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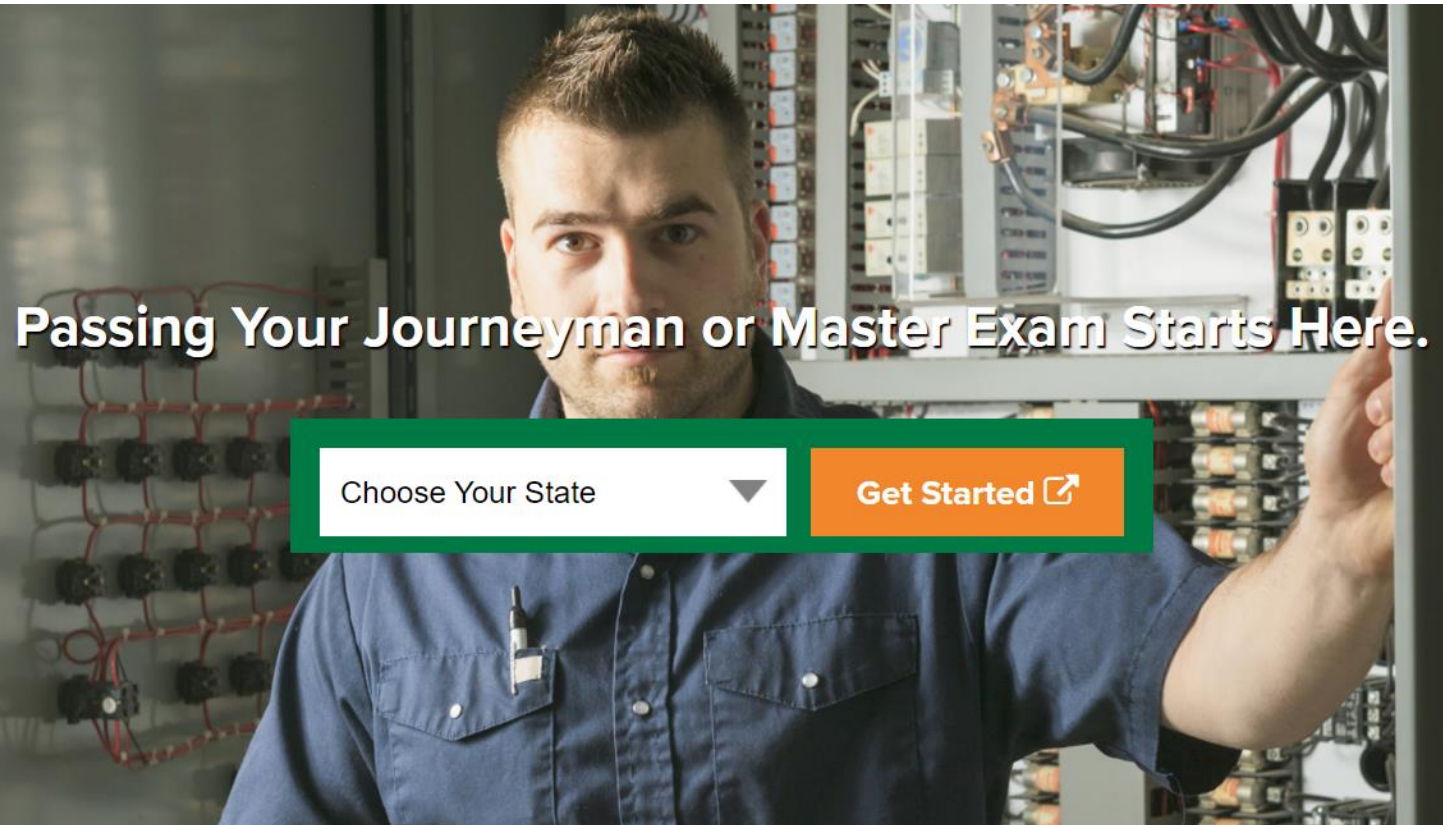
Electrical Continuing Education



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2020 NEC Changes

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- Installation methods
- Sizing conductors
- Disconnects
- Rapid shutdown



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Installing
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2020 NEC Changes

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Welcome Iowa Electricians!

What Does Iowa Require?

18-Hours of Continuing Education Required

- The Iowa electrician must complete no less than 18 Continuing Education Units (CEUs) in each three-year license cycle.
- No less than 6 of those 18 CEUs must focus on the most recent Iowa electrical code.
- JADE Learning's two-hour VILT sessions satisfy ALL of Iowa's requirements for electrical continuing education.
9 VILT sessions provides you all 18 hours.



Iowa



2020 NEC Changes INTRODUCTION & CHAPTER 1

- 2-Hours Credit

Welcome Iowa



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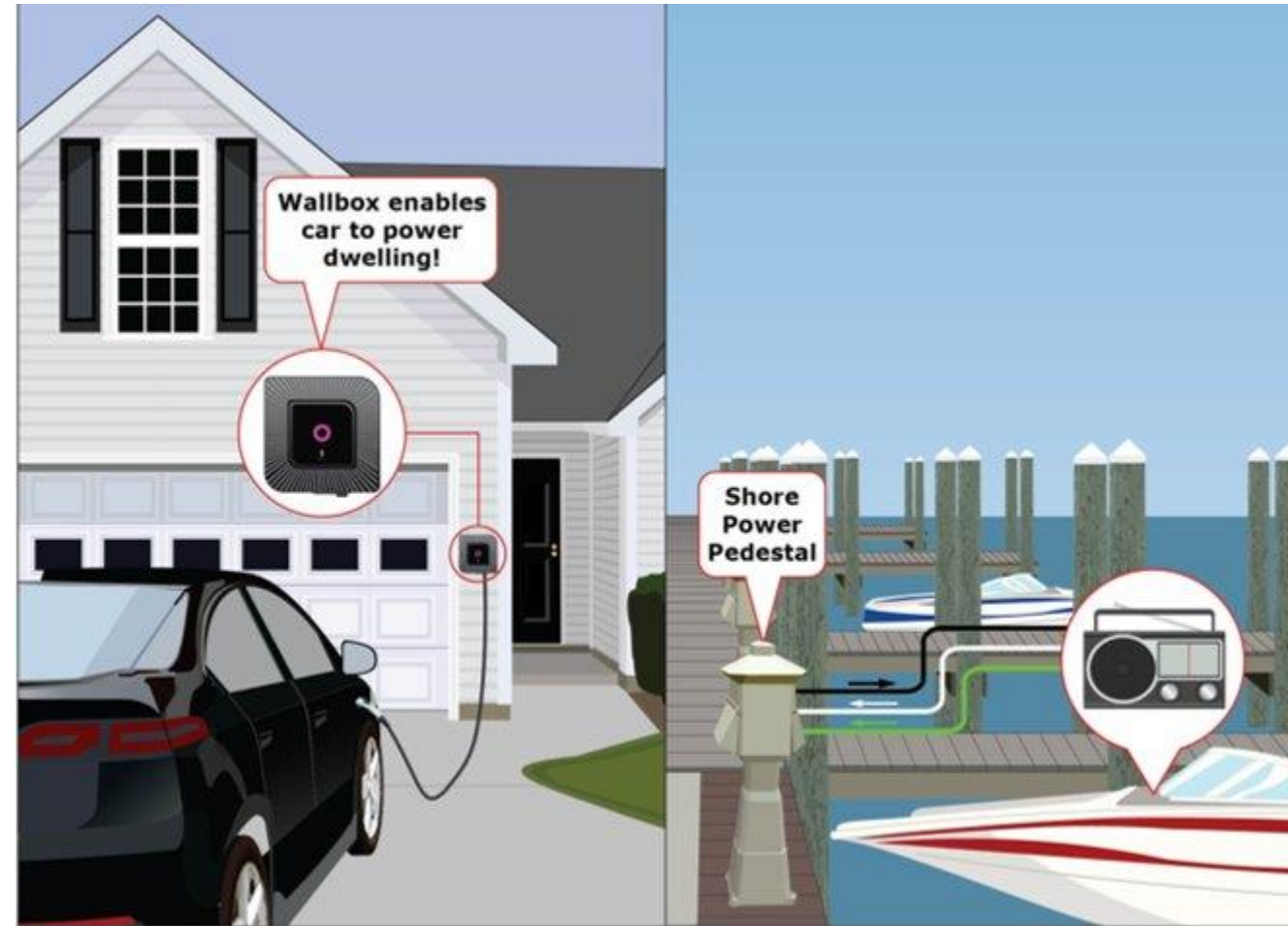


2020 NEC Changes *The Scope*

90.2(A) Scope. Covered.

