



ELECTRICAL CONTRACTORS HANDBOOK



Summary of Changes

Below is a summary of the changes to MGE's Electrical Contractors Handbook (ECH). Changes are also highlighted in the ECH for clarity and convenience.

General Information (Chapter 1):

- Section 1.3.6 - Revised phone numbers for reporting damage and emergencies.
- Section 1.5.2 - Updated contact URLs for service applications.
- Section 1.5.4 - Added or updated references to local ordinances.

Meters and Meter Equipment (Chapter 5):

- Section 5.2.6 - Expanded and clarified metering requirements.
- Section 5.7.1 - Added new requirements for multi-meter residential services to be mounted on strut. Updated temporary service requirements and inspection details.
- Section 5.7.8 - Clarified prohibition of splices inside multi-meter stacks and unmetered raceways.
- Section 5.7.13 - Added sealing requirements for unmetered wire.
- Section 5.7.14 - Added new requirements for wall-mounted metering equipment fasteners.
- Section 5.7.15 - Added new requirements for limits to modifications of equipment beyond a manufacturer's approved means.
- Section 5.7.16 - Added new requirements for meter mounting.
- Section 5.7.17 - Added new requirements for locations of customer-owned equipment in cabinets sealed by MGE.
- Section 5.7.18 - Added prohibition on use of altered, rusted, or damaged equipment.

Customer-Owned Parallel Distributed Energy Resources (DER) (Chapter 13):

- Section 13.9 – Added additional requirements for metering equipment replacement conditions.

MGE Electric Distribution Engineering Department Directory (Chapter 15):

- Updated contact information, including addition of email for Trade Ally Coordinator.
- Updated phone numbers for emergency and engineering contacts.

Service Details (Chapter 16):

- COM-1 - Added notes for utility/CATV services regarding meter sockets.
- COM-2 - Added notes for utility/CATV services regarding meter sockets.
- COM-4 - Updated description to apply to underground service, not overhead service.

Meter Numbers (Chapter 17):

- Tables have been updated with new suppliers and new part numbers. Footnotes have also been updated.

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1 General Information

1.1 Introduction

This Madison Gas and Electric Company (MGE) Electrical Contractors' Handbook gives contractors, architects, engineers, and customers answers to common questions about residential, commercial, and industrial electrical services and metering installations.

Any rules or regulations conform with and supplement local, municipal, and State of Wisconsin electrical codes.

For a complete legal and definitive description of all procedures, regulations, and responsibilities, refer to the *Madison Gas and Electric Company Rates and Service Rules Manual* available from MGE and on file with the Public Service Commission of Wisconsin (PSCW).

MGE may de-energize any service when that service is in an unsafe condition.

MGE may give a disconnect notice for services in need of repair.

1.2 Definitions

1.2.1 **Service Drop** refers to the overhead conductors between the distribution pole and the point of attachment at the applicant's service entrance facility. A Service Drop is normally located on the customer's property and is of secondary voltage.

1.2.2 **Service Lateral** refers to the underground conductors between the Distribution System, including any risers on a pole or other structure and the customer's service entrance facility. A Service Lateral is normally located on the customer's property and is of secondary voltage.

1.2.3 **Distribution System** includes all primary lines, secondary lines, transformers, and control equipment necessary to provide points of connection with Service Drops or Service Laterals. Though located on customer property, transformers and associated equipment are part of MGE's Distribution System.

Normally, the Distribution System is located within an electric utility easement on private property or on public streets, alleys, and roads so that it may be extended to other applicants. Property owners grant easements without cost to MGE.

1.2.4 **Transmission System** includes all overhead lines, underground lines, and transformers operating at or above 69,000 volts line-to-line or 39,800 volts line-to-ground. In addition, it includes all control equipment used to operate these facilities.

1.3 Determine Location of Electric Facilities in Area of Proposed Work

Prior to performing any excavation, grading, blasting, construction, erection, or demolition work within MGE's service territory, call Diggers Hotline at 1-800-242-8511 or 811 or visit diggershotline.com to obtain the location of our facilities and other participating utility facilities. MGE will provide facility location prints and field-locating services promptly.

It is necessary for you to place the request 72 hours (three working days) in advance of non-emergency excavation as required in *Section 182.0175* of the Wisconsin Statutes. Make an additional request for location of facilities when the project is delayed or interrupted for ten or more workdays or when changes are made in the proposed construction.

You, as the contractor, are responsible for maintaining the stakes and markings placed by our locating personnel who mark the location of our existing facilities. If the markings are inadvertently destroyed or additional work is to be performed which requires re-staking of your project area, call Diggers Hotline at 1-800-242-8511 or 811 again.

When emergency excavation is necessary, call Diggers Hotline at 1-800-242-8511 or 811 during normal working hours. If there is an emergency outside of normal working hours, call 608-252-7111 or 1-800-245-1123. MGE locating personnel will respond promptly and field locate our facilities for you.

An emergency location is defined as an underground locate request where excavating or demolition must begin prior to the standard three business days. An emergency exists only when one or more of the following conditions exists:

- The unforeseen excavation which, if not performed, could result in the loss of life or limb.
- The excavation is required to repair a service outage.
- Excavation is required prior to three business days in order to prevent property damage.
- An unstable condition exists which may result in any of the conditions listed above (for example, a leak in any service main or a fault in a primary or secondary wire and/or cable).

When calling in an emergency excavation, inform the operator that an emergency situation exists and be prepared to explain which of the above conditions is in effect. The operator will prepare the ticket for immediate transmission and issue a start date equal to the time the excavation is scheduled to commence.

1.3.1 Placement of Facilities Adjacent to Electric Distribution

Facilities being installed to cross existing underground electric distribution wires and/or conduit (operating at less than 39,800 volts to ground) at or near an angle of 90 degrees must maintain a minimum clearance of 6 inches. Contact MGE Engineering for review of the circumstances involved in all these installations.

Facilities that are to be installed parallel or nearly parallel to existing underground electric distribution wires and/or conduit must provide a minimum of 12 inches of horizontal clearance. Unless it is planned to shore the ditch, increase the horizontal clearance 12 inches for each 12 inches of depth of ditch below the level of the existing facilities.

Contact MGE Engineering for review of the circumstances involved in all these installations.

Above ground appurtenances, poles, buildings, etc., placed adjacent to overhead electric facilities must conform to the clearances specified in the Wisconsin Administrative Code which has adopted, with some changes, the National Electric Safety Code and the National Electric Code. If you have any question as to the clearance required, call MGE Engineering.

If you are engineering a project or planning to bid on a project that may jeopardize existing MGE electric facilities, call MGE at 608-252-7373 for assistance in providing relocation costs or coordination of work activities.

1.3.2 Placement of Facilities Adjacent to Electric Transmission

If you are engineering a project or planning to bid on a project which may jeopardize existing electric transmission facilities, call for assistance in providing relocation costs or coordination of work activities. ATC can be reached at Local: (262) 506-6700 and Toll free: (866) 899-3204.

1.3.3 Excavation Near Underground Electric Facilities

After the location of all underground electric facilities has been determined, make sure all machine operators, foremen, and supervisors on the project are aware of their location. Do not forget new people on the job. They will not know the facilities are there unless you tell them.

Excavations crossing or adjacent to electric facilities must conform with all applicable federal, state, and local codes and ordinances.

Use caution when excavating near underground electric facilities to ensure no damage is inflicted to the cable jacketing or concentric neutral wires. Do not use poured concrete within 18 inches of underground electric cables due to the deterioration it causes to the insulation medium on the cables. This deterioration is not immediate but occurs over time. The length of time to cable failure depends on many factors including strength of concrete, water table, and other environmental conditions.

Do not use any power-operated excavating or earth-moving equipment within 18 inches of the underground facility and the cutting edge of the tool. This is covered in **Section 182.0175** of the Wisconsin Statutes. If you are within 18 inches of the underground facility, it will be necessary to hand dig around it to prevent damage.

Shoring, sloping, and/or some equivalent means meeting OSHA requirements must be used to prevent caving or movement of ditch banks adjacent to underground electric facilities.

Provide proper supports when excavating near or under electric facilities. These supports are not to damage the facilities they are supporting. Before performing any work where existing MGE electric facilities need to be supported, call MGE at 608-252-7373 for assistance and coordination of work activities.

Do not attempt to bore past an underground electric facility without determining if sufficient clearance exists. It is recommended that facilities be exposed as necessary to prevent damage.

Note: Even a simple underground electric service is capable of causing severe injury and/or death if handled improperly.

On all excavations adjacent to underground electric transmission facilities, contact the facility owner before performing any work. ATC can be reached at Local: (262) 506-6700 and Toll free: (866) 899-3204.

1.3.4 Construction Near Overhead Electric Facilities

After the location of overhead electric facilities has been determined, make sure all machine operators, foremen, and supervisors on the project are aware of their locations. Do not consider any overhead wire to be insulated. Do not park tall equipment or create a load/unload area under overhead conductors.

Any time you leave the traveled portion of a road, you must consider that the overhead line clearance may not be sufficient for your tall equipment. Any overhead electric conductor including 120/240-volt service is sufficient to cause severe injury and/or death if contacted.

OSHA requires that you maintain a minimum safety clearance of 10 feet when using backhoe excavators or boom lifts, erecting scaffolding, raising dump boxes on vehicles, and during use of any tall equipment near overhead electric facilities.

Contact the MGE Construction Department if crane operations could get closer than 20 feet to the overhead electric facilities. The crane operator shall comply with OSHA **1926.1408** and **1926.1409** if the crane could get closer than 20 feet to an overhead conductor.

When excavating is to be performed adjacent to overhead poles and/or structures, leave a minimum of 2 feet of ground at the ground line of the pole along with a one-to-one slope from

that point to the new grade level. Other arrangements can be made by contacting MGE Construction Engineering.

If you believe any structure, permanent or temporary, will be in conflict or in close proximity to overhead conductors or a Service Drop, contact MGE Construction Engineering.

1.3.5 Blasting Near Any Electric Facility

Do not perform blasting operations in the vicinity of any MGE facilities until MGE has been notified and provided confirmation that the work can safely proceed. MGE will ensure that protection of all MGE facilities have been taken. Such measures will include preplanned emergency procedures.

When blasting operations are performed, they shall be done only by a licensed blaster and strictly in accordance with all local, state, and federal codes and regulations. Liability for any damage remains the responsibility of the party performing the blasting.

1.3.6 Backfilling in the Area Near Underground Electric Facilities

Report any scrapes, cuts, abrasions, or broken underground cables and/or conduit that have occurred while the facilities are exposed. Call MGE at 608-252-7000 to report any damage and have the underground facilities inspected prior to backfilling. MGE will inspect and make necessary repairs as warranted.

Where excavation removes the original ground under concrete conduit and manhole systems, backfill the area below this facility with pit run or washed sand compacted mechanically in 6-inch lifts to provide the same or better support than was there prior to the excavation. Compact the backfill above the facilities by mechanical compaction in accordance with MGE specifications.

Before performing any work that entails digging under MGE electric conduit systems, call MGE at 608-252-7373 for assistance and coordination of work activities.

1.3.7 Grading and Landscaping Work

When grading or landscaping work is planned which involves the lowering of existing grades, determine the depth of the underground facilities in the area by hand excavation under MGE guidance before the work commences. Raising or lowering of underground electric facilities due to grade changes is at the cost of the party changing the grade.

1.4 Certificate of Inspection Required Before Connection

MGE requires a Certificate of Inspection from the authorized electrical inspector of the appropriate town, village, or city before connecting new or modified services.

If the area or facility is not required by law to have an authorized electrical inspector, MGE will accept, in lieu of the Certificate of Inspection, a signed and notarized affidavit from the electrical contractor which certifies the wiring conforms to the Wisconsin State Electrical Code.

1.5 Before Applying for Service Connections

Service connections and extensions are made in accordance with filed rules and regulations. However, MGE recommends that before you apply for service or prepare wiring plans, you give attention to the following:

1.5.1 Contact the MGE Electric Construction Engineering Department as soon as you begin planning for your facility.

1.5.2 Applications

Apply for service as far in advance as possible of the date service is required. You may apply for service at the MGE General Office Facility or at: mge.com/my-account/energy-service/building-projects

Provide the date your service is required.

Completely identify property locations including name, addresses, lot and block numbers, and provide site plans when possible. Site plans should include the proposed service location as well as the nearest transformer or utility pole.

For commercial and industrial buildings, MGE needs the architect's and engineer's names and contact information, the type of building, and the planned load.

Customer-owned private underground facilities should be identified on site plans. In areas not served by municipal sewer and water, include a copy of septic and water system prints. MGE is not liable for damage caused to unmarked underground private facilities.

1.5.3 Voltages

Check with MGE about the availability of 120/208-volt or 277/480-volt three-phase, four-wire service.

Check the low-voltage network map (see NET-1) to determine if you are served by the underground low-voltage network system which covers the downtown Madison area (see *ECH Chapter 7*).

1.5.4 Underground Service

Depending on project location, certain municipalities may require underground electric services.

Review Section 19.13 of the Madison General Ordinances entitled "Underground Utility Entrance Facilities" concerning underground entrance requirements.

1.5.5 Metering

When applying for service, submit a sheet detailing the quantities and sizes of all the proposed meters for the project.

1.5.6 Pad-mount Transformers in the Non-Network Area

Customers with present or prospective loads of 75 KW or more must provide space for the installation of self-enclosed, pad-mounted transformers and switchgear with vehicle access and in accordance with Wisconsin State Electrical Code (**PSC 114.317**).

1.5.7 Underground Vaults in the Network Area

Customers with present or prospective loads of 75 KW or more must provide transformer vaults approved by MGE and meet all applicable specifications and governmental codes (see *ECH Chapter 7*).

1.5.8 New Residential or Commercial Developments

Check with the municipality for separate requirements, including electric and utility facility placement and streetlighting requirements for new plats.

2 Character of Service

MGE distributes electric current to residential, commercial, and network customers as follows:

2.1 Residential, Commercial, and Network

Transformers supplied by MGE are typically available at 120/240 volts, 120/208 volts, 277/480 volts, 120/208 (low-voltage network), and 277/480 (spot network). Transformers are standard ratio and standard impedance, single-phase and three-phase oil-cooled types only.

2.2 Residential and Commercial

- 2.2.1 Single-phase, 60-cycle alternating current is available at 120/240 volts, or, in special circumstances, 120/208 volts over a three-wire service.
- 2.2.2 Customers outside the low-voltage network system who provide MGE with acceptable space for transformer installations may obtain three-phase 120/208-volt or 277/480-volt four-wire service subject to the following minimum 15-minute demand:
 - 120/208 volts, 75 KW
 - 277/480 volts, 150 KW

2.3 Primary Voltage Metered Commercial Only

- 2.3.1 Three-phase, 60-cycle alternating current may be supplied at 2,400/4,160 volts for large power installations over a four-wire service. This service is available at limited locations and at MGE's discretion.
- 2.3.2 Three-phase, 60-cycle alternating current at 7,970/13,800 volts over a four-wire service is available at limited locations and at MGE's discretion.
 - A new primary-metered service shall take service at 7,970/13,800 volts four-wire if available.

2.4 Network Only

- 2.4.1 Single-phase or three-phase, 60 cycle alternating current may be supplied at 120/208 volts over a three-wire or four-wire service, respectively.
- 2.4.2 Three-phase, four-wire, 277/480-volt spot network service is provided only upon MGE's specific written approval where all of the following conditions are met:
 - The customer requests it,
 - The 15-minute demand exceeds 750 KW,
 - Suitable multiple 13.8-KV circuits are available at the proposed site, and
 - The customer provides necessary transformer space.

3 Service Facilities

3.1 Service Entrance Specifications

MGE specifies, in writing, customers' service entrance locations, including service entrance conduit sizes, quantity, and termination points.

3.2 Electrical Services

MGE supplies electrical service in accordance with all applicable national, state, and local electrical codes, including the NEC, WI PSC 113, and WI SPS 316.230.

For each customer's building or premise, MGE supplies:

- No more than one Service Drop or Service Lateral;
- No more than one class of service;
- No more than one meter; and
- Service to no more than one service entrance, main disconnect, or MGE-approved metering device.

3.2.1 Exceptions:

- When more than one point of delivery is necessary because of voltage regulation, governmental requirements, or regulatory orders.
- When more than one Service Drop or Service Lateral of the same class of service is necessary to meet the load requirements of large installations.
- When row houses and other multiple occupancy buildings comply with the State electrical code by having areas separated by fire walls.
- When an additional service or meter may be required to accommodate special approved service rates.
- Where multiple-occupancy buildings require separate meters for individual tenants, more than one meter is allowed.
- When total load exceeds 800 KW for single-metered commercial customers, two classes of service are available.

4 Overhead Service Drops and Underground Service Laterals (Non-Network)

4.1 Requirements

4.1.1 MGE specifies, in writing, customers' service entrance locations, including service entrance conduit sizes, quantity, and termination points.

4.1.2 MGE installs, owns, and maintains all Service Drops and Service Laterals.

4.1.2 For overhead Service Drops, the applicant's service entrance facility must be located at a point readily accessible to the Distribution System and at a height to provide for proper code clearance of the Service Drop wire.

Where it is necessary to cross adjacent property, the applicant must make arrangements with the third-party landowner for MGE to obtain the proper easements.

The applicant must also obtain the proper location for the service masthead from MGE and provide suitable anchorage for supporting the Service Drop on the building.

4.1.3 If the present or prospective load is 75 KW or more, MGE specifies that the applicant must provide space for the installation of self-enclosed, pad-mounted transformers and switchgear with vehicle access, and in accordance with Wisconsin State Electrical Code (**PSC 114.317**).

4.2 Location of Service

All Service Drops and Service Laterals will be extended from the MGE Distribution System to the customer's service entrance facility over the most direct and properly engineered route as determined by MGE. The customer's service entrance point will be located outside as specified by MGE.

4.3 Customer Contribution for Service Facilities

Single-phase service drops, three-phase service drops, single-phase service laterals up to 120', and three-phase service laterals up to 50' will be installed at no cost to the customer. The customer will pay an incremental cost for single-phase service laterals in excess of 120' and three-phase service laterals in excess of 50'. Distances are measured from the Distribution System to the customer's service entrance facility using the most direct and properly engineered route as determined by MGE. See the ***Electric Service Routes*** page for costs and methods for determining these charges.

4.4 Rights-of-Way, Easements, and Maintenance of Grade

The applicant or developer is responsible for furnishing MGE with rights-of-way and easements within a reasonable time frame to meet service requirements. The right-of-way must be cleared of trees, stumps, and other obstructions prior to installation. After installation, the right-of-way may be used by the grantor in any way that does not interfere with MGE's ability to maintain its electrical facilities at any time.

The right-of-way must be graded within 6 inches of final grade and be maintained by the applicant during utility construction. Future changes or relocations of MGE facilities due to changes in grade will be at the property owner's expense.

5 Meters and Meter Equipment

5.1 Customer Responsibility

Customers are responsible for furnishing and installing all wiring for meter installations, including such associated facilities as meter sockets, meter enclosures, meter test block enclosures, current transformer enclosures, etc., as required for the appropriate type of metering installations specified in this section. Meter sockets must be approved by MGE for the particular type of service and comply with local and state codes.

5.2 Access, Mounting and Location

- 5.2.1 Any residentially zoned buildings, including single-family and two-family homes, must have the meter installation in an accessible area outside the structure (see **SER-1**). Other buildings that are not easily accessible to MGE personnel during normal working hours must also have an outside meter installation.
- 5.2.2 For commercially zoned multiple-unit residential, commercial, and industrial customers such as apartments, office buildings, stores, and factories, meters should be located outside (see **SER-1**) or in an electric room on an exterior wall with exterior access (outside way) (see **SER-2**). Any other location must be pre-approved by MGE Engineering (see **SER-3**).
- 5.2.3 On installations with multiple meters, meters must be grouped together and have the associated disconnects and sockets marked to indicate the portions of the buildings supplied by each meter. Free-standing meter pedestals not attached to a structure, such as for a traffic controller, shall be labeled with the service address. The service address label for each disconnect and/or meter socket shall be at least 1/2" tall and made of the following material:
- rigid engraved plastic
 - engraved self-sticking brass
 - engraved self-sticking aluminum

Unless approved by MGE engineering, meters must be grouped on the same outside wall or in the same electric room or area.

For multiple-metered services with one street address with all the meters in the same location, only labeling the unit number is acceptable. The house meter and fire pump shall have the full address labeled (ex. 123 Maple St - HM and 123 Maple St - Fire Pump).

For multiple-metered services with multiple street addresses, the entire address shall be labeled for each disconnect and/or meter socket.

Separate labels shall be installed if the disconnect and associated meter are separate pieces of equipment.

- 5.2.4 Associated disconnects, CT cabinets, and meter sockets must be located on the same area of the wall or in the same electric room and may not be in separate rooms.
- 5.2.5 In outdoor installations, locate meters where access won't promote damage to lawns, gardens, or shrubbery.
- 5.2.6 All metering equipment and associated appurtenances must be installed in accessible areas with a minimum of 3 feet of frontal clearance so MGE personnel can read and test them without causing customer inconvenience or a safety hazard to MGE personnel. Depending on the installation, the minimum clearance may need to be increased. There must be an unobstructed path to the meter and an unobstructed working space for that meter extending from the floor

or ground to a minimum height of 6 feet, 6 inches. For electrical equipment mounted higher than 6 feet, 6 inches, this space shall extend to the top of the equipment. See NEC 110.26 for more information.

- 5.2.7 Meter rooms must be kept clear of debris and are not to be used for storage.
- 5.2.8 Where meters are mounted side by side, leave at least a 7-inch space between each meter and the nearest adjacent piece of equipment to permit testing and adjusting. Use of a 6-inch spacer section may be required to meet this requirement.
- 5.2.9 Meters mounted inside or outside must be between 4 and 6 feet above final grade. Final grade must be established before the meters can be set.
Exception: Pedestal-type meter sockets and multiple meter stacks must be between 3 and 6 feet above final grade for outside installations.
Exception: Multiple meter stacks must be between 2 and 6 feet above final grade for inside installations and between 2.5 and 6 feet above final grade for outside installations.
- 5.2.10 Meters must be located in such a manner as not to interfere with gas piping or gas metering (see **MIS-2** to determine minimum clearance required).
- 5.2.11 Meter mountings must be secure, free of vibrations, and installed plumb.
- 5.2.12 Meters must be free from unusual temperature and moisture conditions.
- 5.2.13 In areas subject to damage from falling ice or debris, installation of an ice shield is required (see **MIS-10**).

5.3 Removal and Relocation

- 5.3.1 Only MGE employees may set, remove, or relocate meters.
- 5.3.2 On jobs where it is necessary to temporarily disconnect or relocate a meter, contact MGE New Construction Services at 608-252-7373 at least two days to one week before the work is to be done.
- 5.3.3 Where new wiring has been done, inspection permits and/or signed and notarized affidavits are required before MGE will set the meter.
- 5.3.4 MGE will seal all meter switches, meter sockets, enclosures, and meters at the time of installation. Notify MGE prior to removal of seals for construction and maintenance purposes. If a seal is broken in the event of an emergency, contact the MGE Electric Meter Shop at 608-252-4721 within 48 hours for resealing.

5.4 Residential

Note: In the network area, a switch-fuse-meter sequence is required.

- 5.4.1 Horn-type bypass or manual sealable lever-operated bypass for self-contained ringless meter sockets with a meter-switch-fuse sequence for:
 - Single-phase installations of 320 amperes or less (see **RES-1** and **RES-2**).
 - Multiple metering installations for two to six units (see **RES-4**).
 - Multiple metering installations for more than six units (see **RES-5**).
- 5.4.2 Transformer-rated meter sockets and current transformers may require meter-switch-fuse sequence for:
 - Single-phase installations over 320 amperes of actual load (see **RES-3**).
 - Three-phase installations over 200 amperes of actual load (see **COM-3**).

5.5 Commercial and Industrial

Note: In the network area, a switch-fuse-meter sequence is required.

- 5.5.1 Manual sealable, lever-operated bypass, self-contained heavy-duty jaw-released meter sockets with a meter-switch-fuse sequence for:
- Single-phase and three-phase installations of 200 amperes or less (see **COM-1** and **COM-2**).
- 5.5.2 Transformer-rated meter sockets and current transformers for single-metered customers with meter-switch-fuse sequence for:
- Single-phase installations over 200 amperes for commercial and industrial customers (see **COM-3**, **COM-4**, and **COM-5**).
 - Three-phase installations over 200 amperes for commercial and industrial customers (see **COM-3**, **COM-4**, and **COM-5**).
- 5.5.3 For multiple-meter installations in commercial and industrial buildings, a main building disconnect is required (see **COM-6** and **COM-7**).
- In a multi-meter installation, all 277/480V meters and all CT rated meters will require a switch-fuse-meter setup (cold-sequence).
- 5.5.4 Three-phase, primary-metered service supplied at 4,160 volts four-wire or 13,800 volts four-wire is available at limited locations and at MGE's discretion. A new primary-metered service shall take service at 13,800 volts four-wire if available. MGE's preferred method of primary metering is MGE owned pad-mounted primary-metering switchgear. Customers taking service at primary voltage must provide all the necessary switchgear for metering and fused protection of the primary side of the transformers.
- A switch-fuse-meter sequence must be used. Drawings of primary metered switchgear must be approved by MGE Construction Engineering prior to purchase (see **COM-8**).

5.6 Temporary Services

Note: In the network area, a switch-fuse-meter sequence is required.

Note: All 277/480V temporary services will require a CT cabinet.

- 5.6.1 Manual sealable, self-contained meter sockets with a meter-switch-fuse sequence for:
- Overhead single-phase and three-phase installations of 200A or less (see **MIS-4**).
 - Underground single-phase and three-phase installations of 200A or less (see **MIS-5**).
 - Commercial temporary services require a heavy-duty jaw-releasing lever bypass meter socket.
 - Residential temporary services require a horn-type bypass or manual sealable lever-operated bypass.
- 5.6.2 Transformer-rated meter sockets and current transformers for single-metered customers with meter-switch-fuse sequence for:
- Single-phase and three-phase installations over 200A (see **COM-3**, **COM-4**, and **COM-5**).
 - All single-metered 277/480V services (see **COM-3**, **COM-4**, and **COM-5**).
- 5.6.3 Temporary services greater than 200A shall be built on an outdoor free-standing meter structure, commonly referred to as H-frame construction. Temporary services do not require vertical posts to be set in concrete. All temporary builds are subject to evaluation if not built to MGE standard.
- Single-phase and three-phase installations up to 2000A on wood construction (see **MIS-6A**).
 - Single-phase and three-phase installations up to 2000A on steel construction (see **MIS-6B**).
 - Single-phase and three-phase installations built on temporary skids shall be constructed from welded steel with a sturdy base and shall be anchored into the ground or a concrete foundation. Contact MGE Engineering for further details.

- 5.6.4 All temporary services must be inspected by the appropriate jurisdiction with the exception of single and two-family homes, which can be energized with a signed, notarized affidavit.
- 5.6.5 Contact MGE Engineering to confirm the responsibility of MGE and the responsibility of the customer to energize customer-owned temporary services.
- For single-phase and three-phase temporary installations up to 200A, the customer shall have the service wire onsite, terminated in their meter pedestal or service entrance for MGE to connect to MGE's pedestal or transformer. Service wire must fit through MGE's standard 2" knockout.
 - For single-phase and three-phase temporary installations over 200A, contact MGE Engineering to coordinate the service conduit install. MGE will pull and terminate the customer service wire when the inspection permit or notarized affidavit is received.
 - Coordinate with MGE Engineering for all temporary services in the Downtown Network Area.
- 5.6.6 Temporary services shall observe all NEC working clearances throughout the duration of construction. See NEC 110.26 for more information.

