

Metering Equipment: Installation Requirements


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1. Metering Installation Requirements, General

These guidelines are based on NV Energy (NVE) practices that are deemed necessary in order to supply uniform satisfactory and safety service. Interpretations or clarifications of intent of these requirements are subject to NVE approval. Installations shall also conform to the provisions of applicable codes and ordinances of local inspection authorities and all other NVE standards.

If any questions arise that are not answered in this section, contact NVE Meter Services at (702) 402-6110 or (702) 402-6163 for clarification.

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2. Type of Service

The type of service and metering equipment required to safely and accurately measure the energy delivered to a customer varies with the voltage and current of the service. Because of this, it is important that the customer consult the appropriate District Project Coordinator for information before proceeding with the purchase of equipment or installation of wiring. Refer to Section RPM of this manual for manufacturer requirements for utility metering and service equipment.

NVE Meter Services	(702) 402-6110
Las Vegas District Office	(702) 402-4700 or (702) 402-4800
Laughlin District Office	(702) 402-5936

3. Definitions

EUSERC – Electric Utility Service Equipment Requirements Committee. An association composed of electric utilities whose purpose is to promote uniform electric service requirements among its members.

New Sequence – This metering arrangement provides for the line current to enter first the meter and then the disconnecting means and overload protective devices (meter-switch-fuse sequence).

Old Sequence – This metering arrangement provides for the line current to enter first the disconnecting means and overload protective devices and then the meter (switch-fuse-meter sequence).

Readily Accessible (Meter) – Capable of being reached quickly for operation, renewal, or inspection without requiring those to whom ready access is a requisite to climb over or remove obstacles or to resort to portable ladders, chairs, etc.

Self-Contained Metering – A self contained meter is designed to carry rated current and be energized at line potential. It does not require auxiliary instrument transformers to step down line current or voltage.

Transformer/Instrument Rated Metering – When the electrical supply needs of the customer exceed the rating of a self-contained meter, instrument transformers are used. A current transformer (CT) provides a current on its secondary terminal that is in proportion to the customer's current. A potential transformer (PT) provides a voltage on its secondary terminal that is in proportion to the voltage supplied to the customer. An instrument rated meter is designed to properly meter at these smaller currents and voltages.


Meter Disconnect – A circuit breaker, fused switch, or other approved disconnecting means with over-current protection installed on the load side of the meter, to control all of and only the energy registered by the meter. Refer to Section RPM of this manual for specifications.

4. Who Provides Metering Equipment?

1. NVE will provide, own, and maintain the; 1) Meters, 2) Instrument Transformers, 3) Test Switches. In some instances, NVE will furnish instrument transformers for installation by the customer.
2. The Customer will provide, install, own, and maintain the; 1) Test Blocks, 2) Meter Sockets, 3) Meter Socket Enclosures, 4) Instrument Transformer Compartments, 5) Service Sections, 6) Any required conduits or raceways, and 7) Meter Disconnects.

5. Establishment of Service

Service will be connected by NVE after all service equipment has been provided and properly installed and a request for service has been made at the NVE office or by calling 367-5555. Meters will be set after an inspection clearance has been given by the proper inspection agency.

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6. Meter Access

Electric meter installations shall be accessible to authorized representative of NVE for reading, testing, and inspection at all times. Consult the NVE District Project Coordinator for specific questions regarding meter locations. Refer to page 1 or RPI-G for telephone number.

1. Customer locking means for meter enclosures shall provide for independent access by NVE.
2. Working Space in front of meter: This area is to be located entirely on the Customer's property with the following conditions (for single-family residential installation, refer to RPI-2; all others refer to RPI-15)
 - A. The working space shall extend a minimum of 3'-0" from the front of the meter panel or instrument transformer compartment.
 - B. The customer must provide a safe walkway directly to the metering installation, and in no case should be less than a width of 3'-0", and no less than a height of 6'6".
 - C. The height clearance for the working space should be no less than 6'-6".
3. Permanent barricades may be required to provide the clearances where the working space is exposed to vehicles or hazardous conditions.

7. Meter Locations – Refer to RPI-2 & RPI-15

1. Outdoor meter locations are preferred. When adequate exterior wall space is not available, the architect or builder may provide a meter room accessible from outside the building, in which the required number of meter sockets may be properly installed. Consult the NVE District Project Coordinator for specific questions regarding meter locations. Refer to page 1 of RPI-G for the telephone number.

