Customer Requirements for Generation Service

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General Information

Pre-Construction

Before beginning work on a Customer Generation installation, view Idaho Power's technical requirements and application process on Idaho Power's website.

The requirements in this document pertain specifically to Customer Generation services:

- Single "net" meter installations for generation.
- Two-meter (consumption and production) installations for generation.
- "Grandfathered" net meter installations when adding additional generation capacity.

NOTE. *Idaho Power recently submitted a request to the Idaho Public Utilities Commission (IPUC) proposing to modify the second meter requirement for Commercial, Industrial and Irrigation Customer Generation Facilities. Please reference the* Frequently Asked Questions *on Idaho Power's website to see how this will affect future projects if approved by the IPUC.*

For additional information, refer to Idaho Power's website at:

www.idahopower.com/service-and-billing/construction/

All installations must meet the requirements of the *National Electrical Code* (NEC) with modifications as adopted by the Authority Having Jurisdiction at the service address and display the proper electrical permit. To avoid a return trip charge and a delay in service, make sure the installation has passed the required electrical inspections before requesting permanent service.

ATTENTION! *Idaho Power cannot energize a new service or re-energize a disconnected service until it has passed an electrical inspection.*

Dig-Line. Dial **811** (nationwide). To help prevent damage to other underground facilities, always call Dig-Line for a locate at least 2 business days before digging, excavating or driving a ground rod.

811 Know what's below. Call before you dig.

Interconnection Requirements

Refer to the *Generation Interconnection Standards* document for additional information on Idaho Power's requirements for installation and testing Customer Generation facilities.

Required Permits

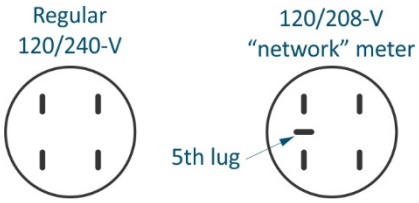
State and local governments may require that the following permits be obtained and provided to Idaho Power before connecting an electrical service:

- City or state electrical permit(s).
- Additional documents and paperwork depending on scope and location of the project (canal or highway permits, easements, etc.).

Service Voltages

Single-phase (1-Ø): 120/240-volt
240/480-volt (see note)
120/208-volt (see note)

Three-phase (3-Ø): 120/208-volt
277/480-volt
120/240-volt (see note)
240/480-volt (see note)



1-Ø Self-contained Meter Lug Arrangements

NOTE. *Single-phase, 240/480-volt services are available for overhead only and must be approved in advance by Idaho Power. Single-phase, 120/208-volt services require a "network" meter with a 5th lug and are only available as part of a 3-phase, multi-tenant service.*

3-Ø Self-contained Meter Lug Arrangement

NOTE. *Three-phase, 120/240-volt and 240/480-volt services are for maintenance only and are not available for new construction, except for some specific applications that must be approved in advance by Idaho Power.*

Site Preparation

To avoid a return trip charge and unnecessary delays with a service installation, prepare the site before the arrival of Idaho Power's team. Site preparation may include the following:

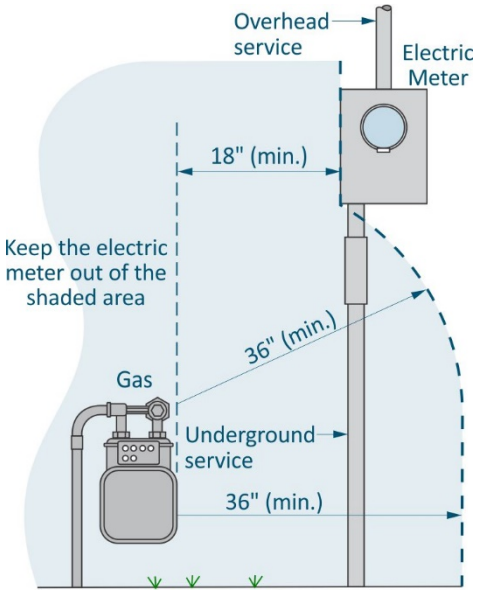
- Install the meter pole, flag its location, or mark the location on the building foundation.
- Provide clear access to the site.
- Identify all property lines with property pins and written documentation.
- Establish the final grade of the site.
- Obtain all required permits and inspections.

Be sure to route to the proper equipment. Refer to the Definitions section or contact Idaho Power for clarification.

Clearances

Separation Between Electric and Gas. A gas meter must have a minimum horizontal separation of 36-inches from any electric meter, enclosure or equipment. Electrical conduit is not considered electrical equipment.

For residential applications only, this clearance can be reduced to 36-inches measured in any direction, except that the horizontal separation must be at least 18-inches. Keep all electric equipment out of the shaded area as shown.



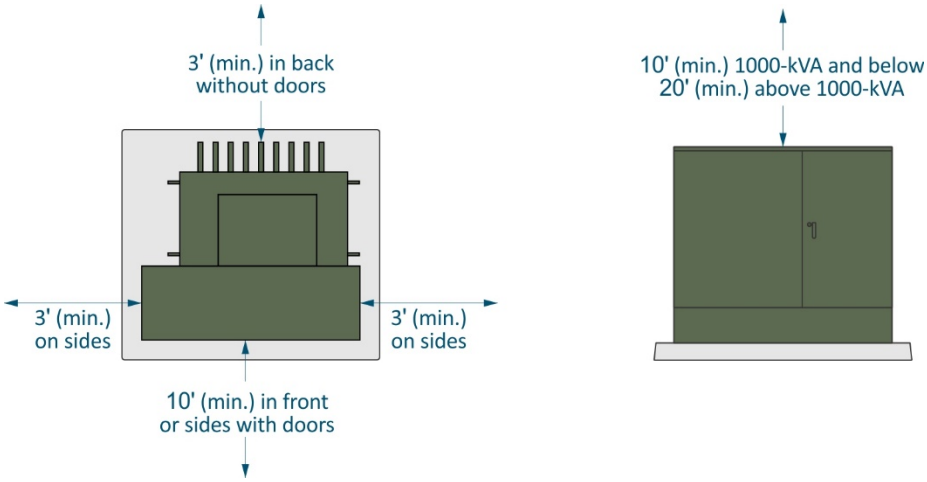
Separation Between Electric and Gas (Residential Only)

Propane Tanks. Any regulator, pressure relief valve, or fill connection associated with a propane tank or its delivery system must be at least 10-feet from any source of ignition, which includes the electric meter, air conditioning unit, etc. Keep the service conductor and conduit at least 3-feet from the tank.

NOTE. *Propane dispensing tanks must be at least 20-feet from any source of ignition.*

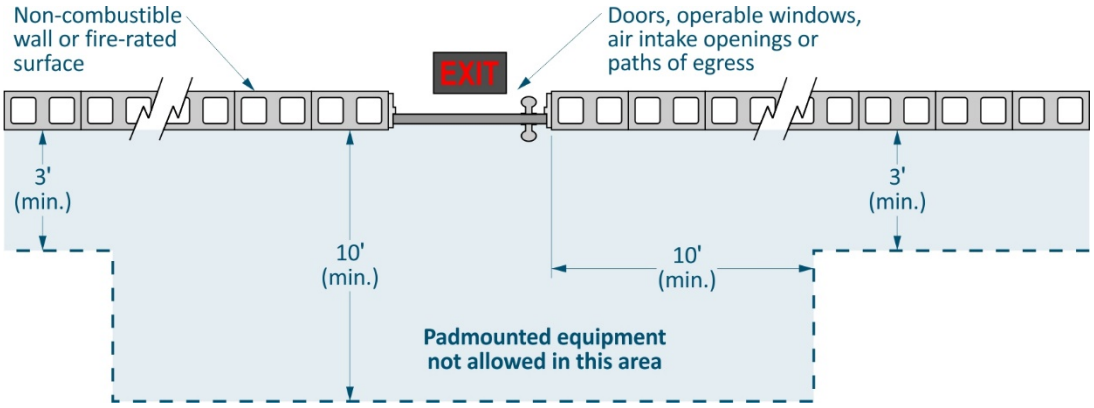
Overhead Power Lines. Persons, including any tools and equipment being held, must stay at least 10-feet from any overhead distribution power line, and further from any transmission power lines. Buildings, antennas, signs, pools and other objects require additional horizontal and vertical clearances from overhead power lines. Consult Idaho Power for more information.

Padmounted Equipment. The working clearance around padmounted equipment is a minimum of 10-feet from the front (or sides with doors) and 3-feet from the other sides and back. Equipment lifting requirements are either 10- or 20-feet above the equipment depending on its size. Keep shrubs, stored material, fences etc. out of this space.



Working Clearance around Padmounted Transformer

Combustible structures are required to be 10-feet from padmounted transformers. This clearance may be reduced to the 3-feet working clearance from a non-combustible wall. A 10-foot clearance is still required in front, to each side, and vertically of any door, operable window, air intake vent, or path of egress located on a non-combustible wall or surface.



Clearance from a Non-Combustible Wall

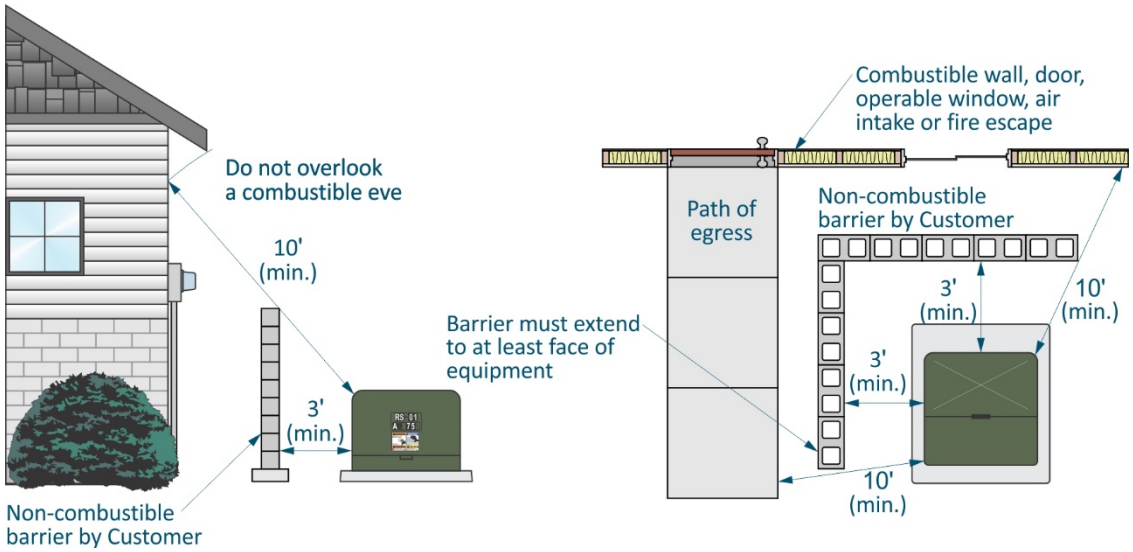
Non-combustible walls must have:

- A 1-hour fire rating for most commercial and industrial buildings.
- A 3-hour fire rating for residences and businesses where people may be sleeping (hotels, etc.).

EXCEPTION: *Non-operable windows (that do not open) installed in a non-combustible wall require a 10-foot clearance in front, but only 3-feet to each side.*

Fire-Resistant Barriers. Where it is not practical to obtain the required clearance between the equipment and a combustible building surface or opening; the Customer may provide a fire-resistant barrier constructed of non-combustible materials and meeting all applicable building codes and Idaho Power's requirements.

An acceptable fire-resistant barrier is a free-standing wall such as brick, CMU block or concrete that is located between the padmounted equipment and a combustible building or surface.



Fire-Resistant Barrier

Consider the following when constructing a fire-resistant barrier:

- Make sure that the height and length of the barrier meet the needs of each application.
- Allow space for reasonable variations in the size of the equipment should it need to be replaced in the future.
- The 10-foot clearance is measured "line-of-sight" between the nearest point on the equipment and the wall, opening and/or path of egress.