New Additions to the NEC Scope:

- Installations supplying shore power to ships and watercraft in marinas and boatyards, including the monitoring of leakage current.
- Installations used to export electric power from vehicles to premises wiring or for bidirectional current flow.





2020 NEC Changes Chapter 1

100 Definitions- Accessible.

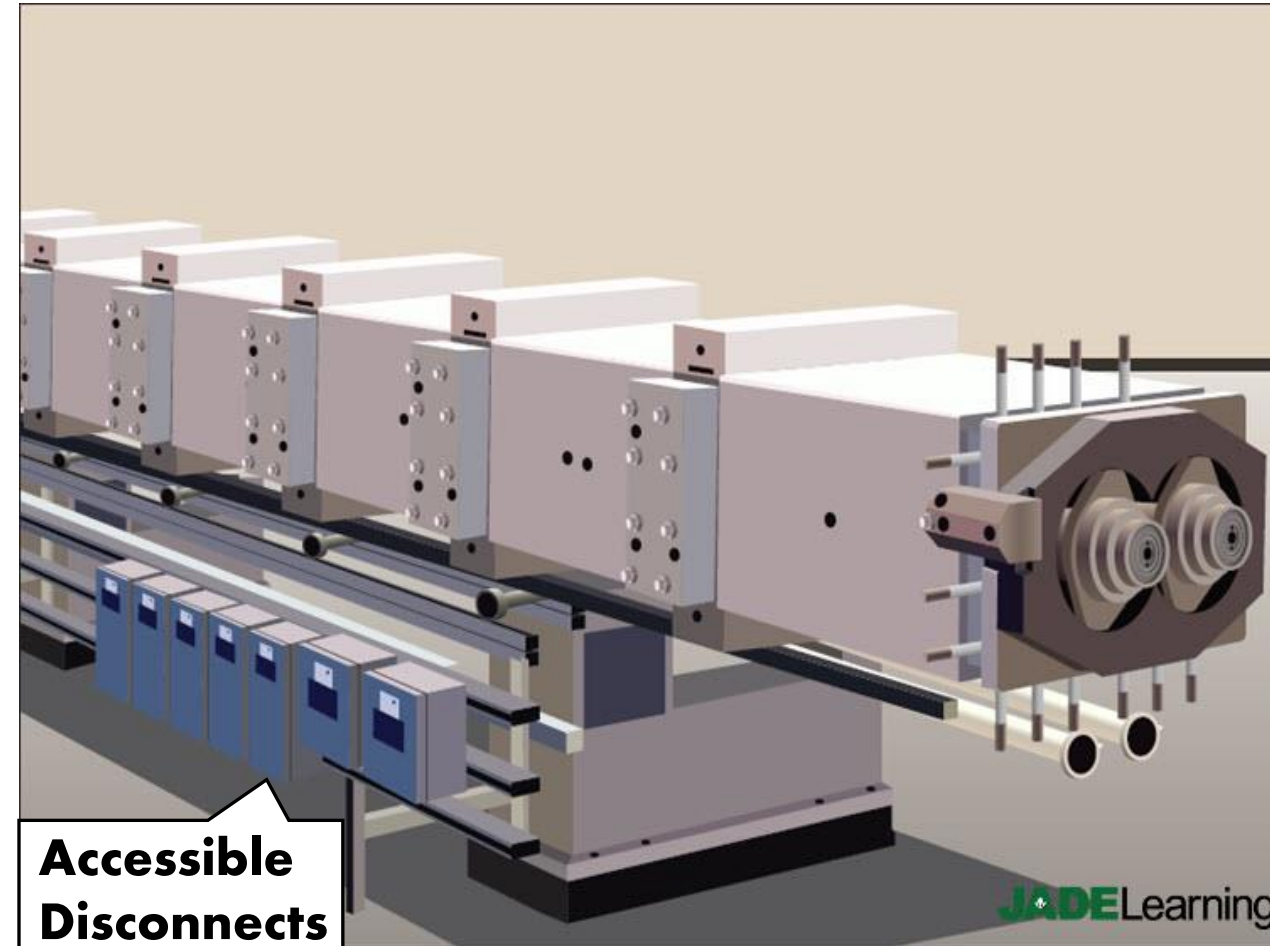
Newly Revised Definition for: *Accessible*

(1of2)

Accessible (Equipment):
Capable of being reached for operation, renewal, and inspection.

This is not the same as equipment considered:

READILY ACCESSIBLE



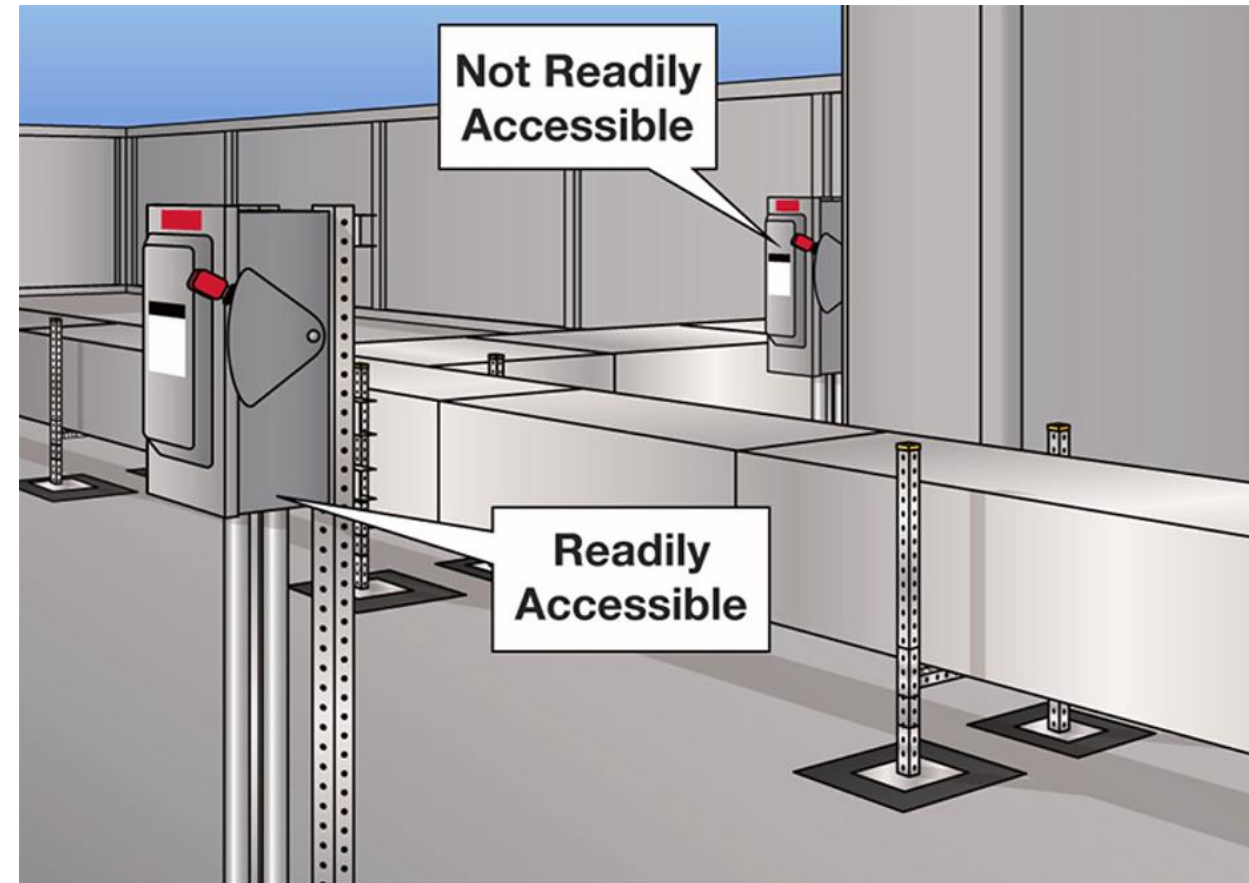
100 Definitions- Accessible.

