CHAPTER 7

ELECTRIC SERVICE RULES – HUD MANUFACTURED HOMES

700. SCOPE

All manufactured homes constructed to the requirements of the United States Housing and Urban Development (HUD) standards, and all mobile homes, will be supplied service according to this chapter. The term **MANUFACTURED HOME** as used in this chapter shall also apply to all mobile homes (see definition of mobile home)

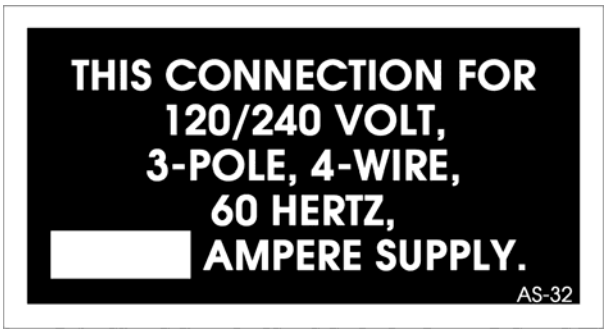
701. DEFINITIONS

Mobile Homes: NEC 550.2, A factory-assembled structure or structures transportable in one or more sections that are built on a permanent chassis and designed to be used as a dwelling without a permanent foundation where connected to the required utilities; these includes the plumbing, heating, air-conditioning, and electric systems. (The term "mobile home" refers to factory-built homes that were produced prior to June 15, of 1976; when the HUD requirement went into effect)

Manufactured Homes: These are homes built entirely in the factory under a federal building code administered by the U.S. Department of Housing and Urban Development (HUD). The Federal Manufactured Home Construction and Safety Standards (commonly known as the HUD Code) went into effect June 15, 1976. Manufactured homes may be single- or multi-section and are transported to the site and installed. The federal standards regulate manufactured housing design and construction, strength and durability, transportability, fire resistance, energy efficiency and quality. The HUD Code also sets performance standards for the heating, plumbing, air conditioning, thermal and electrical systems. It is the only federally-regulated national building code. On-site additions, such as garages, decks and porches, often add to the attractiveness of manufactured homes and must be built to local, state or regional building codes.

Manufactured homes will have a plate (sticker) located on the end of each transportable section:

If the manufactured home is built to **NEC 550.32A** there will be a sticker located near the panel indicating that a 4 wire feeder is required, these homes will be provided service according to this chapter:



If the manufactured home is built to meet the conditions of **NEC 550.32B** there will be a sticker located on the outside of the home nearest the service panel indicating that grounding is required prior to connection of service, these homes will be provided service according to chapters 1 through 6:

Modular Homes: These factory-built homes are built to the state, local or regional code where the home will be located. Modules are transported to the site and installed. These homes will have a state sticker indicating that it has been constructed to the applicable state code requirements. (See Stickers on next page)

Panelized Homes: These are factory-built homes in which panels - a whole wall with windows, doors, wiring and outside siding - are transported to the site and assembled. The homes must meet state or local building codes where they are sited.

Pre-Cut Homes: This is the name for factory-built housing in which building materials are factory-cut to design specifications, transported to the site and assembled. Pre-cut homes include kit, log and dome homes. These homes must meet local, state or regional building codes.

Modular homes, panelized homes and pre-cut homes will be supplied electric service according to chapters 1 through 6.

State Certification Seals

702. GENERAL REQUIREMENTS

A. Alliant Energy will provide and install the service cable to individual or a group metering points for manufactured homes. The customer will provide and install the meter socket(s) and service equipment. Multiple mobile / manufactured homes receiving service at a central location shall obtain approval from Alliant Energy for each installation. Group metering installations shall follow the same rules as individually metered units.

B. Each meter socket shall be permanently marked or tagged to coincide with each mobile/manufactured home. Appropriate marking shall consist of a permanent plaque or directory and, in addition, a permanent marking shall be indicated inside each meter socket base. **Meters shall not be installed until identification requirements are met**. See section 605 for additional information.

C. Minimum rating of a manufactured home service entrance shall be 100 amps**.** **Receptacles shall have overcurrent protection no greater than their rated capacity.**

D. **The manufactured home service entrance equipment shall contain a means for serving an accessory building, structure or additional electrical equipment located outside a mobile/manufactured home by a fixed wiring method.**

E. Manufactured home service entrance equipment is permitted to have additional receptacles for connection of electrical equipment located outside the home, and all such 120-volt, single phase, 15 and 20-amp receptacles shall be protected by listed ground-fault circuit interrupter protection.

F. **All branch circuit breakers and feeder breakers shall be connected on the load side of a single service entrance breaker.**

G. A field installed manufactured home service entrance shall be located adjacent to the manufactured home and, not mounted on or in the mobile/manufactured home and not more than 30 feet from the home. If the manufactured home is placed on a permanent foundation a conventional service may be installed on the foundation, if the following provisions are met:

1. Service entrance rated equipment is located immediately adjacent to the meter pedestal or be an integral part of the meter pedestal.
2. The service entrance shall contain a means for serving an accessory building structure or additional electrical equipment outside the manufactured home by a fixed wiring method.
3. A four-wire feeder is run from the load side of the service entrance to the electrical panel in the manufactured home.

