

Large Basic Service



Introduction

This Section applies to members requiring new Large Basic electric service installations, greater than 400 amps single phase and greater than 50kW three phase. This Section provides most of the information and requirements that will be needed, but it does not cover all possible standards and specifications required by all utilities, state, federal, and local codes. For additional information, contact the Cooperative, the local government agency, or state inspector. Engineering, scheduling, and construction of the work will vary depending upon the complexity of the job as well as the current workload.

General information

This handbook contains material on new Large Basic Service. The material in this Section applies to:

- Very large homes.
- Commercial buildings.
- Apartment complexes.
- Multifamily wells.
- Condominium complexes.
- Mobile home parks.
- Barns and outbuildings.

If a temporary service is needed during the construction of the facility, see the Section regarding, "Temporary Service."

Before a permanent service is energized, the member must complete the following:

- Select between overhead and underground service.
- Install required service equipment and wire.
- Obtain an electrical inspection from your local governmental agency.
- Call the Cooperative to request that service be energized.

If the type of service needed is not addressed in this handbook, call the Cooperative.

Getting started

Service can be initiated for the project by calling the Cooperative at 1-800-698-2007. The representative will request the member's name and address, and may send an "Application for Service," and a "Request for Easement."

Complete the appropriate forms, and include a copy of each of the following items, if applicable, with the application and easement:

- Legal description of the property.
- Title insurance policy, recorded warranty deed, or real estate contract.
- Landscaping plan.
- Water main plan.
- Sewer main and profile plans.
- Road and storm drainage plan.
- Road cross section plan.
- Street light requirements.
- Electrical load.

Several of the above plans may be included in one drawing.

After returning the application and plans, the Cooperative Engineer assigned to the project will begin working on it, based upon the requested schedule.

Service Types

The following standard types of services are available for Large Basic services:

Single-phase: 120/208 volts, 3 wire* over 400 amps
120/240 volts, 3 wire** over 400 amps

Three-phase: 120/208 volts, 4 wire over 50kw
277/480 volts, 4 wire over 50kw

* Available only if 120/208 volt secondary is existing at the location at the time of application for service.

** Available for loads up to a maximum demand of 100kW. Larger loads may be served if determined feasible by the Cooperative's Engineer.

Locates

If trenching or excavating is required, underground locates are required 72 hours prior to digging. To obtain locates, the member calls Dig Safe at 1-888-344-7233. Dig Safe will notify each utility, or a locating service, who will locate the underground facilities in the area. This service is free.

The color codes for locates are:

Color	Utility
Red	Electric
Yellow	Gas/Oil
Orange	Telephone/Cable TV
Blue	Water
Green	Sewer
White	Area to be located

Any digging within 24 inches of either side of the location markings must be done by hand.

Cost for service

Contact the Cooperative to arrange for a field meeting to determine the cost and conditions for service.

Overhead Service

Member responsibilities

This section provides information on installing an overhead service.

The following checklist identifies tasks the member is responsible for. After these items are completed, the Cooperative will install the service equipment and meter.

- Check for local ordinances or covenants that prevent obtaining overhead service. Also, the local governing agency may not allow overhead service.
- Provide the Cooperative with load information.
- Call the Cooperative at 1-800-698-2007 to apply for a service connection and arrange a field meeting to determine where the service line will originate.
- Install the required service equipment.
- Install the service entrance conductors, leaving a minimum of 36 inches exposed at the weatherhead.

- Verify that the service mast height requirements have been met.
- Obtain an electrical inspection from governmental agency if required.

Getting started

Before requesting overhead service to a Large Basic service, the member should complete an "Application for Service."

The next step when installing a new overhead service is to contact the Cooperative's Engineering Department to arrange a meeting to determine which pole the service line will come from.

Next, determine the location of the meter socket. When choosing the meter location, consider carefully the terrain the line will cross. Make sure your entrance will be high enough to provide proper above ground clearance for service lines.