Single – Family Residence

The meter shall be placed in accordance with the RPI-2 standard. . Future building or other structural changes shall not render the meters inaccessible. The metering equipment must be placed outdoors or in a meter room. Consult Meter Services for meter room requirements. Metering locations are not permitted in garages, carports, or breezeways.

Multiple – Family Residence


Meters and metering equipment shall be installed on the customer's premises in a location furnished by the customer and approved by NVE. The metering equipment must be placed outdoors or in a meter room. CONSULT METER SERVICES FOR METER ROOM REQUIREMENTS.

Single-Story Building Other Than Dwellings or Apartments

Meter socket may be installed on exterior walls in a location furnished by the customer and approved by NVE, or installed inside the building provided they are located in a public area or meter room. Consult NVE Meter Services for meter room requirements. Refer to page 1 of RPI-G for the telephone number.

Multi – Story Buildings

1. In large, multiple – occupancy buildings, extensive shopping centers or buildings that exceed two floors, NVE may, at its option, establish more than one meter location for groups of individual meter facilities. Consult the appropriate District Project Coordinator for written approval of the service plans in these cases. Refer to page 1 of RPI-G for the telephone number.
2. When the plan of a meter socket location has been established for a building any additional meter sockets shall conform to that plan.
3. For reasons of public safety, NVE safety, maintenance of service, and reliability of metering, it is not permissible to install meters and metering equipment as follows:
 - A. In any location that is not readily accessible.
 - B. In any location which is hazardous to personnel.
 - C. In garages, carports or breezeways.

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- D. In trash, refuse or garbage enclosures.
- E. In areas containing animal waste.
- F. On any surface subject to excessive vibration.
- G. In any elevated or depressed area that does not have access provided by means of a ramp or clear stairway of normal tread and use which conforms to building code requirements.
- H. In any substation area or transformer vault.
- I. On any NVE pole. It is not permissible to attach panels, switches, junction boxes, or any other customer service equipment.
- J. Within a 4' radius of NVE poles (see RS-4). Meters, metering equipment and associated service equipment may be installed on customer – owned poles, pedestal, structures, etc. provided such equipment is at least 4' from NVE poles.

8. Meter Heights


The meter height shall be measured from a level standing surface to the center of the meter. Meters shall be located not more than 75" and not less than 48" above the ground or standing surface when installed outdoors. When the meter is enclosed in a cabinet or indoors in a meter room, the minimum height may be reduced to 36". When a multiple metering panel is enclosed or properly barricaded, the minimum height may be reduced to 24".

9. Meter Room Detail

1. If the customer is installing metering equipment within a meter room, NVE must be provided with constant access through an external door directly into the meter room. The minimum width of the door shall be 36" or comply with local building codes.
2. The customer will provide a key to the meter room. NVE will provide the lockbox to house the key. The Lockbox needs to be located externally on either side of the door or to the side of it, with a minimum height of 48" to a maximum height of 72".
3. 36" minimum working clearance is required in front of the metering equipment. 10" minimum clearance is required on the sides of each meter. 7" minimum clearance is required between the meter and any obstruction above it. See RPI-2 for surrounding clearances. The meter room is not to be used as a storage closet.
4. If the customer installs an internal access door within the meter room, it must be locked and accessible only by authorized personnel.
5. If the meter is to be removed from the instrument transformer enclosure, the remote conduit length, diameter, and run must adhere to the requirements of RPI-G.
6. Meter rooms must meet all requirements of the NEC Code concerning exits.

10. Identification

1. Each installation shall be clearly identified with its permanent address (house number). The street name shall be clearly posted.
2. Multiple Meter Identification: Each meter position and each service switch or breaker shall be clearly and permanently identified by the customer to indicate the particular location supplied by it. The relation of the socket, breaker, and dwelling served must be easily discernable. Meter will not be installed until marking is complete. Examples of permanent markings are:
 - A. An identification plate attached by screws, rivets or a secure adhesive

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- B. Non-removable, by usual solvents, paint applied with stencil or careful lettering
- C. Commercially available decals designed for this purpose

Clear identification means a legible street address, and apartment or store number. Store name may be included, but it does not constitute a location designation in itself.