703. MOBILE / MANUFACTURED HOME COURTS.

A. A mobile/manufactured home court is defined as a contiguous parcel of land that is used for the accommodation of occupied manufactured homes. Underground distribution systems in a new court will be installed and owned by Alliant Energy according to existing extension rules and Electric Service Rules.

B. For distribution system rebuilds, any relocation of service drops, service laterals or meter locations, requested by the Customer, shall be billed according to existing extension rules.

C. When replacing a meter socket or other equipment located at a central distribution point, the meter socket shall contain a service disconnect or a service disconnect shall be located adjacent to the meter socket. The installation shall comply with *NEC* 550.32.

704. MANUFACTURED HOME SERVICE ENTRANCE PEDESTAL 100-200 AMP, SINGLE-PHASE, 3-WIRE – 120/240 VOLT – UNDERGROUND

☐ **Utility furnishes and installs & maintains:**

1. Underground service lateral
2. Meter

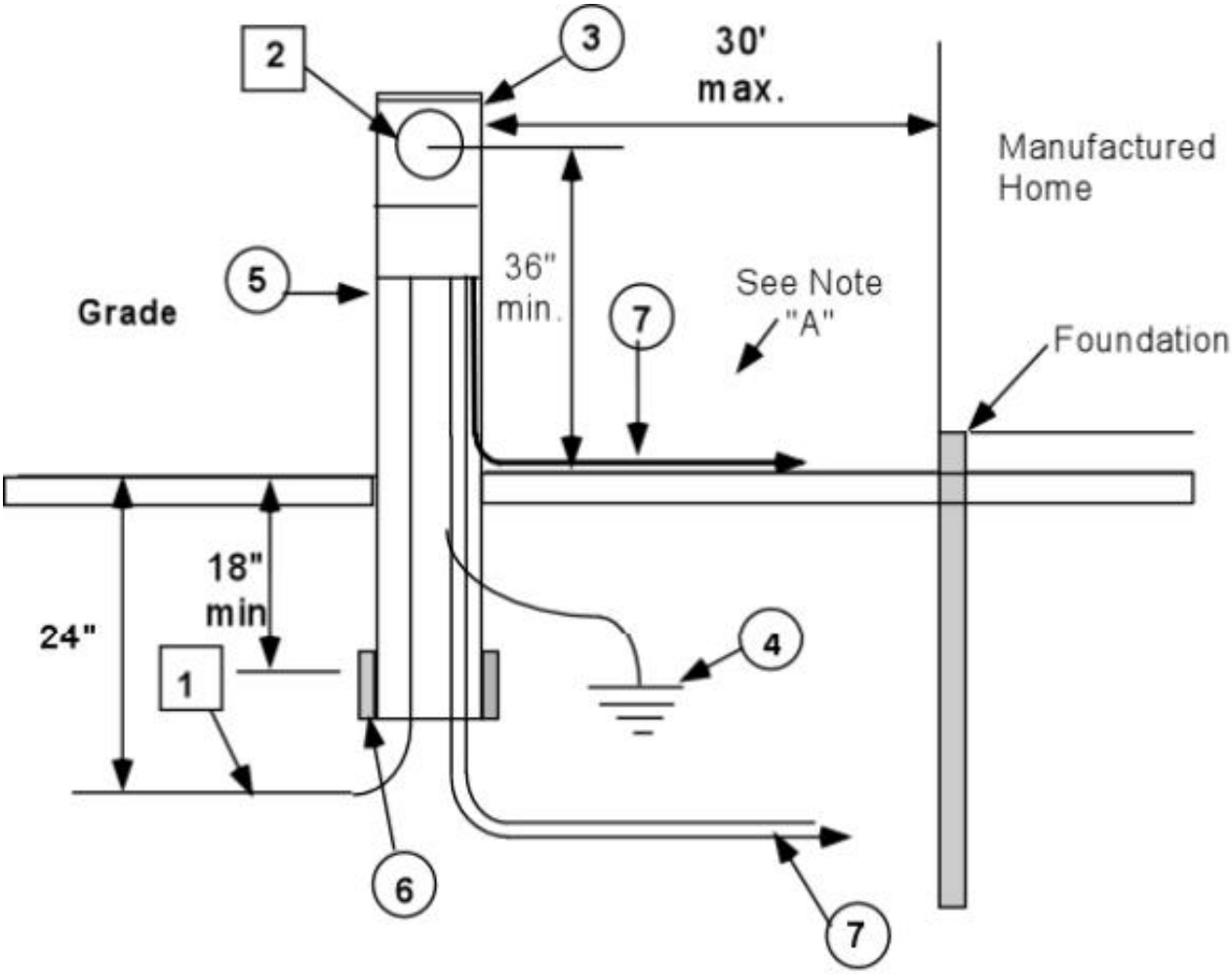
◯ **Customer furnishes, install and maintains:**

3. Mobile/Manufactured home service entrance.
4. Grounding in accordance with applicable electrical code (refer to page 178 to 181).
5. Pedestal
6. Factory provided "stabilizing foot"
7. Mobile/Manufactured home 4-wire power supply cord or Permanent installed 4-wire feeder

NOTES:

1. A mobile/manufactured home service entrance pedestal or an additional disconnecting means listed as suitable for service entrance use shall be located in sight of and not more than 30 ft. from the exterior wall of the mobile/manufactured home it serves.
2. A clear space of 4 feet shall be maintained in front of and in back of the meter pedestal.
3. Commercially made mobile/manufactured home metered service entrance pedestals shall be listed as suitable for service equipment for manufactured homes.

