

# ELECTRIC METERING GENERAL

## 1.0 INDEX

- 1.0 INDEX
- 2.0 SCOPE
- 3.0 GENERAL REQUIREMENTS
- 4.0 EQUIPMENT
- 5.0 METER REQUIREMENTS
- 6.0 METER FACILITIES
- 7.0 ELECTRICAL CONNECTIONS

## 2.0 SCOPE

This guide covers general requirements and codes for all electrical metering. For detailed information refer to the appropriate standard.

## 3.0 GENERAL REQUIREMENTS

### 3.1 **Establishment of Service**

Electric service will not be established until the service entrance facilities are completed by the customer. In areas where local ordinances require permits and final inspection, NVE will not install the service conductors or metering until the installation has passed all local inspections.

### 3.2 **Customer Responsibilities**

The customer shall furnish, install and maintain the conductors and equipment beyond the point of attachment. The customer shall provide approved meter enclosures, as well as meter sockets and sealing rings. No customer owned equipment is allowed in the metering section, pull section or behind the meter.


### 3.3 **NVE Consultation**

The customer must consult NVE before purchasing service entrance equipment. The type of service and voltage available will vary with location. NVE will provide the fault duty information. It is the customer's responsibility to consult NVE for fault duty information.

### 3.4 **NVE Responsibilities**

All meters, metering transformers, secondary test switches and normal metering transformer secondary wiring will be provided and installed by NVE.

3.5 All meter sockets and enclosures shall have Underwriter's Laboratory approval. All installations and Equipment shall comply with the latest requirements of the Electric Utility Service Equipment Requirements Committee (EUSERC).

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		GM0001M
				ELECTRIC METERING GENERAL		
Drawn:	Eng:	Appr:	Date:			Revision: 9
JL	MB	DA	6/15			Page 1 of 9

3.6 In general a building will be supplied through only one set of service conductors of the same voltage.

**4.0 EQUIPMENT**

4.1 The type and size of overhead service entrance conductors (weather head to panel) shall conform to the ordinances and codes of the NEC and the local inspection authority. In no case shall the service entrance conductors be smaller than #8 AWG. **NVE will size and provide underground service conductors.**

**4.2 Equipment / Transformer Ratings:**

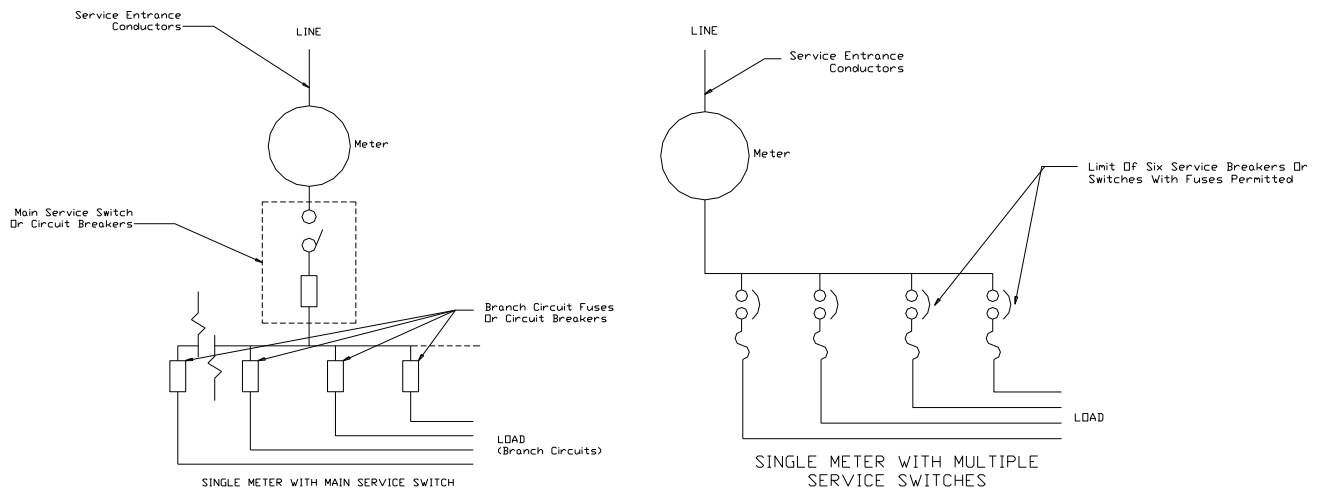
The capacity of the service switch may be used as the basis for determining the size of other related equipment (transformer). In those cases where a main service switch is not used, the rating of the service equipment shall be considered as that required to serve the total diversified load.