5.7 Miscellaneous Metering Requirements

- 5.7.1 For multi-meter residential services, all gear must be mounted on strut. For commercial services, all electrical gear must be mounted on strut. Single-meter residential or duplex residential does not require strut. Temporary electric service installations may not require strut, refer to MIS-6A/MIS-6B for additional information. All service installations are subject to evaluation if not built to MGE standard.
- Contact the MGE Meter Shop at 608-252-4721 with questions.
- 5.7.2 When it is necessary to pull new wire through an existing window/donut style CT cabinet, the existing metering cabinets must be upgraded to MGE standard.
- 5.7.3 Conduit between meter socket and CT cabinet/switchgear must be 1" rigid with grounding locknuts at the CT cabinet/switchgear and meter socket. MGE does not allow LBs on CT wiring conduit. There shall not be more than 270 degrees of bends in CT wiring conduit.
- 5.7.4 Knock outs or hubs must be used when piping into meter sockets.
- 5.7.5 In multimeter stacks all commercial meters must be jaw releasing lever bypass.
- Exception: House Meters for residential services that are installed in the same multimeter stack as the tenant meters may be horn bypass.
- 5.7.6 Metered and unmetered wires may not occupy the same conduit or raceway.
- Exception: Existing installations with metered and unmetered wires that occupy the same conduit or raceway are grandfathered in, however when the service is being upgraded or wires need to be replaced, then metered and unmetered wires must be separated to MGE standard.
- 5.7.7 Unmetered raceways and other unmetered portions of equipment must be sealable. Use a drilled shank bolt with wing nut in two opposite corners.
- 5.7.8 MGE does not allow splices inside multi-meter stacks. Splices and taps are not allowed in unmetered raceways, meter sockets, pedestals, or cabinets.
- 5.7.9 Unmetered panelboards shall not be allowed. Contact MGE Engineering with questions.
- 5.7.10 On any installation with an existing A-base meter socket, when the service is being upgraded or wires need to be replaced, the A-base meter socket will need to be replaced with an approved MGE meter socket. On any installation where distributed energy resources are being added, any A-base meter socket needs to be replaced with an approved MGE meter socket.

- 5.7.11 Current transformer cabinets and sections must have provisions for padlocking.
- 5.7.12 Protective posts are required if metering or service equipment is subject to vehicular traffic. See **MIS-7**.
- 5.7.13 MGE does not allow LB fittings, junction boxes, etc., on unmetered wire. All unmetered wire shall be sealed.
- 5.7.14 Wall-mounted metering equipment must be secured using appropriated anchors or fasteners. Use of tack screws, sheet metal screws, or other non-structural fasteners is prohibited.
- 5.7.15 It is not permitted to modify or install lugs in a meter socket, pedestal, or metering transformer cabinet other than what is listed on the manufacturer's drawing associated with the UL listing.
- 5.7.16 Self-tapping screws are not permitted when mounting a meter socket to the side of a metering transformer cabinet.
- 5.7.17 Customer-owned equipment shall not be installed in any cabinets that are sealed by MGE.
- 5.7.18 MGE will not approve the use of altered, rusted, damaged, or otherwise modified equipment.

6 Non-Network Overhead and Underground Distribution Extensions

6.1 To Extend Service

Upon written request, MGE will extend its Distribution System to provide service to new customers in accordance with the following rules and regulations.

6.2 Definition of Distribution System

The Distribution System includes all primary voltage lines, secondary voltage lines, transformers, and control equipment necessary to provide points of connection with Service Drops or Service Laterals. Though located on customer property, transformers and associated equipment are a part of MGE's Distribution System.

Normally, the Distribution System is located within an electric utility easement on private property or in public streets, alleys, and roads so that it may be extended to other applicants. Property owners grant easements without cost to MGE.

Service voltages supplied by MGE are typically available at 120/240 volts and 120/208 volts (residential), 120/208 volts (low-voltage network) and 277/480 volts (spot network), and all of the above for commercial applications. Transformers are standard ratio and standard impedance single-phase and three-phase oil-cooled types only.

6.3 MGE's Responsibility

MGE designs and installs the distribution facilities in the most safe, reliable, environmentally accepted manner and at the lowest reasonable cost following accepted engineering and planning practices as determined by MGE.

6.4 Items Included in Costs of Extension

If a service extension is required, the customer may be responsible for the cost. The customer's calculated cost of the required extension (to be paid in advance) will not include individual transformers or increased transformer capacity but will include the cost of:

- Extension of primary and secondary facilities (overhead and/or underground), including excavation and restoration.
- Reconstruction of existing facilities, including changing from single phase to three phase or construction of new feeders made necessary solely by addition of such customers.
- Tree trimming and rights-of-way clearing.
- Abnormal trenching costs.
- Securing easements.
- Moving conflicting facilities.
- Overtime expenses.
- All other costs associated with making the extension, including applicable overheads.

6.5 Definition of Allowances

The average embedded cost for providing a service to an individual customer is used to determine any applicable allowances. These standards shall not apply to the inter-connection of customer-owned generation facilities (DERs). MGE determines the average embedded cost allowance (AECA) for the following classes of customers:

6.5.1 Energy-Only Basis

These are generally residential and small commercial customers requesting extensions to serve their facilities on individual lots of multi-lot plats. MGE calculates its average embedded cost of the distribution facilities by dividing the overall depreciated embedded cost by the total number of customers billed in that classification.

6.5.2 Demand and Energy Basis

These are generally commercial customers with demand greater than 20 KW. Their average embedded cost on a per-kilowatt-of-demand basis is calculated by dividing the overall depreciated embedded cost by the total kilowatt demand for this customer class.

6.5.3 Streetlighting Facilities

The average embedded costs are determined on a per-fixture basis by dividing the overall depreciated embedded cost by the total number of fixtures involved.

6.6 Allowances

MGE recomputes and files the AECA annually on March 1. For current information, call MGE Construction Engineering.

6.7 Application of Allowances

MGE applies the allowances to each class of customer as follows.

6.7.1 Energy-Only Customers

The requesting customer receives allowances only for lots having structures beyond the foundation stage of construction that take a Service Drop or Service Lateral directly from the distribution extension being made.

The customer pays the total cost of the extension as previously described, less the average embedded cost per customer multiplied by the number of customers to be served by the extension. The cost is computed on an estimated basis, and the requesting customer makes an advance deposit in that amount.

Refunds, on an average embedded-cost-per-customer basis, are made to the original customer who made the deposit as new customers take Service Drops or Service Laterals within five years of the original extension completion. The refund equals whichever is greater - the AECA in effect at the time the contributed extension was installed or the AECA in effect at the time the meter was set.

In either case, MGE reduces the refund by its costs incurred designing and installing the distribution facilities for the second customer. The total refund never exceeds the original total amount paid, and no interest is paid on refunds.

MGE sends a contract letter specifying the terms and conditions for any refunds to the original contributor.

6.7.2 Demand Plus Energy Customers

Customers requesting service that requires new distribution facilities or rearrangement of existing distribution facilities pay in advance the total cost of the new extension or rearrangement, less the AECA per KW of demand multiplied by the customer's estimated average billed demand. The cost is estimated, and a deposit equal to the estimate is made in advance.

Upon completion of the work, the project is reviewed to determine whether it is within the original scope. If the project is out of scope, an appropriate refund or additional bill will be submitted to the original contributor.

The customer's estimated average billed demand is determined by using 40 percent of the customer's stated service entrance facility rating. It is based on MGE's experience with the relationship between a customer's actual load and the size of the service entrance.

For customers requesting an increase in facilities, the cost is the total distribution facility construction cost as defined in Section 6.4, less an allowance equal to the incremental increase in demand multiplied by the average embedded-cost-per-KW, less the accumulated depreciation of the removed facilities, less the salvage value of the facilities removed.

The cost is estimated, and the customer makes a contribution equal to that estimate in advance. Upon completion of the work, the project is reviewed to determine whether it is within the original scope. If the project is out of scope, an appropriate refund or additional bill will be submitted to the original contributor.

Upon completion of the work and after an appropriate refund or additional bill has been issued, MGE may send a contract letter specifying the possibility of future refunds to the customer. It explains the circumstances under which future refunds may occur as a result of the addition of new customers taking Service Drops or Service Laterals off the extension within five years of the completion of the original extension.

See filed MGE Electric Rates and Rules for more information.

6.7.3 Streetlight Extensions

For streetlight extensions, Service Drops, or Service Laterals, the cost to the requesting party is the total cost of the facilities needed to provide service to the streetlights, less the AECA per fixture. MGE collects this cost in advance on an estimated basis.

Final appropriate refunds or additional bills are submitted to the original contributor upon completion of the installation. MGE treats each request for service and/or extension individually for payment.

6.7.4 More Than One Rate Class

For extensions to more than one customer where some are billed on energy only and some on demand and energy, MGE determines the total allowance by either allocating certain costs of the extension to each class separately or by adding the allowances together to derive one total allowance to offset one total cost. MGE chooses the method that minimizes confusion over payment and/or refund policies.

6.8 Upgrade of Distribution Facilities

For customers who require distribution facility upgrades, MGE determines allowances as follows:

6.8.1 Demand Schedule

Customers served under a demand rate schedule receive an embedded cost allowance. The KW of demand used in computing the allowance is the customer's estimated average billed demand after the upgrade, less the customer's estimated average billed demand before the upgrade.

6.8.2 Customers Transferring to a Different Energy-Only Subclassification

If a customer changes energy-only subclassifications after the upgrade, the customer receives an allowance equal to the difference between the two average embedded cost allowances.

6.8.3 Customers Transferring to a Demand Classification

If a customer transfers from an energy only to a demand plus energy classification after the upgrade, the customer receives an AECA. The KWs of demand to be used in determining the allowance is the customer's estimated average billed demand after the upgrade, less an

estimate of the customer's prior average billed demand (based on calculations described in Sections 6.7.1 and 6.7.2).

6.9 Relocation and Rebuilding of Existing Facilities

Submit a written request to relocate service and distribution facilities at the customer's expense, including replacement of overhead with underground.

MGE computes the estimate by calculating the total cost of the proposed work, including applicable overheads and incidental charges, less the accumulated depreciation of the removed facilities, less their salvage value. The cost is estimated, and a contribution equal to the estimate is made in advance.

MGE refunds the contribution as additional customers attach to the facilities unless the additional customers require a new extension. The refund will be equal to the greater of the AECA in effect at the time the contributed extension was installed or the AECA in effect at the time the meter was set.

In either case, this refund is reduced by MGE's costs incurred designing and installing the distribution facilities for the second customer. Refunds are made for up to five years after the completion of the changes to the facilities. The total refund never exceeds the original total amount paid and no interest is paid on refunds.

7 Low-Voltage AC Network System

7.1 Definitions

- 7.1.1 A Service Lateral in the network system is defined as the underground secondary facilities between the nearest splicing point on the underground low-voltage network system and the supply end of the customer's service entrance facilities. Service Laterals are installed in conduit and normally are only to serve loads that are less than 75 KW.
- 7.1.2 The low-voltage network Distribution System includes primary lines, ducts, manholes, conduits, transformers, and all other facilities that are part of the system. Some of these facilities may be located on the customer's premises.
- 7.1.3 See **NET-1** for a map of MGE's downtown network system.

7.2 Payment for Service Laterals

The customer will pay in advance \$50 per foot, per conduit, for that part of the Service Lateral as defined above that is located between that customer's lot line and service entrance facilities.

7.3 Network Residential Metering

- 7.3.1 Horn-type bypass or manual-sealable lever-operated bypass for self-contained meter sockets with a switch-fuse-meter sequence for:
- Single-phase installations of 200 amperes or less (see **NET-2**).
 - Three-phase installations of 200 amperes or less (see **NET-2**).
 - Multiple-metering installations with 200 amperes or less per position (see **RES-5**).
- 7.3.2 Transformer-rated meter sockets and current transformers with switch-fuse-meter sequence for:
- Single-phase installations over 200 amperes (see **NET-3** and **NET-4**).
 - Three-phase installations over 200 amperes (see **NET-3** and **NET-4**).

7.4 Network Commercial and Industrial Metering

- 7.4.1 Manual-sealable lever-operated bypass self-contained heavy-duty jaw-released meter sockets with a switch-fuse-meter sequence for:
- Single-phase installations of 200 amperes or less (see **NET-2**).
 - Three-phase installations of 200 amperes or less (see **NET-2**).
- 7.4.2 Transformer-rated meter sockets and current transformers with switch-fuse-meter sequence for:
- Single-phase installations over 200 amperes for commercial and industrial customers (see **NET-3** and **NET-4**).
 - Three-phase installations over 200 amperes for commercial and industrial customers (see **NET-3** and **NET-4**).
- 7.4.3 For multiple-meter installations in large commercial and industrial buildings, a main building disconnect is required (see **COM-6** and **COM-7**).

7.5 Transformer Vaults

If the present or prospective load is 75 KW or more, MGE specifies the applicant must provide:

- A below-grade transformer vault with vehicle access constructed in accordance MGE Standards, and all applicable codes with a minimum dimension of 20' D x 25' W x 13' H with

- two 36" x 42" manways, a 6' x 8' equipment-way opening for access, and 3 square inches of free air ventilation per KVA of transformer capacity. (see **MIS-3A**).
- An above-grade transformer vault with vehicle access constructed in accordance MGE Standards, and all applicable codes with a minimum 20' D x 25' W x 13' H with two 8' tall double doors for access and 3 square inches of free air ventilation per KVA of transformer capacity. (see **MIS-3B**).
 - Additional vault space as required for primary-voltage switches and disconnecting equipment.

Upon customer request, MGE will furnish transformer vault plans and specifications, including space and ventilation requirements, but the customer's architects and engineers must be responsible for structural design. Such plans must be submitted to MGE prior to construction. Contact MGE Engineering for additional information.

7.6 New Buildings

New building construction for which Service Laterals are provided must include MGE-approved wall openings for service ducts at locations that MGE specifies.

8 Rights and Responsibilities

8.1 Continuity of Service

MGE uses reasonable diligence to provide an uninterrupted and regular supply of service. MGE is not liable for any interruptions, deficiencies, or imperfections of service. MGE may temporarily suspend the delivery of service when necessary for the purpose of making repairs, changes, and improvements upon any part of the system.

8.2 Balanced Load

The customer is responsible to balance load over the phases as equally as commercial practice will permit and maintain this balance over time.

8.3 Superposition of Electric Energy on Utility System

Where the customer's equipment couples electric energy to their electric system for equipment control, carrier current transmission, signal systems, broadcasting, communication, or any other purpose, the customer shall install equipment suitable to prevent this energy from being imposed upon or entering MGE's electric system.

8.4 Losses Due to Service Disconnection

MGE is not liable for any losses, injuries, or damages to persons or property due to disconnection of service in accordance with the Disconnection of Service rules found in the MGE Electric Service Rules and Regulations on file with the PSCW.

8.5 Customer's Responsibility for Damage to MGE Equipment

The customer is responsible for all damage to MGE facilities or equipment caused by the customer or his permittees, including compensation for consumed energy not recorded on the meter.

8.6 Access to Customer Premises

MGE's authorized agents will have access to customer premises at all reasonable times for the purpose of reading meters, making repairs, inspections, investigations, removing MGE property, or any other purpose incident to providing service.

8.7 Abnormal Trenching Costs

The applicant shall pay in advance an amount equal to the estimated extra cost of trenching and hand digging through any area where normal plowing and trenching methods cannot be used; e.g., ledge rock, boulders, landfill, trees, heavy underbrush, watercourses, etc.

Winter charges will apply for any service and/or distribution extension installed between December 1 and March 31 unless the application for service and/or request for distribution extension is received prior to October 15 and the premise and/or site is ready for installation prior to November 1.

The premise and/or site is ready for installation when the following items are satisfied:

1. All applicable Electric Service Reports and easements are signed by the customer/owner and received by MGE.
2. All applicable deposits are received by MGE.
3. The entire trench route is cleared and graded to within 6 inches of final grade.
4. All private utilities are marked. MGE is not responsible for damage to unmarked facilities.

5. A physical electric service entrance location is installed. This can consist of a meter, meter pedestal, CT cabinet, or secondary termination cabinet with the minimum required service entrance conduits stubbed out from the foundation wall or securely mounted on the building.

Note: A mark showing the proposed service location on the foundation or building does not qualify as ready for installation.

8.8 Installations Under and Through Private Paved and Landscaped Areas

Except for damage caused by MGE's negligence, MGE is not liable for damage to trees, shrubs, fences, sidewalks, or other obstructions incident to the installation, repair, or maintenance of its electric facilities. The applicant is responsible for lawn and landscape restoration except as noted above.

If MGE is requested to provide additional landscaping or other services, the applicant is responsible for the associated costs. Excavation and backfilling are MGE's responsibility. The backfill will consist of the original soil when possible.

8.9 Installation of Facilities

The character, location, and method of installation of MGE-constructed facilities will be at MGE's discretion and conform to specifications that MGE prepares. Any exceptions that MGE consents to shall be at the customer's expense.

8.10 Applicability of Governmental Codes

All facilities installed, whether by the customer or MGE, will comply with the appropriate provisions of the applicable governmental codes.

8.11 Extraordinary Investment

If an investment in an extension appears extraordinary to MGE, or where extensive enlargement or changes to existing distribution or other facilities required to accommodate the customer do not appear to be economically justified, MGE may require the customer to pay MGE that portion of the capital expenditure not economically justified by the anticipated annual revenue. Such payments will be made before construction.

In addition, MGE may require a specific contract with the customer to pay operating and maintenance expenses.

9 Motors and Starting Requirements

9.1 Single-Phase Motors

Split-phase (120V) motors larger than 1/2 HP capacity are not permitted for any application. The locked rotor starting current for single-phase motors or customer-owned parallel generators may not exceed the values specified in the following table:

Maximum Permissible Starting Current Values for Single-Phase Motors

Size	Allowable Starting Current at 120 Volts	Allowable Starting Current at 208 Volts or 240 Volts
1/3 HP	31 Amperes	15.1 Amperes
1/2 HP	45 Amperes	22.5 Amperes
3/4 HP	Not Allowed	30.5 Amperes
1 HP	Not Allowed	35 Amperes
1 1/2 HP	Not Allowed	40 Amperes
2 HP	Not Allowed	50 Amperes
3 HP	Not Allowed	70 Amperes
5 HP	Not Allowed	100 Amperes
7 1/2 HP	Not Allowed	115 Amperes

Note: Window-type or room-type air conditioners and portable appliances shall not have starting currents in excess of four times the rated input current.

9.2 Three-Phase Equipment

Construct all three-phase equipment for operation at the voltage available in the location where it is to be used. Contact MGE with any questions about available service and be sure to notify MGE in advance of all proposed additions of three-phase equipment to ensure an adequate supply of service.

9.3 Three-Phase Motors

Limit the starting current for three-phase motors and customer-owned parallel generators to the values given in the table below by suitable starting devices or motor design. These limitations must be met during all stages of the motor start and running cycles.

Construct all motors and parallel generators larger than 100 HP to maintain a power factor in excess of ninety-two (92) percent at ninety (90) percent of full load or output.

Supply equipment (such as single-phase welders, electric furnaces, motors, parallel generators, and other equipment) which causes frequent variations in current demand which may result in light flicker must be supplied from independent service equipment, including service, receptacle, and meter.

Maximum Permissible Starting Current Values for Three-Phase Motors

Size	Maximum Permissible Starting Current @ 208V	Maximum Permissible Starting Current @ 240V	Maximum Permissible Starting Current @ 480V
5 HP	94 Amperes/Motor	82 Amperes/Motor	41 Amperes/Motor
7 1/2 HP	126 Amperes/Motor	110 Amperes/Motor	55 Amperes/Motor
10 HP	155 Amperes/Motor	135 Amperes/Motor	67 Amperes/Motor
15 HP	218 Amperes/Motor	189 Amperes/Motor	94 Amperes/Motor
20 HP	276 Amperes/Motor	240 Amperes/Motor	120 Amperes/Motor
25 HP	335 Amperes/Motor	291 Amperes/Motor	145 Amperes/Motor
30 HP	398 Amperes/Motor	345 Amperes/Motor	172 Amperes/Motor
35 HP	408 Amperes/Motor	354 Amperes/Motor	177 Amperes/Motor
40 HP	421 Amperes/Motor	365 Amperes/Motor	182 Amperes/Motor
50 HP and Larger	Contact MGE Engineering	Contact MGE Engineering	Contact MGE Engineering

The maximum permissible starting current for motors wound for other voltages shall be the starting currents listed above divided by ratio of other voltage divided by 240V.

For motors 50HP and larger contact MGE Engineering.

10 Power Factor Correction Rule

10.1 Power Factor Correction Rule

10.1.1 For non-incandescent lighting, the customer is responsible to maintain a power factor to a level of at least:

- Ninety (90) percent lagging for illumination or decorative purposes.
- Eighty-five (85) percent lagging for advertising purposes, except that no correction is required for any complete sign supplied from a single auxiliary transformer rated at 225 volt-amperes or less.
- Commercial and industrial customers must maintain a power factor on peak of not less than eighty-five (85) percent or be subject to a penalty as dictated by filed rates.

10.1.2 The power factor is determined by the wattmeter-voltmeter-ammeter method.

11 Emergency Electric Service

11.1 Emergency Electric Service

In commercial or network installations where code requires an emergency service connection on the line side of the building main disconnect (as with emergency lighting or fire pumps), this connection will be a separate metered service. Metering must be installed according to MGE-approved metering guidelines.

12 Customer-Owned Optional Standby Electric Generating Equipment

12.1 Customer-Owned Optional Standby Electric Generating Equipment

The purpose of optional standby electric generating equipment is to provide an alternate source of electric power during power outages to minimize inconvenience or product damage. An optional standby generator must be connected to the customer's electric system through an approved open transition disconnect switch. This system will be electrically and mechanically interconnected so the customer's generation cannot feed back into MGE's system. Any optional standby system must be reviewed by MGE Engineering prior to installation. Send one-line diagrams and transfer switch specifications to MGE Engineering. MGE may witness test the operation of standby generation installations.

- 12.1.1 See ***ECH Chapter 13*** in the MGE Electrical Contractor's Handbook for Customer Owned Parallel Generation Installations.

13 Customer-Owned Parallel Distributed Energy Resources (DER)

13.1 Application and Contract

Before interconnecting a parallel DER with the MGE system, MGE must receive and approve an application and a contract specifying technical connection and operating aspects for the parallel DER. MGE will follow the guidelines of PSC 119 for this review.

See the following references:

- *Customer-Owned Generation Website*
- *Customer Owned Generation Booklet*
- *MGE Distributed Generation (DG) Interconnection Requirements Quick Reference Guide*
- *PSC 119*

13.2 Lockable Load Break Disconnect Switch

MGE requires a customer owned disconnect switch to electrically isolate the customer's DER from the MGE system in order to establish a clearance point for maintenance and repair work in accordance with MGE safety rules and practices. A single disconnect shall be connected such that all DERs on the premise are isolated when the disconnect is opened.

Disconnect switches under 600V must meet the following requirements:

- Located outside within 10' of the electric service entrance, electric meters, or transformer. Any other location must be approved by MGE Engineering.
- Switches must be accessible at all times and located for ease of access to MGE personnel.
- The operating voltage of the disconnect switch shall be same as the service voltage.
- Switches must be gang-operated, where one switch handle opens and closes all phases simultaneously.
- Opens with a visible break, a clear indication that an air-gap of separation has occurred between the blades and contact points.
- Capable of being locked in the open position.
- Adequately sized to handle fault and overcurrent conditions.
- The neutral conductor shall not be switched.
- The disconnect switch shall be properly grounded.
- Includes marking or signage on the switch that clearly indicates the open (off) and closed (on) positions.
- When a disconnect switch is used that specifies the "line" and "load" side, the "line" side shall be connected towards the utility, and the "load" side shall be connected towards the DER. Signage shall be posted on the disconnect saying, "TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION."

13.3 Distribution Transformers

MGE may require separate distribution transformers or replacement of existing distribution transformers for DERs which may threaten safety or interfere with other customers' services. Contact MGE Engineering for more information.

13.4 Automatic Isolation

Each DER must have a system for automatically isolating the DER upon loss of the MGE supply, unless MGE wants local generation to supply isolated load. For synchronous and induction generators, this protection ordinarily consists of overcurrent protection, fuse or circuit breaker, plus a voltage- or frequency-controlled contactor to automatically disconnect the unit whenever

its output voltage or frequency drifts outside predetermined limits, such as plus or minus ten (10) percent of the rated values. Other suitable protective systems may be accepted.

13.5 Disconnection Upon Request

Customers must disconnect the DER upon request. MGE may isolate the generating facility:

- For maintenance or repair of MGE facilities.
- During system emergencies.
- When the generating facility is operating in a hazardous manner or affects service to other customers or nearby communication systems or circuits.

13.6 Access

DERs must be accessible to MGE personnel at reasonable times for testing isolation and protection equipment, evaluating power quality, and isolating sources of electric service or communication systems problems.

13.7 DERs Connected on Network Systems

The owner of a DER designed to operate in parallel with a spot network service must provide relaying or control equipment that is acceptable to the Company (i.e., to prevent the generator kW output from ever exceeding the instantaneous kW load).

See *NET-1* for a map of MGE's downtown network.

Contact MGE Engineering for more information.

13.8 Rights and Responsibilities

The owner of a DER is responsible for protecting owner-installed equipment and adhering to all applicable codes.

A DER's power output must be compatible with normal electrical service and not cause that service to fall outside of the prescribed limits of PSCW rules and other standard limitations.

A DER must not affect the service or equipment of other customers or produce undesirable levels of harmonics in the MGE power supply.

13.9 Additional Requirements

Metering equipment may require replacement to accommodate DG metering, including but not limited to, the following:

1. Ring-style sockets.
2. Rusted or damaged sockets or cabinet.
3. Sockets or cabinets with inadequate internal or external clearances.
4. Sockets without the ability to bypass.

14 Charges for Overhead Drops and Underground Service Laterals

14.1 Temporary Service

MGE will charge \$111 for providing a temporary service up to 200 amperes for construction purposes at a location selected by MGE where facilities currently exist. The service head must be located on a satisfactory temporary support provided by the applicant. This support must adhere to the clearance required by state. See *MIS-4* and *MIS-5*.

For any other location, voltage, or load selected by the applicant, the estimated cost of installing and removing the distribution facilities for temporary service will be paid in advance by the applicant. All commercial temporary services will follow MGE's commercial service rules – see COM pages in *ECH 16*.

14.2 Permanent Service

No charge will be made for permanent overhead Service Drops and underground Service Laterals meeting the aforementioned definitions and all MGE rules and applicable codes unless there is extraordinary investment, excess facilities, abnormal trenching, and/or incremental service lateral charges as referenced in *ECH 4.3*.

In the case of a customer with an existing service that requests another service entrance not meeting an exception in *ECH 3.2.1*, the customer will be responsible for the entire cost of the additional service.

14.3 Upgrade of Service Facilities

Upgrading a Service Drop or Lateral with a larger Service Drop or Lateral of like construction, will be done at no cost, assuming there are no abnormal service charges.

For customers requesting to have an overhead Service Drop converted to an underground Service Lateral, MGE will require a contribution equal to the cost of the new underground Service Lateral.

