

Swansea Electrical Code Regulations

The Village of Swansea has adopted the **2014 National Electrical Code** as amended with the following listed articles as the “Swansea version of the National Electrical Code”. The amended code applies to the Village of Swansea only.

The exceptions are as follows:

- A. **Conductors Material.** It shall be prohibited to use aluminum wire or copper clad aluminum wire in any branch circuit wiring within the village. Aluminum wiring or copper clad aluminum wiring shall be permitted for main service entrance feeders up to the distribution panel(s) only. All aluminum or copper-clad aluminum wiring shall be AA-8000 series aluminum alloy meeting the requirements of A.S.T.M. B800 and A.S.T.M. B801. When used, all aluminum or copper-clad aluminum wiring shall be installed in accordance with the adopted Electrical Code and the manufacturer’s installation instructions.
- B. **Conductors – Minimum Ampacity and Size.** No branch circuit wires smaller than AWG No. 12 may be installed or connected to any device serving lighting or power loads, unless the branch circuit voltage is less than normal voltage supplied by Ameren Illinois and has been transformed down for use on low voltage control circuits.
- C. **Disconnecting Means and Branch-Circuit Protective Equipment.** The minimum electrical service amperage shall be 100 Amps.
- D. **Ground Electrode Conductor.** Ground wire shall be copper wire in PVC conduit from meter socket to ground rod.
- E. **Feeder or Service Neutral Load.** Entrance conductors and neutral shall be of the same wire size gauge and amperage rating.
- F. **Smoke Detectors & Carbon Monoxide Detectors.** All dwellings shall have smoke detectors and carbon monoxide detectors that are hard wired (110V) with battery backup and shall be interconnected. Smoke detectors shall be located within every bedroom and in halls outside of bedrooms within 15 feet of the bedroom door and in each level of the dwelling. Carbon monoxide detectors shall be located within 15 feet of every bedroom door.
 - a. **Exception.** Existing dwellings that have been unaltered shall not be required to have hard wired and interconnected systems, they must however have smoke and carbon monoxide detectors in the aforementioned locations. Once an existing dwelling is altered any altered area shall comply with general exception division (F) completely.

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G. Dedicated Receptacles. Single Dedicated receptacles for refrigeration, sump pumps and all other exclusions outlined in the N.E.C. 2005 for ground fault current interruption protection shall be permitted.

H. Arc Faults. The National Electrical Code 2005 edition language regarding arc fault protection relating to arc fault placement within dwellings shall be permitted.

Before you begin work on a job, you are responsible for contracting the appropriate electric company. Each electric company's guidelines slightly vary and it is best to know what rules need to be followed before beginning a job.

Swansea is serviced by the following Electric Utility Company:

Ameren Illinois(800) 775-5000

Application for Appeal. The owner of a building or structure or any other person may appeal from a decision of the Electrical Inspector refusing to grant a modification to the provisions of standards and specifications applicable thereto. The Board of Appeals application for appeal may be made when it is claimed that; the true intent of the standards and specifications applicable thereto do not apply, or any equally good or better form of electrical installation can be used.

ROUGH IN AND CIRCUITS

1. All work shall be done in a workman like manner.
2. All wiring shall be #12 AWG copper or larger excluding phone, sound, security and data etc.
3. All wiring conductors shall be copper unless provided for in the code.
4. All dwellings shall have smoke detectors; they shall be hard wired with battery back-up and shall be interconnected. Locations are to be: each bedroom, halls outside of bedrooms, within 15 feet of bedrooms and each level of the home. These are mandatory even if an alarm system is installed. New technology style detectors shall be preapproved by the authority having jurisdiction.
5. All dwelling shall have carbon monoxide detectors within 15 feet of the outside of all bedroom doors. They shall be interconnected to the smoke detectors and be both 110 volt and battery backup.
6. All conduits installed shall use proper electrical fittings, plumbing fittings are not allowed.
7. All rough-in wiring shall be completed and made up, all wiring shall be spliced and tailed out with at least 6 inches of wire extending outside the box. All receptacles shall be tailed, feed thru on receptacles is allowed only on GFCI for down line protection.
8. All wiring in a basement 8/3 or smaller shall be installed in a chase or in drilled holes in the joists. Holes shall be drilled as to not damage the integrity of the

