Customer-Owned Backup Generation Requirements

12/1/2025

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1. General

Introduction

Within this manual, whenever “Company” is listed, it is in reference to We Energies, Wisconsin Public Service, or Upper Michigan Energy Resources. These requirements are applicable to all customer-owned backup generation facilities at which Company supply lines are terminated. For questions of requirement intent, a Company Field Application Engineer will provide an interpretation/clarification and shall be solely responsible for final determination of compliance.

This document is a list of Company requirements, not a design guide. The requirements contained herein are exclusively those of the Company. However, additional requirements are set forth in the applicable Wisconsin and Michigan State Electrical Code, IEEE Standards, and other codes and ordinances. The Company should be consulted only on matters relative to its specific requirements. Customers and consultants are advised to communicate directly with appropriate code enforcement authorities for matters which pertain to requirements of the applicable Wisconsin and Michigan State Electrical Codes, and other local codes or ordinances.

It is in the best interest of the customer to identify the Company’s requirements early in the design stage to avoid any unnecessary expenses or delays.

The Company does not assume responsibility for the protection of the customer’s generating equipment or for damage to any other customer equipment, and does not assume any liability or responsibility for customer-owned equipment through the approval process. The customer is solely responsible for protecting its equipment to prevent damage due to faults, line reclosing, imbalances or disturbances on the Company’s distribution system, as well as assuring that the backup generation equipment is not operating in parallel with the Company’s distribution system. The customer is responsible for damage to property and/or injury to personnel of the Company or others when caused by customer’s backup generation equipment because of malfunction, improper design, improper operation, human error, or other negligence of the customer or derived from the generation facility or controls.

Typical Sequence of Events

Below is the typical sequence of events for backup generation and equipment that is installed upstream of the existing service disconnecting means which will typically require a utility disconnection for installation.

1. Customer/installer review the requirements of this manual.
2. Customer submits plans to the Company for review if required.
    a. We Energies – co-non-design-central@we-energies.com
    b. Wisconsin Public Service - customergen@wisconsinpublicservice.com
3. The Company reviews plans and provides feedback to the customer if they are acceptable or if revisions need to be made.
4. The customer/installer schedules a disconnect reconnect with the Company and schedules an inspection with the Authority Having Jurisdiction (AHJ).

5. The Company will disconnect service to allow the installer to install the backup generation and transfer/isolation equipment.
6. The AHJ inspects the new backup generation, transfer/isolation equipment, and one-line diagram (if required).
7. The AHJ sends the completed inspection to the Company.
8. The Company will reconnect service to the customer.
9. The customer schedules commissioning with the Company if required.

General Requirements

1. The Company, in its review and inspection, may specify additional requirements relative to the equipment and general design of the customer-owned backup generation facility.
2. The customer shall obtain the acceptance of the Company before making any additions or material modifications to any existing customer-owned backup generation facility. A material modification is any modification to the equipment that deviates from the equipment shown on submitted documentation including operating modes.
3. By installing customer-owned backup generation, the customer and installer agree to address any existing code or safety issues with metering or service equipment to meet current requirements.
    a. This includes any clearance issues with natural gas equipment in proximity to electrical equipment.
4. Service/Metering installations that fail to meet acceptable electrical standards as determined by the Company shall be modified and/or updated as required.
5. Customers and installers are responsible for proper installation, operation and maintenance of customer-owned backup generation equipment in accordance with the products' listing and manufacturers' instructions.
6. Customers are responsible for the expense to make system improvements needed to support the backup generation facility, obtain any and all authorizations, permits and licenses required for construction and operation of your generating facilities.
7. When the customer is changing the ampacity of their service entrance equipment, they must meet the current State adopted version of the NEC and the current metering requirements of the Company.*
8. When the customer adds to or modifies their service entrance wiring and/or equipment in any way that requires them to adhere to the current State adopted version of the NEC, they shall also adhere to the current metering requirements of the Company.*
9. Moving or relocating service equipment to new or different location shall constitute an upgrade and they shall also adhere to the current metering requirements of the Company.*

    *Note: Any changes to the service will require a completed service change/modification/rewire/relocation application to be submitted to the Company.

10. Any documentation submitted as updated or new takes precedence over all previously submitted documentation and shall comply with current requirements.

2. Scope

This document applies to all customer-owned backup generation facilities that are not interconnected to the Company's distribution system. This document also defines the minimum requirements for proper isolation from the Company's distribution system to allow safe and effective operation of the customer's backup generation facilities. These requirements apply to those generation systems that will not operate in parallel with the Company's distribution system, and will only be used for backup power during utility service outages.

Any system that has the ability to interconnect and operate in parallel with the Company's distribution system shall meet the requirements of the Customer-Owned Generation Manual.