However, if the change is a result of a substantial increase in consumption or extensive building modifications, then the change will be treated as a new service request for the purposes of calculating the contribution.

These standards shall not apply to the inter-connection of customer-owned generation facilities (DERs).

15 MGE Electric Distribution Engineering Department Directory

Email is the preferred method of contact for the Trade Ally Coordinator (TAC). The Trade Ally Coordinator can be reached at TAC@mge.com.

Engineering requests include, but are not limited to, building projects, electric services, overhead upgrades and conversions from overhead to underground, road improvement projects, and stray voltage/voltage complaints.

	Contacts	Phone
Diggers Hotline		800-242-8511 or 811
Easements	Rights-of-Way and Surveying	252-7132
Electromagnetic Field Inquiries	Trade Ally Coordinator	252-5622
Emergency		252-7000 800-245-1123
All Engineering Requests	Trade Ally Coordinator	252-5622
Outages, Customer Requested	Trade Ally Coordinator	252-5622
Meter Sealing	Electric Meter Shop	252-4721
Open Current Transformer Cabinets	Electric Meter Shop	252-4721
Metering, Pick-Up	Electric Meter Shop	252-4721
Operations and Construction	Builders Line	252-7373
Plats, Residential or Commercial	Trade Ally Coordinator	252-5622
Lights, Street or Private Light Engineering	Trade Ally Coordinator	252-5622
Relocation of Distribution Facilities	Trade Ally Coordinator	252-5622
Service Installation Schedule	Trade Ally Coordinator	252-5622
Forestry	Trade Ally Coordinator	252-5622

16 Service Details

This section includes detail drawings of the various electric services MGE provides. It also details the customer requirements for installation. Contact MGE Engineering for final approval or with questions.

Commercial Services		
Single Meter Underground Service	200A or less Single-phase or three-phase 120/240V or 120/208V	COM-1
Single Meter Overhead Service	200A or less Single-phase or three-phase 120/240V or 120/208V	COM-2
Single Meter Wall-Mount Underground Service	400A to 2000A Single-phase or three-phase 120/240V, 120/208V, or 277/480V	COM-3
Single Meter Pad-Mount Underground Service	400A to 4000A Single-phase or three-phase 120/240V, 120/208V, or 277/480V	COM-4
Single Meter Wall-Mount Overhead Service	400A to 600A Single-phase or three-phase 120/240V or 120/208V Requires MGE Engineering Approval	COM-5
Multiple Metering Service	Single-phase up to 600A or three-phase 120/240V or 120/208V Requires MGE Engineering Approval	COM-6
Customer Owned Secondary Switchboard	Three-Phase Only Up to 4000A 120/208V or 277/480V Requires MGE Engineering Approval	COM-7
Primary Voltage Service	One-line for Customer Owned Primary Metering Switchboard 4160V or 13800V Requires MGE Engineering Approval	COM-8

Residential Services

Single-Meter Underground Service	320A or less 120/240V or 120/208V	RES-1
Single Meter Overhead Service	200A or less 120/240V or 120/208V	RES-2
Single Meter Underground Service	400A to 600A 120/240V or 120/208V	RES-3
Multiple Meter Underground or Overhead Service	2 to 6 meters Single-phase up to 600A 200A or less per position	RES-4
Multiple Meter Underground or Overhead Service	7 meters or more Single-phase up to 600A or three-phase 200A or less per position	RES-5

Network Services

Network Map	Low-Voltage Network Map	NET-1
Single Meter Underground Service	200A or less Single-phase or three-phase 120/240V or 120/208V	NET-2
Single Meter Wall-Mount Underground Service Separate Disconnect & CT Cabinet	Single-phase up to 600A Three-phase up to 2000A 120/240V, 120/208V, or 277/480V	NET-3
Single Meter Wall-Mount Underground Service "Combo" Disconnect & CT Cabinet	Single-phase up to 600A Three-phase up to 1200A 120/240V, 120/208V, or 277/480V	NET-4
Multiple Metering Service	Single-phase or three-phase 120/240V or 120/208V Requires MGE Engineering Approval	See COM-6
Customer Owned Secondary Switchboard	Three-Phase Only Up to 4000A 120/208V or 277/480V Requires MGE Engineering Approval	See COM-7

Miscellaneous Drawings

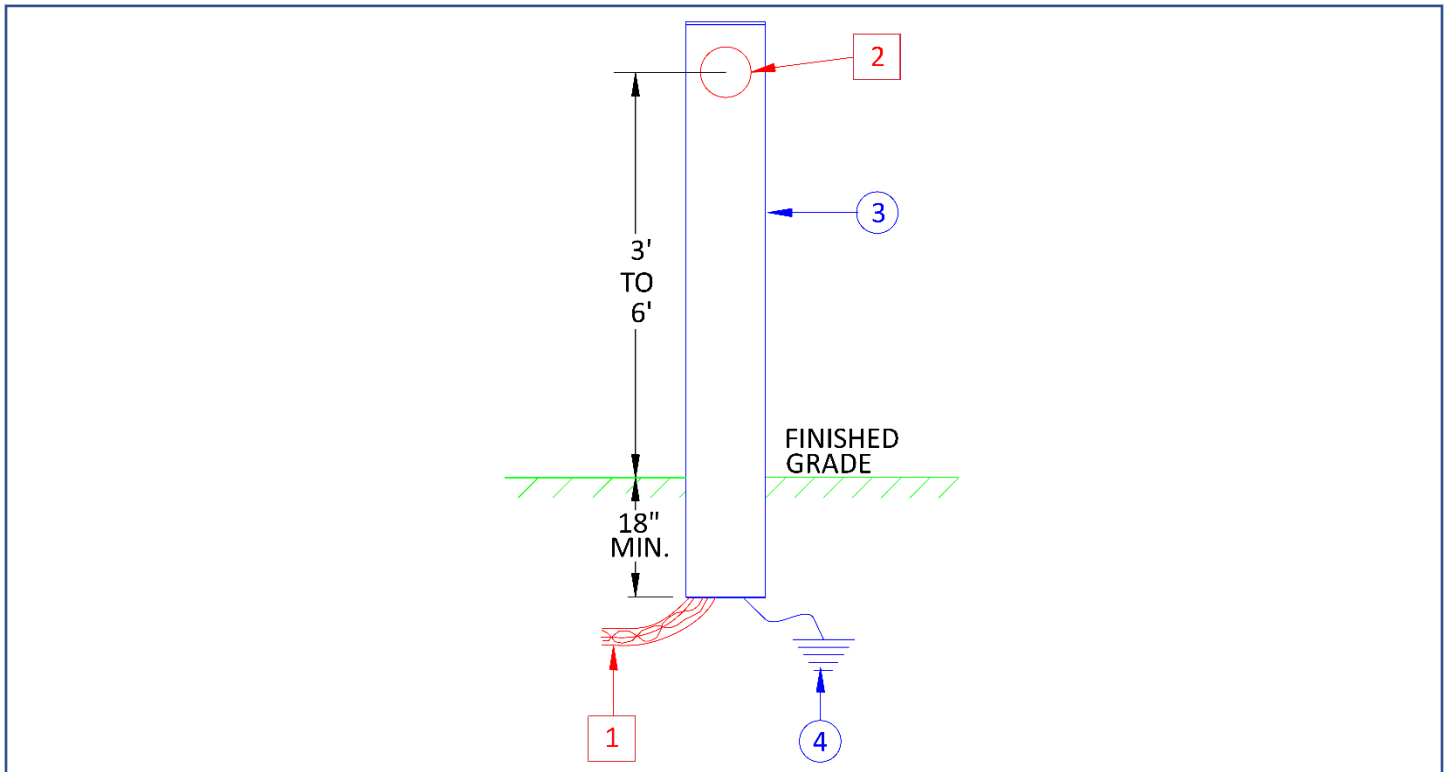
Overhead Clearance Guidelines	MIS-1A
Overhead Clearance Guidelines - Drawings	MIS-1B
Clearance Requirements Between Gas Meters and Electric Meters	MIS-2
Typical Below-Grade Transformer Vault	MIS-3A
Typical Above-Grade Transformer Vault	MIS-3B
Customer-Owned Overhead Temporary Service	MIS-4
Customer-Owned Underground Temporary Service	MIS-5
Free-standing Wood H-Frame Structure	MIS-6A
Free-standing Steel H-Frame Structure	MIS-6B
Protective Bollard Detail	MIS-7
Wall-Mount Termination Cabinet	MIS-8A
Pad-Mount Termination Cabinet	MIS-8B
Typical Metering Wiring Diagrams	MIS-9
Meter Shield	MIS-10

Commercial Service Location Details

Exterior Service at Grade	Preferred for all metering installations	SER-1
Interior Service In an At-Grade Electric Room	Multiple meter service only Not approved for residential use	SER-2
Exterior Service in Termination Cabinet Below-Grade Metering (Outside Wall)	Greater than 30 meters Requires MGE Engineering Approval	SER-3
Low-Voltage AC Network Service	Contact MGE Engineering	

COM-1

COMMERCIAL SINGLE METER UNDERGROUND SERVICE SINGLE-PHASE OR THREE-PHASE 200 AMPERES OR LESS 120/240V OR 120/208V



MGE WILL FURNISH:

1. Service conductors and service conduit.
2. Electric meter.

CUSTOMER WILL FURNISH:

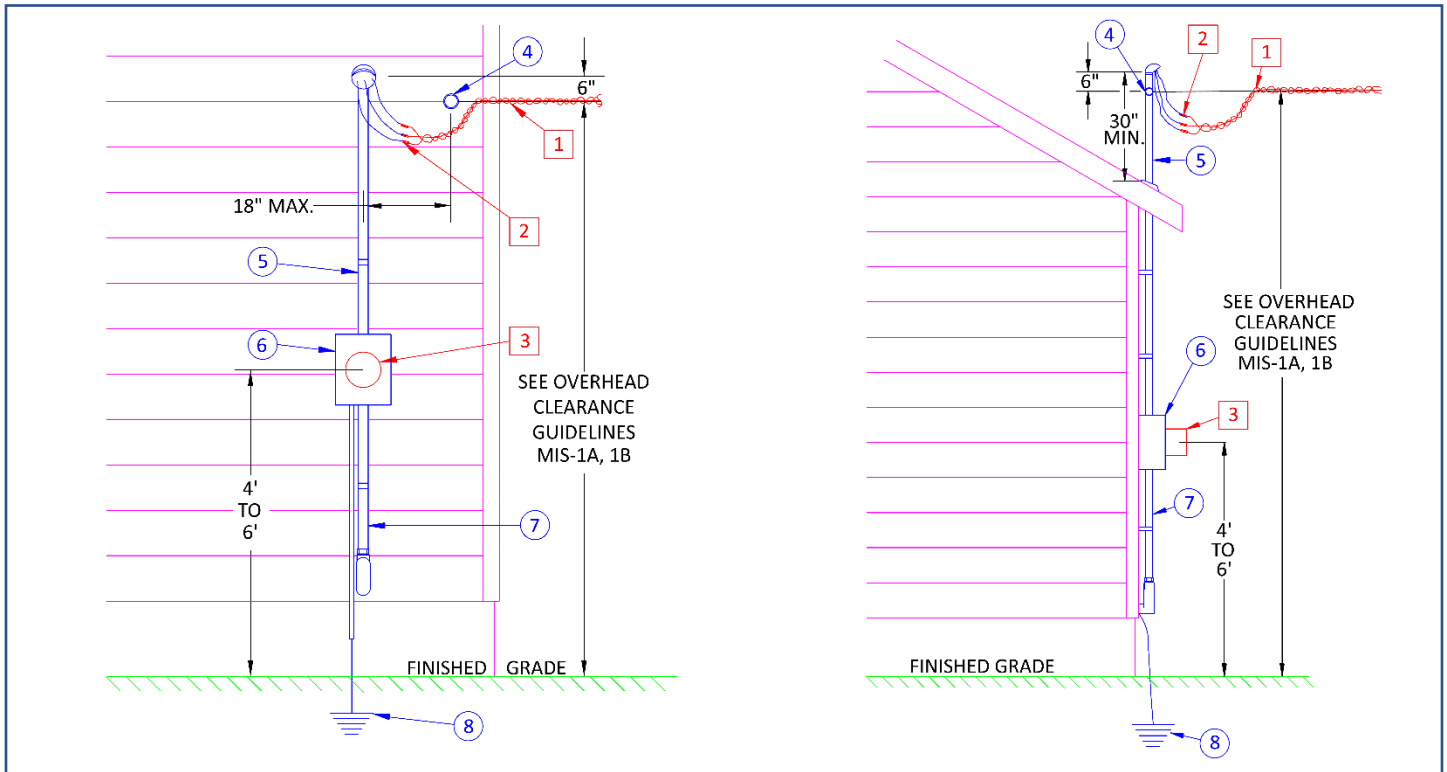
3. MGE approved 200A underground meter socket with jaw-releasing lever bypass. See **TABLE 3**.
 - For 120/240V or 120/208V single-phase, three-wire, use a five-terminal meter pedestal.
 - For 120/208V three-phase, four-wire, use a seven-terminal meter pedestal.
 - See drawing **MIS-9** for meter wiring schematics.
4. Ground in accordance with applicable electrical codes.

NOTES:

- Protective posts will be required if subject to vehicular damage. See **MIS-7**.
- Single-metered 277/480V services will require a CT cabinet. See **COM-3**.
- For **Utility/CATV Services only**, approved residential meter sockets are acceptable for service entrances 60 amps or less. For service entrances 100 amps or larger, commercial-rated lever bypass is required.

COM-2

COMMERCIAL SINGLE METER OVERHEAD SERVICE SINGLE-PHASE OR THREE-PHASE 200A OR LESS 120/240V OR 120/208V



MGE WILL FURNISH:

1. Overhead service conductors.
2. Compression-type connectors. MGE to make final connection.
3. Electric meter.

CUSTOMER WILL FURNISH:

4. Point of attachment – suitable insulated spool(s) and bracket to support service drop conductors.
5. Service riser, conductors, and weatherhead. Leave 36-inch-long wire leads for connection to MGE service drop. MGE does not allow LBs before the meter.
 - A minimum of a two-inch rigid conduit is required for risers above the roof where service conductors attach.
6. MGE approved 200A overhead meter socket with jaw-releasing lever bypass. See **TABLE 3**.
 - For 120/240V or 120/208V single-phase, three-wire, use a five-terminal meter socket.
 - For 120/208V three-phase, four-wire, use a seven-terminal meter socket.
 - See drawing **MIS-9** for meter wiring schematics.
7. Conduit and wire to main service disconnect.
8. Ground in accordance with applicable electrical codes.

NOTES:

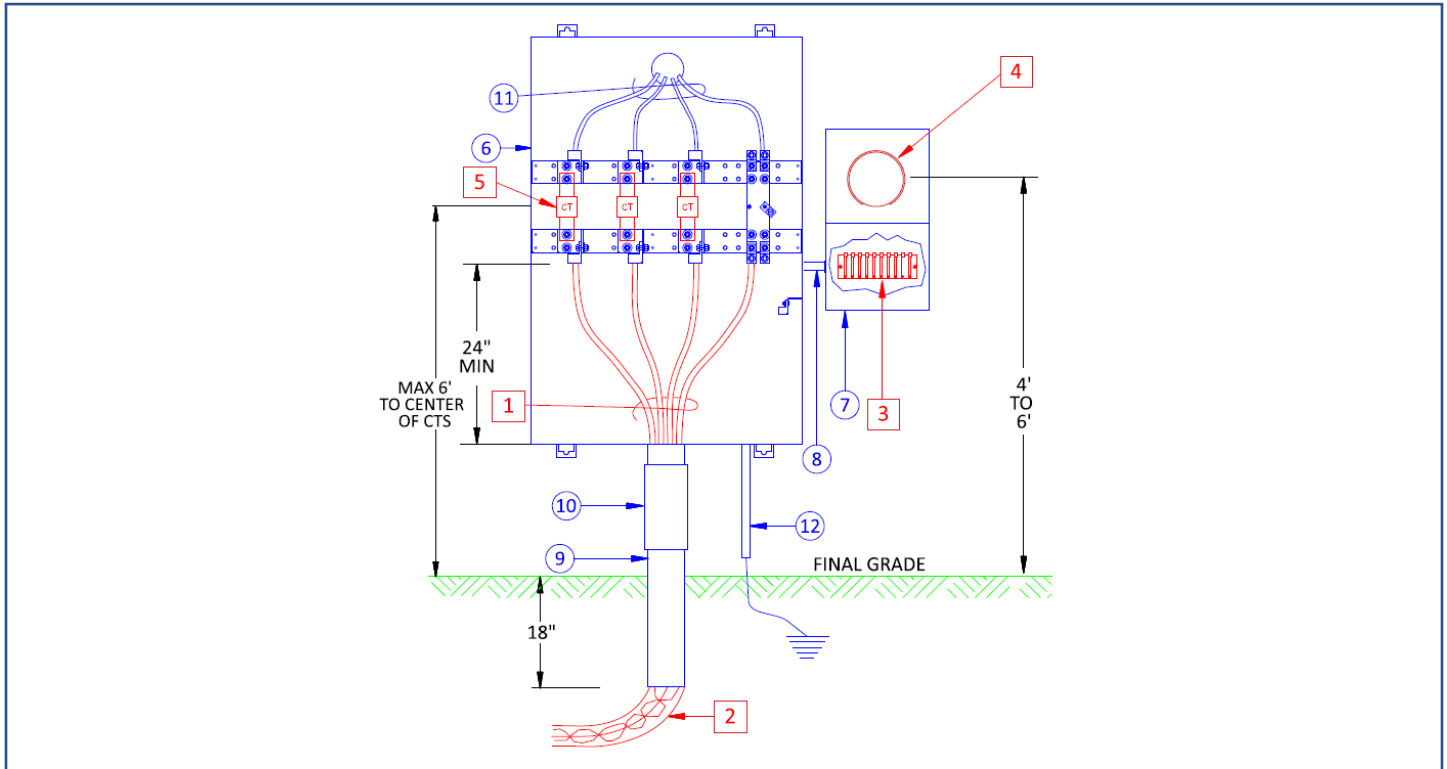
- Attachment points higher than 48" above the roof require guying.
- Protective posts and/or rigid conduit will be required if subject to vehicular damage. See **MIS-7**.
- Single-metered 277/480V services will require a CT cabinet, see **COM-3**.
- For **Utility/CATV Services only**, approved residential meter sockets are acceptable for service entrances 60 amps or less. For service entrances 100 amps or larger, commercial rated lever bypass is required.

COM-3

COMMERCIAL SINGLE-METER WALL-MOUNT UNDERGROUND SERVICE

SINGLE-PHASE – 400A TO 600A

THREE-PHASE – 400A TO 2000A



MGE WILL FURNISH:

1. Underground service conductors.
2. Conduit(s), including 36-inch 90 degree sweep(s), up to the customer's stubbed conduit(s).
3. Meter test switch, installed by MGE.
4. Electric meter and wiring to test switch.
5. Bar-type current transformers (CTs), installed by customer.

CUSTOMER WILL FURNISH:

6. MGE approved bar-type CT cabinet, securely fastened to wall surface, using strut when needed. See **TABLE 5**.
7. MGE approved CT rated meter socket, on opposite side of wireway, if applicable. See **TABLE 4**.
 - The use of a meter shield may be required, see **MIS-10**.
8. One-inch rigid conduit for meter wiring, minimum 6" long, with grounding locknuts.
 - Use existing knockouts on meter socket.
 - MGE does not allow LBs on unmetered conduit.
9. MGE approved underground service conduit(s). See **TABLE 7**.
 - OR optional underground raceway(s). See **TABLE 8**.
10. Expansion fitting(s) installed above-grade.
11. Conduit and wires to main service disconnect.
 - The ampacity rating of the main disconnect(s) may not exceed the ampacity rating of the CT cabinet.
12. Ground in accordance with applicable electrical codes.

COMMERCIAL SINGLE-METER PAD-MOUNT UNDERGROUND SERVICE
SINGLE-PHASE – 400A TO 600A
THREE-PHASE – 400A TO 4000A

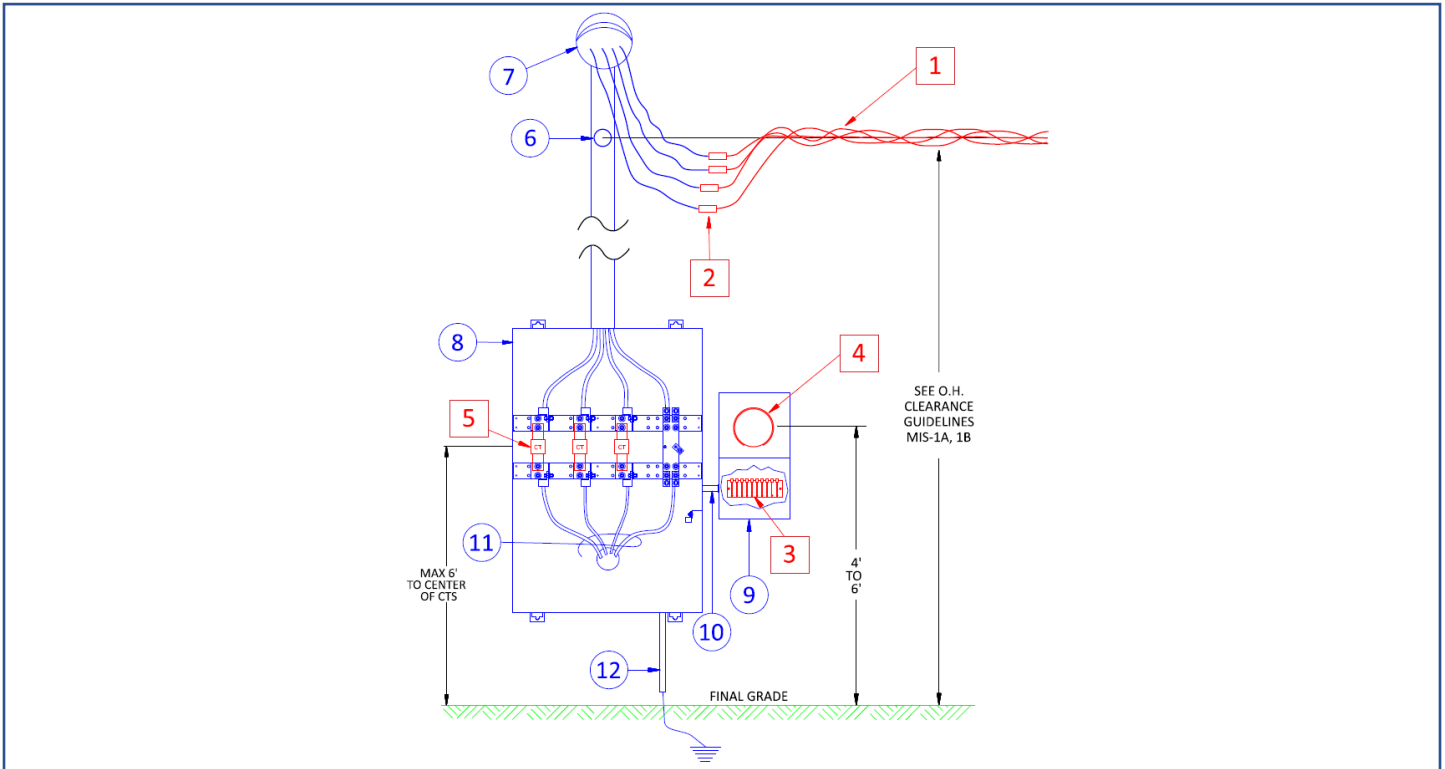


COM-5

COMMERCIAL SINGLE-METER WALL-MOUNT OVERHEAD SERVICE

SINGLE-PHASE OR THREE-PHASE

400 TO 600A



MGE WILL FURNISH:

1. Overhead service conductors.
2. Compression-type connectors. MGE to make final connection.
3. Meter test switch, installed by MGE.
4. Electric meter and wiring to test switch.
5. Bar-type current transformers (CTs), installed by customer.

CUSTOMER WILL FURNISH:

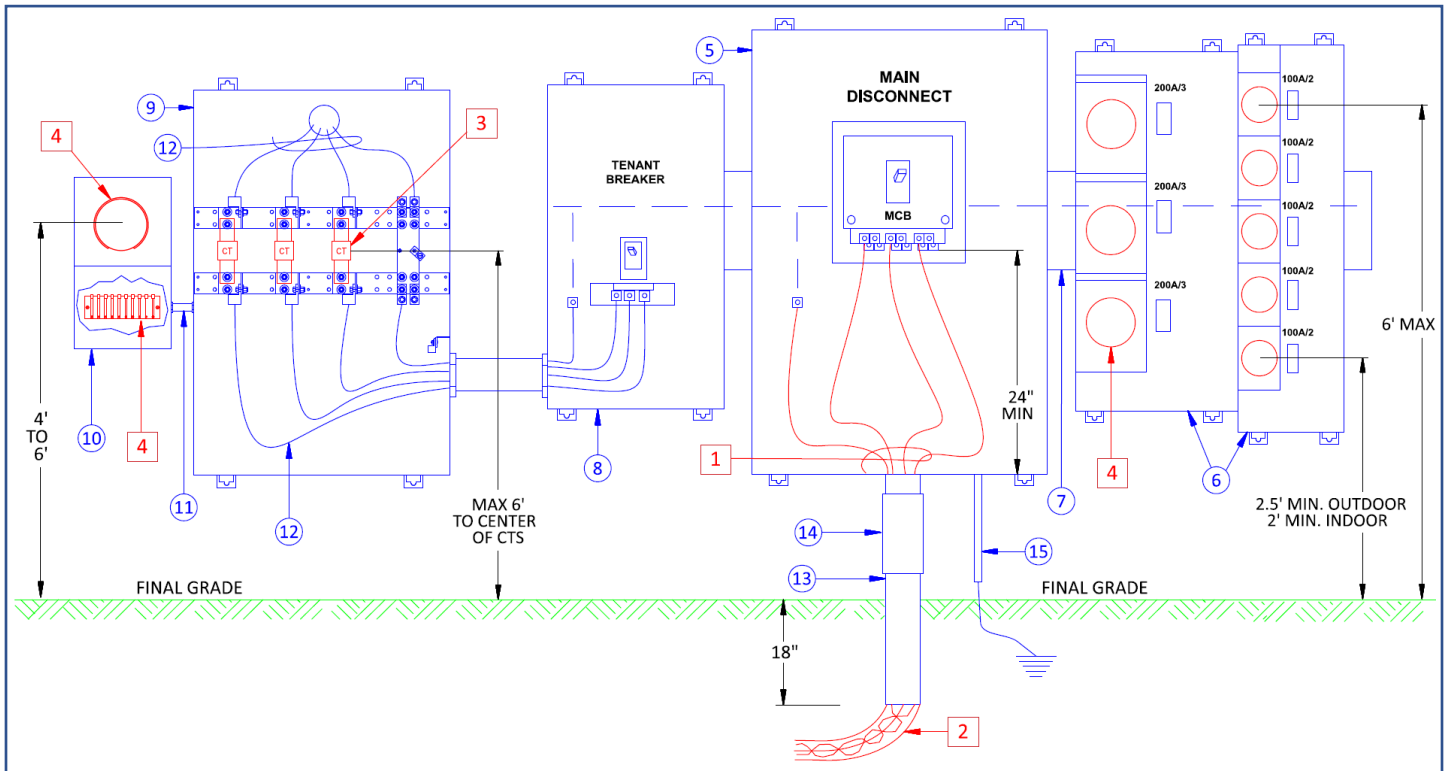
6. Point of attachment – suitable insulated spool(s) and bracket to support service drop conductors.
7. Service riser, conductors, and weatherhead. Leave 36-inch-long wire leads for connection to MGE service drop. MGE does not allow LBs before the meter.
8. MGE approved bar-type CT cabinet, securely fastened to wall surface, using strut when needed. See **TABLE 5**.
9. MGE approved CT rated meter socket. See **TABLE 4**.
 - The use of a meter shield may be required, see **MIS-10**.
10. One-inch rigid conduit for meter wiring, minimum 6" long, with grounding locknuts.
 - Use existing knockouts on meter socket.
11. Conduit and wires to main service disconnect.
 - The ampacity rating of the main disconnect(s) may not exceed the ampacity rating of the CT cabinet.
12. Ground in accordance with applicable electrical codes.