704. MANUFACTURED HOME SERVICE ENTRANCE PEDESTAL 100-200 AMP, SINGLE-PHASE, 3-WIRE – 120/240 VOLT – UNDERGROUND – CONTINUED.



705. FIELD BUILT SERVICE ENTRANCE FOR MANUFACTURED HOMES 100-200 AMP – 3 WIRE – 120/240 VOLTS – OVERHEAD

☐ **Utility furnishes, installs, and maintains**

1. Overhead service drop
2. Cable dead-end(s)
3. Connectors
4. Socket type meter

○ **Customer furnishes, installs, and maintains**

5. Pole, treated, Class 6 Min. 5" Diameter at top, length as required to meet clearances
6. Guy, galvanized, stranded steel ¼" min. and guy guard
7. Anchor
8. Grounding in accordance with applicable codes (refer to pages 178 to 181)
9. Conduit or service entrance cable.
10. Rain-tight service head
11. Mobile/Manufactured Home Service Entrance equipment, rated for outdoors use single main with provisions for feeder or branch circuits
12. Approved meter socket
13. Either a 4-wire mobile home power supply cord or a permanently installed 4-wire feeder
14. Field Built Structure – See Section 434

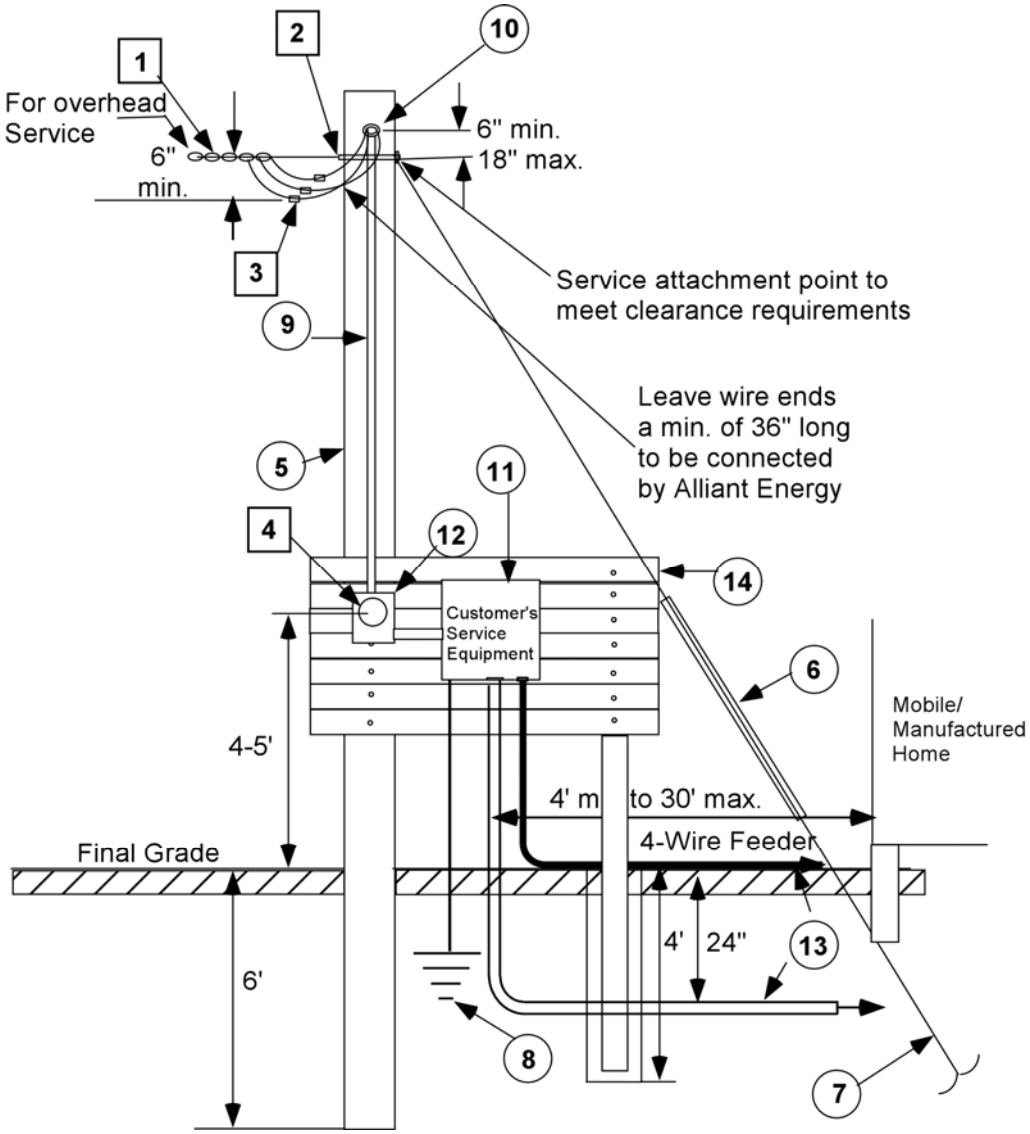
NOTES:

1. The installation shall provide adequate clearances for Alliant Energy's overhead service cables. Above-ground and other clearance requirements are shown in Chapter 11.