Changing an Existing Electrical Service

An existing electrical service may be changed, modified, or relocated to meet the Customer's electrical needs when installing a Customer Generation System. Sometimes, it may be necessary to disconnect the power to do this work.

ATTENTION! *Making changes to an existing service will require the service to comply with Idaho Power's requirements in this and any other related documents.*

Idaho Power will disconnect the existing service and then reconnect it after the work is completed at no cost provided:

1. Idaho Power receives at least 24 hours' notice for the disconnect and the reconnect.
2. Both the disconnect and the reconnect are done during normal working hours (weekdays between 8:00 am and 5:00 pm).
3. The service is ready to be disconnected when Idaho Power arrives.
4. The service is ready to be reconnected when Idaho Power arrives with a passed an electrical inspection by the Authority Having Jurisdiction.

There may be a charge for this service if it is required outside normal business hours, or if Idaho Power is required to make an extra trip if the service is not ready or does not comply with Idaho Power's requirements.

Construction fees may apply to any additional work or materials supplied by Idaho Power to meet the needs of the new service. Construction credit allowances may not be available when load is added to an existing service. An Idaho Power representative will review the new service requirements to determine if its existing facilities are adequate for the changes to the existing service.

Portable Generators

Do not connect a portable generator to a building's electrical wiring unless a transfer switch has been installed as required by **NEC Article 702, Optional Standby Systems** (or other applicable NEC Articles). The transfer switch prevents the generator from feeding back into the Idaho Power electrical system, exposing workers to unforeseeable hazards. The generator can also be damaged if the electrical system becomes energized while the generator is operating.

Transfer devices that are installed in the meter base are not allowed.

Available Fault Current

The NEC requires that service entry equipment must be rated for the maximum available fault current from all sources—including any customer generation.

Residential Services. For typical, single-family, residential services with a self-contained meter; and served from a 100-kVA transformer or smaller, the available fault current contribution from Idaho Power will require service equipment ratings as shown:

Fault Current Ratings for Residential Services by Length

	Overhead Services		Underground Services from Transformer		Underground Services from Handhole	
Service	**10k AIC**	**22k AIC**	**10k AIC**	**22k AIC**	**10k AIC**	**22k AIC**
200A	≥ 30-ft	< 30-ft	≥ 40-ft	< 40-ft	≥ 20-ft	< 20-ft
400A	≥ 50-ft	< 50-ft	≥ 80-ft	< 80-ft	≥ 40-ft	< 40-ft

Contact Idaho Power to obtain more precise fault current contributions, for larger transformers, or for any other type of residential service. Please have a service length and demand load available.

Commercial, Industrial and Irrigation Services. Contact Idaho Power to obtain the maximum available fault current.

Who Provides the Materials?

Most materials are provided by the Customer. Idaho Power will provide the meter and service conductors from its facilities to the point of delivery and may provide other material for some installations. Refer to the service diagrams for an installation type for additional information.

Materials provided by Idaho Power may be charged to the Customer as part of the cost of the service. Consult Idaho Power for specific information.

Connectors. Generally, the owner of the enclosure or equipment will provide the electrical connectors (lugs or terminals) within that piece of equipment necessary to connect the electrical conductors, regardless of who owns the conductors. The number, size, and type of conductors must be known so that the proper lugs or terminals can be provided.

Definitions

General Terms

ANSI (American National Standards Institute) is an organization responsible for a variety of industry standards including pole class.

Authority Having Jurisdiction refers to the Electrical Inspector for the state or city in which the Customer's equipment is installed.

Customer refers to a present or prospective user of Idaho Power's service.

EUSERC (Electric Utility Service Equipment Requirements Committee) is the committee that develops standards for meter enclosures and service equipment.

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

IEEE (Institute of Electrical and Electronics Engineers) is an organization that publishes a variety of industry standards for electrical and electronic equipment.

NEC (*National Electric Code*) is the Code that establishes the requirements for Customer's wiring that is adopted and/or amended by law and enforced by the Authority Having Jurisdiction. Electrical wiring for Idaho Power is governed by a different Code.

Service has two definitions:

1. The supply of electricity from Idaho Power to the Customer.
2. The conductors (wires or cables) that connect Idaho Power's facilities to Customer's equipment.

Tariff refers to the requirements, limitations and rates for a Customer's service. Tariffs are governed by the Public Utilities Commission.

Electrical Terms

Amp (A) is short for "ampere" and refers to the measurement of current flow. It may also refer to the maximum current a piece of electrical equipment is designed to accommodate (i.e. 200-A meter base).

Arc Flash refers to the release of energy caused by an electrical arc. Protection from the hazards associated with a possible arc flash are established by OSHA (Occupational Safety and Health Administration) and the National Fire Protection Association (NFPA 70E).

Fault Current refers to the amount of electrical current that can be supplied to Customer's equipment in the event of a short circuit. Customer equipment must have an AIC (available interrupting current) rating able to withstand this current.

Horsepower (HP) refers to the size (electrical load) of a motor: 1-HP = 0.746-kW.

Kilowatt (kW) refers to the size (electrical load) of a Customer's service: 1-kW = 1000-watts.

Kilowatt-Hour (kWH) refers to the electrical consumption of a Customer's load. A 1000-watt load operating for 1-hour uses 1-kWH.

Kilovolt Ampere (kVA) refers to the apparent power of a Customer's load and is what Idaho Power uses to size its facilities. kVA = kW/pf.

Non-linear Load refers to an electrical device that draws current in a non-sinusoidal waveform such as:

- Solid-state motor drives
- Variable frequency drives
- Adjustable speed drives
- Electronic motor controllers
- Electronic power supplies
- Electronic phase converters

Tariffs require that these loads must meet IEEE 519-1992 guidelines regarding their effect on voltage distortion and notching.

Phase (Ø) refers to the number of waveforms for an electrical service, either single-phase (1-Ø) or three-phase (3-Ø).

Power Factor (pf) is a ratio used to measure the inefficiency of an electric load. Idaho Power may need to install larger facilities to serve a Customer's load if the power factor is too low.

Volt (V) is the measurement of electrical potential and corresponds to the Customer's service voltage (i.e. 120/240-V).

Voltage Drop is a reduction in supply voltage due to resistive heating losses in conductors.

Conduit

Conduit refers to a continuous raceway used for installing electrical conductors.

EMT (Electrical Metal Tubing) is thin wall metal tubing.

Rigid Conduit is required by Idaho Power for certain applications and includes the following types:

- IMC (Intermediate Metal Conduit) is lighter weight than RMC and GRC, but still acceptable for applications that require rigid conduit.
- RMC (Rigid Metal Conduit) and GRC (Galvanized Rigid Conduit) are heavy wall metallic conduit.
- Schedule 80 PVC is heavy weight, non-metallic conduit and is acceptable below ground and for applications that require rigid conduit.

Schedule 40 PVC is a non-metallic conduit that is acceptable to Idaho Power for use below ground.

Weatherhead refers to the weatherproof service drop entry point where overhead power conductors enter the conduit to the meter base.

Metering

Current Transformer (or CT) is an instrument transformer used in metering that allows large Customer loads (those that exceed the capacity of self-contained meters) to be measured.

Current Transformer Enclosure (or CT Enclosure) is a cabinet that houses Idaho Power's instrument transformers.

CT Metering Wires are wires installed in 1-inch conduit by Idaho Power between the CTs and the meter.

Meter is a device for measuring the electric energy consumed by a Customer.

Meter Seal is a device installed on a meter base by Idaho Power that, when broken, indicates that the meter base has been opened.

Self-contained Meter refers to a meter that measures a Customer's load without using CTs.

Poles

Pole Class is an ANSI standard used to establish the strength of a wood pole based on the type of wood and the dimensions of the pole at specific locations. If the pole is not branded follow the table below:

Class 6 Wood Pole Measurements

Pole Length	Top	6' from Pole Butt
20'	17" min.	23" min.
25'	17" min.	26" min.
30'	17" min.	28" min.
35'	17" min.	30" min.

Measurements are circumference for Douglas Fir or Western Red Cedar. Other species of wood poles will vary. For more information contact Idaho Power.

A minimum Class 6, round, treated, wood pole in like-new, climbable condition is required for permanent service. A 6-inch by 6-inch, treated wood post may be used for a temporary service only.

Pole Size refers to the overall length of the pole and includes the portion buried in the ground.

Services

Single-phase (1-Ø) Service refers to an overhead or underground three-wire service used to serve 1-Ø loads. Typically for residential or small commercial and some irrigation Customers.

Three-phase (3-Ø) Service refers to an overhead or underground four-wire service used to serve 3-Ø loads. Typically for commercial, most irrigation and industrial Customers.

Point of Attachment for overhead services is the point on the Customer's building, structure or pole that supports service wires.

Service Point is the point where Idaho Power's service conductors connect to the Customer's wires or equipment.

- For self-contained meters on overhead services, the service point is located at the drip loop where the Customer's conductors exit the weatherhead.
- For self-contained meters on underground services, the service point is located at the line-side lugs in the meter base.
- For CT metered overhead services, the service point is located at the drip loop where the Customer's conductors exit the weatherhead, or at the connection of Idaho Power's conductors to the Customer's conductors.
- For CT metered underground services, the service point is located in the CT enclosure for Idaho Power-owned services; or at the secondary lugs of the transformer, or secondary bus cabinet for Customer-owned services.
- For multi-metered services, the service point is located at the lugs in the incoming section of the service equipment.

Service Disconnect is a Customer-owned circuit breaker or fused switch that is intended to disconnect the Customer's electrical system from Idaho Power.

Equipment

Handholes are small subsurface boxes that contain connections between the Customer's service and Idaho Power's facilities. Don't hide, bury or drive vehicles over handholes.

Handhole

Pedestals are above-ground boxes that contain connections between the Customer's service and Idaho Power's facilities. Meter pedestals are different, as they contain a meter base and not just connectors.

Pedestal

Transformers are electrical devices that convert Idaho Power's high voltage facilities to the desired voltage needed for the Customer's service.

1-Ø Overhead Transformer

3-Ø Overhead Transformers

1-Ø and 3-Ø Padmounted Transformers

Don't mistake other Idaho Power padmounted equipment for a transformer. Only transformers have service voltages on them. Contact Idaho Power for clarification.

Other Padmounted Equipment

Meters

Meter Base Requirements

Refer to the *Meter Base Identification* document for additional information.

120/240-Volt and 240/480-Volt, 1-Ø Meter Bases. EUSERC-approved bases are recommended. Other bases may be accepted if they have adequate wiring space (preferably 6-inches) between the load terminals and underground conduit entry, and meet the following minimum dimensions:

1-Ø Meter Base Minimum Dimensions

Service	Continuous	Height*	Width*	Depth*	Conduit Entry
100A	125A	11"	8"	4"	2"
200A	225A	15"	11"	4"	2"
400A	320A	22"	11"	5"	3"

*Dimensions shown are rounded to the nearest inch.

120/208-Volt, 3-Ø Meter Bases. EUSERC-approved with or without "safety socket test bypass" meter bases are accepted on all self-contained, 208-volt services up to 200-amps.

277/480-Volt, 3-Ø Meter Bases. EUSERC-approved with "safety socket text bypass" meter bases are required on all self-contained, 480-volt meter bases up to 200-amps.

CT Meter Bases. CT meters are required for single-phase services greater than 400-amps and three-phase services greater than 200A. Bases for these meters are provided by Idaho Power.

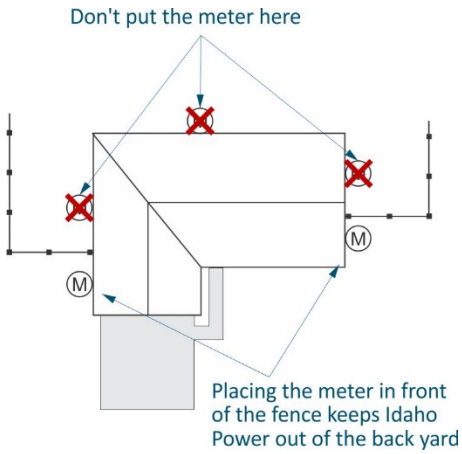
NOTE. *There is an additional charge for CT metering when the Customer's main breaker or panel size is 400-amps or less.*

Meter Base Wiring

Customer wiring for a "consumption" or "net" meter base is required to be connected to the "load-side" (bottom) terminals, and Idaho Power's wiring will be on the "line-side" (top) terminals. Customer wiring for a "production" meter base is required to be connected to the "line-side" (top) terminals and Idaho Power will connect to the "load side" (bottom) terminals.