Newly Revised Definition for: *Accessible*

(2of2)

READILY ACCESSIBLE

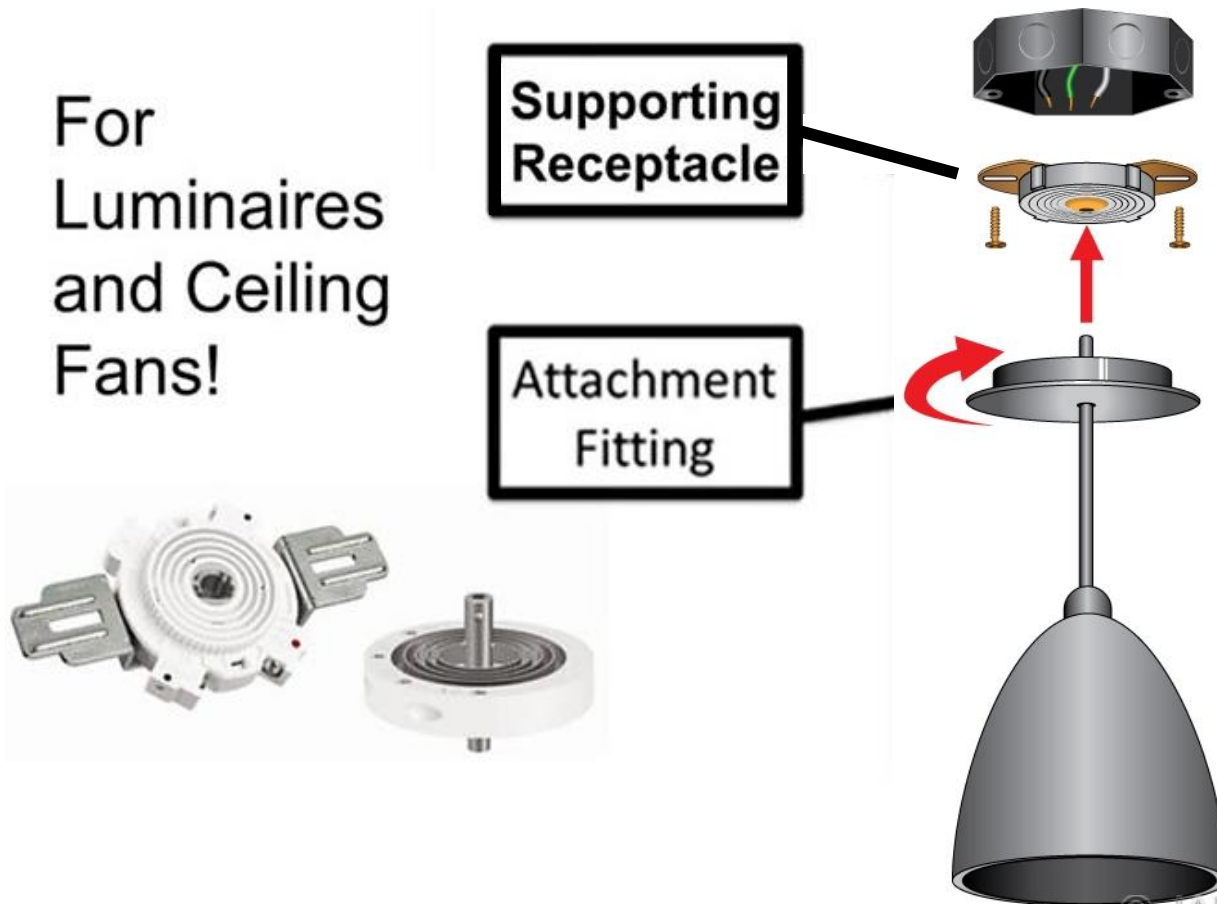
Capable of being reached quickly for operation, renewal, or inspection without requiring those to whom ready access is requisite to take actions such as to use tools (other than keys), to climb over or under, to remove obstacles, or to resort to portable ladders and so forth.



100 Definitions- Attachment Fitting.

Brand-New Definition: *Attachment Fitting*

(1of3)



A device that, by insertion into a locking support and mounting receptacle, establishes a connection between conductors of the attached utilization equipment and the branch-circuit conductors connected to the locking support and mounting receptacle.

100 Definitions- Dormitory Unit.

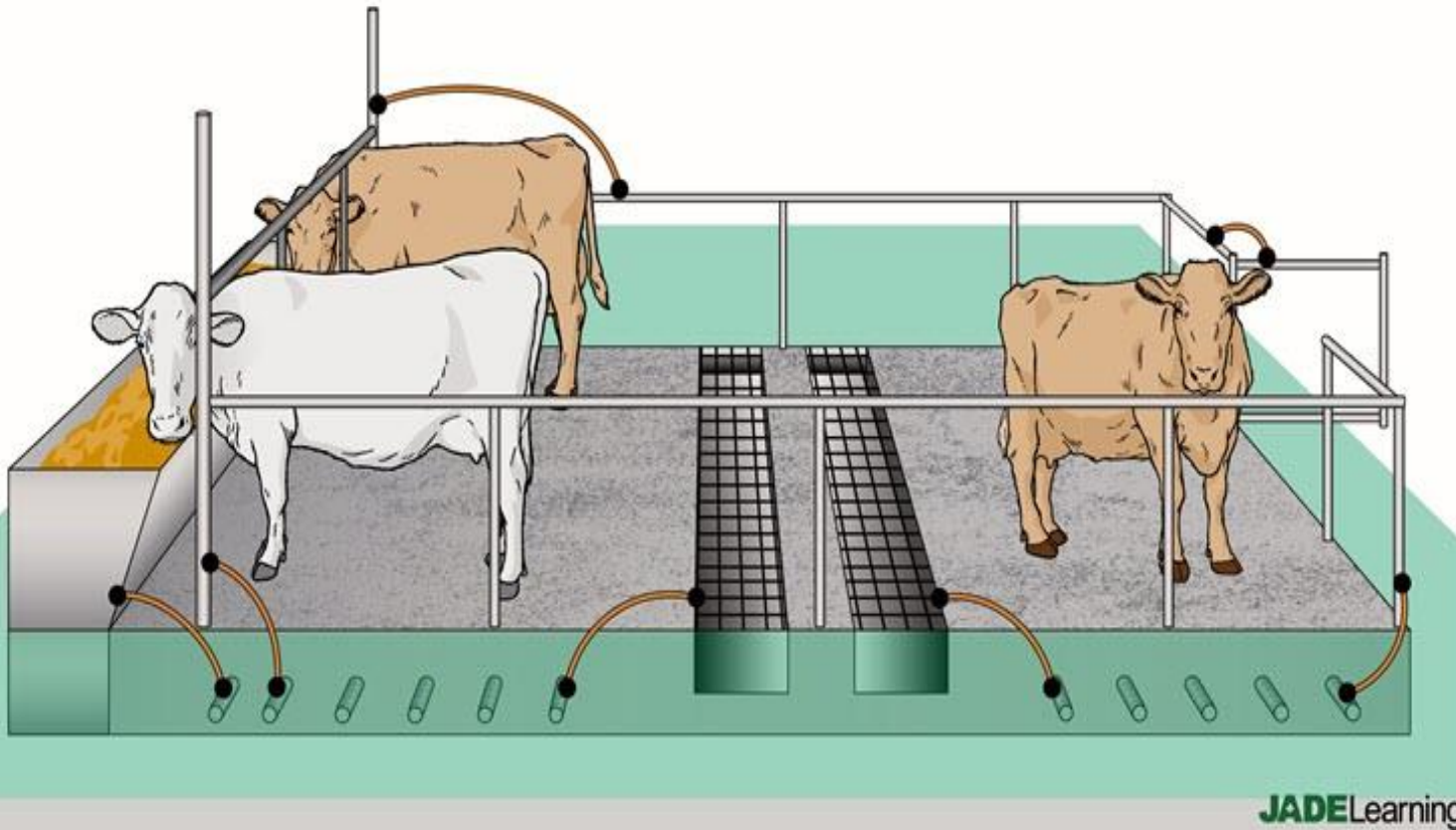
Brand-New Definition: *Dormitory Unit*



- A building or space in a building where sleeping accommodations are provided for more than 16 people who are not related.
- May be one room or a series of closely associated rooms.
- Does not have individual cooking facilities.