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- joists. Wire larger than 8/3 may run on the bottom of the joists, but not in the center of the room.
9. Dryers, ranges and ovens shall be wired with three conductors and a ground, they shall use a four wire receptacle and not have the frame tied to neutral.
 10. Sump pumps, washers, refrigerators, freezers and any other appliance which require a dedicated circuit shall have a single outlet. GFCI receptacles are not required if this article is followed.
 11. All outlets in garages and accessory buildings that have floors at or below grade level, which are not intended as habitable rooms such as storage areas, work areas, unfinished areas of basements etc. shall be GFCI protected.
 12. GFCI are required in crawl spaces, wet bars, all kitchen countertops, bathrooms, garages, outdoor outlets, above ground pools and receptacles within 6 feet of a sink or standing water.
 13. All 120 volt, 15 and 20 amp circuits supplying outlets in bedrooms shall be Arc Fault Protected.
 14. It is required that grounds on receptacles be installed on top, unless a valid exception is determined by the electrical inspector.
 15. All “disconnecting Means” shall be legibly marked to indicate its purpose.
 16. “Working Space” requirements at all electrical equipment including meters, electric panel, air conditioning equipment etc. is enforced.
 17. Illumination is required for all working spaces for service equipment, switch boards, panel boards that are installed indoors.
 18. The white conductor on NM Cable (Romex) shall be identified with a continuous black tape when used as an ungrounded conductor.
 19. Multiple branch circuits, where two or more branch circuits supply devices or equipment a means of simultaneously disconnecting power shall be provided.
 20. Balconies, decks and porches that are accessible from inside the dwelling shall have at least one receptacle with in the perimeter of the balcony, deck or porch.
 21. Raceway sealing, where a raceway enters a building or structure it shall be sealed with sealants that are identified for use with cable insulation. It shall be sealed in the conduit and around the exterior of the conduit.
 22. Grounding and bonding is required on metal pipes, metal equipment, support beams, and concrete – encased electrodes stubbed up or turned out (rebar as grounds) in basements.
 23. New homes or houses being remodeled require a spare switched conductor for ceiling fans and support for the ceiling fan.
 24. Neutrals are required in “switch boxes” for the purpose of automatic room lighting.
 25. Ground Fault circuit interrupter protection shall be provided for cables installed in electrically heated floors of bathrooms, kitchens and hydro-massage bathtubs.
 26. All closet lights shall be covered (no bare bulbs are allowed) a minimum of 12 inches is required between fixture and stored material.
 27. On final inspection all plates, devices and electrical components shall be installed and operational. All fixtures are to be installed, have lamps and be working, all electric work is to be complete.
 28. All electric panels require circuit identification and a legible panel directory.

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SERVICE

1. Minimum Dwelling service is 100 amp.
100 amp service require #3 copper or larger or #1 aluminum or copper clad aluminum or larger.
200 amp services require 2/0 copper or larger or 4/0 aluminum or copper clad aluminum or larger.
Services require #6 copper ground wire for 100 amp or #4 copper ground wire for 200 amp.
2. Entrance conductors and neutrals must be the same size and rating.
3. Neutrals shall be identified with white tape or white insulation and unbroken from the weather head thru the meter to the panel. *CONTACT UTILITY FOR METER CAN TYPE* Ameren Approved Meter Cans do not require unbroken neutrals.
4. All service entrance conductors shall be installed in conduit from the meter to the panel. When using PVC conduit it shall have a ground wire in it. There shall be no splices in these conductors.
5. The ground wire from the meter to the ground rod shall be in PVC conduit from meter can into earth.
6. All PVC conduit shall have the proper size ground wire in it.
7. All service panels must have a single main disconnect. On new construction, panels will have at least three spaces for future circuits.
8. Panel boxes shall be mounted with a maximum height of 6 feet 6 inches to the center of the main breaker.
9. Panel boxes are not permitted to be mounted in closets or bathrooms.
10. Panel boxes require work clearance of 36 inches wide, 3 feet deep and floor to ceiling height unobstructed area. There shall be nothing in this area, including below grade sump pump.
11. Meters shall be 5 feet 6 inches to the center of the meter above final grade.
12. Weather heads shall be a minimum height of 13 feet above ground.
13. Conduit ditches shall remain open until the inspection.
14. Service conductors shall extend 24" to 30" out of the weatherhead and be marked within 12" of the weatherhead.
15. Service conductors are required to be a minimum of ten feet over yards, decks and patios, 12 feet over driveways and 18 feet over roadways.

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General requirements for installation of residential services in the Village of Swansea.

Services: Utility portion (installed by customer) overhead services shall have rigid heavy wall galvanized threaded conduit. The top of the meter can shall have a rain tight hub (not locknuts, bushings and caulk). Metal conduits require “bonding bushings” or “grounding bushings” with lugs and bond wires. The meter can must be the correct or acceptable can for the utility company servicing the customer. By pass ears or horns where necessary. The meter can shall have the correct “continuous load rating” for the breaker in the service. Dry wall screws are not allowed as fasteners mounting electrical equipment.

