

Midwest Rural Energy Council
55th Annual Rural Energy Conference
February 8, 2017

Neutral Isolation

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Neutral Isolation

- What is a neutral isolator?
- Typical configuration
- When would we isolate?
- Installation
- Types
- Testing
- Effects

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What Is A Neutral Isolator?



3



Typical Configuration



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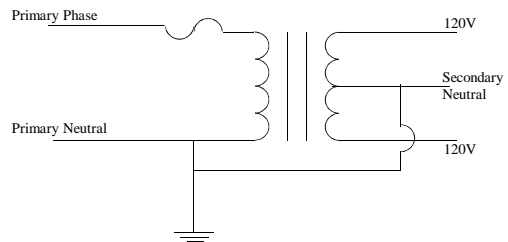
Why Would We Isolate?

- 90 Days
- Isolation on Demand

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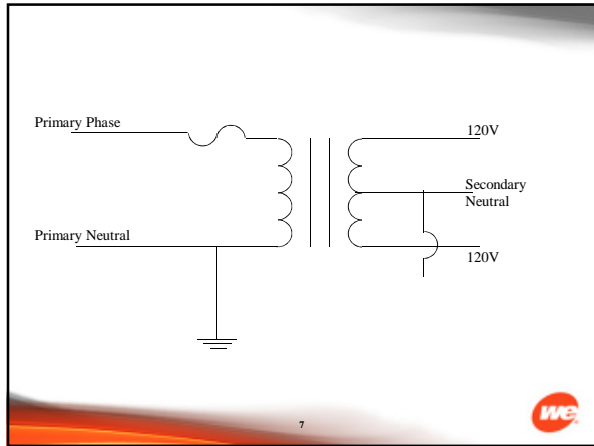


Typical Configuration



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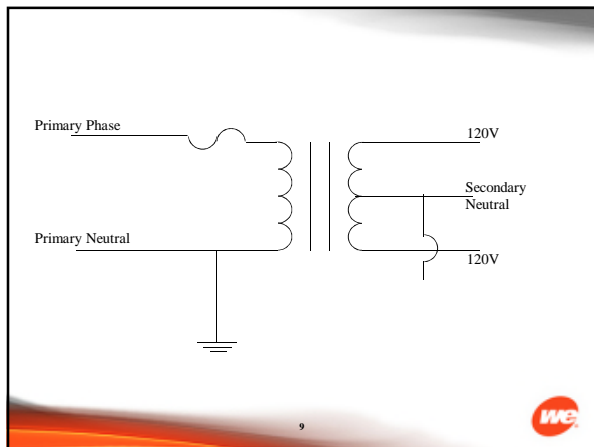


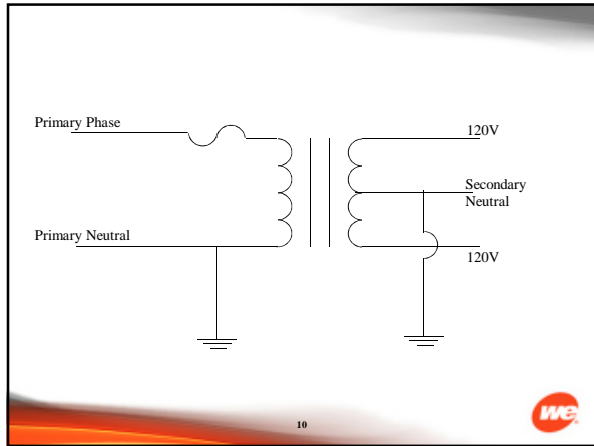


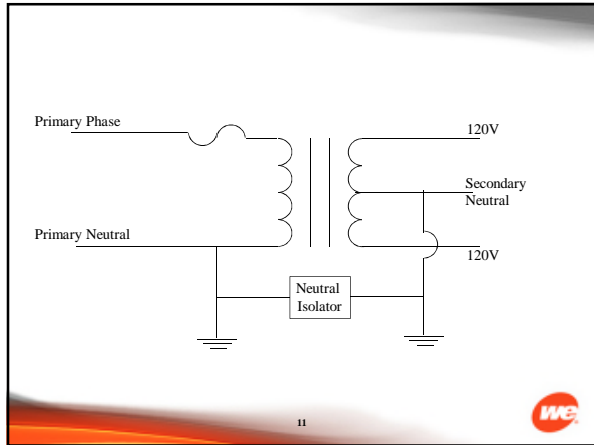
Thank You!

