

# **Customer Generation Interconnection Standards**

## Customer Generation

### Scope

The purpose of this document is to describe Idaho Power's requirements for the installation and testing of Customer Generation Facilities that are interconnected with Idaho Power's electrical system. These requirements are established to help ensure the safety of people and property, and the integrity of the electrical system.

This document does not include the eligibility requirements, or financial and contractual obligations associated with interconnecting Customer Generation Facilities with Idaho Power's electrical system. Please refer to the following Rate Schedules for this and other information about the generation interconnection process:

- ◆ 06 – Residential On-Site Generation
- ◆ 08 – Small General Service On-Site Generation
- ◆ 72 – Interconnections to Non-Utility Generation
- ◆ 84 – Customer Energy Production Net Metering

These schedules and additional information, including the application for establishing a Customer Generation Service, are available on the Idaho Power website at:

[www.idahopower.com/energy-environment/green-choices/solar-power-options-customer-generation/](http://www.idahopower.com/energy-environment/green-choices/solar-power-options-customer-generation/)

or by calling the Idaho Power Customer Generation Team at **(208) 388-2559**.

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

# Customer Generation Interconnection Standards

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## Definitions

**Customer.** A user of Idaho Power's service.

**Customer Generation.** Customers taking service under one of the Rate Schedules listed under "Scope."

**Consumption (or Service) Meter.** The retail meter that measures the power consumed by a Customer.

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

**Generation Capacity.** The total nameplate capacity of the Generation Facility measured in kilovolt-amperes (kVA).

- ◆ For inverter-based generation sources, defined as the AC nameplate capacity of the inverter.
- ◆ For non-inverter-based generation sources, defined as the AC nameplate rating of the generation source.

Idaho Power will approve based on the maximum continuous operating AC output rating (typically kVA or VA). If the inverter only has a manufacturer kW AC output rating, Idaho Power will approve under the kW rating and will assume unity power factor.

**Generation Facility.** The equipment used to generate electric energy where the resulting energy is either delivered to Idaho Power or is consumed by the Customer.

**Interconnected.** Operating in parallel with and capable of delivering energy to Idaho Power's distribution system.

**Net Meter.** The retail meter that measures only the net difference between electricity supplied by Idaho Power and a Customer-owned Generation Facility.

**Parallel.** The synchronized (voltage and frequency) connection between a Generation Facility and Idaho Power's distribution system.

**Photovoltaic Power Source.** One or more solar panels that generate DC power as stated under standard test conditions.

**Production Meter.** The retail meter that measures the power delivered by a Generation Facility to Idaho Power.

**Turbine Power Source.** An AC or DC turbine at its rated speed and voltage.

## Applicable Standards

In addition to Idaho Power's requirements set forth in this document, Generation Facilities must comply with all applicable laws, rules, orders, regulations, codes, ordinances, and standards required by entities with jurisdictional authority and meet all applicable safety and power quality standards established by the latest edition of the following documents:

### **The *National Electric Code (NEC)* 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

# Customer Generation Interconnection Standards

## Qualification

In order to qualify as a Customer Generation Facility, the generation facilities must meet the following parameters:

- ◆ Generation Capacity of 25kW or less for residential or small general service Customers.
- ◆ Generation Capacity of 100kW or less for irrigation, large commercial or industrial Customers.
- ◆ Located on the Customer's premises.
- ◆ Intended primarily to offset part or all of the Customer's requirements for electricity.
- ◆ Interconnected with Idaho Power's distribution facilities.
- ◆ Uses one, or a combination of any, of the following renewable generation resources:
  - Biomass
  - Fuel Cell
  - Geothermal
  - Hydro
  - Solar
  - Wind

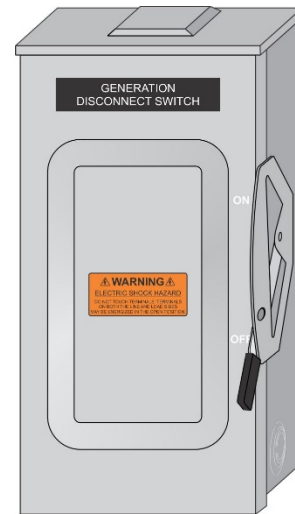
## Installation Requirements

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

The switch shall be located within 10-feet of the service meter and be accessible to Idaho Power employees at all times. If the switch cannot be located within 10-feet of the service meter or is not visible from the meter, a permanent placard at the service meter location must be provided that gives clear directions to the disconnect location.

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

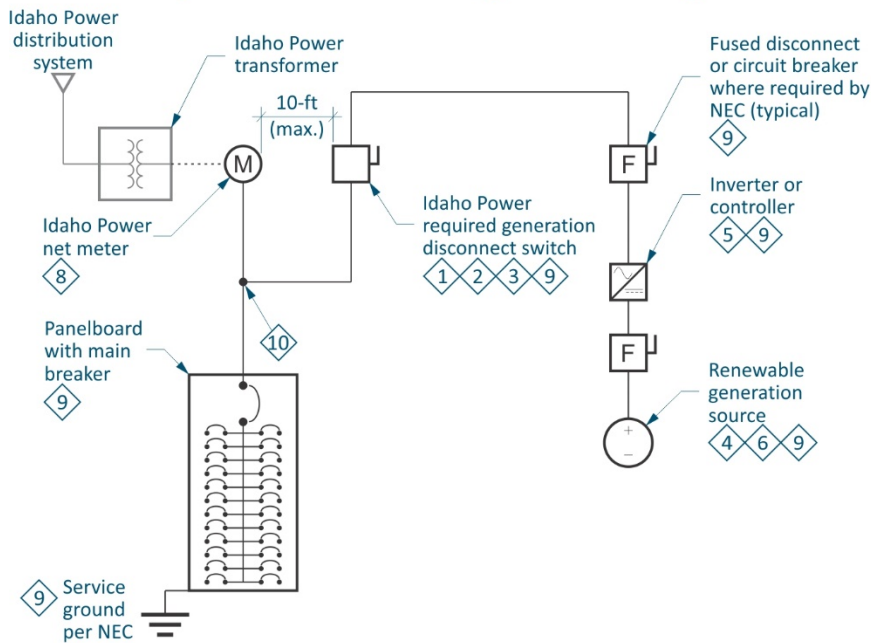
The switch must be labeled "GENERATION DISCONNECT SWITCH" in 3/8-inch or higher lettering. Additional labeling may be required by the NEC.