Size requirement for services:

100 amp service #3 copper – 100 amp breaker 1 ¼” conduit

125 amp service #2 copper – 125 amp breaker 1 ¼” conduit

200 amp service 2/0 copper – 200 amp breaker 2” conduit

2” conduit is required on all services that the utility connects onto the service mast and on roof penetrating services.

Service conductor insulation requirements RHW, RHW-2, THHN, THHW, THW, THW-2, THWN, THWN-2, XHHN, XHHN-2, USE and USE-2 no other insulation is permitted.

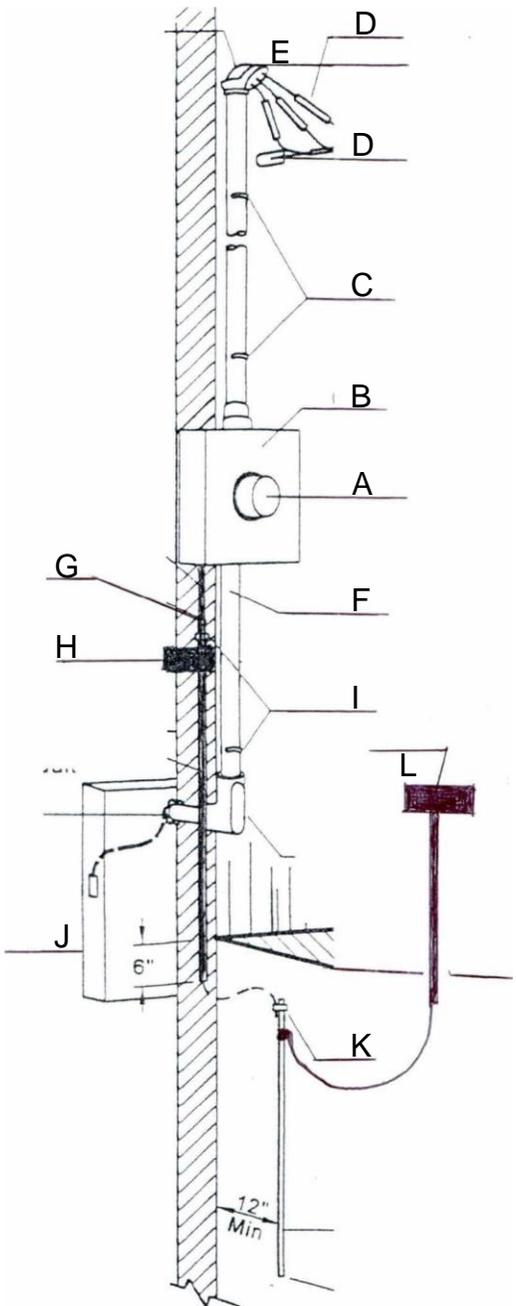
Note: Underground services vary from above information.

Customer side of service: Conduit is required from meter can to service panel or first disconnecting means. Conduit can be rigid heavy wall galvanized threaded conduit or rigid threaded aluminum conduit or rigid PVC conduit schedule 40 or schedule 80. PVC conduit requires a ground wire of proper size in the conduit. All new services or service up grade require an intersystem ground block UL listed for the purpose.

Ground wires required:

100 amp service #6 copper solid or stranded, insulated or bare marked with green tape if insulated, 200 amp service #4 copper and 320 amp service #2 copper. Two ground rods six feet apart may be required to meet 25 OHMs or less as required in the NEC.

100 AMP & 200 AMP Overhead Service "Residential"



A. **METER** 5'6" center (contact electrical inspector for any variance).

B. **METER CAN** With by pass ears contact utility for style. Ameren requires by pass lever and Ameren Approved label.

C. **CONDUIT RISER** Heavy wall rigid, threaded conduit with supports and straps.

D. **SERVICE CONDUCTORS** Lowest point 10'6" above finish grade, neutral identified with white phase tape in meter and within 12" of weatherhead.

E. **WEATHERHEAD** 12' 6" to 13' above finish grade - For yard wire minimum 10' 6" above grade - Drive ways 12' above grade - Roadways or alleys 18' above grade.

F. **CUSTOMER SIDE OF SERVICE** Conduit required either rigid threaded heavy wall - rigid threaded aluminum - rigid PVC (electrical).

