CITY OF HOLDREGE

ELECTRIC UTILITY DEPARTMENT

SERVICE RULES

1.1 PURPOSE

These utility rules have been adopted by the governing body of the municipal utility. The rules are subject to change from time to time to ensure safe and efficient utility in compliance with applicable laws and regulations.

1.2 APPLICABILITY

These utility rules are intended to broadly govern operation of the municipal electric utility. Where a rule cannot be reasonably applied to a specific situation, the governing body reserves the right to act in an adjudicative capacity to resolve such conflicts.

Rates and charges are not included in these operating rules. References to rates or charges and certain other terms and conditions of utility "adopted by the governing body" refer to applicable resolutions or ordinances adopted by the utility's governing body.

1.3 RECORDS/COMMUNICATIONS

The principal records repository of the utility are located at City Hall building.

1.4 DEFINITIONS

Unless another meaning is specifically indicated, when used in these rules:

1) "Complaint" means a statement or question by anyone, whether a utility customer or not, asserting a wrong, grievance, injury, dissatisfaction, illegal action or procedure, dangerous condition or action, or utility obligation. The utility may require that complaints be in writing.

2) "Customer" means any person, firm, association, or corporation, any agency of the federal, state or local government, or legal entity directly benefiting from electric utility or heat from the electric utility. In the case of a residence, customer also means other adult persons occupying the residence.

3) "Delinquent or delinquency" means an account for which a utility bill or utility payment has not been paid in full on or before the last date for timely payment.

4) "Demand" means the quantity of electrical power needed by the customer at a given point in time.

5) "Governing body" means the utility board established or, if a utility board has not been established, the city council.

6) "Maximum Demand" means the greatest demand required by a customer during a specific length of time.

7) "Meter" means a device that measures and registers the integral of an electrical quantity with respect to time.

8) *"*New Service*" is any service that is more recent than the original or where the entrance conductors or any electrical equipment has been or is in need of replacement due to code compliance.*

9) "Timely Payment" is a payment on a customer's account made on or before the date shown on a current bill for utility, or on a form which records an agreement between the customer and a utility for a series of partial payments to settle a delinquent account, as payment charged to the current bill or future collection efforts.

10) "Updated Service" *Where the entrance conductors or any electrical equipment has been replaced due to code compliance*.

11) "Utility" means the City of Holdrege.

2.1 UTILITY CHARACTERISTICS (General Statements)

The utility shall provide service throughout its utility service area as established by the Nebraska Power Review Board. Utility service will be available of a character determined by the utility to meet the needs of its customers.

The standard utility available to meet this obligation is 120/240 (nominal voltage), 60 Hz alternating current, single phase, 200 amperes service. In all standard utility extensions, the utility shall own and maintain the meter.

Other utility connections, including three phase utility and utility at primary voltages, are available at the option of the utility and may require a contribution in aid of construction or an advance for construction costs. Extension policies, including charges and other terms and conditions, shall be established by the governing body. Where a customer contribution in aid of construction or an advance for construction costs is required, the governing body may waive such requirements in whole or in part upon a determination that the waiver is in the public interest. Such waiver, when entered in the minutes of the governing body, shall not be considered a discriminatory practice.

2.1.1 Utility Extensions within City Limits

The utility shall make all standard line extensions, in platted areas within the corporate limits of Holdrege, in accordance with terms and conditions established by resolution. Extensions will be constructed along existing public roads, streets, alleys and where ever practicable, along the rear of the customer's lot. The route of the line extension and location of the meter will be determined by the utility.

2.1.2 Utility Extensions Rural Areas

In serving residential customers outside the corporate limits of Holdrege, the utility shall extend distribution lines along state or county right of way at no charge to the customer. Extensions leaving the right of way shall require a contribution in the aid of construction for a cost of that portion of the extension beyond the first fifty (50) feet on the customer's property.

2.1.3 Utility Extensions New Subdivisions

Line extensions to newly platted subdivision of four or more lots may require an aid in construction by the owner or developer. The amount of the aid shall be established by the City Council and shall be based upon a final print of the area to be served which the owner or developer shall provide to the utility.

2.1.4 Underground Utilities

Underground utility laterals are required for all structures, except where the utility determines that underground installations are technically or economically undesirable.