4.3 Refer to NEC, Article #230, Section F, for service entrance requirements.


**5.0 METER REQUIREMENTS**

**5.1 Meter Sequence**

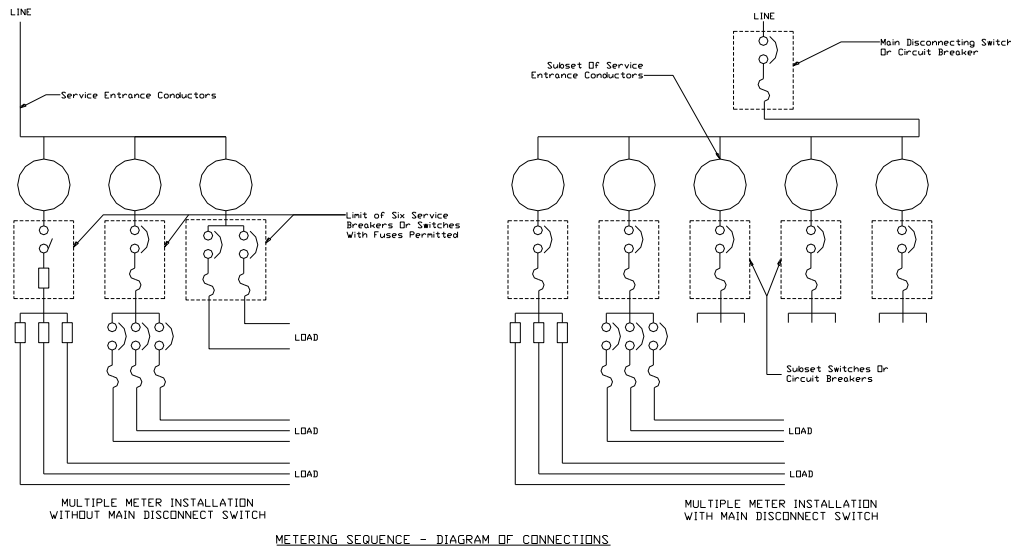
The metering arrangement provides for the line cables to enter first, followed by the disconnect, followed by the protection devices. (Meter-Switch-Fuse Sequence) Refer to local codes for multiple meter installation



The meter switch may be located inside or outside the building being served in accordance with applicable electrical codes. **Inside mounted disconnects will require the installation of a shunt trip device outside the premises.**

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		GM0001M
				ELECTRIC METERING GENERAL		
Drawn:	Eng:	Appr:	Date:			Revision: 9
JL	MB	DA	6/15			Page 2 of 9

When a single set of service entrance conductors supply a multi-meter installation (2-6 meters), a meter switch for each meter shall be located on the load side of each meter.



For larger multi-meter installations (7+ meters) electrical codes require the installation of a main service switch or breaker located on the supply side of the meters. In these instances, an individual meter switch must also be installed on the load side of each meter.

### 5.2 Meter Cabinet

Cabinets for meters and service switches shall be designed to provide the required clearances between the meter socket sealing flange and the inside cabinet door. See **NEC 110-26** for required working spaces and headroom requirements.