100 Definitions- Equipotential Plane.

Brand-New Definition: *Equipotential Plane*



Accessible conductive parts bonded together to reduce voltage gradients (differences) in a designated area.

Equipotential simply means:

EQUAL VOLTAGE

100 Definitions- Fault Current & Available Fault Current.

TWO Brand-New Definitions:

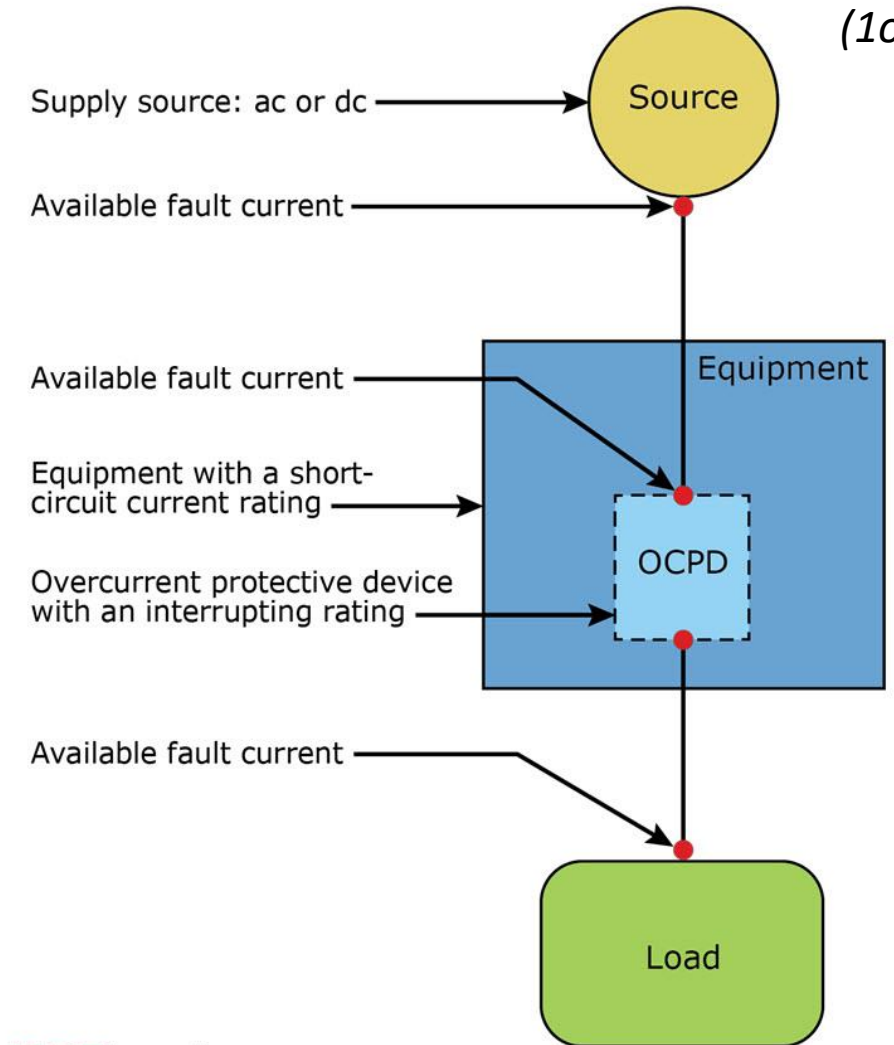
Fault Current:

The current delivered at a point on the system during a short-circuit condition.

Available Fault Current:

The largest amount of current capable of being delivered at a point on the system during a short-circuit condition.

(1of3)

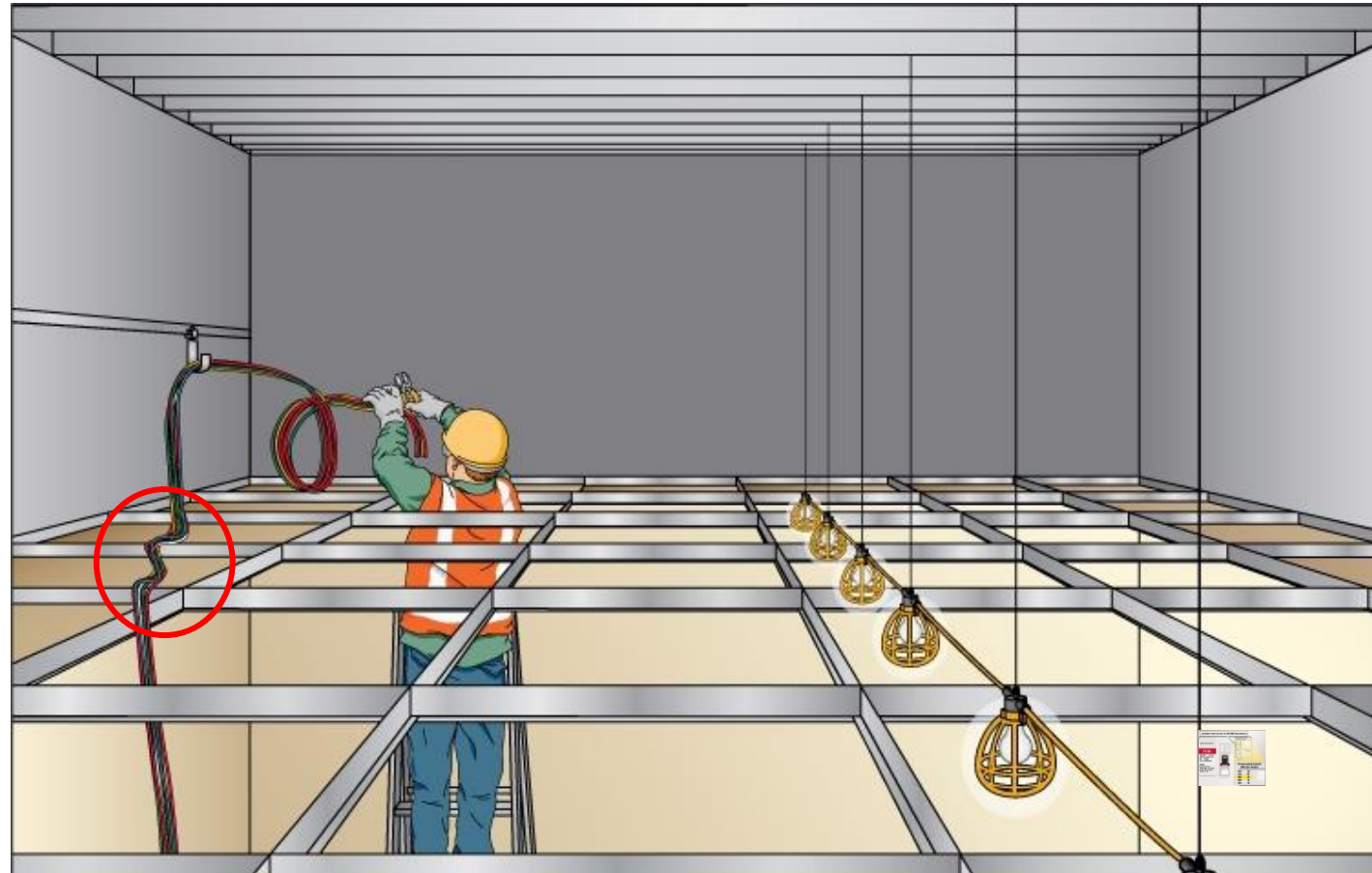


100 Definitions- Fault Current & Available Fault Current.

TWO Brand-New Definitions:

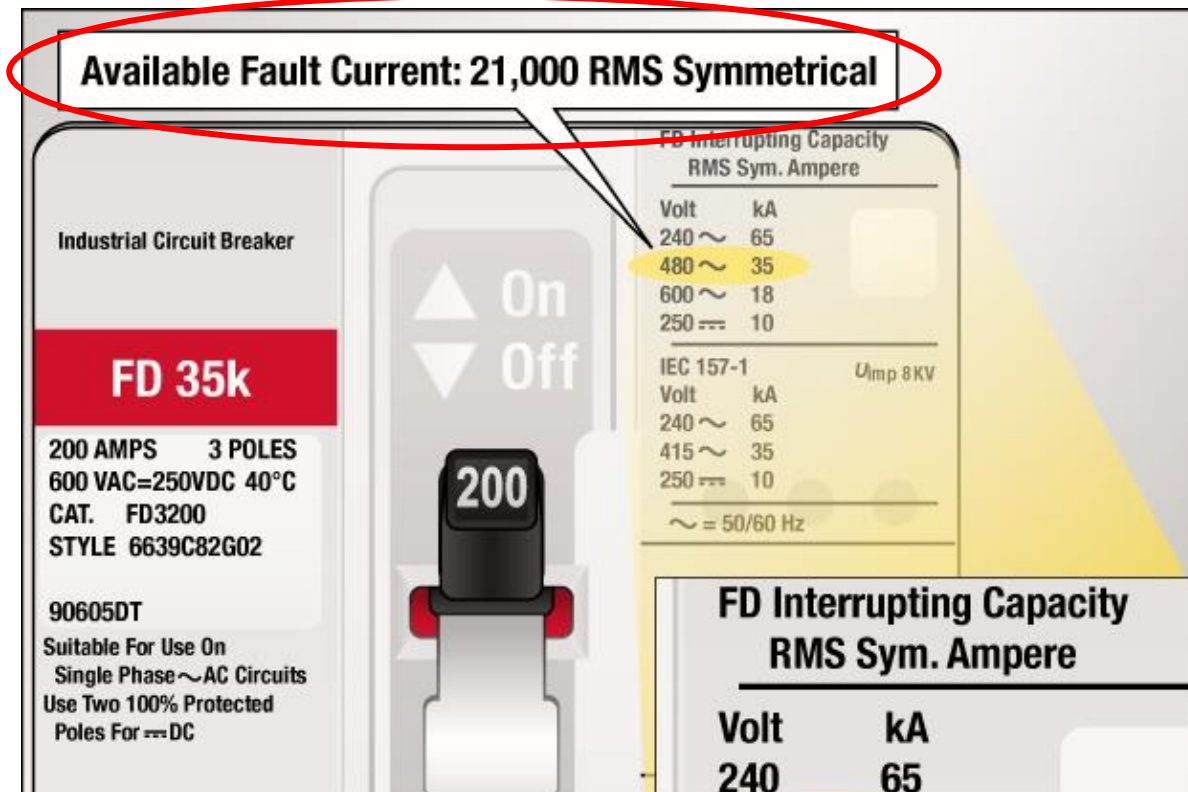
Example: If this energized wiring shorted against the metal grid ceiling, the current flowing on the grid ceiling would be **FAULT CURRENT**.

The **MAXIMUM** current that could flow when this event happens is the **AVAILABLE FAULT CURRENT**.



100 Definitions- Fault Current & Available Fault Current.

TWO Brand-New Definitions:



Example: The **AVAILABLE FAULT CURRENT** is marked on this service disconnect switch. The marking means at this specific equipment site, up to 21,000 amps of current can flow should a short-to-ground or phase-to-phase fault event occur.

100 Definitions- Grounded Conductor.

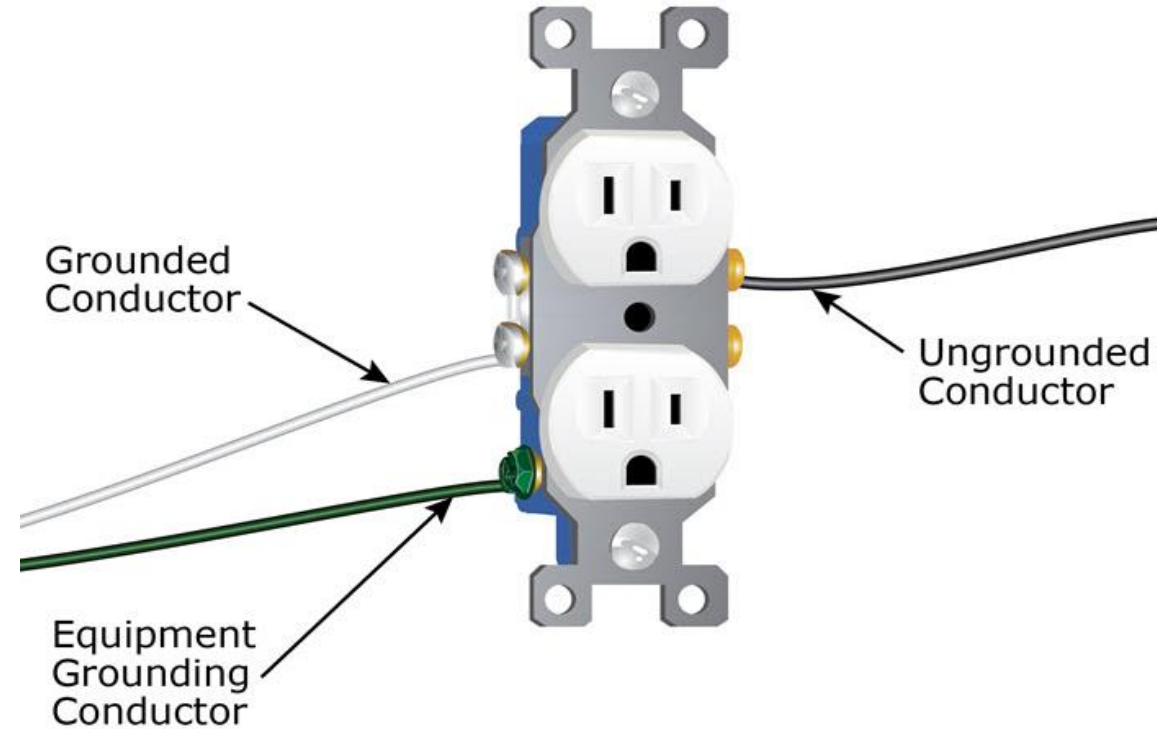
A new Informational Note says:

Although an Equipment Grounding Conductor (EGC) is grounded, it is not considered a “grounded conductor” by the NEC.

Remember, an EGC is typically green or bare and only carries fault-current; it is NOT considered a current-carrying conductor.

A Grounded Conductor is usually white (or gray) and is considered a current-carrying conductor.

(1of2)