11. Sealing


All meters and enclosures for meters, metering equipment, and service entrance equipment on the line side of the meter, will be sealed by NVE. NO PERSON is permitted to tamper, or in any way interfere, with a meter or it's connections as placed by NVE.

12. Grounding

Lugs for terminating the customer's ground wire (or other grounding conductors) shall be located outside of the sealable section and shall be designed to readily permit the customer's neutral system to be isolated, when necessary, from NVE facilities.

13. Metering Service Switch and Rating

1. For each meter, the Customer or Contractor shall furnish and install a switch or other approved disconnecting means, installed on the load side of the meter, to control all of the energy registered by the meter. The disconnect means, where permitted by the governing code or ordinances, may consist of a group of switches or breakers.
2. When a single meter switch is used, the rating of the fuse or circuit breaker shall be the rating of the meter switch.
3. When a group of switches or breakers is used in lieu of a single meter switch, the ampere rating of the conductor or bus connecting to the meter socket will be considered the rating of the meter switch,
4. Every meter switch installed on a service of less than 600 volts, shall be on the load side of the meter or metering equipment. This is called "New Sequence" – see definitions on page 1 of RPI-G.
5. The meter switch may be located at a point other than adjacent to the meter and may be located inside the building served, while the meter is located outside remotely from the instrument transformer compartment. See "Instrument Transformer Enclosure with Safety Socket Box" for further requirements (Page 6).
6. In multi – meter installations, electric codes require the installation of a main service switch or breaker on the supply side of any group of 7 or more meters. In these instances, contact NVE Meter Services for approval before the equipment is installed. Refer to page 1 of RPI-G for the telephone number.

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14. Drawing Submittals

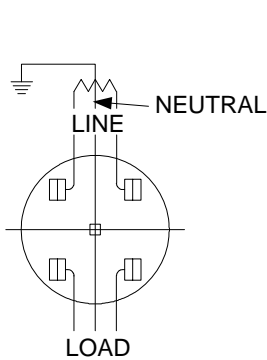
- Drawing submittals will be required for all Customer-Owned Metering Equipment on Instrument-Rated services. Drawing submittals are not required for Self-Contained services less than 600 volts. Two (2) copies of the manufacturer's prints shall be sent to NVE at the following address for approval prior to the construction of the equipment.

NV Energy
 Meter Services, MS B97MS
 7155 Lindell Rd.
 Las Vegas, Nevada 89118

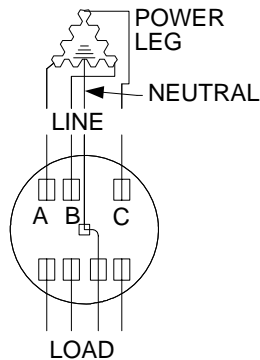
- Drawing submittals are required for Customer-Owned Primary Switchgear for services greater than 600 Volts. Send two (2) copies of the manufacturer's prints to the above address for approval.

15. Self-Contained Meter Sockets

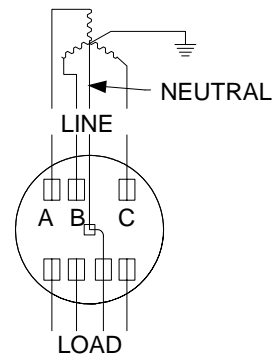
- Sockets for use with self-contained meters are available in approved ratings. When connected to properly sized service entrance conductors, the sockets that are Underwriter Laboratory approved for up to 225 amps are permissible. Service entrance wire terminals shall accommodate conductor sizes per Standard RPI-8. Actual conductor size required must be per NVE construction drawings.
- All self-contained meter sockets designed for underground service that have been approved for aluminum conductor by Underwriter Laboratories may be installed in the NVE service area.
- For single-phase 120/240 Volt services, 320 amp or 400 amp self-contained meters can be supplied when the properly designed service equipment is installed by the Customer. Refer to RPM-2 and RPM-3.
- Self-contained meters are available for 480 Volt services and are rated up to 200 amps. Consult NVE Meter Services for approval of metering equipment. Refer to page 1 for the telephone number.



120/240V: 1-Phase, 3-Wire
FIGURE 1




120/240V: 3-Phase, 4-Wire, Delta
 240/480V: 3-Phase, 4-Wire, Delta
FIGURE 2



120/208V: 3-Phase, 4-Wire, Wye
 277/480V: 3-Phase, 4-Wire, Wye
FIGURE 3

Self-Contained Meter Sockets

NOTE: NVE does NOT allow 3-phase, 3-wire services.

