INTRODUCTION

This booklet was developed to help you acquire electrical power to your property or business. It presents information and general specification about the supply and use of electricity from Flathead Electric Cooperative. For a complete and detailed explanation of our construction standards please contact our New Services Department. Adherence to these procedures and standards will promote safe electrical installations and reliable service.

This handbook is based on utility standards to guide you through the basic requirements for installing a new service. For questions regarding availability of power or service locations please contact our New Services Department at (406) 751-4495. One of our Engineering Coordinators will direct you to the engineer that services your area.

The *Non-Residential Electric Service Handbook* is not meant as a design tool. Rather, it is a reference guide for construction and metering standards recognized by Flathead Electric Cooperative. You should also consult other sources such as the National Electric Code (NEC), Electric Utility Service Equipment Requirements (EUSERC), your electrical inspector, and other standards governing electrical equipment and installations.

Installing new electrical service is a joint project between you and Flathead Electric Cooperative (FEC). FEC desires to provide a safe and reliable electric service in a courteous and efficient manner. Cooperation between members, their contractors and the Cooperative is imperative in the development of plans leading to new or upgraded service to your facility.

We look forward to assisting you in planning electrical service to your project.

Contents

CHAPTER 1: GENERAL INFORMATION

CODES

This handbook supplements the current version of the National Electric Code, and any city or county codes in effect within the service territory of FEC.

RESPONSIBILITIES

Members are responsible for maintaining their wiring and equipment in a safe operating condition. FEC will not repair or work on any wiring or equipment located on the member's side of the meter.

ELECTRICAL PERMITS

Before any electrical work may be installed, altered or repaired, an electrical permit must be obtained from the appropriate agency. The FEC New Services Department will assist you in determining which government agency or municipality is responsible for issuing permits for your project location. Keep in mind that electrical permits will only be issued to licensed electricians for non-residential projects. State Electrical Permit application forms are available at the Cooperative. You may also apply on-line for a State Electrical Permit at *https://app.mt.gov/permit/*. Flathead Electric does not set, administer or collect Electrical Permit fees. These programs are administered by various governmental agencies.

INSPECTIONS

In addition to inspections by the local electrical inspector, FEC also has various inspection requirements. Again, the New Services Department can guide you through these inspection requirements.

FEES

Permit Fees: Permit fees are based on the type of electrical system the member is installing. For commercial projects they are generally based on the value of the work being performed. Please contact the appropriate governmental agency to determine the applicable fees.

Engineering and Connection Fees: FEC charges fees based on the cost of engineering and construction of FEC facilities for your project. The engineering and construction fees can be obtained from the New Services Department after you have applied for service and provided all the required information to the Engineer. All fees must be paid before a crew or serviceman will connect your new service.

EASEMENTS

In some cases an easement will be required to allow FEC personnel and equipment to enter your property for the purpose of construction and maintenance of our facilities on your property. The Staking Engineer will determine if an easement is required, and will prepare the appropriate documents granting the easement to FEC. Subdivision developers should provide the appropriate utility corridors on the subdivision plat.

ADDED LOADS

If a change of an existing service involves an increase in load, contact the New Services Department to see if the existing equipment has the capacity to service the increased load.

LOCATING UNDERGROUND FACILITIES

The member or member's agent must call **U-dig** at 755-8344 at least two full working days (48 hours) prior to doing any excavation work. One call to the locating service notifies all of the utilities that locates are required. U-dig will not locate privately owned facilities. Excavation must not begin until the locations of all underground wires, cables, and pipes have been marked, or the utility has notified the member that they have no facilities in the area. Any digging within 24 inches of either side of the location markings must be done by hand. The color code for marking underground facilities is:

Color	Underground Service
Red	Electric
Yellow	Gas, Oil, Steam
Orange	Telephone, Cable TV
Blue	Water
Green	Sewer
Pink	Temporary survey marks
White	Proposed Excavation

Please note that the color White is used for proposed excavation. Do not use any other colors to mark the area you want U-dig to locate.

CHAPTER 2: APPLYING FOR NEW SERVICE

If you are not currently a member of Flathead Electric Cooperative, a written application for service must be completed and submitted before you can obtain power. Contact the New Services Department and one of the Engineering Coordinators will assist you in completing the membership application.

YOUR RESPONSIBILITIES

1. Determine if you want overhead or underground service.
2. Determine the size of service you want (200 amp, 320 amp, etc.)
3. Determine your voltage requirements.
4. Obtain an Electrical Permit.
5. Contact the FEC New Services Department.
6. Notify other utilities of your project.
7. Install your service entrance equipment.
8. Call "U-Dig" before you dig.
9. Provide trench and conduit for underground services.
10. Provide a clear path for your overhead service line.
11. Call FEC New Services Department when you are ready for us to install the service wire.

FLATHEAD ELECTRIC COOPERATIVE'S RESPONSIBILITIES

1. Install and connect the service line to your underground meter base or overhead mast wiring.
2. Install CT's, if required.
3. Install a meter.
4. Energize your system.

SCHEDULING

If only service wire and a meter installation are required, services are typically energized within a week after you have completed the appropriate “Your Responsibilities” section above. If additional work is required, it may take longer.

SERVICE TYPES

FEC offers the following standard types of services for non-residential applications.

Single Phase	120/240V	3 wire
V-Phase	120/240V	4 wire *
Three Phase	120/240V	4 wire **
	120/208V	4 wire
	277/480V	4 wire

* Available for underground or overhead service applications of 40KW or less. Maximum motor loads of 30HP.
** Available for overhead service application only.

If you have a requirement for other voltages or types of service, FEC must approve your request prior to construction.

CONTACTING OTHER UTILITIES

New construction typically involves the installation of water, sewer, telephone, cable TV and natural gas lines, as well as power cables. It is your responsibility to notify each of the utilities that you wish to provide service to your project. You should get the name and phone number for a contact at each utility and let each of them know which other utilities will be providing new service.

CHAPTER 3: GENERAL REQUIREMENTS

TEMPORARY SERVICE

Most service installations can be coordinated to provide your permanent service early on in the construction process. This will eliminate the need for a temporary service. This in turn eliminates an additional visit to your construction site and additional costs to you. However, if temporary service is required for your project, FEC will connect it under the following conditions:

- Temporary meter loops or pedestals will be provided by you or your contractor.
- You or your electrician must submit to FEC a state or local electrical permit.
- There will be a separate charge for temporary services.
- Your temporary service should only be located adjacent to a transformer and have enough wire stubbed out to connect directly to our facilities. If an existing transformer is not in the area, temporary service may not be available at your location. Consult FEC for other options.
- The costs for permanent services replacing a temporary service will be treated as new services.

INSPECTIONS AND CODES

This handbook should be used only as a guide. It does not cover all federal, state, and local code requirements. It is your responsibility to ensure that your project complies with the most recent issues of the NEC and any other federal, state, or local codes that may apply. Once your service equipment is installed, the state, or the city with jurisdiction, requires that the installation pass an electrical inspection before we can connect you to our system. You are responsible for requesting and passing this inspection. You are also required to contact the FEC New Services department to arrange for a final inspection of your meter installation.

EMERGENCY OR STANDBY GENERATORS

You may elect to install an emergency or standby generator when you build. Permanently installed generators are to be connected to your wiring system by a permanently installed transfer switch intended for that purpose. The transfer switch is used to disconnect all ungrounded conductors connected to FEC's system prior to connecting the generator to the conductors supplying your project. The transfer switch is to be designed and installed so that the generator cannot be connected to FEC's system in any mode of operation. When the switch is in the position that disconnects FEC's service, it must have a visible opening and be lockable in that position. Compliance with these provisions is necessary to prevent serious or possible fatal accidents to FEC line personnel. Portable generators shall not be connected through your house wiring system at any time unless the connection is made through a permanently installed transfer switch. All transfer switches and/or transfer operating schemes must meet applicable building codes and be inspected by the appropriate governmental electrical inspector. FEC will require an inspection be made by FEC personnel prior to operation of the generator. For more detailed information contact FEC and request our "Safely Installing Your Standby Electric Generator" pamphlet.

MEMBER EQUIPMENT, DEVICES AND CHARACTER OF SERVICE

Your electrical equipment and devices are to have characteristics such that FEC's distribution system is efficiently utilized and undue interference with FEC service to other members does not occur. Your equipment shall be designed to perform satisfactorily within the standard voltage ranges and frequency provided on FEC's system. FEC will endeavor to maintain standard voltages and frequency on its distribution systems, subject to variations within reasonable limits. Three-phase service may be required in lieu of single-phase service where in FEC's judgment, your connected load is of a size that three-phase is necessary. FEC reserves the right to inspect and test any equipment connected to its lines and to require any information necessary to determine the operational characteristics of the equipment.

