HOLYOKE GAS & ELECTRIC

Information & Requirements For Electric Service Below 600 Volts

Updated: April 2020
Revision 0

INTRODUCTION

This booklet is published for the benefit of HG&E customers, architects, engineers, employees and contractors to provide a convenient reference. **Design or construction should not be undertaken until complete information is obtained from HG&E.** Such information and assistance is available from HG&E Engineering, Customer Support, Meters and Service. HG&E should be contacted a minimum of 10 business days before starting work.

HG&E supplies electricity subject to our rules and regulations, policies and procedures, rate schedules (*), and industry standards; all of which are made a part of these requirements. These requirements are not included in this booklet because they change from time to time but (*) are available upon request or available on our website at www.hged.com.

Legal restrictions, changes in the art, judgment and safety require this booklet to be revised from time to time, and HG&E reserves the right to make such revisions.

HG&E endeavors to deliver electricity adequately and reliably. HG&E does not guarantee a continuous supply and does not assume liability for direct or consequential loss or damage to persons or property due to the supply delivered, or as a result of any interruption or variation in the supply. Momentary interruptions can occur due to the normal operation of our system's protective devices.

Please be aware, failure to comply with our requirements, applicable codes, or orders of an enforcement authority can result in our refusal to energize the service or in the disconnection of an existing service.

THE REQUIREMENTS COVERED BY THIS MANUAL ARE INTENDED TO ENSURE THAT ALL ELECTRIC SERVICE REQUESTS ARE ADDRESSED IN A SAFE, TIMELY, AND APPROPRIATE MANNER. IT IS INTENDED FOR USE BY:

- CONTRACTORS
- ENGINEERS
- MUNICIPAL INSPECTORS
- BUILDERS
- ARCHITECTS
- CUSTOMERS
- OUR EMPLOYEES

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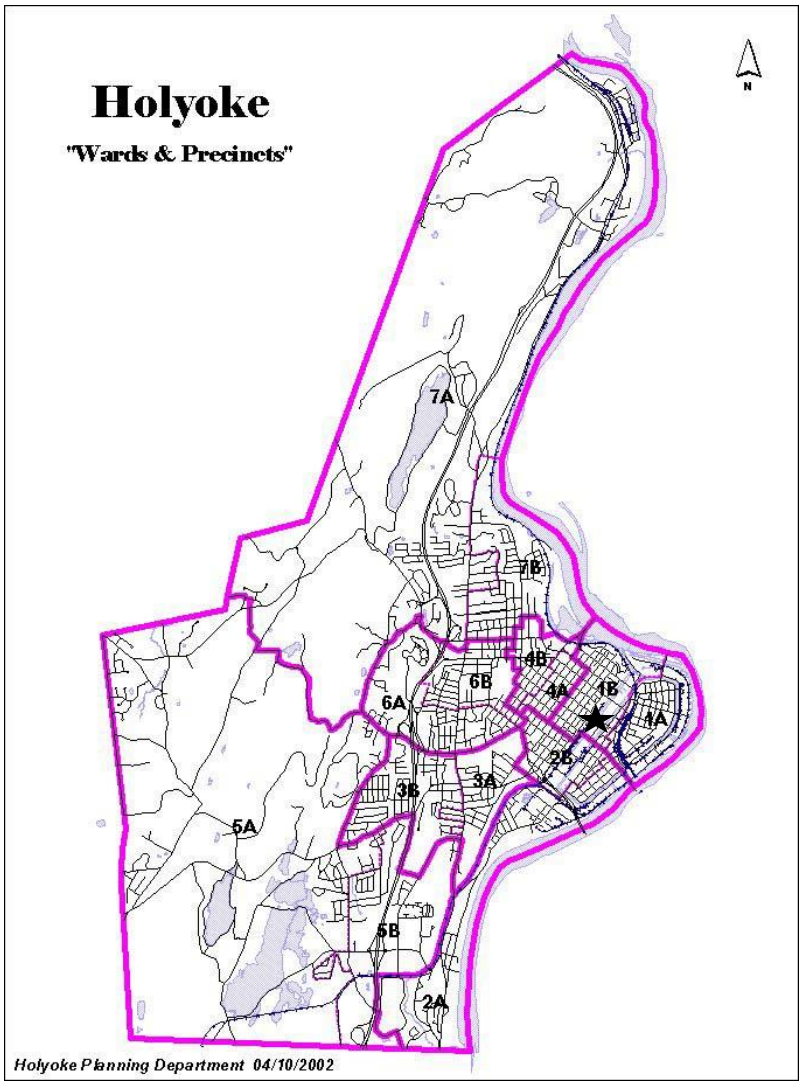
Electric Service Weblink: https://www.hged.com/customers



★ Business office located at 99 Suffolk St Holyoke Ma 01040

NOTE: HG&E electrically serves some locations with addresses that are not Holyoke, MA on our borders and as such, the local town ordinances shall apply.

DEFINITIONS

For additional definitions, refer to Section 100 of the National Electrical Code (NEC).

AMI:
Advanced Metering Infrastructure

AMR:
Automatic Meter Reading

Approved Equipment:
Metering equipment approved by HG&E for use by electrical contractors.

Code(s):
The latest revision of the National Electrical Code (NEC) and/or applicable state or local codes and ordinances.

Company:
Holyoke Gas and Electric, or HG&E

Conduit System:
Electrical distribution facilities installed underground, in electrical grade conduit.

Customer:
The person or entity responsible for paying our bill or their agents who are responsible for work being done.

Instrument Transformer Installations:
A service requiring potential transformers and/or current transformers.

Labeled:
Equipment or material to which a label, symbol, or other identifying mark of an organization has been attached and that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Licensed Electrician:
Master electrician holding a valid Class A or Class B license issued by the State of Massachusetts, Department of Consumer Protection – Occupational & Professional Licensing Division. The licensed Electrician is responsible for all work performed under this policy.

- Master electrician (Class A)
- Journeyman (Class B)

Listed:
Equipment, materials, or services included in a list published by an organization and concerned with evaluation or products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or services meets identified standards or has been tested and found suitable for a specified purpose.

Local Municipal Authority:
A duly appointed building code official, responsible for inspecting and ensuring that contractor work is compliant with all applicable local, State and Federal regulations.

Metering Sequence:

- **Cold Sequence**: Main disconnect required before the self-contained meter or instrument transformers.
- **Hot Sequence:** No main disconnect before meter.

Network:
A distribution system that connects the secondary conductors of multiple distribution transformers for supplying power to a customer's service. This special system for HG&E is located in downtown area of Holyoke surrounding City Hall.

Primary/High Voltage Service:
Above 600 volts (this booklet does not cover these services).

Self-Contained:
A meter capable of measuring the entire amperage of the electric service without the use of current and/or voltage transformers.

Service:
The conductors and equipment for delivery of electric energy from our distribution (supply system) to the service point.

Secondary Service:
600 volts or below (the rules of this booklet apply)

Service Drop:
Overhead service conductors run between the facilities of the serving utility and the Customers structure.

Service Entrance Capacity:
This is the rating of the service entrance equipment in amperes.

Service Equipment:
Consists of the necessary equipment, usually made up of the main control or circuit breaker, and/or fuses and their accessories, that is intended to constitute the main control and means of cutoff of the supply.

Service Lateral:
The underground service conductors and conduit starting at the street main; or at the top of a riser on a pole or other structure; or from a transformer; to the first connection of the service in a terminal box, meter box or other enclosure.

Service Location:
This is the approved point of attachment of our service drop or the approved point of entry of our service lateral to the customers building.

Service Point:
The point of connection between the facilities of the serving utility and the premises wiring.

Slip Meter Riser:
(Slip Joint) for use in electrical service entrance applications with incoming service conduit diameters ranging from 3" to 4". Complies with NEC 300-5, which requires protection for buried cables in areas subject to frost heave, ground settlement, etc.

Spoils:
The soil removed from an excavation.

Suitable Backfill:
Shall not contain ashes, cinders, shell, frozen material, loose debris or stones larger than 2" in maximum dimension

Underground Manhole System:
Our electrical distribution facilities installed in the ground in manholes, vault, duct banks, pads, etc.

SECTION 1: General

HG&E is dedicated to making safety its top priority. While the items listed below require particular attention, Customer safety and the safety of employees will always be our first concern.

To submit a request for electric service, please fill out the form listed at the internet address below

Internet: http://www.hged.com/customers/start-stop-move/request-for-electric-service-upgrade.aspx

By Fax: 413-536-9353

If you are not sure how to classify your service, please contact the Meter Dept. at 413-536-9339 or the Engineering Dept. at 413-536-9355. Please note: The Customer will receive an email confirmation as soon as the form has been successfully submitted.

Once this form is submitted, the Customers electrical contractor must contact our Field Technician at 413-536-9355 to outline customer work requirements and conditions necessary to supply electrical service.

A. Safety - The First Priority

1. Any contact with our wires may cause serious injury or death. Treat all downed, hanging or burning wires as though they are "LIVE" - energized and stay away from them. **Do not regard any covering on our wires as insulation.**

2. Report any downed, hanging or burning wires to **HG&E** at 413-536-9300 or the police or fire department.

3. Massachusetts State law requires contacting **"DIG SAFE"** three (3) full working days prior to doing any excavation, digging holes, or driving posts regardless of whether it is within the street or on private property. Obtain information by calling 1-888-344-7233 or dial 811.

4. Equipment such as ladders, scaffolding, etc., regardless of what they're made of can become electrified if brought in contact with wires. Use extra caution when installing siding, painting, cleaning gutters or performing any work near our facilities. **It is recommended that the Customer call to have any HG&E facilities covered before starting any work.**

5. Removal or relocation of existing overhead or underground service equipment is prohibited. Contact HG&E if removal or relocation is necessary.

6. **Do not enter or open existing electrical structures such as hand holes, transformer pads or switch vaults.** Call HG&E at 413-536-9300.

7. Equipment such as cranes, backhoes, etc., shall never be operated closer than 10 ft. from our overhead distribution conductors. Refer to OSHA limit of approach regulations.

8. Swimming pools and spas **must not** be installed beneath the Company's overhead facilities or above our underground facilities in accordance with code.

9. Where hazards exist, ground fault circuit interrupters must be used in accordance with Code. In addition, HG&E strongly recommend their installation on existing wiring.

10. Never replace/install fuses or breakers, for main switch or branch circuits, with other than a proper size for the installation in accordance with Code.

11. Proper installation of generators is essential to avoid electrical source feeding back into our lines and endangering unsuspecting utility workers. A municipal electrical permit and inspection is required for all transfer switch installations.

12. Antennas, banners, customer lighting, signs or similar customer equipment shall not be attached to our poles.

B. Request for Electric Service

1. Our Request for Electric Service procedure is meant to do the following:

   a. Provide methods for responding to and processing the Customer request for electric service.

   b. Encourage the Customer to contact the Company **a minimum of 10 business days** in advance to allow for proper planning.

   c. Provide the Customer with information which will:
   - Designate the service location, new or relocation
   - Specify the type and character of supply that is available
   - Specify location and requirements for our metering equipment
   - Provide the available fault current for the specific installation
   - Advise the Customer of advance charges, if any
   - Advise the Customer of any special requirements
   - Provide the Customer with an estimated completion date.

2. A request for electric service must be submitted for any new, changed, removed or temporary service. A request for electric service can be submitted via phone, Internet, or Fax in a "Request for Electric Service Form". **The request should be submitted at least 10 business days in advance and filled out completely, including load data.** HG&E is not responsible for making service requests to others: i.e., telephone, cable TV, water or for coordinating their activities.

3. A **"repair",** emergency or non-emergency, that involves the replacement of service equipment is considered a change and requires a Service Request and a permit. This includes the meter socket, service entrance conductors, conduit and/or mast.

4. If an emergency arises after business hours, weekends or holidays it is permissible to perform repair or replacement. However the electrical contractor must take out a service request and obtain a municipal permit the next business day as per the State of MA building Regulations and Standards.

C. Approvals

HG&E will not energize a service until it is approved by the local inspecting authority and it also meets our requirements as outlined in this book.

D. Our Equipment on Private Property

All our equipment located on the Customer's premises, such as poles, conductors, meters, instrument transformers, auxiliary metering equipment, transformers, ducts, etc., shall remain HG&E property and may be

removed by HG&E in the event such equipment is no longer needed.

E. Safe Access to Installation

HG&E reserves the right to enter the Customer's premises at any time to erect, remove, operate or maintain our facilities and to read and test our meters. The access area must be clear of obstacles and capable of carrying heavy vehicles and equipment if they are required. HG&E is not responsible for restoring trees, shrubs and/or grass if we cause damage because of inadequate access.

F. Changes to Building Structure Affecting Service Entrance Equipment

When changes, alterations or additions to an existing structure affect the attachment of service entrance equipment, the attachment point and installation must conform to both our current requirements and applicable codes. No structures, such as decks, patios, sidewalks or swimming pools, shall be constructed over buried service equipment.

G. Work Performed by Homeowners

Homeowners are allowed by MA State law to perform electrical work on their single family, owner-occupied residence **ONLY**. All of the work performed by the homeowner personally and all required permits must be obtained. **Homeowners are not allowed to cut and reconnect their service or remove the HG&E meter.** Homeowner work must be inspected and approved by the local municipal authority.

H. Inspections

HG&E inspection of the Customer service facilities or wiring is not an approval of conformance to applicable codes. The purpose of our inspection is to ensure that our requirements are met with respect to line, load, and ground connections, the meter installations, and that the installation is in conformance with this booklet.

I. Employee Identification

All Company employees carry photo identification which they will present upon request.

J. Theft of Electrical Service

Theft of electrical service is defined as the taking, or acceptance, of electric service without the knowledge or consent of the Company. This includes any method or device used by any person(s) which prevents an electric meter from accurately registering the quantity of electricity supplied by the Company. **Theft of electric service is unlawful, unsafe and can result in serious injuries, electrocution, fires, explosions and death!**

Where there is evidence of meter tampering and/or diversion of electric service, such person or persons responsible shall be liable for criminal prosecution under the penalty of all applicable laws. All lost revenue, intended or unintended, is subject to recover by the Company. **Massachusetts General Laws Chapter 164, Sections 127 and 127A prohibit theft of electricity as well as destruction of or tampering with our facilities, property, and/or meter.**

To report suspected meter tampering, or diversion of electric service, please report it to HG&E (can remain anonymous) at **413-536-9300**.

K. Blighted and Vacant Buildings

If an owner of a blighted or vacant building or portion of a building that has been unoccupied and disconnected from the electric distribution system wishes to resume delivery of electricity to such building or a portion of such building, the owner shall have the building inspected by the local municipal authority at the owner's expense. The customer will have to have all electric conductors and equipment up to and including the main disconnect device inspected to such building. The local inspector shall provide written notice to HG&E, authorizing the Company to provide electric distribution services to such building stating that such equipment is electrically safe and does not constitute a public safety hazard. Upon receipt of the written notice, HG&E shall promptly resume delivery of electricity to such building or portion of such building.

L. Services Disconnected Due to Flood, Fire or Similar Circumstance

If a service has been disconnected due to damage caused by flood, fire or similar circumstance it will not be reconnected without notification by an appropriate public official such as the Fire Marshall or Code Enforcement Official.

SECTION 2: Residential Cut and Reconnect Policy

The Residential Cut and Reconnect Policy are restricted to overhead residential services of 400amps or less for the following types:

- **Three-Wire 120/240 volt single-phase**
- **Three-Wire 120/208 volt single-phase**

POLICY:

1. The Holyoke Gas & Electric (herein referred to as the Company) will permit electrical contractors and electricians (herein jointly called electricians), licensed by the State of Massachusetts, to cut and reconnect residential services at the line side of the weatherhead (or point of attachment) to expedite work requested by customers. Failure to follow the steps contained within the policy may result in additional corrective work and expense for the electrician. The electrician will be billed for any corrective work performed by the Company. The electrician shall be responsible for obtaining the appropriate permits from the local municipal authority.

2. **Homeowners are not authorized to cut and reconnect electric services.**
   - Only an electrician with a Class A or Class B license issued by the State of Massachusetts or work in the capacity of an Electrical Apprentice under the direct supervision of a Class A licensed Electrician.
   - Under this condition physical work may be performed; however, the permit must be obtained by the licensee who is responsible for the work at the location.
   - If a permit has been issued to a homeowner, an electrician is not allowed to perform any electrical work, including the cut and reconnect of the service.

3. If a permit has been issued to an electrician, the Residential Cut and Reconnect policy must be abided by. All electricians who hold a valid MA Class A or Class B license are permitted to perform cut and reconnect services as outlined within this policy. To maintain this privilege, all requirements of the Residential Cut and Reconnect policy must be strictly adhered to. Violations of the policy will result in termination of these privileges.

4. The electrician is responsible for obtaining the appropriate permits from the Authority having Jurisdiction in advance of starting work.

5. The electrician must contact the Company and obtain a valid service request number at least 10 business days prior to starting work to avoid possible code violations or noncompliance of Company requirements.

6. The electrician, his/her employees, and those under his/her control shall perform all work as independent contractors and shall not be deemed to be employees or agents of the Company for any purpose whatsoever.

7. The Company shall not be liable for direct, indirect, or consequential damages of any kind whether resulting from injuries to persons or property or otherwise arising out of the electricians work.

8. The electrician shall cut the service entrance cable at the point of attachment (weatherhead) on the line side of the existing service drop connectors, replace or repair the service, and re-connect the service in compliance with HG&E requirements.

9. If the point of attachment is going to be changed or there are existing clearance conflicts, the electrician must receive Company approval prior to starting work.

10. The electrician shall obtain Company approval of the service/meter location prior to starting work.

11. The service must be reconnected utilizing properly sized connectors as listed below.

    Phase/Hot Leg/Conductor:
    - Properly Insulated Parallel Groove Connector
    - Properly Insulated Plier-applied Wedge Connector
    - Insulation Piercing Connectors (SICAME type only)

    Neutral Conductor:
    - Bare Parallel Groove Connector
    - Bare Plier-applied Wedge Connector
    - Insulation Piercing Connectors (SICAME type only)

12. The electrician is responsible for taking all necessary steps to ensure the meter(s) are reinstalled into the same service location form which they were removed.

    a. For all multiple meter installations, each house, store, office, apartment, or area serviced must be permanently marked with its unique identification on the inside and cover of the associated meter socket and load disconnect for which the service is provided (to avoid erroneous customer billing conditions).

    b. Each meter and meter socket should be marked with the unique identification for the location serviced prior to the start of any service work to ensure compliance with this requirement.

13. Upon completion of the job, the electrician will be responsible for re-installing the meter in to the new meter socket under the following conditions:

    a. The existing meter is appropriate for the new service such as:
    - Replacing a meter socket where the service disconnect size remains the same
    - Upgrading from a 60-100A single phase, 3 wire service to a 100-200A single phase, 3-wire service
    - Replacing 320A meter socket with a 320A meter socket

    b. The meter has not been damaged either prior to or during the service upgrade.

14. If any conditions as stated above prevents the meter from being installed or if a meter is not available to be installed, the electrician shall contact HG&E at 413-536-9300, within one business day to either make appropriate arrangements to install a meter or request permission to install Company approved jumpers and clear meter socket covers. Any type of commercially available jumper and clear meter socket cover designed for such use will be approved. Do not write on the plastic covers with markers. Covers and jumpers are available from HG&E, upon request.

15. The electrician shall leave the old meter, tagged with the customer's name, address and date removed, in close proximity to the new meter socket or delivers it to the Company. In no case shall the old electric meter be reinstalled, unless authorized by an HG&E representative.

16. The electrician shall be responsible for obtaining municipal inspection/approval and will advise the Company as soon as the work is completed.

17. For service upgrades, the Company reserves the right to install a meter after ten business days unless notified of a building code violation by the Local Municipal Authority. **Installation of a meter does not supersede the requirements of an inspection approval by the Local Municipal Authority.**

SECTION 3: Types of Electric Service

A. Request for Electric Service Checklist

When HG&E receives the Request for Electric Service we will determine, based upon the Customer location, the type of service to be offered, the voltage characteristics available and the maximum amperage available for the proposed load.