If the service line will pass through any trees, the Cooperative line crew will prune those trees to provide a clear path for the service line. The point of delivery for overhead service is the connector at the weatherhead.

Service mast requirements

The requirements for the installation of the service mast are described in the National Electrical Code (NEC). Some of the more common methods are included in this section.

Height requirements

The proper height for the service mast varies with each site. Call the Cooperative's Engineering Department for assistance.

Clearances from gas meters

A minimum horizontal clearance of 3 feet is required between electric service equipment and natural gas metering equipment. An approved barrier is required if clearance is less than 3 feet. See Figure 12 on page 18.

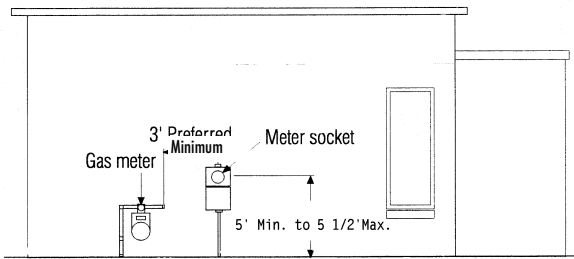


Figure 12 Meter socket height and gas meter clearance

Additional mast supports

Additional mast supports, typically a guy or a brace, are required for any service line over 50 feet in length.

Service Equipment Installation Requirements

The member is responsible for supplying and installing:

- Meter socket and current transformer enclosure.
- Service mast.
- Service entrance conductor.
- Ground rods.

The Cooperative will install the service line and meter for overhead services. The underground service installation is the responsibility of the member.

Manufactured buildings

If an overhead service is being installed to a manufactured building, the Cooperative's service equipment can be installed one of two ways:

1. On a Cooperative-owned meter pole, or
2. On the manufactured building, if both of these conditions are met:
 - a. The manufacturer installed the service equipment at the time the structure was built.
 - b. The service requirement meets the meter socket requirements listed below.

Meter sockets installed on manufactured buildings must:

- Be located on an outside wall of the building and accessible for reading and testing.
- Be between 5 and 5 1/2 feet above finished grade.
- Be outside of a breezeway.

- Be outside of an area subject to being fenced.
- Assure that the top of the service mast meets NEC requirements.

Underground Service

Member responsibilities

For Large Basic underground services, the member supplies the secondary connectors and service conductors to the Cooperative's transformer.

The following checklist identifies tasks the member is responsible for when installing underground service. After these items are completed, the Cooperative will install the meter and connect the service.

- Check any local ordinances or covenants that will prevent obtaining underground service.
- Supply site drawings to the Cooperative.
- Supply load information to the Cooperative.
- Provide an easement for any permanent equipment installed on the property and owned by the Cooperative.
- Call the Cooperative to determine where the underground service will originate.
- Select an approved meter location with Cooperative representative.
- Install required service equipment.
- Connect and label conductors at the meter location.
- Provide trench, conduit, riser, CT enclosures, vaults and service conductors per NHEC or NESC specifications, whichever is more stringent.
- Provide any additional excavation on private property.
- Obtain an electrical inspection from a governmental agency, if required.
- Call the Cooperative's Member Call Center to order the service connection.

Getting started

Before installing an underground service to a commercial structure, you should complete an "Application for Service" and provide load information. This form allows the Cooperative Engineer to begin determining the required engineering specifications and the costs to the member, if any.

The point of delivery for underground service at secondary voltage is at the service lugs of the transformer or pedestal.

The Cooperative determines the point of delivery based, in part, on convenient access to existing power service.

All secondary facilities beyond the point of delivery are installed, owned, and maintained by the member.

Service equipment

The member is responsible for furnishing, installing, and maintaining all required service entrance equipment, including the service conductors from the meter socket or current transformer enclosure to the point of delivery designated by the Cooperative. For services where current transformers (CTs) are required, the member must also run conduit from the CT enclosure to the meter base. The Cooperative supplies the CTs, meter wiring, and meter socket.

120/240 volt services over 400 amps require CT metering. Contact the Cooperative for more information.