Meter Location

The meter and any associated equipment must be located so that the installation and any future maintenance can be performed without undue inconvenience to the Customer or Idaho Power. Locate residential meters as shown below:



Residential Meter Location

The meter must be located in a reasonably protected area to minimize the risk of inadvertent damage. Placing the meter in front of the fence keeps Idaho Power personnel out of the back yard.

The meter base, conduit and any CT enclosure must be adequately supported on the outside of an exterior structure wall so that it will be readily accessible to Idaho Power. Do not cover or enclose the meter.

Recessed Meter Bases. Recessed meter bases are not allowed.

Meter Poles

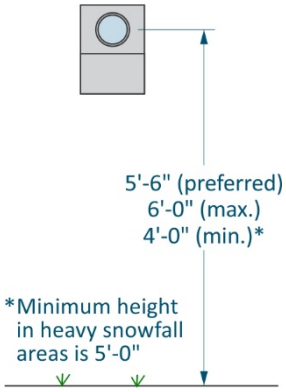
All poles for mounting metering equipment are provided, installed and owned by the Customer. They must be tall enough to provide adequate clearance above the finished grade or obstacles for the service conductor and drip loop.

Each pole must have a minimum setting depth of 10% of the length of the pole plus 2-feet, 6-inches. Additional bracing must be installed if the tension of the service conductor will cause the pole to lean. A minimum Class 6, round, wood pole is required for permanent service.

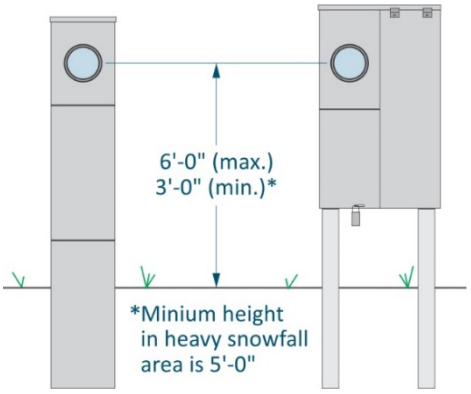
Meter Height

Permanent Meters. The preferred height for permanent meters is 5-feet, 6-inches (to the center of meter socket) above finished grade or other accessible surface such as a deck or stairs. Meters may be mounted between 4-feet and 6-feet, except in areas with heavy snowfall, where the minimum height is 5-feet.

Self-contained meters for underground services not associated with a building, such as pedestals or on freestanding racks, may be mounted as low as 3-feet.

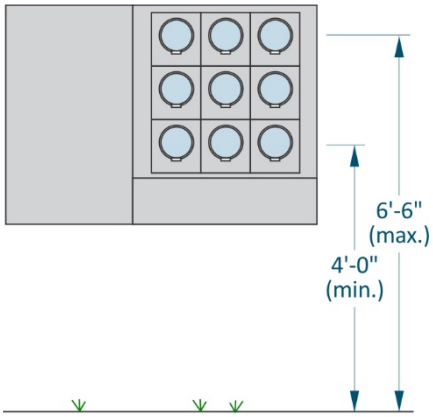


Permanent Meter Height



Meter Pedestal and Freestanding Meter Height

The tops of multiple meter bases must be no higher than 6-feet, 6-inches.



Multi-meter Heights

Multiple Meters

The NEC requires a building or structure to be supplied by only one service (meter). Multiple meters of the same Rate Class are generally not allowed on a single structure at a single address unless permitted under one of the following situations:

1. **Special Conditions.** Additional services are permitted to supply fire pumps, emergency or standby systems; and systems designed with multiple sources for enhanced reliability.
2. **Multi-tenant Occupancies.** Additional services are permitted for multiple-occupancy buildings such as multi-family dwellings or strip malls where there is no available space for service equipment accessible to all occupants.
3. **Capacity Requirements.** Additional services are permitted where the load requirements are greater than Idaho Power can supply through one service.
4. **Different Characteristics.** Additional services are permitted for different voltages, frequencies, or phases; or for different uses, such as for different Rate Schedules.
5. **Customer Generation.** Additional services are required for two-meter installations for "consumption" and "production" metering.

Identification. Where a building or structure is supplied by more than one service, a permanent plaque or directory is required at each service location denoting all other services supplying that building or structure and the area served by each.

Marking. Each meter base or service disconnect that is part of an installation with more than one meter is required to be plainly marked with the numbers and/or letters that correspond to the address, suite, office or room it serves. Marking shall be a permanent nameplate or placard (hand-written information is not acceptable). Mark the service equipment at each address, suite, office or room number to match the corresponding meter (this marking may be hand-written inside the service equipment).

Tap Gutters. Tap gutters are not allowed for connecting multiple meters.

Meter Rooms for Multiple Meters

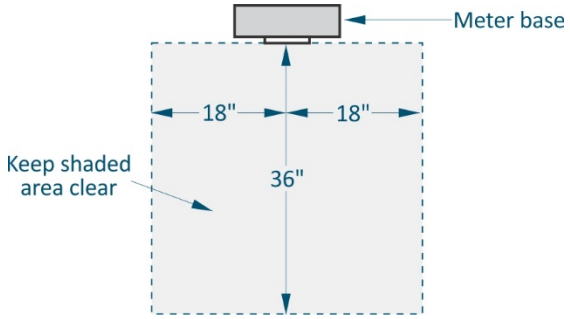
Multiple meter installations for multi-tenant buildings may be located in a meter room provided that all of the following criteria are met:

1. A plan for the meter room must be submitted to Idaho Power for approval prior to construction.
2. The meter room must be directly accessible to Idaho Power through an exterior metal door without having to pass through another interior space.
3. A lock box must be provided on the exterior of the building at the exterior door.
4. The exterior door must be permanently labeled with the words "Electrical Room".
5. The meter room may only be used for electrical equipment and communication equipment that does not interfere with the electrical equipment. No storage of any kind is allowed.
6. Lighting, drainage and health issues are the responsibility of the Customer.

NOTE. *The meter for a single tenant building may not be installed in an electrical or meter room.*

Working Space

Keep the 36-inch by 36-inch area directly in front of the meter base clear of any equipment, landscaping or other obstacles that could interfere with access to the meter.



Working Space Around Meter Base

Overhead Services

Heights for Overhead Services

Overhead services must meet the minimum clearance above the finished grade or other accessible surface as shown below. Make sure the point of attachment is high enough to meet these requirements.

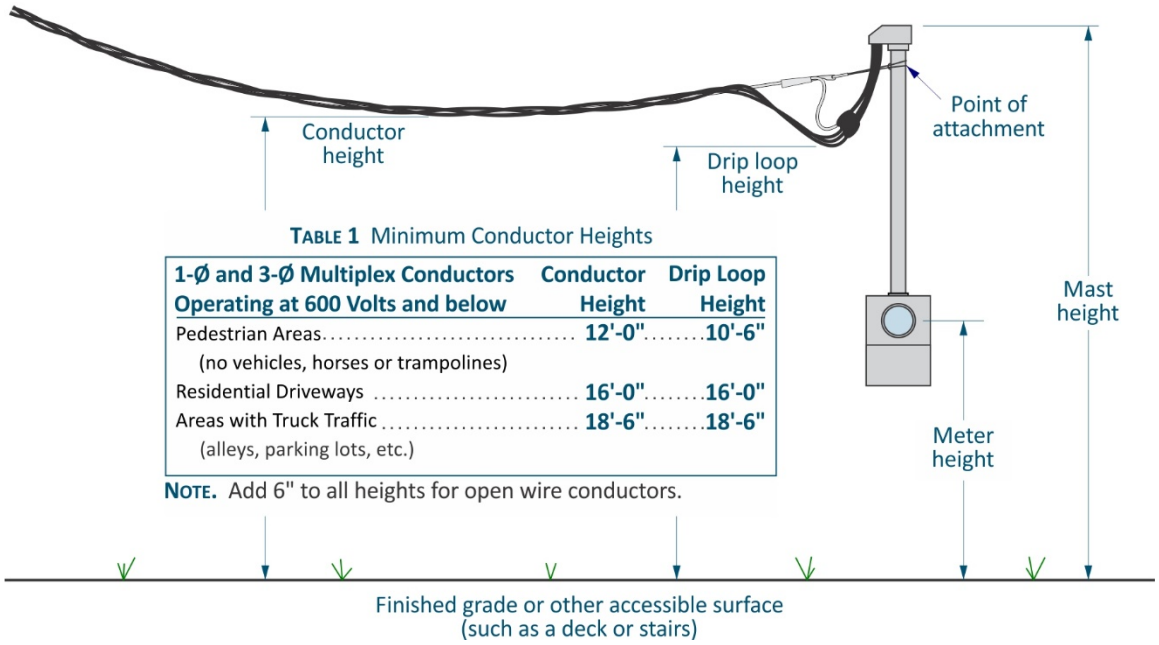


TABLE 1 Minimum Conductor Heights

1-Ø and 3-Ø Multiplex Conductors Operating at 600 Volts and below	Conductor Height	Drip Loop Height
Pedestrian Areas (no vehicles, horses or trampolines)	12'-0"	10'-6"
Residential Driveways	16'-0"	16'-0"
Areas with Truck Traffic (alleys, parking lots, etc.)	18'-6"	18'-6"

NOTE. Add 6" to all heights for open wire conductors.

Heights for Overhead Services

Contact Idaho Power to determine the minimum conductor height requirement when the service conductor must cross over areas that are not addressed here (such as a road, highway, railroad track, canal, waterway, etc.).

Mast Height. If the installation requires a mast height that exceeds 15-feet above grade in pedestrian areas, or 18-feet above residential driveways, contact Idaho Power prior to construction to verify that the service can be safely installed.

Services Over Building Roofs

A service conductor or drip loop that crosses over the roof of a building must meet the minimum conductor height over the roof as shown in **Table 1** *Minimum Conductor Heights*. There are three exceptions where reduced clearances are permitted:

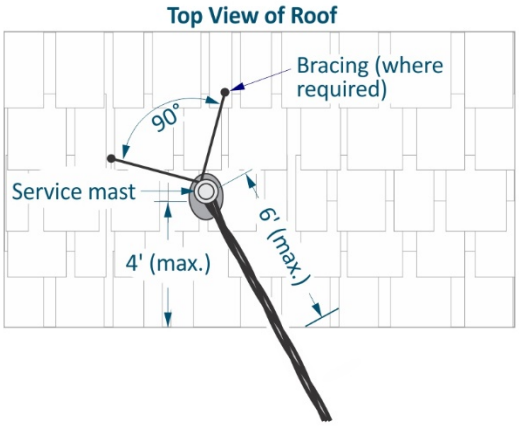
1. A service conductor (or the drip loop) up to 600-volts line-to-line that crosses over a non-accessible roof must have a clearance of 8-feet above the roof.
2. A service conductor (or its drip loop) up to 300-volts line-to-line that crosses over a non-accessible roof with a slope of 4-to-12 or greater must have a clearance of 3-feet above the roof.

3. A service conductor (or its drip loop) up to 300-volts line-to-line that crosses only the eave portion of the roof where it reaches the service mast must have an 18-inch clearance over the roof. The service mast must not be more than 4-feet from the edge of the roof. Only 6-feet of the service conductor may be above the roof as shown:

TABLE 2: MAXIMUM SPAN LENGTHS

Service Size	1Ø	3Ø
200A and less	100'	80'
201 - 400A	80'	60'
Larger than 400A*	60'	40'

*Contact Idaho Power for requirements.