2. A mobile home service entrance equipment or an additional disconnecting means listed as suitable for service entrance use shall be located in sight of and not more than 30 ft. from the exterior wall of the mobile home it serves.

3. Service equipment shall be listed as (e.g. U.L.) suitable for service equipment, rated for outdoor use, power outlet type service equipment listed for mobile home or a separate meter socket, disconnect and distribution panel shall be used.

705 FIELD BUILT SERVICE ENTRANCE FOR MANUFACTURED HOMES, 100 - 200 AMP, 3-WIRE, 120/240 VOLTS, OVERHEAD – CONTINUED.



706. FIELD BUILT SERVICE ENTRANCE MANUFACTURED HOME, 100 – 200 AMP, 3-WIRE, 120/240 VOLTS, UNDERGROUND.

☐ **Utility furnishes, installs & maintains**

1. Underground Service lateral
2. Socket type Meter

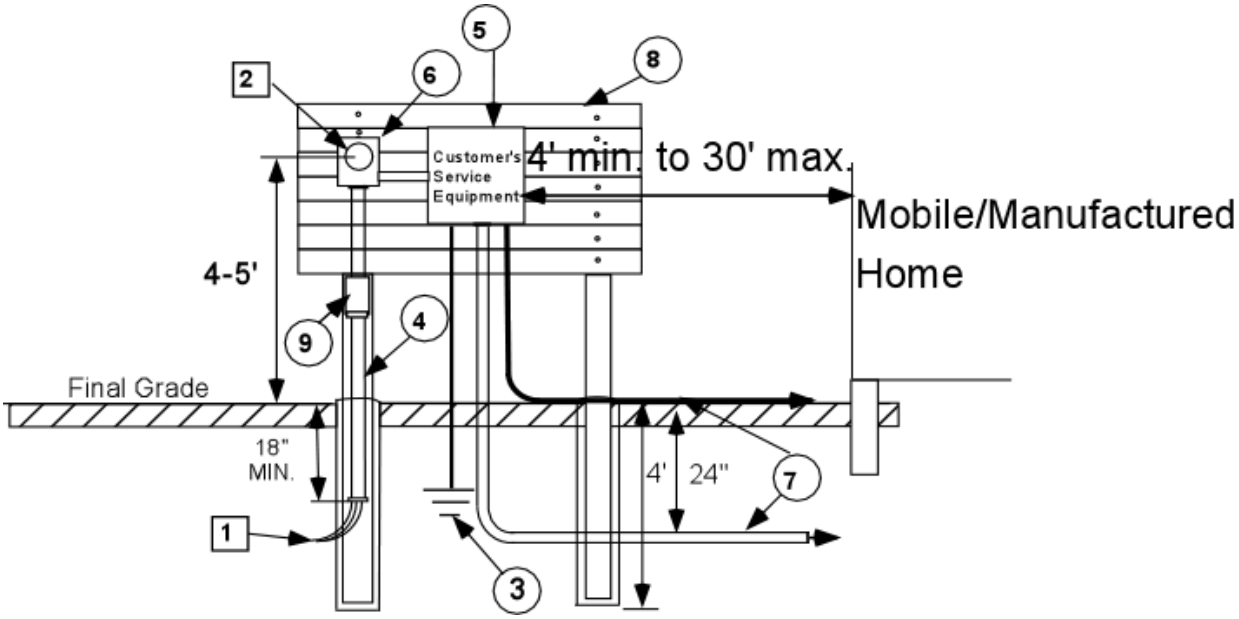
○ **Customer furnishes, installs & maintains**

3. Grounding in accordance with applicable codes (Refer to pages 178 to 181)
4. Rigid Conduit
5. Mobile/Manufactured Home Service Entrance equipment, rated for outdoor use, single main with provisions for feeder or branch circuits.
6. Approved meter socket
7. Either a 4-wire manufactured home power cord or a permanently installed 4- wire feeder to the manufactured home
8. Field Built Structure See Section 434
9. Expansion Joint

NOTES:

1. The free standing service entrance equipment shall contain a means for serving an accessory building or structure or additional electrical equipment located outside manufactured home by a fixed wiring method.
2. Service equipment shall be listed as (e.g. U.L.) suitable for service equipment. Power outlet type service equipment listed for manufactured home or a separate Meter socket, disconnect and distribution panel shall be used.
3. Wood field built pedestals shall have a minimum of 2- 6" X 6" wood posts and 2" X 6" planks that are commercially treated against decay. The posts shall be buried a minimum of 4' deep, plumb, and set in concrete the full depth. The planks shall be level and fastened with galvanized hardware. The standard width is 24 to 60 inches.
4. Alliant Energy engineering approval is required for use.