The utility will designate a junction point for the connection of the customer's secondary underground utility lateral. The junction point will be a utility pedestal or junction box, the terminals of the pad-mounted transformer, or a meter enclosure. For residential utility extensions, the utility will own, install, operate, and maintain all facilities on the source side of the junction point, including the junction enclosure and connections. The customer will install, own, operate, and maintain all secondary cables, conduit, and related utility equipment specified by the utility at their expenses. For commercial utility extension, the customer may be required to install a transformer pad, constructed to utility specifications at their expenses.

All utility easements requested by the utility to provide utility to the designated junction point shall be granted to the utility by the customer, without cost.

On all new structures the services will be installed underground. The service lines will be furnished, installed, operated, and maintained by the owner at their expenses. The customer installed cable shall be approved by and installed in a manner satisfactory to the City.

Any existing structure where the service is replaced, upgraded, relocated or improved will be replaced with an underground service. The service lines will be installed, operated, and maintained by the owner at their expenses. The city will supply the conductors for the customer/contractor to install.

If the under ground service is installed by the city the customer will be required to reimburse the cost of the installation to the city. This cost is governed by City tariffs and regulations in effect at the time of installation. Underground services that are installed by the city will only be done at the conveyance and desecration of the city.

2.1.5 Non Residential Low Use Extensions

Low use utility at sites where no residence exists, such as utility for water pumps, cribs, feed lots, etc. shall require a contribution in the aid of construction equal to the cost of installing the extension.

2.1.6 Temporary Extensions

Where utility is likely to be temporary, the utility shall require a contribution in aid of construction equal to the total cost of installing and removing the utility, less cost or reusable material. Any deposit in excess of actual cost will be refunded.

The utility may also require a customer deposit pursuant to section 3.2 of this tariff.

2.1.7 Security Lighting

Security Lighting extensions are available in accordance with terms and conditions established by the City Council.

2.2 ENGINEERING PRACTICE

The utility shall use and shall require compliance with applicable provisions of the publications listed below as standards of accepted good practice and with applicable provisions of the City Code.

a. *National Electrical Safety Code*, by reference, the *National Electric Safety Code*, ANSI C2, and makes modifications to that code.
b. National Electrical Code, ANSI/NFPA No. 70.
c. American Standard Code for Electricity Metering, ANSI C12.
d. USA Standard Requirements for Instrument Transformers, ANSI C57.13.
e. American National Standard Requirements for Electrical Analog Indicating Instruments, ANSI C39.1.
f. American Standard Requirements for Direct-Acting Electrical Recording Instruments (Switchboard and Portable Types), ANSI C39.2.
g. American National Standard Voltage Ratings for Electrical Power Systems and Equipment (60 Hz), ANSI C84.1.
h. Grounding of Industrial and Commercial Power Systems, ANSI C114.1.
i. References to publications listed above shall be deemed to be to the latest edition or revision accepted by the Utilities.

2.2.1 Electric Inspection Policy & Procedure

The City of Holdrege requires that all installations comply with the NEC and NESC Codes. All facilities shall be constructed, installed, maintained and operated in accordance with accepted good engineering practice in the electric industry.

The utility will require compliance with applicable provisions of the publications listed below as standards of accepted good practice and with applicable provisions of the City Code.

A. National Electrical Safety Code.
B. National Electrical Code, ANSI/NFPA No. 70.

References to publications listed above shall be deemed to be to the latest edition or revision.

Except for facilities defined in section 2.1 of these rules or in extension of policies adopted by the governing body as a responsibility of the utility, the customer/contractor shall be responsible for all wiring and electrical equipment on his or her premises. The installation and maintenance of customer/contractor

facilities shall be consistent with standards imposed by section 2.2 of these rules, the special conditions of this section, and any other applicable laws or regulations.

All facilities will be subject to an electric inspection by a Certified State Electric Inspector.

All facilities must meet or exceed present NEC & NESC code before electric utility will be provided.

The Utility reserves the right to disconnect any facility that is in violation of NEC or NESC Codes.

On newly constructed/remodeled, facilities it will be the contractor/owner responsibility to notify the Utility prior to construction in order to identify meter placement and type of service requested.

Failure to comply with the above inspection policy will result in denial of electric utility.

No inspection or approval of a customer's compliance with this section by the utility or other agent of the municipal government shall be construed to impose any duty or liability on the utility, but shall be considered solely for the purpose of ensuring protection of the utility's property and continuity of utility to customers of the utility.

All facilities must meet the requirements of SECTION 5 of this manual.

2.3 SPECIAL CONDITIONS OF UTILITY

Except for facilities defined in section 2.1 of these rules or in extension of policies adopted by the governing body as a responsibility of the utility, the customer/contractor shall be responsible for all wiring and electrical equipment on his or her premises. The installation and maintenance of customer/contractor facilities shall be consistent with standards imposed by section 2.2 of these rules, the special conditions of this section, and any other applicable laws or regulations.