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Installation -
Where do we put the ground rods?

Primary Phase

Primary Neutral

120V

Secondary Neutral

120V

Neutral Isolator

Other Grounding Ideas

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2012 National Electrical Safety Code

087D2

Section 9: Grounding Methods

099A2

addition to customer's grounds at each service entrance. The primary grounding conductor, or the secondary grounding conductor, shall be insulated for 600 V.

NOTE: For single-grounded systems, also see Rules 93C1, 93D, and 96D.

2. Multi-grounded systems

On multi-grounded systems, the primary and secondary neutrals should be interconnected according to Rule 97B. However, where it is necessary to separate the neutrals, interconnection of the neutrals shall be made through a spark gap or a device that performs an equivalent function. The gap or device shall have a 60 Hz breakdown voltage not exceeding 3 kV. At least one other grounding connection on the secondary neutral shall be provided with its grounding electrode located at a distance not less than 1.80 m (6 ft) from the primary neutral and surge-arrester grounding electrode in addition to the customer's grounds at each service entrance. Where the primary and secondary neutrals are not directly interconnected, (a) the primary grounding conductor, or the secondary grounding conductor, or both, shall be insulated for 600 V, and (b) the secondary grounding conductor shall be guarded according to Rule 93D2.

NOTE 1: A difference of voltage can exist where primary and secondary neutrals are not directly interconnected. For example, where metallic equipment is bonded to the secondary grounding conductor and is installed on the same pole, the primary grounding conductor would be insulated.

NOTE 2: Cooperation of all communications and supply utilities, customers of these utilities, and others may be necessary to obtain effective isolation between primary and secondary neutrals.

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2012 National Electrical Safety Code

093D2

Section 9: Grounding Methods

094

- Multi-grounded systems: Grounding conductors of multi-grounded systems need not be guarded.
- Where guarding is required, grounding conductors shall be protected by guards suitable for the exposure to which they may reasonably be subjected. The guards should extend for not less than 2.45 m (8 ft) above the ground or platform from which the grounding conductors are accessible to the public.

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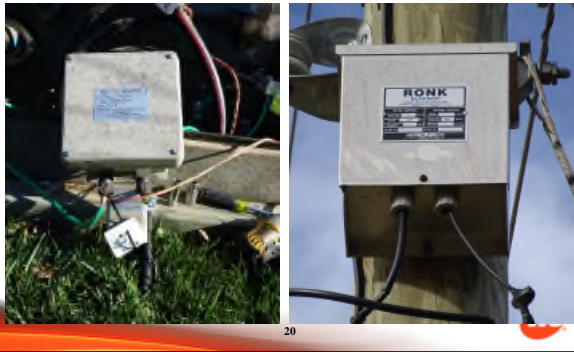
Installation (Continued)

- Review:
 - Separated Neutrals
 - Installed the Isolator
 - Properly Grounded
 - Check for bypasses
 - Phone
 - Cable TV
 - City Water

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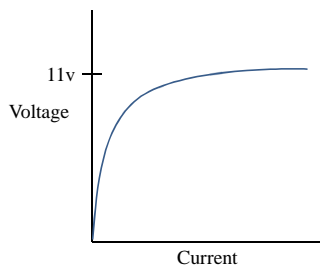


Types of Neutral Isolators



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Ronk



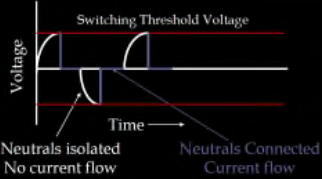
Ronk Datasheet:
The BLOCKER has a very low impedance (less than 0.5 ohms)
for a voltage level above 12 volts.

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Dairyland

Neutral Isolator Operation Voltage at Switching Threshold



*Slide above is property of Henry Tachick of Dairyland Electric Industries

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2012 National Electrical Safety Code

087D2

Section 9: Grounding Methods

099A2

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When Can We Isolate?