All requirements laid out in this document are designed to:

- Ensure the safety of customers, electric provider employees and the general public
- Maintain overall system reliability
- Protect customer and distribution system facilities

3. Required Documentation

Documentation is not required for systems that utilize a “break-before-make” style transfer switch that is UL 1008 listed and installed in accordance with its listing. All other backup generation systems will require the following documentation.

The completed documentation listed below is required before a customer-owned backup generation equipment will be reviewed for acceptance.

- Application(s)
    - A service change application is also required for energy storage backup systems.
- One-line diagram*
- Site plan*
- Technical documents of the customer-owned backup generation equipment*

Completed documentation after acceptance of backup generation equipment.

- Letter of Acknowledgement

* Please see additional requirements listed below.

One-line Requirements

- One-line must be computer generated, hand-drawn one-lines will not be accepted.
- List the major equipment part numbers
- List the amperage rating and fuse information of the disconnect
- Main Over Current Protection Device amperage rating
- Transfer Switch or Grid Isolation Relay manufacturer name and model number
- List the customer of record’s name and address
- One-line must distinguish existing systems from new equipment
- One-line should show revision tracking with identification of changes shown on the one-line to expedite reviews.
- One-line must show all customer-owned generation systems on the same building/property.
- One-line must show any traditional backup generation including transfer equipment.
- One-line must show any other Electric Vehicle (EV) Chargers.
- If applicable, one-line submittal must note the resolution of any existing code violations or metering violations before approval.

Onsite One-line Requirements

- Final interpretation of these requirements is determined by the Company Field Application Engineer.
- One-line must be computer generated, hand-drawn one-lines will not be accepted.
- One-line must be of weatherproof permanent construction and UV-resistant (permanent engraved/embossed placard or laminated paper in a holder)
- One-line must show the following electrical equipment and how it is electrically connected.
    - Generator, inverter, and/or energy storage
    - Generator - Solar panels, energy storage, traditional generators, etc.
    - Metering equipment
    - Visible break isolation Disconnect
    - Micro-grid interconnect device
- List the customer of record's address
- One-line must show all customer-owned backup generation systems on the same building/property.
- One-line must show any traditional backup generation including transfer equipment if applicable.
- One-line must show any Electric Vehicle (EV) Chargers including vehicle to home capable systems.

Site Plan Requirements

- Site plan must show the locations of the following components.
    - Metering equipment
    - Visible break isolation Disconnect
    - Energy storage equipment
    - EV Charging Equipment
    - Service equipment including microgrid interconnect devices, transfer switches, or similar
    - All buildings on the property
- Site plan must be computer generated, hand-drawn site plans will not be accepted.
- List the customer of record's name and address
- Site plan must distinguish existing systems from new equipment
- Site plan must show all customer-owned generation systems on the same building/property.

Required Technical Documents

- Data sheets showing the product's ratings and listings for the energy storage back up equipment.
- To speed up the review process it is recommended to provide documentation showing a high level sequence of events (how the system functions during an outage and restoration)

4. System Improvement

During the review of submitted plans and application for a customer-owned backup generation facility the distribution system may need to be studied to determine the need for any system improvements required to accommodate the addition of the facility. This is required for all energy storage backup systems.

Examples of (but not limited to) system improvement requirements:

- Customer plans indicate the additional load required to charge the energy storage backup equipment is greater than the transformer serving the customer, the transformer will need to be changed out to avoid any overloading.
- Customer plans indicate the installation of a meter socket or main service panel breaker larger than the existing equipment, the customer's service conductors will need to be changed out to avoid any overloading.
- Customer plans indicate the use of a meter socket that is no longer approved, the customer must install metering equipment that is approved for the service size indicated.
- The energy storage backup equipment exceeds the ratings of the distribution equipment and/or substation equipment and requires upgrades.
- The energy storage backup equipment creates power quality issues for other customers so the customer may need a dedicated transformer.

Depending on the nature of the improvements required the customer/installer will be notified of the cost and rough timeline to make the improvements.

5. Equipment Requirements

Compliance with the following requirements shall be confirmed during evaluation of customer-owned backup generation system designs. The following listed requirements are the minimum and additional requirements may be added at time of review. Any revised design submitted must be in compliance with the most current requirements.

Technical Requirements

Design Considerations

The customer shall not energize the Company's de-energized circuit. The customer shall install the necessary sensing and control devices required to monitor voltage on all phases of the Company's supply circuit and prevent energizing where any phase voltage is outside the range specified in PSC 113.0702.

The Company normally applies automatic reclosing to all distribution lines. The customer must ensure that its backup generation is automatically disconnected from the Company's distribution system prior to reclosing.