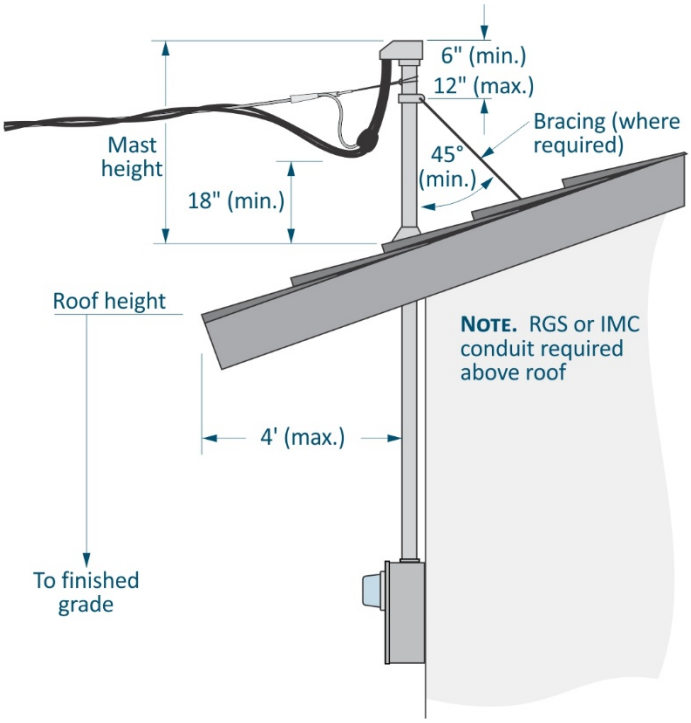


Illustration of Exception 3 for Services over Building Roofs

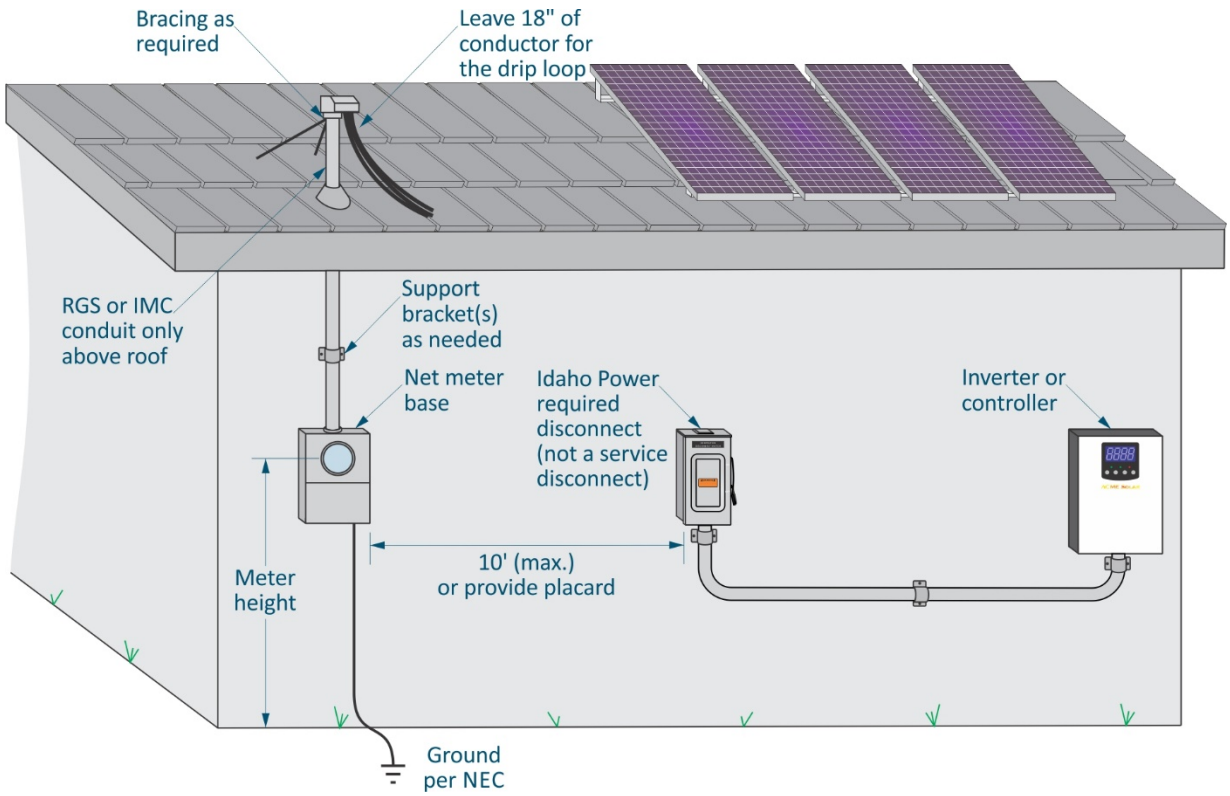
Exception 3 typically applies to the most common installations for service to a building. Exceptions 1 and 2 often apply where the service mast location for the building being served will not qualify for Exception 3. A roof may be considered non-accessible if it cannot be reached through a door, window or by a stairway, or fixed ladder.

Service Mast. Use a minimum of 2-inch conduit for service masts. Masts that penetrate a roof must be rigid conduit (RGS or IMC). Non-rigid EMT or Schedule 80 PVC conduit may be used below the roof.

Mast and Roof Height. If the installation requires a mast height that exceeds 6-feet above a roof, or the roof height exceeds 10-feet above grade (without bucket truck access); contact Idaho Power prior to construction to verify that the service can be safely installed.

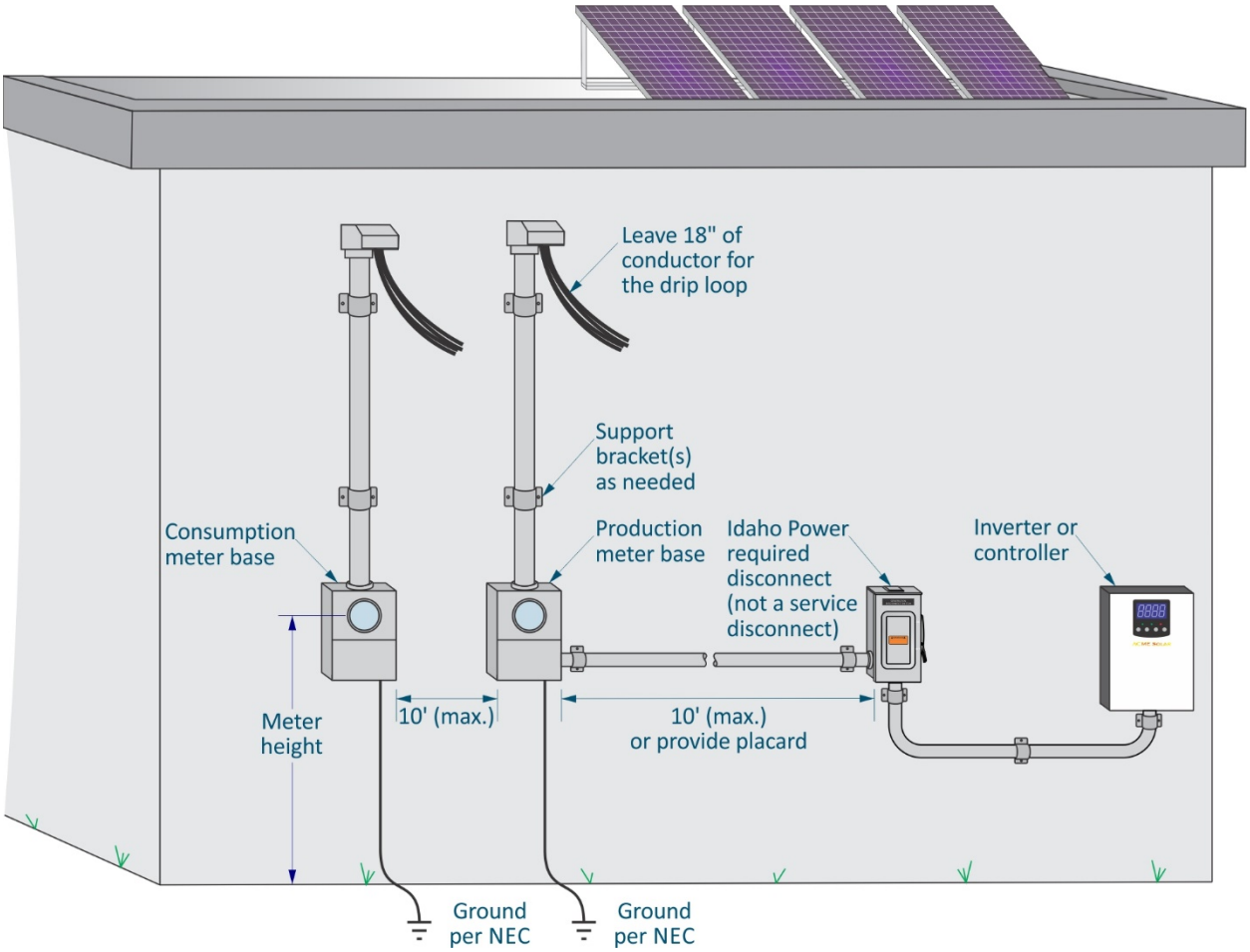
Bracing. Bracing is required for masts that exceed 30-inches above a roof, in heavy snow areas, or where the service span exceeds the length shown in **Table 2** *Maximum Span Lengths*.

Typical Overhead Service to a Residence (single meter, 1-Ø)



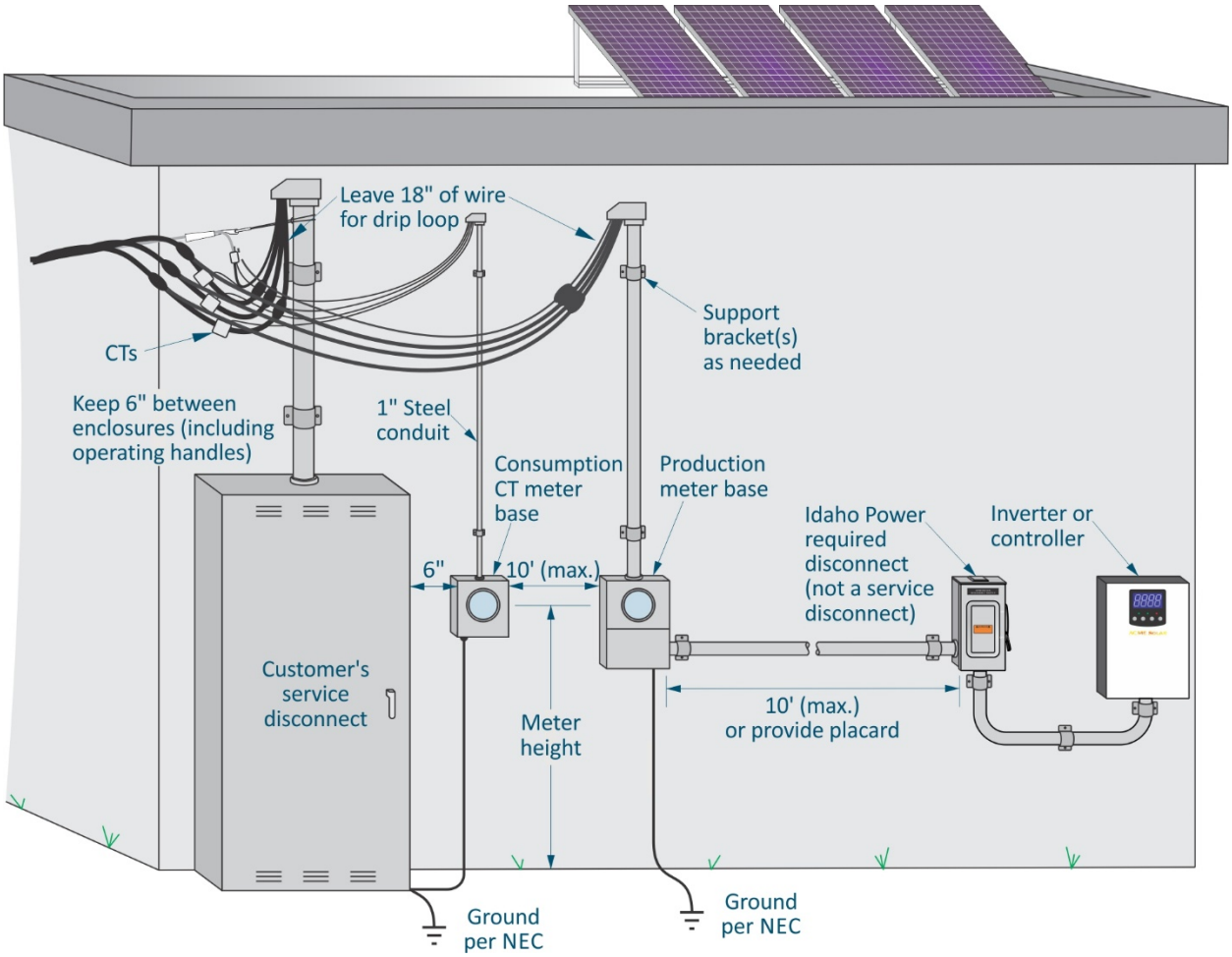
Item	Provided by	Installed by	Maintained by
Meter	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer to drip loop	Idaho Power	Idaho Power	Idaho Power
Connectors for service conductors at drip loop	Idaho Power	Idaho Power	Idaho Power
Meter base with lugs	Customer	Customer	Customer
Conduit, support brackets, weatherhead and bracing (as required)	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Conductors from meter base to drip loop per NEC	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