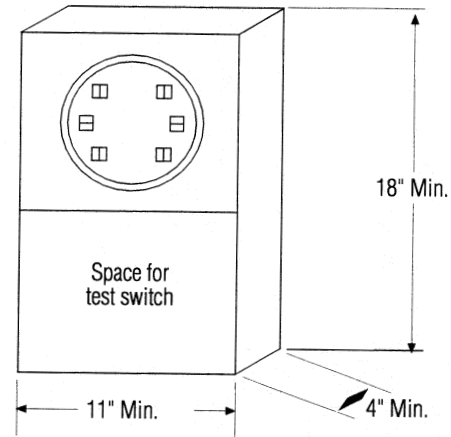


Figure 13 120/240V single-phase CT meter

Services Greater Than 400 Amps

120/240 volt services over 400 amps are available, usually at additional charge. This service requires a different meter base. See Figure 13 on page 19. This service also requires additional equipment, such as a CT enclosure, conduit, CT mounting bracket, etc. Contact the Cooperative.

Conduit requirements

The member is responsible for:

- Contacting the Cooperative’s Engineering Department for entry location and procedure when entering existing vaults with conduit.
- Grouting around member-owned conduits which enter the Cooperative’s vaults.
- Sealing service entry conduit to prevent water or other items from entering into the member’s service panel. Severe sealing problems may require a positive mechanical seal at the building wall and at the Cooperative’s vault.

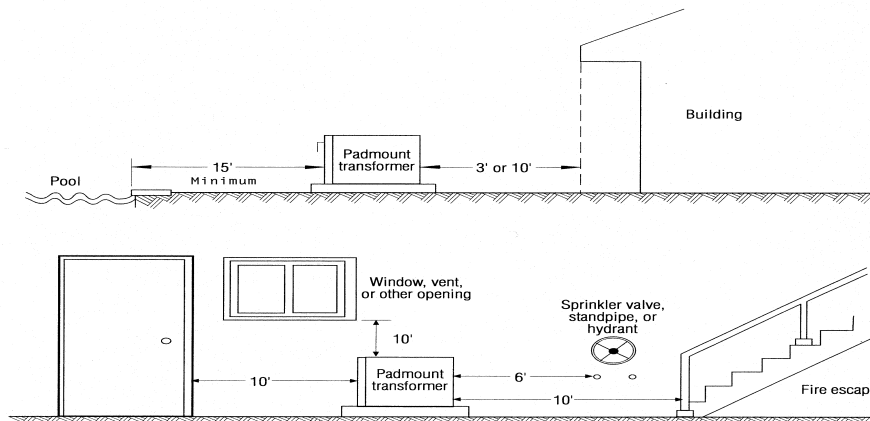


Figure 14 Clearances for padmount transformer

Transformer locations

The Cooperative will install padmount transformers and oil-filled switches using the clearances shown in Figure 14 on page 19.

Clearances between padmount transformers and structures must be measured from the metal portion of the transformer closest to the building or structure. This includes any overhangs within the following clearances:

- 3 ft. - from non-combustible walls (including brick, concrete, steel, and stone), provided the side of the transformer facing the wall does not have doors.
- 6 ft. - from fire sprinkler valves, standpipes, and fire hydrants.
- 10 ft. - from combustible walls (including stucco), doors, windows, vents, fire escapes, and other building openings.
- 15 ft. - from the water's edge of a swimming pool or any body of water.
- 20 ft. - from facilities used to dispense or store hazardous liquids or gases (for example, service station gas pumps and tanks, propane bulk dispensing tanks, and emergency generator fueling points).

Working space

A clear, unobstructed working area of 8 feet minimum shall be maintained around all sides of padmount equipment.

Protection for padmounted equipment

Guard posts are required around padmounted equipment that is in close proximity to vehicular traffic. Guard posts locations will be determined by the NHEC Representative.

It is the member's responsibility to install and maintain guard posts, where required.

Landscaping and other obstacles

Landscaping and other obstructions must not encroach on the clearances specified in Figure 15, page 21.