Reminder Lists for Upgrades and New Services:

- Contacted HG&E to submit a "Request for Electric Service" via internet, or fax, 10 business days prior to starting the Customer work.
- Provided HG&E with an existing meter number (if applicable)
- Discussed the routing and location of the service with a Field Technician or Engineer, before starting work.
- Confirmed that service locations and meter locations meet requirements of this booklet.
- Received an approved meter location
- Received approval for custom, combination, or instrument transformer metering equipment
- Obtained all local permits, including environmental permits, etc.
- Obtained a utility easement, if required
- Paid all applicable charges, if required
- Coordinated with other utilities
- Notified Dig Safe at 1-888-344-7233 or 811
- Installed an approved meter socket with clear meter socket cover
- Installed **all** the Customer service entrance equipment. Note: services will not be energized nor meters set unless **all** load side service entrance disconnects or main breakers are connected to the load side of the meter socket(s).
- Permanently marked the inside of each meter socket, load disconnect and matching outside meter cover with its unique identification.
- Established a safe work space in front of each meter location – 3' in front of and 2' off center on both sides.
- For a conduit system, install UL listed slip joint, sweeps, 3 inch or greater schedule 40 PVC from the meter trough(s) to the pole, hand hole or manhole and ¼" pulling line or MULETAPE ®.
- Discussed the need for 24 inch radius, schedule 80 PVC sweeps in the conduit system (if applicable).
- Called the local inspecting authority for inspection/approval.

B. Line Extensions and Residential Developments

The Customer should consult with HG&E at a very early date about any situation that will require a single or three-phase line extension along a City road, State highway, or into new residential developments, commercial complexes, industrial parks or environmentally sensitive areas. Under certain circumstances, customer charges and/or additional customer responsibilities will apply. In addition, HG&E will have special policies for line extensions into new residential developments.

C. Primary Service

Requirements for primary service (over 600 volts) are not included in this booklet. To provide such service, early and detailed consultation is required.

D. Types of Secondary Service

1. Overhead Service from Overhead System (400 amps or less)

a. HG&E will attach our service drop to the structure at the approved location (See Section 11. Figure 5, page 55) which is accessible to our lineman and high enough to provide adequate ground clearance. The minimum clearance requirements are:

- ***Twelve feet (12')*** above finished grade, sidewalks, residential driveways and commercial areas not subject to truck traffic and *located more than **25 feet** in any direction from a swimming pool, swimming area, or diving platform; clearance can be reduced to 22.5 feet with HG&E review and approval.*
- ***Sixteen feet (16')*** over town roads or streets, alleys, parking lots or other areas subject to truck traffic.
- ***Eighteen feet (18')*** over state highways.

b. The Customer service entrance conductors or cable shall be terminated with an approved detachable weatherhead and be safely accessible from a ladder on the ground.

c. The location of the Customer weatherhead shall be positioned to permit the installation of our service drop below the weatherhead. A minimum of 20 inches of conductor must extend from the weatherhead to make a connection to the service drop with a proper drip loop. See Section 11. Figure 6, Page 56.

d. The location of the weatherhead is not to exceed twenty feet (20') above the finished ground level without consulting HG&E beforehand.

e. The Customer is responsible for providing adequate tree trimming and/or tree removals for the service on private property.

2. Service Lateral from Overhead System or from Conduit System

Note: Consult with HG&E for a conduit service over 125 feet long.

The Customer will be responsible for the following:

a. Providing a trench, hand holes, the transformer pad, any related products, conduit and backfill that will provide a minimum cover of 24 inches above the conduit for secondary's or 30 inches above the conduit for primaries, which will run from our facilities at the curb line to the designated service location outside the foundation. The designated location shall be in direct line of sight of HG&E's distribution facilities. The Customer must consult with the Company for any installations that may not conform to this requirement. The conduit shall be electrical grade Schedule 40 or 80 PVC (minimum of 3 inch diameter), and encased in concrete if conduit is going under paved ways, HG&E will make the final determination on whether to allow use of alternate steel conduit in lieu of encasement (consult a HG&E Engineer for size). In addition to the service conduit, HG&E recommends installing a second 2" conduit (schedule 40 or schedule 80 PVC) for possible future fiber communication installations. Caution tape shall be installed in the trench and backfill even if the conduit is encased in concrete. Note: Metallic foil tape is NOT acceptable. (See Figure 2, page 51), (Figure 3A & B, page 52) and Figure 9, page 59)

b. Coordinating with other utilities such as telephone, cable TV, water and gas.

c. If service is to a pole, the customer must provide conduit for primary and/or secondary conductors from the meter socket and/or transformer to a point ten (10) feet up the pole.

d. If the designated point of distribution system is on the opposite side of the road, an overhead crossing is preferable although a conduit road crossing is also acceptable and may be installed at the customer's expense. This includes the pole, the length of customer-dedicated road crossing conductor and any required guying. If a road crossing pole exists or is provided by another utility, a customer's conduit

service may be taken from that pole. Contact the HG&E Engineer whenever a road crossing is required.

e. Providing and installing conduit, including an approved slip joint, from the metering equipment to the trench conduit. The line side conduit shall enter the meter cabinet through the bottom/side knock-out. The slip joint shall be securely fastened to the building with one clamp. The end of the conduit at our facilities shall be capped and left accessible. Consult HG&E for minimum slip joint size. (See Fig. 2, page 51)

f. At the service end, providing and installing an electrical grade Schedule 40 PVC sweep (or steel, if required by HG&E) with a 90 degree bend and a 24 inch minimum radius from the slip joint to the conduit in the trench. (See Figure 2, page 51)

g. Providing and installing an electrical grade Schedule 40 PVC sweep (or steel, if required by HG&E) and conduit with cap at the riser pole if from our overhead system. The sweep shall be a 90 degree bend and have a minimum 24 inch radius. (See Figure 3B, page 52)

h. Installing a ¼ inch diameter nylon pulling line from the meter socket to the end of the conduit at our facilities (transformer pad, temporary dead-end, hand hole or riser pole). Do not enter or open existing electrical structures such as hand holes, transformer pads or switch vaults, when installing the pulling line. If access is needed, call the HG&E Engineer. (See Figure 3A and B, page 52)

i. Providing and installing the ground assembly, if a steel sweep, is used at the Customer's service entrance or at the pole location. The ground assembly shall consist of a ground clamp suitable for direct burial, no. 6 bare copper wire, a ground rod connector and a five-eighth inch by eight foot copper ground rod. (See Figure 2, page 51 and figure 3B page 52)

j. Backfilling the trench (after receive inspection approval by the Local Municipal Authority, if required) before HG&E installs the cable and exercise care to avoid damaging the conduit. (See Figure 9, page 59)

k. The trench shall be straight as possible from the point of termination on the building to our facilities. The total of all bends shall not exceed 225 degrees with no reverse bends.

l. Ensuring the proper clearances for pad-mounted transformers are maintained from travel ways, windows, doors and any other structures per the following table.

	Minimum Distance (in feet)		
Item	**In front of**	**To side of**	**Below**
Door	20	10	-
Air Intake	10	10	25
Window	10	3	5
Fire Escape	20	20	-
Combustible Wall	6	6	-
Noncombustible Wall	5	3	-
Fuel Tanks (above & below grade)	10	10	-
Natural gas or propane connections	3	3	-
Gasoline dispensing unit	20	20	-

3. **Installation and maintenance responsibilities for conduit system for service laterals:**

   a. **Residential Service**. HG&E will furnish the cable, install it in the Customer conduit and terminate it at the Customer meter socket, main switch, trough, duct box or other suitable device either outside or immediately adjacent to the wall entrance. The Company will repair damaged service conduits once the service conductors have been installed. The Customer will maintain the seal between the foundation wall and the conduit.

   b. **Commercial/Industrial/Residential Services.** HG&E will supply the connectors where the service size does not exceed 4/0 copper or aluminum. Multiple or larger connectors, when required, shall be provided by the Customer and installed by HG&E. In no case shall conductors of 350 MCM or larger have less than a thirty-six inch lead, and smaller conductors shall have no less than an eighteen (18) inch lead. With HG&E's approval, if service conductors terminate in a main switch, the Customer shall provide the connectors and pay for all materials and labor that is required more than three (3) feet inside the building.

   c. **Commercial/Industrial Services to Service Entrance Capacity of 400 Amps Total or Less**. HG&E will furnish the cable, install it in the Customer conduit and terminate it at the meter socket, main switch, trough, duct box or other suitable device either outside or immediately adjacent to the wall entrance. HG&E will maintain our cable. The Customer will furnish, install and maintain the conduit and all conductors and disconnecting device (breaker or fuse) beyond the termination point.

   d. **Commercial/Industrial/Residential Services to Service Entrance Capacity of Over 400 Amps Total**. The Customer will design, furnish, install, own and maintain, at the Customers expense, the complete secondary system, including all service conduit and conductors. In addition from single or three phase pad-mount transformer installations, the Customer will provide the connectors between the Customer's conductors and the secondary bushings of the Company-owned transformer. The Customer will loosely make up all connections to the transformers to ensure proper conductor length with the Company making the final connections. **Under no circumstances will the customer use the secondary bushings of the transformer as a pulling point.**

4. **Service Lateral from Underground Manhole System**

Note: Please contact HG&E prior to commencing work.

a. The underground manhole system in the public way will be furnished, installed, owned and maintained by HG&E.

b. The Customer service shall include approved conduit, schedule 40 or 80 PVC (minimum of 3 inches for single phase and 4 inches for three phase), from the service entrance point to the curb line. The Customer will furnish, install, own and maintain this conduit.

c. The Company will install our conductors in the Customer conduit. The Company will furnish, install and own the seal between the Customer conduit and HG&E conductors. The Company will maintain this seal at the customer's request but will not be responsible for damage due to a leaking seal. The Customer will furnish, install, own and maintain the seal between the conduit and the wall.

d. **Duct Box**
Where required by the Company, a steel duct box is to be provided and installed by the Customer. It is to be rigidly and permanently secured immediately adjacent to the wall entrance of the conduit, at a designated location inside the building. It will contain the incoming duct(s) and the splices which are to be made by the Company between the HG&E service lateral conductors and the customer service-entrance wiring.

e. **Duct Box Sizes**
The size will be determined by the number of sets of service-entrance conductors to be contained within the box and by the rating of the largest switch or circuit breaker.

f. Duct boxes are to be mounted horizontally and so located that the duct(s) into the box shall be in a corner to allow for the most practical means for forming the conductors in the box and make the splices.

g. The Customer's service-entrance conductors into the box are to be kept clear of the incoming supply duct(s).

5. **Temporary Service**

The Customer will be responsible for:

a. Supplying and maintaining suitable service entrance equipment (weatherproofed, if required); and

b. Payment in advance, of the cost of connecting and disconnecting this service. This includes the cost of installation and removal of any poles, wires, transformers, meter equipment, or other facilities. These charges are in addition to the regular rate applicable to the use of energy. Requirements for temporary service are shown by (Figure 1 on pages 49 and 50 for underground, and Figure 4 on pages 53 and 54 for overhead).

c. Temporary service is a service that will not continue for a sufficient period of time to justify a permanent service. For such service, the customer's electrician must provide a means of attachment for wires to install a fused switch, meter socket, and driven ground according to the NEC.

d. Temporary construction requiring more than a 125-foot extension of low voltage conductor or the installation of conduits, poles, high voltage lines, or transformers shall be at the customer's expense. Temporary service extensions, which are to be used later for permanent service, shall not be charged to the customer except insofar as the customer is otherwise liable as part of his permanent service.

e. Energy consumed shall be billed at the appropriate rate. A temporary service shall be disconnected as soon as possible. An installation charge shall be required for each temporary service required and must be paid prior to connection. Refer to HG&E Rules & Regulations for actual costs.

SECTION 4: Characteristics of Supply, (*480 volts and below*)

A. Supply Characteristics

1. The Company will supply alternating current with a nominal frequency of 60 Hertz (cycles per second) and a nominal voltage as described in item 3 below.

2. If the Customer desires a new service or an increase in capacity, they should contact HG&E **before** purchasing any equipment or beginning any electric construction. The Company will designate the voltage and phase characteristics which will be available.

3. Normally, one of the following will be supplied:

*Includes Network Voltage (125/216 Volt & 216Y/125 Volt)

Nominal Voltage	Phase	Wires	Comments
120/240	1	3	a, b, c
120/208*	1	3	b, c
208Y/120*	3	4	e, f, g
480Y/277	3	4	e, f, g

a. In general, only single-phase service will be supplied to residential loads.

b. **The maximum single-phase service from an overhead distribution system is 400 amps, including the total rated capacity for multiple main switches.** Under some circumstances, a 400 amp main disconnect is required ahead of the multiple sub-main switches whose total rated ampacity exceeds 400 amps (excluding the owners loop if it is rated at 60 amps). Please consult with a HG&E Engineer for all services over 400 amps.

c. **Single-phase services over 400 amps and up to 800 amps maximum must be fed from a padmount transformer.** The largest single-phase service allowed is 800 amps. Please consult with an HG&E Engineer for all services over 800 amps. HG&E does not provide instrument transformer rated single phase metering, therefore, load greater than 400 amps and up to 800 amps would require multiple self-contained meters or a three phase service feeding multiple single phase services.

d. **The maximum three-phase service allowed from an overhead distribution system is 400 amps, including the total rated capacity for multiple main switches.** Under some circumstances, a 400 amp main disconnect may be required ahead of multiple sub-main switches whose total rated capacity exceeds 400 amps. Please consult with an HG&E Engineer for all services over 400 amps.

e. **The largest standard three-phase underground service HG&E will provide with one transformer is 4000 amps; 2500 kVA, at 480Y/277 or 1000 kVA at 208Y/120. Please consult early with HG&E for all services over 4000 amps.**

f. Three-phase service is normally available for supply loads of 75 kVA or larger only.

g. Three phase supply is not normally available for single family housing. For large residential complexes, which may require a three-phase service to the building, individual residential customers will be served only with single-phase 120/208 volts.

4. The Company cannot, and will not, guarantee to maintain the voltage level of these nominal values under all conditions; however, voltage will normally be maintained within reasonable limits and as specified by the regulatory authority. The Company recommends the use of suitable voltage regulating devices where equipment sensitive to voltage variations is in use. (See Section 9, page 43, paragraph F)

5. The voltage rating of the Customer equipment must be compatible with the nominal voltage which HG&E supplies. (See Section 4.A.3, page 18)

6. Six hundred volt service will not be supplied to new locations or to locations where service at this voltage has previously been removed. HG&E reserves the right to discontinue 600-volt service by supplying step transformers to the customer to allow the customer to convert a standard voltage to 600 volts.

B. Unusual Conditions

The Company may refuse to supply electric services to loads which have characteristics which might adversely affect the supply to other customers, such as harmonic distortion, voltage fluctuations, noise or low power factor.

C. Two-Phase Supply

The Company no longer offers 2-phase supply. If the Customer's present service is 2-phase, consult HG&E prior to making any changes or additions.

D. Three-Phase, 3-Wire Delta Supply

The Company no longer offers 3-phase, 3-wire, delta services (240, 480, or 600 volts). If the Customer's present service is 3-phase, 3-wire delta supply, consult HG&E prior to making any changes or additions.

SECTION 5: Our Service Facilities

A. General

1. HG&E or our agents shall install all facilities which we will own, operate, and maintain. HG&E or our agents shall perform all work on our poles and equipment except as noted in Section 6, paragraph D, page 24.

2. The Customer may be required to contribute to the cost of installing service facilities. Where HG&E assumes responsibility for future operation and maintenance, we shall hold title of ownership to such facilities.

3. Service installations involving special conditions due to size of load, physical limitations, rate application, environmental considerations or other special requirements of the customer will be subject to joint study and agreement with HG&E.

4. **All connections or disconnections between HG&E facilities' and the Customer facilities' will, in general, be made by HG&E or our agents**. However, in case of single-phase residential services, qualified electricians will be permitted to cut and reconnect such services in compliance with our existing policies. (See Section 2, page 8 for details)

B. Service Location

HG&E will designate the location for new, relocated or upgraded services. **A request for electric service must be submitted prior to starting the Customer work.** It can be submitted by Internet, fax, or in person at 99 Suffolk Street, Holyoke.

C. Number of Services

1. In accordance with the National Electric Code (NEC) and Massachusetts Electrical Code (MEC), as amended from time to time, normally, only one (1) service or any one (1) voltage will be installed to a single building or structure. Firewalls meeting applicable safety code requirements shall be considered separate buildings.

2. Where more than one service is installed to a building or structure, it will be by written approval of the local inspecting authority. Such services shall not be interconnected.

3. Each service will be separately metered and will be billed as serving a separate Customer under the appropriate rate.

D. Disconnecting a Service at Customer Request

HG&E will temporarily disconnect the Customer service to allow them to perform maintenance, construction, or tree-trimming. HG&E will require sufficient advance notice to schedule the work. There may be a charge for this service.

E. Relocating a Service at Customer Request

HG&E will designate the service location for all relocated services**.** HG&E will require sufficient advance notice to schedule the work. There may be a charge for this service.

F. Removal of Electric Service at Customer Request

1. **Building Demolition**

HG&E will remove all electrical services, meters and metering equipment, after receipt of written request (per State Law) and promptly confirm in writing to the customer of record and/or the owner of the property that the services, meters and metering equipment have been removed. Note: the building owner is responsible for HG&E's gaining safe access to the structure to remove all of our electrical facilities.

2. **Other than Demolition**
   If the service, meters and metering equipment must be removed from a building or structure where no demolition is to take place, written request is required from the customer of record and/or the owner of the property. HG&E will require sufficient advance notice. No written confirmation will be furnished unless requested.

SECTION 6: Customer Service Facilities

A. Service Location

HG&E will designate the location for a new service or change of service, which will be on the front or the side of the building. The front of the building is considered to be the side, adjacent to our distribution facilities. It is the Customers responsibility to submit a request for electric service and obtain this information before the work is started.

B. Service Equipment

1. The service equipment must be properly rated for interrupting duty and ground fault. Upon request, HG&E will furnish the information necessary to select proper equipment. Higher than usual interrupting capacity is required for service equipment protection devices when supplied from a network system or transformation greater than or equal to 75 kVA. Contact HG&E for detailed requirements.

2. Service equipment shall be installed on the load side of the self-contained meters up to 240 volts.

3. **The following exceptions are installations where the main disconnect will be installed on the line side of the meter (cold sequence).**

   a. All 480Y/277 volt or 480 volt delta services.

   b. Services fed from the HG&E **network system** (216Y/125 volt). Contact HG&E for detailed requirements, such as R type fuses, 100,000 amp fault current rating, and rejection clips.

   c. Single phase, overhead, residential installations with multiple meter positions exceeding 400 Amps. The Customer must consult with an HG&E Engineer for these types of installations.

   d. Services fed from a transformer capacity of 75 KVA or greater.

4. Network services may require the Customer to furnish a cable limiter cabinet. Consult with HG&E in such instances.

5. There shall be no more than six (6) disconnects per service grouped in any one location. See Figure 19, page 70 and NEC 230-71 (a). Utilizing a main disconnect is the preferred installation to allow for additional meters beyond six.

6. Fire Pumps – refer to NEC Article 695 for requirements. All fire pump and alarm circuits shall be metered. If the authority having jurisdiction requires that the fire pump or alarm system connections be ahead of the normal metering, then a separate service and meter shall be installed at the Customer's expense. Consult with HG&E in such instances.

7. For multiple unit residential buildings, all common facilities (hallway, lighting, alarm systems, well pumps, etc.) must be metered separately per NEC, Section 210-25. This is commonly referred to as an owner's meter.

8. When changes or alterations are made to the Customer service equipment, the service entrance and meter installations must conform to both our current requirements and applicable codes.

C. Service Entrance Conductors

1. Where a main switch or circuit breaker constitutes the service equipment for a residential single-phase

installation, the minimum ampacity of the service entrance conductors and meter socket trough shall be at least equal to the rating of the main circuit breaker or the largest main fuse which can be installed in the service equipment.

2. For a single-phase installation to an individual customer where more than one switch or circuit breaker is permitted as the service equipment, the socket-meter trough shall be a minimum of 100 amperes but not less than Code requirements.

3. For multiple-occupancy buildings, where up to six individual switches or circuit breakers function as the disconnecting means, the service entrance conductors must have adequate ampacity for the load as determined by applying the methods and rules set forth in the National Electrical Code (NEC).

4. Metered and unmetered conductors shall not be contained in the same raceway or conduit.

5. Metered conductors from more than one meter shall not be contained in the same raceway or conduit.

D. Pole Mounted Service Equipment and Permanent Pedestal Service Metering (Special Installation)

Service equipment and metering is permitted only on private property secondary poles as shown by Figure 13 page 63 and Figure 14 on page 64. With the exception of the pole and meter, all facilities beyond this service point will be furnished, installed, owned and maintained by the Customer. Only one meter will be allowed on a private property pole. Consultation with HG&E is required. Service equipment and metering will not be installed on poles in the public way with the exception of CATV power supplies, Distributed Antenna Systems, and any other similar type equipment related to the Telecommunications field unless otherwise approved by the Company.

E. Identification of Non-HG&E Facilities

The contractor or electrician shall post his/her name, address, and telephone number at each installation to facilitate contacting the proper person.