706. FIELD BUILT SERVICE ENTRANCE MANUFACTURED HOME, 100 – 200 AMP, 3-WIRE, 120/240 VOLTS, UNDERGROUND – CONTINUED.



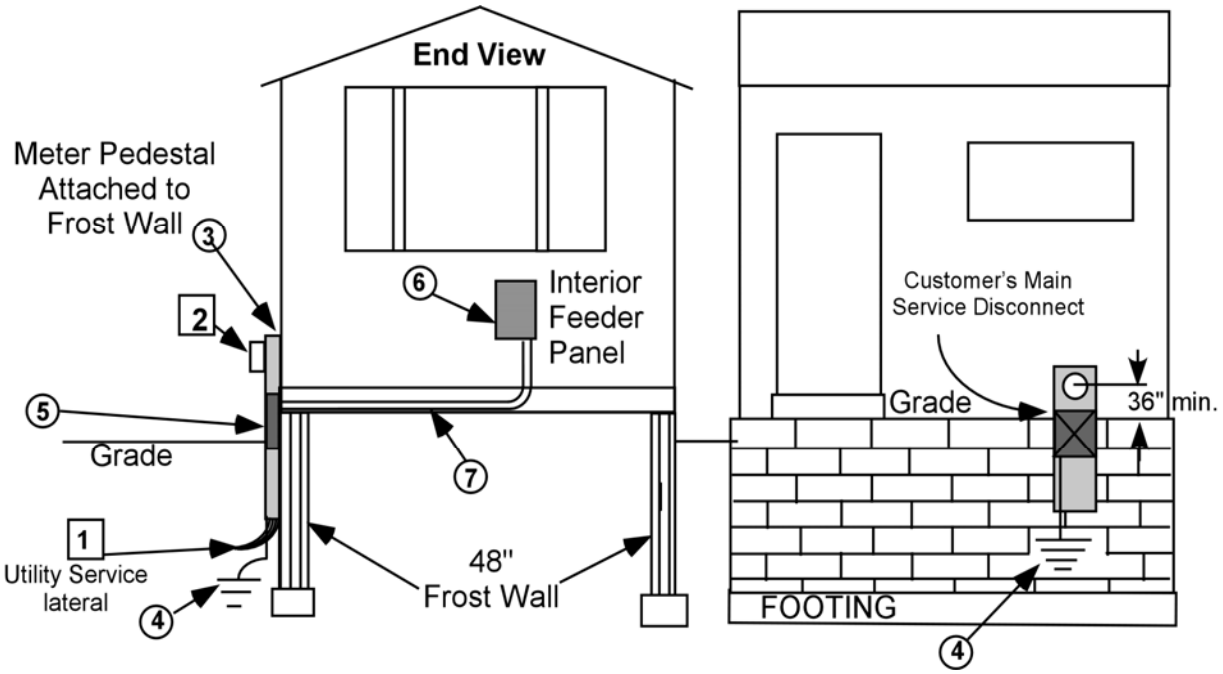
△ **707. MANUFACTURED HOME SERVICE PEDESTAL, MOUNTED ON FROST WALL PERMANENT FOUNDATION, SINGLE-PHASE, 100 – 200 AMP, 120/240 VOLTS.**

☐ **Utility furnishes and installs & maintains**

1. Underground service lateral
2. Socket type meter

○ **Customer furnishes, install and maintains**

3. Service Entrance Pedestal
4. Grounding in accordance with applicable electrical code (refer to pages 178 to 181)
5. Mobile/Manufactured Home Service Entrance equipment, rated for outdoor use, single main with provisions for feeder or branch circuits. Can be foundation mounted or free standing.
6. Factory installed feeder panel
7. Permanently install 4-wire feeder to manufactured home