100 Definitions- Grounded Conductor.

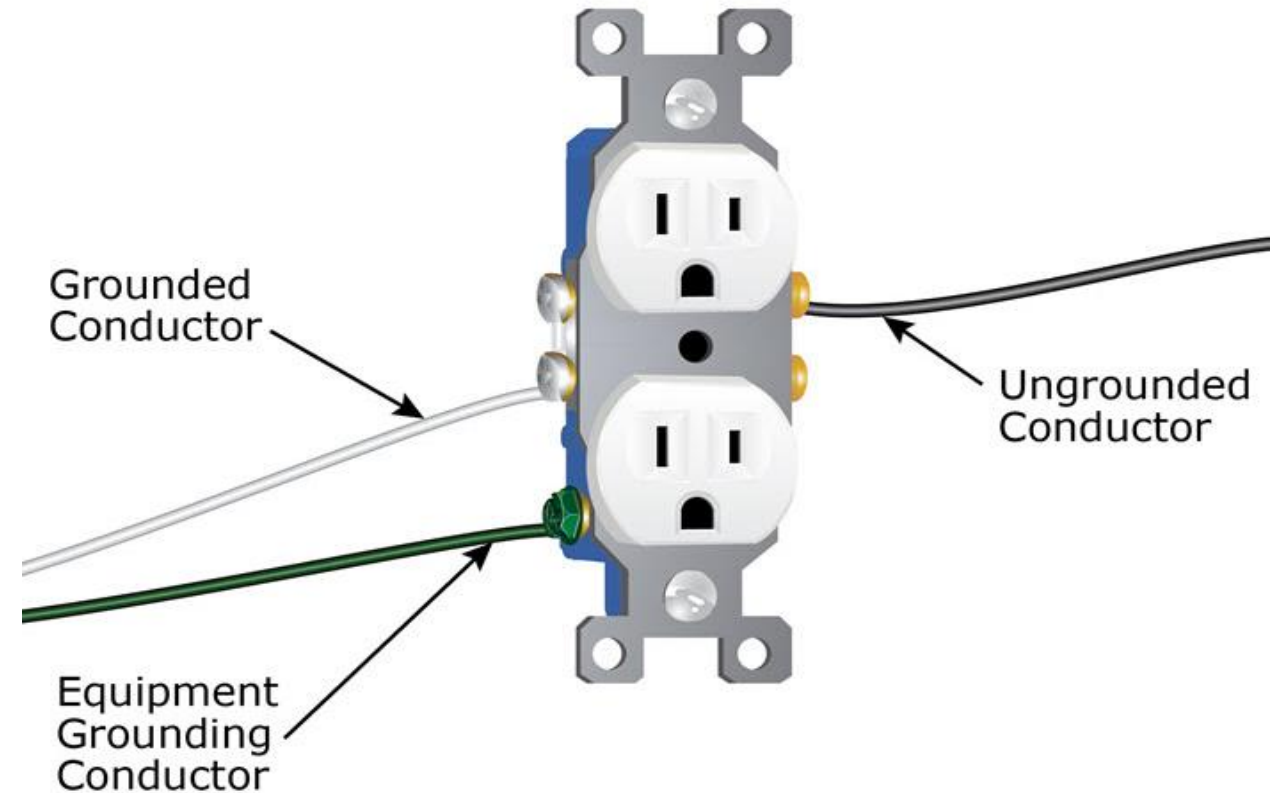
Grounded Conductor:

The white or gray grounded conductor is a return path in a circuit for electrons reading zero-volts.

Grounding Conductor:

The green/bare EGC is the wire or metal-conduit used to carry fault-current, *should a short-to-ground occur*. This path enables the OCPD to trip.

(2of2)



AFCI

GFCI

10 Minute Break

Electrician Talk:

GFCI and AFCI circuit breakers look similar.

**But do you think a GFCI circuit breaker
provides the same kind of protection as the
arc-fault (AFCI) circuit breaker?**

Can you explain the difference to your customer?

AFCI

GFCI

GFCI

AFCI

JADE Learning

100 Definitions- Habitable Room.

Brand-New Definition: *Habitable Room*

A room for living, sleeping, eating or cooking, but excluding bathrooms, closets, hallways, storage, and utility spaces.

Includes:

Bedrooms
Family Rooms
Kitchens
Dining Rooms



Does NOT Include:

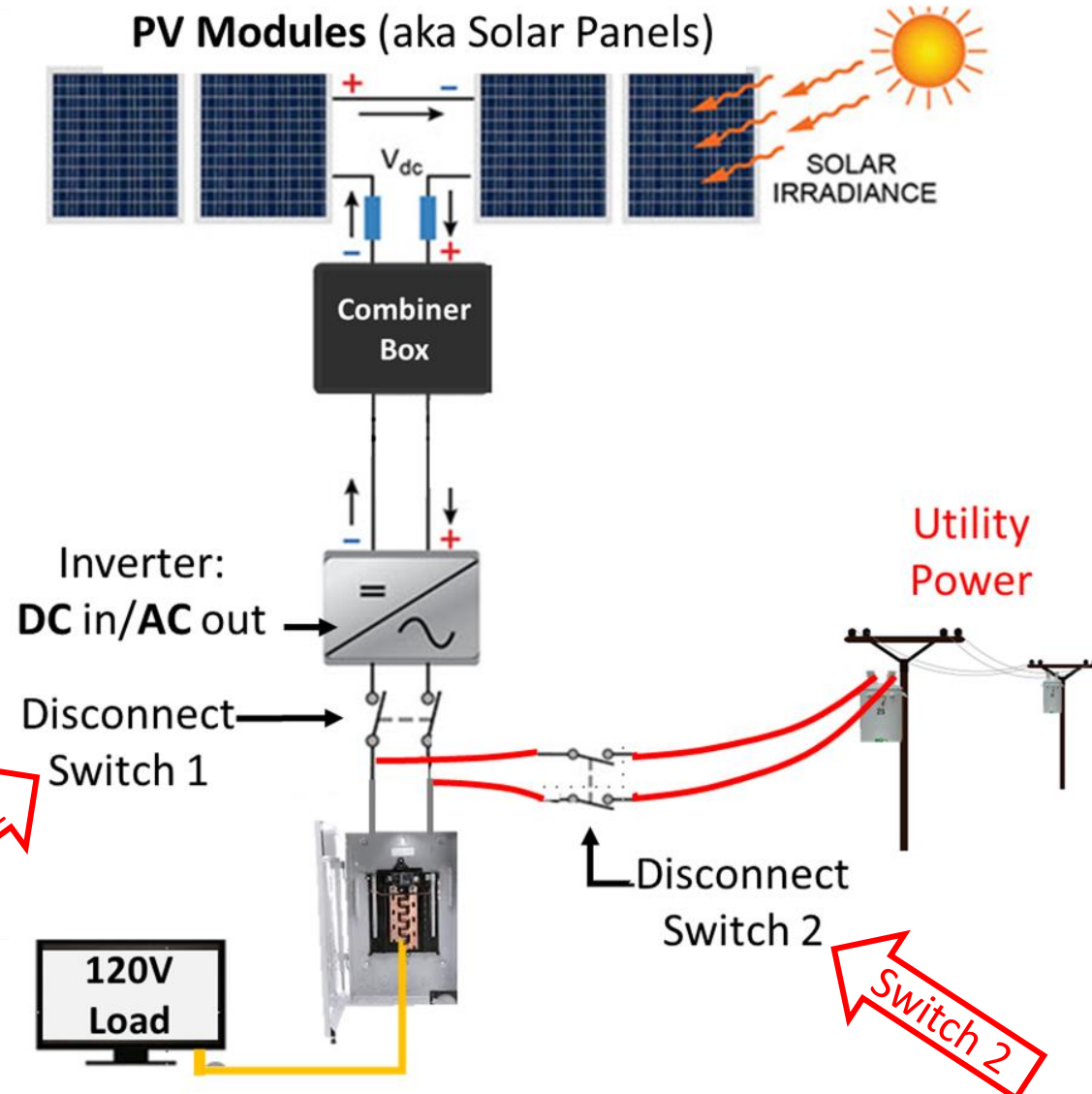
Bathrooms
Closets
Hallways
Storage and
Utility Spaces

100 Definitions- Island Mode.

A Brand-New Definition is Provided in the 2020 NEC for *Island Mode*

WHAT IS ISLAND MODE? If you disconnect power-producing equipment or an isolated microgrid system (such as a solar PV system) from the utility company power that it normally works in conjunction with, you have placed that equipment or microgrid system into an operational mode called **ISLAND MODE**.

To put the microgrid system (PV system) pictured to your right into **ISLAND MODE**, you would OPEN Disconnect Switch 2 and CLOSE Disconnect Switch 1. The PV system generated power would then be “islanded” or isolated from utility power.



100 Definitions- Labeled.

A brand-new *Informational Note* now accompanies the existing definition of **LABELED**:

LABELED: *Equipment or material with a label, symbol, or identifying mark acceptable to the AHJ.*

New Informational Note:

If a listed product is of such a size, shape, material, or surface texture that it is not possible to apply legibly the complete label to the product, the label may appear on the smallest unit container in which the product is packaged.

