

# Net Metering Interconnection Requirements

## Scope

The purpose of this document is to describe the general requirements for the design, installation and testing of Net Metering facilities that operate in parallel with Idaho Power's electrical system. These requirements are established to help ensure the safety of people, property and the integrity of the electrical system.

This document does not describe the financial or contractual obligations of interconnection with Idaho Power's electrical system. Refer to Schedule 72, *Interconnections to Non-Utility Generation* and Schedule 84, *Customer Energy Production Net Metering* for this information.

These schedules and additional information, including the application for establishing a Net Metering service, are available on the Idaho Power website at:

[www.idahopower.com/netmetering/](http://www.idahopower.com/netmetering/)

or by calling (208) 388-2518 for Net Metering and (208) 388-2658 for Generator Interconnection.

These requirements are subject to change. Refer to the Idaho Power website or call the above number for the latest information prior to installation.

## Applicable Standards

Generation equipment installations must comply with all local codes and ordinances, and any other authority having jurisdiction. Additionally, the equipment and installations must meet all applicable safety and power quality standards established by the latest edition of the following documents:

The presently adopted edition of the *National Electric Code* (NEC) for the local jurisdiction; and especially, the following Articles:

- ◆ 250 – Grounding and Bonding
- ◆ 685 – Integrated Electrical Systems
- ◆ 690 – Solar Photovoltaic (PV) Systems
- ◆ 692 – Fuel Cell Systems
- ◆ 694 – Small Wind Electric Systems
- ◆ 700 – Emergency Systems
- ◆ 702 – Optional Standby Systems
- ◆ 705 – Interconnected Electric Power Production Sources
- ◆ 706 – Energy Storage Systems

Underwriters Laboratory, Inc. (UL) for listing of equipment:

- ◆ 1741 – Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
- ◆ 1703 – Flat-Plate Photovoltaic Modules and Panels
- ◆ 6140 – Outline of Investigation for Wind Turbine Generating System
- ◆ 1008 – Transfer Switch Equipment
- ◆ 2200 – Stationary Engine Generator Assemblies

The Institute of Electrical and Electronics Engineers (IEEE):

- ◆ 929 – Recommended Practice for Utility Interface of Photovoltaic (PV) Systems
- ◆ 1547 – Recommended Practice for Interconnecting Distributed Resources with Electric Power Systems Distribution Secondary Networks

**NOTE:** This document *does not* supersede any of the requirements in the above standards.

## Definitions

**Idaho Power or IPC** refers to Idaho Power Company or its authorized agent.

**Generator** refers to the user of a Net Metering System that has an on-site generation facility.

## Net Metering

A Net Metering System measures and bills only the difference between electricity supplied by Idaho Power and a customer-owned generator that is capable of providing power back to Idaho Power's distribution system.

In order to qualify as a Net Metering System, the generation facilities must meet the following parameters:

- ◆ Generation capacity of 25kW or less for residential or small commercial customers.
- ◆ Generation capacity of 100kW or less for irrigation or large commercial customers.
- ◆ Is located on the customer's premises.
- ◆ Is intended primarily to offset part or all of the customer's requirements for electricity.
- ◆ Operates in parallel (synchronizes) with Idaho Power's distribution facilities.
- ◆ Uses renewable resources as its primary means of generating electricity.

Acceptable renewable resources include the following methods:

- ◆ Biomass
- ◆ Fuel Cell
- ◆ Geothermal
- ◆ Hydro
- ◆ Solar
- ◆ Wind

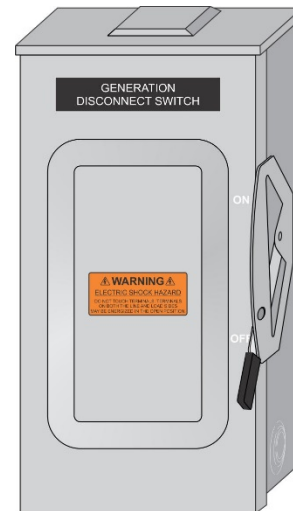
## Installation Requirements

Idaho Power requires a safety switch to disconnect *all* customer energy production and storage sources from its distribution system for the safety of its line workers.