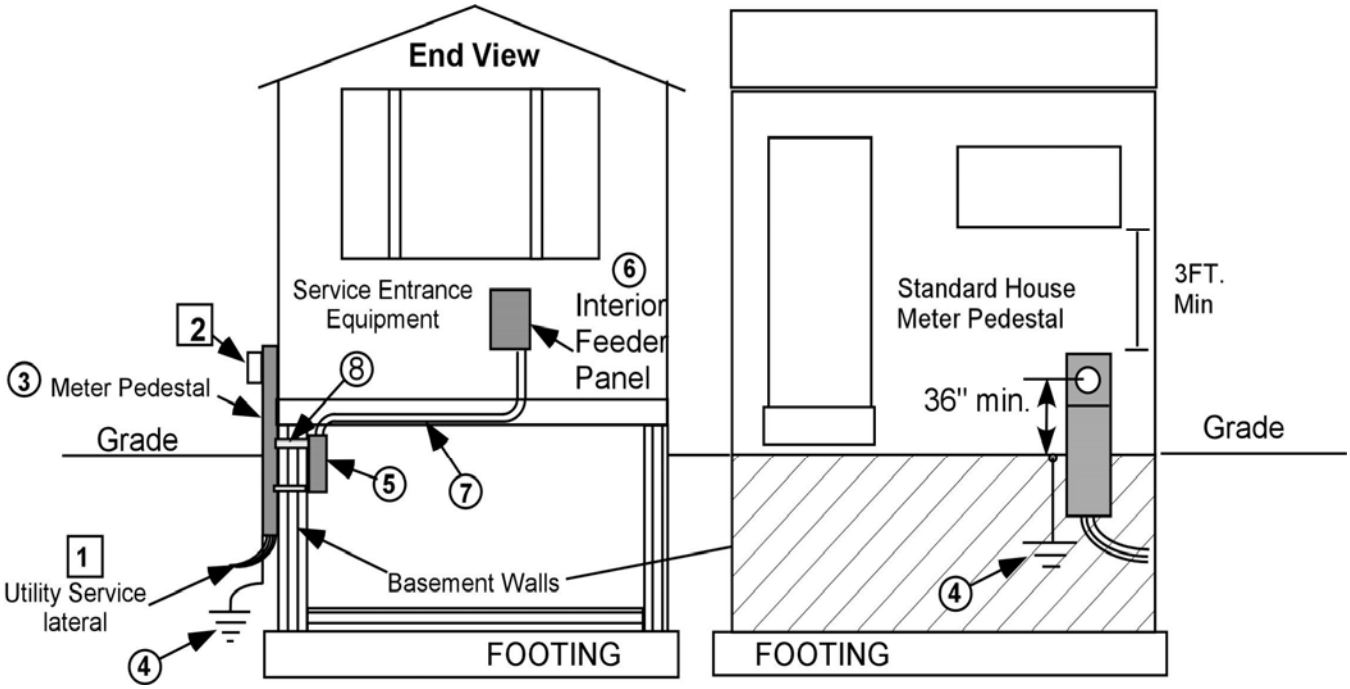
△ **708. MANUFACTURED HOME SERVICE PEDESTAL, MOUNTED ON FULL BASEMENT, PERMANENT FOUNDATION, SINGLE-PHASE, 100 – 200 AMP, 120/240 VOLTS.**

☐ **Utility furnishes and installs & maintains**

1. Underground service lateral
2. Socket type meter

◯ **Customer furnishes, install and maintains**

3. Standard House Meter Pedestal
4. Grounding in accordance with applicable electrical code (refer to pages 178 to 181)
5. Service Entrance equipment, single main Disconnect with provisions for feeder of branch circuits
6. Factory installed feeder panel
7. Permanently install 4-wire feeder to manufactured home
8. Service Entrance Conductors



709. GROUNDING

A. In accordance with the **National Electrical Code** (NEC), a permanent and effective ground shall always be provided for all service entrance equipment. The neutral conductor shall also be grounded. See next page for examples.

B. The grounding of electric installations is essential for the safety of those using the electric service, personnel maintaining the service, and is a safeguard for the Customer's equipment.

C. Intersystem Bonding is required by NEC 250.94. See page 178-181 for details.

710. GROUNDING ELECTRODE SYSTEM

Grounding Electrodes NEC 250.52:

1. Metal Underground Water Pipe. – NEC250.52 (A)(1)
2. Metal Frame of a Building or Structure - NEC250.52 (A)(2)
3. Concrete Encased Electrode (Ufer) - NEC250.52 (A)(3)
4. Ground Ring - NEC250.52 (A) (4)
5. Rod and Pipe Electrodes - NEC250.52 (A)(5)
6. Plate Electrodes. - NEC250.52 (A)(6)

A. If available on the premises at each building or structure served, each item in NEC 250.52 (A) 1-6, shall be bonded together to form the grounding electrode system.

B. The grounding electrode conductor (GEC)

1) The grounding electrode conductor shall not be run through meter sockets, Instrument Transformer Cabinets, or the utility portion of a metering pedestal.

2) The grounding electrode conductor may be terminated in one of the following.

a) In the service disconnect(s).

b) In the metering equipment containing a service disconnect

c) In the termination compartment of multiple metering installations.

C. Metal underground gas piping systems on the line side of the gas meter shall not be used as a grounding electrode or bonded to the grounding electrode system.

D. If two ground rods are installed (NEC 250.56), both ground rods shall be installed to left or to right of meter socket but not in front. The grounding electrode conductor shall not pass in front of meter socket or pedestal