> The Company shall assume no responsibility for damage to customer's equipment due to out of-phase reclosing.

Typically, the Company's devices may have one or more recloses with the first set at a minimum of 1.0 second. There may be single phase protection devices installed between the Company's source substation and the customer. It is the responsibility of the customer to protect its three phase equipment for potentially damaging effect of the loss of one or two phases supplying that equipment. The Company's system voltage may vary at the interconnection point. The customer's generation and protective scheme must be able to operate at the normal and short term voltage variation outlined above in PSC 113.0702.

It is the responsibility of the customer to ground the generator as necessary to protect its equipment.

Design and Operating Requirements

The nature of the Company's distribution system is dynamic; therefore, source conditions may change. The customer should be aware that changes made to the local utility system, or addition of other customers with generation, may require that modifications be made to the customer interconnection protective devices to properly coordinate with the utility supply. If changes are necessary, the customer may be subject to future charges to facilitate the modifications. Operation of the customer backup generation system shall not adversely affect other customers or interfere with proper operation of the utility system. If the backup generation system adversely affects other customers, the backup generation equipment may be required to be disconnected until the problem is resolved. The backup generation system owner must resolve the problem internally, if possible. The Company may make distribution system modifications to resolve the problem at the backup generation owner's expense, or the Company may disconnect service to the generation facility.

Maintenance

All backup generation protective devices, including circuit breakers, relays, control batteries and communication equipment, owned by the customer shall be periodically maintained, tested and calibrated by qualified personnel at intervals specified by the device manufacturer, or in accordance with accepted industry practice. Copies of maintenance, testing and calibration logs and reports shall be made available to the Company upon request. The customer grants the Company the right to witness or verify on demand the calibration and operation of all interconnection protective equipment.

Backup Generation Equipment Requirements

- Any energy storage system installed shall be UL 9540 compliant and shall be installed in accordance with its listing.
    - UL 9540 does not apply to Electric Vehicles since they are portable.
- The backup generation equipment shall use either a “Break-Before-Make” Style transfer switch or a Micro-grid Interconnect Device.
    - The use of mechanical interlocks in lieu of a transfer switch or Micro-grid Interconnect Device may be acceptable if installed in according to its listing and following review and approval from the Company.
- The Micro-grid Interconnect Device shall be UL 1741 compliant and shall be installed in accordance with its listing.
- Any transfer switch shall be UL 1008 compliant and shall be installed in accordance with its listing.
- The use of a Micro-grid Interconnect Device or mechanical interlocks will require a visible break disconnect to be installed to provide additional isolation between the backup generation and the distribution system.
- Installation of equipment that deviates from the manufacturer’s instructions/specifications voids these UL listings. (Installing equipment in areas that are not suitable for the environment, mix and match components outside of system’s listing, available fault current exceeds equipment ratings, etc.)
    - Minimum temperature ratings for equipment installed outside
        - Southeast WI: -30°F (Sheboygan and Fond Du Lac Counties and south)
        - Northeast WI and Upper Michigan: -40°F (North of Sheboygan and Fond Du Lac Counties)
- All equipment located upstream of the main service panel/disconnect shall be rated for the Guaranteed Available Short Circuit Current of the service.
    - All service entrance equipment shall be rated for the available fault current.
- The Company’s meters will not be installed in any customer-owned meter collars and meter socket adapters.
- Meter collars and meter socket adapters installed downstream of Company metering equipment in customer metering equipment will be allowed provided they are Listed by a Nationally Recognized Testing Lab, and installed in accordance with its Listing and Manufacturer’s Instructions.
    - Additional customer metering equipment shall not create additional neutral to ground bonds when installed in accordance with the meter socket’s listing/instructions.

Metering Equipment Requirements

- Any changes required to metering or service entry equipment shall be selected from the Company's metering manuals (We Energies or Wisconsin Public Service) and shall match the utility requested service size.
- Metering or service entry equipment that is a code violation or imposes a safety risk shall be updated to address the issue(s) and comply with current requirements listed in the Company's metering manuals.
- Metering equipment that shall be replaced to accommodate customer-owned backup generation
    - Rusted or damaged sockets or cabinets
        - This includes metering equipment with damaged fasteners and/or other internal components such as bypass levers.
    - Sockets or cabinets with inadequate internal or external clearances
- Metering/service equipment that is recommended to be replaced to accommodate customer-owned backup generation
    - Round-ring sockets
    - Legacy service types (e.g., three-phase 3W or 4W Delta Services)
    - Meters without the ability to bypass.
    - Metering equipment for underground services without provisions for frost loops (conduit style meter sockets).
    - Legacy metering installations that are not listed in the Company's metering manuals.
- Splices and/or taps shall not be made inside metering/service termination equipment.
- Once service entrance or similar customer-owned conductors exit the metering/service termination equipment they are not allowed to re-enter the metering/service termination equipment.