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16. Sockets

For self-contained meters with customer owned wiring, the customer shall terminate their wiring. The socket shall be equipped with terminals of sufficient size to install the conductors without removing any strands of wire.


17. Instrument Transformer Enclosure-General

1. For instrument transformer-rated meters, NVE will furnish and install the normal secondary wiring from the metering transformers to the meter socket.
2. No connections shall be made in the instrument transformer enclosure to supply any other meter, or more than one load circuit.
3. When the neutral conductor is a part of the service, it shall pass through the instrument transformer box, be continuous, and be capable of being bonded to the box.
4. Line supply conductors can enter the instrument transformer compartment from either the top or the bottom of the compartment. Load wire must exit through the opposite end of the compartment from which the line supply conductors entered.
5. The instrument transformer box may be used as a combination service termination and current transformer mounting box for residential underground services when the service conductors supply only the one customer. The underground service conduit shall enter the center of the lower end of the instrument transformer box.

18. Switchboards - General

1. NVE shall be consulted prior to manufacture of switchgear, to determine the type of metering, size of current and/or voltage transformers, and any special arrangement necessary for mounting instrument transformers.
2. The customer shall bring their meter socket panel to NVE Meter Shop for wiring. At that time, the customer will be provided with current transformers (CT's) for installation in their equipment.
Information required on the back of the meter socket panel: Job name; Job address; Main size (amps) Voltage; Top side; Hinge side; NVE work order number. If the meter is remoted, the true tape-measured length of remote conduit and the number of quarter (90°) bends in the conduit must be noted at the time the CT's are provided.
The NVE Meter Shop is located at:

7155 Lindell Road
Las Vegas, Nevada 89118
3. The rating of the current transformers will not necessarily be the same as the service switch.
4. All compartments containing unmetred conductors shall be sealable. When a raceway or conduit for metering secondary wiring is necessary, such raceway or conduit shall be sealable (see "Sealing," page 3).
5. The instrument transformers supplied by NVE for metering shall not be utilized for any other purpose.

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19. Instrument Transformer Enclosure with Safety Socket Box

Instrument transformer enclosure with a hinged cover and a separate meter socket enclosure are acceptable. A minimum 10" space is required between the edges of the two enclosures. The maximum separation between the edges of the enclosure is 10'. Each enclosure shall be visible from the other enclosure. There shall be no fence barrier between the two enclosures. The conduit run between the instrument transformer enclosure and the socket enclosure shall be either 1-1/2" or 2" trade size Rigid Metal Conduit or Intermediate Metal Conduit and shall contain no more than 270° of bend. Condulets (LB, LR, LL and T fittings), enclosures and junction boxes are prohibited in the conduit between the instrument transformer enclosure and the meter socket enclosure. The CT enclosure shall be located in the immediate area of the main and meter disconnecting means.

20. Switchboard Service Section

1. In cases where more than one meter is to be installed, there will ordinarily be a separate service for each meter installation and its associated service switch.
2. For services with self-contained meters (not using current transformers) it may be practicable to put two or more meters and switches in the service section.
3. When two or more switchboard service sections are supplied from one set of service conductors, the supply conductors serving these switchboards shall be terminated ahead of and outside of the metering transformer compartments in a separate sealable enclosure. The supply conductors are to be arranged so they are readily accessible without disturbing the metering transformers and associated secondary wiring.
4. Additional service connections may be made in the main service termination and pull section where more than one metering installation is necessary, or where more than one rate schedule is desired. Additional service connections shall not be made.

21. Specially Engineered Service Section


Switchboard design which does not conform to the standard switchboard is considered specially engineered, and includes the following installations:

1. Installations rated over 3000 amperes or 600 volts.
2. Where the service breaker ampacity rating exceeds that of the standard service section.
3. When multiple metering sections are used.
4. When recessed meter panels are used.

NOTE: All specially engineered service sections shall be approved before manufacture and installation. Copies of Manufacturer drawings shall be sent to NVE Meter Services for approval.

22. Service Termination, Instrument Rated and Switchboard Services

1. Overhead Service Terminations:
For overhead services, the customer shall furnish lugs and connect the cable to line and load sides of the bus stubs in the current transformer compartment.
2. Underground Service Terminations:
 - A. NVE will terminate its service conductors on lug landings in the termination section, as shown in Figure 1 on sheet RPM-45.
 - B. The customer shall install conductors from the service termination lug landings to the line side of current transformer compartment.