NOTES:

- Requires MGE Engineering approval. Contact MGE Engineering before building service.

COM-6

COMMERCIAL MULTIPLE METERING INSTALLATION SINGLE-PHASE UP TO 600A OR THREE-PHASE 120/240V OR 120/208V



MGE WILL FURNISH:

1. Underground service conductors.
2. Conduit(s), including 36-inch 90 degree sweep(s), up to the customer's stubbed conduit(s).
3. Bar-type current transformers (CTs), installed by customer.
4. Electric meters, meter test switch, and wiring to test switch, all installed by MGE.

CUSTOMER WILL FURNISH:

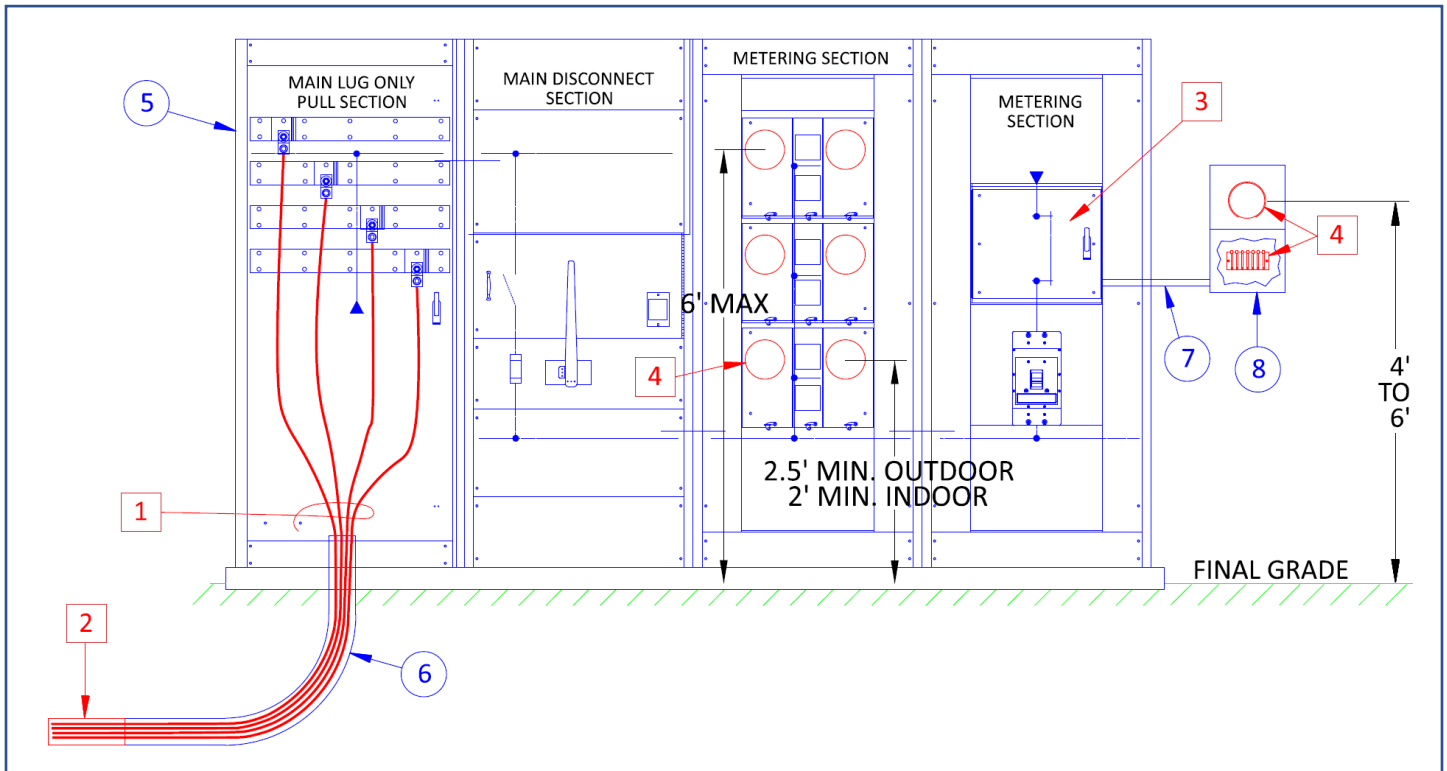
5. Pre-bussed bottom-termination main disconnect switch or main breaker. At least 24" of pullspace is required.
6. Pre-bussed jaw-releasing lever bypass meter stack(s), to be approved by MGE on a case-by-case basis.
7. Pre-bussed spacer on the meter side of the meter stack.
8. Disconnect switch for any meter greater than 200A. Disconnects must be switch-fuse sequence.
9. MGE approved bar-type CT cabinet for any meter greater than 200A. See **TABLE 5**.
10. MGE approved CT rated meter socket, on opposite side of wireway, if applicable. See **TABLE 4**.
 - The use of a meter shield may be required, see **MIS-10**.
11. One-inch rigid conduit for meter wiring, minimum 6" long, with grounding locknuts.
 - Use existing knockouts on meter socket.
 - MGE does not allow LBs on unmetered conduit.
12. Customer-owned wiring between disconnect and CT cabinet, and to customer loads.
13. MGE approved underground service conduit(s). See **TABLE 7**.
14. Expansion fitting(s) installed above-grade.
15. Ground in accordance with applicable electrical codes.

NOTES:

- Metered and unmetered wire cannot occupy the same space.
- Unmetered taps are not allowed in customer owned equipment.
- All unmetered sections must be sealable.
- All 480V meters must have their own disconnect ahead of the meter for a switch-fuse-meter sequence.

COM-7

COMMERCIAL CUSTOMER OWNED SECONDARY SWITCHBOARD SHOWN WITH MULTIPLE METERING UP TO 4000 AMPERES



MGE WILL FURNISH:

1. Underground service conductors.
2. Conduit(s), including 36-inch 90 degree sweep(s), up to the customer's stubbed conduit(s).
3. Current transformers (CTs), installed by customer. The CT compartment must be sized to accommodate standard MGE CTs. Contact MGE Meter Shop for specific information.
4. Electric meter(s), meter test switch, and wiring to test switch, all installed by MGE.

CUSTOMER WILL FURNISH:

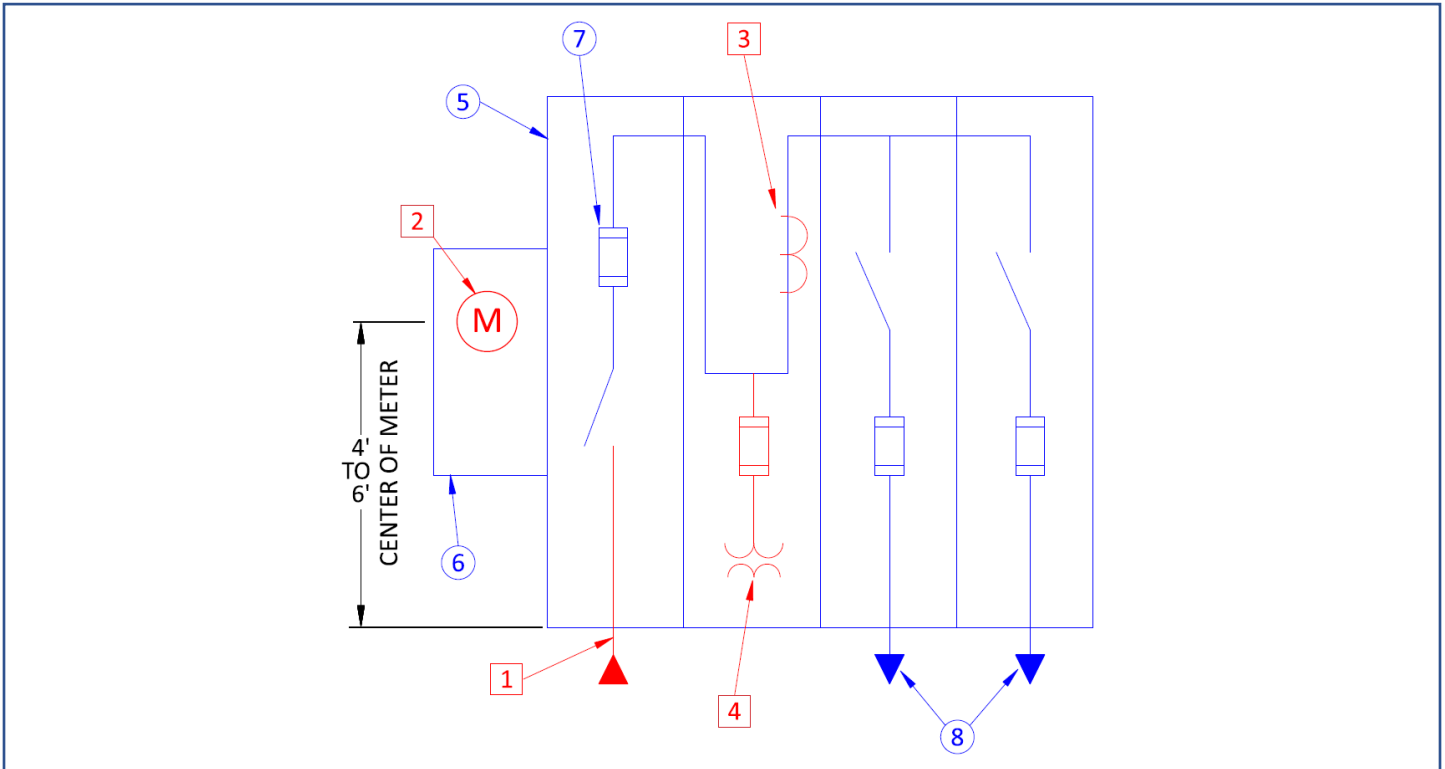
5. Customer owned secondary switchboard with main-lug-only termination section, main disconnect switch, metering compartment(s), and distribution sections. In a multiple-metering setup, each meter will be cold-sequence with a separate disconnect ahead of each metering section.
 - MGE requires tamper-proof sealing provisions on all unmetered sections.
6. MGE approved underground service conduit(s). See **TABLE 7**.
 - Use 36" 90 degree bends and extend at 3' below grade to 3' past concrete pad, towards transformer.
7. One-inch rigid conduit for metering wires from meter socket to switchboard, with grounding locknuts.
 - Use non-metallic conduit between CT compartment and edge of switchboard.
 - Use existing knockouts on meter socket.
8. MGE approved CT-rated meter socket, mounted on wall near switchboard. See **TABLE 4**.

NOTES:

- The switchboard shown is typical for a multiple meter service. Each switchboard will be treated on an individual basis. **MGE Engineering must approve each switchboard on a case-by-case basis before installation.**

COM-8

ONE-LINE DIAGRAM FOR CUSTOMER-OWNED PRIMARY METERING SWITCHGEAR 13.8KV



MGE's preferred method of primary metering is a MGE owned pad-mounted primary-metering switchgear. This drawing is for reference only and shall not be used without MGE Engineering approval.

MGE WILL FURNISH:

1. High-voltage (13.8 kV) service conductors.
2. Metering equipment (not shown).
3. Bar-type current transformers, installed by customer or switchgear manufacturer.
4. Potential transformers, installed by customer or switchgear manufacturer.

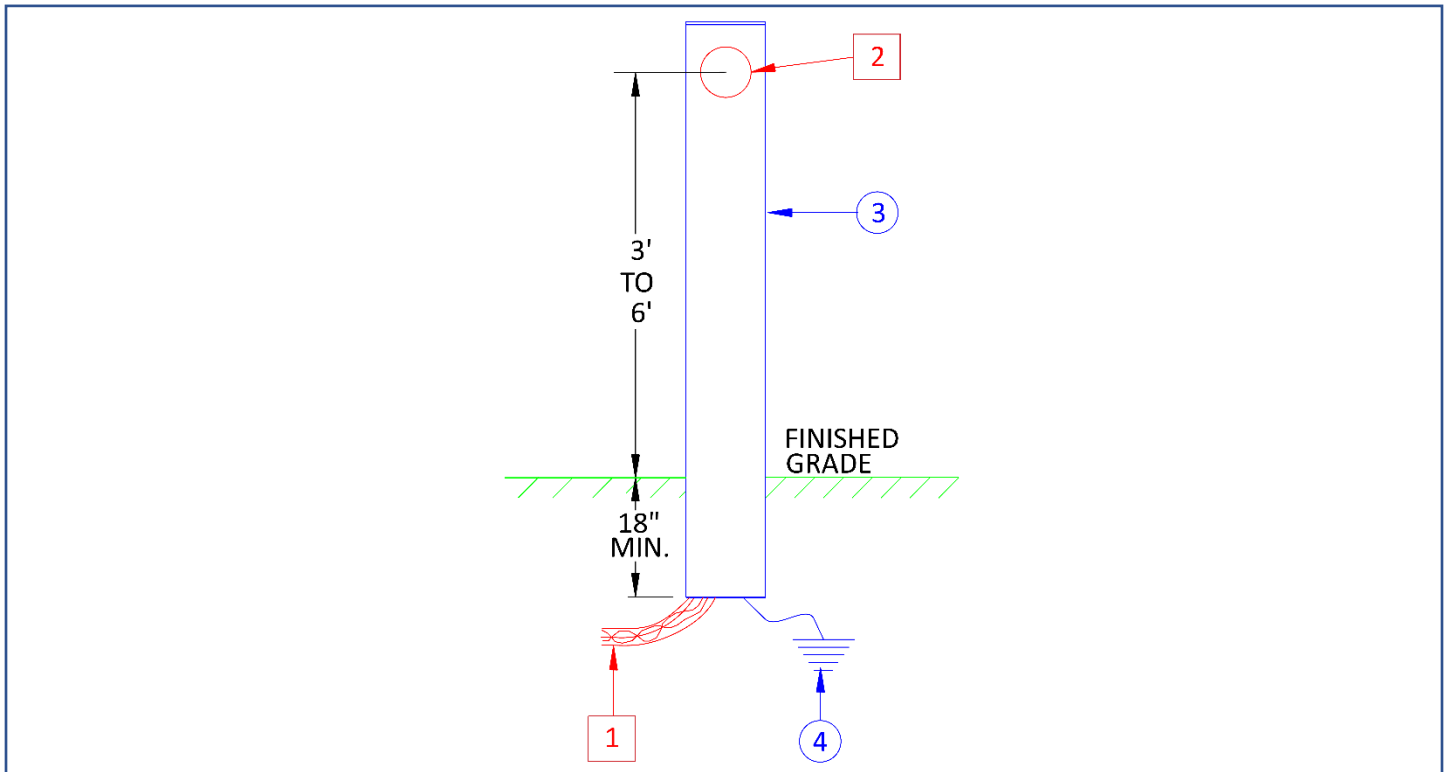
CUSTOMER WILL FURNISH:

5. Primary metering switchgear, as approved by MGE.
6. Meter equipment enclosure, as specified by MGE.
7. Main service fusing, as approved by MGE.
8. Fusing and primary cable to transformers.

NOTES:

- Contact MGE Engineering before designing primary metered services.

RES-1
RESIDENTIAL SINGLE METER UNDERGROUND SERVICE
SINGLE-PHASE
320A OR LESS
120/240V OR 120/208V



MGE WILL FURNISH:

1. Service conductors and service conduit.
2. Electric meter.

CUSTOMER WILL FURNISH:

3. MGE approved underground meter socket. See **TABLE 1**.
 - Horn Bypass is acceptable for 200A and less.
 - 320A requires a jaw-releasing lever bypass pedestal.
 - For 120/240V single-phase, three-wire, use a four-terminal meter pedestal.
 - For 120/208V single-phase, three-wire, use a five-terminal meter pedestal.
 - See drawing **MIS-9** for meter wiring schematics.
4. Ground in accordance with applicable electrical codes.

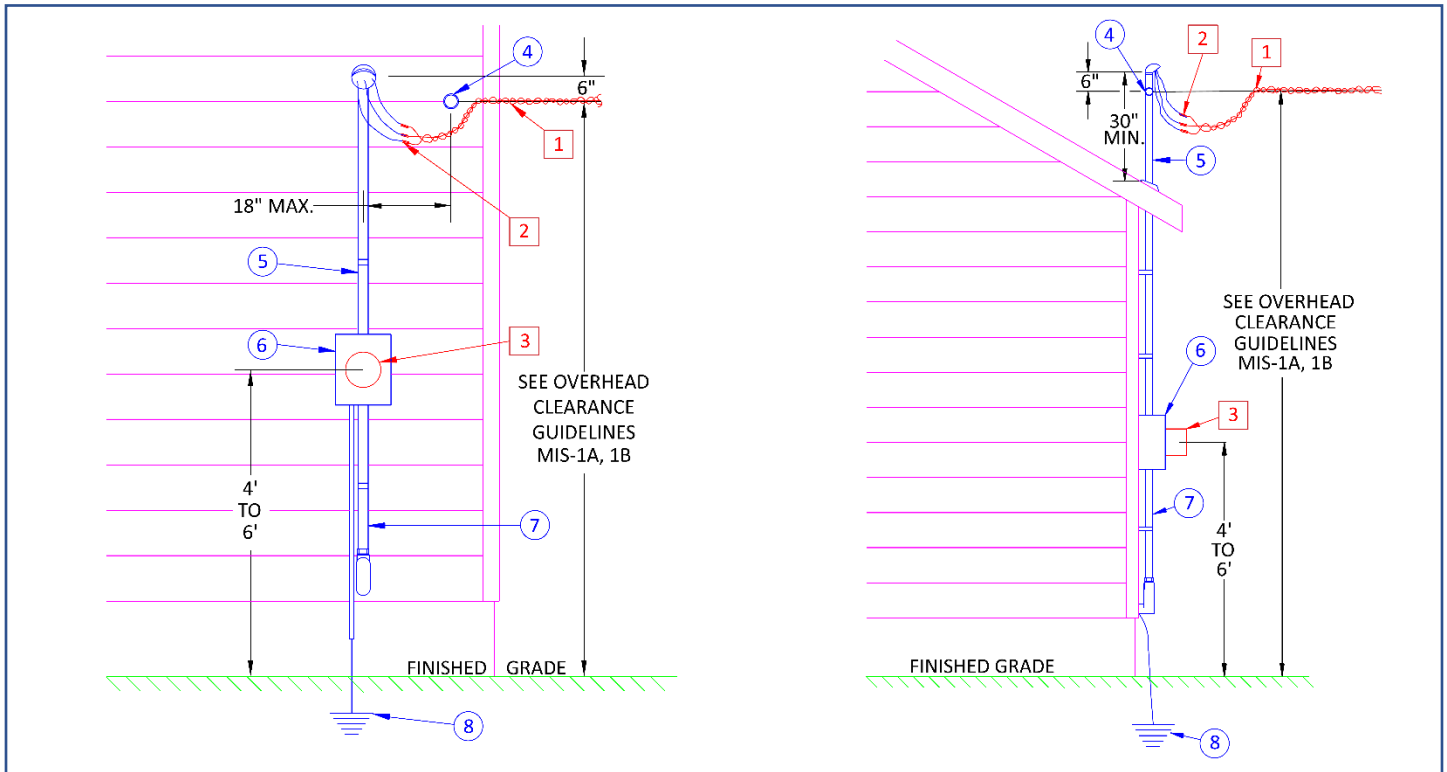
NOTES:

- Protective posts will be required if subject to vehicular damage. See **MIS-7**.

RES-2

RESIDENTIAL SINGLE METER OVERHEAD SERVICE

SINGLE-PHASE 200A OR LESS 120/240V OR 120/208V



MGE WILL FURNISH:

1. Overhead service conductors.
2. Compression-type connectors. MGE to make final connection.
3. Electric meter.

CUSTOMER WILL FURNISH:

4. Point of attachment – suitable insulated spool(s) and bracket to support service drop conductors.
5. Service riser, conductors, and weatherhead. Leave 36-inch-long wire leads for connection to MGE service drop. MGE does not allow LBs before the meter.
 - A minimum of a two-inch rigid conduit is required for risers above the roof where service conductors attach.
6. MGE approved 200A overhead meter socket with horn bypass. See **TABLE 1**.
 - For 120/240V single-phase, three-wire, use a four-terminal meter pedestal.
 - For 120/208V single-phase, three-wire, use a five-terminal meter pedestal.
 - See drawing **MIS-9** for meter wiring schematics.
7. Conduit and wire to main service disconnect.
8. Ground in accordance with applicable electrical codes.

NOTES:

- Attachment points higher than 48" above the roof require guying.
- Protective posts and/or rigid conduit will be required if subject to vehicular damage. See **MIS-7**.

RESIDENTIAL SINGLE-METER WALL-MOUNT UNDERGROUND SERVICE

SINGLE-PHASE

400A TO 600A



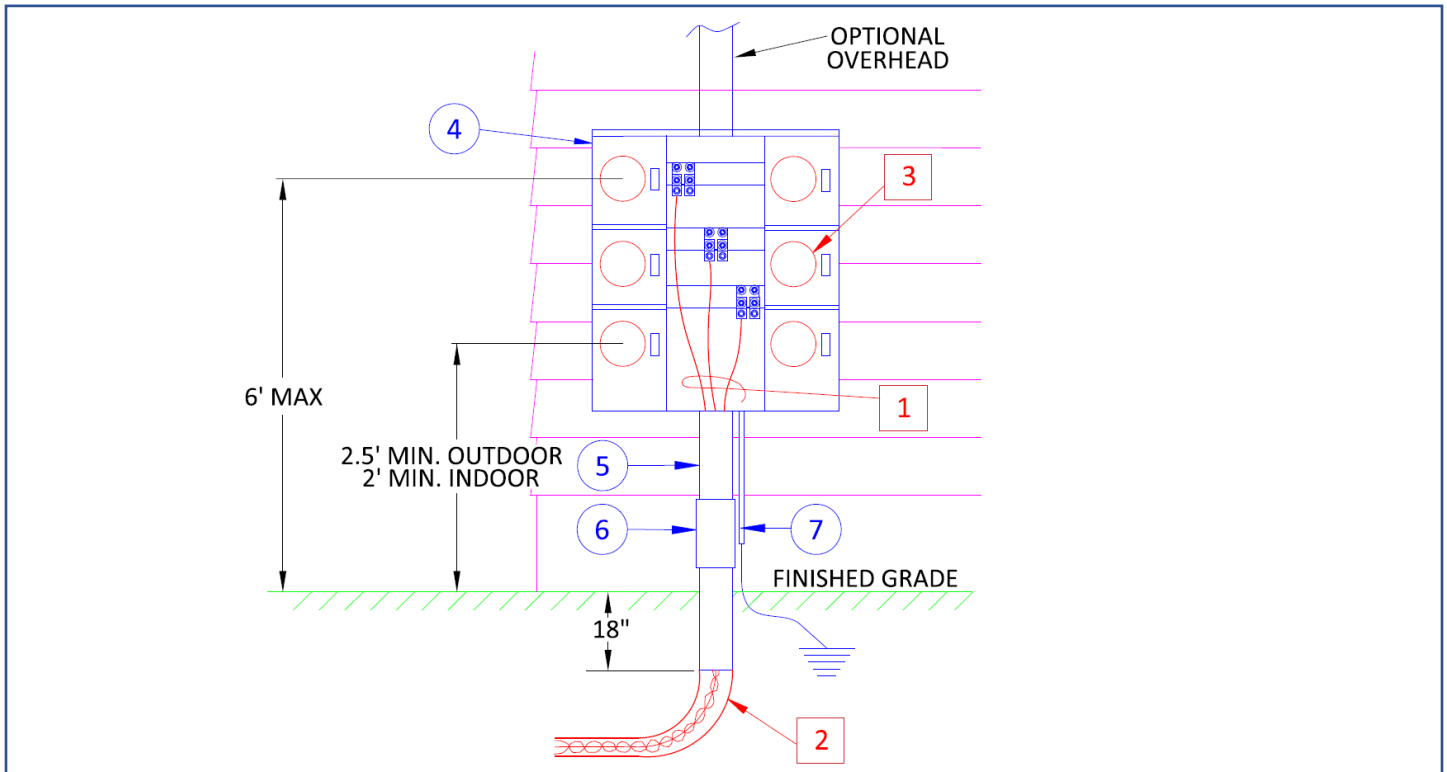
RES-4

RESIDENTIAL MULTIPLE-METER UNDERGROUND OR OVERHEAD SERVICE

SINGLE-PHASE UP TO 600A

2 TO 6 METERS

200A OR LESS PER POSITION



MGE WILL FURNISH:

1. Underground service conductors.
2. Conduit(s), including 36-inch 90 degree sweep(s), up to the customer's stubbed conduit(s).
3. Electric meters.

CUSTOMER WILL FURNISH:

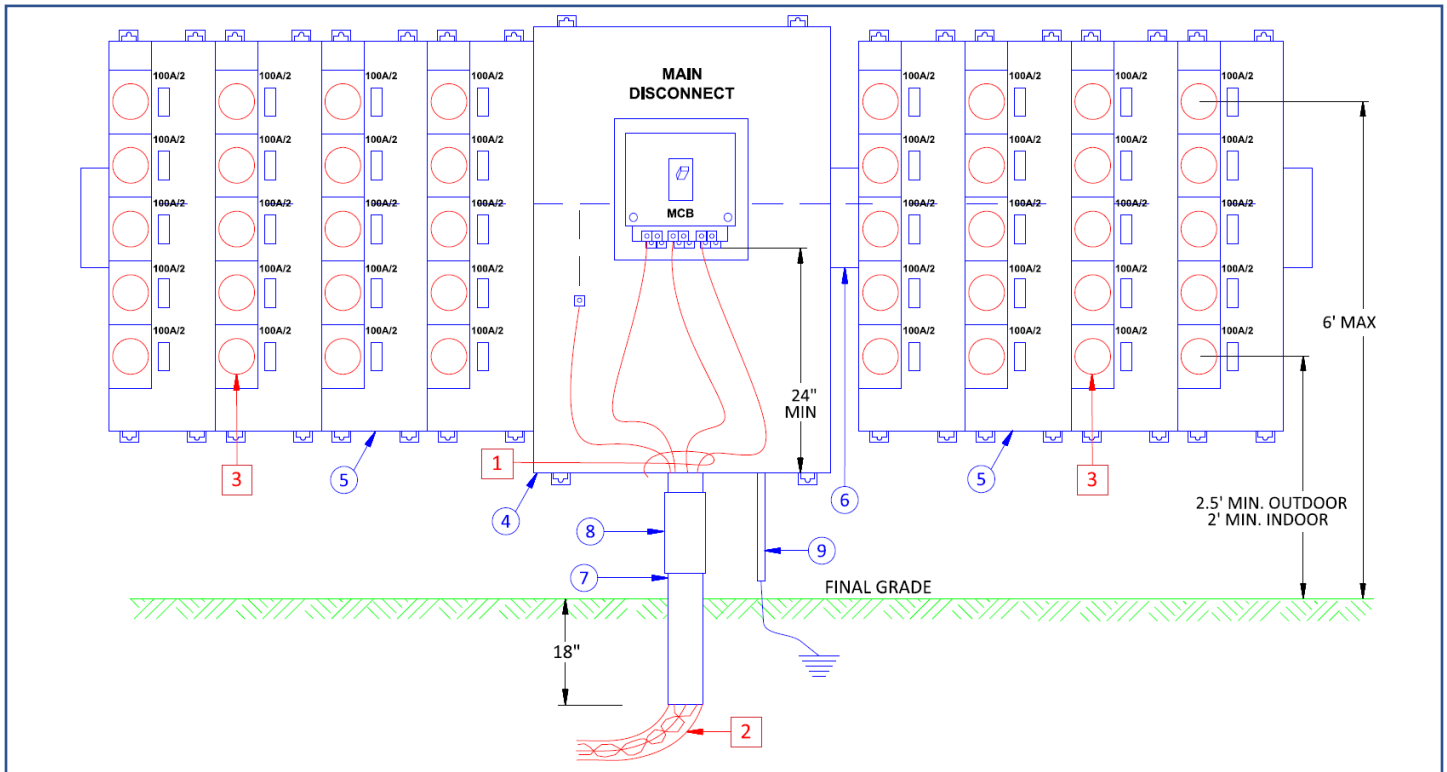
4. MGE approved pre-bussed 2 to 6 position meter sockets. See **TABLE 2**.
 - Underground services require a separate termination section for MGE.
5. MGE approved underground service conduit(s). See **TABLE 7**.
 - OR optional underground raceway(s). See **TABLE 8**.
6. Expansion fitting(s) installed above-grade.
7. Ground in accordance with applicable electrical codes.