Disconnect Equipment Requirements

- Externally mounted disconnects shall provide a visible open between its contacts.
    - Breakers, including breakers integrated in metering equipment, or air conditioner "pull out" disconnects are not acceptable.
- Externally mounted disconnects shall have the ability to be locked in the OPEN position.
- Equipment connected downstream of the externally mounted disconnect shall be rated for the maximum input fault current allowed by the upstream fuses.
- All disconnect switches shall be connected such that their blades are de-energized when the switch is in the open or off position.
- The centerline of the disconnect shall be installed between 30" and 72" above grade.
- The disconnect shall have a minimum of 6" vertical and horizontal separation from all other electrical equipment, non-electrical equipment, and all other obstructions.
- Disconnect should be within 10' from metering equipment and within line of sight from the metering equipment.
    - Around the corner of a building, on the back side of a fence, or backside of a metering structure are not considered to be within line of sight from the metering equipment.
    - If the disconnection device cannot be located within 10 feet of the utility electric meter, permanent placards shall be installed at the metering equipment and

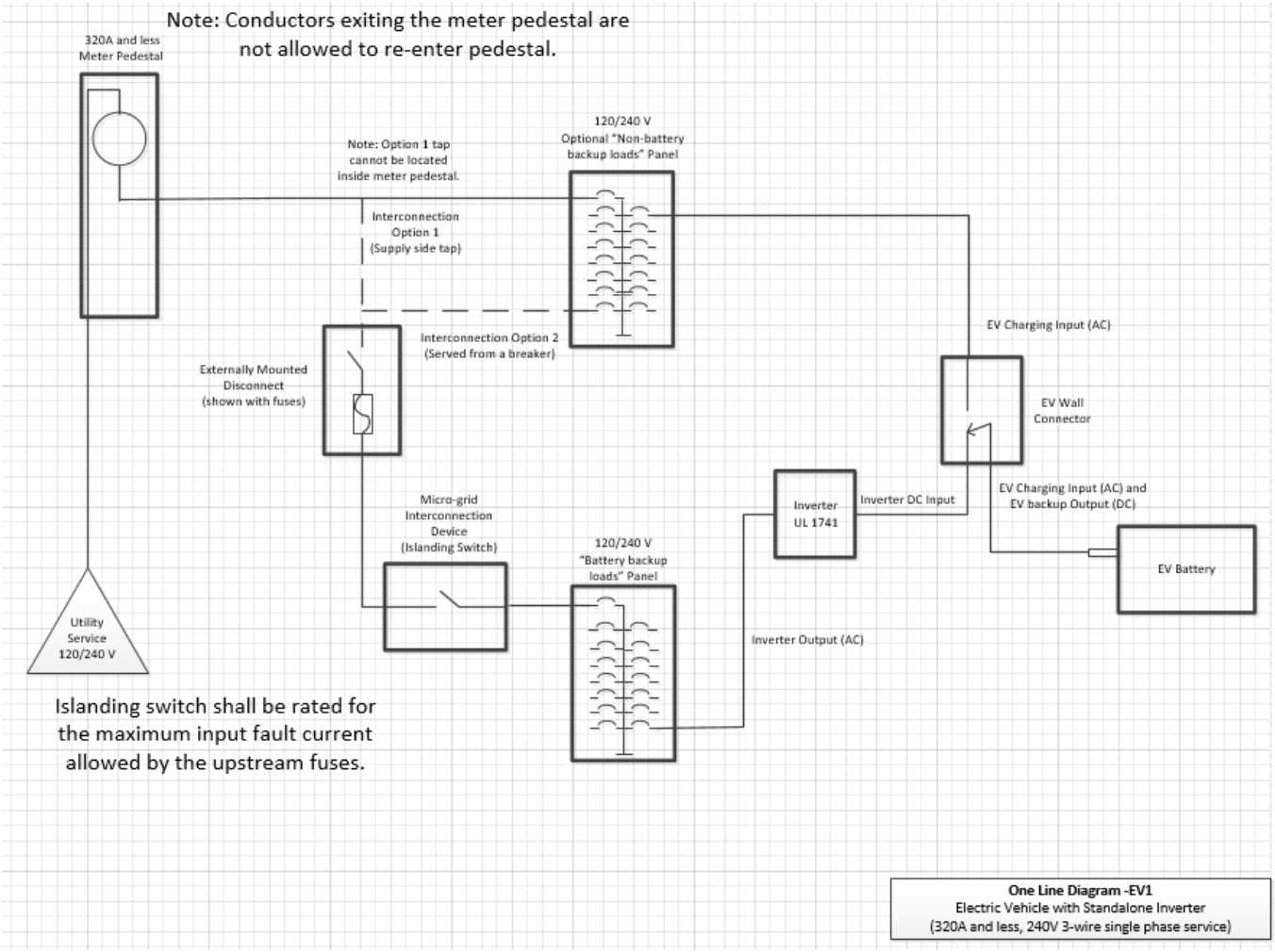
disconnect locations indicating the locations of the interconnection disconnect switch and metering equipment.