SECTION 7: Third Party Communication Companies' Attachments to HG&E Distribution System Facilities

A. Scope

This section addresses the requirements for the attachment of third party company equipment to HG&E distribution system facilities. These devices, both pole mounted and pad mounted, are powered by 120 volt AC as their normal power source and are equipped with auxiliary power sources, either batteries or generators, utilized when the normal source is not available. This does not address the installation of communication antennas installed on or near transmission structures.

All third parties who propose to install generation and operate in parallel with the HG&E distribution system must follow a formal procedure by submitting an application to start the process and by complying with HG&E's Distributed Generation Policy. Also see Section 10, Item D, page 45, Distributed Generation.

B. General

1. A Request for Electric Service shall be made for each installation prior to starting work.

2. HG&E, telephone, and third party company representatives should agree on the particular location of this equipment. Remote or enclosed metered sites and access roads to these sites must be accessible for meter reading.

3. Installations shall be in compliance with the National Electrical Safety Code (NESC). This equipment shall be inspected by the municipal inspection authority.

4. Requests for installation of equipment on HG&E property shall be directed to the HG&E Manager of Engineering. Please call (413) 536-9300.

C. Protection Issues

Third party company equipment utilizing generators, batteries, inverters or rectifiers are possible devices of back feed into the distribution system. All steps to prevent any and all back feeds shall be taken:

1. **No equipment shall be connected to the distribution system without prior approval and testing by HG&E personnel to ensure that back feed will not occur.** Equipment with permanently connected generators and inverters shall have an automatic, positive, and fail safe method to prevent back feed. Equipment which demonstrates back feed capability must be modified by the third party company prior to connection to the distribution system. This restriction applies to both new and existing installations.

2. A break-before-make switch or cable removal before connection to portable generators is required.

3. The third party company requesting service may have more than one design of backup supply furnished by either the same or several suppliers. The specifications for each model shall be submitted to our Electric Operations Engineering Department to determine if back feed could occur and if so, what protective devices shall be required. This equipment shall be approved by a specific model designation. Approval shall be determined by specific tests required and witnessed by HG&E Electric Operations personnel. The tests shall be performed by a third party company at their expense. Any modifications to previously approved models which may permit back feed must be reported by the third party company to HG&E.

4. The third party company is responsible for protecting its equipment from faults or abnormal voltages within its

facilities. HG&E shall not be held responsible for damaging fault currents or voltages to the third party company's equipment.

5. HG&E shall be held harmless for damages to third party Company's equipment resulting from transients due to lightning strikes, load swings, faults, capacitor switching, system switching, etc.

6. The Company may reduce its voltage level up to an additional 5% during times of system capacity emergency or during designated test periods. The third party company may wish to ensure that this action will cause no adverse effect on its equipment or operation.

7. The interconnection of the third party company's facilities with the distribution system shall not cause any reduction in the quality of service being provided to our customers. The third party company shall adhere to IEEE Standard 519 for harmonics. The introduction of harmonics, frequencies, flicker, etc. shall not be permitted and the third party company's equipment shall be disconnected until corrected.

8. HG&E recommends that the third party company install suitable surge arresters on both the source-side and load-side of its system.

9. The third party company shall ensure that any over-current protective device on its system coordinates with HG&E primary and/or secondary protective devices. Each third party company shall submit the over current characteristics to HG&E Electric Operations for review and approval.

10. Per HG&E's Distributed Generation Policy, any form of parallel generation shall require an external disconnect switch between the generator meter and the service panel.

D. Metering

1. Services to power supplies shall be metered with a demand meter, unless the service meets the requirements for unmetered services (i.e. street lighting).

2. Pad mounted meter units shall not be installed below the five (5) foot level without the approval of the Meter Department.

3. All pole mounted installations and the orientation of the meter socket must be approved prior to installation.

4. Meters shall not be installed on poles unless the control unit itself is also installed on the pole. The meter location for pole mounted control units shall be at the five (5) foot level.

5. An approved lever operated manual bypass is required on sockets (except for Residential Customers). 100 amp sockets may be supplied with non-locking jaws. Sockets greater than 100 amps must be supplied with locking jaws.

6. Grounds shall not be installed in meter socket(s).

7. A minimum three (3) inch conduit with slip joint is required when the service is underground.

E. Grounding

1. Control cabinets and messengers on the pole shall be grounded and bonded to the HG&E grounds and messengers.

2. Bonding shall be an irreversible connection and made at the time of installation by the third party company. The attachment point of the bond to the utility pole ground shall be no higher than the communication gain level.

3. If our primary supply circuit is delta or uni-grounded connected, the bonding shall be to the secondary ground, and **not** to the primary equipment/arrester ground. Do not bond to utility grounds on any pole where transformers, arresters, or any other primary equipment is installed.

F. Pole Mounted Equipment

The NESC requirements for clearance heights above ground shall be followed. The NESC requirement for effectively grounded equipment cases is 15 feet minimum over roads and areas subject to vehicular traffic and 11 feet over ways subject to pedestrians and restricted vehicular traffic. There is an exception for effectively grounded equipment cases such as control boxes which allows the equipment to be mounted at a lower level for accessibility "provided such cases do not unduly obstruct a walkway". In addition to the above requirements, the following restrictions apply:

1. HG&E, telephone and third party company representatives should agree on the particular location of this equipment.

2. Equipment exceeding two (2) feet in height shall only be installed on poles that can be accessed by aerial device vehicles.

3. Equipment exceeding 16 inches in width shall not be installed on riser poles.

SECTION 8: Meter Installation

A. General

1. Under **no circumstances** will electricity be supplied without being metered or otherwise accounted for under special written arrangements made with HG&E. Contractors are **not allowed** to install jumpers on commercial, industrial or new residential services. If all requirements of the Cut and Reconnect policy are met, jumpers **are allowed** on residential service upgrades only. This includes the owners meter on multi-family services. Refer to Section 3.

2. All services greater than 400 amps shall be transformer rated and cold sequenced. Refer to Section 8, table A, p.40.

3. The Customer shall furnish, install, own, and maintain the meter socket and the instrument transformer enclosure if required.

4. HG&E will furnish, own, and maintain all metering equipment.

5. Single residential houses must have and display a unique street number to avoid billing errors.

6. For **all multiple meter installations**, each house, store, office, apartment, or area serviced **must be permanently marked on the door with its unique identification.** This unique identification **must be permanently marked (no magic markers) on the inside and outside of the associated meter socket and load disconnect before the meter will be installed,** to avoid billing errors.

7. All residential self-contained meter sockets shall have ringless covers and a fifth jaw at 9 o'clock. All other self-contained meter sockets shall have ringless covers and factory installed lever-operated bypasses. (See Section 11, Approved Metering Equipment)

8. Primary metering and totalized metering is not a Customer option. It may be allowed, under special conditions, if approved by an HG&E Engineer.

9. The meter socket shall not be used as a junction box, raceway or as a grounding point.

10. HG&E will not allow any Customer owned equipment to be installed between the Customer meter socket and the Company meter.

11. When requesting a new or upgraded commercial service and or an additional meter, the Customer or their contractor may be required to submit a one line schematic diagram showing the service entrance, the Customer's main switch and the proposed meter location.

12. For Customers planning to install parallel generation – residential Customers planning to install less than 25 kW-dc and all commercial Customers planning to install parallel generation – each must submit a schematic diagram showing the service entrance, the Customer's main switch, the existing or proposed meter trough(s) and how the generator will be tied in so that HG&E can order the correct meter. Please see HG&E's Distributed Generation Policy, Section 3 and 4 regarding metering and interconnection.

B. Standard Meter Installations

1. The two types of standard metering installations are:
   - self-contained

- instrument transformer

2. The type of meter installation is determined by the voltage, phase, and total name plate rating of the associated disconnect(s). Refer to Section 8, Table A on page 40.

C. Meter Locations

1. **HG&E WILL DESIGNATE METER LOCATIONS FOR NEW OR CHANGED INSTALLATIONS**.

   a. **All residential meters shall be located outdoors** on the front or front side corner of the house. The front of the house is considered to be the side adjacent to our distribution facilities.

   b. **Commercial meters shall normally be located outdoors.**
   Any deviation from this requires pre-installation approval from the HG&E Meter Service Department.

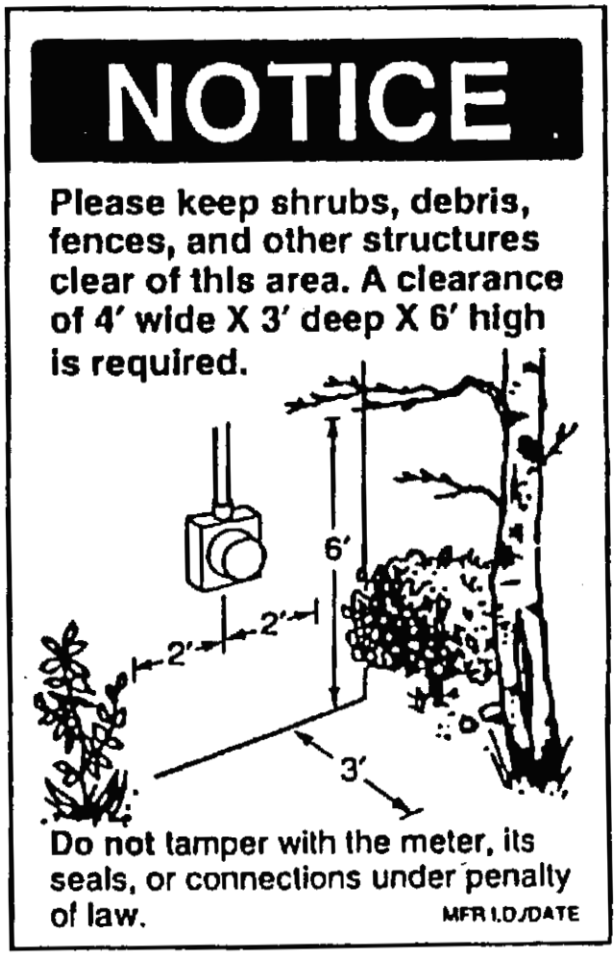
   c. Meters shall be grouped so as to keep the number of metering points to a minimum.

   d. Instrument transformer enclosures should be located indoors in a suitable area readily accessible to HG&E.

   e. Other specific exceptions may be approved. For example, grouped metering may be located indoors, in a suitable area accessible to HG&E, only if there is no acceptable outside metering location.

   f. If after a review by HG&E it is deemed outside meter trough(s) are not possible to install, then remote meter disconnect(s) will have to be installed on the inside meter trough(s) at an additional cost to the Customer.

2. The Customer will maintain a clear, safe work space directly in front of each meter location, and a suitable approach to it. Such work space shall be at least four (4) feet wide, shall extend out from the meter at least three (3) feet, and up to a height of at least (6) feet. In addition, the meter socket must be located at least three (3) feet measured horizontally from a gas meter, regulator or propane cylinder.



3. Private property pole-mounted meters are permitted. This is a special installation. Early and detailed consultation with HG&E is required. (See Figure 13, page 63 for overhead and Figure 14, page 64 for a conduit system)

4. Private property metering pedestals for conduit service may be permitted. This is a special installation. Early and detailed consultation with HG&E is required. (See Figure 15 page 65, and Figure 16 page 66)

5. In areas where meter equipment is subject to vehicular traffic, doors, etc., the Customer will be required to install additional protection, such as bollards.

D. Meter Equipment Mounting and Supports

1. Meter sockets shall be mounted plumb and securely fastened to a permanent rigid wall. (See Figure 10, page 60). Rust- resistant sheet metal screws of sufficient size shall be used to hold the socket secure. Standard expansion bolts or anchors shall be used on masonry.

2. An individual meter, or meters mounted adjacent to each other horizontally, shall be installed so that the center is approximately 5 feet from the floor or final grade. See and Figure 19, page 69.

3. Height requirements for vertically positioned, multiple meter installations. (see Figure 18, Page 70):

   a. Maximum height at top of meter is six (6) feet from the floor or finished grade.

   b. Minimum height at bottom of meter is two (2) feet from the floor or finished grade.

4. Meter sockets may be attached to adequately braced panels or frames in metal enclosures. With HG&E approval, meters may be installed on pre-punched sheet metal enclosures to be provided by the Customer in metal cubicles.

5. Meter sockets should be mounted on the finished surface of the building or structure. Consult with HG&E for recessed or other non-surface mounted installations.

E. Grounding

1. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode conductor shall not be run through the meter socket.

   - **An exception to this will be allowed on a Cold Sequenced self-contained service only. For this type of service, the grounding electrode conductor will be allowed to travel through the meter socket along with the feeder conductors.**

2. The requirements of the Code shall be followed relative to grounding practices.
3. The service entrance installation shall have the neutral or identified phase conductor which is grounded as required by Code.

4. To avoid corrosion problems, HG&E strongly recommends the use of copper for the system grounding conductor.

5. Copper and aluminum shall never be in physical contact with each other. Where electrical connection is necessary, use special devices designed for this purpose.

6. The system grounding conductor shall not be connected to any part of a gas or fuel oil system.

7. The meter socket shall not be used as a grounding point.

F. Cover Plates

After the meter socket has been installed, it is the contractor's responsibility to protect the interior of the socket by installation of an approved optically clear cover obtained from HG&E.

G. Meter and Equipment Seals

1. All meters and all points of access to unmetered wiring, i.e. wiring troughs, on the Customer premises shall have sealing provisions. All disconnecting switches over 400 amps must have locking provisions for HG&E.

2. The breaking of our seals, connecting, disconnecting or tampering with our metering equipment by unauthorized persons is **strictly prohibited**. The law provides penalties for theft of electricity**.**

3. If it becomes necessary to gain access to any of this sealed equipment, the Customer shall contact HG&E and receive permission to do so. At that time, HG&E will make arrangements to reseal the installation.

H. Self-Contained Single-Phase Meter Installations

Refer to Section 8 Item B, page 31, and Table A, page 40, for services where this type of meter installation is

required.

1. **Metering Equipment**

   a. The Customer will furnish, install, own, and maintain approved single-phase ringless meter sockets with factory installed bypass. Our approved sockets are listed in Section 11.

   b. HG&E will furnish, install, own, and maintain the electric meter.

   c. Where damage occurs or is anticipated, outdoor socket meters shall be protected by a suitable metal enclosure with hasp and staple for installation of a lock. HG&E will determine if a protective enclosure is required. This enclosure shall be furnished, installed, owned, and maintained by the Customer, the lock being provided by HG&E.

2. **Sequence of Meter and Service Equipment**

Single-phase service equipment shall be normally installed on the load side of self-contained meters, unless otherwise specifically approved or requested by HG&E. (See Figure 11, page 61, and Figure 19, page 69). An exception to this would be all network services. These types of services will require overcurrent protection and a main disconnect on the line side of the meter (cold sequence).

3. **Manual Bypass Meter Sockets**

The following installations require an approved manual bypass meter socket:

   a. All nonresidential (including owners' meter) self-contained 100 amp or less installations require an approved ringless meter socket with a lever-operated manual bypass and flash shield.

   b. All nonresidential (including owners meter) self-contained installations greater than 100 ampere capacity require an approved ringless meter socket with a lever-operated manual bypass, jaw release, and flash shield.

   c. All nonresidential self-contained installations greater than 200 ampere capacity require an approved ringless meter socket with a lever-operated manual bypass, jaw release, and flash shield.

   d. All self-contained installations serving an apartment common laundry room(s), hallway(s), or stairwell(s) (owner's loop) require manual bypass sockets specified by 3.a., 3.b or 3.c.

4. **Meter Socket Connections**

Line-side conductors are always connected to the top terminals of meter sockets and the load side conductors to the bottom terminals. Standard connections for single-phase and three wire network socket meter installations are shown in Figure 17, page 67.

5. **Grouped Metering**

Custom-made installations and modular panels may be used for groups of meters, such as in apartment houses. Prints of these arrangements must be submitted and approved by HG&E **prior to installation**. (See Figure 17, page 67). As an alternative, the Customer may furnish, install, own, and maintain suitable pre-bused or a pre-conducted wiring trough with sealing provisions to feed multiple installations of meter sockets. (See Figure 18, page 68, and Figure 19, page 69)

I. Self-Contained Three-Phase Meter Installations

Refer to Section 8.B., page 31, and Table A, page 40, for services where this type of meter installation is required.

1. Meter Equipment

a. The Customer shall furnish, install, own, and maintain approved, three-phase ringless sockets with factory-installed lever- operated bypass and jaw release, complete with flash shield and sealing provision for all three-phase self- contained installations shown in Section 7, Table A, page 40. Refer to Section 11 for Approved Meter Sockets.

b. HG&E will furnish, install, own, and maintain the electric meter.

c. Where damage occurs or is anticipated, outdoor socket meters shall be protected by a suitable metal enclosure with hasp and staple for installation of a lock. HG&E will determine if a protective enclosure is required. The box shall be furnished, installed, owned, and maintained by the Customer, and the lock will be provided by HG&E.

2. Sequence of Meter and Service Equipment

All service equipment shall normally be installed on the load side of the self-contained meters, unless otherwise specifically approved or requested by HG&E (See Figure 11, page 61, Figure 18, page 68, and Figure 19, page 69). The following exceptions are installations where the main disconnect will be installed on the line side of the meter.

- All 480 volt services.
- All services fed from a HG&E **network system**. Contact us for detailed requirements, such as R type fuses, 100,000 amp fault current rating, and rejection clips.

3. Meter Socket Connections

Line side conductors are always connected to the top terminals of meter sockets and the load-side conductors to the bottom terminals. Connections for a three-phase socket meter installations are shown in Figure 20, page 70.

J. Instrument (Current and Voltage)

1. Transformer Installations

Refer to Section 8.B., page 31, and Table A, page 40, for services where this type of meter installation is required.

- Every installation which may require instrument transformers shall be referred to HG&E for approval before work is started.
- The service will not be energized until the metering has been inspected and approved by HG&E.

2. Metering Mounting Equipment – Instrument Transformer Enclosure/Conduit/Socket

a. The Customer shall furnish, install, own and maintain a sealable metal enclosure approved by HG&E for the instrument transformers. Current and voltage (when required) transformers shall be installed in the same compartment. All meters and all points of access to unmetered wiring on the Customer's premises shall have

sealing provisions. All disconnecting switches over 400 amps must have locking provisions for HG&E.

This enclosure may be one of the following:

- An individual cabinet for instrument transformers only;
- A combined entrance switch and current and voltage transformers enclosure (See Figures 23, page 73 and Figure 24, page 74); or
- A separate compartment in metal-enclosed switch gear built from the Customer prints, which HG&E have previously approved. Wiring in the instrument transformer enclosure shall be limited to that pertinent to the meter installation.

b. The Customer shall furnish, install, own, and maintain an approved, pre- wired combination meter socket and test switch. Entry through the hub opening at the top of the meter socket is not allowed. See Section 11 for approved equipment. (See Figures 21, 23 and 24 on pages 71, 73 and 74)

c. The Customer shall furnish, install, own and maintain approved conduit of specified size, minimum 1-1/2 inch, between the instrument transformer enclosures and the combination meter socket. The conduit must be continuous from the instrument transformer enclosure to the side or bottom of the meter socket test switch enclosure. The conduit must be a minimum of 6 inches and a maximum of 50 feet in length. When PVC conduit is used the Customer shall install a separate equipment grounding conductor in this conduit according to the Code (see Figures 21, 23 and 24 on pages 71, 73 and 74).

3. Meter, Instrument Transformers, Test Switch, Wiring Installation

a. HG&E shall:

- Furnish, install, own, and maintain the primary conductors for the voltage transformer connections.
- Maintain the test switch and instrument transformers.
- Furnish, install, own, and maintain the electric meter.
- Provide, for the Customer to install, the current and/or voltage transformers.
- Furnish, install, own, and maintain the secondary conductors between the instrument transformers and the test switch.

b. Customer shall:

- Contact Meter Department to schedule instrument transformers drop off and pre-inspection.
- Provide adequate support and clearance for the current and voltage transformers, and service conductors.
- Install current transformers. **The secondary shorting devices on each transformer must be left in the closed position.** (See Figure 22, page 72)
- Connect line conductors to the current transformers so that the polarity mark on the current transformer is on the line side. Use approved connectors for all primary connections to current transformers (See Figure 22, page 72)

c. The connection of the Customer equipment to or before the meter or to or before the secondary of the instrument transformers is prohibited.