MOTOR PROTECTION

To assure adequate safety to personnel and equipment, it is recommended that you provide and maintain code approved protective devices in each phase to protect all motors against overloading, short circuits, ground faults, low voltage and to protect all three phase motors against single phase conditions.

MOTOR STARTING AND POWER CORRECTION FACTOR

Unless prior approval is given by FEC, reduced voltage starters are required on all motors rated 40 horsepower and larger and also on motors that are frequently started that are rated in excess of 10 horsepower. A power factor correction of 3KVARS per 10 horsepower of motor capacity must be installed.

CHAPTER 4: OVERHEAD SERVICE

OVERHEAD SERVICE: See the *Residential Electric Service Handbook* page 6 for overhead service requirements.

CHAPTER 5: UNDERGROUND SERVICE

UNDERGROUND SERVICE: See the *Residential Electric Service Handbook* page 12 for underground service requirements.

CHAPTER 6: METERING

.GENERAL REQUIREMENTS

Removing and installing meters: FEC places seals on meters and associated equipment to prevent injury and/or tampering. Only authorized and qualified FEC personnel shall cut seals or remove and install meters. Qualified electricians with prior approval from FEC may remove a meter to disconnect the service under abnormal or emergency conditions. Please note that with some types of meter bases, removal of the meter does not de-energize the member's system. The purpose of FEC placing seals on meters and associated service equipment is to prevent injury and/or tampering.

Equipment: Instrument transformer (CT and PT) enclosures, pull sections, switchgear, gutters that contain unmetered conductors and metering equipment must have provisions for sealing. FEC will furnish, install and maintain the following equipment:

- Revenue meters.
- Instrument (current and\or voltage) transformers.
- CT meter wiring.
- Test Switch.

You are responsible for furnishing, installing, and maintaining the following equipment beyond the point of delivery.

- Meter bases.
- All necessary wiring, connectors, and lugs (except CT meter wiring).
- Instrument transformer mounting frames.
- Switches.
- Enclosures.
- Conduit.
- Protection equipment.

Available Fault Current: It will be your responsibility to ensure that any fault current interrupting devices installed meet the requirements of NEC Article 110 regarding equipment interrupting ratings. FEC can provide information on available fault current at the point of delivery. However, system changes can cause the available fault current to increase. You may want to consider installing current limiting devices to ensure that the installations continue to meet the intent of NEC Article 110.

Meter Location: You must install your service entrance equipment where it will be accessible to FEC at all times. All locations are subject to approval by an FEC representative. FEC requires putting the metering equipment on the quadrant of your building closest to the FEC transformer or secondary pedestal. The requirements for properly locating your metering equipment (Metering equipment includes meter base, switchgear or CT cabinet) are:

- It must be outside.
- It must be located in an area that is not subject to being fenced or blocked.
- It must be located on a structure that is owned by you.

The reasons for these requirements are:

- So FEC meter personnel can obtain periodic meter readings in a cost effective manner.
- So FEC can efficiently maintain the meter.
- So our employees can stay out of your facilities.
- If there is a fire or other disaster, we can disconnect your service.

Metering equipment may not be installed in any of the following locations:

- Above or below the first story level.
- On poles owned by FEC or other utilities except for a meter pole provided by FEC.
- In commercial occupancies they do not serve.
- Any place where safety may be compromised.

It should be pointed out that FEC will not accept recessed, semi-flush or flush mounted metering installations. Also all metering installations must provide protection from ice, snow and debris unloading from the roof. Metering equipment includes meter base, switchgear, CT cabinet and main disconnect.

General Meter Base Requirements: FEC's meter base requirements include the following:

- All meter bases must be equipped with a screw-type ring. Snap rings are not acceptable.
- Meter bases must not be jumpered to provide power.
- Any meter base containing energized equipment must be covered and sealed with a transparent cover plate when a meter is not installed.
- All unused openings (knockouts) on the meter base enclosure must be closed with rain tight plugs that are locked tightly in place from the inside of the enclosure, before a meter is installed.
- Meters will be installed only in bases which are level, plumb and securely fastened to the structure.
- Meter bases and enclosures must be Underwriters Laboratories (UL) approved.
- Terminals must be marked with a conductor range for aluminum or copper conductors. When aluminum conductors are used, the base must be approved and clearly marked by the manufacturer for that use.
- All meter equipment exposed to weather must be rain tight according to the National Electrical Manufacturer's Association (NEMA) 3R minimum.
- Ringless socket meter bases are not acceptable unless they are specifically approved by the meter foreman.

Meter Clearances: The center of the meter socket is always the point of reference. Meter base height shall be a minimum of 4.5 feet and a maximum of 6 feet above finished grade. These heights are for single meter base installations. For multiple meter pack installations see the section titled *Multiple Meter Installations.*

Working space in front of metering equipment (including instrument transformer enclosures) must be at least 36 inches wide and 36 inches deep. Plants, shrubs and trees must not be planted in this space. Gas meters and related piping must be at least 36 inches horizontally from the center of the meter base enclosure.

The center of all self-contained meter base enclosures must be a minimum of 10 inches from adjacent walls, ceilings, or other similar obstructions. The minimum distance from the meter base to the wall increases to 36" if the instrument enclosure cabinet door opens toward the wall. See figure (1b). All service equipment must be a minimum of 10 inches from the meter's center. In addition there must be at least 72 inches of clear headroom in front of the meter. See figure (1a and 1b).

Whenever meter installations are placed in areas subject to roof shedding you will be required to make provisions to protect the meter from falling debris and snow. Meter bases may not be enclosed inside of structures or cabinets that hide the meter.

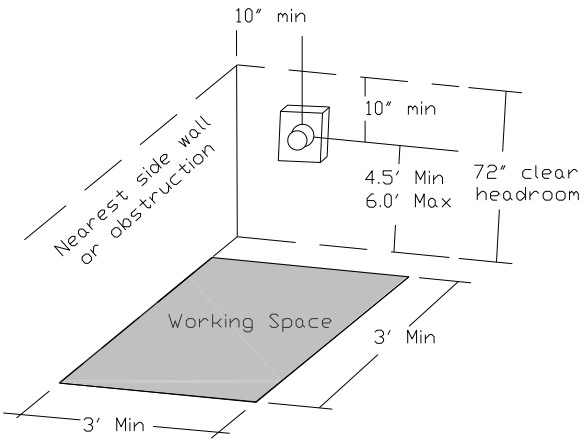


Figure 1a: Self-Contained Metering

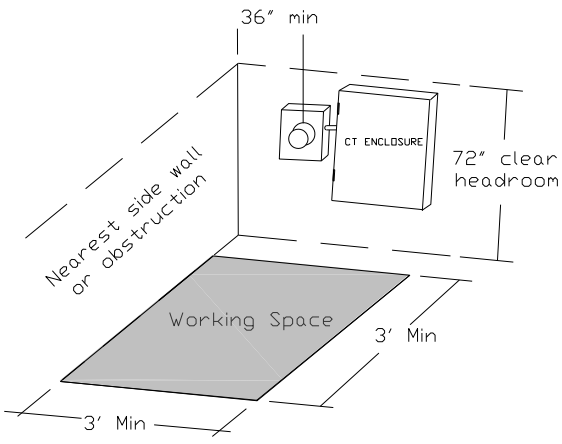


Figure 1b: CT Metering

Multiple Meter Installations
Multiple meter packs shall comply with the equipment arrangement shown in Photos 1 & 2. The maximum number of meters in a stack is three. The pull section or termination compartment shall meet USEREC 343 size requirements. You must supply any terminal blocks used. Meter bases used as a “house meter” require a safety socket.

Factory-Built Multiple Meter Panel
Prior to ordering Factory Built Meter Panels for non-residential use, you must submit drawings to FEC’s Metering Department for approval. See Photo 1 below for minimum spacing on multifamily residential meter panels.