All facilities will be subject to an electric inspection by a Certified State Electric Inspector.

No inspection or approval of a customer's compliance with this section by the utility or other agent of the municipal government shall be construed to impose any duty or liability on the utility, but shall be considered solely for the purpose of ensuring protection of the utility's property and continuity of utility to customers of the utility.

2.3.1 Requirements for Electric Motors

All installations of power loads on the utility's system shall conform to the safety rules as set forth in the National Electrical Safety Code.

Customers are required to provide suitable protective devices so that motors and equipment will be protected from damage and from improper or dangerous operation in case of overload, loss of voltage, low voltage, single phasing of poly-phase motors, or the re-establishment of normal utility after any of the above. The utility is not responsible for motor damage caused by any of the above conditions.

No motor in excess of five (5) horsepower shall be installed without application by the customer and express approval of the utility.

The utility reserves the right to limit the number and size of motors installed on single phase extensions. The customer or customer's electrician shall contact the utility regarding requirements for motor starting equipment, wiring and other motor specifications.

2.3.2 Corrective Equipment

Customer electrical equipment shall be installed and used in such a manner as not to adversely affect voltage regulation or impair the utility's service to other customers. When such equipment creates fluctuating voltage or power factor conditions, or any other disturbances in service detrimental to the service of other customers or to the utility's use of its own equipment, the customer shall be required to install and maintain, at his or her own expense, suitable corrective equipment to eliminate the detrimental effects.

2.3.3 Standby Generators

No other source of supply of electricity shall be introduced or used by a customer in conjunction with electric service supplied by the municipal utility, without prior written approval of the municipal utility. At a minimum, standby facilities will be approved only if a single change-over switch that provides a visible opening and is padlocked in the open position, or a relay of adequate capacity, is installed so that municipal utility lines

cannot become energized by a standby power source under any condition.

All stand-by sources that are permitted connected are subject to yearly inspection by the City.

2.3.4 Energy Conservation Standards

As a condition of electric utility for space heating or cooling, the owner or builder of any structure, completed after April 1, 1984, and intended primarily for human occupancy, must certify to the utility that the building conforms to the energy conservation requirements of the State Building Code. If compliance is being certified to another state or local agency, a copy of the certification form may be provided to the utility. If no other certification is being made, the utility will provide a form.

2.3.5 City's Right To Protect Lines

Whenever it becomes necessary to protect the lines or property of the electric distribution system of the City, the Utilities Superintendent shall have the right to remove and cut away in a careful and prudent manner overhanging branches or limbs of trees so that its lines shall be free and open. Such right, privilege and authority may also be exercised by the City whenever the Mayor and City Council at any regular or special meeting shall pass a resolution stating its intention so to cut or remove such obstructions to the lines and service of its electric distribution system.

2.3.6 Tree Work Near Power Lines

Any person desiring to cut or remove trees or branches thereof, or to fell the same, in close proximity to the lines of the electric distribution system of the City, which work might cause injury or damage to the lines thereof, shall before doing the work give reasonable written notice to the City, shall secure a permit in writing from the Utilities Superintendent and shall seek the assistance of the City to do such work so that electric service shall not be interrupted or damage done to the lines or property of the City. Any person felling or removing such trees, or branches of trees, resulting in the interruption of electric service or damage to the lines or property of the City, without having given notice to the City, as aforesaid, and without having received such permit in writing from the Utilities Superintendent, shall be guilty of a violation of this Article.

2.3.7 Posting Signs

It shall be unlawful for any person to post, tack, or fasten to the poles, structures, fixtures, or equipment of the Municipal Electrical System any sign, poster, advertisement, or banner without written permission from the Utilities Superintendent.

2.4 CLASS OF UTILITY FOR APPLICATION OF RATES

Utility classification shall be based upon the type of utility supplied and on similarities in customer load and demand characteristics. Utility classifications shall be defined as part of the rate schedules adopted by the governing body. In addition, the utility reserves the right to supply large power utility in accordance with the provisions of a written contract. As nearly as practicable, rate schedules adopted by the utility shall reflect relative differences in the costs of providing various quantities of utility to each customer class.

Residential: This schedule is available within the corporate limits through a single meter at a single phase secondary voltage for one-family residences or their equivalent for a residential uses of electric service. Service may be supplied under this rate to multifamily dwellings, apartment's houses, cottage camps and mobile homes. This rate shall not apply to any commercial establishments or non-residences establishments.