4. Sequence of Meter and Service Equipment

For instrument transformer installations, the Customer will furnish, install, own, and maintain a main switch or circuit breaker, for the Customer load only, to be located on the line side of the instrument transformers except as noted below (See Figure 24, page 74). This is referred to as cold sequence which means that the main disconnect is located on the line side of the current transformers.

a. For all other installations, HG&E may grant an exception to the sequence requirement if at least:

- The power transformer(s) supplying the Customer load will be used to supply only the Customer load now and in the future as determined by HG&E.
- In accordance with our standards HG&E will furnish, install, own and maintain a primary supply load break device ahead of the power transformer(s) which will allow interrupting the supply to Customer load without affecting the supply to other customers' loads. In spot network installations, network protectors may be used for this purpose.
- The Customer installation conforms to all Code requirements. Consult with HG&E early in your planning stage so that HG&E can determine if your proposed installation qualifies for the exception.

TABLE A

**Includes Network Voltage of 125/216 & 216Y/125 Volt*

Supply Characteristics			Type of Metering					
			Self-Contained			Instrument Transformer		
Nominal Voltage	Phase	Wire	Total Nameplate Rating of Disconnects	Reference	Figure	Total Nameplate Rating of Disconnects	Reference	Figure
120/240	1	3	≤ 400 Amps	Pg 35 Sec. H	Pg 68 No. 17	> 400 Amps	Pg 37 Sec J	Pg. 72, 73, 74 No. 21, 22, 23
120/208*	1	3	≤ 200 Amps	Pg 35 Sec. H	Pg 68 No. 17	Not Available		
208Y/120	3	4	400 Amps	Pg 37 Sec. I	Pg 71 No. 20	> 400 Amps	Pg 37 Sec J	Pg. 72, 73, 74 No. 21, 22, 23
480Y/277	3	4	≤ 400 Amps	Pg 37 Sec. I	Pg 71 No. 20	> 400 Amps	Pg 37 Sec J	Pg. 72, 73, 74 No. 21, 22, 23

SECTION 9: Customer Utilization Equipment

A. General

1. HG&E reserve the right to disconnect the Customer supply, upon proper notice when Customer equipment interferes with the operation of any components of our system or the electric supply to others. The Customer must consult with us **in advance** of making any commitments for large motors, welders, x-ray machines, elevators or other equipment which may have a high instantaneous electric demand.

2. The operation of equipment having a relatively high load of short duration, such as welding equipment, x-ray machines, elevators, and compressor motors, may make it necessary for us to install special or larger than usual facilities to render satisfactory supply. In such cases, the Customer shall pay an additional charge, over and above the regular rate, based on the cost of the additional facilities required.

3. All loads shall be electrically balanced. On three-phase supply, single-phase loads shall be as evenly divided as possible between each of the phases. On single-phase supply, the load should be evenly divided between the two energized conductors and the neutral.

B. Motor Installations

1. For most satisfactory operation, motors over ½ horsepower operating on single-phase services in size should not be operated on 120 volt systems and must be connected at 240 volts.

2. The Customer should consult with HG&E to determine **if three-phase is available** before starting work on purchasing utilization equipment. Three-phase supply is not normally provided for residential use or for commercial and industrial use where all motors are smaller than 7-1/2 horsepower. Exceptions may be made where three-phase is available from existing secondary distribution facilities or where the total load justifies three- phase.

3. Motors should be rated 208 volts for use on a 208 volt system. Motors rated at 230 volts may not operate satisfactorily on a 208 volt system.

4. Motors of 3 H.P. and above shall be three-phase except in a network voltage area where 5 H.P. single-phase motors may be allowed. Exceptions to these conditions require HG&E approval prior to installation or use. HG&E reserves the right to require reduced voltage or reduced load starting to be installed on customer equipment when it deems necessary.

5. Chapter 25 of the Revised Ordinances for the City of Holyoke and most current version of the NEC, as amended by the NEC from time to time, further regulates electrical wiring. The Customer shall obtain approval from HG&E prior to connecting any motor larger than indicated below:

- 3 H.P. for single phase, secondary service up to 600 volts.
- 15 H.P. for three phase, secondary service up to 600 volts.
- 75 H.P. for three phase, primary service of either 13.8kV or 34.5kV.

C. Motor Starting Current

1. The starting current of a motor is much greater than the normal running current. The magnitude differs with the motor size and type. While this starting current exists for only a short time, the frequency with which it occurs is a major cause of supply disturbances.

2. **Before** installing single-phase motors over three (3) horsepower or three phase motors over fifteen (15)

horsepower, consult HG&E for assurance of adequate supply.

3. The maximum locked-rotor current anticipated shall be the sum of the starting currents of all motors which are started simultaneously.

4. HG&E will specify motor starting limitations. When required, reduced voltage starters or other devices must be furnished, installed, owned, and maintained by the Customer.

D. Motor Protective Devices

1. All motors shall be controlled and protected from damage that could be caused by continuous operation under abnormal conditions such as single phasing. HG&E is not responsible for equipment damage. **The Customer should consider installing a single phasing protection device on each three-phase motor.**

2. There are advantages to incorporating **timed under-voltage relays** for motors on certain applications. Due to the normal, rapid reclosing of our supply circuit breakers, many manual restarts can be avoided by delaying the opening of the motor contactor. Conversely, some devices or processes require disconnection immediately upon loss of voltage to protect the operation involved.

E. Power Factor

Where any equipment having low power factor characteristics is installed, it is to the Customer's advantage to furnish, install, own, and maintain corrective equipment which will result in an overall power factor approaching unity. Customers installing capacitors to improve the power factor of their loads should contact HG&E so advice may be given regarding supply system characteristics and essential coordination details. This will improve the voltage regulation and reduce the size of the attendant electrical equipment.

F. System Disturbances

1. Certain electronic equipment, such as computers and microprocessors, and some manufacturing processes, are extremely sensitive to and can be damaged by disturbances which are inherent in all supply systems. Therefore, it is the Customers responsibility to furnish, install, own, and maintain equipment needed to protect your operations. (See Section 8, paragraph C, page 31)

2. Secondary lightning (surge) arresters, if desired, will be furnished, owned, installed and maintained by the Customer on the load side of their protective devices.

SECTION 10: Customer Alternate Electric Energy Sources

A. Non-parallel Generation (Standby or Emergency)

When a Customer has emergency generation, an adequately sized double- throw disconnecting device must be provided by the Customer to open all ungrounded conductors from the normal supply before connection is made to the emergency supply, in accordance with the requirements of the NEC. (See Figure 28, page 79)

B. Parallel Generation

1. Subject to certain requirements, HG&E will permit parallel operation of the Customer's generating equipment with our system. Automatic or manual prevention of any feed into our de-energized system must be provided by the interconnecting Customer. Synchronizing may be required.

2. Standby or emergency generation, that runs in parallel with the HG&E system, when returning to normal operation within the first few seconds after the end of an interruption has similar requirements as for parallel generation. Standby Generation that runs in parallel to HG&E's distribution system will be subject to HG&E's Standby Facilities Charge. Any excess generation exported back to HG&E's distribution grid will not be compensated unless participating in HG&E's Distributed Generation program.

3. **The Customer must contact HG&E early in the planning process and receive written approval to install generation. Please see HG&E's Distributed Generation Policy for Interconnection requirements. The following must be submitted to HG&E *prior* to construction**. Please note that specific application requirements may vary depending on size, type and location of generation.

    a. Completed Interconnection Application
    b. Request for Electric Service, if required for a new service or a change or upgrade of a Customer's existing service.
    c. HG&E may determine an upgrade is necessary based on existing distribution grid conditions. If such upgrade is required, expense will be responsibility of the Customer.
    d. Complete set of electrical installation drawings including the following:
    e. One line diagram showing:
        - Generation unit interconnection
        - Utility revenue metering
        - Cold Sequence AC disconnect switch
    f. Relay control diagram (if required), including:
        - Relay types
        - Settings
        - Manufacturer & Catalog Number(s)
    g. Generator electrical specifications or inverter specifications

Depending on the nature of the installation, the following may also be required and shall be determined by HG&E:

- Utility grade under voltage and overvoltage protective relays.
- Under/over-frequency relay(s)
- An external disconnect switch.
- Static capacitors to provide no load VAR requirements.

***Prior* to interconnection with HG&E system**:

- Customer must submit to HG&E a Certificate of Completion signed by the local wiring inspector.
- HG&E shall witness-test the operation of all HG&E required protective equipment.

Notes:

1. Installation on HG&E "network" type distribution system, if allowed, will have additional protection requirements.

2. Installation must conform to all local, state and federal codes and regulations.

C. Uninterruptible Power Supply (UPS)

If a Customer decides that a UPS is required at their facility, the Customer will install, own, operate and maintain any such equipment. **Automatic prevention of any feed into HG&E's supply must be provided by the Customer**. The Customer must contact HG&E early in the planning process and receive written approval.

D. Distributed Generation (DG) – Less than 500 kW-DC

1. Subject to certain requirements, HG&E will permit parallel operation of a Customer's generating equipment with HG&E's system. For the safety of our field personnel automatic or manual prevention (dependent upon generating technology) of any feed into our de-energized system must be provided by the interconnecting customer.

2. **The Customer must contact HG&E early in the planning process. HG&E requires a signed Interconnection Application and Utility sign off prior to interconnecting the generator to HG&E's distribution system. It is strongly recommended that the Customer or their contractor supply HG&E with a one line diagram showing our feed, our metering and the Customer's interconnect point, before receiving written approval to install the generation. Any missing information, job scope changes or an interconnect point that does not meet with HG&E's approval will result in delays to the project. See Figure 31, page 82.**

3. The following general rules will also apply
   a. HG&E will not allow the generation feed to be interconnected in the meter trough, at the lugs or jaws of the meter.
   b. Generation must either be tied in at the customer's main panel, in a junction box or some other approved location on the load side of the Customer's meter trough.
   c. Installation must conform to all local, state and federal codes and regulations.
   d. For services greater than 400 amps, requiring instrument transformers, the interconnect point will be on the load side of the Customer's main switch and HG&E's instrument transformers. In doing so the service (if new) will be, or (if existing) will remain cold sequenced. See illustrations in Section 11, page 74 (Figure 23) and page 75 (Figure 24).
   e. The (DG) interconnect point will not be made at HG&E's transformer.
   f. Installations on HG&E "network" type distribution system, if allowed, have additional protection requirements.
   g. DGs less than 25 kW-dc will be allowed to interconnect to HG&E's distribution system through a single phase connection.
   h. All DGs greater than 25 kW-dc will be required to interconnect through a three-phase connection.
   i. DG will, in most cases, require the installation of second meter and meter socket and a bi- directional meter, by HG&E. HG&E will provide both meters. The Customer will be responsible for providing the required second meter socket. HG&E's Distributed Generation Program allows for customers to sell their electricity back to the utility at the Distributed Generation Credit under the HG&E's Distributed Generation Purchase Power Clause.

j.

- HG&E will meter all generation and consumption separately.
- All generation will be metered by the DG meter, and credited according to the applicable rate.
- All load will be charged at the applicable retail electric rate.

4. **If there is a credit remaining on the bill for such billing period, the credit will be rolled over into the following month's billing cycle in perpetuity. If a Customer leaves HG&E's service territory and a credit still remains on the bill, the Customer may request a check from HG&E for the remaining balance.**

E. Distributed Generation (DG) – Greater than 500 kW-dc

a. Customers interested in installing DG greater than 500 kW-dc will be required to enter into a Purchase Power Agreement (PPA) with HG&E. Interconnection requirements will be on a case by case basis.

- All primary electric equipment will be purchased and installed by HG&E at the expense of the interconnecting Customer.
- If a Customer wishes to purchase equipment, HG&E will provide specifications of required equipment to Customer.
- All secondary electric work will be the responsibility of the interconnecting Customer.
- All systems over **1 MW-AC** will require a DSCADA capable auto-sectionalizing recloser or equivalent vacuum Interrupting device installed by HG&E at the expense of the Customer.
- HG&E will make final connections on the secondary side of transformer prior to energizing interconnecting system. Customers to provide connectors and secondary lugs.

b. A witness test shall be conducted by HG&E personnel before any DG will be allowed to remain operational.

Please refer to HG&E's Distributed Generation Policy for all other interconnection requirements.

SECTION 11: Illustrations

FIGURE 1: Temporary Electric Service Conduit System

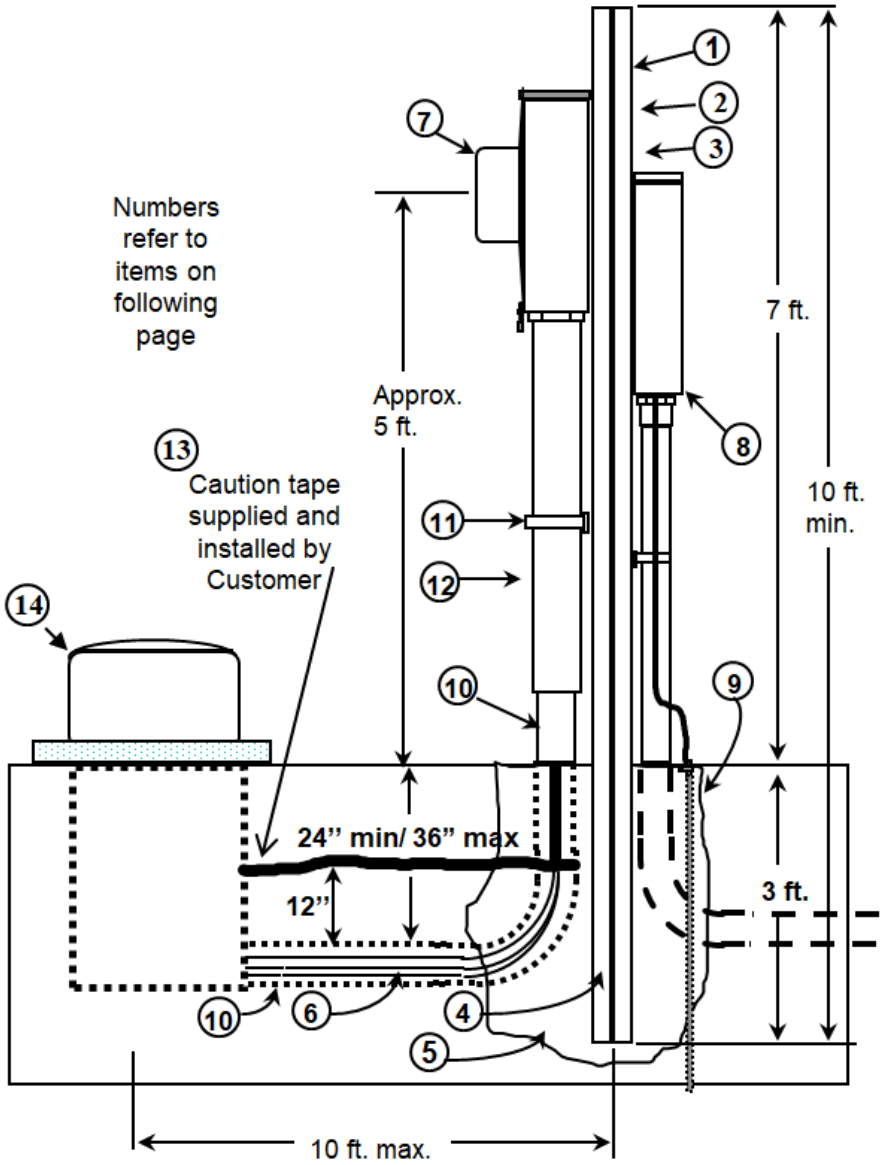


FIGURE 1 NOTES: Temporary Electric Service Conduit System

The Company will install our conductors for a temporary electric service that is erected by the Customer and meets the requirements listed below.

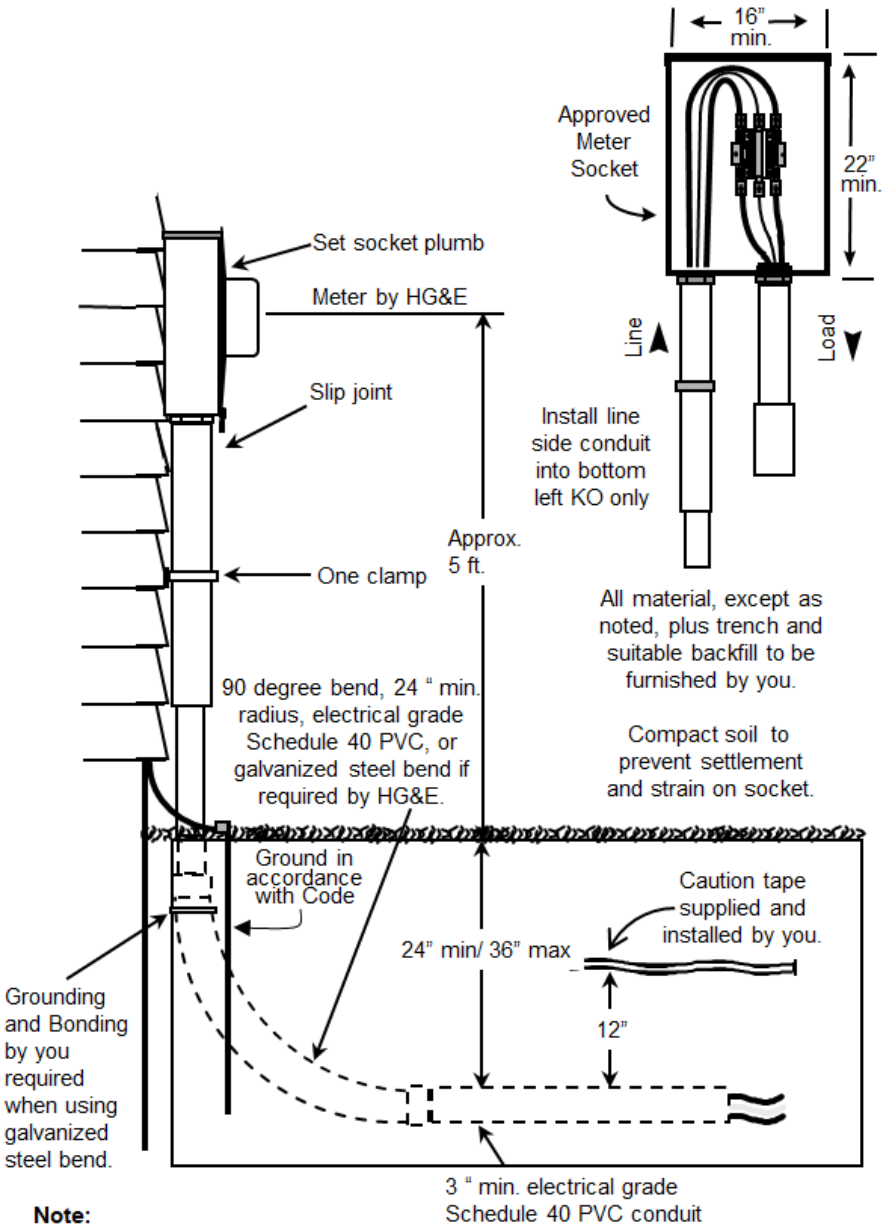
NOTE: All conduit shall be inspected by the local municipal authority prior to backfilling.

1. Location of temporary service timber is to be specified by the Company.
2. The timber is to be structural grade fir or pine with cross section not less than nominal solid 6” x 6” or two 2” x 8” spiked together on 8” centers.
3. The temporary service timber is to be at least 10 ft. long.
4. The temporary service timber is to be set a min. of 3 ft. in firm ground with well-tamped backfill.
5. There is to be no excavation near the temporary service timber which might reduce its stability.
6. Service cable by the Company.
7. Approved meter socket is to be installed approximately 5 ft. above ground.
8. Outdoor type service equipment rated in accordance with NEC Sections 230-79 and 230-90 is to be installed on load side of meter socket and within 12” of approved meter socket. Install ground fault interrupter protection.
9. Ground in accordance with code.
10. Electrical grade Schedule 40 PVC conduit supplied and installed by the Customer. All conduit will be listed and labeled for direct buried and above ground use.
11. Pipe strap or clamp.
12. Minimum 3” slip joint required.
13. The Customer will provide and install the caution tape which meets the requirements of the NEC. This tape shall be red with the a printed warning message printed in black;
    As an example;

“Caution - Electrical Line Buried Below”
Metallic Foil tape is NOT acceptable

14. Do not enter or open existing electrical structures such as hand-holes, transformer pads or switch vaults, when installing the pulling line. Call HG&E Engineering Dept. at (413) 536-9355.