G. **GROUND CONDUIT** 1/2" electrical conduit (PVC) attached to meter can and 6" into earth.

H. **GROUND BLOCK** With 1/2" PVC hubs. Shown without hubs receptacle.

I. **STRAPS OR SUPPORTS ON CONDUITS** Proper UL listed.

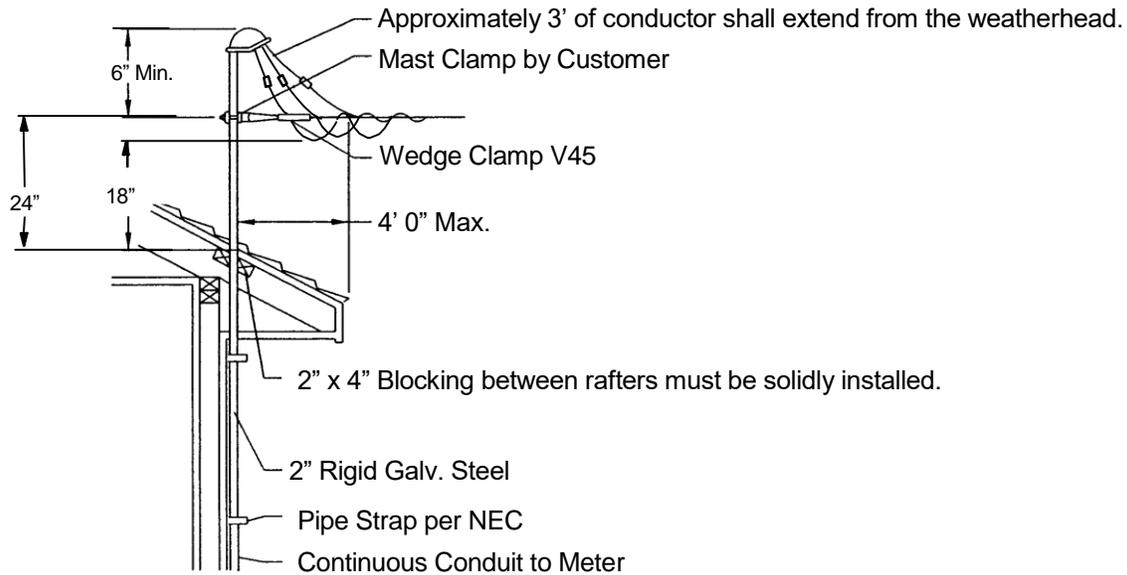
J. **CUSTOMERS PANEL OR DISCONNECTING MEANS** Located in accessible location either by meter or inside of building nearest point of entrance.

K. **GROUND ROD AND CLAMP** Rod 5/8" x 8' #6 wire (copper) for 100 amp service #4 for 200 amp service, top of rod 4" to 6" below grade. Where a ground rod does not meet the 25 OHMs or less requirement in NEC a second rod is required with the rods being at least 6' apart.

L. **ALTERNATE WAY OF INSTALLING "GROUND BLOCK"**

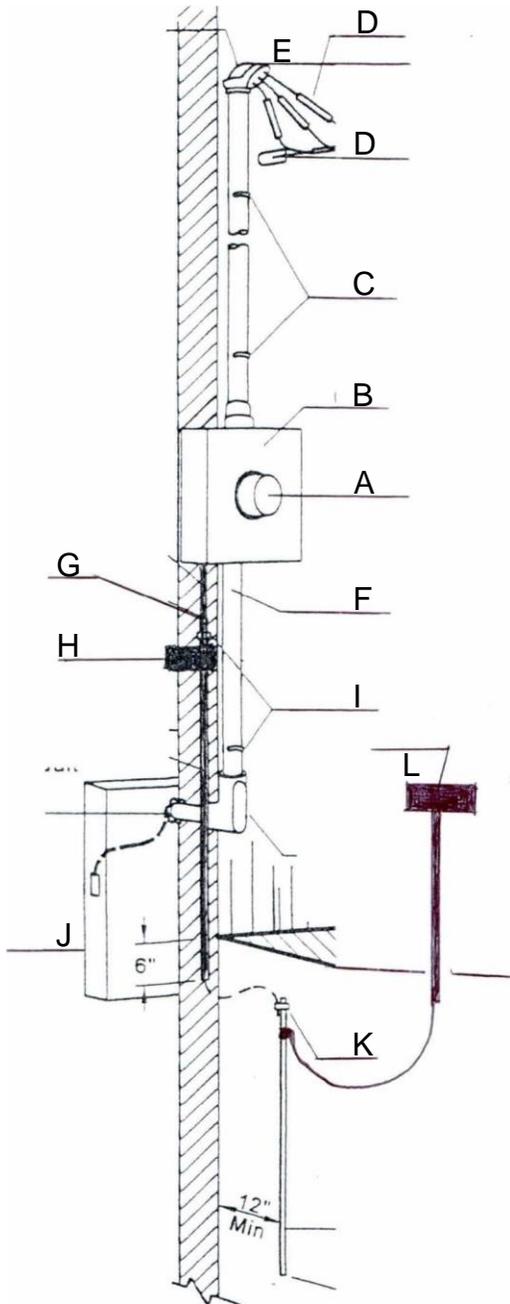
100 AMP & 200 AMP Through Roof Service "Residential"