Fig. 710A

Wall Mounted Meter Socket

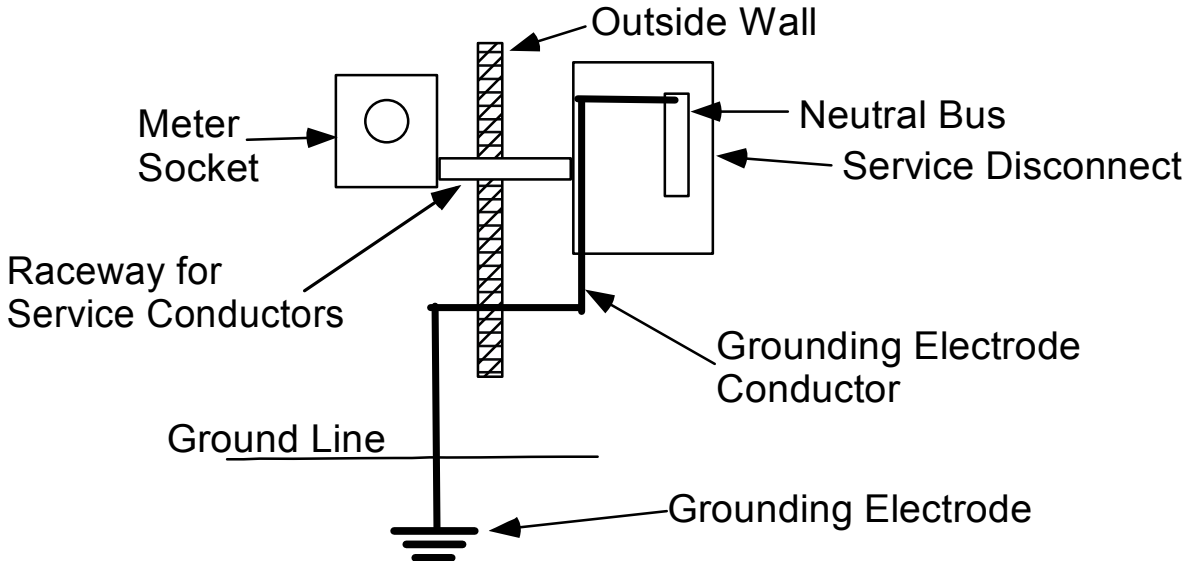


Fig. 710B

Grounding Single Self Contained Wall Mounted Meter Sockets and Pedestals

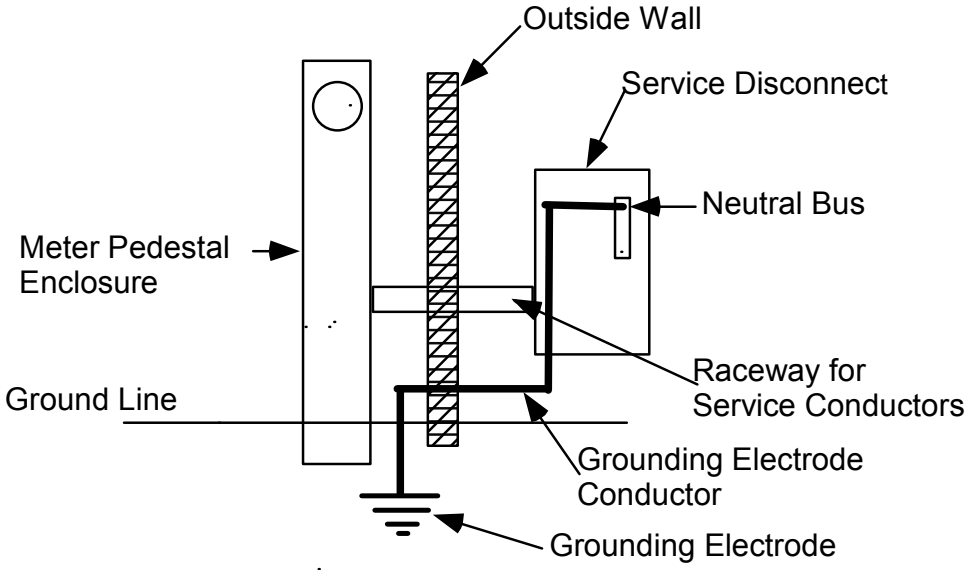
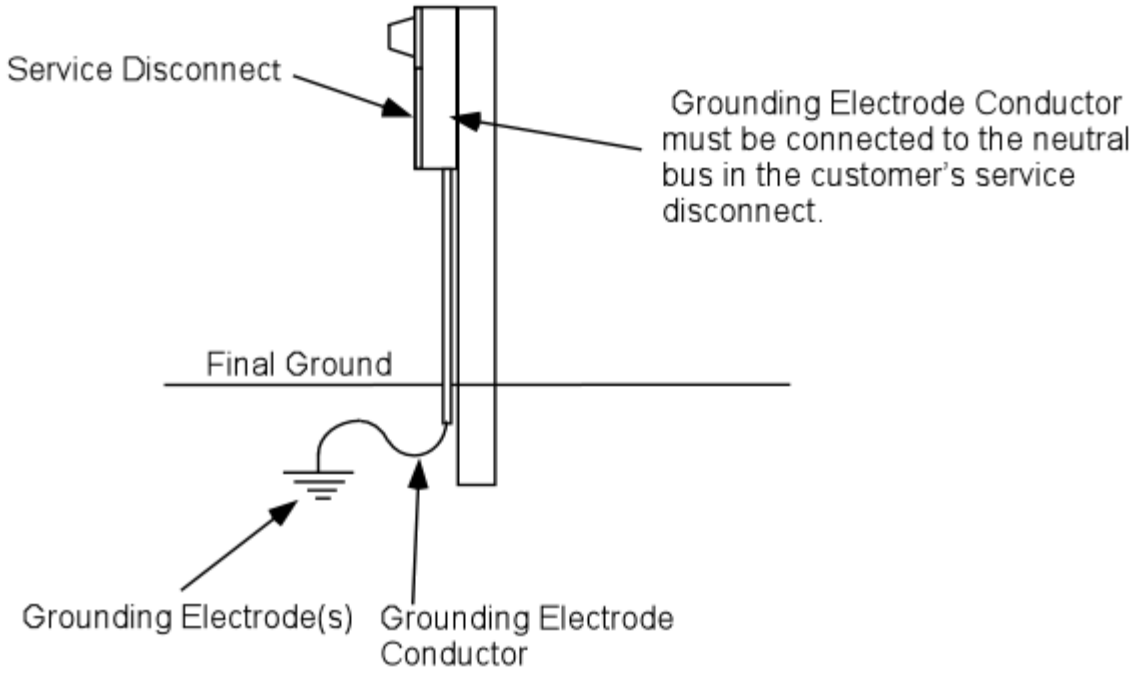