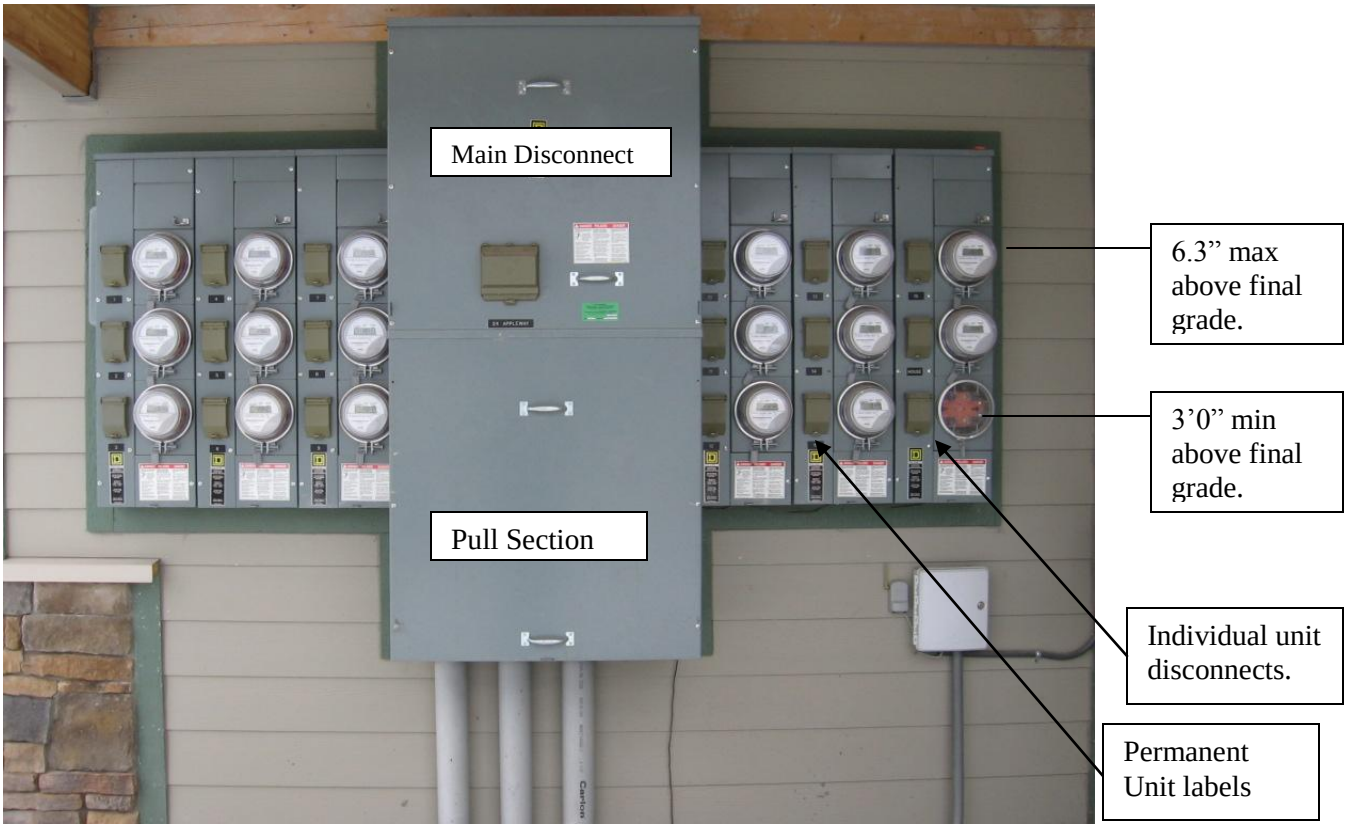


Photo 1: Typical installation of a single phase multiple meter pack for a multifamily residential building or multi-unit business complex.

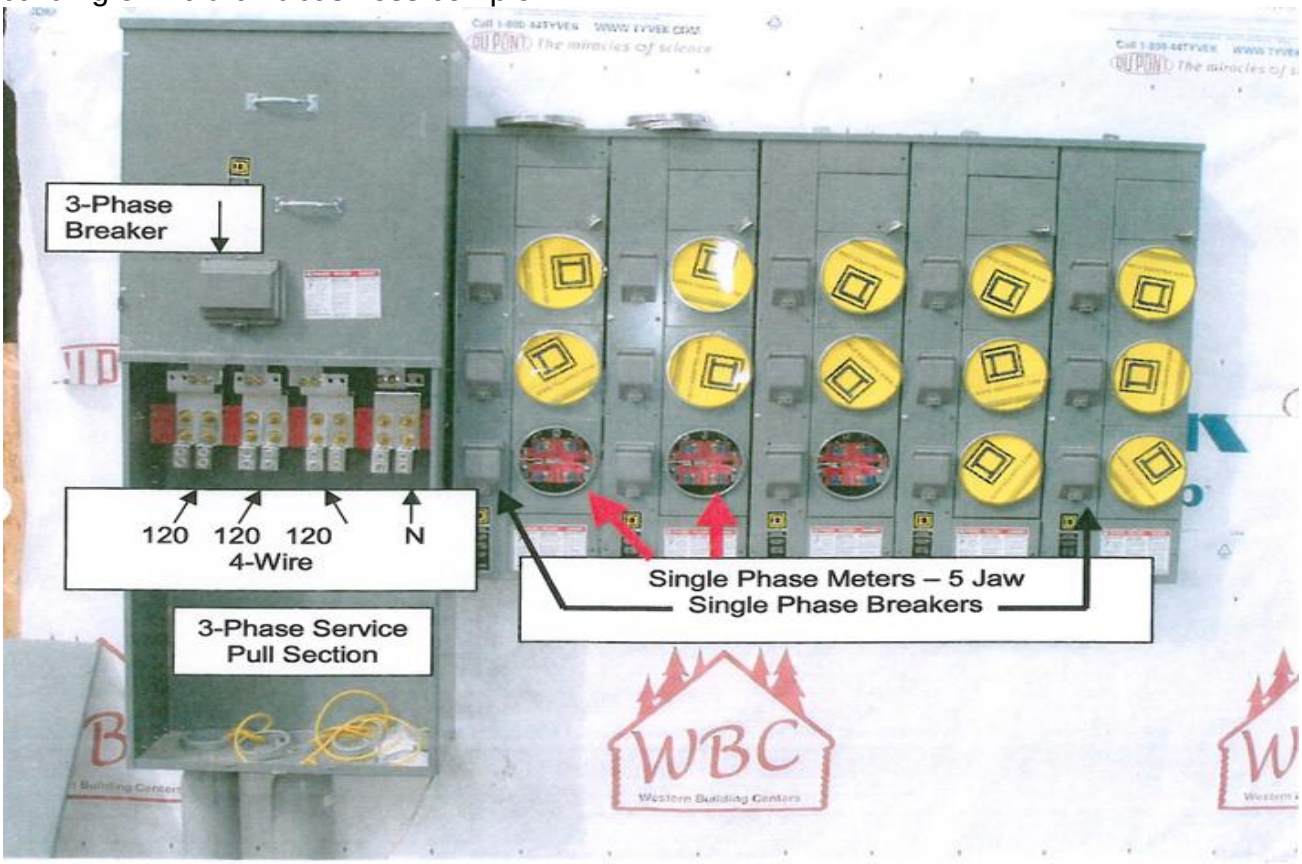


Photo 2: Typical installation of a three phase multiple meter pack for a multi-family residential or business complex.

Meter Base Labeling

Meter bases must be permanently labeled to indicate the part of the premises they serve (i.e. address, unit number, etc.) The customers name is not acceptable. The labels must be either engraved phenolic nameplates or adhesive type labels at least one inch high. Felt tip pens and label maker tape are not considered permanent marking. Service will not be established until marking is complete.

Grounding

All meter bases, enclosures and conduit shall be bonded in accordance with Article 230 and 250 of the latest NEC. When self contained meter bases are used, the neutral conductor must be connected to the neutral terminal in the socket. The ground may not be connected to the line side neutral. The load side neutral must always be present.

Current Limiting Fuses

Current limiting fuses to protect your electrical equipment from high fault current must not be installed in meter bases, instrument transformer enclosures or FEC distribution transformers. They may be installed in your service panel or a separate enclosure between the meter base and the panel.

Self-Contained Metering

All three phase self-contained meter bases (200 amps or less) will be Safety Socket Type. All single phase self-contained 200 amp meter bases used for non-residential application will be of the safety socket or manual bypass type. Single phase 100 amp and class 320 amp self-contained meter bases used for non-residential applications, will need to have provisions for manual bypass blocks.

Single phase 100 amp	manual bypass required
Single phase 200 amp	manual bypass or safety socket required
Single phase 320 amp	manual bypass required
Three phase 100 amp	safety socket required
Three phase 200 amp	safety socket required

SINGLE PHASE SERVICES

Single-phase Services: 200 amps or less

A self-contained meter base shall be installed on all single phase services (120/240V or 120/208V, where the current carrying capacity of the service entrance does not exceed 200 amps. (See figure 2a.)

Single-phase Services: 201 to 400 amps

A self-contained 320 ampere meter base with a 320 class manual bypass is required on all single phase 120/240V services. (See figure 2b) Automatic circuit closers or a lever are not acceptable.

Single-phase services: 120/208V

Under some circumstances FEC will allow the use of 120/208V single-phase services as temporary services feed by 120/208V three–phase transformers. A five terminal meter socket is required on all single-phase 120/208 volt services. The fifth terminal must be in the nine o'clock position, connected to the socket neutral bus connector. (See figure 2c.)