Rural: Available outside tile corporate limits through a single phase meter at secondary voltage for one-family residences or their equivalent for a residential uses of electric service. Service may be supplied under this rate to multifamily dwellings, apartment's houses, cottage camps and mobile homes. This rate shall not apply to any commercial or non-residences establishments.

Irrigation & Grain Drying: This schedule is available through a single meter at secondary voltage, either single phase or three phases, for all Irrigation & Grain Drying or any other farm application.

Commercial: This schedule is available through a single meter at secondary voltage, either single phase or three phases, for all commercial lighting and power purposes and for single metered multifamily use. This rate is not available except where all consumption is measured through a single meter and necessary wiring arrangements as required by the City are made by the user.

Commercial Demand Rate: This rate applies to commercial customers whose monthly usage exceeds 25000 kWh for any 4 consecutive months or the demand exceeds 150 kW for 2 consecutive months during the summer period.

Commercial Space & Water Heating: Service shall be through a single meter either single phase or three phases. Electric space heating or

electric motor operated air conditioning equipment only may be connected.

Industrial: Available through a single meter for industrial power service. This rate applies to customers whose monthly usage exceeds 4,000,000 kWh for any 6 consecutive months or whose demand exceeds 7,500 kW for any 3 consecutive months.

Municipal: Available through a single meter for all municipal buildings power requirements except street and park lighting, irrigation and pumping wells.

Street Lighting: Available through a single meter for all municipal street and parking lighting requirements.

Municipal Wells: Available through a single meter for the municipal water department wells requirements.

2.5 METER INSTALLATION

The utility shall install, own, and maintain a meter of a type appropriate to the nature of the utility, for each utility extension. Meter will be installed at a location determined by the utility.

All electric current furnished consumers by the electric distribution system of the City shall be measured by meter. The City will furnish all necessary meters to consumers of electricity from the City and will keep all meters clean and in repair at the expense of the City. The owner or tenant of premises where a meter is located shall provide ready and convenient access to the meter so that it may easily be examined and read by authorized agents of the City.

All meters installed in connection with the electric light plant and system of the City shall be and remain the property of the City. When a meter is entirely worn out and a replacement is necessary, a new meter will be furnished and set by the City for such consumer.

Meters may not be required, however, where consumption can be readily computed without metering or where the utility is of a temporary nature and the cost of meter installation would be unreasonable. A meter seal shall be placed on all meters such that the seal must be broken to gain entry.

2.5.1 Individual Metering

Individual metering shall be required on multi-occupancy premises in which units are separately rented or owned, except that the utility may provide single meters for electricity used: in central heating, cooling, water heating or ventilation systems; where individual metering is impractical; where a facility is designated for elderly or handicapped persons and utility costs constitute part of the operating cost and are not apportioned to individual

tenants; or where sub-metering or resale of utility was permitted prior to l966.

2.5.2 Special Metering Installations

The utility reserves the right, at its option, to require or place special meters or instruments on the premises of a customer for the purpose of special tests of all or part of the customer's load.

2.5.3 Meter Register

Where it is necessary to apply a multiplier to the meter readings, the multiplier shall be marked on the face of the meter register or stenciled in weather resistant paint upon the front cover of the meter. Wherever practicable, customers shall have continuous visual access to meter registers.

2.5.4 Meter Testing

All meters and associated devices shall be inspected, tested, adjusted, and certified to be within an allowable tolerance of error, in accordance with commonly accepted engineering practice.

3.1 APPLICATION FOR UTILITY

Application for utility shall be filed at the utility's business office. At the time of application, the applicant shall be given an opportunity to designate a person or agency to receive a copy of any notice to disconnect utility due to the applicant's nonpayment of a bill.

Applicant may also appoint a party to be responsible for his/her bill. Both parties will be required to fill out a Responsibility for Bill Form. At which time the party responsible for the bill will be billed for the utility at that account until they notify the Utility.

As soon as practicable after the approval of the application, the utility shall supply utility to the applicant in accordance with

these rules and at a rate established by the utility for the applicant's appropriate class of utility.

Each prospective customer will be required to sign a service application agreeing to pay for service in accordance with the applicable rate schedule and the Rules and Regulations of the City. When applying for service, the customer will be required to furnish the City the following information:

1) Name of the customer requesting service
2) Location of the premises to be served
3) Customer's Mailing Address
4) Customer's Social Security Number
5) Customer's Driver License Number
6) Size and general characteristics of the proposed load
7) Any special requirements of the load
8) Previous address of the prospective customer, if any, where City service was rendered.