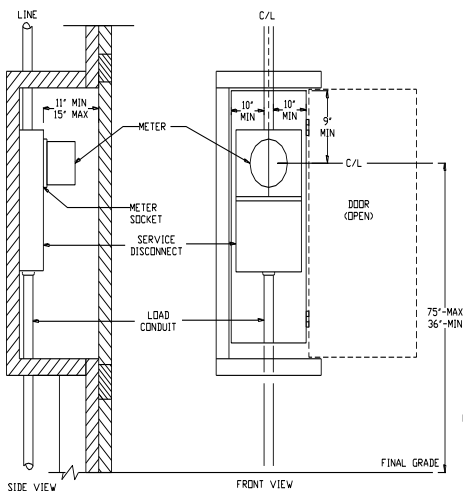


FIGURE 1

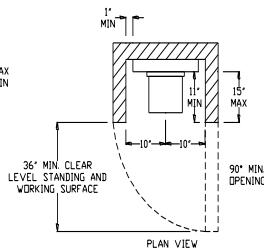
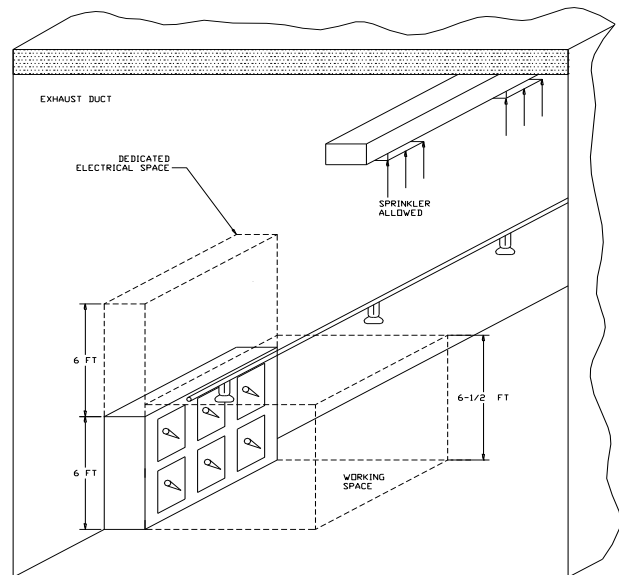


FIGURE 2



				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		GM0001M	
				ELECTRIC METERING GENERAL			
Drawn:	Eng:	Appr:	Date:			Page 3 of 9	
JL	MB	DA	6/15				

**5.3 Meter Markings**

*Each meter position and each service switch or breaker shall be clearly and permanently marked to indicate the particular location supplied by it.* The relation of the meter socket, breaker, and location served must be easily discernible. Meters will not be installed until the marking is complete.

*Permanent marking shall include a stamped or engraved metal or plastic identification plate attached by screws or rivets. Clear identification means a legible apartment or street number. The store name or number may be included, but does not constitute a clear designation in itself.*

**5.4 Meter Locking and Sealing**

All service switches or breakers shall have provisions for locking in the open position. Sealable latches, studs, or screws shall be used for sealing covers or sections. When a latch is also used, it shall be designed to permit positive locking and made of a durable corrosion resistant material.

Enclosure and meter seals shall be **provided by NVE. Removal of the seal is unlawful without prior authorization.**

When a stud and wing nut assembly is used for sealing, the stud shall be 1/4" - 20UNC minimum. The stud and wing nut shall be drilled 3/32".


**5.5 Transformer Compartments**

Current transformer compartments are normally required if the capacity of the service switch exceeds 200 amps.

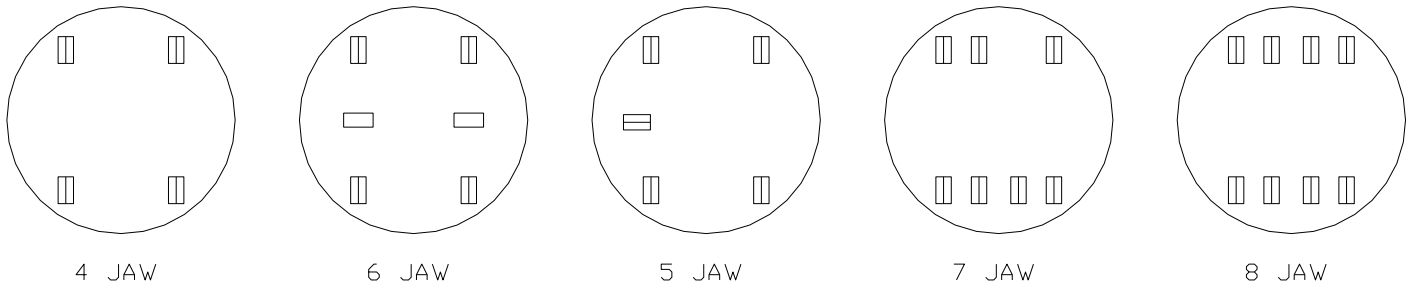
**5.6 Cover Panel Attachments**

Cover panels shall be rigidly attached to stationary components of switchboards and enclosures independent of any removable socket mounting device, test device, or other non rigid section.

**5.7 Meter Sockets** - The type of socket required is shown below:

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		GM0001M
				ELECTRIC METERING GENERAL		
Drawn:	Eng:	Appr:	Date:	Revision: 9		Page 4 of 9
JL	MB	DA	6/15			

REQUIRED SOCKET JAW CONFIGURATION



METER Voltage	SOCKET Phases	JAWS Types	0-200 Amp Self-Contained			201 Amps and Above Rated Meter Socket Jaws
			Wires	Meter Socket Jaws	Socket By-Pass Device	
120/240	1	Residential	3	4	Optional	6
120/208	1	Residential	3	5	Optional	-
120/240	1	C & I	3	4	Yes	6
120/208	1	C & I	3	5	Yes	-
120	3 - Delta	C & I	3	5	Yes	8
240	3 - Delta	C & I	3	5	Yes	8
480	3 - Delta	C & I	3	5	Yes	8
208/120	3 - Wye	C & I	4	7	Yes	13
120/240	3 - Delta	C & I	4	7	Yes	13
480/277	3 - Wye	C & I	4	7	Yes	13

Sealing rings shall be provided with socket. When sockets are installed on hinged panels, they shall be designed for back connection. All self-contained meter sockets shall be rigidly connected to the back wall of the socket enclosure or to a stationary support within the meter panel. Additionally when meter panels with sealing ring flanges are used, all meter sockets shall be attached with screws to the meter panel.