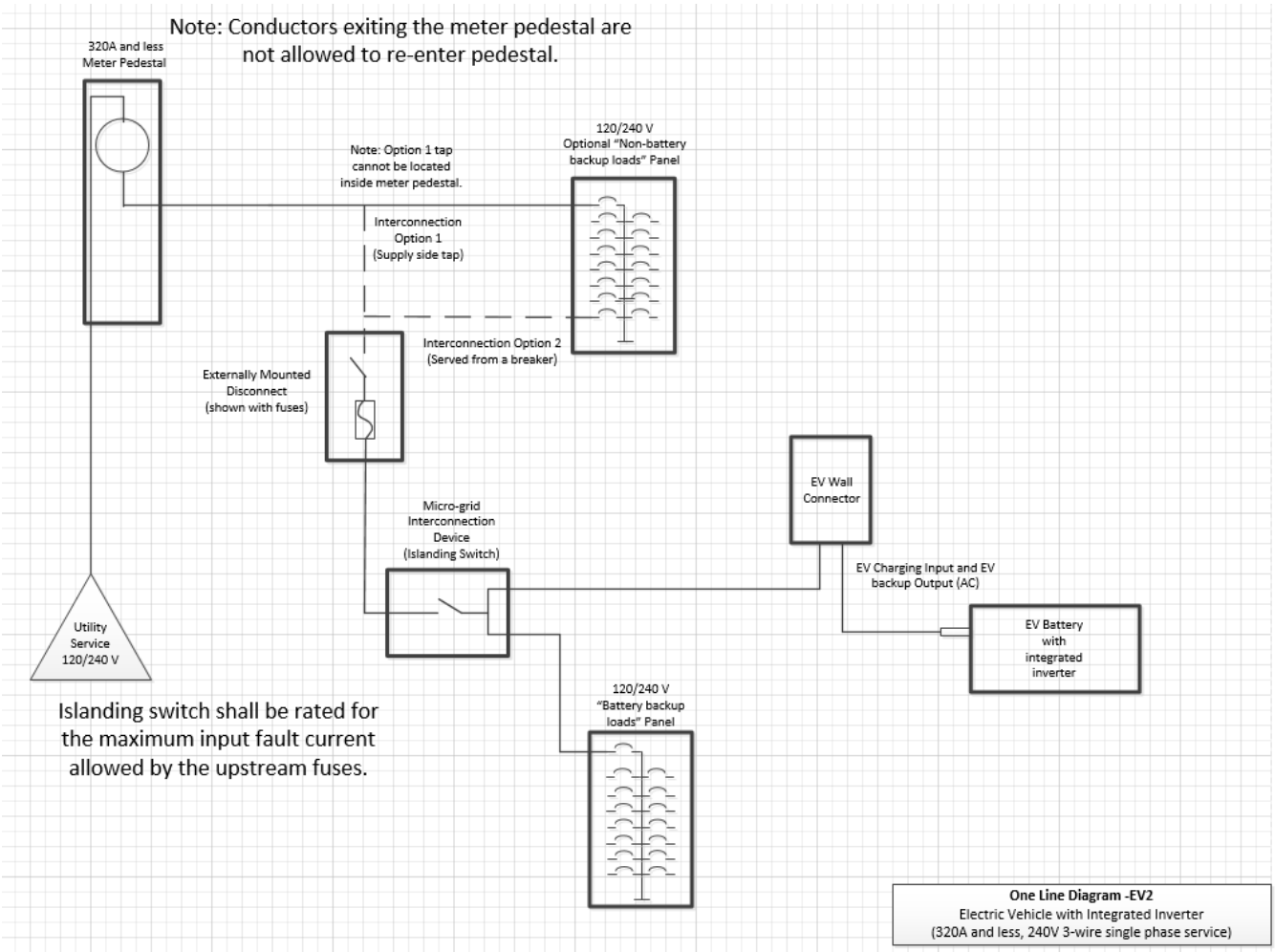
- Locating disconnect devices more than 10 feet away or out of line of site of metering equipment requires a written request for review and approval from the Company field application engineer. The intended placarding shall be submitted at the same time for review and approval.

