Section 3

SERVICE INSTALLATIONS

300. General

The electrical contractor should be familiar with the work of other trades on the premise so the electric service system and electric meter installation will not be obstructed. Examples of possible obstructions are plumbing, HVAC, or other building structures.

TEMPORARY ELECTRIC SERVICE

301. Requirements for Electric Service

The Company will supply temporary electric service, where available, subject to applicable tariffs on file with the appropriate public utility commission. For charges and information concerning temporary electric services, call Power Delivery at (513) 651-0444 or 1-800-262-3000 ext. 3866.

A. For single phase services, 200 amps or less, the customer must furnish and install the following:

1. Temporary support with address visible from the street
2. Service entrance conductor or underground service lateral
3. Weatherhead (for overhead services)
4. Service drop attachment device (for overhead services)
5. Ringless meter socket
6. Meter board (when required)
7. Service grounding

8. Service disconnecting device

9. Any other equipment required by the geographical area's certified electrical inspector

These requirements must meet the stipulations contained in article 100B of this manual.

Drawings 637 and 638 show typical supports for maximum 200 amp temporary services.

B. The Company will:

1. Furnish and install the service drop (for overhead areas)
2. Make connections to the Company's facilities
3. Furnish and install the electric meter

C. For three-phase services or single-phase service over 200 amps, call Power Delivery at (513) 651-0444 or 1-800-262-3000 ext. 3866.

PERMANENT ELECTRIC SERVICE

302. Number Of Services

Only one service drop or underground lateral, except for separate lighting and power services, will be supplied to any one structure. Exceptions may be permitted by the National Electrical Code but are subject to approval by the Company and the geographical area's certified electrical inspector. Separate service raceways and meter equipment are normally grouped and service drops or underground laterals will be run to the same general location on the structure.

At the discretion of the Company, the overhead service drops may be installed from different poles and the service entrance conductors may enter a structure at different locations. When this arrangement occurs, a permanent plaque or directory will be installed by the customer at each service equipment location specifying all other service locations in or on the structure served.

303. Space For Service Equipment

Minimum space requirements can be obtained from drawings in section 6 of this manual and also from the National Electrical Code. For information regarding installations not covered by these drawings, call (513) 421-9500 or 1-800-262-3000 to be connected to the appropriate office.

304. Service Address

The structure's permanent address must be clearly visible from the street or road.

305. Service Drop Location

The location of all service drop attachments must be approved by Power Delivery before the customer's work begins.

A. The service drop attachment must be *safely accessible* and in direct line to the Company's service pole. *Safely accessible* is defined as accessible with an extension ladder placed on firm level ground directly beneath the point of attachment and with a mounting height of no greater than 24 feet. If these conditions cannot be met, contact Power Delivery for assistance.

B. The service drop attachment must be located so that the service drop will not cross adjoining property.

C. The service drop attachment must be located at a height to permit the following minimum clearances (under conditions of maximum sag) at any point along the span of the service drop conductors. These clearances apply to company-owned service drops meeting NESC rule 230C3 (triplex, quadraplex, duplex, or parallel-lay conductors). For other company-owned service conductors (open wire, bare wire) refer to NESC for appropriate clearances:

1. 12 feet above finished grades, sidewalks, platforms, or projections from which the conductor might be reached when the voltage is limited to 300 volts to ground
2. 16 feet above residential driveways when the voltage is limited to 300 volts to ground
3. 16 feet above commercial areas, parking lots, public streets, alleys, roads, commercial driveways, and areas subject to truck traffic or agricultural vehicles

D. The service drop conductors to a structure must have a horizontal clearance not less than 3 feet from all windows, doors, porches, fire escapes, or similar locations readily accessible to pedestrians. All other clearance requirements of the National Electrical Code, National Electrical Safety Code, and State and local requirements must be met.

E. The service drop attachment or service mast guying attachment device must not be installed on a masonry chimney.

F. The minimum size service mast for attachment of a service drop is 2" rigid steel or 2" Intermediate Metallic Conduit (IMC). Conduit couplings are not permitted above the roofline. Couplings, if required, must be installed below the second conduit support from the roofline. (See drawing 605)

306. Attachment Of Service Drop

The customer will furnish and install an appropriate service drop attachment device capable of withstanding a 1,200# dead-end tension fastened to the structure wall or other support for terminating the service drop. Attachment details for services over 320 amps are available by calling (513) 421-9500 or 1-800-262-3000 to be connected to the appropriate office. These service drop attachment devices must be secured into studs or other parts of the main building structure and must be capable of supporting the service drop tension. Attachment to the trim board only is not permitted.

This attachment device must be mounted a minimum of 10 inches below and within 2 feet from the weatherhead. (See drawings 603, 604, 605, 634 and 635)

307. Service Pole Line

If it is necessary to install poles and conductors to reach a service point, the cost of the pole line may be at the customer's expense. Power Delivery will provide the estimated costs for these facilities.