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NOTE: The load wires from the distribution section (branch circuits) shall not pass through any sealable section.

3. For both standard and specially engineered switchboard service sections, all services or supply conductors shall enter the service section through one end and leave through the opposite end of the instrument transformer compartment. This stipulation applies to either overhead or underground service or if two or more service sections are connected together. The direction of feed shall be vertical through the instrument transformer compartment (see RPM-45).
4. In cases where more than one switchboard is to be installed, a separate service section will be installed which is completely barred from other service sections, pull sections, termination sections, or service switches and disconnects.
5. When two or more switchboard service sections are supplied from one set of service conductors, the supply conductors are to be arranged so they are readily accessible without disturbing the instrument transformers and associated secondary wiring.
6. Additional service connections may be made in the main service termination section where more than one metering installation is necessary. Additional service connections shall not be made in the instrument transformer compartment. Consult NVE for approval.
7. Meter installations of six meters or less, shall be connected "New Sequence".

23. Pull Section Lug Landings and Bussing Requirements

Bus bars, and other hardware, attached to the outer walls of the enclosure shall be secured with devices that may not be loosened from the outside. Screws or bolts requiring special tools for installation or removal are not acceptable.

Single Meter Switchboard Installation Rated through 800 amps

Bus bars (or cable) shall extend from the landing lugs in the termination section to the CT bus stubs.

Single Meter Switchboard Installation Rated above 800 amps

Bus bars shall extend from the service-terminating stubs in the termination section to the CT bus stub.

24. Unmetered Conductors


Customer unmetered service wires & metered load wires are not to be run in the same conduit, raceway or wiring gutter. Unmetered conductors from the consumer's distribution section shall not pass through the utility's sealable sections.

25. NVE Requirements for Customer Owned Service Cables

Only authorized employees of NVE will be permitted to connect or disconnect a customer's underground service to or from any NVE facility

The customer shall furnish and NVE will install compression terminal connectors on the transformer secondary bushings. Contact the appropriate NVE New Business District for wire size information (phone #, page 1). All customer supplied connectors shall be compression type and approved by NVE. Compression lugs should be purchased according to NVE Material Standard MC-7, or may be purchased directly from NVE.

The following table lists the maximum number of conductors per service voltage for each service panel per a given service voltage. Required cable lengths above the pad are also given.

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Service Panel Ratings			Maximum Conductors per Terminal	Maximum Conductor Size	Minimum Cable Length Above Pad
Volts	Amps	Phase			
120/208 or 277/480	400-1000	3	4	750 MCM AL	6 feet
	1200-2000		8		
	2500-3000		10		
	4000-6000		16		
120/240	400-600	1	2	500 MCM AL	6 feet
	400-600	3	2		12 feet
	800		3		
	1000		4		

* Maximum 15 minute peak demand on 4000-6000 Amp panels shall be limited to 3000 Amps.

NOTES:

1. The wild leg of a customer owned service panel shall be clearly marked at the pull section of the service panel with orange electrical tape. Use the C-phase as the wild leg on any instrument rated meter (>200 amps, 4 wire, delta) or any self contained meter.
2. When the customer requests 3-phase, 480 Volt 4 wire delta service from a padmount transformer, the neutral size must be large enough to carry the return fault current. The wire size provided shall be per the National Electric Code.

NOTE: NVE does **NOT** allow 3-phase, 3 wire services.


26. Multiple meter installation design

Service equipment to serve multiple tenants shall be designed so that all energy to one tenant space shall be measured by one meter. All energy for non-tenant specific (house) consumption shall be measured by one meter. Installations where the tenant is served under multiple rates such as general service interruptible water will have multiple meters. Consult NVE Meter Operations with questions.

27. Fire pump service

Fire pumps shall be connected so that energy for the fire pump will be measured by the non-tenant specific (house) meter. When the fire pump controller is used as the main disconnecting means, the room where the fire pump controller is located shall meet all requirements for access and work space. An easement shall be required for access to the controller.

When a separate disconnecting means is installed as supervised installation in accordance with NEC Article 695.4(B), the disconnecting means shall be installed near the service equipment or at a location approved by NVE Meter Operations. Consult NVE Meter Operation with questions.

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