**Generation Disconnect Switch**

# Customer Generation Interconnection Standards

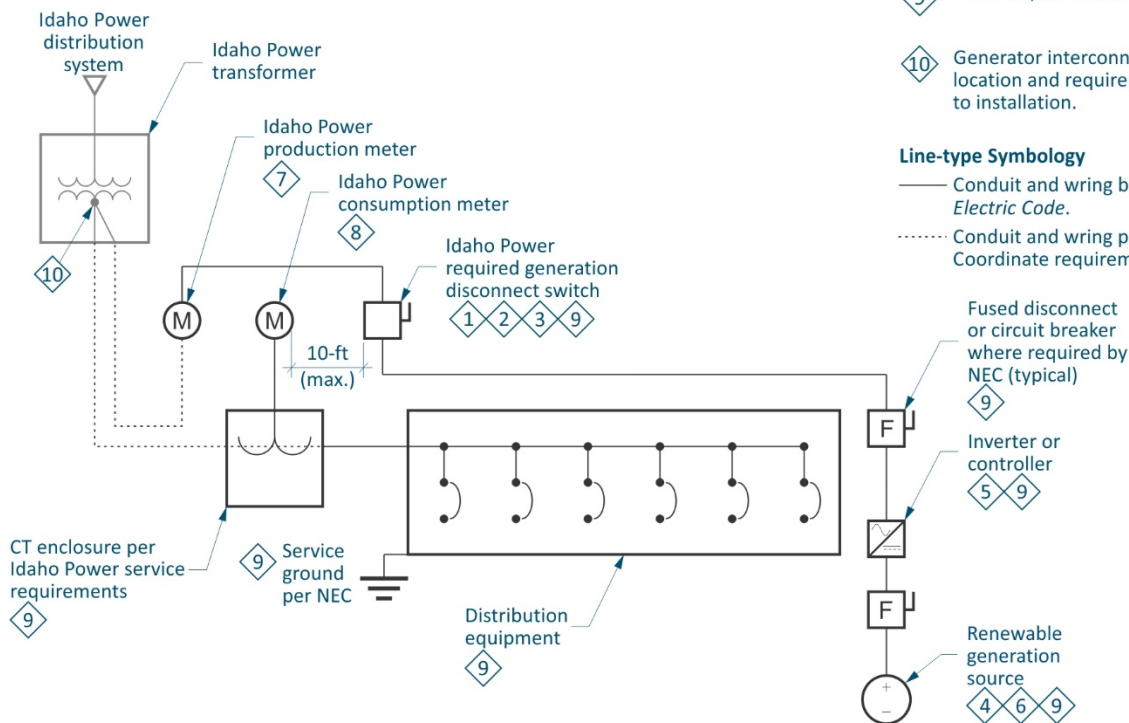
## Sample One-Meter Single-Line Diagram



### Notes to Diagrams

- 1 Disconnect must be manual 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 Idaho Power.
- 6 Separately derived systems must be properly grounded and/or bonded to the building grounding electrode system as required by the NEC.
- 7 Production meter provided and owned by Idaho Power. Meter base owned by and installed adjacent to service meter by Customer.
- 8 Consumption meter provided and owned by Idaho Power. Meter base provided, owned and installed by Customer.
- 9 Provided, owned and installed by Customer.
- 10 Generator interconnection point. Coordinate exact location and requirements with Idaho Power prior to installation.

## Sample Two-Meter Single-Line Diagram



### Line-type Symbolology

- Conduit and wiring by Customer per the *National Electric Code*.
- ..... Conduit and wiring per Idaho Power specifications. Coordinate requirements prior to installation.

### ATTENTION!

The sample diagrams on this page are provided for illustrative purposes only and do not indicate all the equipment, or the specific arrangement of such equipment, that may be necessary for Customer Generation systems. These diagrams provide examples of how Idaho Power's interconnection requirements apply to a Customer Generation system but should in no way be interpreted or used as installation instructions; and are not representative of the engineering design, installation or *National Electric Code* requirements associated with all Customer Generation systems.

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 installation. Refer to Idaho Power's Service Requirements for additional information.

## Testing Requirements

When the Customer 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 Generation Facility shall conform to the acceptance and maintenance test requirements described below.

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 generation equipment is recommended, but not required by IPC unless they impact the interconnection protection.

## 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.

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

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.

**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.

**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.

## Revision History

REVISION	DATE	DESCRIPTION
0	05/01/2020	Reformatted document. Revised Definitions.
1	08/03/2020	Renamed document.
2	09/21/2020	Revised definition of "Generation Capacity."