The safety switch shall be located within 10 feet of the service meter and be accessible to Idaho Power employees at all times.

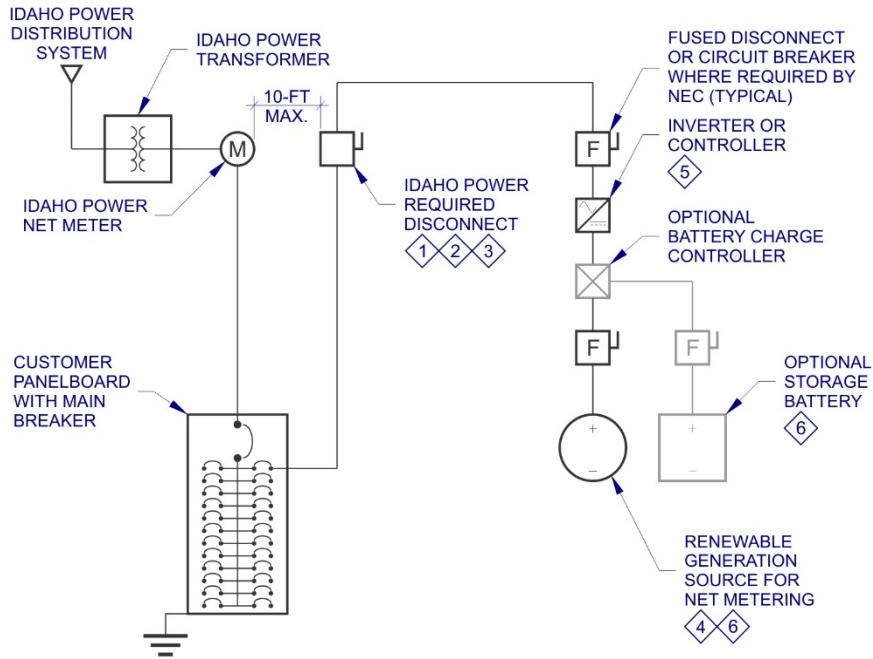
The switch must be manually operable with a visible "ON" and "OFF" indication and capable of being locked in the off position. **Drawout or other types of disconnects are not acceptable.**

The switch must be labeled "GENERATION DISCONNECT SWITCH" in 3/8" or higher lettering. Additional labeling may be required by the NEC.