NOTES:

- When installing an overhead service in an underground-ready area, install underground service conduit(s) and a termination section able to accept an underground feed. Contact MGE Engineering.
- Protective posts will be required if subject to vehicular damage. See **MIS-7**.

RES-5

RESIDENTIAL MULTIPLE METERING INSTALLATION SINGLE-PHASE UP TO 600A OR THREE-PHASE MORE THAN 6 METERS – 200A OR LESS PER POSITION 120/240V OR 120/208V



MGE WILL FURNISH:

1. Underground service conductors.
2. Conduit(s), including 36-inch 90 degree sweep(s), up to the customer's stubbed conduit(s).
3. Electric meters.

CUSTOMER WILL FURNISH:

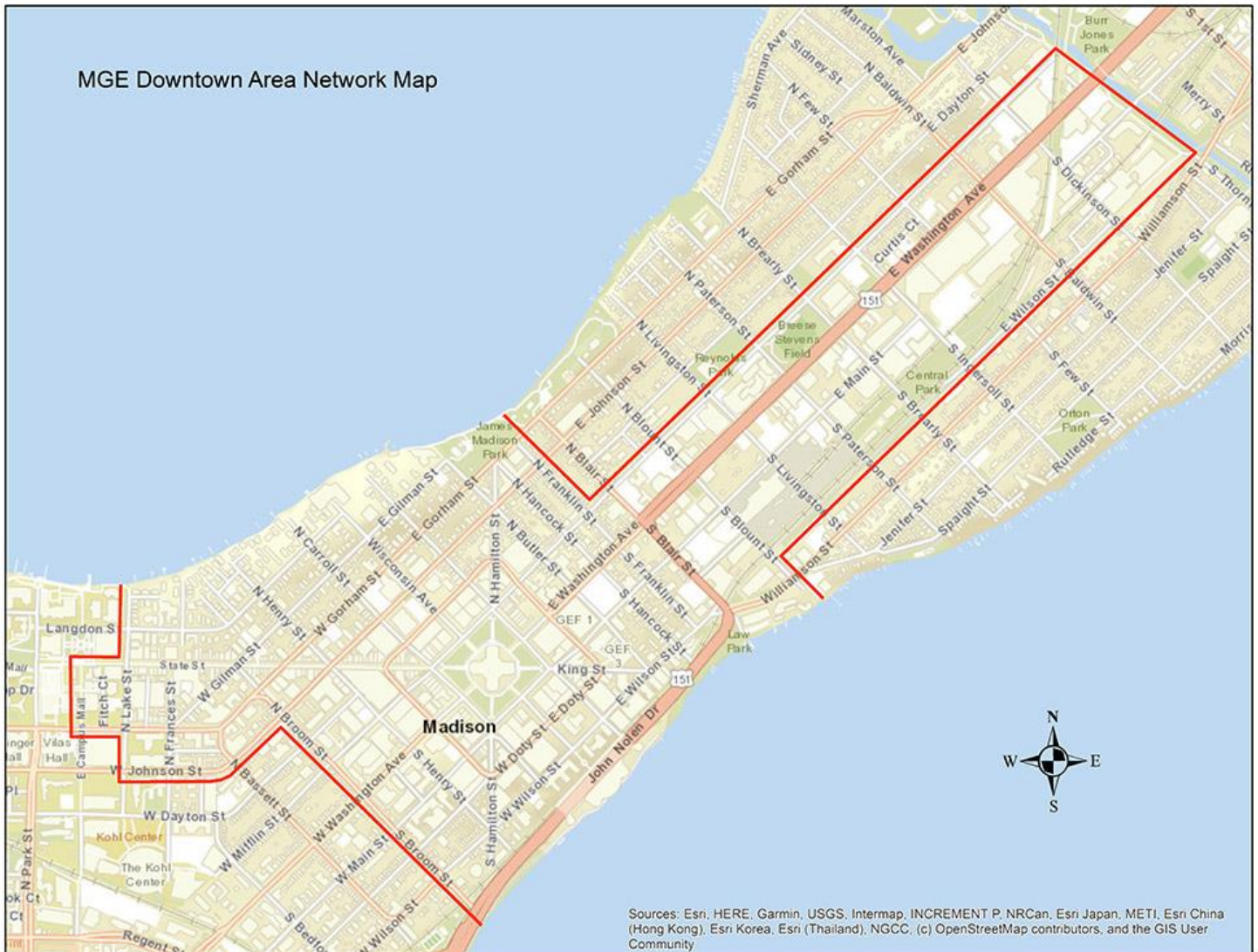
4. Pre-bussed bottom-termination main disconnect switch or main breaker. At least 24" of pullspace is required.
5. Pre-bussed horn bypass meter stack, to be approved by MGE on a case-by-case basis.
6. Pre-bussed spacer on the meter side of the meter stack.
7. MGE approved underground service conduit(s). See **TABLE 7**.
8. Expansion fitting(s) installed above-grade.
9. Ground in accordance with applicable electrical codes.

NOTES:

- Metered and unmetered wire cannot occupy the same space.
- Unmetered taps are not allowed in customer owned equipment.
- All unmetered sections must be sealable.
- All 480V meters must have their own disconnect ahead of the meter for a switch-fuse-meter sequence.

NET-1

LOW-VOLTAGE NETWORK MAP



NOTES:

- Contact MGE Engineering for service work in the low-voltage network area.
- Due to high available fault current, all low-voltage network services shall be cold-sequence (switch-fuse-meter).

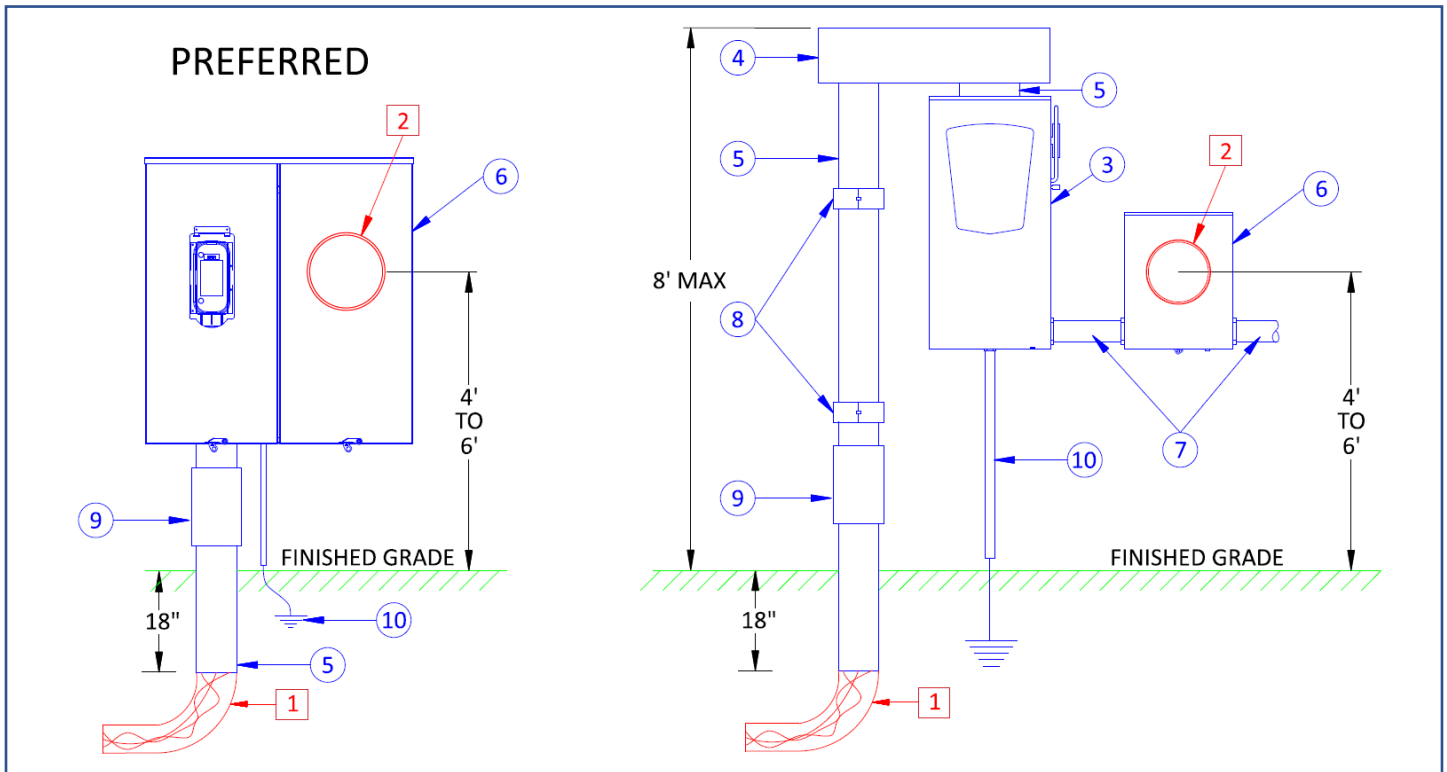
NET-2

RESIDENTIAL OR COMMERCIAL NETWORK SERVICE

SINGLE-PHASE OR THREE-PHASE

200A OR LESS, 120/208V

COLD-SEQUENCE (SWITCH-FUSE-METER)



MGE WILL FURNISH:

1. Service conductors and service conduit(s), including 36-inch 90 degree sweep(s), up to customer conduit stub(s). MGE may concrete encase the network service conduits.
2. Electric meter.

CUSTOMER WILL FURNISH:

3. Main disconnect switch or main breaker, fused at 200A or less.
4. Sealable outdoor-rated gutter, as specified in **TABLE 9**.
5. MGE approved service conduit(s). See **TABLE 7**.
6. MGE approved 200A underground meter socket. See **TABLE 1** for residential and **TABLE 3** for commercial.
 - For 120/208V single-phase, three-wire, use a five-terminal meter socket.
 - For 120/208V three-phase, four-wire, use a seven-terminal meter socket.
 - Combination disconnect and meter sockets preferred.
 - See drawing **MIS-9** for meter wiring schematics.
7. Conduit and wire to customer's main distribution panel.
8. Pipe strap(s) as needed.
9. Expansion fitting(s) installed above-grade.
10. Ground in accordance with applicable electrical codes.

NOTES:

- Protective posts and/or rigid conduit will be required if subject to vehicular damage. See **MIS-7**.
- Single-metered 277/480V services will require a CT cabinet, see **NET-3** or **NET-4**.

SEPARATE DISCONNECT & CT CABINET



NET-4

NETWORK SINGLE-METER WALL-MOUNT UNDERGROUND SERVICE

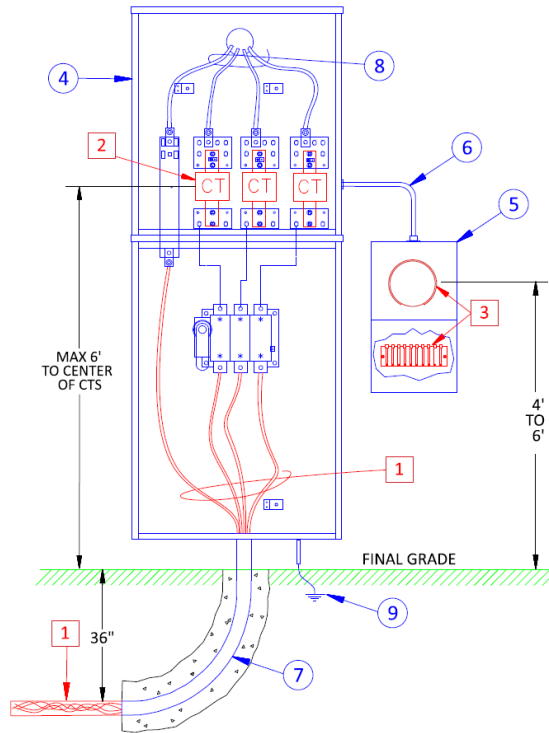
SINGLE-PHASE UP TO 600A

THREE-PHASE 400A TO 1200A

120/208V OR 277/480V

COLD-SEQUENCE (SWITCH-FUSE-METER)

"COMBO" DISCONNECT & CT CABINET



MGE WILL FURNISH:

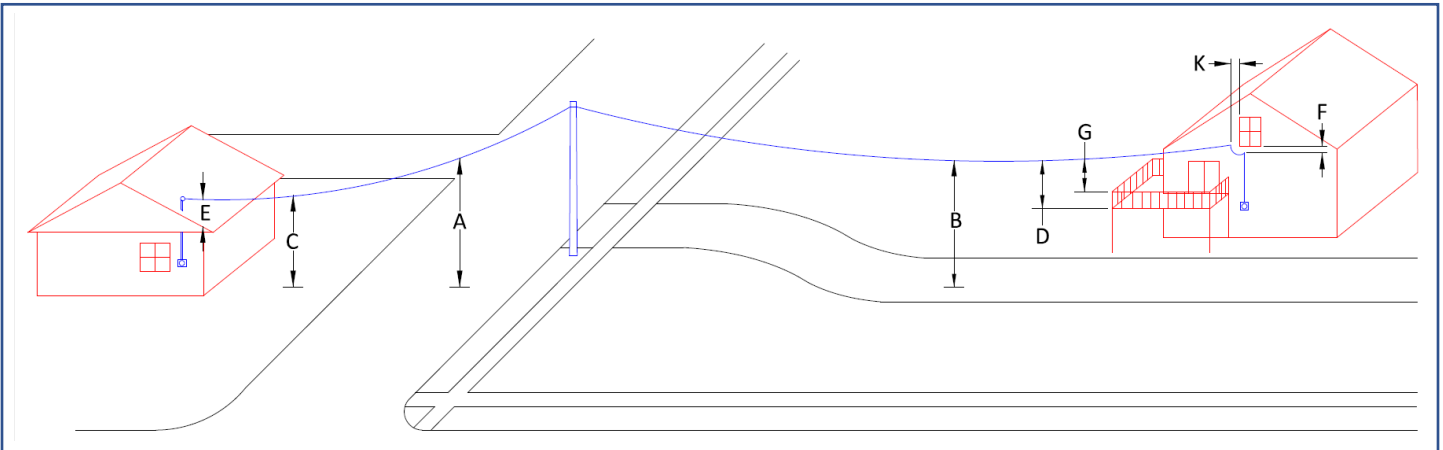
1. Service conductors and service conduit(s) up to customer conduit stub(s). MGE may concrete encased the network service conduits.
2. Bar-type current transformers (CTs), installed by customer.
3. Electric meter, meter test switch, and wiring to test switch, all installed by MGE.

CUSTOMER WILL FURNISH:

4. MGE approved pre-bussed combination main disconnect and CT enclosure. See **TABLE 6**.
 - Install side pullbox for bottom-exit applications.
5. MGE approved CT rated meter socket, on opposite side of wireway, if applicable. See **TABLE 4**.
 - The use of a meter shield may be required, see **MIS-10**.
6. One-inch rigid conduit for meter wiring, minimum 6" long, with grounding locknuts.
 - Use existing knockouts on meter socket. Do not enter the top of a meter socket without a knockout.
 - MGE does not allow LBs on unmetered conduit.
7. MGE approved service conduit(s), with 36" sweep 90 degree bends, concrete encased. See **TABLE 7**.
8. Conduit and wires to main panelboard.
9. Ground in accordance with applicable electrical codes.

MIS-1A

CLEARANCE GUIDELINES FOR A TYPICAL OVERHEAD SERVICE DROP INSTALLATION ADAPTED FROM THE 2014 WISCONSIN ADMINISTRATIVE CODE



The following are guidelines for overhead service drops. Refer to the 2014 Wisconsin Administrative code chapter PSC 114 for specific information concerning special conditions or contact MGE Engineering for assistance with specific applications.

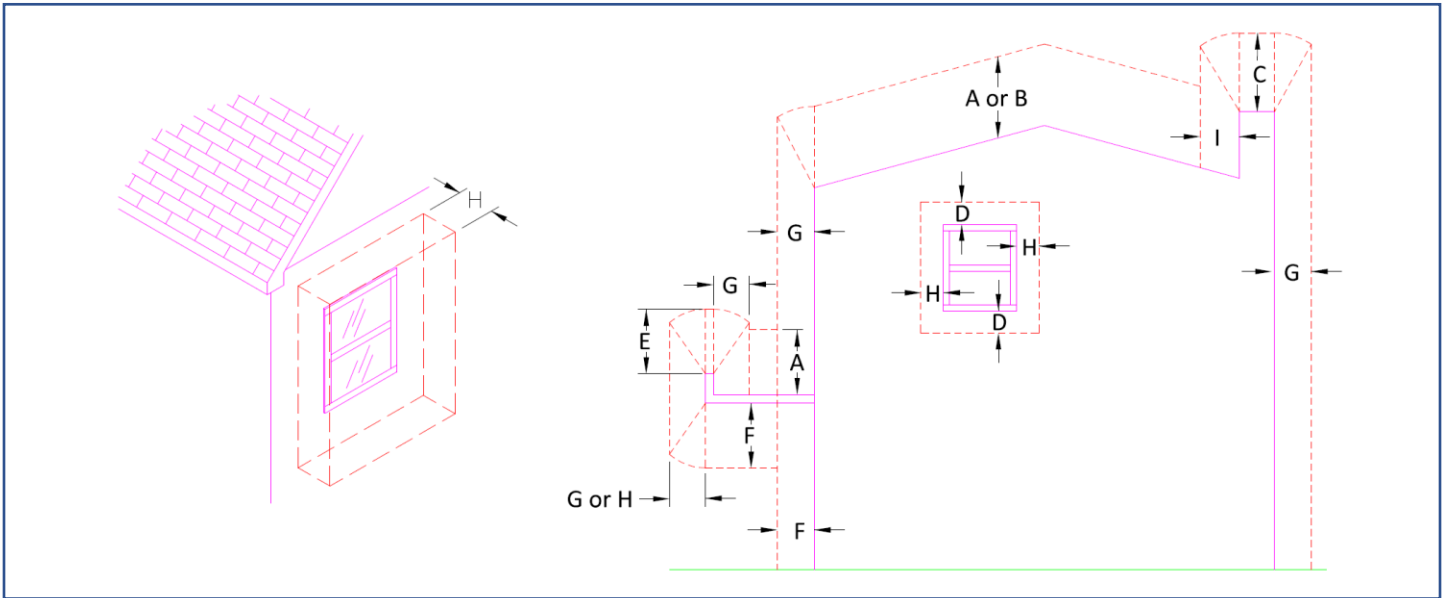
	Minimum Vertical Clearance
A. Roads streets, alleys, nonresidential driveways, parking lots, and other areas subject to truck traffic. (1)	18'*
B. Residential driveways. (1)(2)	18'*
C. Spaces or ways subject to pedestrians or restricted traffic only. (1)(3) (Use the clearance value of Item (H) if the requirement of footnote (3) is NOT met or does NOT apply to this area)	14'*
D. Over roofs, balconies, porches, or attached decks accessible to pedestrians. (4) (Service drop attached to building.)	12'* (10' to Drip Loop)
E. Over roofs or projections not accessible to pedestrians. (4)(5) (Service drop attached to building.)	10'* (8' to Drip Loop)
F. Windows, doors, or similar locations. (6)(7) (Service drop attached to building.)	3' (including drip loop)
G. Over railings, walls, or parapets around balconies, decks, or roof. (Service drop attached to building.)	5.5'*
H. Other land traversed by vehicles such as cultivated, grazing, forest, and orchard lands, industrial sites, commercial sites, etc. (1)(8) (Not shown)	18'*
I. Playground equipment. (Not Shown) (9)	13'*
J. Under balconies, fire escapes, porches, decks, etc. (Service drop attached to building.) (Not Shown)	5'*
	Minimum Horizontal Clearance with Wind Displacement
K. Windows, doors, balconies, fire escapes, porches, decks, etc. (7) (Service drop attached to building.)	3'
L. Swimming pool and spas. (Not Shown) (10)	10'
M. Playground equipment. (Not Shown) (11)	5'

MIS-1A Footnotes to Items A Through M:

1. A diagonal clearance equal to the required vertical clearance shall be maintained to uneven or sloping terrain within a horizontal distance of 3/4 (75%) of the required vertical clearance. All distances shall be measured from the conductors in their wind-displaced position as defined in National Electric Safety Code (NESC) Rule 234A2.
2. Where the height of a residential building does not permit service drop(s) to meet these values, the clearances over residential driveways only may be reduced to the following:
 - a. 14'* for supply service drops limited to 150-volts to ground and meeting Rules 230C1 and 230C3 as stated in the National Electrical Safety Code (NESC).
 - b. 10' for drip loops only of service drops limited to 150-volts to ground and meeting Rules 230C1 and 230C3 as stated in the NESC.
3. Spaces or ways subject to pedestrians, or restricted traffic only are those areas where riders on horses or other large animals, vehicles or other mobile units exceeding a total height of 8 ft. are prohibited by regulation or permanent terrain configurations or are otherwise not normally encountered nor reasonably anticipated. (Use the clearance value of Item (H) on farms and in rural areas where riders on horses or other large animals are NOT prohibited by regulation).
4. A roof, balcony, porch or attached deck is considered readily accessible to pedestrians if it can be accessed through a doorway, ramp, window, stairway, or permanently mounted ladder. (A permanently mounted ladder is not considered a means of access if its bottom rung is 8 ft. or more from the ground or other permanently installed accessible surface.)
5. This clearance may be reduced to 3' for drip loops and 5' (*) for supply conductors limited to 300-volts to ground and if the roof has a slope of not less than 4 inches (vertical) to 12 inches (horizontal).
6. Above the top level of a window is considered out of reach from the window and, where necessary, may be installed less than 3' if all other requirements are met.
7. This does not apply to windows that are not designed to open and, where necessary, may be installed less than 3' if all other requirements are met.
8. When designing a line to accommodate oversized vehicles, these clearance values shall be increased by the difference between the known height of the oversized vehicle and 14 ft.
9. Vertical and diagonal clearance is from the highest points of the equipment installation in reference to the overhead service drop.
10. Swimming pools and spas require a 10' minimum horizontal clearance from the inside walls on the pool or spas, and 22.5 ft. clearance in any direction to the edge of water surface or inside edge of pools.
11. Horizontal clearance is from the closest point of the equipment installation.

MIS-1B

CLEARANCE GUIDELINES FOR A TYPICAL OVERHEAD SERVICE DROP INSTALLATION ADAPTED FROM THE 2014 WISCONSIN ADMINISTRATIVE CODE



The following are guidelines for overhead service drops. Refer to the 2014 Wisconsin Administrative code chapter PSC 114 for specific information concerning special conditions or contact MGE Engineering for assistance with specific applications.

	Minimum Vertical Clearance
A. Over roofs, balconies, porches, or attached decks accessible to pedestrians. (1)	12'* (10' to Drip Loop)
B. Over roofs or projections not accessible to pedestrians. (1)(2)	10'* (8' to Drip Loop)
C. Signs, chimneys, billboards, antennas, etc. not accessible to pedestrians. (1)	5.5'*
D. Windows, doors, or similar locations. (3)(4)	3' (including Drip Loop)
E. Over railings, walls, or parapets around balconies, decks, or roof.	5.5'*
F. Under balconies, fire escapes, porches, decks, etc.	5'*
	Minimum Horizontal Clearance with Wind Displacement
G. Building walls, projections, windows, doors, balconies, fire escapes, porches, decks, etc. (Service drop not attached to building.)	5'
H. Windows, doors, balconies, fire escapes, porches, decks, etc. (3)(4)	3'
I. Signs, chimneys, billboards, antennas, etc. not accessible to pedestrians. (1)	3.5'

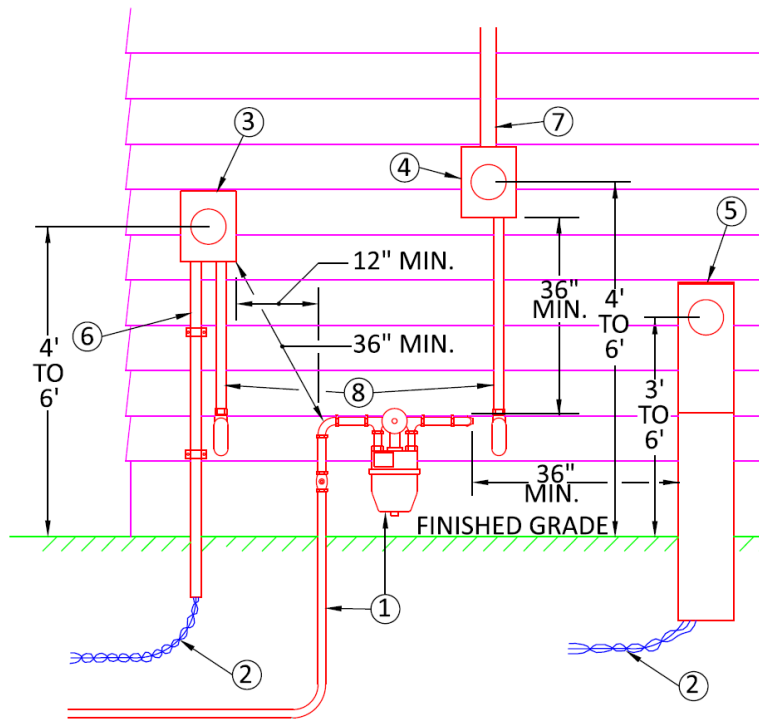
Footnotes to Items A Through I:

12. A roof, balcony, porch or attached deck is considered accessible to pedestrians if it can be accessed through a doorway, ramp, window, stairway, or permanently mounted ladder. (A permanently mounted ladder is not considered a means of access if its bottom rung is 8 ft. or more from the ground or other permanently installed accessible surface.)
13. This clearance may be reduced to 3' for drip loops and 5' (*) for supply conductors limited to 300-volts to ground and if the roof has a slope of not less than 4 inches (vertical) to 12 inches (horizontal).
14. Above the top level of a window is considered out of reach from the window and, where necessary, may be installed less than 3' if all other requirements are met.
15. This does not apply to windows that are not designed to open and, where necessary, may be installed less than 3' if all other requirements are met.