THREE PHASE SERVICES

Three-phase Services: 200 amps or less

A seven terminal meter base is required on all three phase 120/240 volt, 120/208 volt and 277/480 volt services where the current carrying capacity of the service entrance conductors do not exceed 200 amps. The meter socket must be a safety socket. The neutral conductor must be connected to the third terminal from the left on the lower terminals.

Four wire delta services require a high leg (power leg or wild leg) to be connected through the right hand terminals of the socket. In addition, the high leg shall be identified in orange at the point of termination in the meter socket. This is done in addition to the grounded conductor required by NEC. (See figure 2d.)

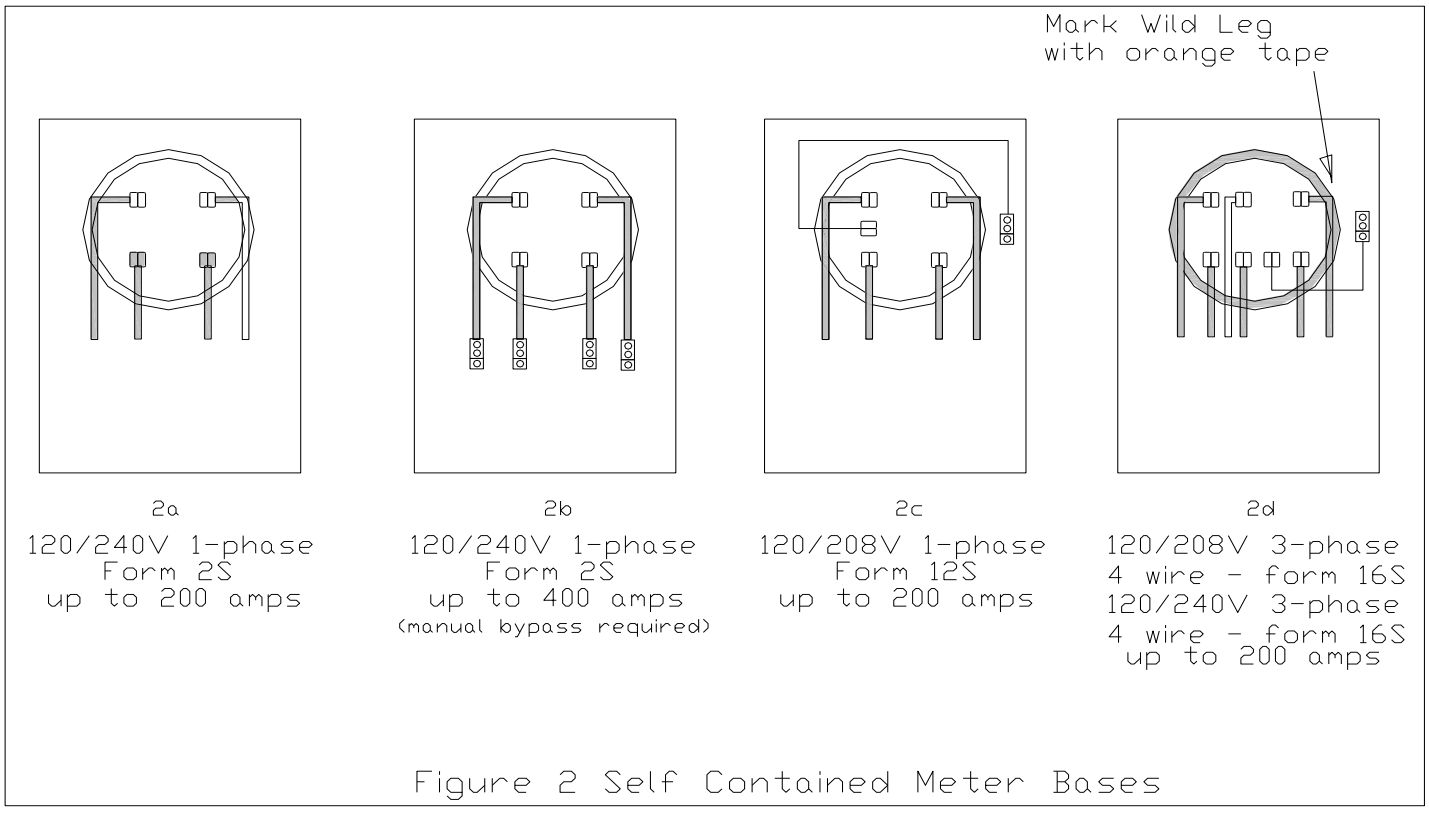


Figure 2 Self Contained Meter Bases

Meter Base/ Main Disconnect Combinations

Meter base and circuit breaker combinations are preferred for single phase services of less than 400 amps, and three phase services 200 amps or less. All self contained service equipment must be metered ahead of the main disconnect. Under special conditions permission may be granted to modify this sequence provided all equipment ahead of the meter is sealed by FEC.

Service Conductors for Self Contained Metering

Line side conductors must always be connected to the top terminals of the meter safety socket. Service conductors must be arranged in the meter base to avoid interfering with the meter installation or operation of the bypass blocks.

You are responsible for ensuring that the connection of the service entrance conductors in the meter base are inspected and tightened before the service is energized. Where safety sockets are used, circuit connecting nuts must be tightened to the proper torque. Meters will not be installed unless these connections are tight and wired correctly. Meters will not be installed if conductors place undo strain on the meter base terminals. Terminal blocks must be provided by the electrician and must be rated for the size of the conductor used. Strands may not be removed to make conductors fit under sized terminals.

INSTRUMENT TRANSFORMER METERING

Provisions for instrument transformers (current and voltage transformers) must be made when the current carrying capacity of the service entrance conductors exceeds 320 amps single-phase or 200 amps three-phase. (See photo 3 on page 15)

Member's Responsibility

You are responsible to do the following:

1. Provide and install a current transformer (CT) enclosure ahead of the main disconnect on the outside of your building.
   - All CT enclosures require a minimum front clearance of 36 inches.
   - Enclosures must be hinged.
   - Enclosure doors must not block a safe exit while open.
   - The top of the CT enclosure shall be a maximum of 6 feet above finished floor/grade.
   - The bottom of the enclosure shall be a minimum of 2 feet above finished floor/grade.
   - Enclosures may not be mounted in any confined space.
   - CT enclosure dimensions are 48"H x 36"W x 11"D.
   - The CT enclosure may only contain the main service conductors.
   - A maximum of four main service conductors may be served off the load side of each current transformer mounting bracket.
   - Splicing of service conductors is not allowed in the enclosure.
2. Install a CT mounting base that complies with the below reference drawings for services of 800 amps or less.
   - Single-phase EUSERC Drawing 328A
   - Three-phase EUSERC Drawing 329A
3. Provide and install two bolt lugs on the line and load sides of each phase and the neutral bus of the CT mounting base.
4. Provide and install the meter base. The meter base must have provisions to accommodate a test switch.

5. Provide and install a metering circuit conduit between the meter base and CT enclosure that meets the following specifications:
   - The conduit must be rigid or EMT.
   - The conduit is to be as short as possible.
   - LB's are not permitted.
   - Flex conduit is not permitted.
   - Conduit diameter must be 1-1/4 inches.
   - No junction boxes are permitted.
   - The meter base must be within 15 feet walking distance to the CT enclosure.
   - The meter base and CT enclosure must be properly bonded.
   - Only FEC installed conductors are permitted in the conduit.
6. Four-wire delta services require the high leg (power or wild leg) to be connected to the right-hand position in the CT compartment. In addition, the high leg shall be identified in orange at the point of termination in the CT compartment and at the weather head for overhead services.
7. The member must terminate underground services on the top lugs of the CT cabinet.

FEC's Responsibility

FEC is responsible for providing and installing the following:
1. Current Transformers
2. Meter
3. Test switch
4. Wiring for test switch.

SWITCHBOARD METERING

A custom-built switchboard constructed to EUSREC specifications is required for services over 800 amps. You must submit one set of drawings to the FEC meter foreman for approval on all switchboard metering prior to shipment from the manufacturer. (See photo 4, 5 and 6 on pages 15 and 16).