Typical Overhead Service to a Building (two meters, 1-Ø or 3-Ø)



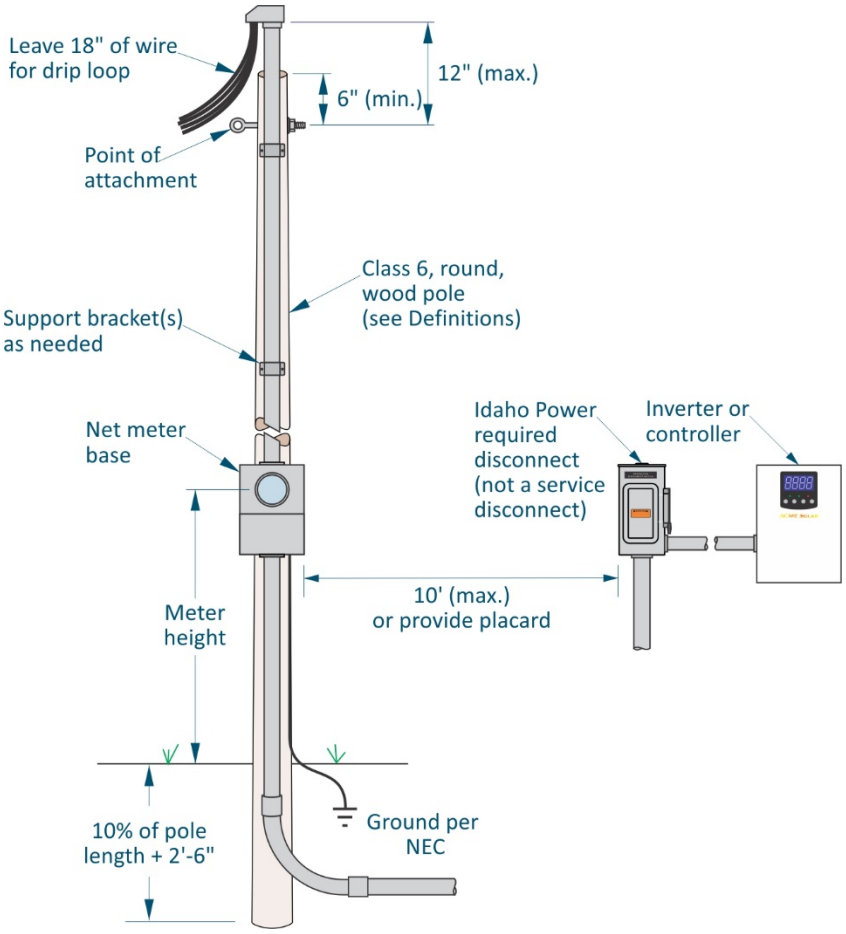
Item	Provided by	Installed by	Maintained by
Meters	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer to drip loops	Idaho Power	Idaho Power	Idaho Power
Connectors for service conductors at drip loops	Idaho Power	Idaho Power	Idaho Power
Consumption meter base with lugs	Customer	Customer	Customer
Production meter base with lugs	Customer	Customer	Customer
Conduit, support brackets, weatherhead and bracing (as required)	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Conductors from meter bases to drip loops per NEC	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

Typical Overhead CT Service to a Building (two meters, 1-Ø or 3-Ø)



Item	Provided by	Installed by	Maintained by
CTs and meters	Idaho Power	Idaho Power	Idaho Power
Conductors from drip loop to transformer	Idaho Power	Idaho Power	Idaho Power
Connectors for the service conductors at drip loop	Idaho Power	Idaho Power	Idaho Power
CT metering wires and connectors	Idaho Power	Idaho Power	Idaho Power
CT meter base (consumption) with lugs	Idaho Power	Customer	Idaho Power
1-inch conduit, support brackets and weatherhead for CT wiring	Customer	Customer	Idaho Power
Meter base (production) with lugs	Customer	Customer	Customer
Conduit, support brackets, weatherhead and bracing (as required)	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Conductors from service equipment to drip loop per NEC	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

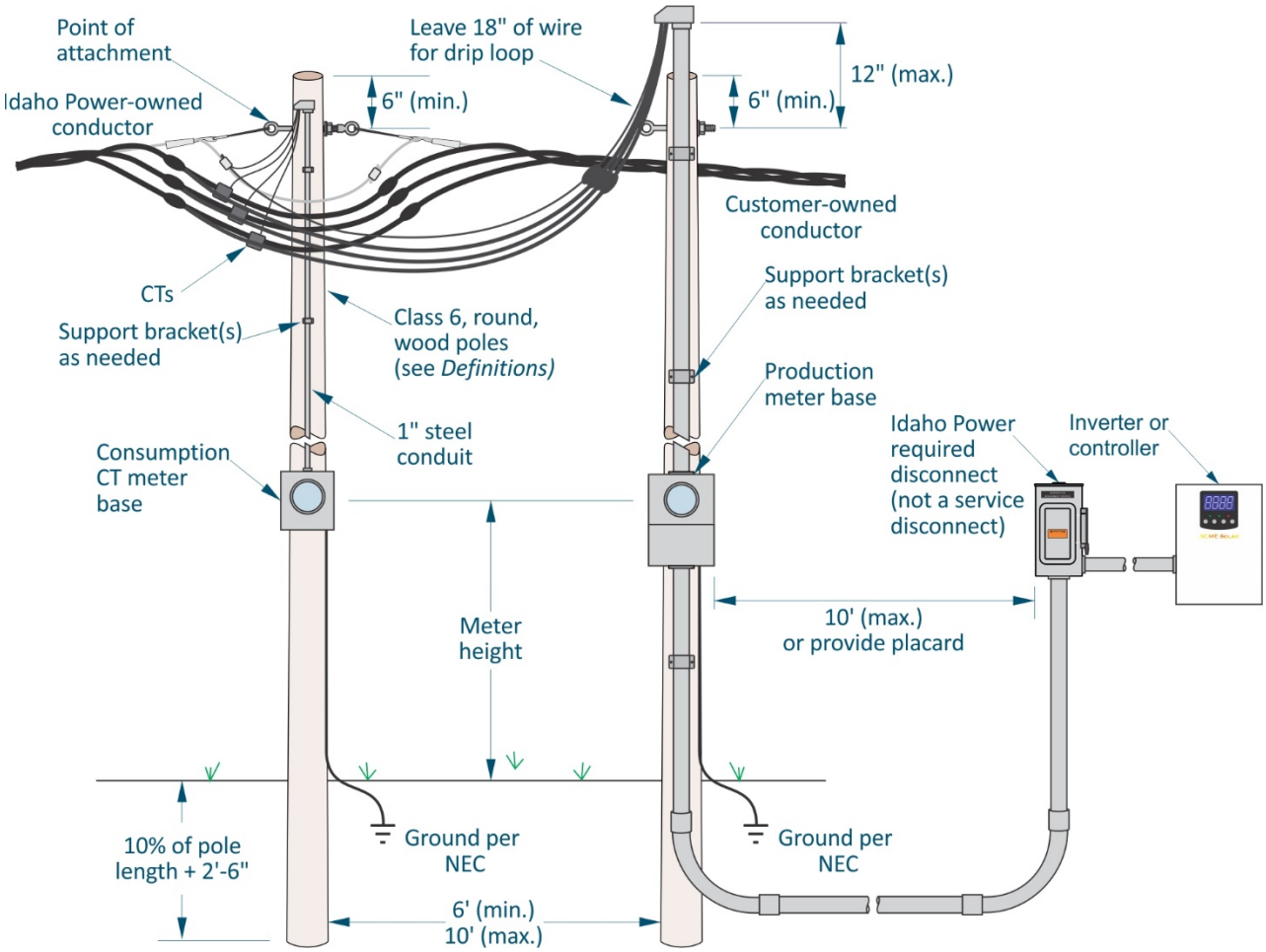
Typical Overhead Service to a Pole (single meter, 1-Ø or 3-Ø)



Item	Provided by	Installed by	Maintained by
Meter	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer to drip loop	Idaho Power	Idaho Power	Idaho Power
Connectors for service conductors at drip loop	Idaho Power	Idaho Power	Idaho Power
Meter base with lugs	Customer	Customer	Customer
Conduit, support brackets and weatherhead	Customer	Customer	Customer
Pole for equipment mounting (see note)	Customer	Customer	Customer
Point of attachment	Customer	Customer	Customer
Conductors from meter base to drip loop per NEC	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

NOTE. Metal poles may be allowed under certain circumstances and must be approved by Idaho Power prior to installation.

Typical Overhead CT Service to a Pole (two meters, 1-Ø or 3-Ø)



Item	Provided by	Installed by	Maintained by
CTs and meters	Idaho Power	Idaho Power	Idaho Power
Conductors from drip loop to transformer	Idaho Power	Idaho Power	Idaho Power
Connectors for service conductors at drip loop	Idaho Power	Idaho Power	Idaho Power
CT metering wires and connectors	Idaho Power	Idaho Power	Idaho Power
CT meter base (consumption) with lugs	Idaho Power	Customer	Idaho Power
1-inch conduit, support brackets and weatherhead for CT wiring	Customer	Customer	Idaho Power
Meter base (production) with lugs	Customer	Customer	Customer
Service conduit(s) and weatherhead(s)	Customer	Customer	Customer
Conductors from service equipment to drip loop per NEC	Customer	Customer	Customer
Poles for equipment mounting	Customer	Customer	Customer
Point of attachment	Customer	Customer	Customer
Grounding electrode(s), ground wire and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

Underground Services

Sealing for Moisture and Gas

Each meter base that is connected to an underground service where the service conductors are installed in conduit must have all opening(s) between the meter base and the interior of a building permanently sealed to prevent any liquids or vapors from passing into the building. See **NEC 230.8, Raceway Seal**.

Underground Conduit

Use gray, UL listed, Schedule 40 or Schedule 80 PVC conduit, bends and fittings for Idaho Power-owned service installed below grade. The NEC requires Schedule 80 PVC or another type of rigid conduit above grade and for Customer-owned service conduit. All conduit joints must be completely seated and permanently glued with PVC cement. Contact Idaho Power for size and quantity of conduit(s) required.

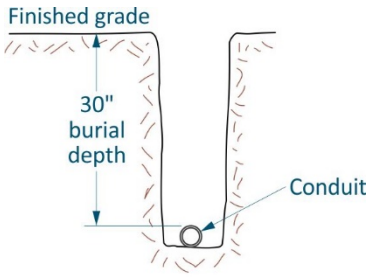
Single-phase, residential services. The Customer may provide and install the Idaho Power conduit below grade by following the *Underground Residential Conduit Installation Requirements* document on the Idaho Power website for this program.