Trenching

The service trench dug by the member must meet state and local regulatory requirements. Trenches supplied for primary systems owned and installed and inspected by the Cooperative must have a minimum of 36 inches cover from the top of the conduit to the point of final grade.

Meter Requirements

This Section gives information on metering requirements. The meter socket must:

- Be NHEC approved for application.
- Be UL (Underwriters' Laboratory) approved for application.
- Be rated for exterior use, and be raintight according to NEMA-3R.
- Have all unused openings tightly sealed from the inside of the socket.
- Be plumb and securely fastened to the supporting structure.
- Be approved by New Hampshire Electric Cooperative (see approved listing at www.nhec.coop).

Removing and installing meters

Only qualified personnel, authorized by the Cooperative, are permitted to cut seals, and remove or install meters. Under emergency conditions, exceptions may be granted to qualified electricians by contacting the Cooperative's Meter Department. When this occurs the party accepts all liability for damage or alteration to equipment, injury to persons or property, and loss of revenue to the Cooperative from the time the seal is removed until 72 hours after the Cooperative has been notified that the equipment is ready to be resealed. The member or electrical contractor must promptly notify the Cooperative when repairs or modifications have been completed. Extreme caution must be used when meters are removed or installed. Depending upon the type of service or meter base, removal of the meter might not de-energize service.

Equipment

Current transformer (CT) enclosures, switch gear, gutters that contain unmetred conductors, and metering equipment must have provisions for sealing. Contact the Cooperative meter department to obtain access for inspection.

The Cooperative will furnish, install, and maintain the following equipment:

- Revenue meters.
- Current transformers.
- CT meter wiring.

The member is responsible for furnishing, installing, and maintaining the following equipment beyond the point of delivery:

- Approved meter sockets.
- All necessary wiring, connectors, and lugs (except CT meter wiring).
- Switches.
- Current transformer cabinet upon Cooperative approval.
- Conduit.
- Protection equipment, including single phase conditions on a three phase service.

Meter location

The member must provide a location to install metering equipment. The meter location must be free from obstruction, corrosive atmosphere, abnormal temperature, vibration, and be convenient to the Cooperative's distribution system. All meters, meter equipment, and enclosures must be readily accessible by Cooperative personnel during normal business hours for meter reading, maintenance, testing, installation, or removal. All meter locations are subject to approval by the Cooperative.

Meters must not be installed at any of the following locations:

- Above the first story level or below the first basement level of a building. Any exceptions to this rule must have the approval of the Cooperative's Meter Department before electrical installation begins.
- On poles not owned by the Cooperative.
- On any line pole occupied solely by the telephone company, except to serve telephone company equipment.
- In commercial occupancies they do not serve.
- Any place where safety may be compromised.

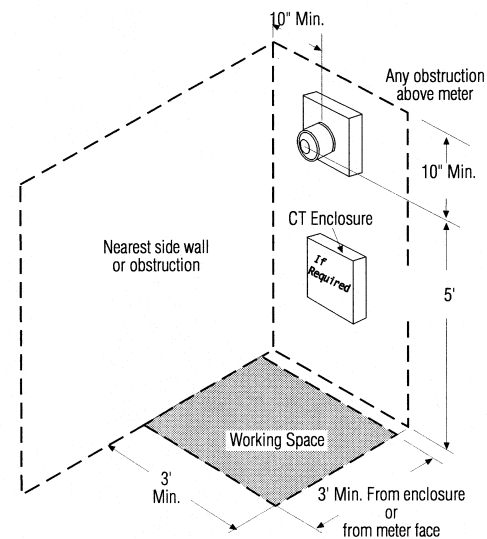


Figure 15 Meter socket minimum clearance

Electrical rooms

Meter sockets may be located inside an electrical equipment room. The electrical room must be used solely for power and communication equipment. The electrical room must be well lit, accessible during normal business hours, and not used for storage. The member is responsible for providing a location near the door for installation of a key box, a key for the box, and for installing a sign on the exterior door saying "Electrical Room."

