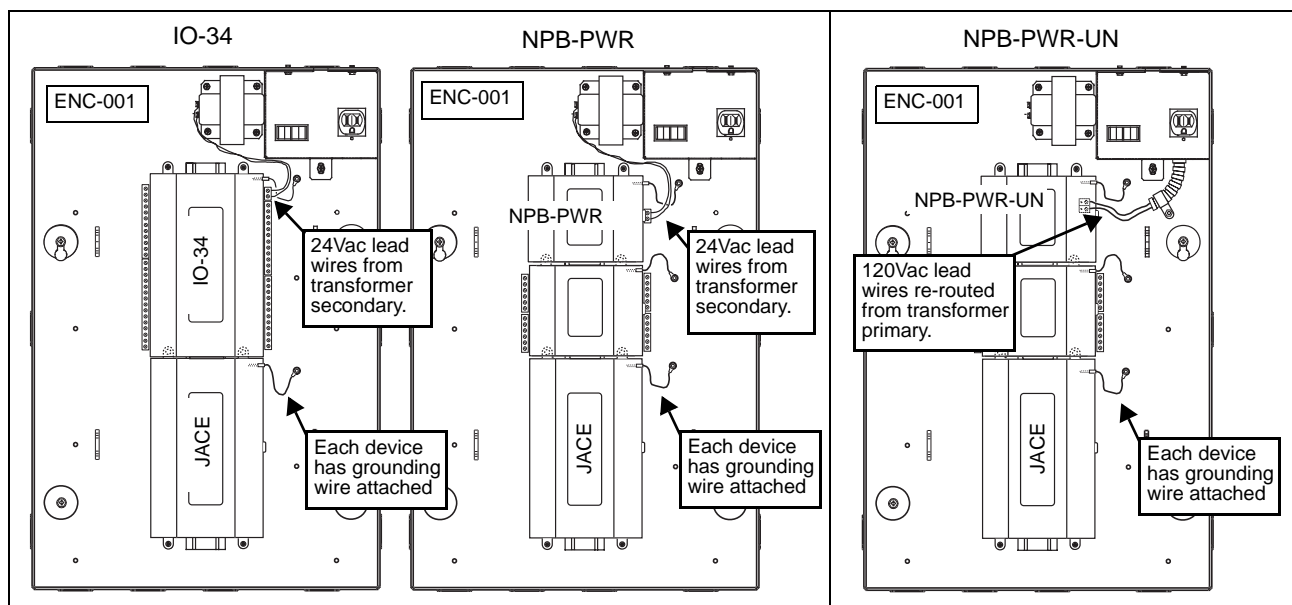
The JACE-2/6 controller *and* any DIN-mount module *each* are shipped with a grounding wire that has a quick-disconnect 0.187" female connector.

To ensure maximum electrical protection, for each device:

- Connect its earth grounding wire to the device's grounding spade lug connector.
- Secure the wire's ringed end to a nearby enclosure stud, using the #6-32 nuts provided.

This provides a suitable ground path via the main earth ground connection to the enclosure. See "[Earth Grounding](#)," page 11 for related details.

**Figure 10** Example grounding wires and power connections to different module combinations.



### Module power

In the ENC-001 or -002 enclosure, the top-most module supplies power to the attached JACE-2/6 controller plus any other chained IO-16 modules. This module is one of the following:

- IO-34 or NPB-PWR: Requires connection to both 24Vac lead wires coming from the transformer secondary (lead wires are pre-connected to the screw terminals on the transformer).
- NPB-PWR-UN: Requires connection to the two re-routed 120Vac lead wires coming from the bottom of the shield assembly. See "[Re-routing wiring for 120V module \(NPB-PWR-UN\)](#)," page 12.

See [Figure 10](#) for examples. Do not connect AC power to the enclosure circuit until other wiring is completed.

## Final Wiring and Startup

After completing termination of [grounding wires](#) and [module power](#) connections, wire all I/O points according to mounting and wiring instructions for each device. Connect any Ethernet and/or other communications cables needed, as described in the appropriate JACE mounting and wiring guide.



**Note** See “[Related Documentation](#),” page 2.

To power up the enclosure, follow [Procedure 7](#) below.

### Procedure 7 Enclosure power startup.

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- Step 1** At the enclosure, switch the circuit breaker/switch to the OFF position.
- Step 2** Energize the 120Vac circuit wired to the enclosure.
- Step 3** At the enclosure, switch the circuit breaker/switch to the ON position to power all connected devices, and monitor the LEDs on devices to verify proper startup.
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## Replacement Parts

Standard replacement parts are listed in [Table 1](#) 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 1** Standard replacement parts.

Part Number	Description
10901	ENC-001 Hardware bag, includes #6-32 keps nuts, 6-32 x 1/4" screws for securing DIN-mounted devices, tie wraps, and one split loom tubing piece and clamp for AC wiring.
10902	ENC-002 Hardware bag, includes #6-32 keps nuts, 6-32 x 1/4" screws for securing DIN-mounted devices, tie wraps, and one split loom tubing piece and clamp for AC wiring.
10846	24Vac 40VA Replacement Transformer, or order Honeywell Tradeline Model AT72D1683 from a local Honeywell supplier.

## UL Listing

Tridium has obtained a UL Listing on ENC-001 and ENC-002 enclosures from Underwriters Laboratories Inc. UL investigation of these enclosures does not include investigation of any equipment or material contained therein. Tridium has obtained separate UL Listings for Vykon products that it ships installed within these enclosures. Please note any user-supplied equipment or material is not covered by this UL Listing.