Slip couplers. Slip-couplers are required for all one- and two-family residential services.

Non-residential services. The Customer may work with an Idaho Power designer to determine if it is beneficial for the Customer to install Idaho Power-owned underground service conduit. Follow the trench, backfill and compaction requirements below when installing Idaho Power conduit.

Bend Radius. Use grey colored, manufactured bends. For 2-inch and 3-inch conduit, use 24-inch radius bends and 36-inch radius bends for larger sized conduits. Do not heat conduit in any way to shape it or form bends in the field!

Burial Depth. Conduit for electrical service conductors must be buried 30-inches deep. The trench must be deeper than the burial depth to allow for the diameter of the conduit. Contact Idaho Power if this depth cannot be achieved.



Conduit Burial Depth

Conduit Routing. The preferred route for service conduit is the most direct, straight-line path between the Idaho Power facility (transformer, handhole, or pole) and the meter. Keep the number of conduit bends to a minimum.

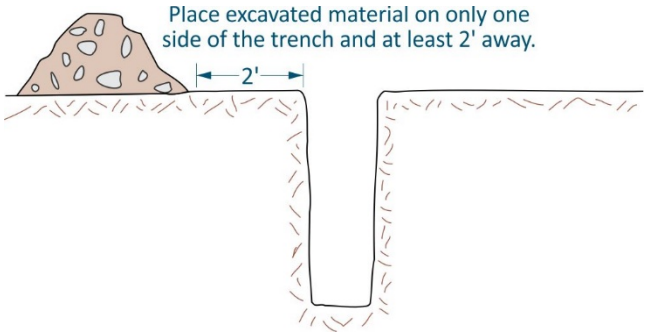
Avoid routing service conduit under driveways, or in areas where it is reasonable to expect future digging—particularly routes that run along property lines. If the route must follow a property line, keep the conduit at least 2-feet away. Do not route service conduit under buildings or build over the top of existing service conduits.

Separation from other Utilities. Keep electrical service conduit at least 12-inches from other underground utility lines. Avoid routing electrical conduit parallel to or directly above or below other underground utilities.

Installation. Keep dirt and debris out of the conduit. Make square conduit cuts and remove burrs from the inside and outside edges. All joints must be completely seated and permanently glued with PVC cement. Do not change conduit sizes in the run.

Trench Requirements

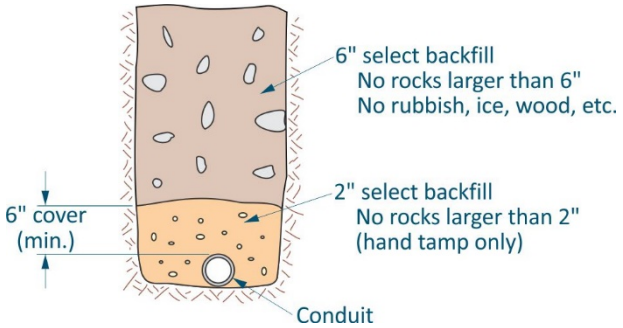
Trench Spoils. Keep trench spoils at least 2-feet from the edge of the trench and any property pins or permanent markers and out of the roadway or other access areas whenever possible. Any spoils or debris to be removed from the site should be hauled away each day and disposed of in accordance with all applicable regulations.



Trench Spoils

CAUTION! *Any open trench must be adequately barricaded or protected for public safety as required by local, state or federal rules and regulations.*

Shading and Backfill. Shade the conduit with enough 2-inch select backfill material to provide a 6-inch covering. This helps protect the conduit from being damaged during the compaction process. After shading, backfill the rest of the trench with 6-inch select backfill material. Don't put garbage, wood, ice, etc., in the trench.



Shading and Backfill

Compaction

Compact all trench backfill to prevent future trench settling. Some settling may be permissible in most new construction areas that are not under paved areas such as sidewalks, driveways and road surfaces. These areas are much more sensitive to settling and require high compaction.

Standard Compaction. Standard compaction is required for most new construction projects where some settling is permissible and achieves up to an 80% compaction rate but is dependent on soil conditions. Backfill with the desired material and wheel roll the trench. The first 6-inches of cover can be native soil with no rocks larger than 2-inches. The remainder of the trench can be native soil with no rocks larger than 6-inches.

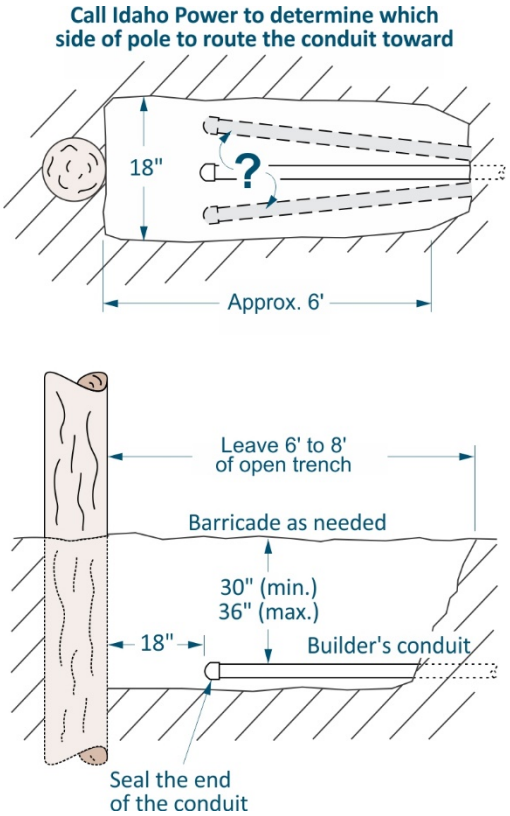
Medium Compaction. Medium compaction is required when trenching through existing landscaped areas where only minimal trench settling is tolerable. Backfill the trench with the same material as required for standard compaction, but in 24-inch lifts. Compact each lift with a tamping rammer or other similar compaction device.

High Compaction. High or 95% compaction results in the least amount of trench settling and is required in certain rights-of-ways and when the trench is under paved or concrete surfaces such as roadways, alleys, parking lots, driveways and sidewalks. Backfill with 3/4-inch road mix, pit run, or sand in 12-inch lifts, compacting each lift with a tamping rammer or other similar compaction device. Using shallower lifts or adding water to the backfill may help reach the desired compaction rates.

Special Requirements for Poles

If the service will come from a pole, contact an Idaho Power prior to digging the trench. An Idaho Power representative will determine:

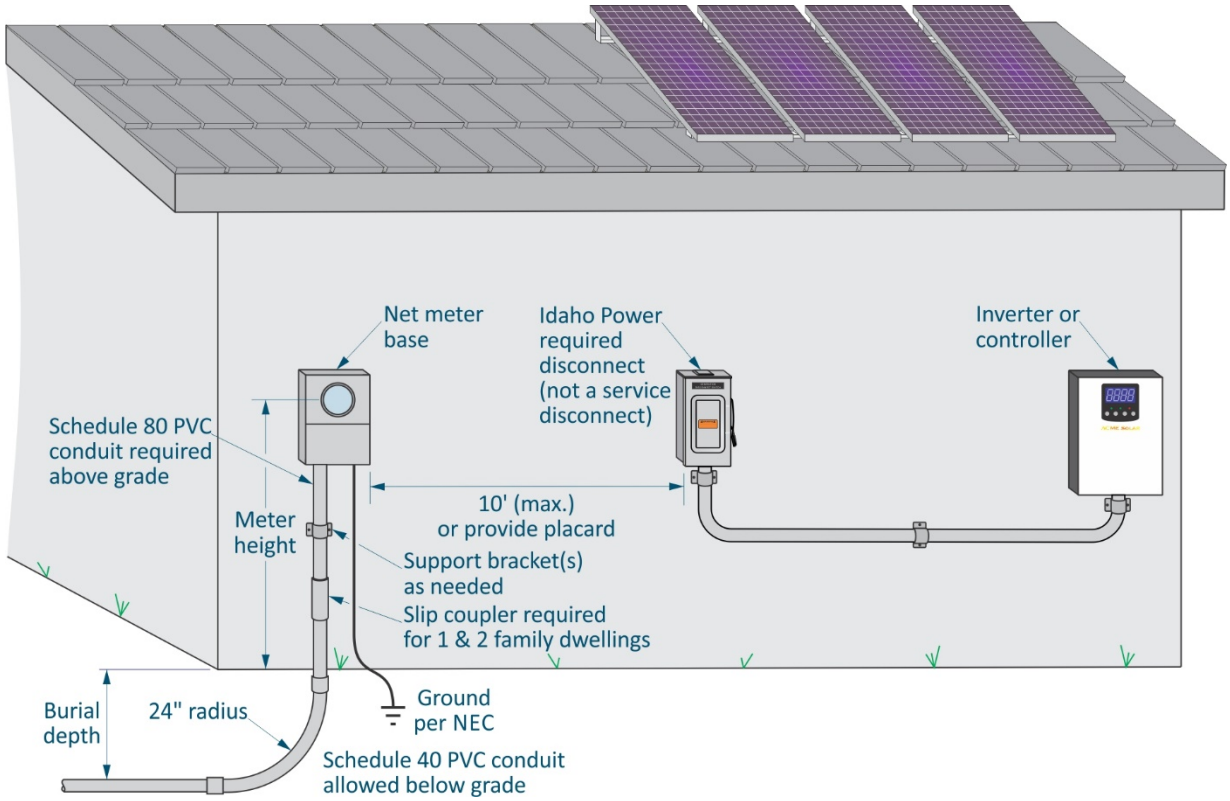
1. If the pole is adequate for the service.
2. Toward which side of the pole to route the conduit.



Underground Conduit to a Pole

Trench all the way to the base of the pole. <u>If the pole becomes unstable, contact Idaho Power immediately!</u> When backfilling the trench, leave 6- to 8-feet open adjacent to the pole. After Idaho Power connects the pole riser and conduit, it is the Builder's responsibility to backfill and compact any remaining trench.

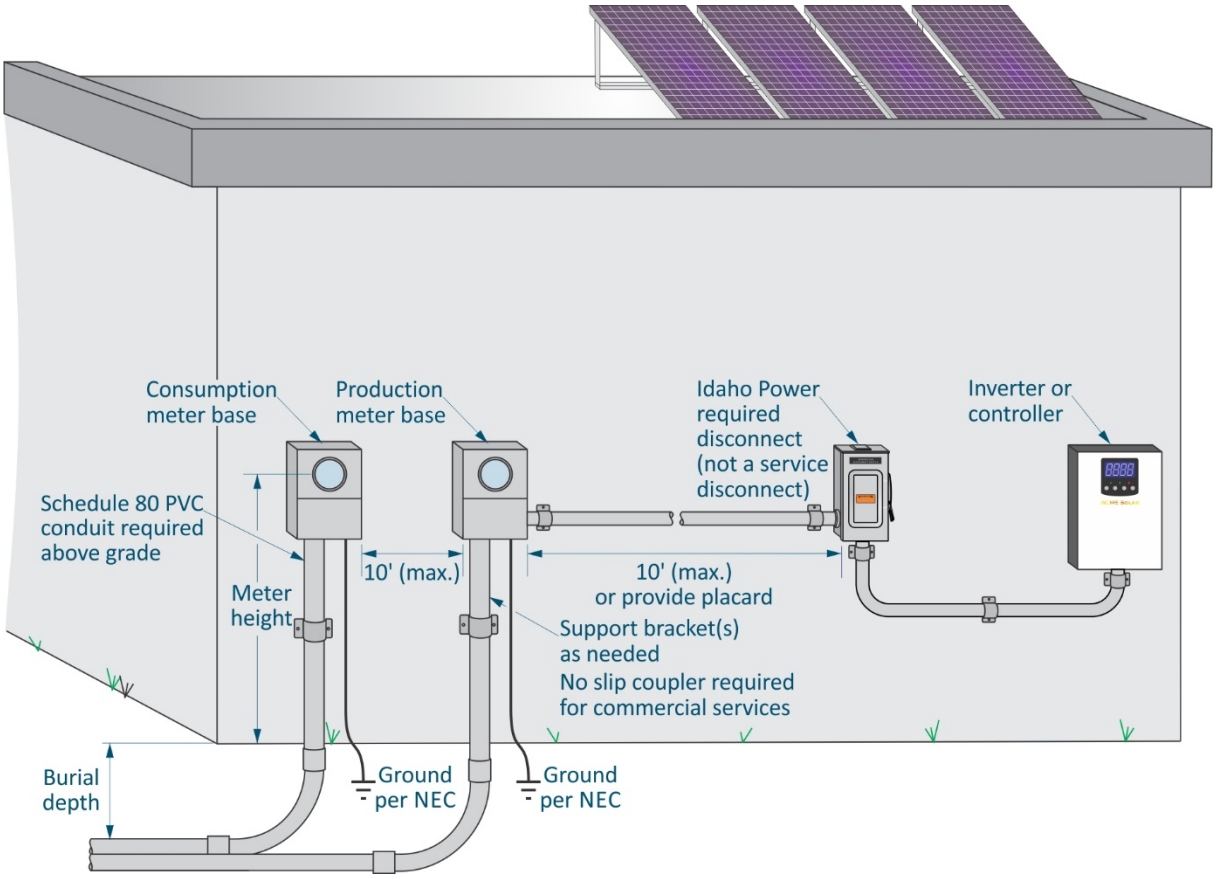
Typical Underground Service to a Residence (single meter, 1-Ø)