Reference One-Line Diagrams

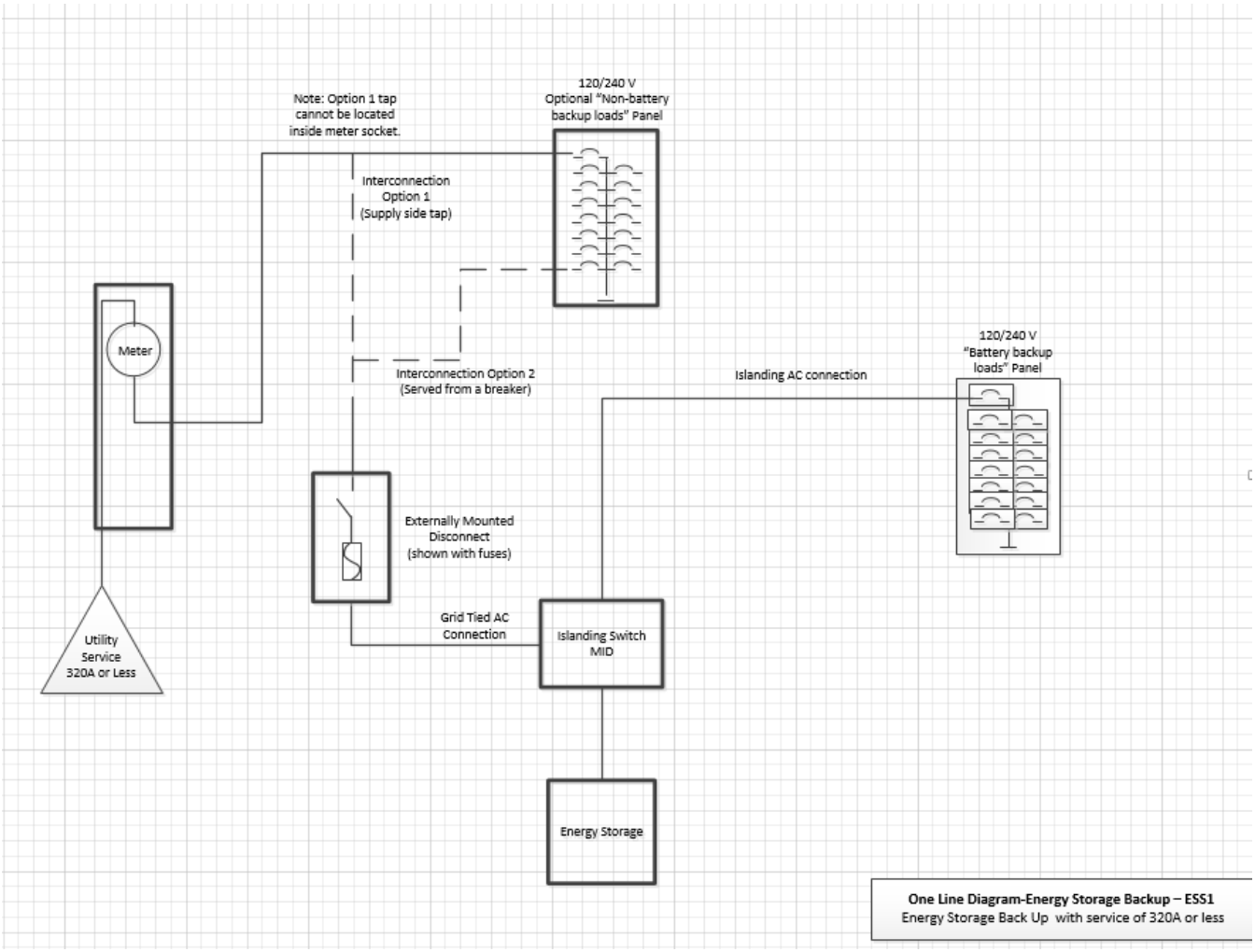
The following one-line diagrams are not a substitute for a design by a qualified individual, and are meant to be used as reference only. The following references do not cover all possible combinations of equipment and the minimum required disconnecting means are shown. The example one-lines below are shown with the most common forms of customer-owned backup generation.