*Two additional feet of clearance have been added to these values to allow for additional sag when conductor temperatures exceeding 120 degrees Fahrenheit are caused by large load currents, or when crossing under projections a reduction of sag is required when conductor temperatures are below 32 degrees without ice.

MIS-2

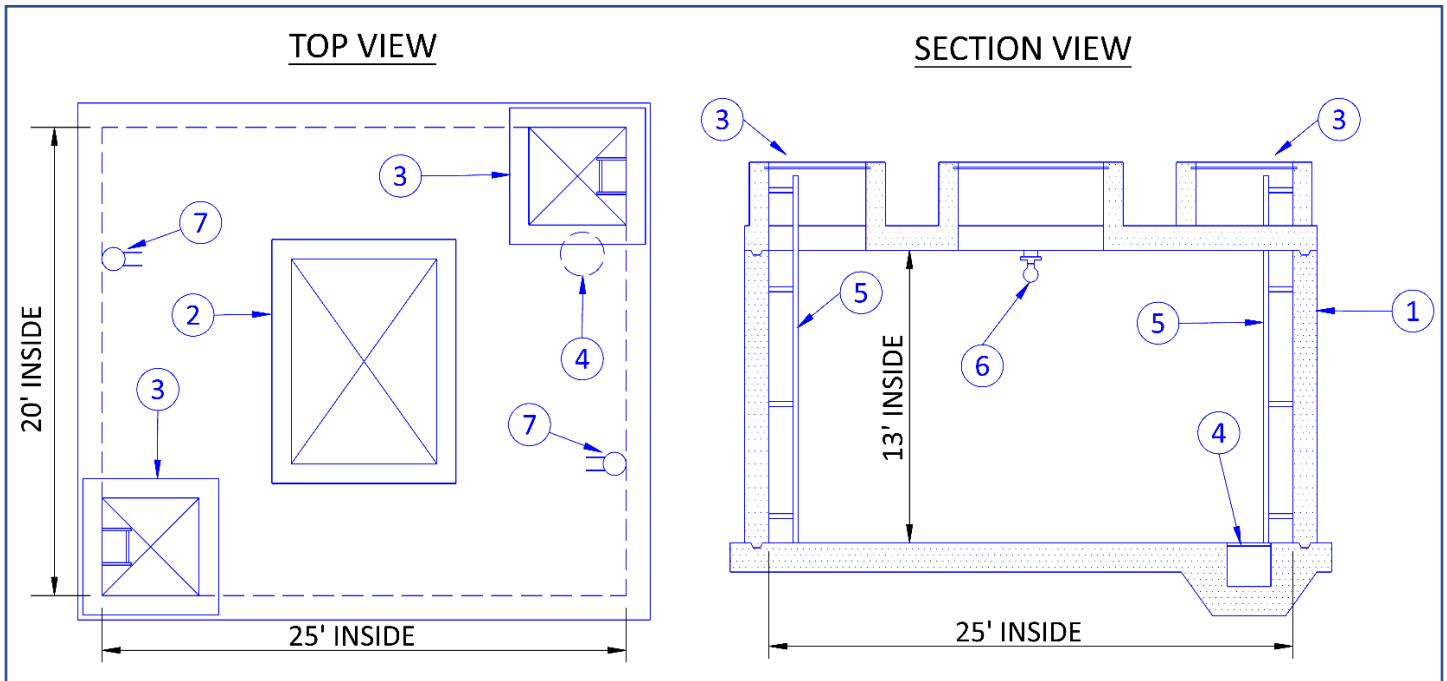
CLEARANCE GUIDELINES BETWEEN GAS AND ELECTRIC METERS



1. Gas meter and piping.
2. Underground electric service conductors.
3. MGE-approved underground meter socket.
4. MGE-approved overhead meter socket.
5. MGE-approved pedestal-type meter socket.
6. Two-inch PVC conduit for electric service conductors.
7. Overhead service riser and conductors.
8. Conduit and wire to main distribution panels.

MIS-3A

TYPICAL BELOW-GRADE TRANSFORMER VAULT TWO TRANSFORMER CONFIGURATION – 480V OR LESS



MGE WILL FURNISH:

- Submersible network transformer(s).
- Primary cables and terminations at transformer(s).
- Secondary terminations at transformer(s) and secondary collector bus.
- Ground rods (coordination required - installed prior to pouring of vault floor).
- Pulling irons at appropriate locations (furnished by MGE, installed by customer; coordination required - installed prior to pouring of vault wall).

CUSTOMER WILL FURNISH:

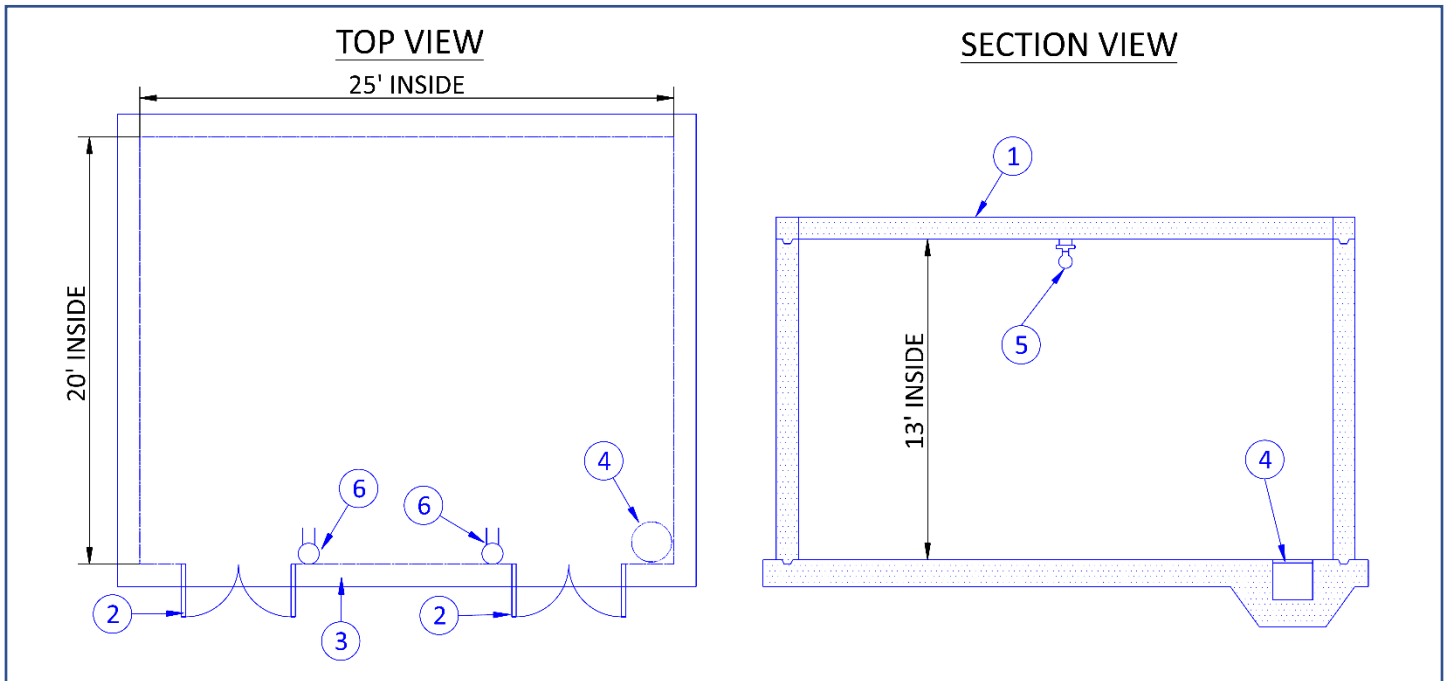
1. Transformer vault, including structural design, construction, and permanent maintenance.
2. Galvanized equipment access doors, 6' x 8' minimum, grilled to provide ventilation. MGE to provide specification.
3. Galvanized personnel access doors, 32" x 32" minimum, grilled to provide ventilation. MGE to provide specification.
4. Sump pit, 18" x 18" minimum, covered with galvanized steel plate, locate just to the side of one of the ladders; entire floor must be smooth troweled and drain toward pit.
5. Galvanized steel ships ladders at personnel access door.
6. Lighting with associated light switches located at each personnel access door no more than 18" below the ceiling.
7. 120V receptacles, as required by code, and at least one receptacle at the light switch location for each personnel access hatch.
8. Secondary service conductors from main disconnect to collector bus.
9. Ventilation per all applicable codes. Forced air ventilation is required if free air ventilation cannot be meet. NEC requires 3 square inches of free space per KVA of transformer capacity. Contact MGE for specifics on forced air ventilation.

NOTES:

- Dimensions and configuration shown are typical. Each transformer vault will be treated on an individual basis. Consult MGE for required vault dimensions and configuration. The customer will be responsible for the structural design and construction of the transformer vault.
- Vaults shall be constructed and maintained in accordance with all applicable codes and regulations, and away from occupied space.
- Permanent unrestricted 24/7 truck access to the vault is required.
- This information is intended to supplement the customer's construction documents. Any discrepancies shall be forwarded to MGE Engineering.

MIS-3B

TYPICAL ABOVE-GRADE TRANSFORMER VAULT TWO TRANSFORMER CONFIGURATION – 480V OR LESS



MGE WILL FURNISH:

- Submersible network transformer(s).
- Primary cables and terminations at transformer(s).
- Secondary terminations at transformer(s) and secondary collector bus.
- Ground rods (coordination required - installed prior to pouring of vault floor).
- Pulling irons at appropriate locations (furnished by MGE, installed by customer; coordination required - installed prior to pouring of vault wall).

CUSTOMER WILL FURNISH:

1. Transformer vault, including structural design, construction with proper support of existing facilities, and permanent maintenance.
2. Two sets of double doors, minimum of 3' wide and 7' tall per door, opening outwards with panic hardware keyed to MGE's locking cylinders that locks upon close.
3. Minimum 4" sill for oil containment.
4. Sump pit, 18" x 18" minimum, covered with galvanized steel plate. Entire floor must be smooth troweled and drain toward pit.
5. Lighting with associated light switches located at each personnel access door no more than 18" below the ceiling.
6. 120V receptacles, as required by code, and at least one receptacle at the light switch location for each personnel access hatch.
7. Secondary service conductors from main disconnect to collector bus.
8. Ventilation per all applicable codes. Forced air ventilation is required if free air ventilation cannot be met. NEC requires 3 square inches of free space per KVA of transformer capacity. Contact MGE for specifics on forced air ventilation.

NOTES:

- Dimensions and configuration shown are typical. Each transformer vault will be treated on an individual basis. Consult MGE for required vault dimensions and configuration. The customer will be responsible for the structural design and construction of the transformer vault.
- Vaults shall be constructed and maintained in accordance with all applicable codes and regulations, and away from occupied space.
- Permanent unrestricted 24/7 truck access to the vault is required.
- This information is intended to supplement the customer's construction documents. Any discrepancies shall be forwarded to MGE Engineering.

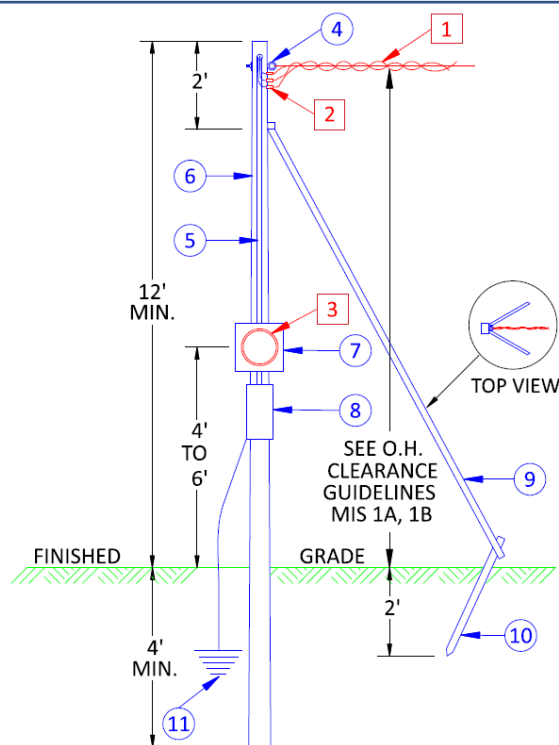
MIS-4

CUSTOMER OWNED OVERHEAD TEMPORARY SERVICE

SINGLE-PHASE OR THREE-PHASE

200A OR LESS

120/240V OR 120/208V



MGE WILL FURNISH:

1. Overhead service conductors, maximum length of 50 feet from overhead MGE facilities.
2. Compression-type connectors.
3. Electric meter.

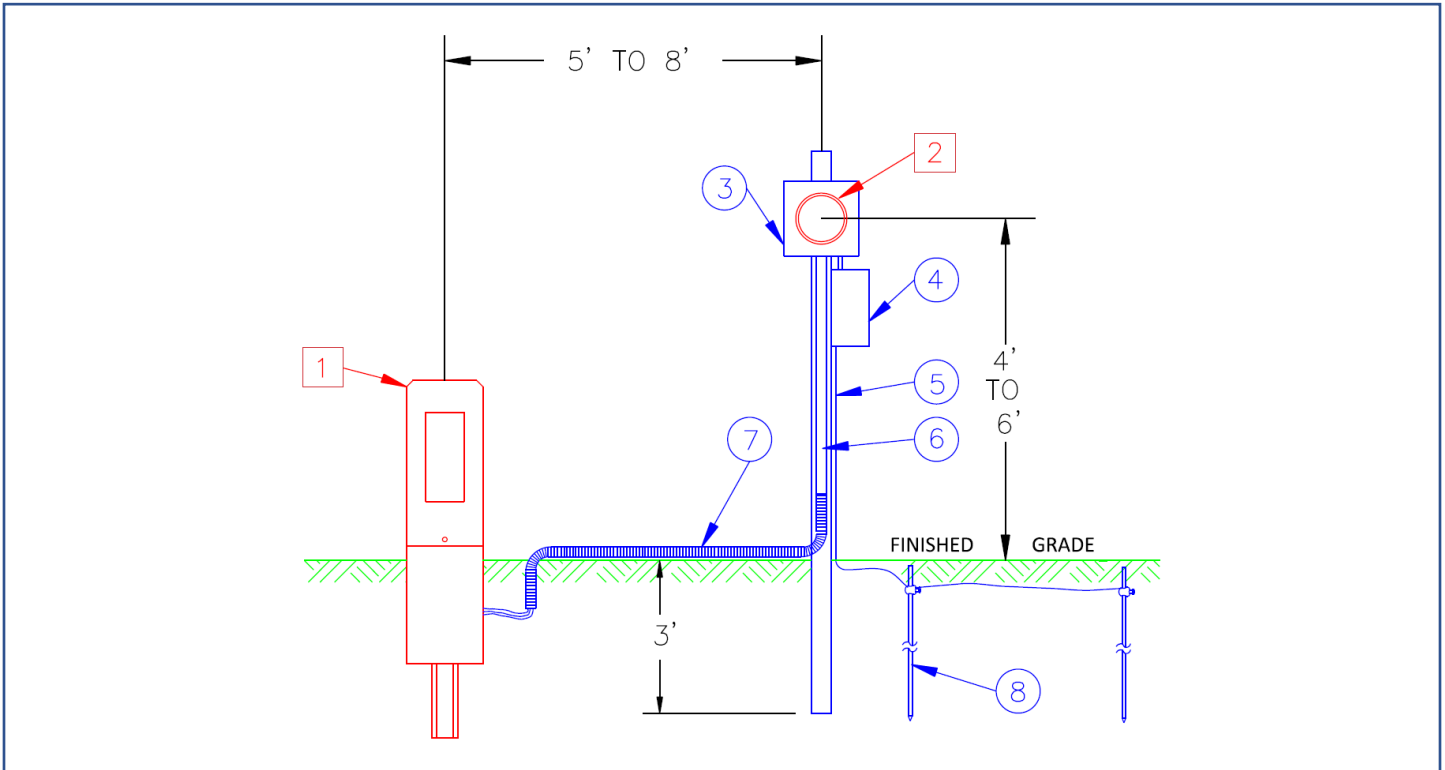
CUSTOMER WILL FURNISH:

4. Point of Attachment – insulated spool and bracket to support service drop conductors.
5. Service riser, conductors, and weatherhead. Leave 36" long wire leads for connection to MGE service drop.
6. Customer-owned pole with minimum cross section of 4" x 4". Poles over 16' long must be a minimum of Class 7 pole or equivalent. Pole to be set a minimum of 5' away from existing aerial facilities.
7. MGE-approved meter socket. See **TABLE 1** for residential and **TABLE 3** for commercial meter sockets.
 - All commercial temporary services will require a jaw-releasing lever bypass meter socket.
8. Distribution panel/outlets.
9. Two braces of 2" x 4" x 16' in direction of service origin or supporting guy.
10. Two 2" x 4" stakes.
11. Ground in accordance with applicable electrical codes.

NOTES:

- All temporary services must be inspected by the appropriate jurisdiction with the exception of single and two-family homes, which can be energized with a signed, notarized affidavit.
- Single-metered 277/480V services will require a CT cabinet, see **COM-3**.

MIS-5
CUSTOMER OWNED UNDERGROUND TEMPORARY SERVICE
SINGLE-PHASE OR THREE-PHASE
200A OR LESS
120/240V OR 120/208V



MGE WILL FURNISH:

1. Existing MGE pedestal or pad-mounted transformer.
2. Electric meter.

CUSTOMER WILL FURNISH:

3. MGE-approved meter socket. See **TABLE 1** for residential and **TABLE 3** for commercial meter sockets.
 - All commercial temporary services will require a jaw-releasing lever bypass meter socket.
4. Distribution panel/outlets.
5. Supporting post with minimum cross section of 4" x 4".
6. PVC conduit from meter socket down the supporting post.
7. Protective flexible conduit and cable of sufficient length to be terminated in pedestal or pad-mount transformer. Cable must be protected in accordance with applicable codes.
 - Ensure that service conduit/wire can fit in MGE's knockout, or dig under pedestal or transformer.
 - MGE personnel to make terminations within pedestal or transformer.
8. Ground in accordance with applicable electrical codes.

NOTES:

- All temporary services must be inspected by the appropriate jurisdiction with the exception of single and two-family homes, which can be energized with a signed, notarized affidavit.
- Single-metered 277/480V services will require a CT cabinet, see **COM-3**.

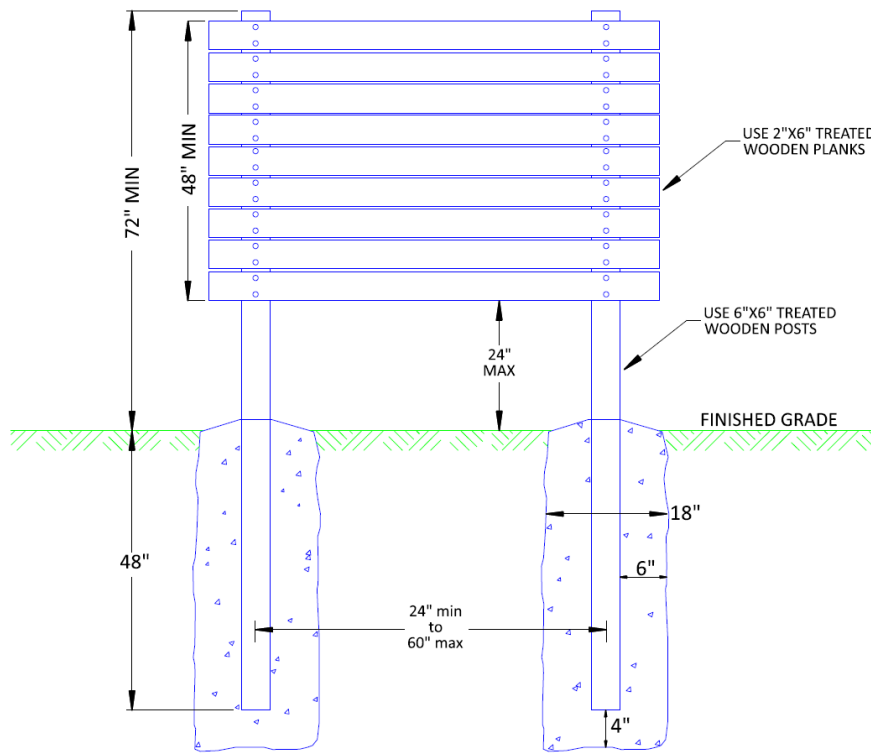
MIS-6A

OUTDOOR FREE-STANDING METER STRUCTURE

WOOD CONSTRUCTION

SINGLE-PHASE OR THREE-PHASE

2000A OR LESS



NOTES:

- Field built structures are limited to 2000A maximum.
- Wood field-built structures shall have a minimum of two 6" x 6" wood posts and 2" x 6" planks that are pressure treated against decay per the American Wood Protection Association (AWPA).
- The posts shall be buried a minimum of 4 feet deep, plumb and set in concrete the full depth.
- The planks shall be level and fastened with stainless steel or hot-dipped galvanized (G-185) hardware (bolts, washers, nuts, etc.), **nails and screws are not acceptable.**
- The customer is responsible for the maintenance of the structure.
- See above drawing for allowable design details.
- Temporary services do not require vertical posts to be set in concrete. Temporary services may have **new** 3/4" treated plywood on the front and back side of the vertical posts instead of the 2" x 6" treated wood planks. Contact MGE Engineering for further details.

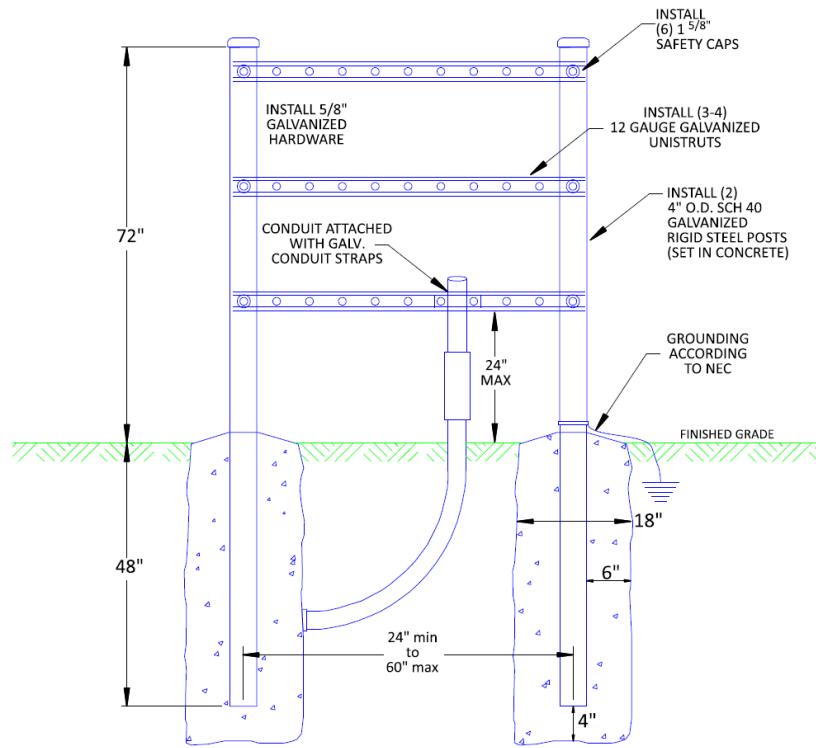
MIS-6B

OUTDOOR FREE-STANDING METER STRUCTURE

STEEL POST CONSTRUCTION

SINGLE-PHASE OR THREE-PHASE

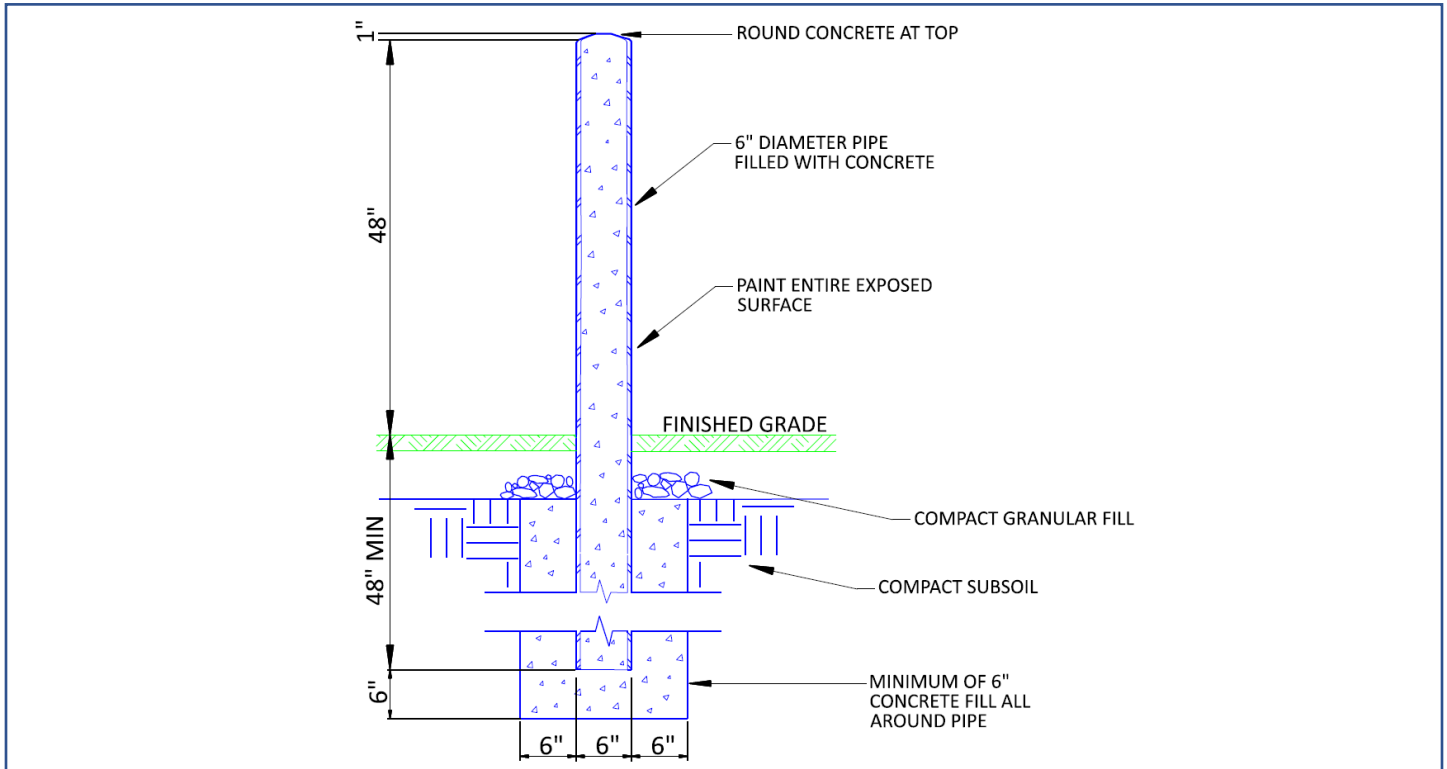
2000A OR LESS



NOTES:

- Field built structures are limited to 2000A maximum.
- Steel posts are not allowed to serve as equipment grounding conductors.
- Horizontal unistrut shall not extend beyond post & must have safety end caps.
- All metallic parts shall be bonded according to the NEC.
- Grounding shall conform to NEC and MGE Service Rules.
- Aluminum posts or beams are not allowed due to their corrosive properties when installed in concrete.
- See above drawing for allowable design details.
- Temporary services do not require vertical posts to be set in concrete. Contact MGE Engineering for further details.