5.8 Bus Bar


Ampacities of busbar conductors shall conform to UL-891 “Deadfront Switchboard Standards.” Maximum widths and number of busbars shall conform to NVE standards. Ampacity of instrument transformer compartment bus shall conform to NEMA Standards publication PB2, part 6.04, Paragraph A, for section bus. Aluminum busbars shall be plated to prevent corrosion.

5.9 Ventilation Openings

Ventilation openings shall be louvered, screened and be guarded with internal barriers to prevent access to energized parts.

5.10 Lifting Handles

When lifting handles are required on panels or enclosures, each handle shall be designed for full grasp, secure attachment, and minimum strength of 75 pounds. **Note: Chest type handles with a folding grasp are not acceptable.**

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		GM0001M
				ELECTRIC METERING GENERAL		
Drawn:	Eng:	Appr:	Date:			Revision: 9
JL	MB	DA	6/15			Page 6 of 9

## 6.0 METER FACILITIES

### 6.1 Meter Access

All metering facilities shall be installed in locations which provide ready access for meter reading, inspection, and testing. Ready access is defined as capable of being reached quickly without climbing over objects or removing obstacles.

### 6.2 Meter Rooms

An internal electrical room adjacent to the building's outer wall (with the switchgear adjacent to the outer wall) is allowed with **written approval from NVE**. The meter room must be illuminated and can be used for communication equipment. **Internal / isolated electrical rooms without direct access from the outside of the building are prohibited.** See GI0011U, Section 4.0. Gas meters shall not be installed in any enclosed room nor shall a meter room be used for storage. Meter rooms shall be provided with a doorway opening to the outside with a NVE keybox at customer expense. Keyboxes are available in the warehouse and should be included as part of the work order package. See GI0004M for details.

### 6.3 Meter Heights


Meter height, which is measured between the centerline of the meter and the standing surface, shall be as follows:

1. Meter rooms, enclosed cabinets, recessed cabinets 48" - 75"
2. Surface mount 48" - 75"
3. The 48" height may be reduced to 36" upon NVE approval.

### 6.4 Meter Locations (see CM0001M, Section 4)

Electric meter installations shall be accessible for reading, testing, and inspection.

- a. Outdoor switchgear / meter locations are preferred.
- b. An internal electrical room adjacent to the building's outer wall (with the switchgear adjacent to the outer wall) is allowed with written approval from NVE.
- c. All locations for meters are subject to prior NVE approval. All meter installations in non-preferred locations require written approval from NVE.
- d. Accessibility to the meter shall be maintained during landscaping, fencing, and construction.
- e. Locations in elevated areas or depressed area shall have access by means of a ramp or stairway.
- f. Meters installed on or recessed in the surface of a building shall have a clear working and standing space (36"x36"x78" high) entirely on the property of the customer. Exceptions must be approved by NVE.
- g. Locations on any walkway, alley, or driveway giving access to commercial or industrial property are not allowed.

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		GM0001M
				ELECTRIC METERING GENERAL		
Drawn:	Eng:	Appr:	Date:			Revision: 9
JL	MB	DA	6/15			Page 7 of 9

6.5 **Unacceptable Locations:**

- a. Hazardous locations such as elevator shafts, doorways, driveways, alleys, hatchways, over stairways, ramps, or steps. Areas where personnel may contact high voltage conductors or moving equipment.
- b. In places where vibration, moisture, excessive temperature, fumes or dust may damage the meter or interfere with its operation.
- c. Within or requiring access through any restroom or powder room. Areas accessible only by trapdoor, hatchway or ladder.
- d. For single family residences, meter shall not be installed within any single family garage or residence.
- e. Within any enclosed areas which contain gas meters.
- f. It is recommended that locations of meters on exterior walls of bedrooms or closets should be avoided.