General meter socket requirements

Meter socket requirements include the following:

- Meter sockets may be ring or ringless type. The meter ring must have a screw-type locking ring. Snap rings are not acceptable.
- Meter sockets must not be jumpered to provide power.
- Meter sockets and enclosures must be UL (Underwriters Laboratory) and NHEC approved (see approved listing at www.nhec.coop).
- Any meter socket containing energized equipment must be covered and sealed with a transparent cover plate when a meter is not installed.

- All unused openings of the meter socket enclosure must be closed with plugs (raintight, if outside) that are locked tightly in place from inside the enclosures, before a meter is installed.
- Meters must be installed only in sockets which are level, plumb, and securely fastened to the structure.
- Terminals must be marked with a conductor range for aluminum or copper conductors. When aluminum conductors are used, the socket must be approved and clearly marked by the manufacturer for that use.
- All meter equipment exposed to weather must be raintight according to the National Electrical Manufacturer's Association (NEMA) 3R minimum.

Meter clearances

The center of the meter socket is always the point of reference. Meter socket height is a maximum of 5 1/2 feet and a minimum of 5 feet, above finished grade or floor.

When a meter socket enclosure is recessed in the building wall, a flush-type socket is required. Building siding must not cover or overlap the meter base.

Working space in front of metering equipment (including current transformer enclosures) must be at least 36 inches wide and 36 inches deep, measured from the front of the enclosure and meters. Plants, shrubs, and trees must not be planted in this space. Gas meters and related piping must be at least 36 inches away from metering equipment, see Figure 12, page 18.

The center of all meter socket enclosures must be a minimum of 10 inches from adjacent walls, ceilings, or other similar obstructions.

Meter socket labeling

Meter sockets must be permanently labeled to indicate the section or unit they serve, for example, the unit number. The member's name is not acceptable. The labels must be engraved phenolic identifying plates, fade-resistant and at least one inch high. Felt-tip pens and label maker tape are not considered permanent markings. Service will not be established until marking is complete and verified for accuracy.

Factory-built multiple meter panel

Prior to shipment from the factory, the manufacturer must submit commercial multiple meter panel drawings to the Cooperative's Meter Department for approval.

Meters must be adequately protected from mechanical damage, and the installation approved by the Cooperative's Meter Department.

Service conductors

Metered circuits must not enter raceways or enclosures containing un-metered circuits, except for meter loops on poles, or in specific situations approved by the Cooperative's Meter Department.

Member load monitoring

The member's load monitoring equipment must be installed only on the load side of the meter. No member equipment is allowed inside a meter or current transformer enclosure.

Grounding

All meter sockets, enclosures, and conduit must be bonded and grounded in accordance with Articles 230 and 250 of the latest edition of the NEC. When self-contained meter sockets are used, the neutral conductor must be connected to the neutral terminal in the socket.

Current limiting fuses

Current limiting fuses to protect the member's electrical system from high-fault current must not be installed in meter sockets, instrument transformer enclosures, or the Cooperative's distribution transformers. They may be installed in the member's service panel, or in a separate enclosure between the meter socket and the panel.

Single-Phase 120/208 Volt Services

A five-terminal meter socket is required on all single-phase networked 120/208 volt service. The fifth terminal must be in the nine o'clock position, connected to the socket neutral bus conductor.

Three-Phase Self-Contained Metering

Three-phase service requires a seven-terminal socket with a lever bypass. The neutral (grounded) conductor must be connected or tapped to the third terminal from the left on the lower terminals.

Meter socket/main disconnect combinations

Meter socket and circuit breaker combinations are required for 0-400 amps provided the meter socket is approved by the Cooperative.

Sequence of equipment

All self-contained service equipment must be metered ahead of the disconnect switch. Under special conditions, permission may be granted to modify this sequence in group installations of less than six individual occupancies, provided all equipment ahead of the meter is sealed by the Cooperative.

Load balancing

When 120/208 three-phase transformers provide single-phase service, it is the member's responsibility to identify the conductors and balance the load on the transformer.