FIGURE 2: Conduit Service House End

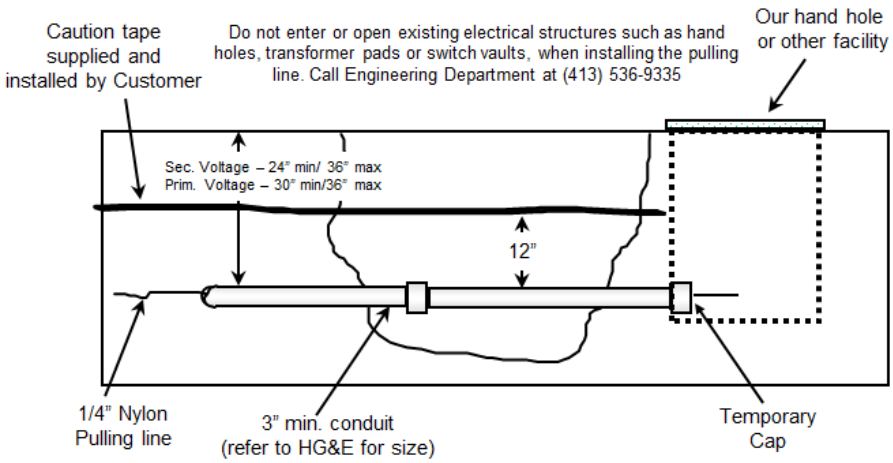


Note:

1. Provide suitable backfill (no rocks)
2. All conduit shall be inspected by the local municipal authority prior to backfilling.

FIGURE 3: Conduit Service Supply End

A. Supply from HG&E Conduit System



B. Supply from HG&E Overhead System

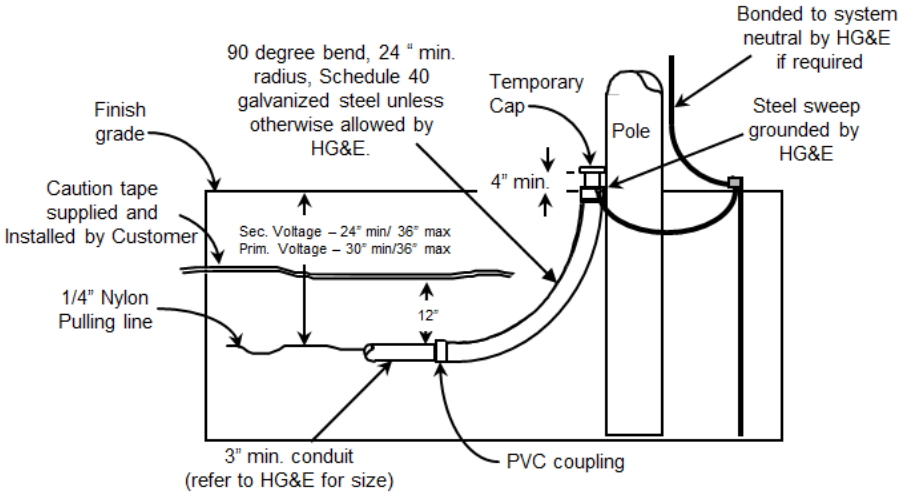


FIGURE 4: Temporary Service from Overhead System

Numbers refer to items on following page

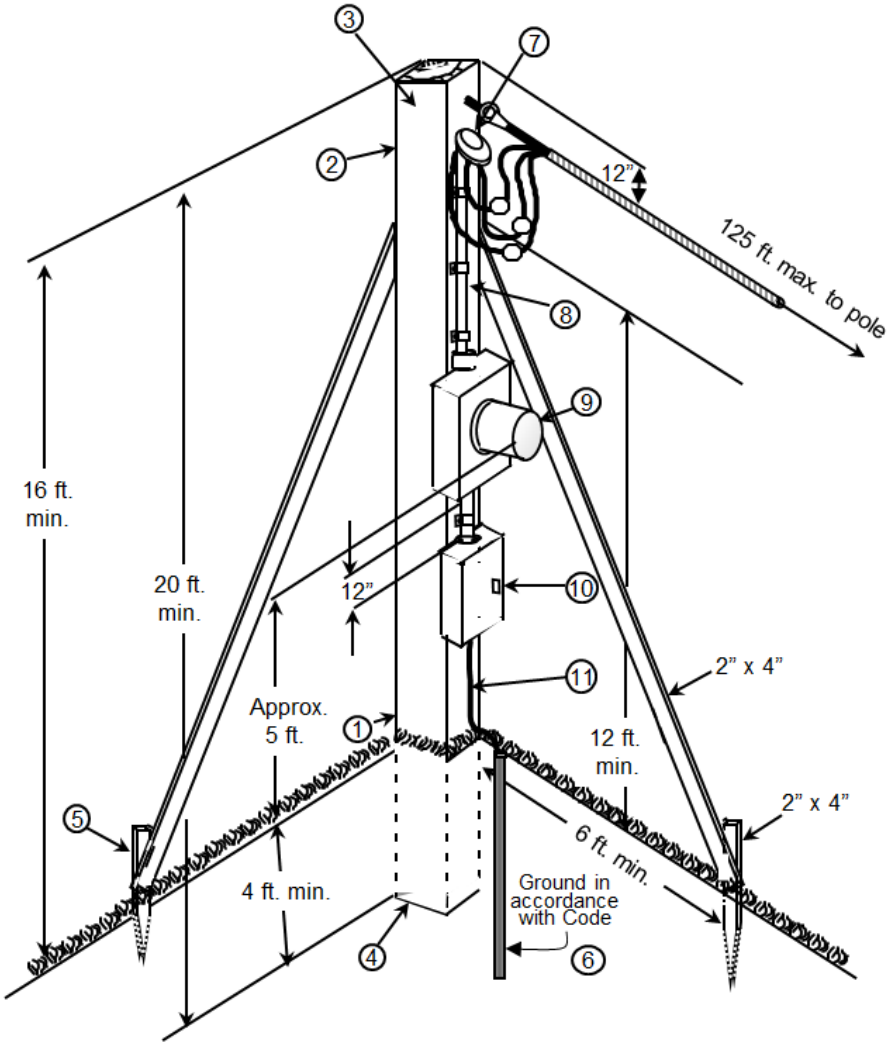


FIGURE 4 NOTES: Temporary Service from Overhead

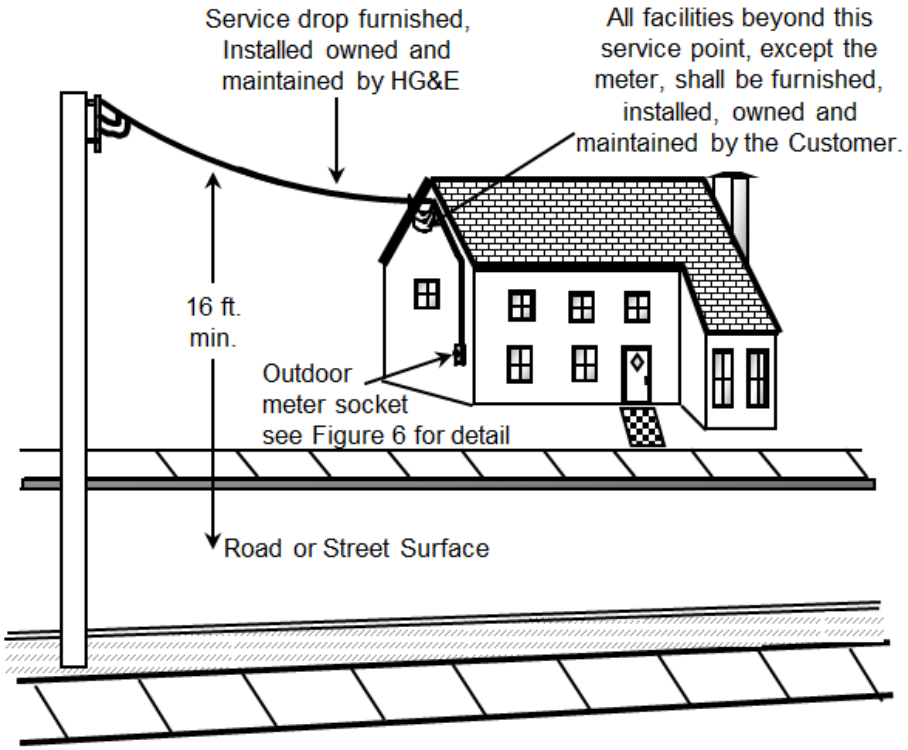
The Company will dead-end our service drop for temporary electric service on a pole or timber which is to be erected by the Customer and is to meet the requirements listed below;

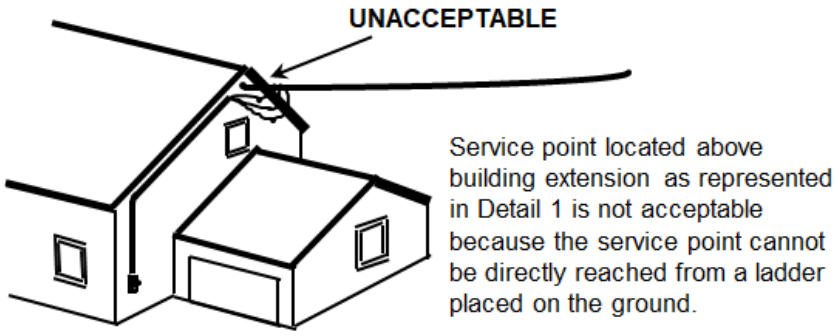
1. Location of temporary service pole is to be specified by the Company such that the service span does not exceed 125 feet measured from our pole to the Customer owned pole. If the service drop will not be transferred to a permanent location, there will be additional charges.
2. If a timber is used, it is to be structural grade fir or pine with cross section not less than nominal 6” x 6”.
3. The temporary service pole is to be 20 feet minimum. Additional length may be required in order to provide service drop clearance of 16 feet min. over the road and driveway and 12 feet minimum over other areas.
4. The temporary service pole is to be set a minimum of 4 feet in infirm ground and well compacted backfill.
5. The temporary service pole is to be adequately braced to support at its top both a person on a ladder and a service drop tension of 600 pounds. A minimum of two, 2” x 4” braces at right angles to each other, with one in line with the service drop, are to be installed. Braces are to be well spiked flat against the side of the pole at least 12 ft. above ground and to solidly driven 2” x 4” stakes 3 ft. minimum located a minimum 6 ft. from the service pole.
6. There is to be no excavation near the temporary service pole or its braces which might reduce its stability.

Approved electric service is to be installed to meet the following requirements and to be in accordance with the code(s).

7. A weatherhead is to be installed approximately 12” from top of pole and 14 ft. minimum above ground.
8. Minimum sizes of service entrance conductors are to be 3-wire no. 2 aluminum, securely fastened to the pole.
9. An approved meter socket is to be installed approximately 5 ft. above ground on the side nearest our pole.
10. Outdoor type service equipment rated in accordance with the NEC is to be installed on load side of meter socket within 12” thereof. Ground fault interrupter protection shall also be installed.
11. Ground in accordance with NEC. The grounding conductor electrode connection shall be made at an accessible location in the service equipment and not in the meter socket.

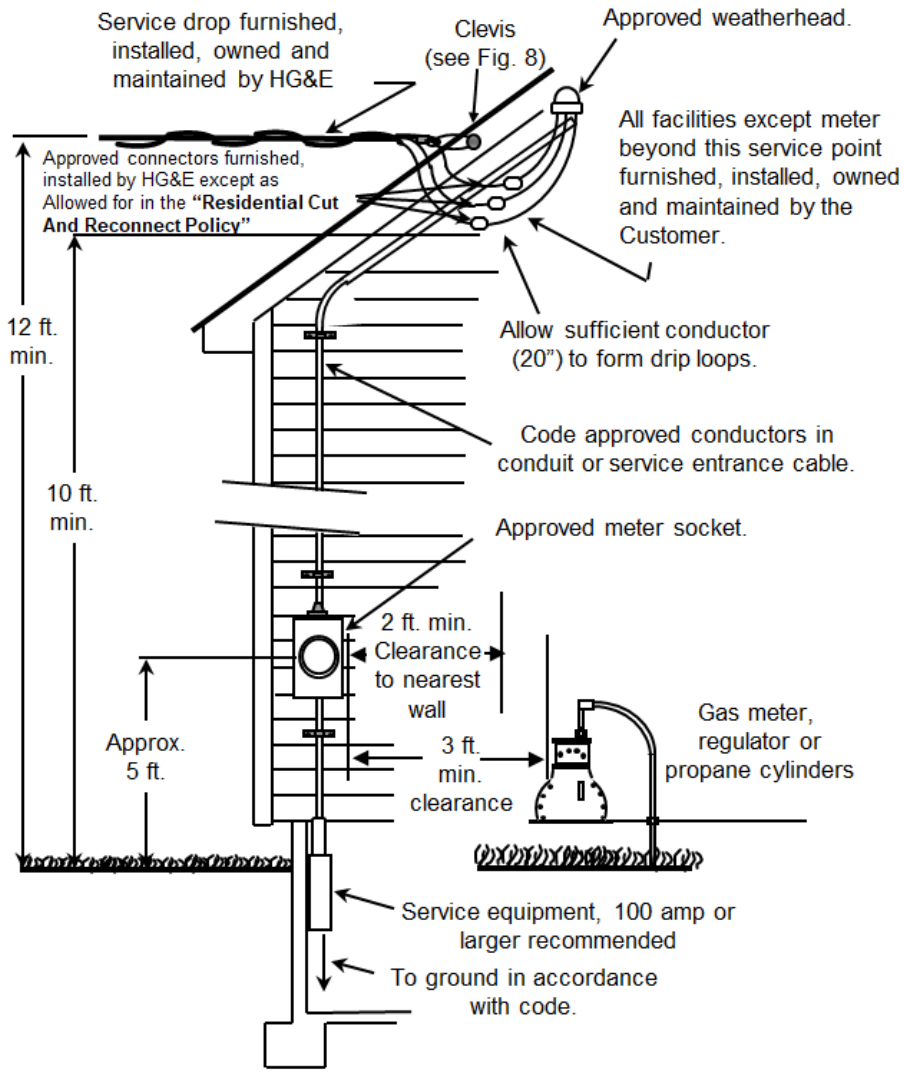
FIGURE 5: Overhead Service





Detail 1

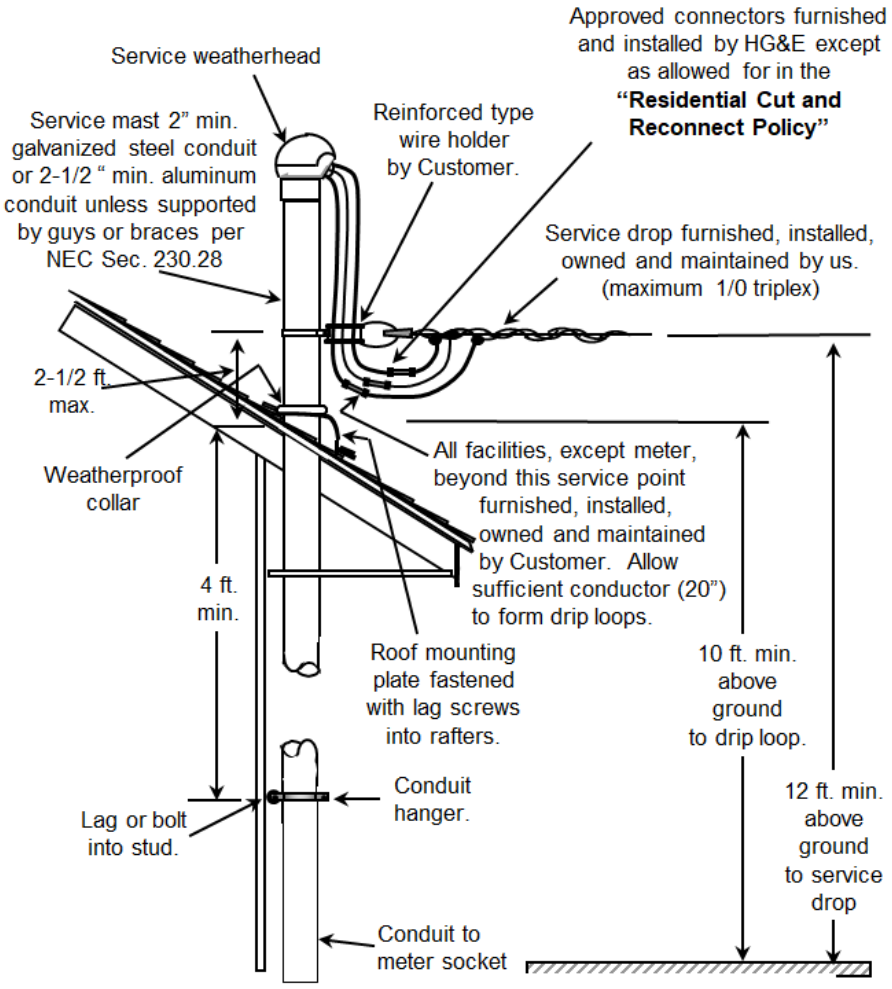
FIGURE 6: Overhead Service Entrance Facilities



Note:

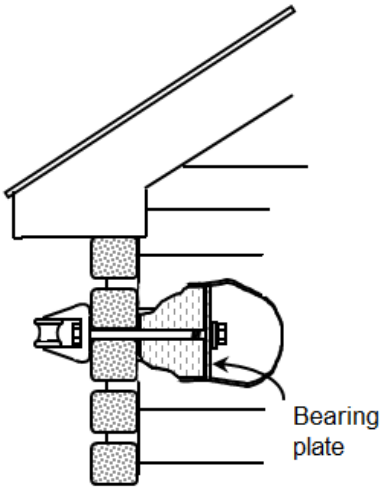
- **A.** Electrical contractor must mark stud location for HG&E service wire holder.
- **B.** For service attachment points exceeding 20ft. in height contact us.

FIGURE 7: Service Mast



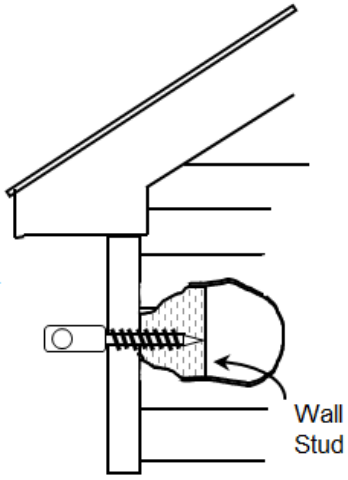
Note:
Only power service drop conductors shall be permitted to be attached to a service mast (per NEC Section 230.28).

FIGURE 8: Special Service Attachments



Notes:

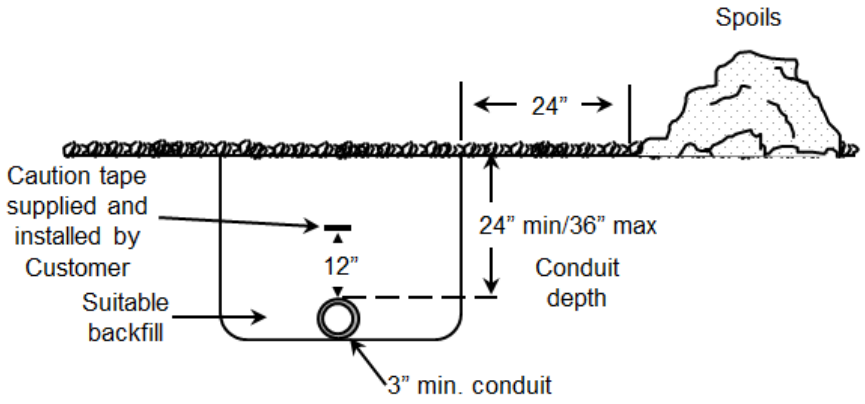
A. Required for masonry and metal buildings
B. Will be required for large and/or long services. (ex. 1/0 service or service greater than 125 ft.)



Note:

Electrical contractor must mark stud location for HG&E service wire holder.

FIGURE 9: Trenching Requirements



Notes:

A. OSHA standards require that spoil shall be placed 24" from edge of trench.

B. Suitable backfill shall not contain ash, cinder, shell, frozen material, loose debris or stones larger than 2" maximum dimension.

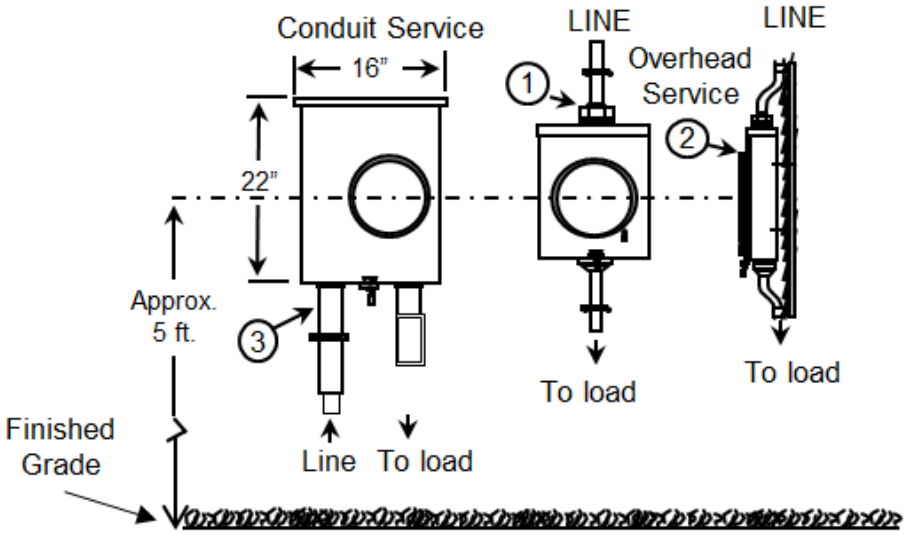
C. All Electrical grade Schedule 40 PVC conduit will be listed and labeled for direct buried and above ground use.