7.0 **ELECTRICAL CONNECTIONS**

7.1 Unmetered Conductors

Only NVE service conductors as defined by the NEC shall be permitted in NVE "sealed" compartments. **Customer-owned conductors, including ground rods and associated ground wire are prohibited in the sealed compartments.**

7.2 **Contact the NVE Meter Department for Fire Pump connections and requirements.**


7.3 Grounding / Bonding

Lugs for terminating the panels "ground/bonding" conductors shall be located outside the NVE "sealable" section and shall be designed to readily permit the user's neutral system to be isolated from NVE's neutral. **Grounding electrode conductor(s) shall not be routed through any NVE "sealed" compartment.**

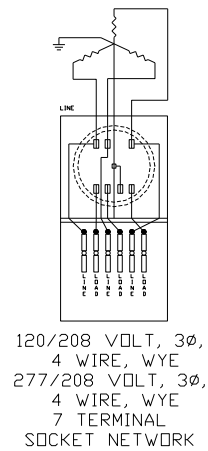
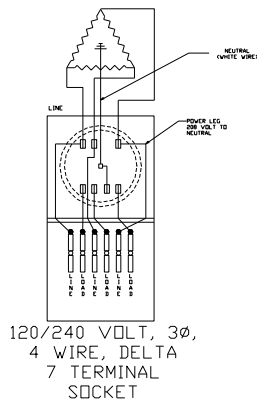
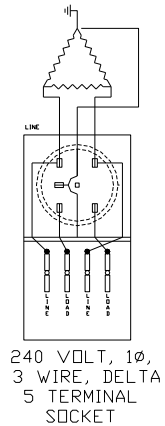
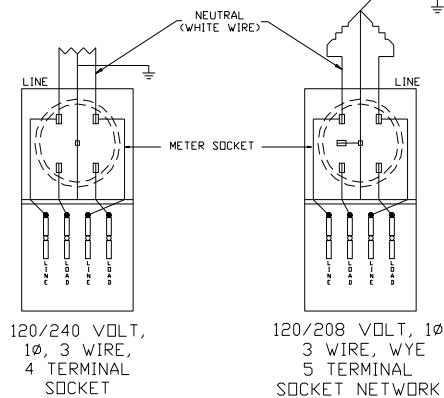
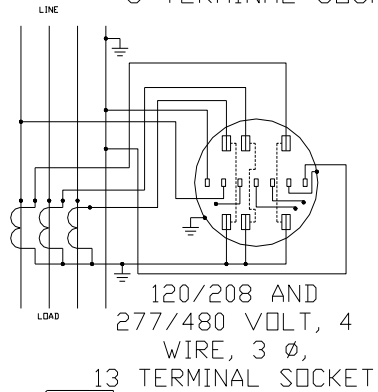
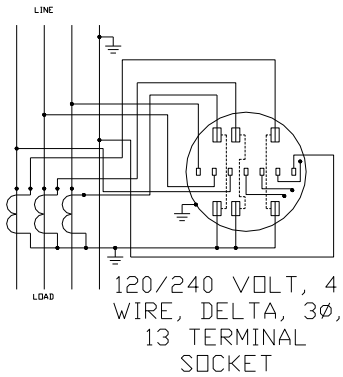
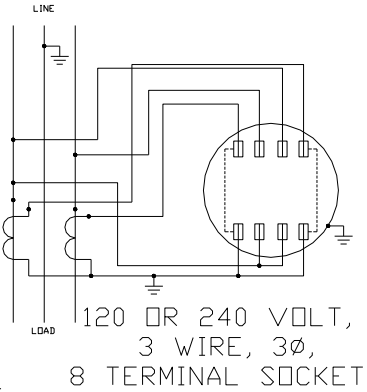
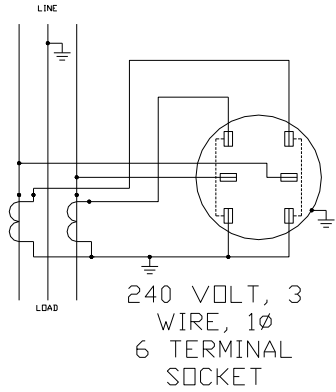
7.4 Panel / Socket Wiring:


**Automatic and lever type by-passes are not approved.**

Electrical connections for approved sockets are shown for reference on the following page.

				VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD		GM0001M
				ELECTRIC METERING GENERAL		
Drawn:	Eng:	Appr:	Date:	Revision: 9		Page 8 of 9
JL	MB	DA	6/15			





	VOLUME 17 – ENGINEERING & CONSTRUCTION STANDARD			GM0001M
	ELECTRIC METERING GENERAL			
Drawn:	Eng:	Appr:	Date:	Revision: 9
JL	MB	DA	6/15	Page 9 of 9