EV Backup

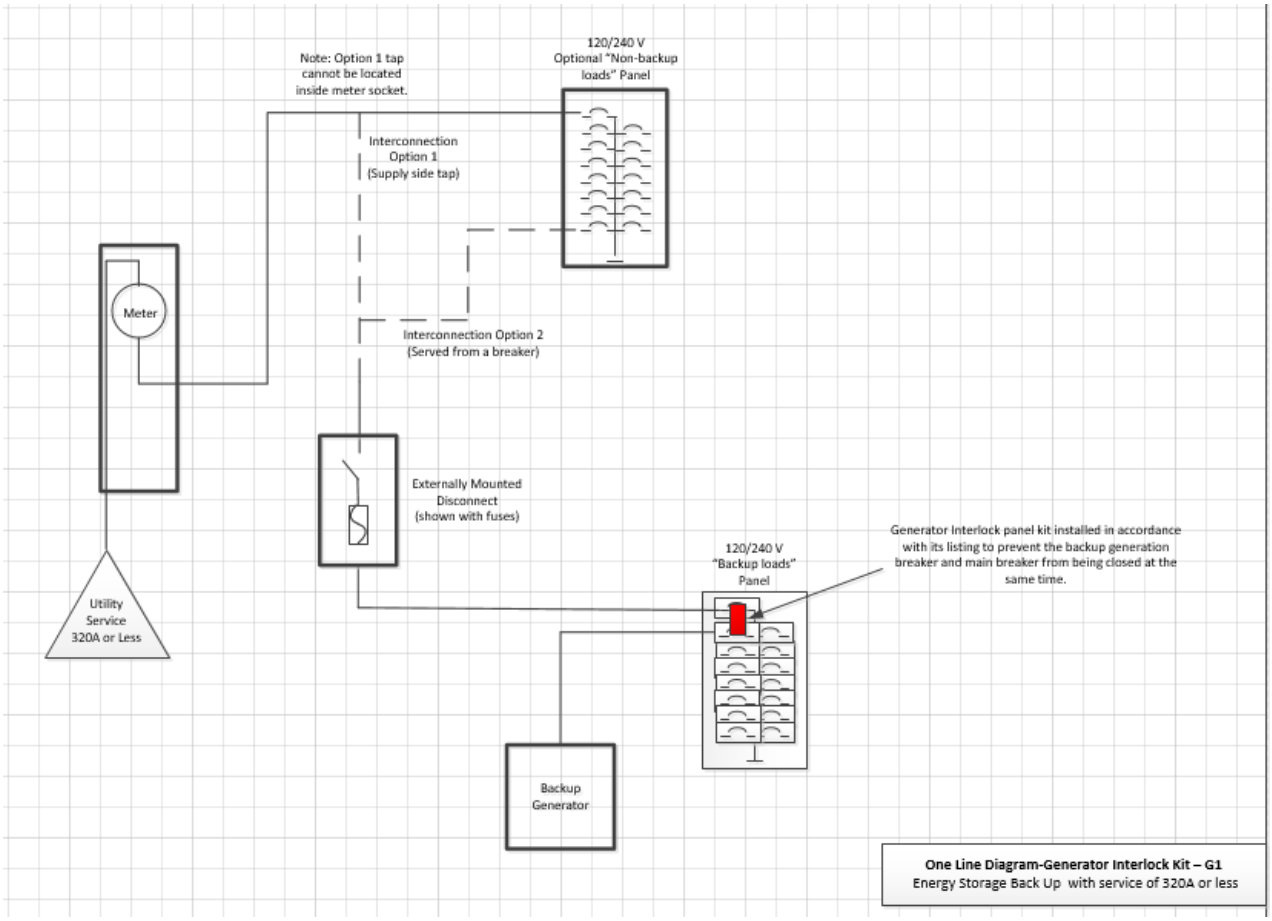



Note: Conductors exiting the meter pedestal are not allowed to re-enter pedestal.
320A and less Meter Pedestal
120/240 V Optional "Non-battery backup loads" Panel
Note: Option 1 tap cannot be located inside meter pedestal.
Interconnection Option 1 (Supply side tap)
Interconnection Option 2 (Served from a breaker)
Externally Mounted Disconnect (shown with fuses)
EV Wall Connector
Micro-grid Interconnection Device (Islanding Switch)
EV Charging Input and EV backup Output (AC)
EV Battery with integrated inverter
Utility Service 120/240 V
120/240 V "Battery backup loads" Panel
Islanding switch shall be rated for the maximum input fault current allowed by the upstream fuses.
One Line Diagram -EV2
Electric Vehicle with Integrated Inverter
(320A and less, 240V 3-wire single phase service)

Energy Storage Backup



Backup Generator with interlock kit



6. Commissioning Requirements

Commissioning will be required for all systems with the exception of the following:

1. Residential systems
2. Commercial systems utilizing a UL 1008 listed “break-before-make” transfer switch without energy storage.

Expectations

Approval of the facility documentation is the prerequisite to scheduling of final testing. Testing must be completed and passed in order to obtain permission to operate. The following guidelines are meant to ensure the commissioning is a timely and safe process.