1. All standard requirements for services apply to through roof services (for meeting height requirements).
2. All service equipment and supports furnished by customer unless noted.
3. Lowest point 10'6" over yards 12' over driveways 18' over street and alleys ways.
4. Customer installed house knob shall be imbedded at least 2" into vertical stud of house, through bolt and backing plate may also be acceptable.
5. Rigid threaded galvanized heavy wall conduit required for the riser and may not be coupled if less than 10' long, if over 10' required coupling should be closet to meter can.
6. Utility may require a guy wire if they do not feel mast is strong enough for the strain.
7. Chart shows acceptable spans from NEC.



Amperes	Phase	Service Conductor	Drop	Span in Feet			
				2" Rigid Steel Conduit	2 1/2" Rigid Steel Conduit	3" Rigid Steel Conduit	3 1/2" Rigid Steel Conduit
100A	1Ø	#4 A1, Triplex		150	-	-	-
100A	3Ø	#2 A1, Quadruplex		146	150	-	-
200A	1Ø	#2/0 A1, Triplex		98	150	150	-
200A	3Ø	#2/0 A1, Quadruplex		90	150	150	-
320A	1Ø	#4/0 A1, Triplex		136	150	150	-

320 Amp Overhead Service "Residential"



A. **METER** 5'6" center (contact electrical inspector for any variance).

B. **METER CAN** **METER CAN** With by pass ears contact utility for style. Ameren requires by pass lever and Ameren Approved label.

C. **CONDUIT RISER** Heavy wall rigid, threaded conduit with supports and straps.

D. **SERVICE CONDUCTORS** Lowest point 10'6" above finish grade, neutral identified with white phase tape in meter and within 12" of weatherhead.

E. **WEATHERHEAD** 12' 6" to 13' above finish grade - For yard wire minimum 10' 6" above grade - Drive ways 12' above grade - Roadways or alleys 18' above grade.

F. **CUSTOMER SIDE OF SERVICE** Conduit required either rigid threaded heavy wall - rigid threaded aluminum - rigid PVC (electrical).

G. **GROUND CONDUIT** 1/2" electrical conduit (PVC) attached to meter can and 6" into earth.

H. **GROUND BLOCK** With 1/2" PVC hubs. Shown without hubs receptacle.

I. **STRAPS OR SUPPORTS ON CONDUITS** Proper UL listed.

J. **CUSTOMERS PANEL OR DISCONNECTING MEANS** Located in accessible location either by meter or inside of building nearest point of entrance.

K. **GROUND ROD AND CLAMP** There shall be two ground rods, they should be 5/8" x 8' rods at least 6' apart. Ground wire shall be #2 copper with top of rod 4" to 6" below grade.

L. **ALTERNATE WAY OF INSTALLING "GROUND BLOCK"**

Conductors for 320 amp services may be either 350 cir. mil. copper or parallel 2/0 copper (4 hots and 2 neutrals) confirm with utility which they prefer.

100 AMP & 200 AMP Underground Service "Residential"

1. **METER** 5'6" center (contact electrical inspector for any variances).

2. **WORK AREA** There shall be 3' square in front of meter with no obstructions such as air condition, generators, gas meters or water faucets.

3. **METER CAN** Use 200 amp can for underground services, correct can for servicing utility, by pass ears if required. Ameren requires by pass lever and Ameren Approved label.

4. **CUSTOMER SIDE OF SERVICE** Conduit required from meter can to service panel, either rigid galvanized threaded heavy wall, rigid aluminum or rigid PVC schedule 40 or schedule 80.

5. **CONDUIT FOR GROUND WIRE** ½" PVC electrical conduit attached to meter can and 4" to 6" below grade.

6. **GROUND BLOCK** With ½" PVC hubs UL listed for intersystem grounding.