Fig. 710C

Grounding of Free Standing Pedestals



711. BONDING SERVICE ENTRANCE AND METERING EQUIPMENT

A. The electrical contractor is responsible for all bonding connections.

B. The termination cabinet, the CT cabinet and the meter socket enclosure shall be bonded to:

1. The system neutral when they are located on the line side of or at the main disconnect.

2. The equipment grounding conductor, when all of the following apply:

a. They are installed the load side of the main disconnect.

b. No service ground-fault protection is installed.

c. They are located immediately adjacent to the main disconnect.

C. Bonding shall be provided where necessary to ensure electrical continuity and the capacity to safely conduct any fault current likely to be imposed.

D. Intersystem bonding – CATV, Cable Dish systems and Telephone Companies shall bond to the grounding electrode system, if available. If the grounding electrode system is not readily available, bonding shall be done at the ground terminal bar in the main service entrance equipment. NEC 250.94 (2) or (3) only. This intersystem bonding shall not be

done in or on the metering equipment. Wisconsin is the jurisdiction of the PSC. (PSC 114.099).

E. Meter disconnect switches nominally rated not in excess of 600 volts shall have a short circuit rating equal to or greater than the available short circuit current. These devices shall also be grounded and bonded according to parts V & VII of Article 250.

712. BONDING CONDUCTOR SIZING

A. Equipment bonding conductors on the supply side of service shall be sized according to NEC 250.102C. Table 712 may be used as a guide in determining the minimum size for equip. bonding conductors for metering cabinet installations.

B. Table 712 assumes **75°C temperature ratings** for service entrance conductors, with no adjustment factor for more than 3 current-carrying conductors. On a 3-phase 4-wire wye service where the major portion of the load consists of nonlinear (harmonic) loads, the neutral shall be considered as a "current-carrying" conductor (NEC 310.15B4c); in such cases a larger equipment bonding conductor shall be used.

△ **TABLE 712 (NEC 250.66)**

Metering Cabinet Rating, Amps	Svc Entrance Conductor Size (75°C Alum.)	2011 NEC Table 310.15(B)(16) 90°C Ampacity (per run)	Number of Runs	Total Ampacity	Minimum Equipment Bonding Conductor Size or Equivalent Area for Parallel Conductors (Aluminum, AWG/kcmil)
400	250	205	2	410	#2
	350	230	2	460	1/0
600	250	205	3	615	1/0
	350	230	3	690	1/0
800	250	205	4	820	2/0
	350	250	4	1000	4/0
1200	350	250	5	1250	250
	500	310	4	1240	250
	600	340	4	1360	300
1600	350	250	7	1750	350
	500	310	6	1860	500
	600	340	5	1700	500
2000	350	250	8	2000	350
	500	310	7	2170	500
	600	340	6	2040	500
2500	750	385	7	2695	750
	1000	445	6	2670	750
3000	750	385	8	3080	750
	1000	445	7	3115	1000

Metering Cabinet Rating	Service Entrance Conductor Size (75C Copper)	2011 NEC Table 310.15(B)(16) 75°C Ampacity (per run)	Number of Runs	Total Ampacity	Minimum Equipment Bonding Conductor Size or Equivalent Area for Parallel Conductors (Copper, AWG/kcmil)
400	3/0	200	2	400	#4
	4/0	230	2	460	#2
	600	420	1	420	#2
600	3/0	225	3	675	#2
	4/0	260	3	780	#1
	300	320	2	640	#1
800	350	310	3	930	1/0
	500	380	3	1140	2/0
1200	350	350	4	1400	4/0
	500	430	3	1290	4/0
	750	475	3	1425	250
1600	350	310	6	1860	250
	500	380	5	1900	250
	600	420	4	1680	300
	750	475	4	1900	300
2000	350	310	7	2170	300
	500	380	6	2280	350
	600	420	5	2100	400
	750	475	5	2375	400
2500	500	380	7	2660	400
	600	420	6	2520	500
	750	475	6	2850	500
3000	500	380	8	3040	500
	600	420	8	3360	600
	750	475	7	3325	600