308. Service Raceways And Service Entrance Cables

A. The service entrance conductors must be brought to the metering equipment enclosures in conduit, service entrance cable, or bus duct installed in compliance with the National Electrical Code. The metering equipment must be located on the supply side of the main service disconnecting device whenever possible. **The meters are to be located outdoors on all new or rewired buildings**. For more meter and service location information call (513) 421-9500 or 1-800-262-3000 to be connected to the appropriate office.

B. Suitable protection must be used in locations where service entrance cables and/or meters would be subject to damage. Locations may include areas adjacent to driveways, sidewalks, parking lots, etc.

C. All service entrance conductor installations must be provided with a rain tight weatherhead located above and within two feet of the service drop attachment device. Watertight connectors must be installed in the top of outdoor meter sockets and cabinets when service entrance cables are used. Cable sealant may be required to make the installation watertight.

D. Watertight provisions should be made where service entrance cables or raceways enter the structure.

309. Draining Service Raceway

Where exposed to weather, raceways enclosing service entrance conductors must be arranged to drain as required by the National Electrical Code.

310. Service Entrance Conductors

A. All single-phase installations having more than one branch circuit must be wired with a three-wire service.

B. Service entrance conductors must extend at least three (3) feet from the weatherhead to permit connection to the Company's service drop. Additional conductor lengths may be required on installations having multiple or parallel sets of service entrance conductors or having pole, mast or building mounted current transformers.

C. Outdoor grounded service neutral conductors must be permanently identified by either:

- White or natural gray insulation or tracer identification
- Bare conductor stripped to the weatherhead
- On a 4-wire, delta connected service where the midpoint of one phase winding is grounded, the service conductor having the higher phase voltage to ground must be durably and permanently marked by an outer finish that is orange in color, or by other effective means, at each termination or junction point. (See drawing 625 for wiring details)

Only indoor grounded service neutral conductors may be identified by painting or taping. The grounded service neutral must be connected to the neutral bus in the service disconnect and to the neutral connectors in the self-contained meter socket. Phase identification will be required where multiple sets of conductors are used and on all three-phase, three-wire service installations.

D. If multiple position meter sockets are installed without a main service disconnect ahead of the meters, grounded neutral and phase conductors must be continuous from the weatherhead through the line side connectors of each meter position. The grounded service neutral conductor tap connectors should be used at each position supplied. (See drawings 621 and 631)

E. Service entrance conductors for residential services must have ampacities not less than 100 amps, 120/240 volt, single-phase.

F. An oxidation inhibitor must be properly applied to all connection points where aluminum service entrance conductors terminate in the meter socket or current transformer connectors. It is recommended that the inhibitor also be applied to service equipment connections.

G. Aluminum and copper service entrance conductor termination connectors must be torqued to the manufacturer specifications in metering and service equipment. Connectors should not be over-tightened.

311. Service Laterals

A. The Meter location and the point of connection to the Company's system must be specified by Power Delivery before the installation of the service lateral.

B. The customer will furnish, install, own, and maintain all new service laterals. When a direct buried service lateral is installed, sufficient cable slack must be provided at the foundation to allow for settling of the earth. This cable slack helps to avoid destructive strain on the meter socket connectors. The trench must be back-filled in a proper manner before the service lateral can be energized. (See drawings 615, 617 and 618)

C. For direct buried service laterals 200 amps or less, the incoming line side conductors must be looped inside the meter base. (See drawing 617)

D. The requirements for the installation of the service lateral (depth, ampacity, type, etc.) are under the jurisdiction of the certified electrical inspector serving the customer's geographical area.

E. For three-phase installations, or where multiple sets of conductors are used, phase identification is required.

312. Underground Service Connections

UNDERGROUND AREAS

Company personnel will make all secondary service connections to the system.

A. Unauthorized personnel will not be permitted to enter the Company's padmounted transformers, vaults, pits, pull boxes, pedestals, etc., for pulling cables without specific authorization from Power Delivery.

B. The customer must install the service lateral to a point two feet from the Company's approved connection point. To determine sufficient cable lengths required for connections, or to coordinate cable pulling through a conduit system into Company facilities, contact Power Delivery.

C. Residential service laterals terminating at a padmounted transformer must be extended within two feet of the rear center of the pad. (See drawing 616)

UNDERGROUND IN OVERHEAD AREAS

D. When installing a service lateral to the service pole the customer must furnish and install the following:

1. A non-metallic 90° bend at the base of the pole when a duct or conduit system is installed
2. A NESC approved "4" or smaller non-metallic pipe riser. (See drawing 616) The first 10' section of conduit must be secured to the pole every 24" with 2-hole conduit straps. (Please note, U-Guard is no longer accepted.)
3. Sufficient lengths of cable for the Company to make connections to secondary conductors or terminals of pole-mounted transformer
   - Obtain cable length information from Power Delivery
   - The cable is to be coiled and attached to the pole at the top of the cable riser guard (See drawing 616 and 676)

E. If the service pole is not adjacent to or on the customer's property, contact Power Delivery.

F. Service laterals with more than two sets of conductors per phase or with conductors larger than 500 KCMIL in size will require the installation of an underground pull box or pedestal and associated conduit system. Contact Power Delivery for assistance.