Service conductors for self-contained metering

Line-side conductors must always be connected to the top terminals of the meter socket.

Service conductors must be arranged in the socket to avoid interfering with the meter installation or operation of the bypass.

The member is responsible for ensuring that the connection of service entrance conductors in the meter socket are inspected and tightened before the service is energized. If safety sockets are used, circuit-connecting nuts will also be properly torqued. Meters will not be installed unless these connections are tight, and are wired correctly for the class of service involved. Meters will not be installed if conductors place undue strain on the terminal facilities. Terminals must be rated for the size of conductor to be used. Strands must not be removed to make conductors fit under-sized terminals.

Current Transformer Metering

Single-phase over 400 amp and Three-phase over 400 amp

Member's responsibility

Provisions for current transformers must be made when the current-carrying capacity of the service entrance conductors exceeds 400 amps single-phase or 400 amps three-phase, as determined by NEC.

The member is responsible to do the following:

1. Provide and install a current transformer (CT) enclosure where designated by the Cooperative. The member must install the CT enclosure on the supply side of the main disconnect, unless otherwise approved by the Cooperative's meter department.

All CT enclosures require a minimum front clearance of 36 inches. Hinged CT enclosure doors must not block a safe exit while open.

The top of the CT enclosure is a maximum of 8 feet above the floor or finished grade; the bottom is a minimum of 6 inches above the floor/grade. Enclosures must not be mounted in crawl spaces, attics, any confined areas, or mounted on ceilings.

All member-supplied CT mounting equipment shall be listed and labeled, and shall be installed and used in accordance with any instructions included in that listing or labeling.

2. Install the metering circuit conduit.

The Cooperative-required conduit between the meter socket and CT enclosure shall be provided and installed by the member. Conduit must be as short as possible and cannot exceed 50 feet in length, and shall be installed according to Cooperative requirements. A pull-string of 1/4 inch polypropylene rope is required in any meter conduit over 10 feet.

- Single-phase: 1 inch minimum.
- Three-phase: 1 1/4 inch minimum.

The Cooperative's responsibility

The Cooperative is responsible for providing and installing the following:

- Current transformers.
- Metering circuits (wiring).

Before Connection

Before calling the Co-op for service connection, please review this important information to avoid unnecessary delays and/or billing:

- Have you provided the Cooperative with all necessary documentation such as an easement and application?
- If you signed an easement, did you use black ink and have it notarized?
- Have you made all necessary up-front payments?
- Have you (or your electrician) set the service up as the applicable NHEC specification in this handbook shows?
- Is the service located as you and our Field Representative discussed?

If you have any questions concerning any of these items, please call the Cooperative at 1-800-698-2007 or the Field Representative for your area.

Service Upgrade and Relocation

Introduction

An upgrade or relocation of service requires changing the existing metering equipment. This section provides information for upgrading and relocating an existing service. There are two types of upgrades: same location and relocation. Same location upgrades involve using the same location to install new metering equipment. Relocation upgrades involve moving the point of attachment to a new location, which may incur new costs.

Getting started

The Cooperative should be made aware of any planned changes to an existing service as soon as possible.

- Review your plans with your electrician to determine what your needs are.
- Consult the Overhead and Underground sections of this handbook to determine the necessary requirements for your service.
- Make sure you have obtained all necessary permits for your project.
- Call the Cooperative at 1-800-698-2007 to arrange a field visit to determine the service requirements and what costs are involved.
- Provide the Cooperative with increased load information. You may be required to fill out a Load Data Sheet.
- Install the new service equipment to Cooperative specifications.
- Obtain an electrical inspection and approval of the service equipment and structure. The call for this inspection is made by the member (or the electrical contractor) to the electrical inspector for your area.
- Call the Cooperative at 1-800-698-2007, after the electrical inspection is complete, and request that the old service equipment be de-energized and that the new service equipment be energized. A service order will then be generated to the District for this work and they will insert it into their construction schedule.