**Generation Disconnect Switch**

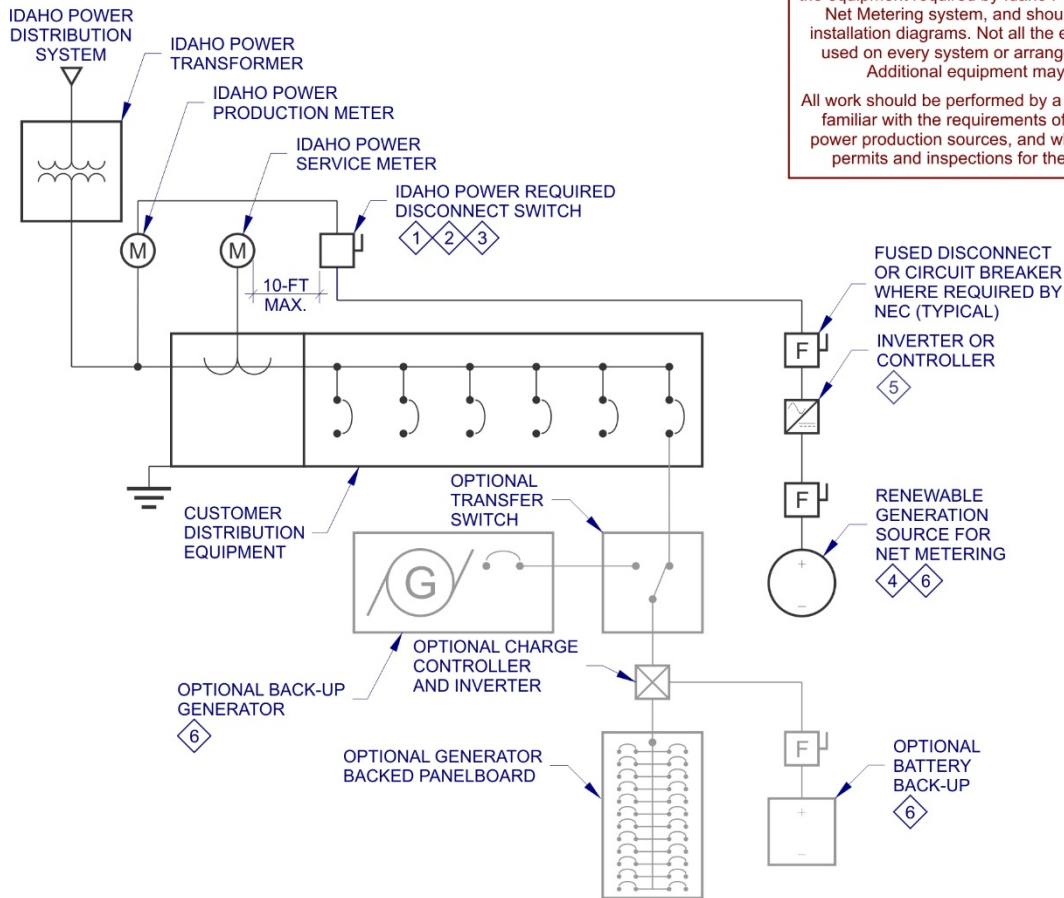
The generation disconnect switch may also serve as the NEC required disconnecting means if the location of the switch will comply with both Idaho Power's requirement and that of the NEC.



**NOTES TO DIAGRAMS**

- 1 DISCONNECT MUST BE MANUALLY OPERABLE, WITH VISIBLE "ON" AND "OFF" POSITIONS LOCATED WITHIN 10-FT OF SERVICE METER. PROVIDE LABEL "GENERATION DISCONNECT SWITCH" WITH PERMANENT LETTERS 3/8" HIGH OR LARGER.
- 2 DISCONNECT MAY ALSO SERVE AS NEC DISCONNECTING MEANS WHERE IT CAN BE LOCATED TO COMPLY WITH BOTH NEC AND IPC REQUIREMENTS. FUSE MAY BE REQUIRED.
- 3 WARNING LABEL MAY BE REQUIRED ON IDAHO POWER DISCONNECT INDICATING THAT BOTH SETS OF TERMINALS MAY BE ENERGIZED WHEN IN THE OPEN POSITION.
- 4 RENEWABLE SOURCE MAY GENERATE EITHER AC OR DC POWER.
- 5 EQUIPMENT MUST COMPLY WITH UL 1741 OR IEEE 1547 LISTINGS FOR GRID INTERACTION, OR BE APPROVED BY IPC.
- 6 SEPARATELY DERIVED SYSTEMS MUST BE PROPERLY GROUNDED AND/OR BONDED TO THE BUILDING GROUNDING ELECTRODE SYSTEM AS REQUIRED BY THE NEC.

**Sample Residential Single-Line Diagram**



**ATTENTION!**

These sample diagrams are provided to show how and where the equipment required by Idaho Power might fit into a typical Net Metering system, and should not be interpreted as installation diagrams. Not all the equipment shown may be used on every system or arranged in the same manner. Additional equipment may also be required.

All work should be performed by a qualified electrician that is familiar with the requirements of interconnected electric power production sources, and who obtains the necessary permits and inspections for the particular installation.