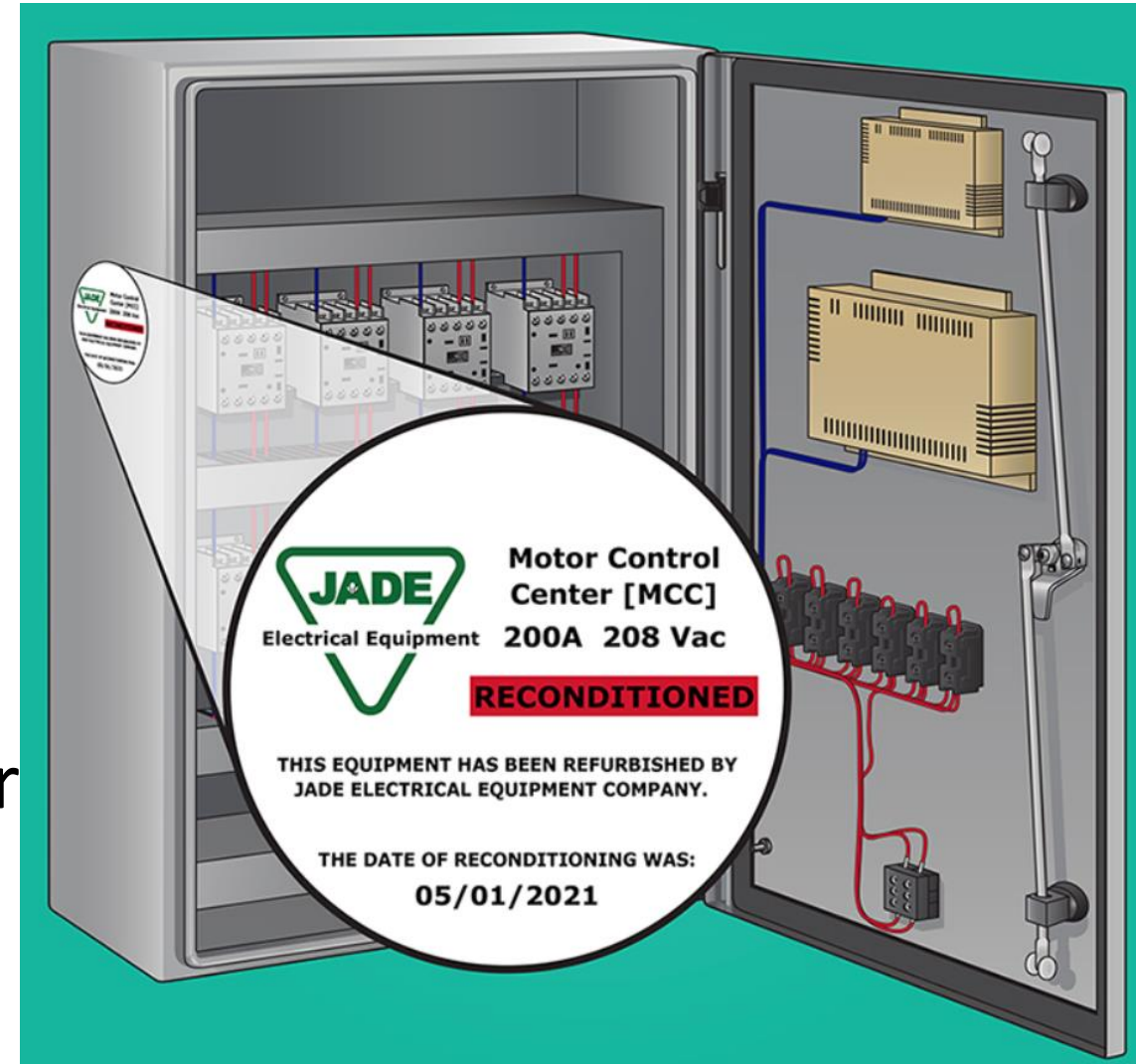


100 Definitions- Reconditioned.

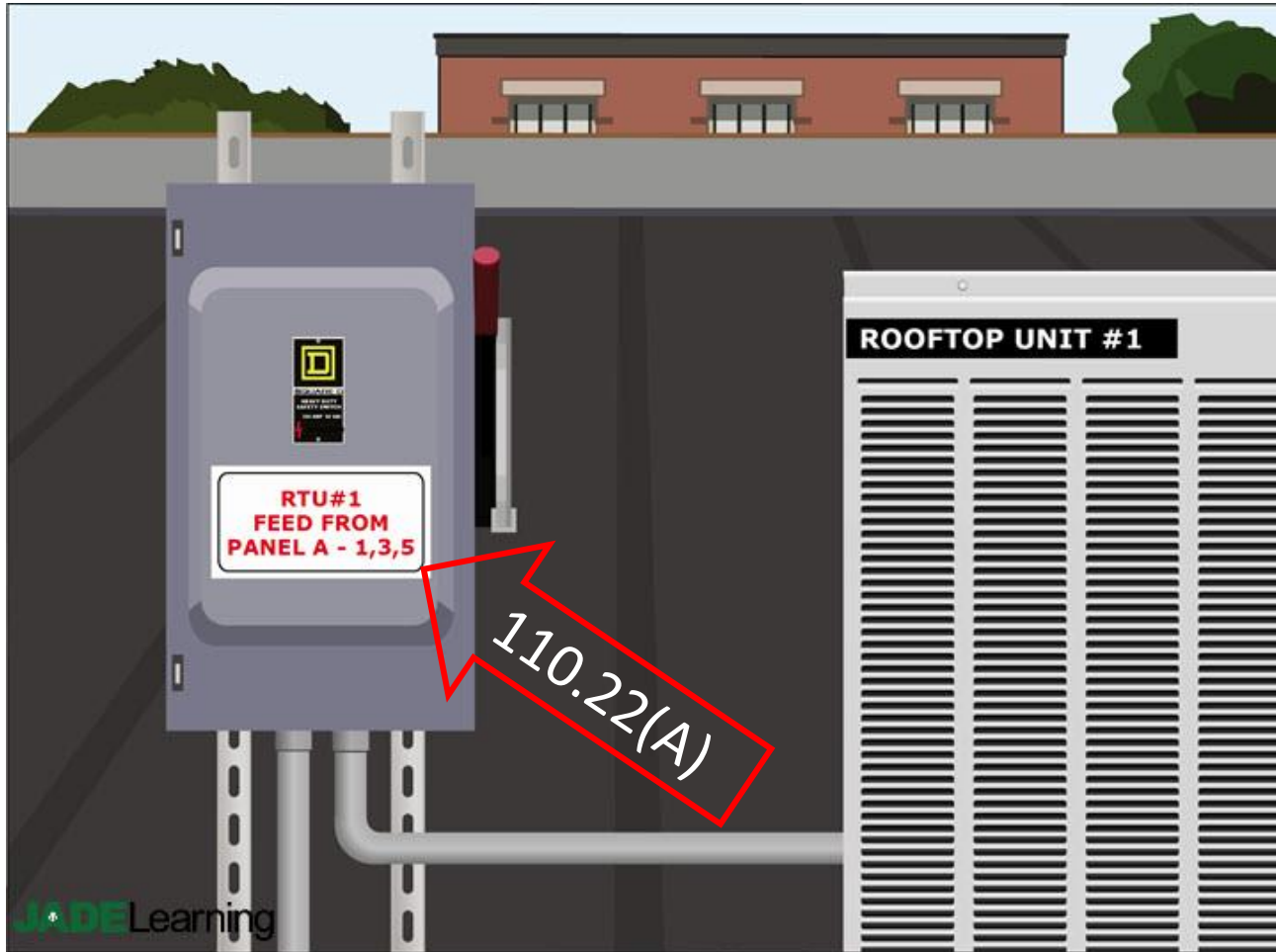
Brand-New Definition: *Reconditioned*

Electromechanical systems, equipment, apparatus, and components that are restored to operating conditions.

- Also referred to as rebuilt, refurbished, or remanufactured.
- Replacing a damaged circuit breaker with a new circuit breaker is NOT considered reconditioning a panel.