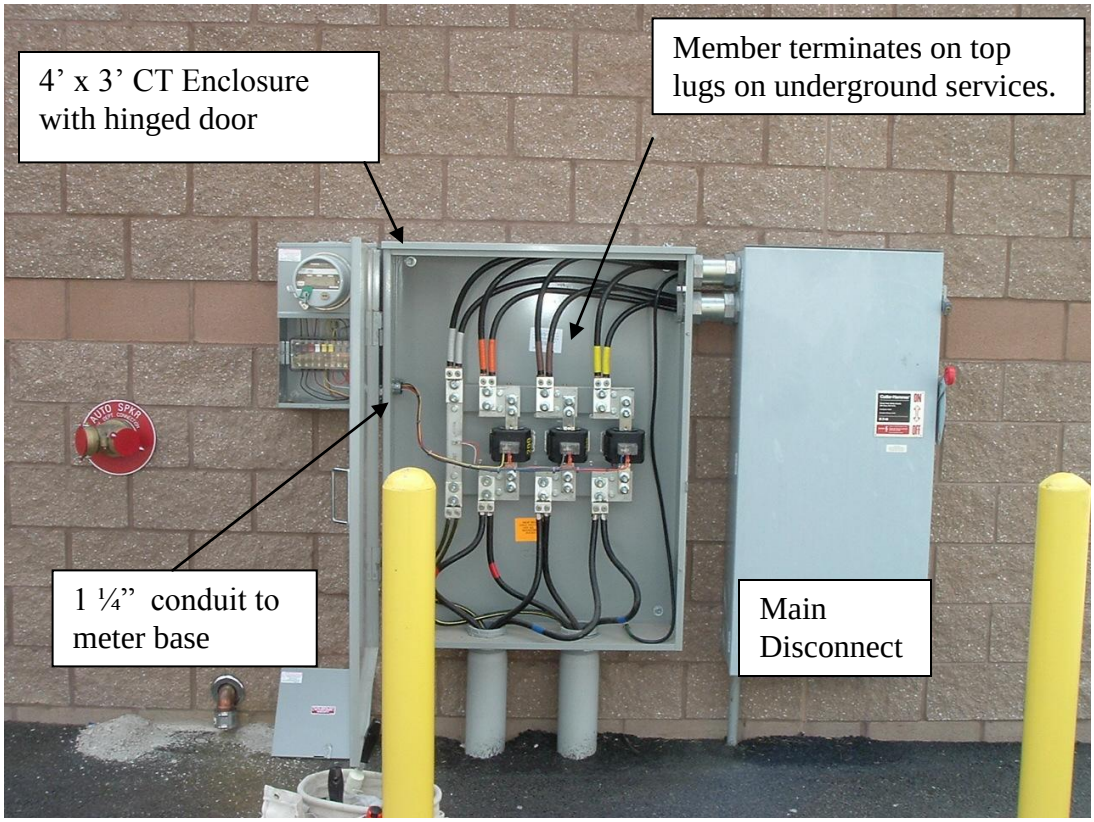


PHOTO 3: CT Enclosure Installation

Photo 4: Switchboard metering cabinet with meter base mounted to cabinet.

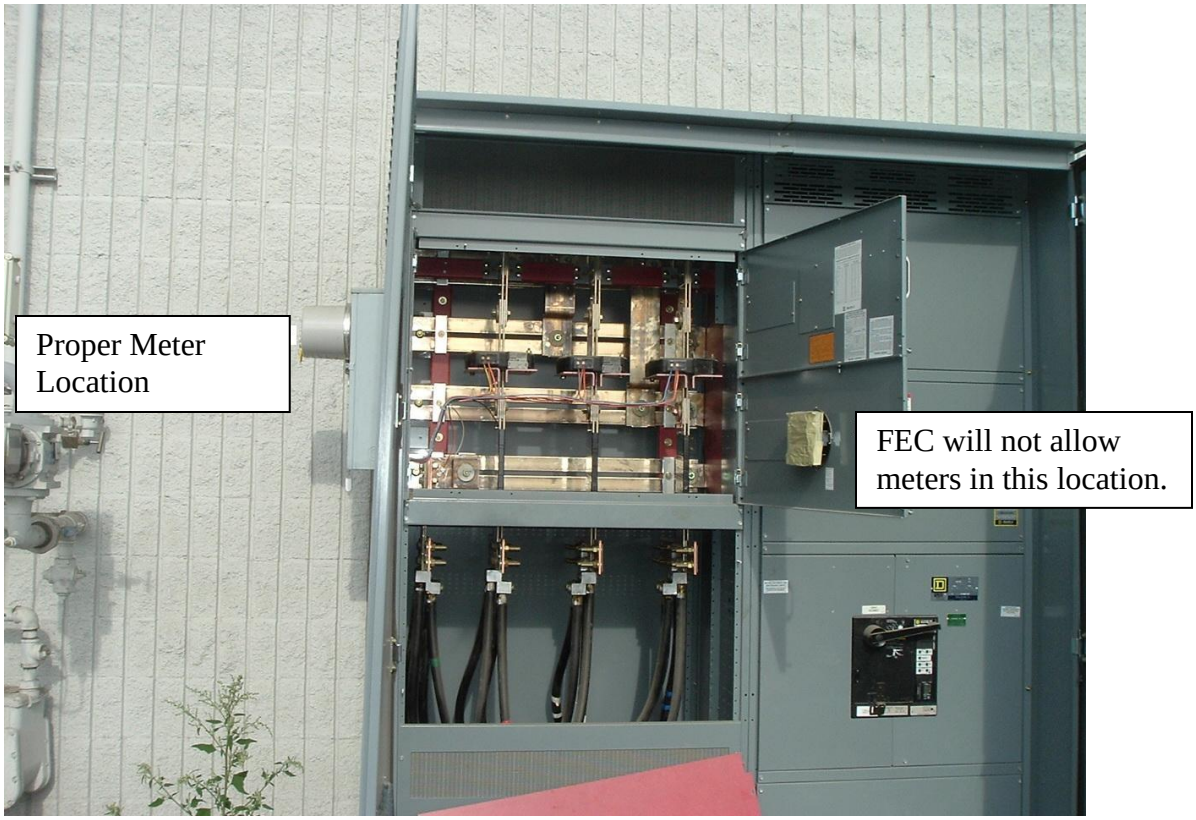


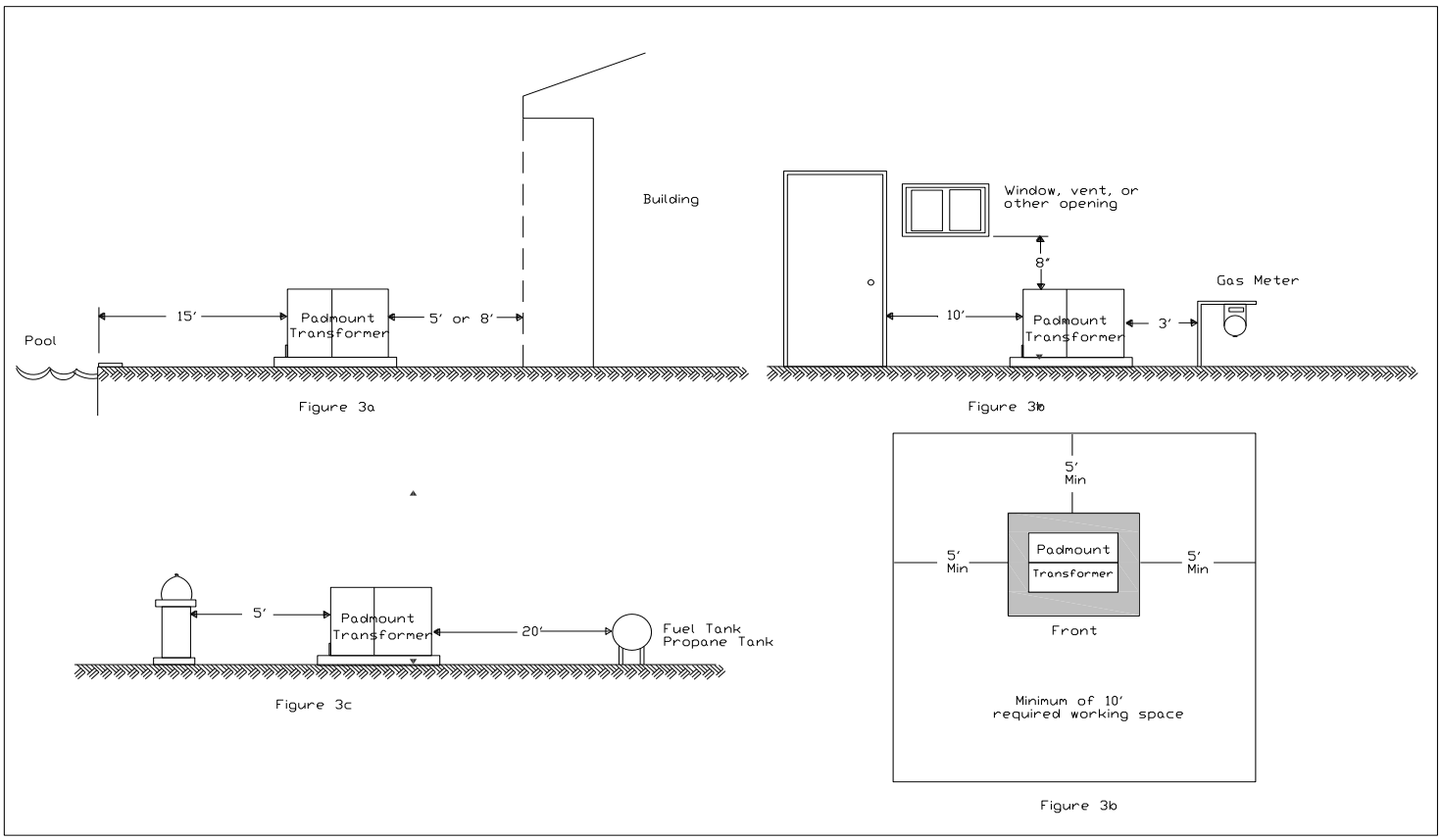
Photo 5: Pull Section and CT Section of Switchboard Cabinet