MIS-7
PROTECTIVE BOLLARD
6" STEEL POST CONSTRUCTION
WITH CONCRETE FOUNDATION



NOTES:

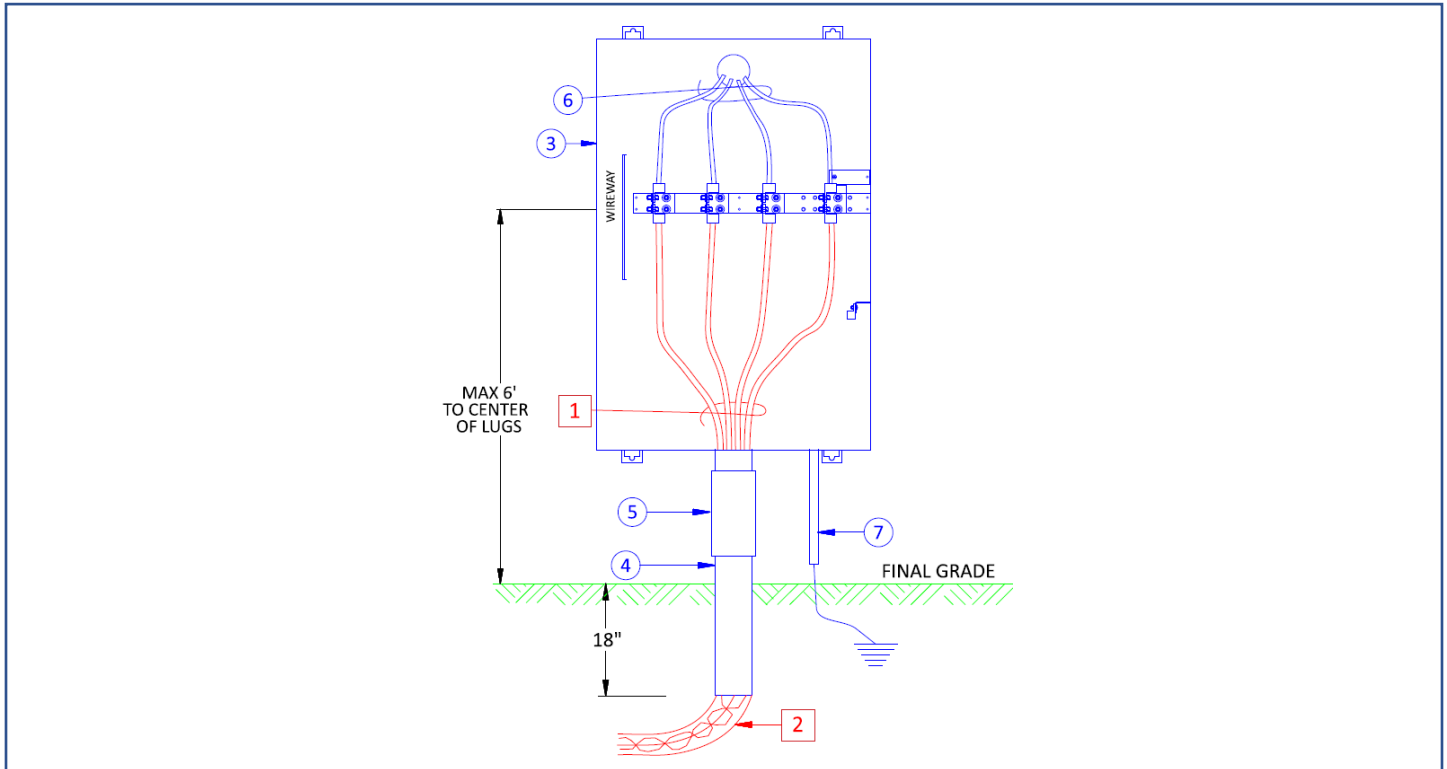
- Customer to install protective bollards in front of any equipment subject to vehicular damage.
- Ensure bollard placement allows for full working clearance in front and to the sides of electrical equipment, including full door swing.
- See above drawing for allowable design details.

MIS-8A

CUSTOMER-OWNED WALL-MOUNT TERMINATION CABINET

SINGLE-PHASE UP TO 600A

THREE-PHASE UP TO 3000A



MGE WILL FURNISH:

1. Underground service conductors.
2. Conduit(s), including 36-inch 90 degree sweep(s), up to the customer's stubbed conduit(s).

CUSTOMER WILL FURNISH:

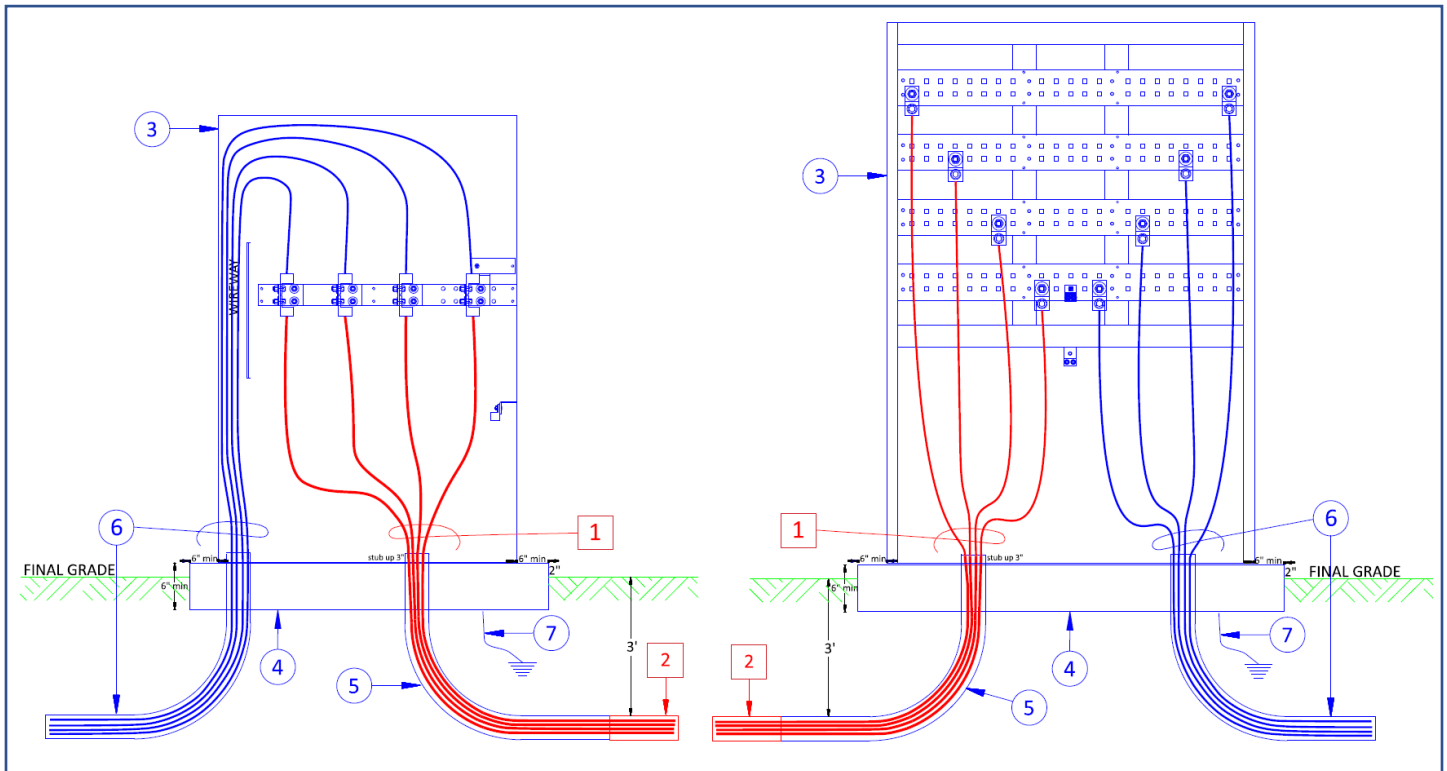
3. MGE approved wall-mount termination cabinet. See **TABLE 10**.
4. MGE approved underground service conduit(s). See **TABLE 7**.
5. Expansion fitting(s) installed above-grade.
6. Conduit(s) and wires to main service disconnect. Customer conduit shall not intrude past the wireway into MGE pull space.
 - The ampacity rating of the main disconnect(s) may not exceed the ampacity rating of the termination cabinet.
 - Load side wires leaving a termination cabinet are unmetered and must be in continuous conduit or sealable raceways to the main disconnect.
7. Ground in accordance with applicable electrical codes.

MIS-8B

CUSTOMER OWNED PAD-MOUNT TERMINATION SERVICE

SINGLE-PHASE UP TO 600A

THREE-PHASE UP TO 4000A



MGE WILL FURNISH:

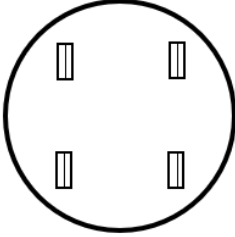
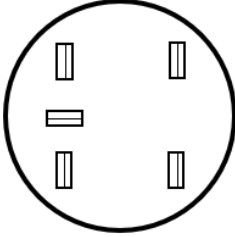
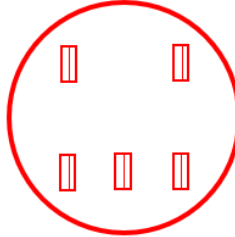
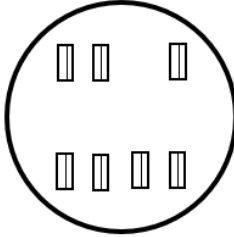
1. Underground service conductors, terminated on the bottom line lugs.
2. Conduit(s) at 3' below grade connected to the customer's stubbed conduit(s).

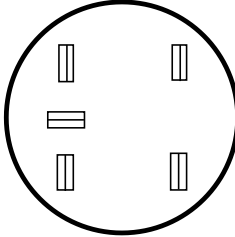
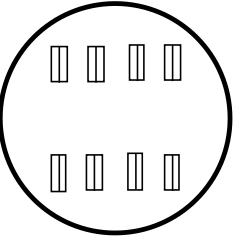
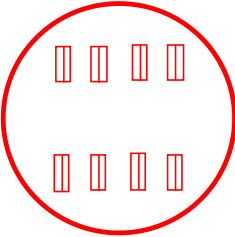
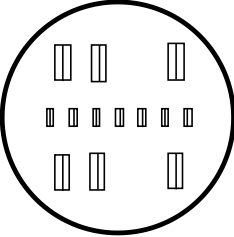
CUSTOMER WILL FURNISH:

3. MGE approved bottom-in / bottom-out termination cabinet. See **TABLE 10**.
 - Bolt cabinet to concrete pad with washers and concrete screws following manufacturer's instructions.
4. Poured concrete pad, minimum 6" thickness and 6" around the cabinet.
5. MGE approved underground service conduit(s), stubbed up in cabinet max 3" above pad. See **TABLE 7**.
 - Use 36" 90 degree bends and extend at 3' below grade to 3' past concrete pad, towards transformer.
 - Conduits shall be centered in the MGE pullspace, under the line lugs.
6. Conduit and wires to main service disconnect, terminated on the top load lugs and ran through the wireway. Customer conduit shall not intrude past the wireway into MGE pull space.
 - The ampacity rating of the main disconnect(s) may not exceed the ampacity rating of the termination cabinet.
 - Load side wires leaving a termination cabinet are unmetered and must be in continuous conduit or sealable raceways to the main disconnect.
7. Ground in accordance with applicable electrical codes.

MIS-9

TYPICAL METERING DIAGRAMS

Self-Contained Meter Sockets			
(Residential Sockets must be Horn Bypass. Commercial and 320 Amp Sockets Must Be Jaw Release Lever Bypass)			
4 Terminal	5 Terminal	*5 Terminal	7 Terminal
			
<u>1 PH, 3 Wire</u> 120/240 Volt - Residential 240/480 Volt <u>1PH, 3 Wire - 320 Ampere</u> 120/240 Volt	<u>1 PH, 3 Wire</u> 120/208 Volt 120/240 Volt - Commercial Note: 5th Terminal in 9 o'clock position	<u>*3PH, 3 Wire</u> *240/240 Volt *480/480 Volt Note: Grounded B PH must be removed on Delta services	<u>3PH, 4 Wire</u> 120/208 Volt 277/480 Volt

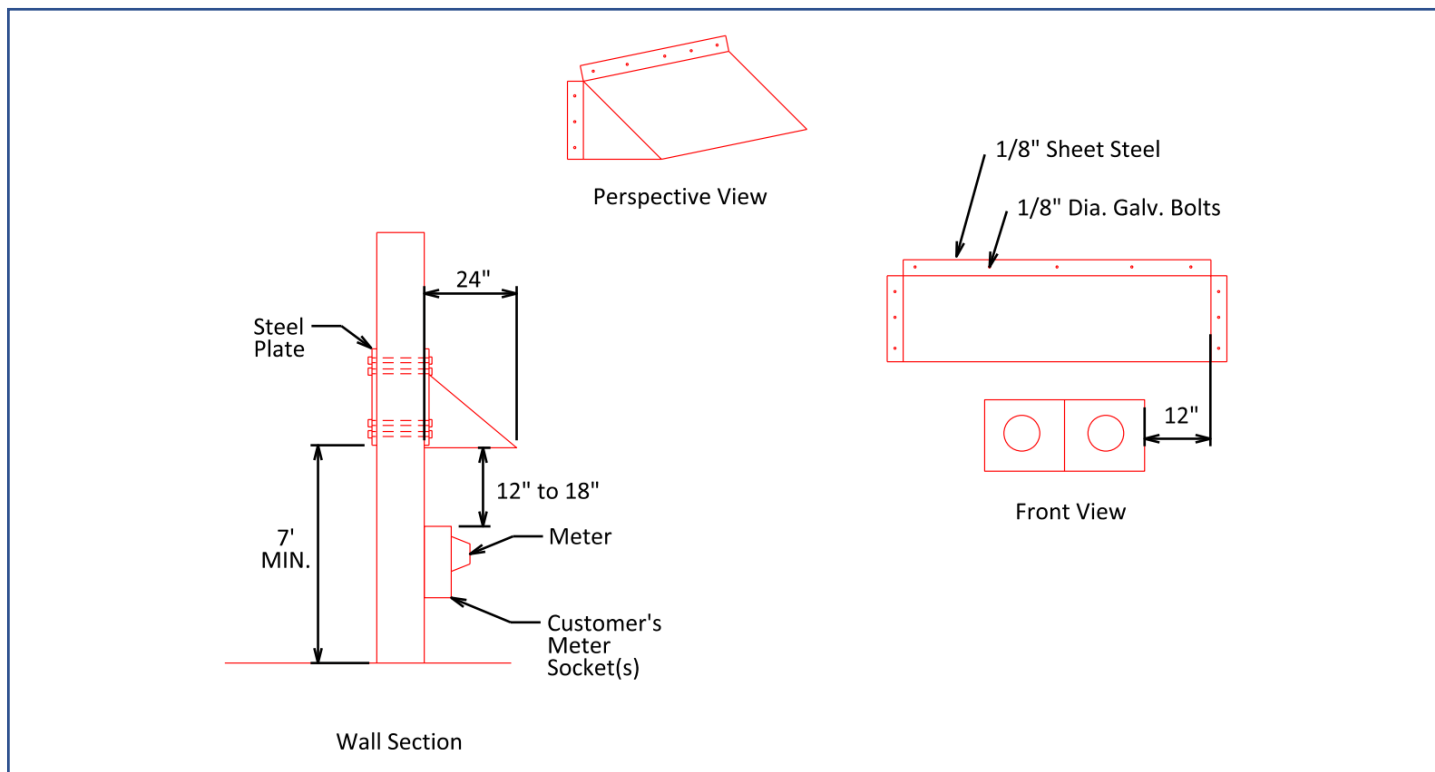
Current Transformer (CT) Rated Meter Sockets			
5 Terminal	8 Terminal	*8 Terminal	13 Terminal
			
<u>1 PH, 3 Wire</u> 120/240 Volt Note: 5th Terminal in 9 o'clock position	<u>1 PH, 3 Wire</u> 120/208 Volt	<u>*3PH, 3 Wire</u> *240/240 Volt *480/480 Volt	<u>3PH, 4 Wire</u> 120/208 Volt 277/480 Volt

FOOTNOTE:

*For maintenance only, not allowed for new services.

MIS-10

METER SHIELD



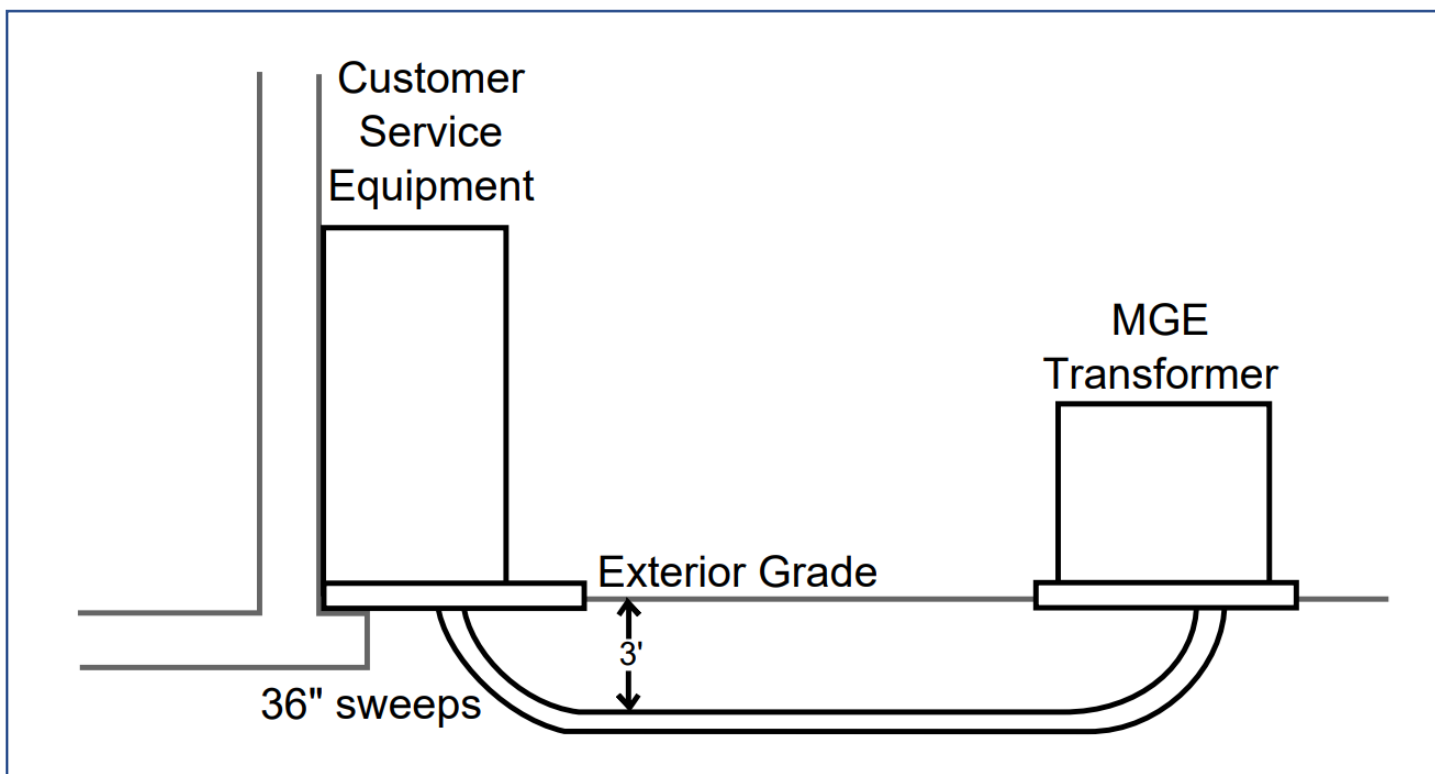
NOTES:

- The customer is responsible for protecting MGE's meter(s) from damage caused by falling ice, snow, or other objects. If protection is not provided for MGE's meter by adequate roof overhang, the Customer shall construct a protective shield, or the meter location shall be moved to a safe area.
- The Customer will be charged for meter replacement if damage occurs.
- An adequate roof overhang shall extend a minimum of 24" out from the face wall to which the meter is mounted.
- Shield shall be constructed of steel or masonry. Thin sheet metal (tin) or wood is not acceptable.
- Steel to be primed and painted with rust resistant paint.
- Shield shall be mounted on strut or installed with lag bolts through the building connected to an interior steel plate.
- Shield shall be capable of supporting 50 pounds.
- Shield to be so located as to not be a "head bumping" hazard.
- Width of shield may vary depending on the number of meters being protected.

SER-1

EXTERIOR SERVICE AT GRADE

PREFERRED FOR ALL METERING INSTALLATIONS



NOTES:

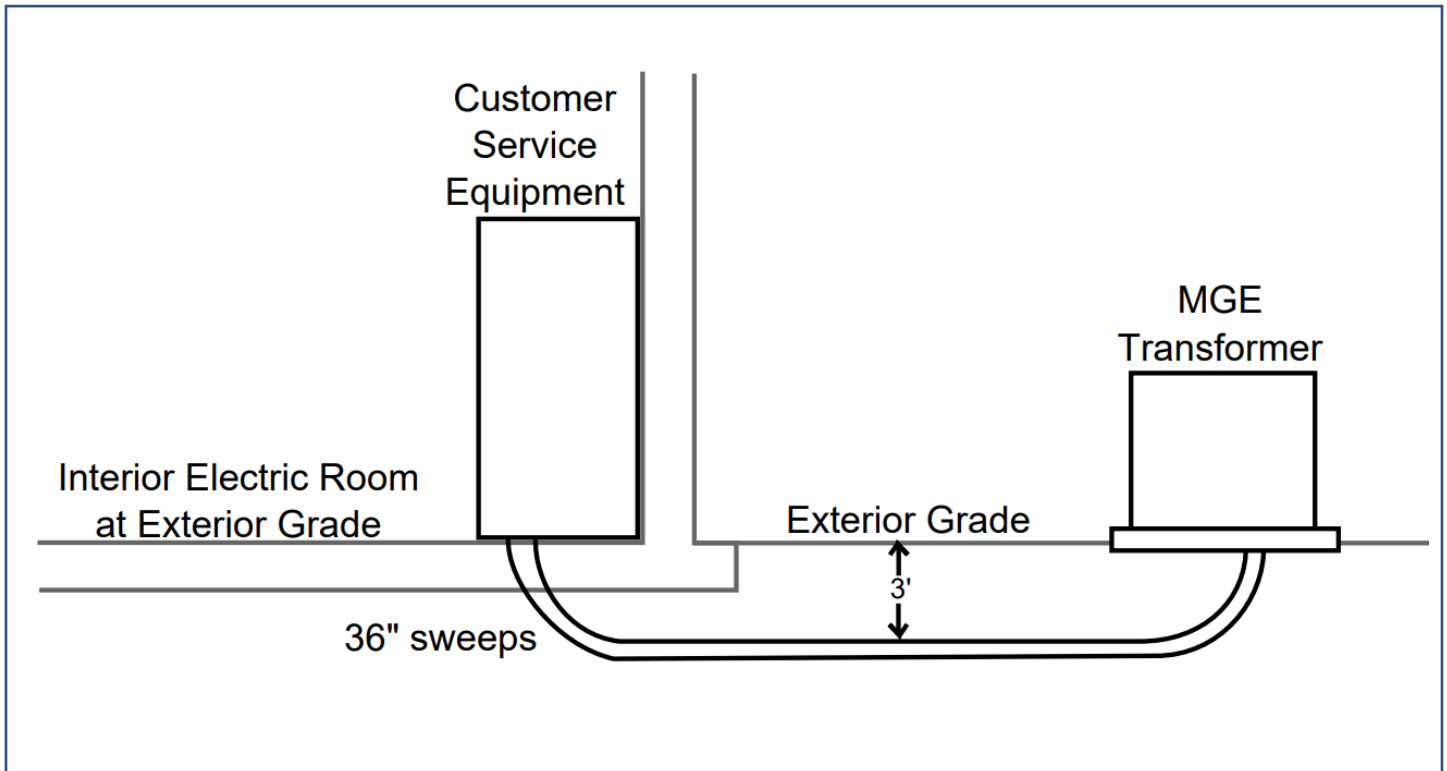
- Electric service to be at exterior grade located on an exterior wall. Meter shields required if overhang is less than 24".
- MGE connects onto customer provided conduit stubs, which are provided at 18" into ground with expansion fittings, or horizontally at 3' below grade from concrete pad. Use 36" radius sweeps.
- MGE pulls service conductors into service equipment and terminates on customer main disconnect or main lugs.
 - For a service 1600A or less, MGE requires at least 24" of pull space from bottom of conduits to termination lugs.
 - For a service larger than 1600A, MGE requires a separate pull section with termination lugs only.

SER-2

INTERIOR SERVICE IN AN AT-GRADE ELECTRIC ROOM

MULTIPLE METER SERVICE ONLY

NOT APPROVED FOR RESIDENTIAL USE

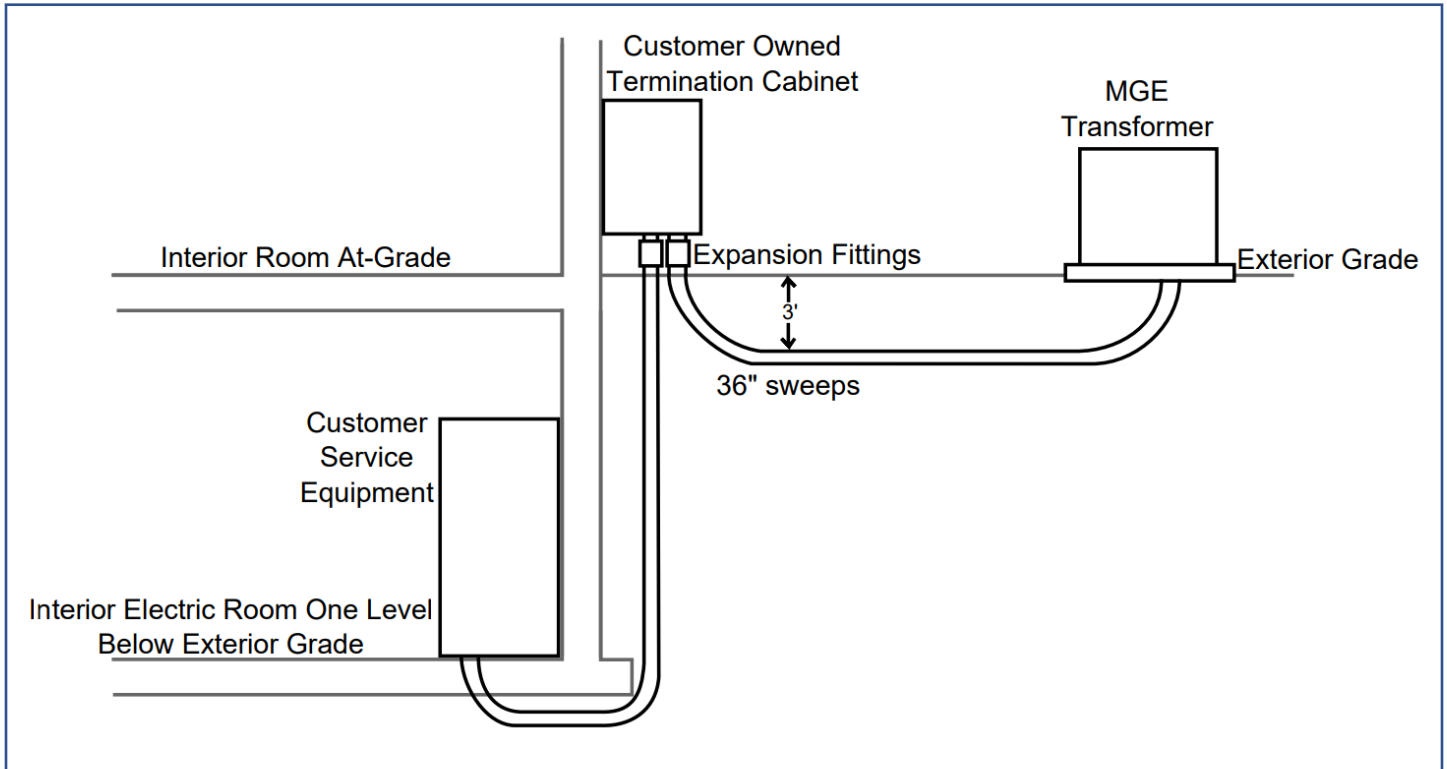


NOTES:

- **For multiple meter service use only.**
- **Not approved for residential use.**
- Electric room to be at exterior grade located inside an exterior wall, accessible by an exterior door.
- Electric room door to be minimum size of 6.5" tall, 36" wide, and open outwards with panic hardware.
- Customer to install a MGE-provided lock box for unescorted 24/7 access into building. Contact MGE Meter Shop for associated costs.
- All meters to be in a dedicated electric room, which will be accessible at all times to MGE personnel.
- No storage of equipment allowed in customer electric rooms.
- MGE connects onto customer conduit stubs, which are provided at 3' below grade, 5' out from the building footing. Use 36" radius sweeps.
- MGE pulls service conductors into electric room and terminates on customer main disconnect or main lugs.
 - For a service 1600A or less, MGE requires at least 24" of pull space from bottom of conduits to termination lugs.
 - For a service larger than 1600A, MGE requires a separate pull section with termination lugs only.