■ 90 Days

- 1) Installed at utility's own cost
- 2) Not available under level of concern
- 3) Safety, grounding, PN voltage
- 4) No more than 90 days

■ Isolation on Demand

- 1) Isolation request form
- 2) State inspection
- 3) Pre/Post stray voltage test
- 4) Only for stray voltage concerns
- 5) Hold harmless agreement
- 6) Utility owns isolator

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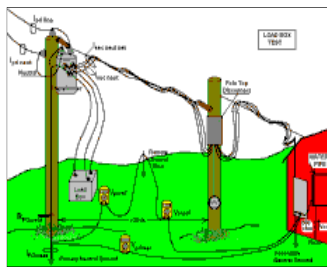
Additional Thoughts With Isolation

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Isolator Testing

- Isolation System



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Isolator Testing

- Isolation System
- Isolator (Open)

$$V = I \times R$$



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Isolator Testing

- Isolation System
- Isolator (Open)
- Isolator (Closed)



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Isolation Changes

- How does Isolation affect the utility system?



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Isolation Changes

- How does isolation affect the farm?

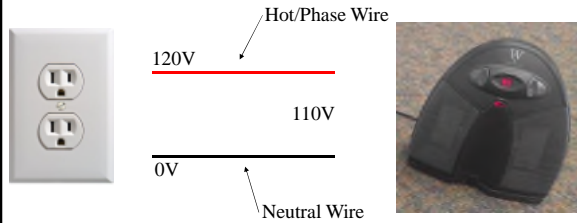


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Isolation Changes

- Before Isolation

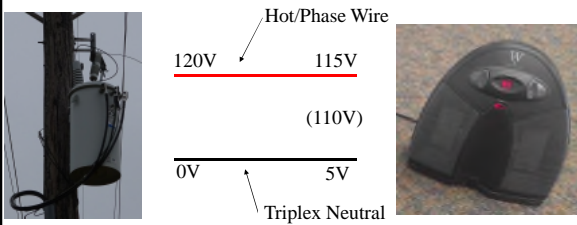


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Isolation Changes

- Before Isolation

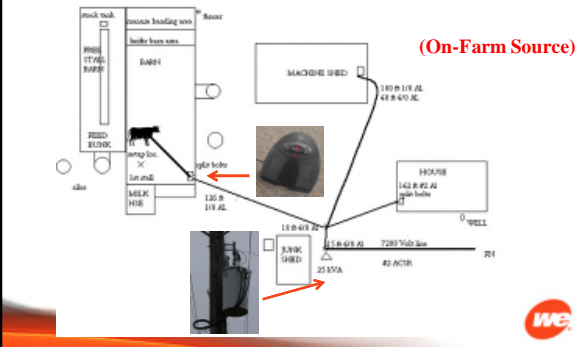


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Isolation Changes

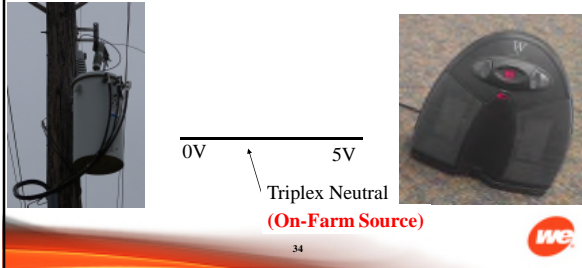
- How does isolation affect the farm?



Isolation Changes

- How does isolation affect the farm?

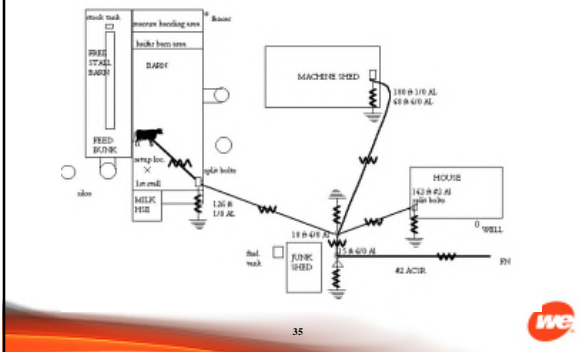
“Isolation gets rid of the utility contribution”



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Isolation Changes

- How does isolation affect the farm?



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Thank You!

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