Photo 6: Switchboard Cabinet

CHAPTER 7: SAFETY CLEARANCES

Clearances to Padmount Transformers

Clearances from padmount transformers to structures are measured from the nearest metal portion of the transformer to the structure or overhang. The clearance from the building must be a minimum of 4 feet if the building has non-combustible walls (brick, concrete, steel, or stone) and 8 feet if the building has combustible walls. (See figure 3a below.) Work space around a padmount transformer is shown in figure 3d. Landscaping or other structures must not encroach upon these clearances. Other clearance requirements are shown in figure 3b and 3c. When padmount transformers are placed in areas that subject them to possible damage by vehicular traffic, FEC may require the installation of protective bollards.



CHAPTER 8: UNDERGROUND SPECIFICATIONS

The purpose of this Chapter is to clearly outline the requirements for the installation of vaults and conduits used in the FEC electrical distribution system. FEC requires all new underground line extensions to be placed in a vault and conduit system. All guidelines must be followed. Any deviations from these requirements must be approved by FEC prior to construction. Failure to do so may result in a rejection of the installation. If there are any questions or if you need direction regarding the installation of a vault and conduit system please contact FEC's New Services Department.

Member Responsibilities

The member is responsible for the following when installing underground services.

- Contact U-dig prior to digging.
- Installation of trench, conduit, vaults and light bases, if required.
- Installation of FEC supplied secondary pedestals.
- Calling for a pre-backfill trench inspection.
- Installing metering equipment.
- Calling for a final inspection when project is ready for FEC crew.
- Obtaining an electrical inspection.
- Pay fees and supply electrical permit.

Flathead Electric Responsibilities

Once you have provided an electrical permit, paid fees and passed final inspection FEC will:

- Schedule a serviceman or crew to complete your job.
- Install transformers, and pull wire.
- Install meter in your meter base.
- Energize your service.

Trench

Preparation

- Know whose property you are on! Be sure you have the legal right to dig on the property. FEC will not install lines on property where we do not have an easement. FEC may have an easement on the property, but that does not give you the right to dig without the owner's permission.
- If you are digging in the Montana Department of Transportation (MDOT) right-of-way you must have a copy of the MDOT 131 permit obtained by FEC for your job. You must have a copy of this permit on site while trenching is being done. Failure to have the permit or comply with the terms of the permit may result in the State taking action against you.
- After the trench route has been determined you must have all underground utility lines located. In the FEC service area please call 755-UDIG (755-8344) two working days (48 hours) before you dig so these lines can be located. Remember that the locate marks are only accurate to within 18".

General

- The bottom of the trench must be smooth and level. This prevents bridging of the conduit, which can cause the conduit to flatten or pull apart once the trench is backfilled.

- The trench must be free of sharp rocks, concrete waste and other construction debris. In rocky soil, sand bedding may be required.
- The trench must be a minimum of 5’ from septic tanks and a minimum of 10’ from the drain field.
- **FEC requires the inspection of primary trenches and conduit installations prior to backfill.**

Width and Depth

- There are two different trench specifications. The first is the primary trench. The primary is the main line that goes from vault to vault or pole to vault.
- The proper dimension for a primary trench is a minimum of “16 to 18” wide and 36” to 40” deep.
- The second is the secondary trench. The secondary is the line that goes from the vault or pole to your meter.
- The proper dimension of the secondary trench is 16” to 18” wide and 24” to 30” deep.
- Joint trenches with other utilities should comply with the dimensions specified in Figure 4.

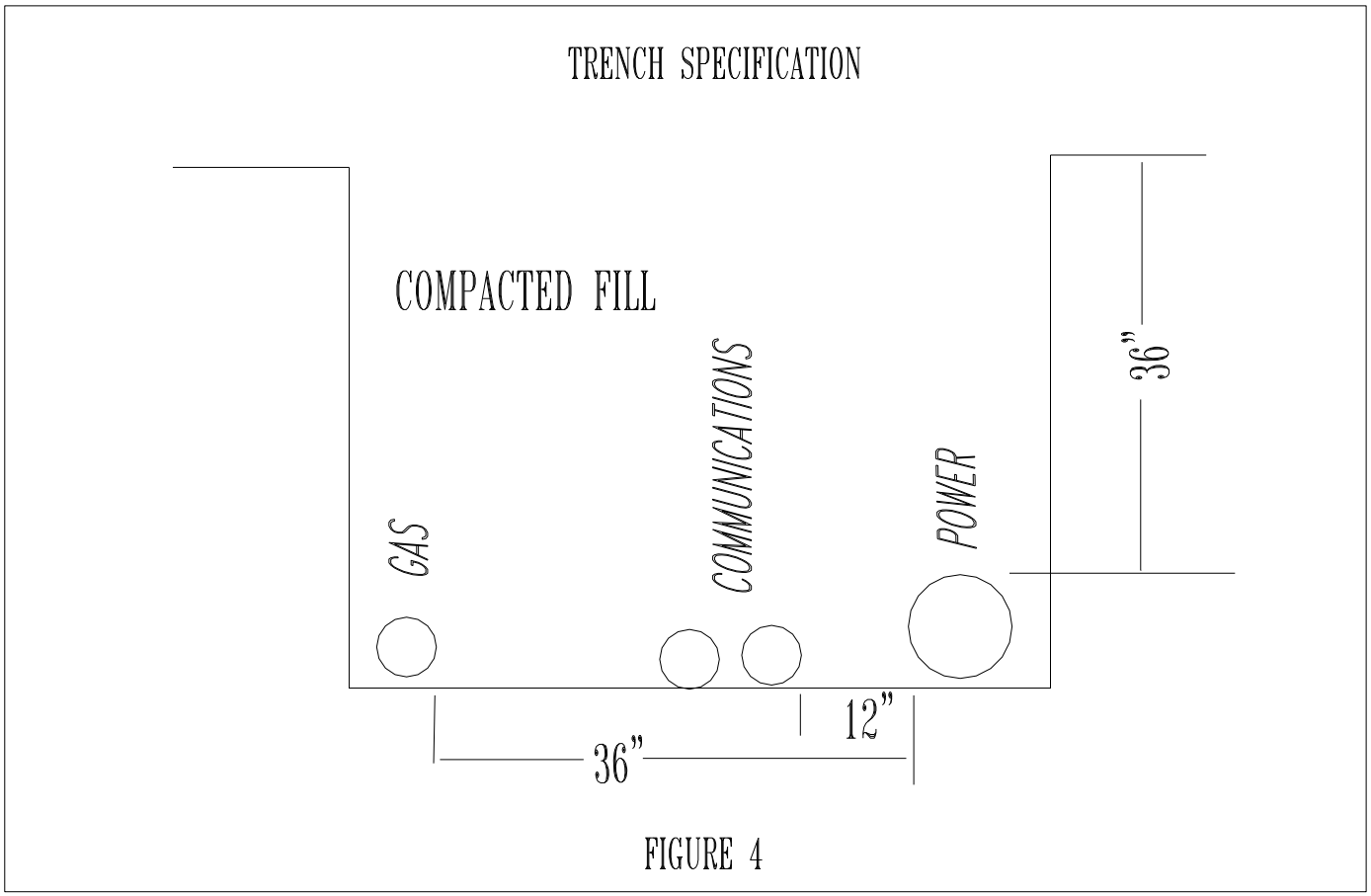


FIGURE 4

Conduits

Installation

- All conduits will be installed in a trench with a level bottom to avoid a “bridging effect”.
- Keep the inside of the conduit clean and free of foreign materials.
- The use of primer is recommended when gluing conduit.
- Special care needs to be taken to insure that conduits do not block any other knockouts in the vault.
- Conduits installed in vaults should only extend 2” to 4” into the vaults. The conduit should enter the vault as straight as possible.
- A ¼” nylon pull rope is required in all conduit runs

Specifications

- Conduit size and number of conduits will be determined by the FEC New Services Department. Be sure you know what size and how many conduits are required for your installation. If you use too small or too few conduits your installation will be rejected.
- Buried conduits must be Schedule 40 gray electrical PVC.
- Any exposed conduits must be Schedule 80 gray electrical PVC.