7. **STRAPS OR SUPPORTS ON ALL CONDUITS**

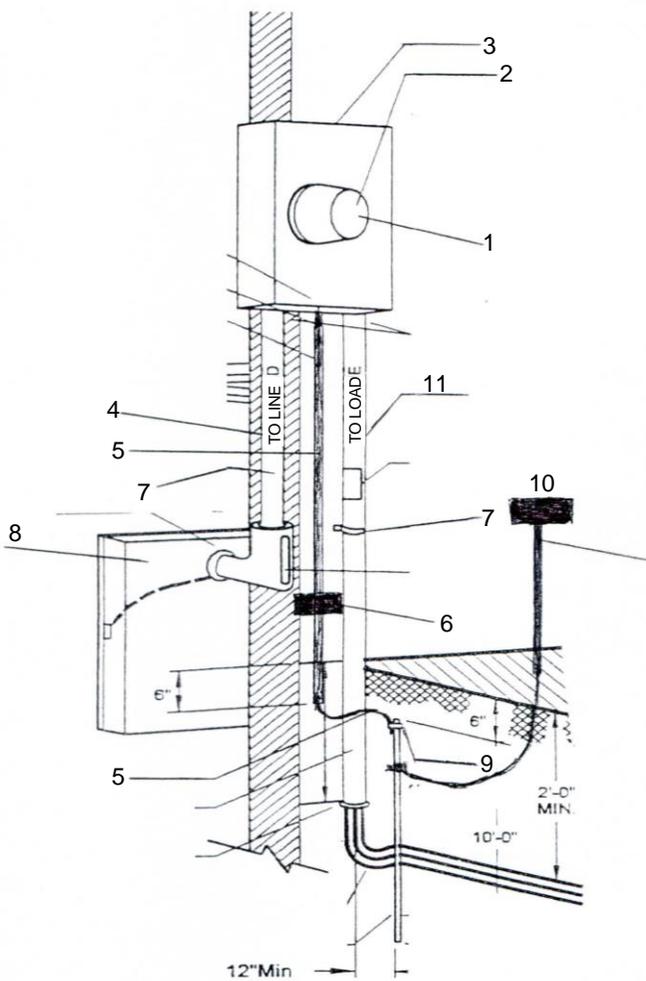
8. **SERVICE PANEL OR CUSTOMER HOUSE PANEL/DISCONNECTING MEANS** In accessible location either by meter or inside of building nearest point of entrance.

9. **GROUND ROD AND CLAMP** 5/8" x 8' rod with #6 copper 100 amp service or #4 copper for 200 amp service. Top of rod 4" to 6" below grade. Where a rod does not meet the 25 OHM standard a second rod is required 6' between rods.

10. **ALTERNATE WAY OF INSTALLING "GROUND BLOCK"**

11. **SLIP FITTING** Most utilities require a "Slip Fitting" or "Expansion" directly below meter can.

Note: Customers wire attaches to bottom of meter customer may have to supply utility side conduit depending on utility some manufacturers make meter can with 3" knock outs.



320 AMP Underground Service "Residential"

1. **METER** 5'6" center (contact electrical inspector for any variances).

2. **WORK AREA** There shall be 3' square in from of meter with no obstructions such as air condition, generators, gas meters or water faucets.

3. **METER CAN** Do not block work areas or utility access.

4. **CUSTOMER SIDE OF SERVICE** Conduit required from meter can to service panel, either rigid galvanized threaded heavy wall, rigid aluminum or rigid PVC schedule 40 or schedule 80.

5. **CONDUIT FOR GROUND WIRE** 1/2" PVC electrical conduit attached to meter can and 4" to 6" below grade.

6. **GROUND BLOCK** With 1/2" PVC hubs UL listed for intersystem grounding.