SER-3

EXTERIOR SERVICE IN TERMINATION CABINET
BELOW-GRADE METERING (OUTSIDE WALL LOCATION)
MORE THAN 30 METERS
REQUIRED PRE-APPROVAL BY MGE ENGINEERING



NOTES:

- **Requires pre-approval by MGE Engineering.**
- **Only allowed for services with more than 30 meters.**
- Electric meters to be grouped together one level below exterior grade located inside an exterior wall.
- Customer to install a MGE-provided lock box at building entrance for unescorted 24/7 access into building. Contact MGE Meter Shop for associated costs.
- All meters to be in a dedicated electric room, which will be accessible at all times to MGE personnel.
- No storage of equipment allowed in customer electric rooms.
- Service Entrance is at a customer provided, approved, exterior termination cabinet at grade near transformer.
- MGE connects onto customer conduit stubs, which are provided at 18" into ground with expansion fittings (for wall mount applications – see **MIS-8A**), or horizontally at 3' below grade from termination cabinet (for padmount applications – see **MIS-8B**). Use 36" radius sweeps.
- MGE pulls service conductors into termination cabinet and terminates on line-side lugs.
- Customer installs and maintains conduit and wiring from termination cabinet to bottom of main disconnect. MGE does not allow top feed disconnects below grade.

17 Meter Numbers

Approved Metering Tables

Table 1	Residential Meter Pedestals, Meter Main Pedestals and Meter Sockets
Table 2	Residential Multi-position Meter Sockets and Meter Main Sockets
Table 3	Commercial and Industrial Meter Sockets
Table 4	Transformer Rated Meter Sockets
Table 5	Approved CT Cabinets
Table 6	Approved Combo (Disconnect & CT) Units
Table 7	Approved Underground Service Conduits
Table 8	Approved Underground Service Raceways
Table 9	Approved Gutter Sizes
Table 10	Approved Secondary Termination Cabinets

TABLE 1
Residential Meter Pedestals, Meter Main Pedestals and Meter Sockets

Meter Pedestals						
Supplier	Size	Bypass	Use	Sequence	120/240 V 4 Terminal	120/208 V 5 Terminal
Milbank	200 A	Horn	UG	Meter Only	U5706-O-200S-KK-ALT	U5706-O-200S-KK-ALT ^[2]
	200 A	Horn	UG	Meter Only	U3358-O-KK	U3358-O-KK ^[2]
	200 A	Horn	UG	Meter - Main	U6689-O-KK ^{[2][3]}	U6689-O-KK ^{[2][3]}
	200 A	Horn	UG	Meter Only	U8436-O-# ^[3]	
	200 A	Horn	UG	Meter - Main	U5136-O-# ^{[6][10]}	U5136-O-# ^{[2][6][10]}
	200 A	Horn	UG	Meter - Main	U5137-O-# ^{[6][10]}	U5137-O-# ^{[2][6][10]}
Durham, Eaton-Cutler Hammer, Midwest Electric Products, or Square-D	200 A	Horn	UG	Meter Only	1008846CH	1008846CH ^[15]
	200 A	Horn	UG	Meter Only	UHTRP242363-() ^[5]	UGHTRP242363-() ^{[2][5]}
Siemens/Talon	200 A	Horn	UG	Meter Only	UAP317-PPWI	UAP317-PPWI ^[2]
Milbank	320 A	Lever	UG	Meter Only	U1748-O-WI ^[4]	
	320 A	Lever	UG	Meter Only	U6317-O-100-200-K3L	
	320 A	Lever	UG	Meter - Main	U3849-O-# ^{[4][6][8]}	
Siemens/Talon	320 A	Lever	UG	Meter Only	47604P-9CH/WI	
Eaton - Cutler Hammer	320 A	Lever	UG	Meter Only	1009018CH	
	320 A	Lever	UG	Meter Main	1009841CH	
Ronk	320 A	Lever	UG	Meter Main	MSB320LC(*)-UG ^[9]	MSB320LE(*)-UG ^[9]

Footnotes for Table 1:

- 1 Underground service to a single-family home requires a 200-ampere-rated meter pedestal.
- 2 Requires installation of fifth terminal at nine o'clock position. All sockets in MGE network area shall be equipped with 5th terminal.
- 3 MGE terminations require mechanical lugs.
- 4 Requires the use of extension Part No. S1848
- 5 () = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products or (SQD) Square-D.
- 6 # = Multiple catalog numbers related to breaker configurations, all 3 types approved.
- 7 Must use UQFBH style or other breakers that maintain the 22K AIC rating.
- 8 Models are rated 22K AIC when using Siemens QPH (100 Amps) or QNH (200 Amps) breakers.
- 9 Requires anti-inversion clip. (*) designates anti-inversion clip installed at factory
- 10 Requires stabilizer Foot K5415

Meter Sockets						
Supplier	Size	Bypass	Use	Sequence	120/240 V 4 Terminal	120/208 V 5 Terminal
Milbank	100 A	Horn	OH	Meter Only	U7487-RL-TG-KK	U7487-RL-TG-KK ^[2]
	100 A	Horn	OH	Meter - Main	U5842-RL-100-KK ^[8]	U5842-RL-100-KK ^{[2][8]}
	200 A	Horn	OH	Meter - Main	U5168-XTL-200-KK ^[8]	U5168-XTL-200-KK ^{[2][8]}
	200 A	Horn	OH	Meter Only	U7040-XL-TG-KK	
	200 A	Horn	OH	Meter - Main	U5844-PXL-200-KK ^[8]	U5844-PXL-200-KK ^{[2][8]}
	200 A	Horn	OH	Meter Only	U1773-XL-TG-KK	U1773-XL-TG-KK ^[2]
	200 A	Horn	OH	Meter - Main	U5842-RL-200-KK ^[8]	U5842-RL-200-KK ^{[2][8]}
Durham, Eaton-Cutler Hammer, Midwest Electric Products, or Square-D	200 A	Horn	OH	Meter - Main	MB816B200BTSD	MB816B200BTSD ^[2]
	200 A	Horn	OH	Meter Only	UHTRS202BMEP	
Siemens/Talon	200 A	Horn	OH	Meter - Main	U5844-PXL-200-KK ^[8]	U5844-PXL-200-KK ^{[2][8]}
	200 A	Horn	OH	Meter Only	UHTRS202C-() ^[5]	UGHTRS202C-() ^{[2][5]}
	200 A	Horn	OH	Meter Only	UHTRS213C-() ^[5]	UGHTRS213C-() ^{[2][5]}
	200 A	Horn	OH	Meter Only	UAT317-0Q	UAT317-0Q ^[2]

Footnotes for Table 1:

- Underground service to a single-family home requires a 200-ampere-rated meter pedestal.
- Requires installation of fifth terminal at nine o'clock position. All sockets in MGE network area shall be equipped with 5th terminal.
- MGE terminations require mechanical lugs.
- Requires the use of extension Part No. S1848
- () = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products or (SQD) Square-D.
- # = Multiple catalog numbers related to breaker configurations, all 3 types approved.
- Must use UQFBH style or other breakers that maintain the 22K AIC rating.
- Models are rated 22K AIC when using Siemens QPH (100 Amps) or QNH (200 Amps) breakers.
- Requires anti-inversion clip. (*) designates anti-inversion clip installed at factory
- Requires stabilizer Foot K5415

TABLE 2
Residential Multi-position Meter Sockets and Meter Main Sockets

Multiple Meter Sockets						
Supplier	Size	Bypass	Use	Sequence	Number of Positions	
					2	3
Milbank	100 A	Horn	OH	Meter Only	L572-XL-KK ^[2]	L573-XL-KK ^[2]
	100 A	Horn	OH	Meter Only	U2692-XL-KK ^[2]	
	100 A	Horn	OH	Meter Only	U7362-RL-KK ^[2]	U7363-RL-KK ^[2]
	100 A	Horn	OH	Meter Only	U8032-XL-KK ^[2]	U8033-XL-KK ^[2]
	200 A	Horn	OH	Meter Only	U1252-X-KK ^[2]	U1253-X-KK ^[2]
	200 A	Horn	UG	Meter Only	U1783-O-KK ^[2]	
	200 A	Horn	UG	Meter Only	U1252-X-KK-K#-PED ^{[2][3][4]}	U1253-X-KK-K#-PED ^{[2][3][4]}
	100 A	Horn	UG	Meter - Main	U5902-X-KK-K#-PED ^{[2][3][4]}	U5903-X-KK-K#-PED ^{[2][3][4]}
	200 A	Horn	UG	Meter - Main	U5882-X-KK-K#-PED ^{[2][3][4]}	U5883-X-KK-K#-PED ^{[2][3][4]}
Eaton	100/200 A	Horn	OH/UG	Meter - Main	1 MM Series ^{[1][2]}	1 MM Series ^{[1][2]}
Square D	125 A	Horn	OH/UG	Meter - Main	EZMH Series ^[2]	EZMH Series ^[2]
ABB	125 A	Horn	OH/UG		RMS(X)-HBR ^[2]	RMS(X)-HBR ^[2]

Footnotes for Table 2:

- 1 When used for underground service, a separate pull section is required. Contact MGE Engineering.
- 2 For 120/208 V service, must include 5th terminals at nine o'clock position.
- 3 For underground service, order the S2291-TO pedestal raceway extension kit is also available – order catalog number S2571.
- 4 Replace K# with appropriate connector kit. (K1 = (1) #6-35 MCM, K4 = (2) #2-600=MCM.) Contact MGE Engineering.

* All meter sockets in the MGE network area require 5th terminal at nine o'clock position.

** 6-Position multi-meter stacks not approved for outdoor use.

Multiple Meter Sockets (Continued)							
Supplier	Size	Bypass	Use	Sequence	Number of Positions		
					4	5	6
Milbank	100 A	Horn	OH	Meter Only	L574-XL-KK ^[2]	L575-XL-KK ^[2]	L576-XL-KK ^[2]
	100 A	Horn	OH	Meter Only			
	100 A	Horn	OH	Meter Only	U7364-RL-KK ^[2]	U7365-RL-KK ^[2]	U7366-RL-KK ^[2]
	100 A	Horn	OH	Meter Only	U8034-XL-KK ^[2]	U8035-XL-KK ^[2]	U8036-XL-KK ^[2]
	200 A	Horn	OH	Meter Only	U1254-X-KK ^[2]		
	200 A	Horn	UG	Meter Only			
	200 A	Horn	UG	Meter Only	U1254-X-KK-K#-PED ^{[2][3][4]}	U1255-X-KK-K#-PED ^{[2][3][4]}	U1256-X-KK-K#-PED ^{[2][3][4]}
	100 A	Horn	UG	Meter - Main	U5904-X-KK-K#-PED ^{[2][3][4]}	U5905-X-KK-K#-PED ^{[2][3][4]}	U5906-X-KK-K#-PED ^{[2][3][4]}
	200 A	Horn	UG	Meter - Main	U5884-X-KK-K#-PED ^{[2][3][4]}	U5885-X-KK-K#-PED ^{[2][3][4]}	U5886-X-KK-K#-PED ^{[2][3][4]}
Eaton	125/ 200 A	Horn	OH/UG	Meter - Main	1 MM Series ^{[1][2]}	1 MM Series ^{[1][2]}	1 MM Series ^{[1][2]}
Square D	100/ 200 A	Horn	OH/UG	Meter - Main	EZMH Series ^[2]	EZMH Series ^[2]	EZMH Series ^[2]
ABB	125 A	Horn	OH/UG	Meter - Main	RMS(X)-HBR ^[2]	RMS(X)-HBR ^[2]	RMS(X)-HBR ^[2]

Footnotes for Table 2:

- 1 When used for underground service, a separate pull section must be added. Contact MGE Engineering.
- 2 For 120/208 V service, must include 5th terminals at nine o'clock position
- 3 For underground service, order the S2291-TO pedestal raceway. A 12-inch pedestal extension kit is also available – order catalog number S2571.
- 4 Replace K# with appropriate connector kit. (K1 = (1) #6-350MCM, K3 = (1) #4-600MCM, K4 = (2) #2-600=MCM.) Contact MGE Engineering.

* All meter sockets in the MGE network area require 5th terminal at nine o'clock position.

** 6-Position multi-meter stacks not approved for outdoor use.

TABLE 3
Commercial and Industrial Meter Sockets

Meter Pedestals					
Supplier	Size	Bypass	Use	Sequence	120/240 V or 120/208 V Single Phase, 5 Terminal
Milbank	200 A	Lever	UG	Meter Only	U4724-O-5T9
	200 A	Lever	UG	Meter - Main	U4322-O-5T9 ^[2]
	200 A	Lever	UG	Meter - Main	U5701-O-# ^[3]
	200 A	Lever	UG	Meter - Main	U6221-O-200-5T9-10GR
	200 A	Lever	UG	Meter - Main	U4833-O-5T9
	200 A	Lever	UG	Main - Meter	U5949-O-5T9 ^{[2][4]}
Siemens/Talon	200 A	Lever	UG	Meter Only	40405P-9WI

Footnotes for TABLE 3:

- 1 For free standing use, order burial kit S3488 separately.
- 2 Must be installed so that the rear of the pedestal can still be accessed for installing service wires.
- 3 # = Multiple catalog numbers related to breaker configurations; all types approved.
- 4 This equipment is Cold Sequence.
- 5 () = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products or (SQD) Square-D.
- 6 Includes ground lug 36503, #14-2/0.
- 7 All overhead sockets must be entered through the top knockout. Bottom-entry not permitted.

Meter Sockets					
Supplier	Size	Bypass	Use	Sequence	120/240 V or 120/208 V Single Phase, 5 Terminal
Milbank	200 A	Lever	OH ^[7]	Meter Only	U9550-RL
	200 A	Lever	OH ^[7]	Meter - Main	U5871-XL-200-5T9
	200 A	Lever	OH ^[7]	Meter - Main	U6281-XL-200-5T9
	200 A	Lever	OH ^[7]	Main - Meter	U5764-X-200-5T-# ^{[3][4]}
	200 A	Lever	OH ^[7]	Meter Only	U4801-XL-5T9
	200 A	Lever	UG	Main - Meter	U5784-O-200-5T-# ^{[3][4]}
Siemens/Talon	200 A	Lever	OH ^[7]	Meter Only	40405-025F ^[6]

Footnotes for TABLE 3:

- ¹ For free standing use, order burial kit S3488 separately.
- ² Must be installed so that the rear of the pedestal can still be accessed for installing service wires.
- ³ # = Multiple catalog numbers related to breaker configurations; all types approved.
- ⁴ This equipment is Cold Sequence.
- ⁵ () = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products or (SQD) Square-D.
- ⁶ Includes ground lug 36503, #14-2/0.
- ⁷ All overhead sockets must be entered through the top knockout. Bottom-entry not permitted.

Meter Pedestals					
Supplier	Size	Bypass	Use	Sequence	120/208 V Three Phase, 7 Terminal
Milbank	200 A	Lever	UG	Meter Only	U9107-O-WI ^[1]
Siemens/Talon	200 A	Lever	UG	Meter Only	40407P-9WI

Footnotes for TABLE 3:

- 1 For free standing use, order burial kit S3488 separately.
- 2 Must be installed so that the rear of the pedestal can still be accessed for installing service wires.
- 3 # = Multiple catalog numbers related to breaker configurations; all types approved.
- 4 This equipment is Cold Sequence.
- 5 () = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products or (SQD) Square-D.
- 6 Includes ground lug 36503, #14-2/0.
- 7 All overhead sockets must be entered through the top knockout. Bottom-entry not permitted.

Meter Sockets					
Supplier	Size	Bypass	Use	Sequence	120/208V Three Phase, 7 Terminal
Milbank	200 A	Lever	OH ^[7]	Main - Meter	U5767-X-200-# ^{[3][4]}
	200 A	Lever	UG	Main - Meter	U5787-O-200-# ^{[3][4]}
	200 A	Lever	OH/UG	Meter Only	U1493-X-ALT
	200 A	Lever	OH ^[7]	Meter Only	U9700-RRL
	200 A	Lever	OH ^[7]	Meter Only	U9701-RXL
Durham, Eaton-Cutler Hammer, Midwest Electric Products, or Square-D	200 A	Lever	OH ^[7]	Meter Only	UTH7233U-() ^[5]

Footnotes for TABLE 3:

- 1 For free standing use, order burial kit S3488 separately.
- 2 Must be installed so that the rear of the pedestal can still be accessed for installing service wires.
- 3 # = Multiple catalog numbers related to breaker configurations; all types approved.
- 4 This equipment is Cold Sequence.
- 5 () = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products or (SQD) Square-D.
- 6 Includes ground lug 36503, #14-2/0.
- 7 All overhead sockets must be entered through the top knockout. Bottom-entry not permitted.

TABLE 4
Transformer Rated Meter Sockets

Meter Sockets ^{[1][2]}				
Supplier	120/240 V Single Phase 5 Terminal ^[3]	120/208 V Single Phase 8 Terminal	120/208 V Three Phase 13 Terminal	277/480 V Three Phase 13 Terminal
Milbank	UC7442-RL	UC7448-XL	UC7449-XL	UC7449-XL
	UC7532-XL ^[5]	UC3887-XL	UC3889-XL	UC3889-XL
Durham, Eaton-Cutler Hammer, Midwest Electric Products, or Square-D	USTS5-() ^[4]	USTS8-() ^[4]	USTS13-() ^[4]	USTS13-() ^[4]
Siemens/Talon	9837-8203	9837-8403	9837-8503	9837-8503
Erickson ^[6]	W-130 ^[5]	W-330	W-340	W-340
Tesco			9070122	9070122

Footnotes for Table 4:

- 1 For outdoor use, only install sockets with hub openings if that hub will be used.
- 2 MGE installs and wires test switch.
- 3 Fifth terminal must be in the nine o'clock position.
- 4 () = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products or (SQD) Square-D
- 5 Six terminal socket, approved for 5 terminal application.
- 6 Conduit entry in Erickson sockets shall be made below the test switch, NOT the top meter socket area.

TABLE 5
Approved CT Cabinets

Supplier	Service Size	Wall Mount Bottom Entry / Top Exit		Wall Mount Bottom Entry / Bottom Exit		Padmount Bottom Entry / Bottom Exit	
		Single-Phase	Three-Phase	Single-Phase	Three-Phase	Single-Phase	Three-Phase
AMP Manufacturing and Supply	400A	MGECT4-3TM	MGECT4-4TM	MGECT4-3TMB	MGECT4-4TMB	MGEPT4-3	MGEPT4-4
	600A	MGECT6-3TM	MGECT6-4TM	MGECT6-3TMB	MGECT6-4TMB	MGEPT6-3	MGEPT6-4
	800A		MGECT8-4TM		MGECT8-4TMB		MGEPT8-4
	1200A		MGECT12-4TM		MGECT12-4TMB		MGEPT12-4 MGESCC12CT
	1600A		MGECT16-4		MGECT16-4B		MGEPT16-4 MGESCC16CT
	2000		MGECT20-4		MGECT20-4B		MGEPT20-4 MGESCC20CT
	2500A						MGEPT25-4 MGESCC25CT
	3000A						MGEPT30-4 MGESCC30CT
	4000A						MGESCC40CT
Milbank (Galva-Closure Products)	400A	MGEM-403UG	MGEM-404UG	MGEM-403UGBX	MGEM-404UGBX	MGEM-403PM	MGEM-404PM
	600A	MGEM-603UG	MGEM-604UG	MGEM-603UGBX	MGEM-604UGBX	MGEM-603PM	MGEM-604PM
	800A		MGEM-804UG		MGEM-804UGBX		MGEM-804PM
	1200A		MGEM-1204UG		MGEM-1204UGBX		MGEM-1204PM
	1600A		MGEM-1604UG		MGEM-1604UGBX		MGEM-1604PM
	2000A		MGEM-2004UG		MGEM-2004UGBX		MGEM-2004PM
Erickson	400A	MGE1182-1	MGE1182-2				
	600A	MGE283-1	MGE283-2				
	800A		MGE283-2				
	1200A		CT-124MGE				
	1600A		CT-164MGE				
	2000A		CT-200MGE				

TABLE 6
Approved Disconnect & CT "Combo" Units

Supplier	Service Size	Single-Phase 120/240V or 120/208V Bottom-Entry / Top-Exit	Three-Phase 120/208V Bottom-Entry / Top-Exit	Three-Phase 480Y/277V Bottom-Entry / Top-Exit
AMP Manufacturing and Supply ^{[1][2]}	400A	MGEMCT225J	MGEMCT325J	MGEMCT365J
	600A	MGEMCT226J	MGEMCT326J	MGEMCT366J
	800A		MGEMCT327L	MGEMCT367L
	1200A		MGEFMCT328L	MGEFMCT368L ^[3]

Footnotes for Table 6:

- 1 For bottom exit applications install PB84 pullbox.
- 2 MGE does not allow fusible pullouts in combo units.
- 3 Does not have Ground Fault Protection, only approved for fire pump service use.

TABLE 7
Approved Underground Service Conduits

Service Size	Conduit Quantity
400A	(1) 4"
600A	(2) 4"
800A	(2) 4"
1000A	(3) 4"
1200A	(3) 4"
1600A	(4) 4"

Footnotes for Table 7:

- MGE prefers the use of 4" conduits with expansion fittings instead of service raceways.
- Stub conduits or raceways 18" below grade for wall-mount applications.
- For padmount applications, provide large 36" 90 degree sweeps at 36" below grade towards MGE transformer.
- For services greater than 1600A contact MGE Engineering.

TABLE 8
Approved Underground Service Raceways

Supplier	Catalog Number	Size
Erickson	USR-36	11" x 6" x 36"
	USR-48	11" x 6" x 47"
	USR-60	11" x 6" x 59"
Milbank (Galva-Closure Products)	CC-36	10.5" x 6" x 36"
	CC-46	10.5" x 6" x 46"
	CC-60	10.5" x 6" x 60"
AMP Manufacturing and Supply	WWPB36	12" x 6" x 36"
	WWPB48	12" x 6" x 48"
	WWPB60	12" x 6" x 60"
	WWLPB118	12" x 12" x 18"
	WWLPB136	12" x 12" x 36"
	WWLPB148	12" x 12" x 48"

Footnotes for Table 8:

- MGE prefers the use of 4" conduits with expansion fittings instead of service raceways.
- Use one 6" raceway for service less than or equal to 800A.
- Use two 6" raceways or one 12" raceway for service greater than 800A to 1600A
- For services greater than 1600A contact MGE Engineering.

TABLE 9
Approved Gutter Sizes

Main Size	Minimum Gutter Size (Larger May Be Required)
200A	8" x 8" x 24"
400A	12" x 12" x 24"
600A	12" x 12" x 24"
800A	12" x 12" x 24"
1000A	12" x 12" x 36"
1200A	12" x 12" x 36"

Footnotes for Table 9:

- **MGE prefers the use of 4" conduits with expansion fittings instead of service raceways.**
- All unmetered sections, including gutters, must be sealable.
- The top of a gutter shall not be higher than 8' above final grade.
- For services greater than 1200A contact MGE Engineering.

TABLE 10
Approved Secondary Termination Cabinets

Supplier	Service Size	Wall Mount Bottom Entry / Top Exit		Wall Mount Bottom Entry / Bottom Exit		Pad Mount Bottom Entry / Bottom Exit	
		Single-Phase	Three-Phase	Single-Phase	Three-Phase	Single-Phase	Three-Phase
AMP Manufacturing and Supply	400A	MGETC4-3	MGETC4-4	MGETC4-3B	MGETC4-4B	MGEPTC4-3	MGEPTC4-4
	600A	MGETC6-3	MGETC6-4	MGETC6-3B	MGETC6-4B	MGEPTC6-3	MGEPTC6-4
	800A		MGETC8-4		MGETC8-4B		MGEPTC8-4
							MGESCC8-4A
	1000A						MGESCC10-4A
	1200A		MGETC12-4		MGETC12-4B		MGEPTC12-4
							MGESCC12-4A
	1600A		MGETC16-4		MGETC16-4B		MGEPTC16-4
							MGESCC16-4A
	2000A		MGETC20-4		MGETC20-4B		MGEPTC20-4
							MGESCC20-4A
Milbank (Galva-Closure Products)	2500A						MGEPTC25-4
							MGESCC25-4A
	3000A						MGEPTC30-4
							MGESCC30-4A
	4000A						MGESCC40-4A
	400A	TBMGEM-413-1	TBMGEM-434-1	TBBXMGEM-413-1	TBBXMGEM-434-1	TBPMMGEM-413-1	TBPMMGEM-434-1
	600A	TBMGEM-613-2	TBMGEM-634-2	TBBXMGEM-613-2	TBBXMGEM-634-2	TBPMMGEM-613-2	TBPMMGEM-634-2
	800A		TBMGEM-834-2		TBBXMGEM-834-2		TBPMMGEM-834-2
	1200A		TBMGEM-1234-3		TBBXMGEM-1234-3		TBPMMGEM-1234-3
	1600A		TBMGEM-1634-4		TBBXMGEM-1634-4		TBPMMGEM-1634-4
	2000A		TBMGEM-2034-5		TBBXMGEM-2034-5		TBPMMGEM-2034-5
	2500A		TBMGEM-2534-7		TBBXMGEM-2534-7		TBPMMGEM-2534-7
	3000A		TBMGEM-3034-8		TBBXMGEM-3034-8		TBPMMGEM-3034-8