Item	Provided by	Installed by	Maintained by
Meter	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer or hand hole to meter base	Idaho Power	Idaho Power	Idaho Power
Connection of Idaho Power conductors at meter base	Idaho Power	Idaho Power	Idaho Power
Conduit below grade (see note)	Idaho Power	Idaho Power	Idaho Power
Meter base with lugs	Customer	Customer	Customer
Conduit riser above grade, slip coupler and support bracket(s)	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Conductors from meter base to main disconnect	Customer	Customer	Customer
Connection of Customer conductors at meter base	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

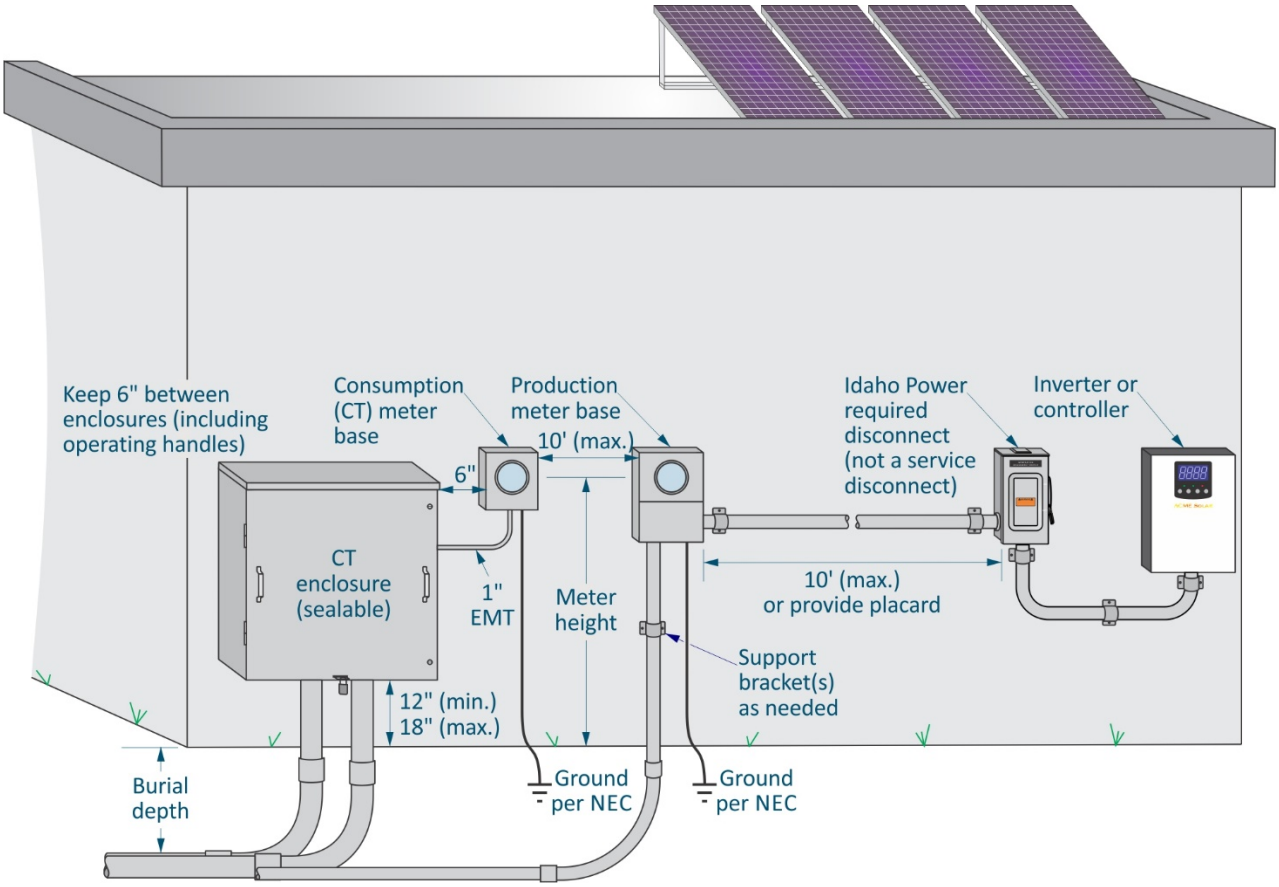
NOTE. The Customer may provide and install the underground conduit from the Idaho Power service point to the meter riser for residential services that meet certain criteria. Refer to the *Underground Residential Conduit Installation Requirements* document for more information.

Typical Underground Service to a Building (two meters, 1-Ø or 3-Ø)



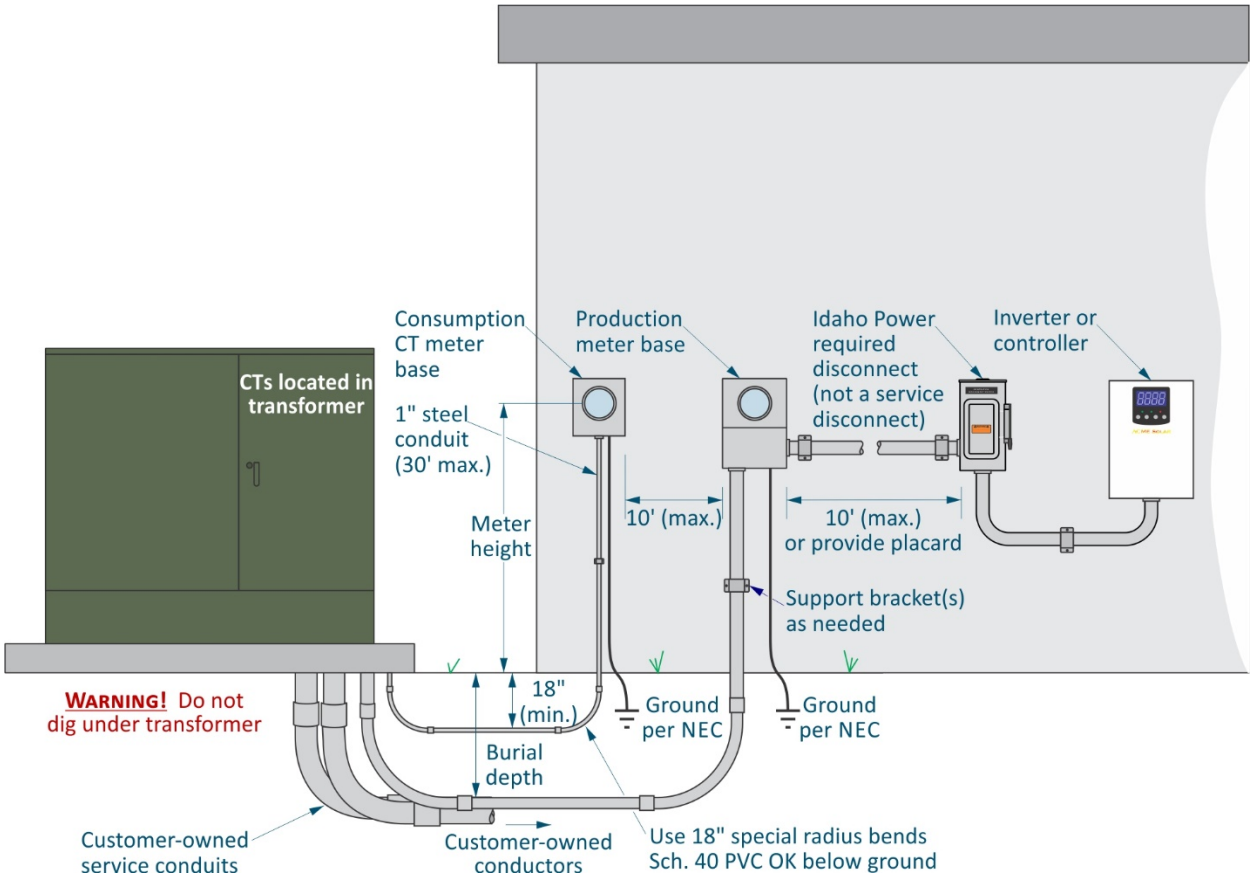
Item	Provided by	Installed by	Maintained by
Meters	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer or hand hole to meter base	Idaho Power	Idaho Power	Idaho Power
Connection of Idaho Power conductors at meter base	Idaho Power	Idaho Power	Idaho Power
Conduit below grade	Idaho Power	Idaho Power	Idaho Power
Consumption meter base with lugs	Customer	Customer	Customer
Production meter base with lugs	Customer	Customer	Customer
Conduit risers above grade and support bracket(s)	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Conductors from meter base to main disconnect	Customer	Customer	Customer
Connection of Customer conductors at meter base	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

Typical *Idaho Power-owned* Underground CT Service (two meters 1-Ø or 3-Ø)



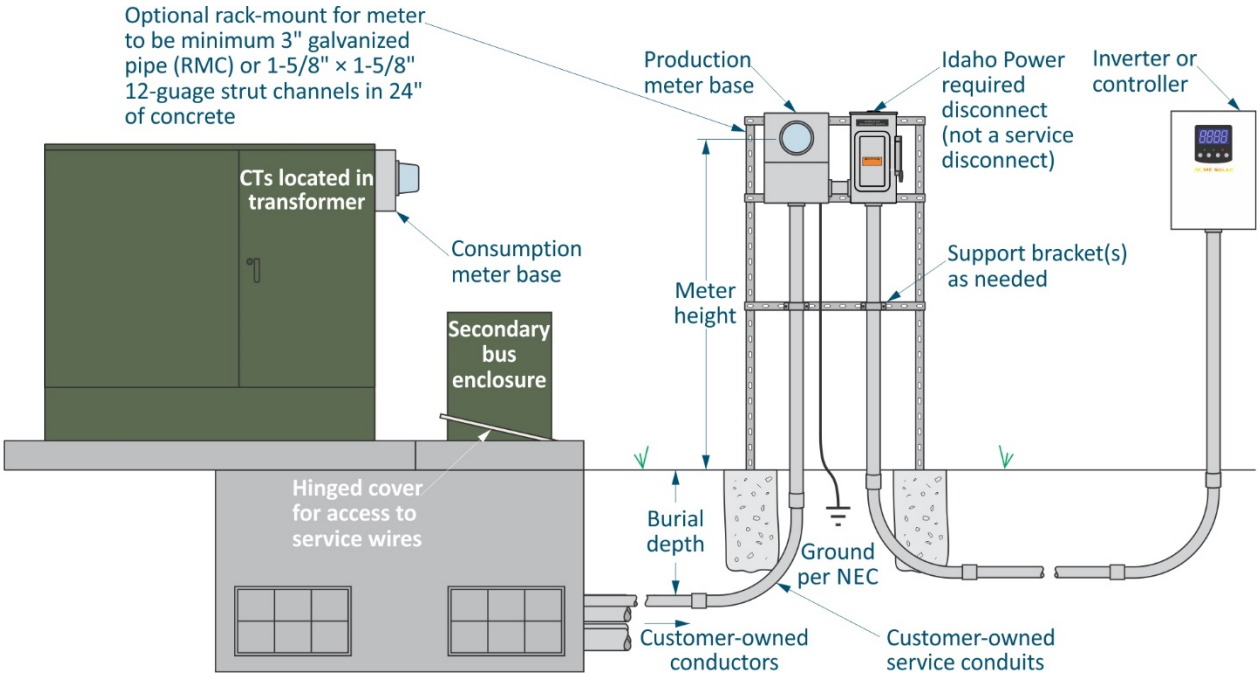
Item	Provided by	Installed by	Maintained by
CTs and meters	Idaho Power	Idaho Power	Idaho Power
CT metering wires and connectors	Idaho Power	Idaho Power	Idaho Power
Conduit below ground	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer to CT enclosure & production meter base	Idaho Power	Idaho Power	Idaho Power
CT meter base (consumption) with lugs	Idaho Power	Customer	Idaho Power
1-inch Conduit for CT wiring	Customer	Customer	Idaho Power
Conduit above ground per NEC	Customer	Customer	Customer
CT enclosure per Idaho Power requirements	Customer	Customer	Customer
Connectors for the service conductors at the CT enclosure	Customer	Customer	Customer
Conductors from CT enclosure to service disconnect per NEC	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