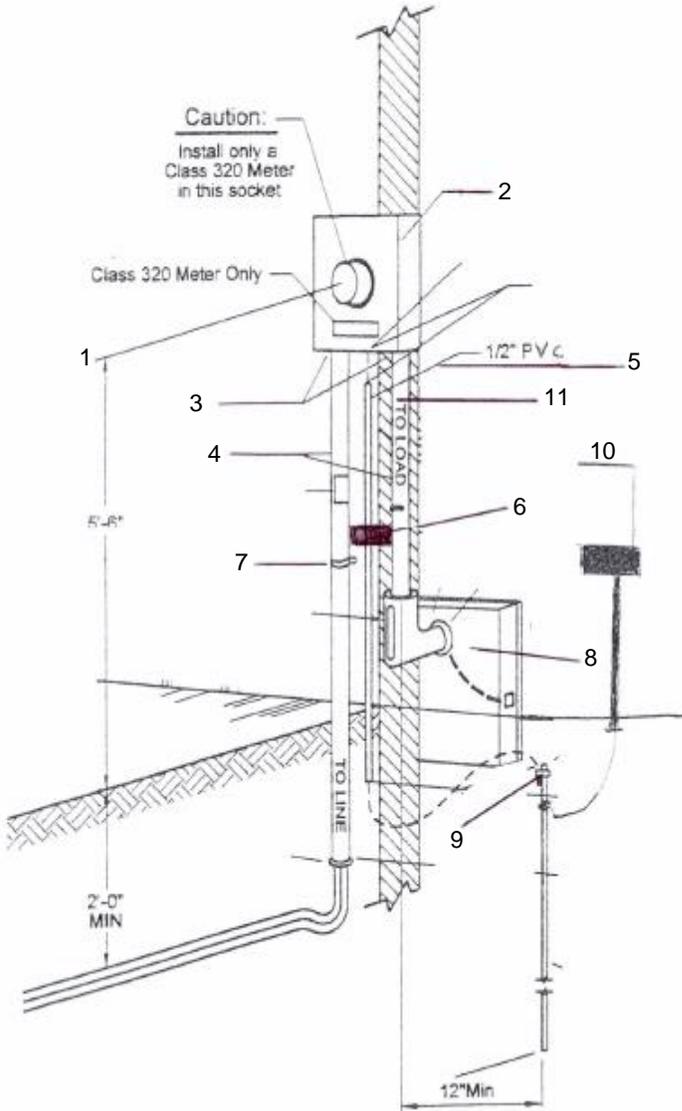
7. **STRAPS OR SUPPORTS ON ALL CONDUITS**

8. **SERVICE PANEL OR CUSTOMER HOUSE PANEL/DISCONNECTING MEANS** In accessible location either by meter or inside of building nearest point of entrance.

9. **GROUND ROD AND CLAMP** There shall be a ground rods. It should be 5/8" x 8' rods. Ground wire should be 1/0 copper with top of rod 4" to 6" below grade.

10. **ALTERNATE WAY OF INSTALLING "GROUND BLOCK"**

11. **SLIP FITTING** Most utilities require a "Slip Fitting" or "Expansion" directly below meter can.