**Sample Commercial Single-Line Diagram**

## Testing Requirements

When the Generator owns, operates, and maintains the interconnection protection and control equipment, either as discrete components (relays/circuit breakers) or as part of a DC inverter package, the Generator shall conform to the test requirements in this section.

These test requirements apply only to interconnection disconnection devices and the protection and control equipment (e.g. the equipment protecting IPC personnel, the IPC system and IPC's customers). Testing of equipment associated specifically with protection or control of Generator's equipment is recommended, but not required by IPC unless they impact the interconnection protection.

The Generator shall have an independent qualified party as required by IPUC Tariff Schedule 72 perform the required acceptance and maintenance tests. The test results shall be submitted to IPC to evaluate and approve. IPC reserves the right to witness any testing.

## Acceptance Testing

An acceptance test must be performed to verify that the equipment meets the requirements specified herein prior to initial parallel operation by a Generator, or any time interface hardware or software is changed.

**UL listed (UL 1741) DC Inverters:** DC inverters meeting the latest edition of UL 1741, and permanently marked "Utility Interactive," or the equivalent, shall be inspected for proper installation.

Verification that the disconnect is functional and reconnection time complies with IEEE Standard 1547.

**Non-UL listed DC Inverters and Other Protection and Control Equipment (relays, etc.):** The equipment shall automatically disconnect from the IPC system as follows:

- ◆ Within ten (10) cycles if the voltage falls below  $60V_{RMS}$  phase to ground (nominal  $120V_{RMS}$  base) on any phase.
- ◆ Within two (2) seconds if the voltage falls below  $106V_{RMS}$  phase to ground (nominal  $120V_{RMS}$  base) on any phase.
- ◆ Within one (1) second if the voltage rises above  $132V_{RMS}$  phase to ground (nominal  $120V_{RMS}$  base) on any phase.
- ◆ Within ten (10) cycles if the voltage rises above  $144V_{RMS}$  phase to ground (nominal  $120V_{RMS}$  base) on any phase.
- ◆ Within ten (10) cycles if the frequency rises above 60.5Hz or falls below 59.3Hz.

All single-phase and three phase test voltages shall be applied phase to ground. Test voltages are specified phase to ground for a 120-volt nominal system. Other system voltages require adjusting the test voltages by the appropriate percentage. Over and undervoltage protection should be wired phase to ground. Phase-to-phase voltage sensing results in less sensitive undervoltage detection and more sensitive overvoltage detection.

Following a generation facility disconnect due to a voltage or frequency excursion, the generation facility shall remain disconnected until IPC's service voltage and frequency are within the operating voltage range of 106-132V, and frequency range of 59.3-60.5Hz for a minimum of five (5) minutes.

The controls (typically consisting of control switches, lockout relays and other discrete components) shall perform the following control functions:

- ◆ The Generator can allow the circuit-interrupting device to close or force it to trip. However, the Generator cannot force the circuit-interrupting device to close or prevent it from tripping.
- ◆ If the circuit-interrupting device closes into a fault it will trip and lockout requiring a manual reset (a motor circuit protector can be the interrupting device).

The installed protection equipment must have a nameplate that clearly shows the model number and firmware version (if applicable).

## Maintenance Testing

A maintenance test is required to determine if the equipment meets the requirements specified herein; to verify the interconnection protection and control has not been tampered with; and to verify the interconnection equipment meets safety codes and standards. In addition, all maintenance tests prescribed by the manufacturer shall be performed.

Maintenance testing shall be performed in accordance with IPUC Tariff Schedule 72.

**UL listed (UL 1741) DC Inverters:** For DC inverters that meet UL 1741 requirements and are labeled as such, the load break disconnect switch shall be opened to verify the power producing facility automatically shuts down and does not restart for five minutes after the switch is reclosed.

**Non-UL listed DC Inverters and Other Protection and Control Equipment (relays, etc.):** Equipment shall be tested as specified in “Acceptance Testing” above.