Sweeps

- All sweeps must be wide radius sweeps. In conduit runs of less that 200 feet and 270 degrees of bend PVC sweeps may be used. On runs in excess of 200 feet you must use steel or burn proof fiberglass wide radius sweeps. In no case may you exceed 270 degrees of bend in a single conduit run.
- Heating and bending of conduits will be allowed but must be inspected by FEC before backfilling. Be careful not to flatten the conduit when bending. This deceases the ability to pull our lines through the conduit.

Vaults

General

- There are two standard vault sizes that may be required for underground line extensions. Specifications for Single-Phase vaults are shown in Figure 5. Three-Phase vault specifications are shown in Figure 6. The engineer will determine which will be used for your application. These vaults are produced to FEC specifications and will not be accepted from manufacturers with out approval from FEC. FEC’s vault specifications are available upon request. The manufacturers listed below are currently producing approved vaults.

  Flathead Concrete Products (406) 752-4259
  Glacier Pre-Cast Concrete (406) 752-7163
  Granite Concrete (Libby) (406) 293-3777

- Some applications may require “specialty” vaults. The specifications for these vaults will be provided by FEC.
- **FEC reserves the right to reject any vault that does not comply with FEC specifications.**

Vault Locations

- Vaults will be placed according to the design provided by the FEC New Services department. Any variation from the design MUST be approved by FEC prior to construction. Failure to follow these steps may result in the rejection of the installation.
- A minimum clear zone of 10' feet from the centerline of the vault must be maintained in order for FEC personnel to work on FEC equipment. Access to vault locations must be maintained for maintenance and future line extensions. All vault locations must be accessible by a boom truck at the time of installation and in the future.
- Vaults will also need to be located to maintain the following minimum clearances as listed below:
  1.) 5 feet from noncombustible walls (including brick, concrete, steel and stone).
  2.) 8 feet from combustible walls.
  3.) 15 feet from the waters edge of a swimming pool.
  4.) 20 feet from facilities used to dispense or store hazardous liquids or gasses such as gas tanks, propane tanks, gas pumps, etc.
  5.) 5 feet from fire hydrants.

Clearance between vaults and structures must be measured from the point of the vault nearest to the structure or building. These clearances include any overhangs on buildings. If you have any questions regarding the installation of your service equipment we suggest you consult the NEC, call the inspecting agency for your area, or contact an electrical contractor. **Remember: Call U-DIG before you dig.**

<u>Setting the Vault</u>

- All vaults will be set level. This is best accomplished by setting the vault on 4" of compacted gravel. The gravel also aids in draining any water from the vault.
- Vaults will be set at a depth where the vault (without the lid) is 2" above final grade. This prevents water and dirt from entering the vault.
- The orientation of the vault should be such that the copper wire that exits the concrete (UFER Ground) in the back.
- The floor drain that is located in the bottom of the vault is to be knocked out except in areas with high water tables.
- Holes that have been enlarged or knockouts that have been removed and not used need to be sealed with grout. Minor damage may also be repaired with grout.
- Clean out the inside of the vault after it is set. Keep all dirt and construction debris out of the vault.
- FEC retains the right to reject all vaults that are not properly installed or are damaged.

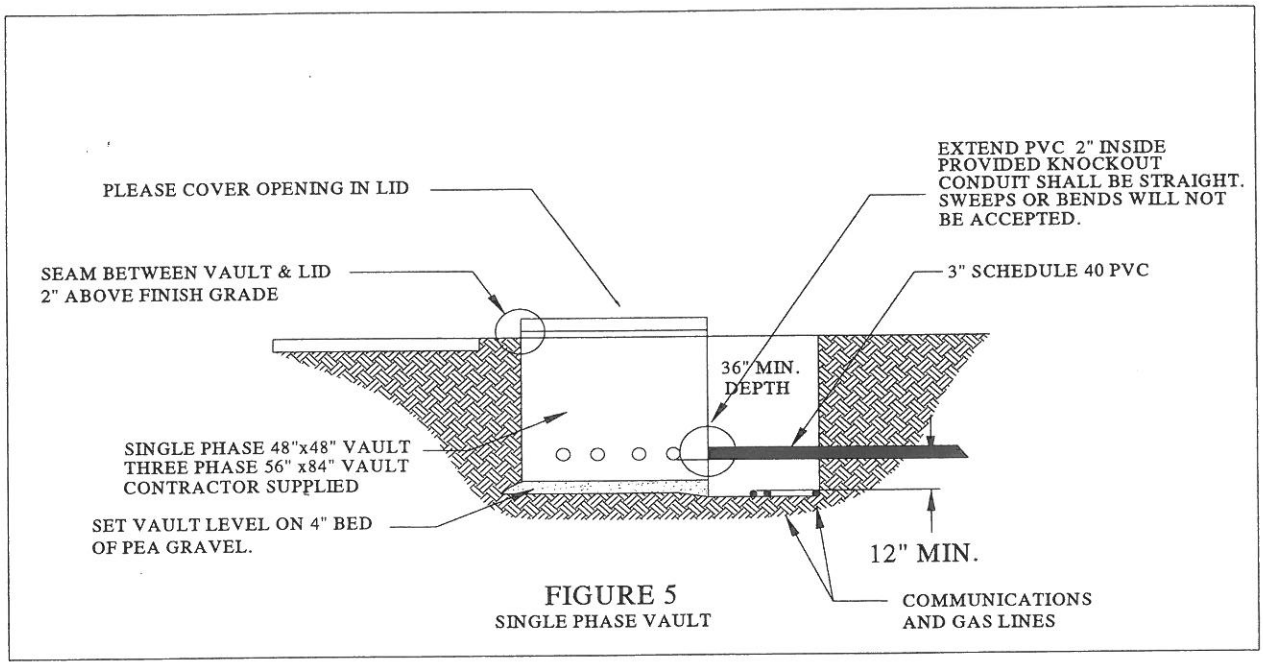


FIGURE 5
SINGLE PHASE VAULT

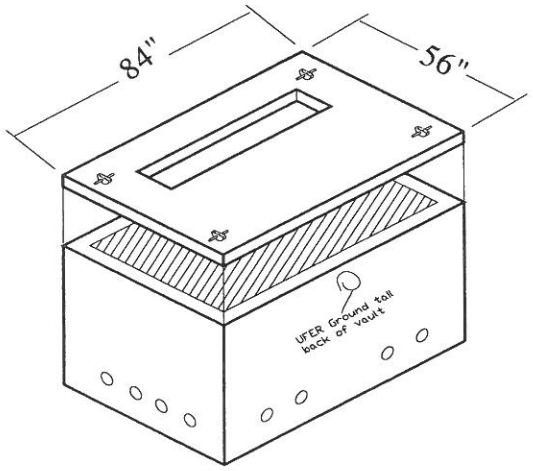


FIGURE 6
THREE PHASE VAULT

Secondary Pedestals

Secondary Pedestals are provided by FEC and installed by the member. They are primarily used to feed multiple services from the same transformer in subdivisions. Please refer to Figure 7 for specifications on how to install secondary pedestals.