Typical *Customer-owned* Underground CT Service (two meters 1-Ø or 3-Ø)



Item	Provided by	Installed by	Maintained by
CTs and meters	Idaho Power	Idaho Power	Idaho Power
CT metering wires and connectors	Idaho Power	Idaho Power	Idaho Power
CT meter base (consumption)with lugs	Idaho Power	Customer	Idaho Power
Conductors from transformer to production meter base	Idaho Power	Idaho Power	Idaho Power
1-inch Conduit for CT wiring	Customer	Customer	Idaho Power
Meter base (production) with lugs	Customer	Customer	Customer
Conduit above and below ground per NEC	Customer	Customer	Customer
Conductors from transformer to service disconnect per NEC	Customer	Customer	Customer
Connections for the service conductors at transformer	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

Basement under Transformer for More than 8 Runs of Conductors



Item	Provided by	Installed by	Maintained by
CTs and meters	Idaho Power	Idaho Power	Idaho Power
CT metering wires and connectors	Idaho Power	Idaho Power	Idaho Power
CT meter base (consumption)with lugs	Idaho Power	Customer	Idaho Power
Conductors from transformer to secondary bus enclosure	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer to production meter base	Idaho Power	Idaho Power	Idaho Power
Secondary bus enclosure	Customer	Customer	Customer
Meter base (production) with lugs	Customer	Customer	Customer
Conduit above and below grade per NEC	Customer	Customer	Customer
Conductors from transformer to service disconnect per NEC	Customer	Customer	Customer
Connections for the service conductors at transformer	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnect	Customer	Customer	Customer

Grandfathered Services

Eligibility

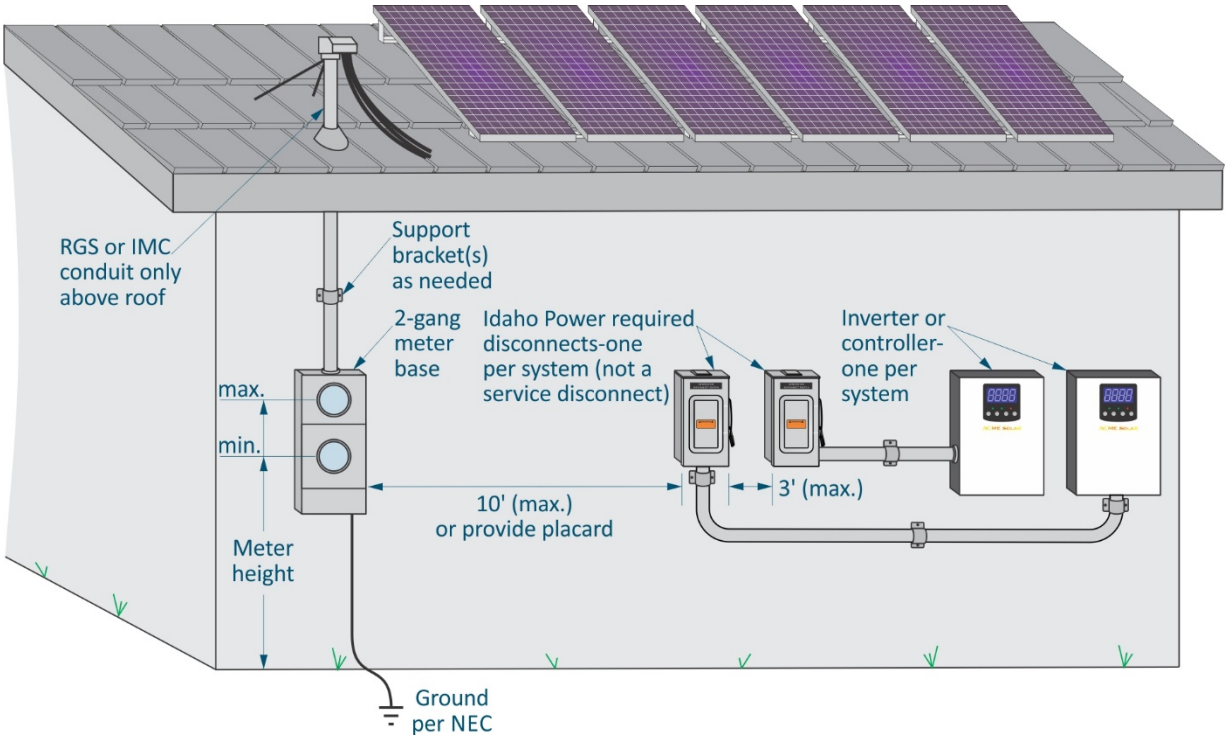
Some Customers taking service or applying to take service under Schedules 6 and 8 by **December 20, 2019** qualify for grandfathering under the 2019 compensation structure for excess energy. Per PUC Order 34546 on Case 18-15, Customers who are "grandfathered" may add generating capacity (up to the allowed maximum kW) to their premise without losing the original system's grandfathered status if Idaho Power can separately measure the energy flows from the different systems.

> **NOTE.** *Customers with "non-grandfathered" systems (after December 20, 2019) can add to their existing generation system under their current rate structure up to the allowed maximum kW. "Grandfathered" Customers may add to their existing generation system up to the allowed maximum kW but will lose their "grandfathered" status and be metered under Idaho Power's future rate structure.*

For Idaho Power to separately measure the energy flows from the different systems, two separate net meters are required. The existing generation system will be measured on one meter, and the new generation system will be measured on a second meter. Idaho Power will provide <u>one set of service conductors</u> to a Customer-provided, double socket (2-gang) meter base:

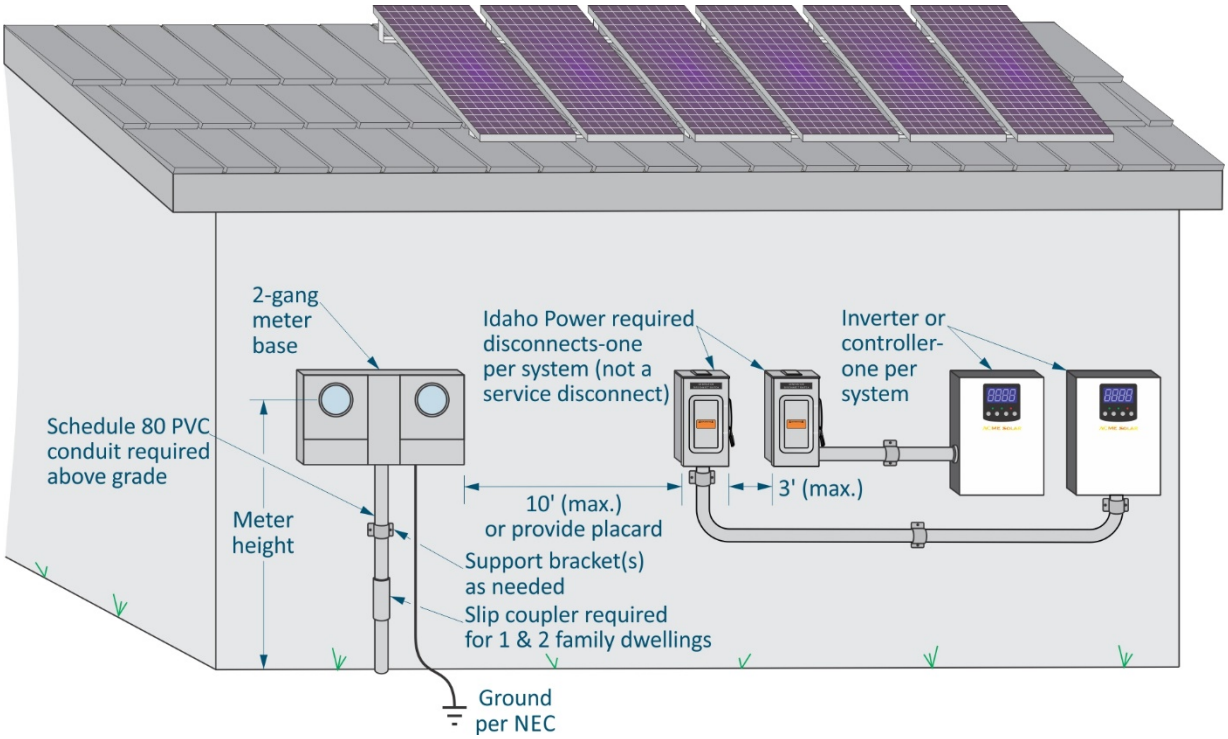
- Meter base bus amp-rating must be equal to or greater than the existing meter socket rating.
- Meter sockets may be vertically or horizontally arranged (see diagrams).
- All covers must be sealable.

Grandfathered Overhead Meter Base Arrangement (1-Ø, vertical 2-gang meter base shown)



Item	Provided by	Installed by	Maintained by
Meters	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer to drip loop	Idaho Power	Idaho Power	Idaho Power
Connectors for service conductors at drip loop	Idaho Power	Idaho Power	Idaho Power
2-gang meter base with lugs	Customer	Customer	Customer
Conduit, support brackets, weatherhead and bracing (as required)	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Conductors from meter base to drip loop per NEC	Customer	Customer	Customer
Grounding electrode(s), ground conductor and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnects	Customer	Customer	Customer

Grandfathered Underground Meter Base Arrangement (1-Ø, horizontal 2-gang meter base shown)



Item	Provided by	Installed by	Maintained by
Meters	Idaho Power	Idaho Power	Idaho Power
Conductors from transformer or hand hole to meter base	Idaho Power	Idaho Power	Idaho Power
Connection of Idaho Power conductors at meter base	Idaho Power	Idaho Power	Idaho Power
Conduit below grade (see Note)	Idaho Power	Idaho Power	Idaho Power
2-gang meter base with lugs	Customer	Customer	Customer
Conduit riser above grade, slip coupler and support bracket(s)	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Conductors from meter base to main disconnect	Customer	Customer	Customer
Connection of Customer conductors at meter base	Customer	Customer	Customer
Structure for equipment mounting	Customer	Customer	Customer
Grounding electrode(s), ground wire and connections per NEC	Customer	Customer	Customer
Idaho Power required disconnects	Customer	Customer	Customer

Revision History

REVISION	DATE	DESCRIPTION
0	05/01/2020	Reformatted document. Added changing existing services, trenching and conduit requirements and Grandfathered expansions. Recessed meter bases and tap gutters are no longer allowed. Updated residential fault current values.
1	08/03/2020	Renamed document. Added definitions and clearance requirements.