- The facility shall be ready for testing no later than 10 minutes after the scheduled commissioning start time.
    - Ready for testing is defined as the facility is ready for the utility outage.
- The installer shall have access to the building(s) and all electrical equipment required for commissioning.
- The installer will remove all access panels necessary to allow access for commissioning measurements if required.
- The installer will have the tools and equipment with them required to perform the voltage and current measurements for verification of system operation if required.
    - Computer software connected to inverter is not an acceptable means of showing voltage or current measurements
- Other than the disconnecting device, Company personnel cannot operate customer-owned facilities such as breakers or inverter during the commissioning process, so the system needs to be left in a state that it will operate by closing the disconnect.
- If the customer is unable to have commissioning performed during normal business hours (Monday-Friday, 7 AM to 3 PM), the Company may be able to accommodate commissioning during non-business hours at the applicable billing rate.
- The Company reserves the right to reschedule commissionings on short notice due to elevated outage activity or other unavoidable Company resource constraints.
- All labels shall be installed prior to commissioning.
    - The labeling on the disconnect shall indicate power source(s) of the disconnect (generator, inverter, energy storage, etc.).
- The installation should be tested prior to commissioning to confirm all components are operating properly.

Commissioning Procedure

Commissioning begins with verification of equipment matching the submitted documentation. If any equipment installed differs from submitted documentation, the equipment will be reviewed to see if it will be acceptable and as-built documentation must be submitted after. The system cannot be operated until the as-built is submitted, reviewed, and accepted by the Company.

If the equipment that was installed is not acceptable the customer will need to either replace the equipment to match the accepted one-line or submit a new one-line for review and acceptance.

The Company will make the determination if a generation facility passes or fails the commissioning tests.

For backup facilities involving three-phase voltage that has high complexity (as determined by the Company) or is greater than 200kW, loss of phase testing shall be added to the commissioning process as described below. Installation of temporary disconnects for loss of phase testing is not an acceptable configuration, the system must be in final working condition.

The Company will create or simulate a utility outage (complete and partial phase as required) to the customer's service and verify the following:

1. The customer-owned backup system is operational and serving building loads
2. There is no voltage at the service point or disconnect location.

Approval/Pass

If the system passes, the job owner shall provide a written statement of final acceptance to the customer and installer.

Rejected/Failed

If the system fails, the job owner shall provide a written statement of failure to the customer and installer.

The installer shall take corrective action to fix the system, and the system shall be retested for proper operation.

7. Example Approval Letter

Template:

Subject: *ADDRESS* Backup Generation Formal Review WR*XXXXXXXX*

Body:

ADDRESS WR*XXXXXXX*

Customer-Owned Backup Generation Type:

☐ EV ☐ Energy Storage System ☐ Other:_____

I have reviewed the customer-owned backup generation application for the above address. New equipment shall be installed per the current metering requirements of the Company. If a hazard or unsafe condition is found the customer will need to make modifications to eliminate the hazard or unsafe condition before commissioning can occur.

The customer-owned backup generation application is APPROVED based on the adherence to the requirements laid out in the Customer-Owned Backup Generation Manual.

Any deviations from the approved documentation of the customer-owned backup generation facility will require re-review, approval, and commissioning, if required.

System Improvement Requirements Required?	*Customer Obligated*
☐ Service conductor replacement	☐
☐ Service transformer replacement	☐
☐ Service relocation	☐
☐ Distribution improvements	☐
☐ Other: _____	☐

Loss of Phase Testing Required? ☐ YES ☐ NO

Please contact JOB OWNER when system is ready to be commissioned per commissioning guidelines laid out in the Customer-Owned Backup Generation Manual.

Signed,

Engineer of Review

Subject: *1896 Generation Way, Milwaukee* COGS Formal Review WR*1234567*

Body:

1896 Generation Way, Milwaukee WR*1234567*

Customer-Owned Backup Generation Type:

☐ EV ☒ Energy Storage System ☐ Other:_____

I have reviewed the customer-owned backup generation application for the above address. New equipment shall be installed per the current metering requirements of the Company. If a hazard or unsafe condition is found the customer will need to make modifications to eliminate the hazard or unsafe condition before commissioning can occur.

The customer-owned backup generation application is APPROVED based on the adherence to the requirements laid out in the Customer-Owned Backup Generation Manual.

Any deviations from the approved documentation of the customer-owned backup generation facility will require re-review, approval, and commissioning, if required.

System Improvement Requirements Required?	*Customer Obligated*
☐ Service conductor replacement	☐
☐ Service transformer replacement	☐
☐ Service relocation	☐
☐ Distribution improvements	☐
☐ Other: _____	☐

Loss of Phase Testing Required? ☐ YES ☐ NO

Please contact JOB OWNER when system is ready to be commissioned per commissioning guidelines laid out in the Customer-Owned Backup Generation Manual.

Signed,

Engineer of Review