D. **Horizontal Clearance** - shall be 12 inches minimum or more as necessary to permit access for maintenance of either facility without damage to the other. This includes private wiring. Fuel (Gas and Oil) and Water Lines shall be no closer than 18 inches in all directions. **Vertical Crossing Clearance** - shall be so constructed and supported that upper facility will not transfer harmful load onto their lower facility. There shall be adequate vertical clearance to permit access for maintenance of either facility without damage to the other. In general, 12 inches is considered adequate separation, but the parties involved may agree to a lesser separation. Fuel (Gas and Oil) and Water Lines shall be no closer than 18 inches in all directions.

E. The Customer will provide and install the caution tape which meets the requirements of the NEC **(Metallic Tape is NOT acceptable)**. This tape shall be red polyethylene, 6" wide X 4 mills thick with black lettering of a minimum letter size of 120 Helvetica Light. It shall contain the following continuous printed warning:

"Caution - Electric Line Buried Below"

FIGURE 10: Self-Contained Meter Socket Sequence and Mounting Arrangement



1. Weatherproof joint with removable or non-removable hub.
2. Socket shall be mounted plumb. On clapboard shingle siding, socket shall be located on the high point of two clapboards.
3. Slip joint for conduit service.

Notes:

A. All network and 480Y/277 volt services will require a main disconnect ahead of the meter (cold sequence).

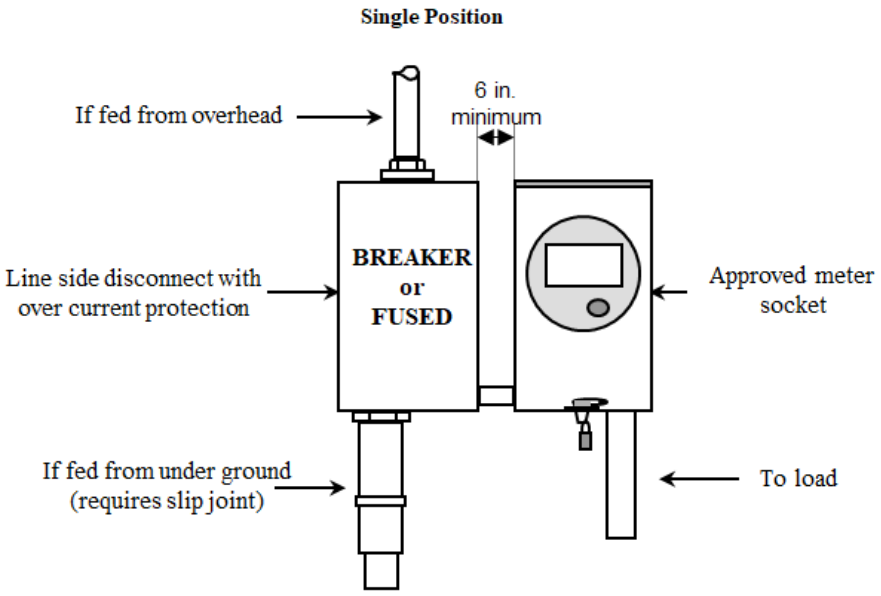
B. Self-contained meter sockets are required for:
- Single-phase 120/240 volt, 400 amp service entrance capacity or less.
- Single-phase 120/208 volt, 200 amp service entrance capacity or less.
- Three-phase 400 amp service entrance capacity or less.

C. All equipment (except meter) furnished, installed, owned and maintained by the Customer.

D. Bond at service equipment in accordance with MEC Article 250. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode shall not be run through the meter socket.

FIGURE 11: Sequence of meter and service equipment for self-contained 216Y/125v Network services and 480Y/277v services

(Cold Sequence - Refer to section 7.B)



Note:

A. All wiring beyond the service point installed, owned and maintained by the Customer.

B. An approved lever operated manual bypass with jaw release and flash shield is required.

C. Maintain clearances as specified in Section 8.C.2., page 34.

D. Line side disconnect must be adjacent to the meter socket and accessible to HG&E at all times.

E. For cold sequence services only, the equipment grounding conductor is permitted to travel through the meter socket.

F. Provisions must be made to accommodate HG&E's conductors. A sealable pull box may be required. Consult with HG&E Engineering prior to installation.

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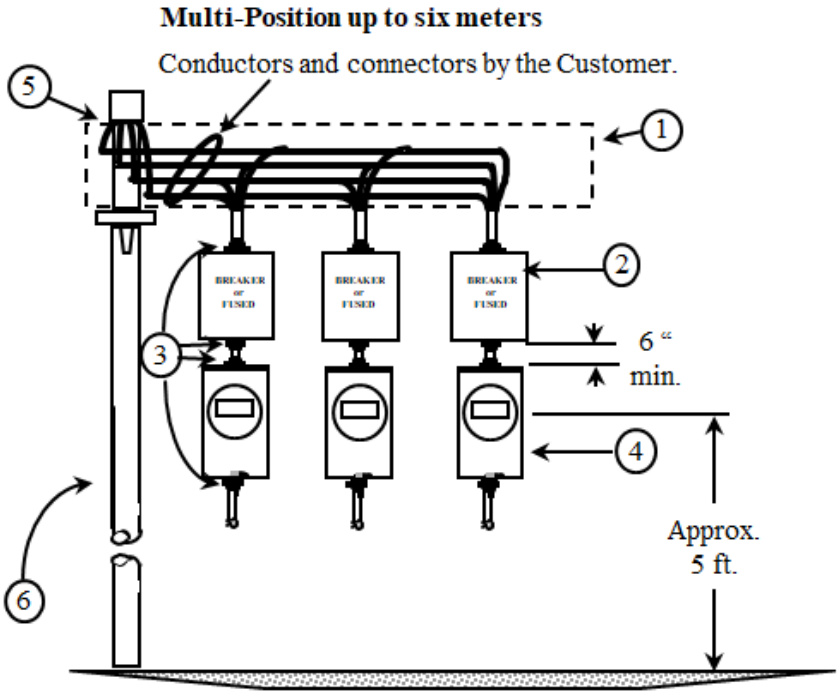
FIGURE 12: Sequence of meter and service equipment for three-phase self-contained 216Y/125v Network services and 480Y/277v services

(Cold Sequence – Refer to section 6.B)



1. Wiring trough with suitable connectors for the Company to terminate our conductors. Sealing provisions are required.
2. Line side disconnect with over current protection, 400 amps or less.
3. Weatherproof joints.
4. Approved meter socket.
5. Line, if supply is overhead and total ampacity is 400 amps or less.
6. Line, if supply is conduit system (a slip joint is required for outside installations)

Notes:

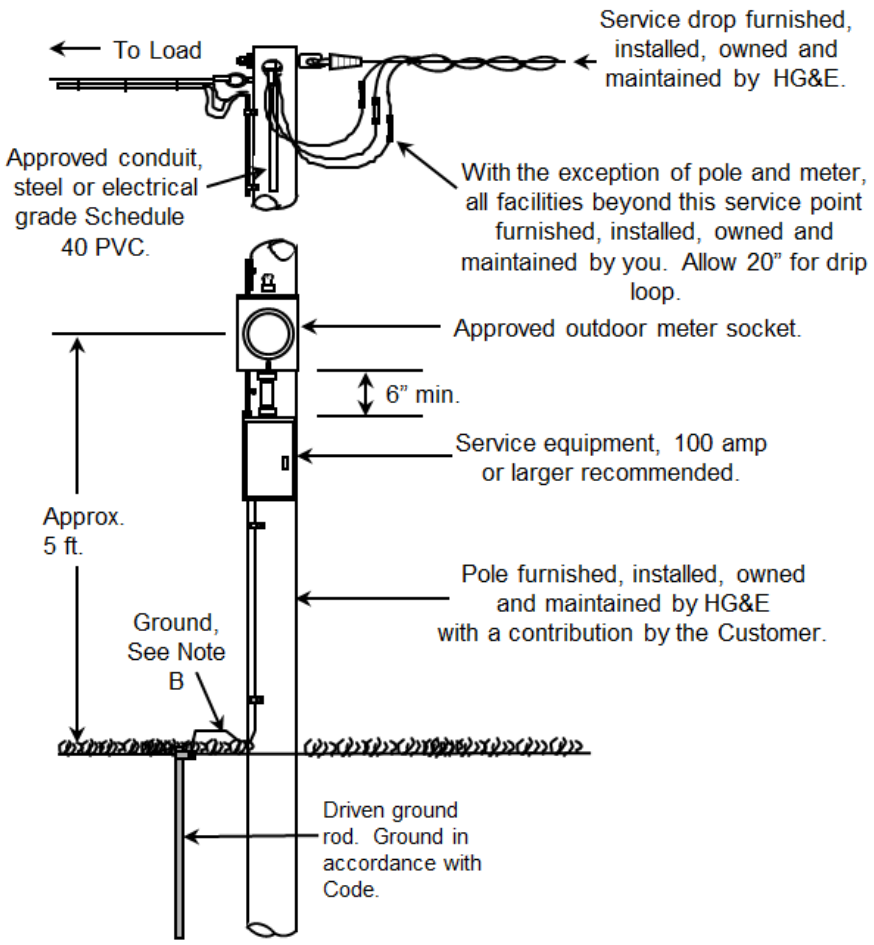
A. Each area serviced must be permanently marked on the door with its unique, permanent identification. This unique identification must be permanently marked on the associated meter socket, on meter socket cover and inside load center before the meter will be installed.

B. An approved lever operated manual bypass with jaw release and flash shield is required.

C. Maintain clearances as specified in Section 8.C.2., page 31.

D. Line side disconnect must be adjacent to the meter socket and accessible to HG&E at all times.

FIGURE 13: Meter Installation-Private Property Pole - Customer Conductors Overhead



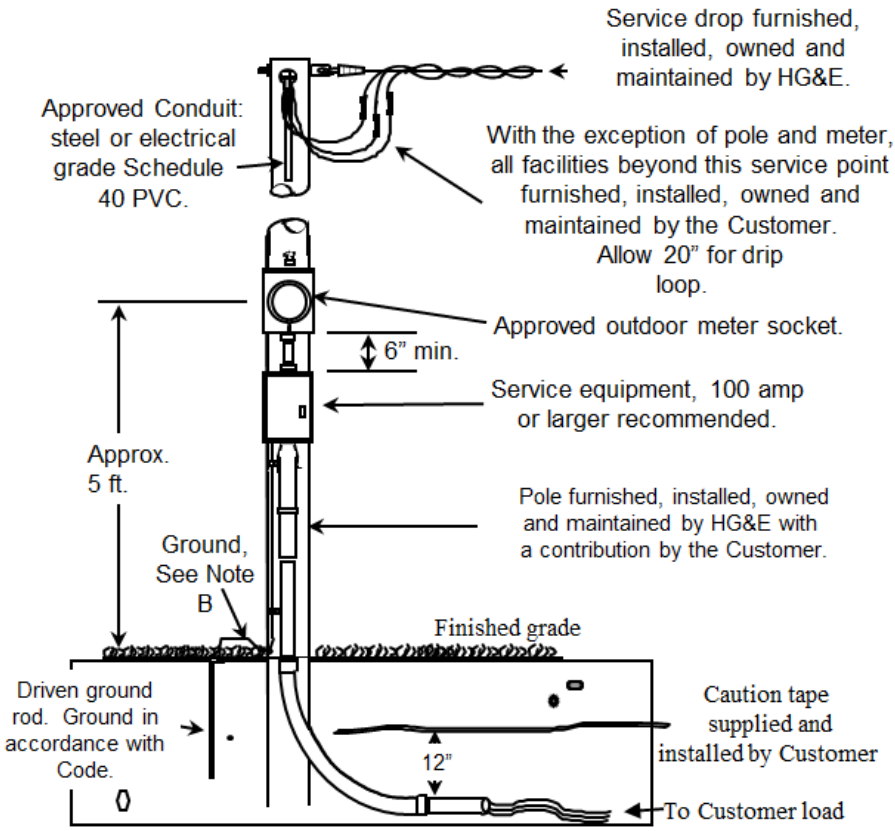
A. Only one meter to be installed on pole

B. Ground at service equipment in accordance with MEC Article 250. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode conductor shall not be run through the meter socket.

C. **All three-phase 216Y/125 Volt network and 480Y/277 volt services will require a main disconnect ahead of the meter (Cold Sequence).**

D. The customer is responsible for relocating their equipment if the pole is replaced.

FIGURE 14: Meter Installation-Private Property Pole - Customer Conductors Underground



Notes:

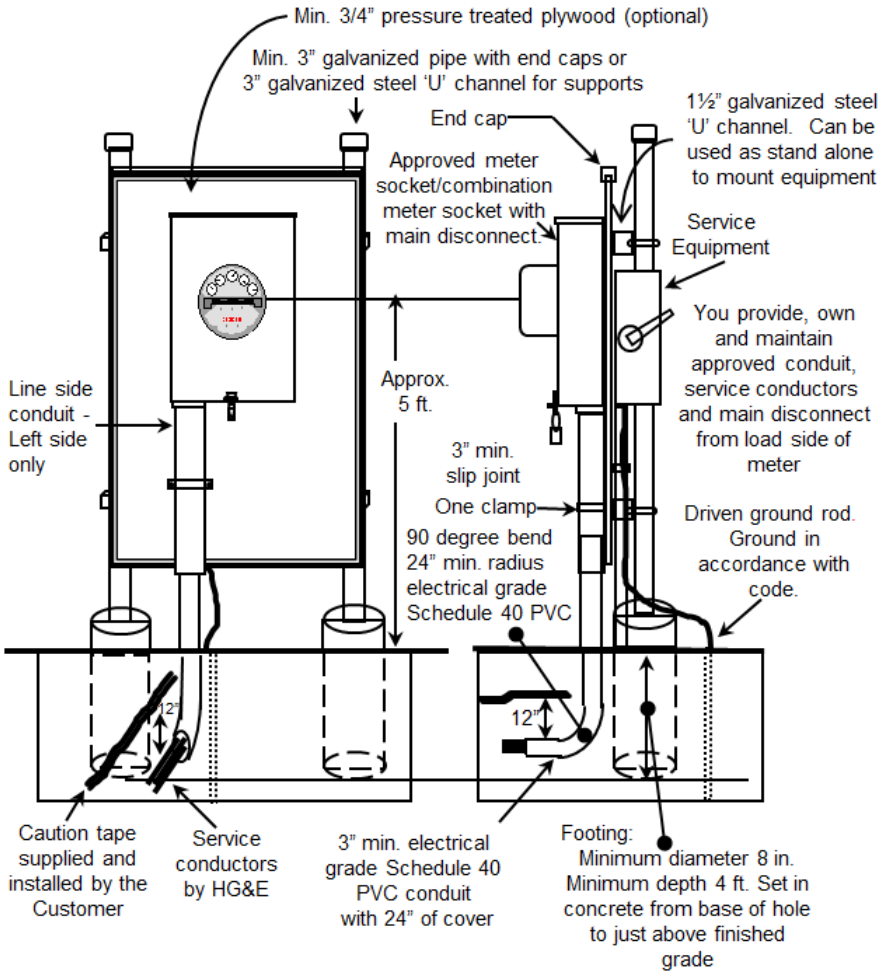
A. Only one meter to be installed on pole.

B. Ground at service equipment in accordance with NEC Article 250. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode conductor shall not be run through the meter socket.

C. **All network and 480Y/277 volt services will require a main disconnect ahead of the meter (Cold Sequence).**

D. The Customer is responsible for relocating their equipment if the pole is replaced.

FIGURE 15: Permanent Pedestal Service - Site Built
(MUST BE APPROVED BY HG&E)



NOTE:

Single-phase 125/216 volt and Three-phase 216Y/125 volt services on the Network and Three-phase 480Y/277 volt services must be cold sequenced.

FIGURE 16: Manufactured Pedestal Service

(Typical)

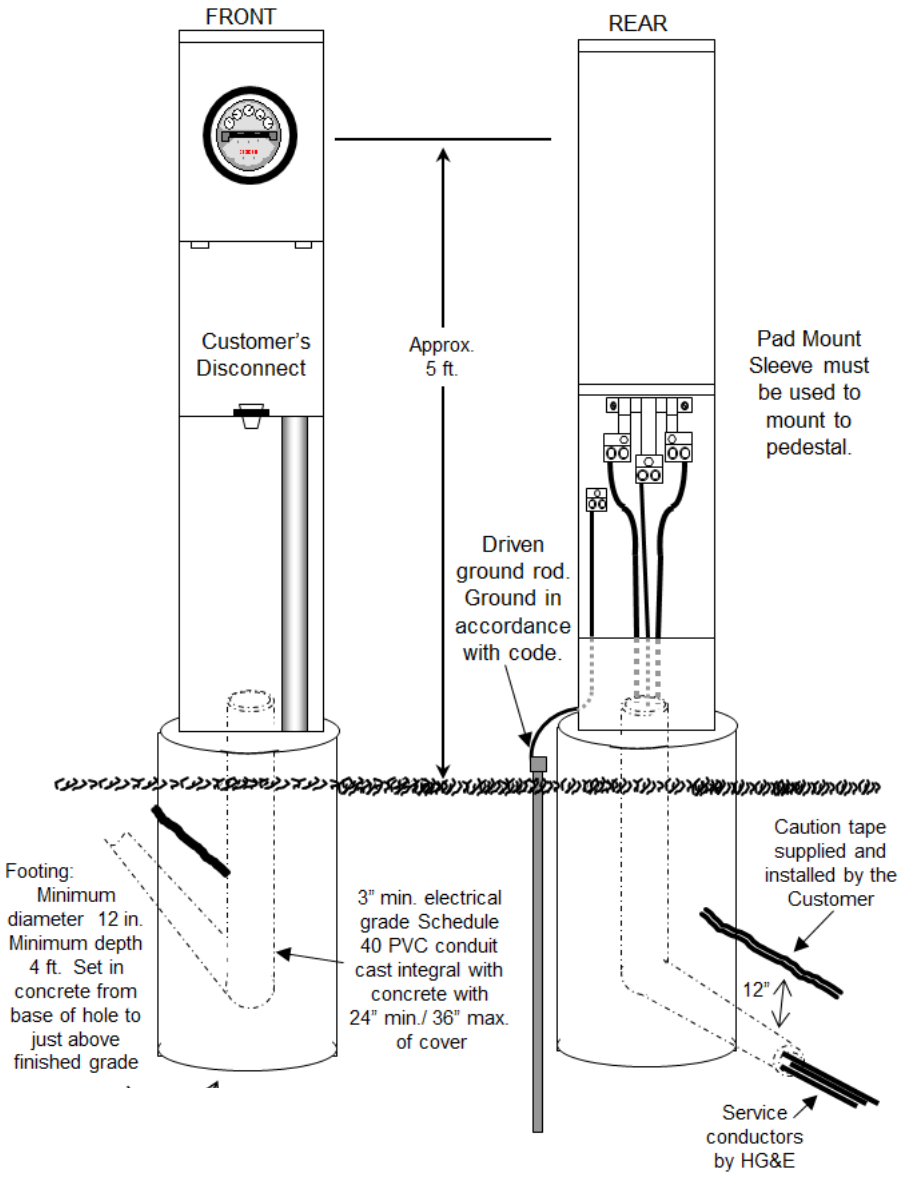
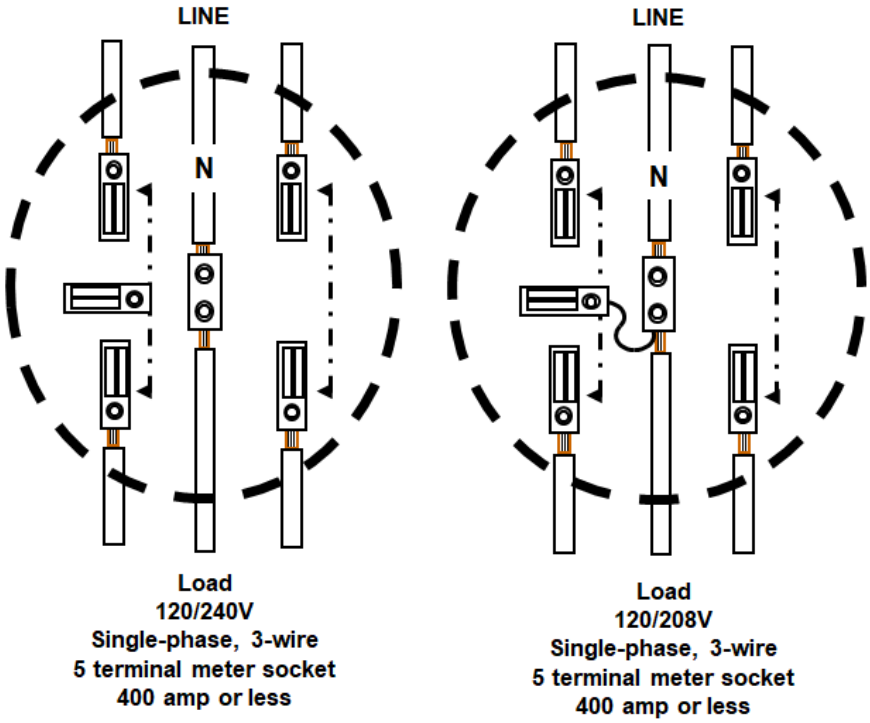


FIGURE 17: Single-Phase Self-Contained Metering Connections (Typical)



Notes:

A. An approved lever operated manual bypass is required on sockets for all commercial/industrial services, 100 amp may be supplied with non-locking jaws, greater than 100 amp must be supplied with locking jaw.