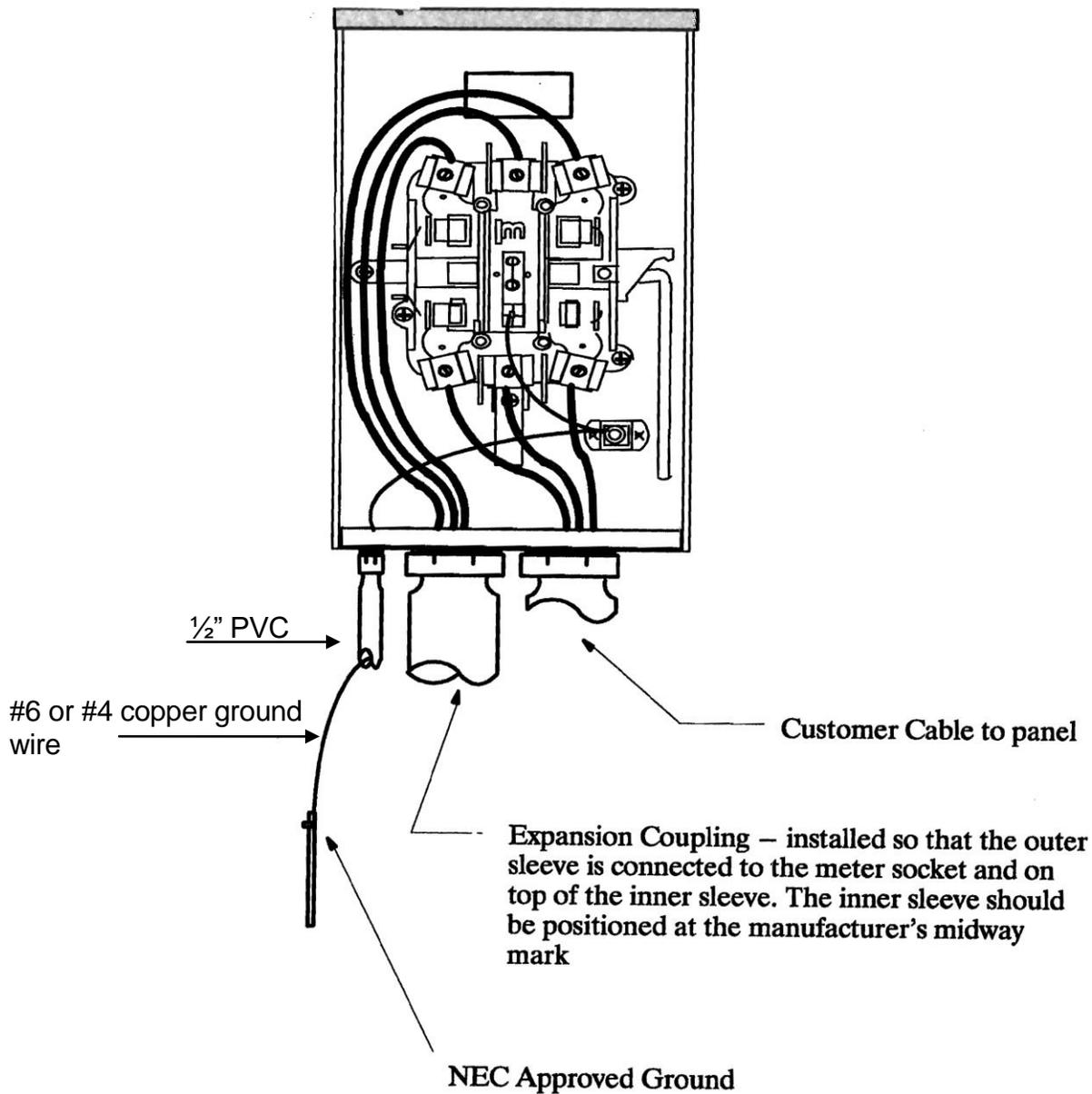


Note: Conductors for a 320 amp service may be either:

- A 200 amp and 100 amp panels 2/0 & #3 copper
- B 2 200 amp panels parallel 2/0 copper (breakers required no fuses allowed)
- C 350 cir mil feed meter can (copper)
- D 500 cir mil feed meter can (alum)

Customer wire attaches to bottom of meter customer may have to supply utility side conduit depending on utility. Some manufactures make a meter can with 3" knockout.

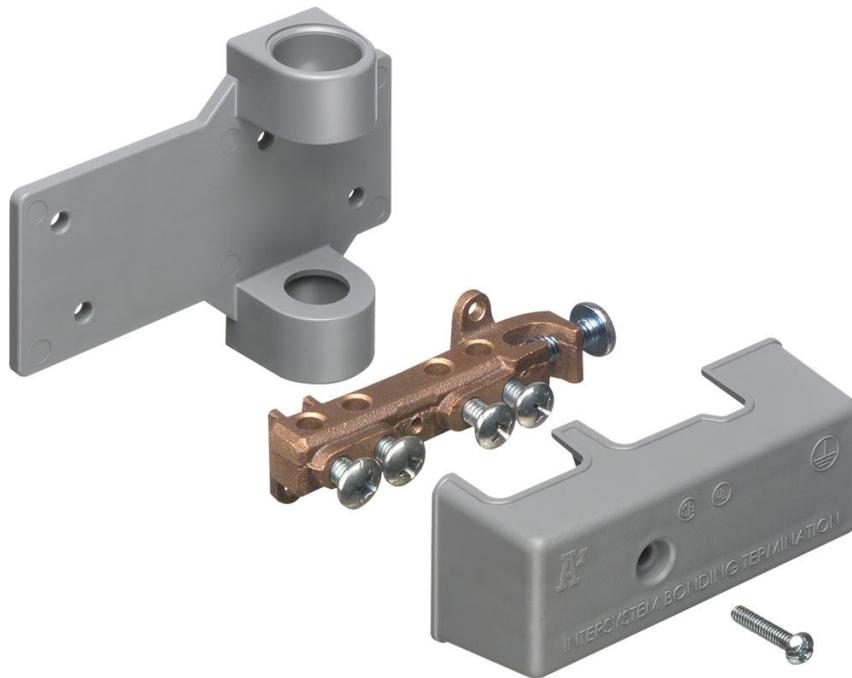
Self-Contained 100/200A Socket Criteria



Notes:

1. Ameren Approved Lever Bypass socket shown, **contact your electric utility company for proper socket type and configuration.**
2. Socket must have a UL sticker, and have a NEMA3, 3S or 3R enclosure rating.
3. Socket must be rated for continuous duty. (For a 200 amp service the meter socket needs to be marked, usually inside, 200 amp CONTINUOUS as opposed to 200 amp maximum).
4. Multiple meter sockets are to comply with the same criteria as above.

Ground Block



Back Up Generators

Examples of placement of customer equipment