110.22 Requirements for Electrical Installations. Identification of Disconnecting Means.



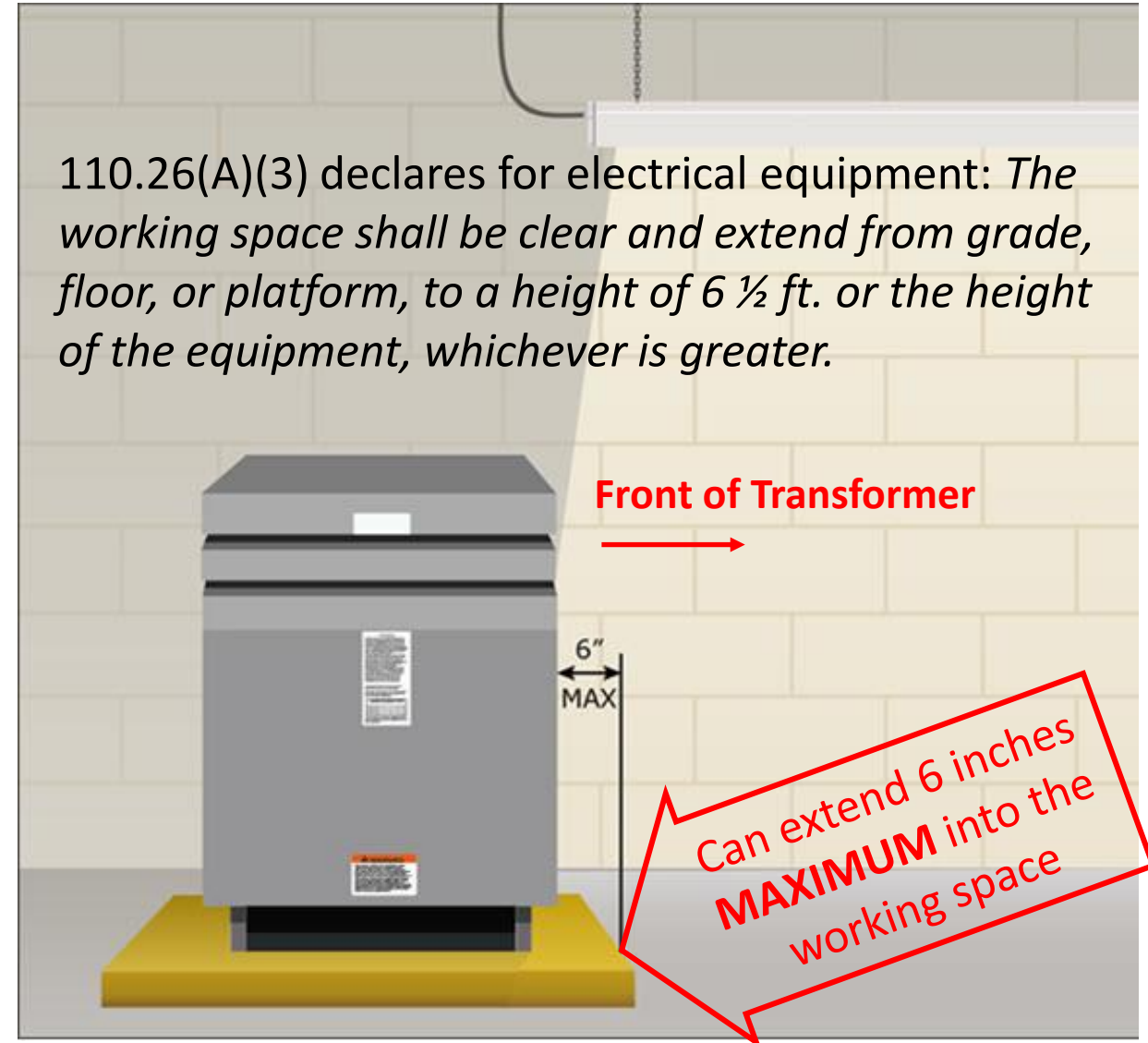
Section 110.22(A) in the 2020 NEC now includes the following new requirement when marking disconnects:

In other than one- or two-family dwellings, the marking shall include the identification of the circuit source that supplies the disconnecting means.

110.26(A)(3) Height of Working Space.

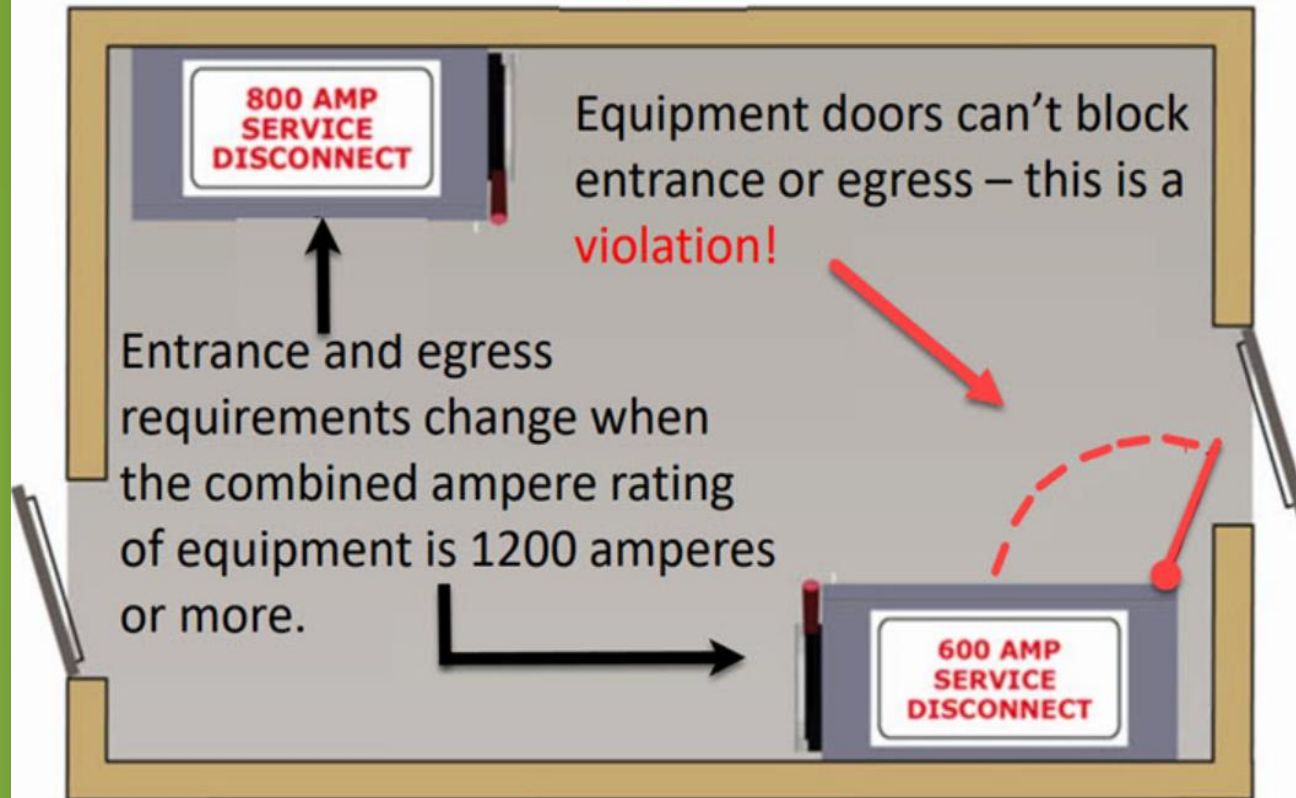
The 2020 NEC now specifies:

- Support structures such as concrete pads located under electrical equipment may not extend more than 6 inches beyond the front of the equipment.
- The 2017 NEC did not specify that support structures such as concrete pads used to hold equipment off the ground were also included in the 6-inch rule.



110.26(C)(2) Large Equipment.

The conditions that trigger the requirement to have *Two Openings* around large electrical equipment have changed in the 2020 NEC



- One entrance and one egress is now required for disconnecting means with a combined rating of 1200 amps or more, when over 6 feet wide, and installed according to Section 230.71.
- Open equipment doors shall not impede the entry or egress from the working space.

THANK YOU FOR ATTENDING!

Questions?

For additional instructor support, please contact
instructor@jadelearning.com

For questions about your continuing education, please
contact registrar@jadelearning.com