B. When the fifth terminal kit is used, install a No. 12 copper conductor, with white insulation, between the fifth jaw in the 9 o'clock position and the neutral lug/bar.

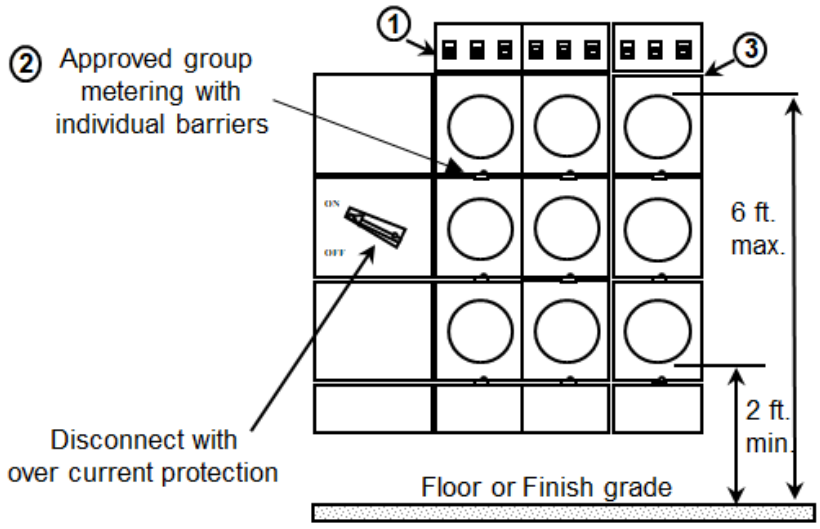
C. All new or upgraded services (200 amps or less) must have a 5 terminal socket installed even if it is a 120/240 volt service.

D. A five terminal meter socket is acceptable for a 120/240 volt service.

E. All single-phase network and 125/216 volt services will require a main disconnect with over current protection ahead of the meter (Cold Sequence).

FIGURE 18: Modular Meter Panels for Group Metering

Single-Phase 120/240v or 120/208v Three-Phase 216Y/125v
Network Three-Phase 480Y/277v



1. Service load disconnects may be located above, below or beside meter.
2. Individual meter sockets with **individual barriers between meter positions** as well as provisions for seals and barrel locks.
3. Single-phase 120/208 volt and Three-phase 216Y/125 volt services on the Network and Three-phase 480Y/277 volt services shall be cold sequenced.

Notes:

A. For 480Y/277v group metering installations consult your HG&E.

B. Sketch of meter panel arrangements must be submitted to HG&E for approval prior to layout and installation of equipment.

C. Each store, office, apartment or area serviced must be permanently marked on the door with its unique, permanent identification. This unique identification must be permanently marked on the associated meter socket, on meter socket cover and inside load center before the meter will be installed.

D. Ground at service equipment in accordance with MEC Article 250. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode conductor shall not be run through the meter socket.

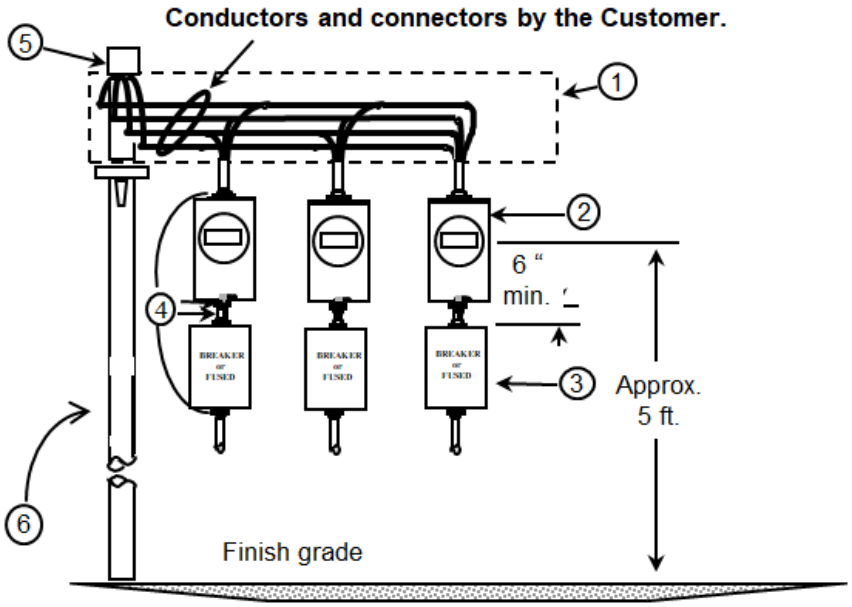
E. Maximum height at top of meter is 6 ft.

F. Minimum height at bottom of meter is 2 ft. above floor or finish grade.

G. Residential meter sockets shall not have level operated bypass.

H. Meter panels must be protected by barriers if there is a potential for damage by vehicles.

FIGURE 19: Self-Contained Outdoor Meter Socket Installation Multi-Position Up To Six Meters



1. Wiring trough with suitable connectors for HG&E to terminate the conductors. Sealing provisions are required.
2. Combination meter socket and disconnect is acceptable.
3. Service equipment, 400 amps or less.
4. Weatherproof joints.
5. Line, if supply is overhead and total ampacity is 400 amps or less.
6. Line, if supply is conduit system.

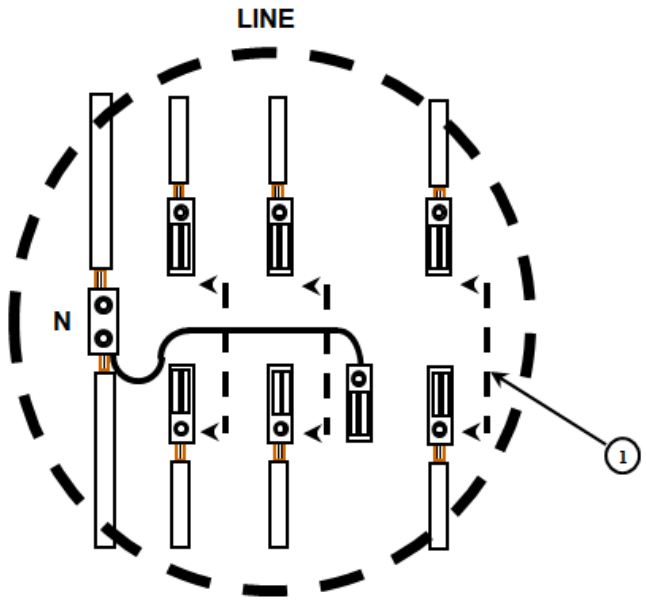
Notes:

A. Each store, office, apartment or area serviced must be permanently marked on the door with its unique, permanent identification. This unique identification must be permanently marked on the associated meter socket, on meter socket cover and inside load center before the meter will be installed.

B. An approved lever operated manual bypass with jaw release and flash shield is required for meter sockets greater than 100 amp. An approved lever operated bypass, non-jaw release, with flash shield may be used on a 100 amp meter socket. Residential meter sockets shall not have level operated bypass.

C. Maintain clearances as specified in Section 8.C.2., page 32.

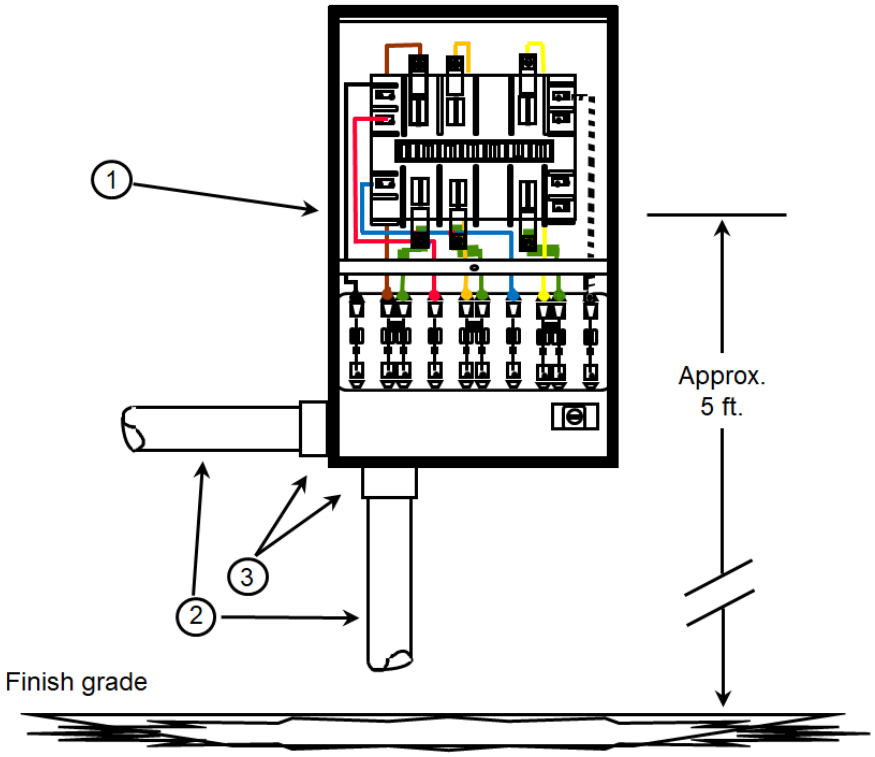
FIGURE 20: Three-Phase Self-Contained Metering Connections



1. An approved lever operated manual bypass with jaw release and flash shield.

   A. Ground at service equipment in accordance with MEC Article 250. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode conductor shall not be run through the meter socket.
   B. All three-phase network (216Y/125 volt) and 480Y/277 volt services will require a main disconnect with over current protection ahead of the meter (Cold Sequence).

FIGURE 21: Outdoor Instrument Transformer Meter Socket with Test Switch



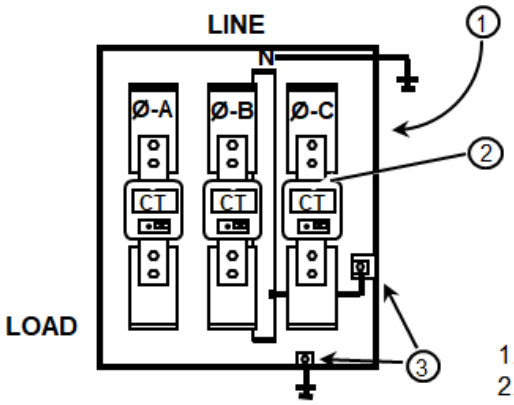
1. Approved pre-wired meter socket with test switch.
2. Electrical grade Schedule 40 PVC, galvanized steel conduit to be minimum of 1-1/2” diameter, minimum length 6”, maximum length 50 ft. If PVC, provide and install an equipment grounding conductor (No. 10 wire or larger). Conduit is to be installed in the bottom or side of meter socket only - no top feed is allowed.
3. Weatherproof joint.

Notes:

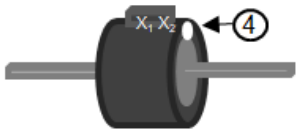
A. Consult HG&E before starting design of any job where an instrument transformer installation is required.

B. See Figure 29 for meter and service equipment sequence.

FIGURE 22: Instrument Transformer Connections



480Y/277v & 208Y/120v
Three-phase, 4-wire
13 Terminal
Meter Socket



CT=Current Transformer

1. Instrument transformer enclosure.
2. Current transformers to be installed with white dot polarity mark on the line side.
3. Suitable individual neutral and equipment grounding connectors for #10 AWG wire.
4. The white polarity mark on the CT must be installed facing the main switch.

Notes:

A. Instrument transformers are required for the following:
- All single-phase 120/240 volt over 400 amps service entrance capacity.
- All three-phase 4 wire over 400 ampere capacity

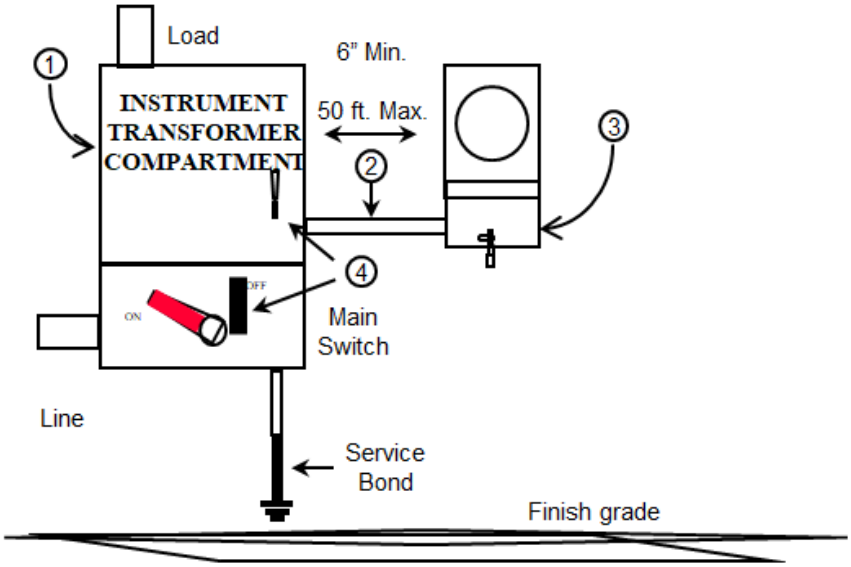
B. Where multiple conductors or a single conductor over 500 kcmil is used, refer to list of approved instrument transformer mounting equipment in Section 12.

C. Install a grounding connector and neutral connector in the instrument transformer enclosure.

D. Service line and load side must be marked or labeled in the instrument transformer compartment.

FIGURE 23: Combination Main Switch and Instrument Transformer Enclosure

(Cold Sequence – Refer to section 6.B)



1. If located outdoors, enclosure shall be of weatherproof design.
2. Electrical grade Schedule 40 PVC or galvanized steel conduit 1-1/2" min. diameter, 6 " min. length and 50 ft. max. length. If PVC, provide and install an equipment grounding conductor (No. 10 wire or larger).
3. Approved pre-wired meter socket with test switch.
4. Must have a locking provision for the main breaker and instrument transformer enclosure.

Notes:

A. Consult HG&E before starting design on any job where an instrument transformer installation is required.

B. The Customer will provide the combination main disconnect and instrument transformer enclosure, conduit for meter wiring, primary connectors for instrument transformers and approved pre-wired combination meter socket with test switch.

C. Instrument transformers provided by HG&E and installed by the Customer.
Conduit must be continuous from the instrument transformer compartment to the test switch compartment.

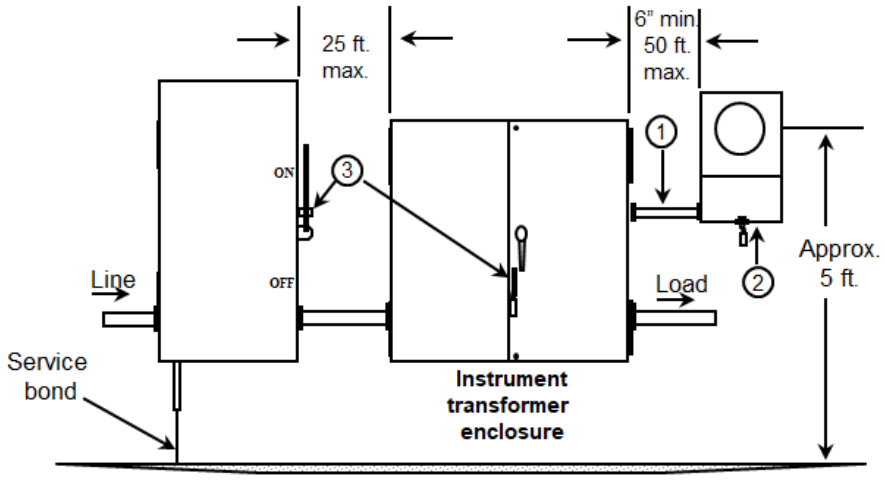
D. Service line and load side must be marked or labeled in the instrument transformer compartment.

E. Conduit must be continuous from the instrument transformer compartment to the test switch compartment.

F. If PVC, provide and install an equipment grounding conductor (No.10 wire or larger).

FIGURE 24: Instrument Transformer Installation

(Cold Sequence – Refer to section 6.B)



Instrument Transformer Enclosure Requirements:

Provisions must be made to accommodate HG&E conductors.
A sealable pull box may be required. Consult with HG&E prior to installation.

SERVICE NOMINAL VOLTAGE		SIZE WIDTH	HEIGHT	DEPTH	CURRENT TRANSFORMER
Minimum size enclosure with current transformers only:					
208Y/120 (Max. 800 amps)	**&**	**36”**	**36”**	**10”**	**3 ea.**
480Y/277 (Max. 1200 amps)					

FIGURE 24 NOTES: Instrument Transformer Installation
(Cold Sequence)

1. Electrical grade Schedule 40 PVC or galvanized steel conduit 1-1/2” min. diameter, 6 “ min. length and 50 ft. max. length. If PVC, provide and install an equipment grounding conductor (No. 10 wire or larger).

2. Approved pre-wired meter socket with test switch located outdoors.

3. Must have barrel lock sealing devices for main disconnect and instrument transformer enclosure.

Notes:

A. CONSULT HG&E BEFORE STARTING DESIGN ON ANY JOB WHERE ANY INSTRUMENT TRANSFORMER INSTALLATION IS REQUIRED.

B. The Customer will provide the instrument transformer enclosure, conduit for meter wiring, primary connectors for instrument transformers, and approved combination meter socket with test switch.

C. Bond at service equipment in accordance with MEC Article 250. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode conductors shall not be run through the meter socket.

D. Service line and load side must be marked or labeled in the instrument transformer enclosure.

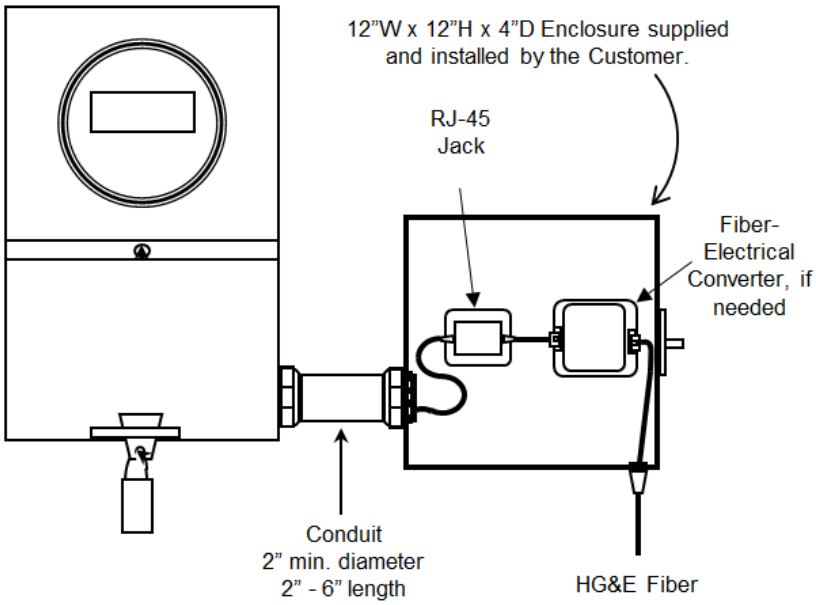
E. Install a grounding connector and neutral connector in the instrument transformer enclosure.