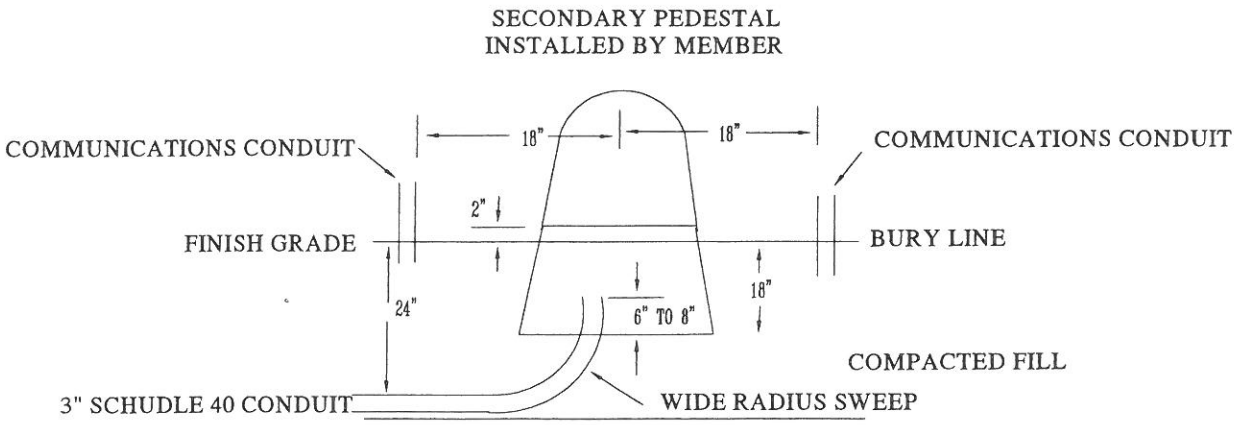


FIGURE 7

Light Bases

FEC does not install or provide bases for aluminum street light poles. The bases are manufactured to FEC specifications by one of the following manufacturers:

Flathead Concrete Products (406) 752-4259
Glacier Pre-Cast Concrete (406) 752-7163

Light bases are to be installed by the member using the following FEC specification:

- The top of the concrete light base shall be 4" above finished grade.
- Light bases shall be backfilled and compacted with suitable material in 12" lifts.
- The installer shall insure that each mounting bolt is fitted with 2 washers and one nut.
- Conduit runs feeding street light bases shall be 1" PVC.
- All conduit runs shall have pull rope installed.
- A maximum of 270 degrees of bends will be permitted in each conduit run.

CHAPTER 9: SUBDIVISIONS

FEC has specific requirements for the placement of utilities in a subdivision. These requirements are based upon the specifications provided to us by the various governmental agencies. The county or city that has jurisdiction over your subdivision may request a letter from FEC indicating our ability to serve your subdivision. Before we can provide that letter you will need to start a work order and provide us with some basic information such as location and number of lots. This chapter outlines the basic steps necessary to secure an electric utility design from Flathead Electric.

Engineering

In order to prepare the engineering work on your project we will need a copy of the subdivision plat. Your surveyor should be able to provide an electronic copy to us by email, or provide you with a CD containing the drawings. The plat should indicate all roads, utility easements, lot lines, curbs and gutters, sidewalks, common areas and any special requirements such as the location of wells and septic systems. We will also require that your civil engineer provide us with a profile of a typical road section showing elevation of ditches, etc. The civil engineer should also provide a plan view showing the location of sewer lines, water lines, storm drain lines and culverts. The location of water and sewer service stops must be clearly marked on the drawings. It is also helpful if the civil drawings show the location of any existing utilities in close proximity to your project. Once this information is provided we will be able to complete a design for the installation of electric utilities. We will provide you with a cost estimate, specifications for the installation of conduits, vaults, secondary pedestals and street lights for your project. We will also provide you with copies of the drawing that you may supply to your contractor, and other utilities.

Street Lights

Each municipality has specific requirements for the installation of street lights within their jurisdiction. We will provide either 100W or 200W HPS cobra style light fixtures on 30 foot aluminum poles if you wish to use FEC supplied lights in your subdivision. We **will not** provide design services for the location of street lights. Please contact the governmental agency that has jurisdiction over your subdivision to determine their requirements. Once you provide us with the location and type of light required we will determine how each light will be powered. You will be required to provide us with a letter from the municipality stating that they have reviewed and approved your street light layout before we will incorporate your lighting scheme into our design.

Inspections

Because of the complexity of many subdivisions we will require several inspections during the course of construction. Please coordinate an inspection schedule with the FEC Project Engineer assigned to your project. Under no circumstances should any of the dry utility installations be backfilled until they have been inspected and approved by the FEC engineer.

Typical utility layout

Please refer to figure 8 for a typical subdivision utility layout.

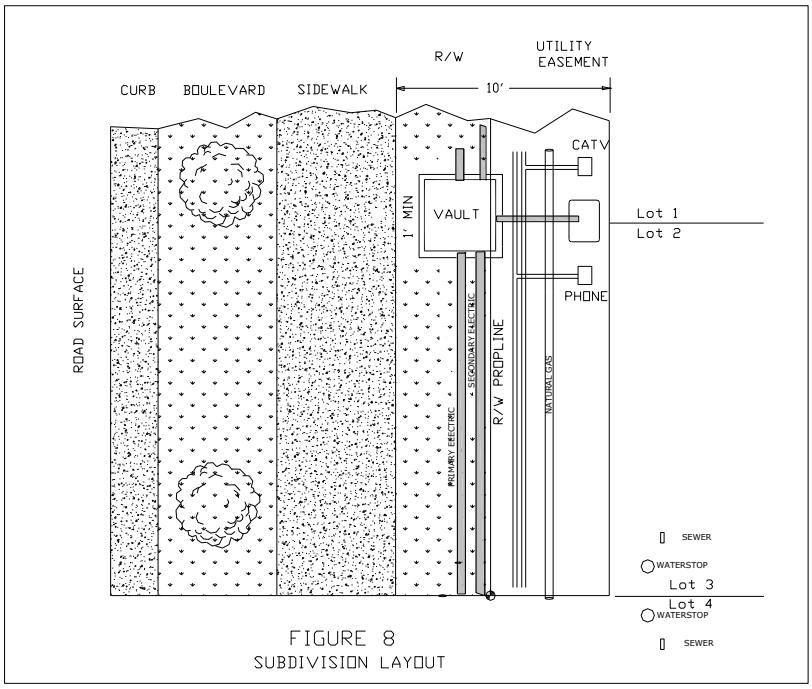


FIGURE 8
SUBDIVISION LAYOUT

FREQUENTLY ASKED QUESTIONS

What will it cost to get power to my property?
There are many variables involved in determining the cost of a line extension. In order to get the most accurate estimate, it will be necessary for you to pay the required non-refundable engineering deposit and schedule an appointment with a Staking Engineer. The Staking Engineer will provide you with an estimate based upon your service requirements.

How long will you honor the cost estimate?
Estimates provided by the staking engineer are good for 90 days.

Will you install the conduit?
Flathead Electric does not provide the trench, conduit or vaults necessary to provide service to your project. You will be required to arrange to have the conduit and vault system installed to FEC specifications. FEC will then install the wire, equipment and terminations necessary to energize your service.

What size conduit should I install?
Conduit sizes are based on the type and number of wires that FEC will install for your service. The Staking Engineer assigned to your project will provide you with conduit specifications.

What size service should I install?
FEC does not have the resources available to determine your service requirements. Please consult with a licensed electrician or engineering firm for assistance in calculating the load requirements for your project.

When will my service be connected?
Work order scheduling is based upon the date the job is released from the engineering department. Your job will be released for construction once you have provided an electrical permit, paid the line extension fees, and pass the final inspection conducted by the Staking Engineer. Simple service connections are typically energized by a serviceman within a week. Major line extensions, large commercial projects and subdivisions are assigned to crews based on FEC workload. These projects could take as long as six weeks to energize during a busy construction season.

Can I connect a fire suppression pump before the main disconnect?
Yes, fire suppression systems may be connected between the meter and the main disconnect. Please contact our metering department for requirements regarding connection of these systems inside CT cabinets or switch cabinets.

How do I schedule an inspection?
Contact the Staking Engineer or Project Engineer assigned to your project prior to beginning any excavation work. The engineer will discuss the inspection requirements with you at that time.

Will FEC arrange to have the other utilities installed?
No, it is your responsibility to contact the other utilities that will be involved in your project. The other utilities may be placed in the same trench using clearances specified in Figure 4 on page 19.

Can the main disconnect be placed inside the building?
Flathead Electric prefers that the main disconnect be placed on the outside of the building in an accessible location. However, there are circumstances where the main disconnect may be placed inside. Please consult with the Engineer assigned to your project for further guidance.

APPENDIX A

SERVICE OFFICE INFORMATION

Flathead Electric Cooperative, Inc.
2510 US Highway 2 East
Kalispell, MT 59901-2397

Mailing Address
2510 US Highway 2 East
Kalispell, MT 59901-2397

FEC Website:
www.flatheadelectric.com

Kalispell Headquarters
751-4483 or 1-800-735-8489
Fax: (406) 752-4283

Libby Service Center
121 West 4th Street
Libby, MT 59923
(406) 293-7122
Fax: (406) 293-3821

UDIG or Call Before UDIG
755-UDIG (8344) or
1-800-551-8344
www.udig.org

MT Dept of Labor and Industry
Building Codes Bureau – Electrical Permits
PO Box 200517
Helena, MT 59620-0517
(406) 841-2056
buildingcodes@mt.gov

Flathead County Plat Room
800 South Main Street
Kalispell, MT 59901
(406) 758-5510
http://mg.co.flathead.mt.us/