NETWORK AREAS (DOWNTOWN CINCINNATI)

G. Underground service laterals generally will be furnished, installed, owned and maintained by the Company in the customer installed duct system. Contact Power Delivery for details.

H. The service lateral will be installed to the customer's premise and will generally terminate in a service entrance junction box furnished by the Company and installed by the customer. This is the service point.

I. The Company will make the final connections to the customer's wiring in the service entrance junction box.

J. Services consisting of three or more conductors per phase may be terminated individually on each end with cable limiters. For further information contact Power Delivery.

SERVICES OVER 600 VOLTS

313. General

Power Delivery must be consulted early in the customer's planning for services over 600 volts so the Company may prepare drawings and have sufficient time to order equipment. The customer must provide one-line service diagrams and switchgear drawings to the Company.

GROUNDING

314. Grounding Of The Customer's Service

Service entrance wiring with a neutral must have the neutral grounded. Grounding of all electric services and equipment must be in compliance with the National Electrical Code and meet the requirements of the certified electrical inspector serving the customers geographical area.

315. Grounding Electrode Conductor Installation

A. Grounding electrode conductor connections must not be made to gas pipes.

B. On indoor installations, the grounding electrode conductor can be copper or insulated aluminum. On outdoor installations, the grounding electrode conductor must be copper. (See drawing 636)

C. The grounding electrode conductor can be routed through the metering equipment. No connections should be made in self-contained meter sockets or current transformer cabinets serving less than three main disconnects.

316. Grounding Connection To A.C. Wiring

The grounding electrode conductor and the grounded service neutral conductor must be connected to the neutral/grounding-bus of the service switch or service panelboard. The grounding electrode conductor must be installed in accordance with articles 314 and 315 above and with the National Electrical Code.

317. Grounding Of Meter Test-Device Cabinets Or Transformer-Rated Meter Sockets To Meter Transformer Cabinets

A. Service installations of 600 volts or less must be grounded as follows:

1. When metallic conduit system is used, grounding can be obtained by proper bonding at both ends of the conduit run

2. When non-metallic conduit is used, grounding can be obtained by running a #10 AWG bare or green insulated copper conductor in the metering conduit. It must connect to customer furnished grounding connectors in the test-device cabinet or transformer-rated meter socket and the metering-transformer cabinet

3. All metering equipment enclosures must be bonded to the main service disconnect

B. On service installations greater than 600 volts, a separate grounding conductor of #4 AWG bare or green insulated copper must be installed from the customer furnished grounding connector in the test-device cabinet or meter enclosure to the electric system grounding electrode. This conductor must not be run in the metering-cable conduit.

TRANSFORMER/EQUIPMENT INSTALLATIONS

318. Installations On Customer's Premise

A. It may be necessary for the customer to provide space at a mutually acceptable location on their premise(s) for Company transformers/equipment. Contact Power Delivery for further information.

B. Space requirements and specifications for various types of transformer/equipment installations can be obtained from Power Delivery. Installations must conform to the requirements of the National Electrical Code, National Electrical Safety Code, State and local requirements, and Company requirements.

C. The customer must maintain the area around the Company's transformer/equipment and keep the area free from obstruction so the Company has satisfactory access for installation, operation, maintenance, and removal of its equipment. The Company will not be responsible for damage to any obstruction. (See drawings 670 and 672)

D. When transformers/equipment are located in areas where there is vehicular movement, protective barriers will be required. Contact Power Delivery for details.

E. Storage of flammable gases, fluids, or other substances in the area adjacent to the Company's transformer/equipment is prohibited.

F. For specific information see the drawings in Section 6 of this manual.

319. Transformer Vaults

Architects, engineers, and contractors must contact Power Delivery and supply drawings early in the course of planning transformer vaults so the Company may prepare drawings and have sufficient time to order equipment.

A. The vault must be constructed by the customer to conform to all requirements of the National Electrical Code, National Electrical Safety Code, State and local requirements, and to specifications issued by the Company. The vault will be inspected and approved for compliance with the National Electrical Code by the lawfully designated electrical inspector for the geographical area. The designated Company representative will approve the vault prior to the installation of Company equipment.

B. The Company will install all wiring inside transformer vaults. The customer's service bus duct must be extended into the vault and the Company will provide the connection between the transformer and the bus duct. If the customer installs cable services, a sufficient length of cable must be supplied to reach the secondary terminals of the transformer(s).

C. Specific authorization from the Company is required by anyone desiring to work inside the vault after the Company equipment has been installed. Contact Power Delivery for additional information.

D. The electric meter and equipment must be located outside the transformer vault.

E. Any customer owned equipment that is to be located inside the vault (i.e. sprinkler heads, etc.) must be approved by Power Delivery before it can be installed. The Company reserves the right to limit the type of customer owned equipment that will be permitted inside the vault.

320. Drawings

Drawings are contained in Section 6 covering various customer installation requirements.