F. Maintain clearances as specified in Section 8.C.2., page 31.

G. Instrument transformers provided by HG&E and installed by the Customer.

H. Enclosure to have hinged doors and provisions for seal and padlock and mounting brackets for transformers. If located outdoors, enclosure shall be of weatherproof design.

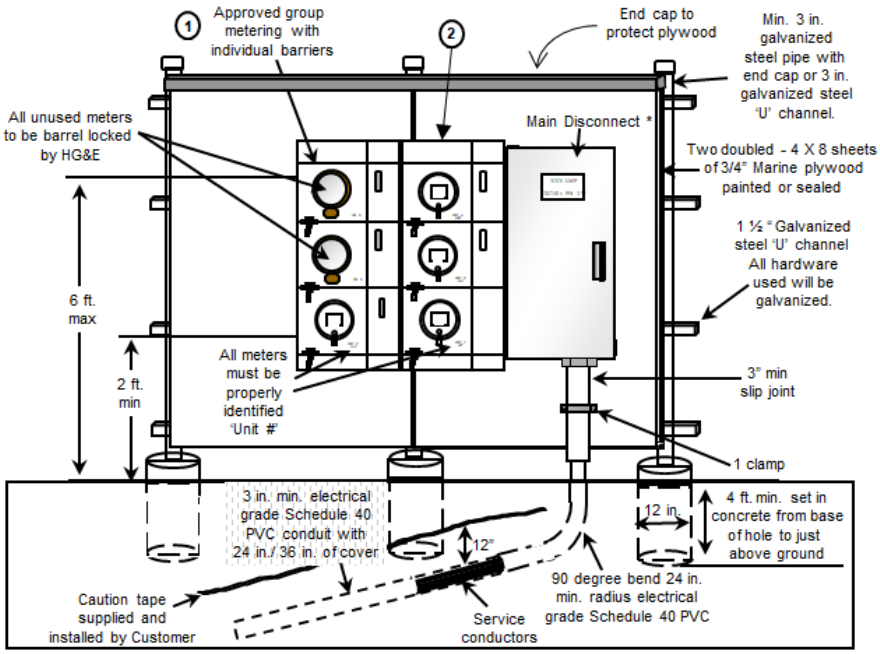
FIGURE 25: Fiber Meter Equipment Diagram



NOTE:

A. For some special meter types (normally involving co-generators, distributed generators etc.), an RJ-31X jack, DSL modem or Ethernet connection may be required for proper meter communication.

FIGURE 26: Cell Site Metering Pedestal



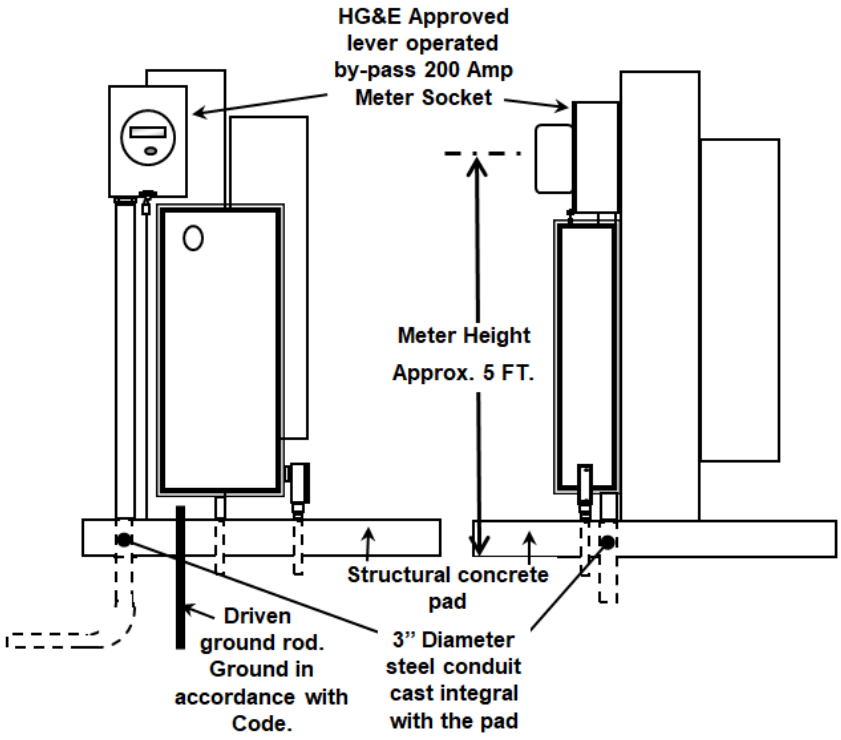
1. Individual meter sockets with individual barriers as well as provisions for seals and barrel locks.
2. Single-phase 125/216 volt and Three-phase 216Y/125 volt service on the Network and Three-phase 480Y/277 volt services shall be cold sequenced.

Note:

A. Utilizing a main disconnect is the preferred installation to allow for additional meters beyond six.

B. Metering pedestal must be protected by barriers if there is a potential for damage by vehicles.

FIGURE 27: Typical Remote Communications Power Site



Note:

A. A slip joint is not required provided that the steel conduit is integral with the concrete pad.

B. Blueprints/Design must be submitted to HG&E for approval **prior** to installation.

FIGURE 28: Typical Transfer Switch Installation in Conjunction with Customer Auxiliary Supply

Consult the local authority for proper wiring procedures.

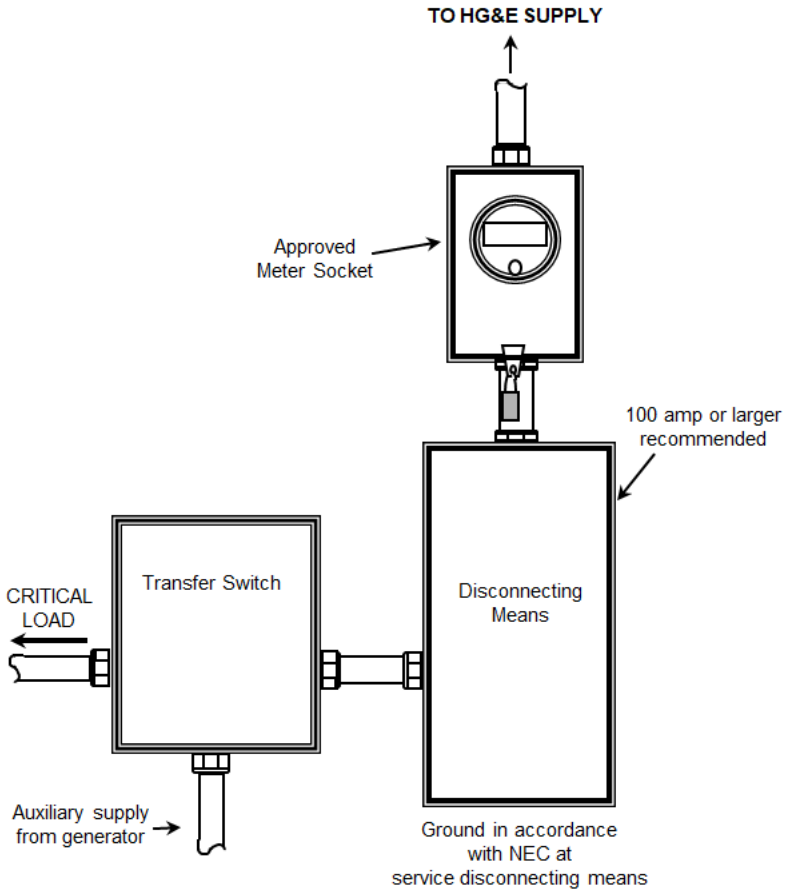
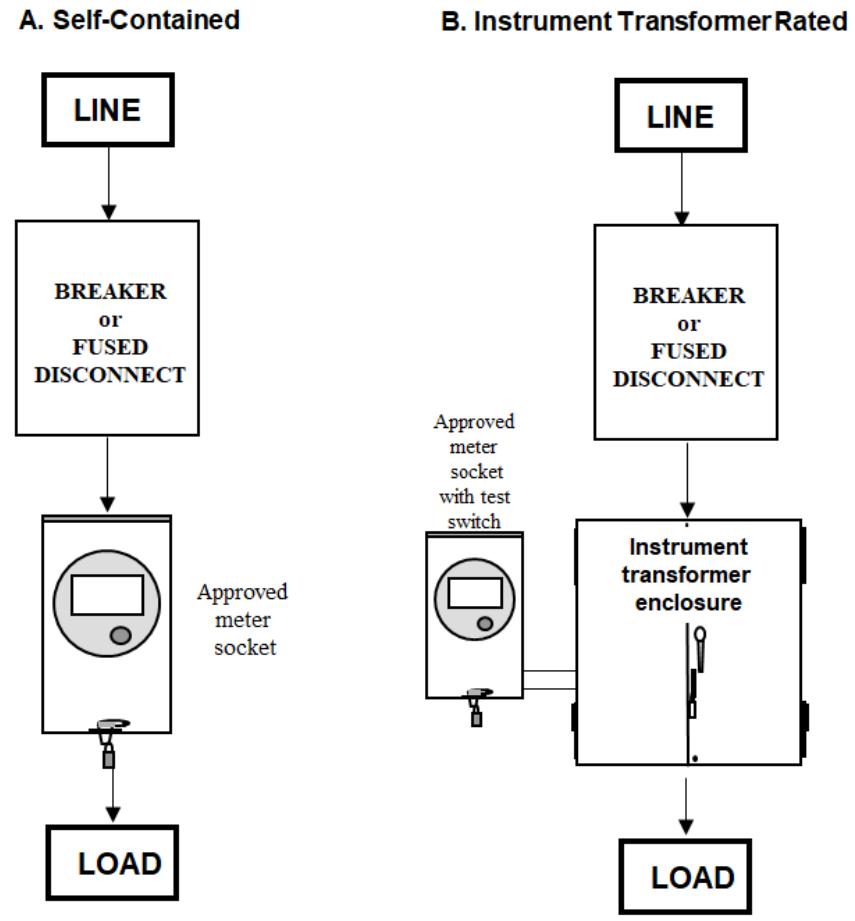


FIGURE 29: Cold Sequence Metering



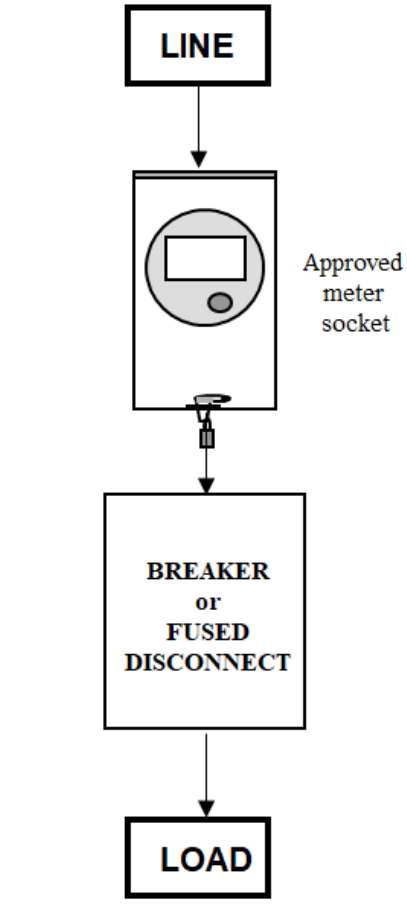
400 Amps or less

- Three phase Network System
- Single phase Network System
- Three phase 480Y/277 v

Greater than 400 Amps

- Three phase 480Y/277 v
- Three phase 280Y/120 v
- Single phase 120/240 v

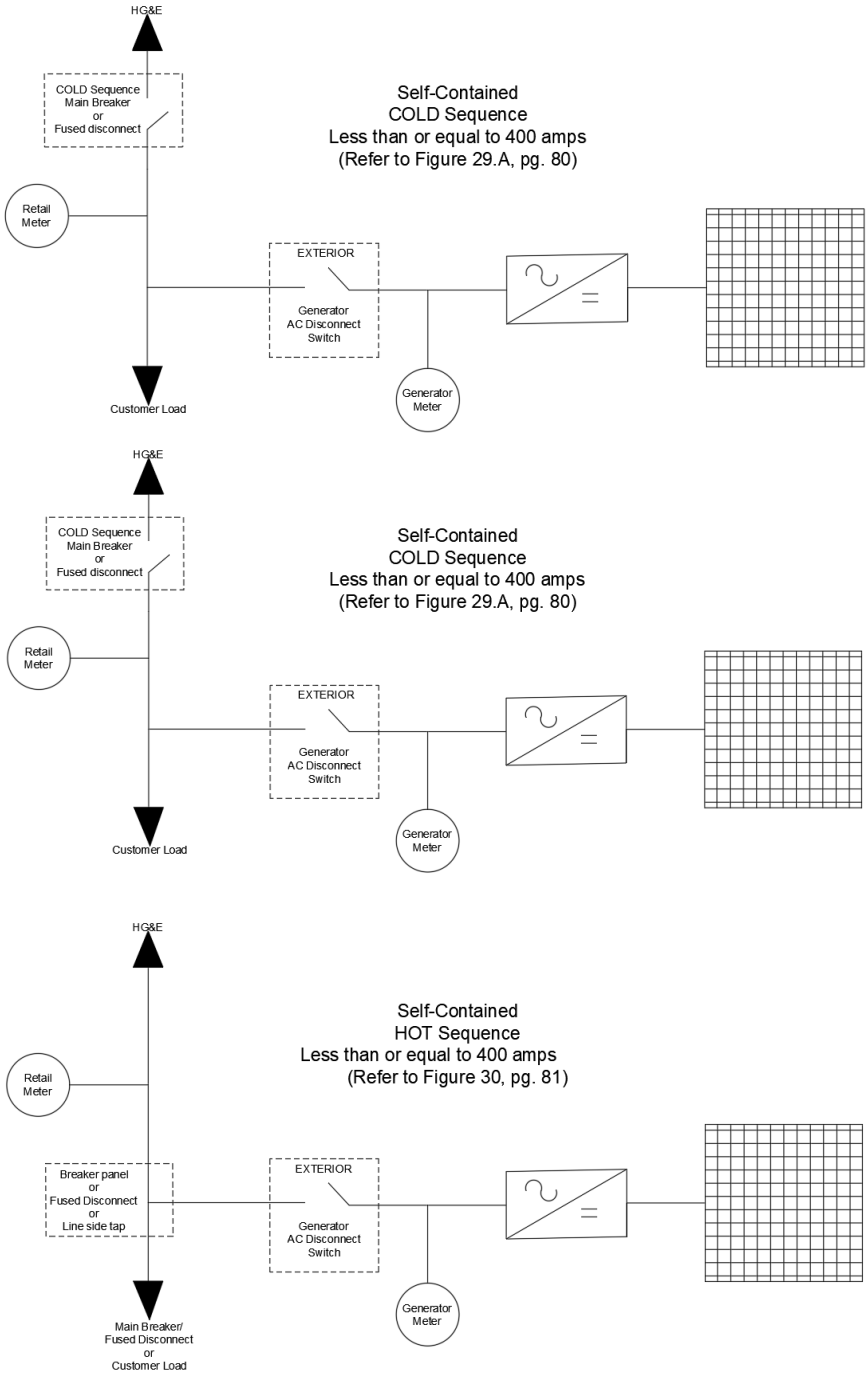
FIGURE 30: Hot Sequence Metering



400 Amps or less

- Three phase 208Y/120 v
- Single phase 120/208 v
- Single phase 120/240 v

FIGURE 31: DG Examples



SECTION 12: Approved Metering Equipment Requirements

A. General Requirements

1. Safety will be the number one consideration when approving any metering equipment.

2. All meter sockets must have a UL label. Any modification of a meter socket will void the UL listing and the manufacturer's warranty, making it non-compliant with our approved standards.

3. All self-contained meter sockets must be rated for 600 volts or less

4. All **non-residential** self-contained meter sockets must have a lever operated manual bypass, with a receiver bracket and a ringless cover with a 7/16" knockout to accept a barrel lock or equivalent.

5. A 400 amp instrument transformer rated service (CT's) is no longer offered. All 400 amp services are required to be self- contained and will be metered with a Class 320 meter. Any exception will require the approval of HG&E's Meter Department.

6. The lever operated manual bypass is required to be single-handle operated:
   - 100 ampere may be supplied with non-jaw release
   - 200 ampere and 320 ampere must be supplied with jaw release

7. The non-bypassed, in-service position of the operating mechanism must be visible when the meter is installed. Auxiliary straps or jumpers are not acceptable as bypass devices. It must not be possible to override the bypass by replacing the cover when the operating mechanism handle is in the bypassed position.

8. A safety flash shield is required on all self-contained meter positions.

9. Horn-type bypasses are not permitted.

10. Sliding-type bypasses are not permitted.

11. Automatic bypasses are not permitted.

12. Basic catalog numbers may have different or additional prefix or suffix numbers or letters indicating variations in hubs, sealing rings, addition of fifth terminal, left or right wiring extensions.

13. Meter sockets for use on single phase three-wire 120/240-volt and 208Y/120-volt network must have a fifth terminal located at left in the 9 o'clock position, connected to neutral.

14. Any new or upgraded service 200 Amps or less connected to the Network Distribution system must have a 5 terminal meter socket installed even if the services 120/240 volt service. Refer to Figure 17, Page 68.

15. Custom-made meter channels and modular metering panels may be used for groups of meters such as in apartment houses. Prints of these panel arrangements must be submitted to the HG&E Engineer, and the Company's approval obtained prior to installation. Line side panels must be sealable.

16. All underground residential single position sockets must be a minimum 16"W x 22"H x 5"D, 200 amp, ringless with line side lugs capable of accepting 350 KCMIL conductors. Sockets will also have a minimum 3- inch knockout to accept a 3-inch slip joint. If a service run is greater than 200 feet contact HG&E. The bottom left side knockout is for line conductors only. Line conductors are on the left side so they won't interfere with the

bypass handle.

17. All group metering units must have sealing provisions and meet minimum and maximum height requirements.
    a. Maximum height (top of meter) is 72 inches.
    b. Minimum height above floor 24 inches (bottom of meter) indoor, 24 inches (bottom of meter) from finished grade outdoor.
    c. All meter positions must have individual covers, and barriers between each meter position.
    d. All non-residential meter positions must have lever operated manual bypass.
    e. Each meter position must have a receiver bracket and ringless cover with a 7/16" knockout to accept a barrel lock or equivalent.

18. All OH/UG 320-amp meter sockets must have 4-inch knockouts, jaw release lever operated manual bypass, with a receiver bracket and a ringless cover with a 7/16" knockout to accept a barrel lock or equivalent.

19. All underground hubs or knockouts must be a minimum of 3 inches diameter.

20. Hot sequence metering (6 socket positions or less) is required for single-phase 120/240-volt service.

21. New equipment from manufacturers not listed in this book will be considered for approval. Please contact HG&E for approval.

22. All meter sockets and switchgear must be properly identified with approved catalog numbers listed in this book.

23.

B. Requirements for Commercial Metering

1. Cold sequence metering is required for all self-contained 480 volt services and all three-phase services fed from a HG&E Network Distribution system. Line side disconnect must be adjacent to meter socket and accessible to HG&E at all times. (See Section 6.B.3 page 24)

2. Custom-built meter centers must have individual utility approval prior to installation.

3. Three-phase four-wire self-contained commercial group metering must have barriers between meter positions.

4. Self-contained 480Y/277 volt group metering must have individual disconnects before each meter position.

5. A 400 amp instrument transformer rated service (CT's and VT's) is no longer offered. All 400 amp services are to be self-contained and will be a metered with a Class 320 meter. Any exception will require the approval of the Meter Department.

6. Custom-built switchgear with instrument transformer enclosures must have individual utility approval prior to installation**.** Check with HG&E for available fault current before ordering equipment**.** A print of the switchgear must be supplied to the appropriate district meter supervisor.

7. All 480Y/277 volt switchgear with instrument transformer enclosures must have:
    - Provisions for mounting current transformers with hinged sealable doors.
    - 600 amp - 1600 amp **Bar Type** current transformers
    - 2000 amp-3000 amp **Window Type** current transformers.

8. All instrument transformer sealable enclosures for 480Y/277 volt three-phase four-wire wye services must use

a minimum size enclosure of 36" W x 36” H x 10”D.

9. Neutral bus and grounding connections must be available in instrument transformers enclosure.

10. Combination circuit breaker and instrument transformer enclosures must have barrel lock sealing devices for Main Breaker and instrument transformer enclosures.

11. All Main Breakers or Disconnects must have provisions to be locked in the OFF position.