3.2 CUSTOMER DEPOSITS

A deposit intended to guarantee payment of bills for utility will be required prior to approval of the utility application. In any case where a deposit has been found to be inadequate, a new or additional deposit may be required upon twelve days written notice of the need for such deposit.

All landlords will be required to have a deposit on file for the rental property they own.

3.2.1 Credit Criteria for Initial Deposits

The requirements of an initial deposit shall be determined by application of the following criteria:

a) No initial utility deposit shall be required of an applicant:
   1 who has previously established a credit history with the utility;
   2 whose twelve most recent bills from the utility were timely paid (including one automatic forgiveness of a late payment); and
   3 whose new utility is subject to the same rate classification as that for which the payment history was established.

2) An initial utility deposit not exceeding the two highest monthly billings for utility during the previous twelve month period shall be required of an applicant for utility who does not meet the credit criteria of subparagraph "a" above.

3.2.2 Credit Criteria for New or Additional Deposits

A new or additional deposit may be required of a current customer whose initial deposit has been found to be inadequate. The new or additional deposit shall ensure a total deposit equal to the two highest monthly billing for utility during the previous twelve

month period and shall apply to customers who make two late payments in a twelve month period (not including one automatic forgiveness of late payment).

3.2.3 Deposit Calculation Criteria

In calculating customer deposits which may be based on the maximum estimated charge for a billing period, the amount shall be determined from the highest meter reading period of the previous year. The maximum level of consumption so determined, may be adjusted for reasonably determinate differences in the likely level of energy consumption, including: number of persons served, change in the type of nonresidential utility; and, the installation or removal of energy conservation or alternative energy measures. Where the utility connection was not previously metered, the maximum estimated charge shall be based on comparable existing utility of the utility.

3.2.4 Record of Deposits

The utility shall maintain a record of all deposits. The record of each unclaimed deposit shall be maintained for a period of three years from the date utility is terminated. During that period, the utility shall make a reasonable effort to return the deposit. Unclaimed deposits shall be credited to an appropriate utility account. Deposits remaining unclaimed two years after termination of utility will be transferred to the state.

3.2.5 Refund of Deposit

A deposit shall be refunded upon termination of utility, the deposit plus, less any unpaid utility bill of the customer, shall be reimbursed to the customer or other person who made the deposit. If a refund by the city is owed to the customer it shall be paid at the next regular City Council Meeting.

A deposit shall be refunded to an applicant who has established a credit history with the utility, whose twelve most recent bills from the utility were timely paid

No interest shall be paid on customer deposits.

3.3 BILLING INFORMATION

Customers shall be billed on a monthly basis according to the appropriate rate schedule for metered utility received during the billing period. In addition, the bill will include charges for applicable fuel and purchased power adjustments as well as special extension and utility costs applicable to the billing period.

3.3.1 Billing Form

The following information shall be included on the billing form or made available to the customer at the utility's business office:

1 The actual or estimated meter readings at the beginning and end of the billing period.
2 The date of the meter readings.
3 The number and kind of units metered.
4 Reference to the applicable rate schedule.
5 The account balance brought forward and amount of each net charge, and total amount currently due. In the case of prepayment meters, the amount of money collected shall be shown.
6 The last date for timely payment shall be clearly shown and shall be not less than twenty days after the bill is rendered.
7 A distinct marking to identify an estimated bill or meter reading.
8 A distinct marking to identify a minimum bill.
9 Any conversions from meter reading units to billing units or any other calculations to determine billing units from recording or other devices or any other factors such as sliding scale or automatic adjustments used in determining the bill.

3.3.2 When Payable—Late Payment Penalty

A bill shall be due and payable when rendered and shall be considered delinquent after fifteen days from the time it is rendered. A bill shall be considered rendered by the utility when deposited in the US mail with postage prepaid or when delivered by the utility to the last known address of the party responsible for payment. Bill payments received by the utility on or after the delinquent date shall be for the gross amount stated on the bill which shall include a late payment penalty of an amount set by the Governing Board per month of the last due amount. Failure to receive a properly rendered bill shall not entitle the customer to relief from penalties for late payment.

Each account shall be granted one, (1) complete forgiveness of a late payment penalty in each calendar year. The date of delinquency for all residential customers and for other customers whose consumption is less than three thousand kWh per month, shall be changeable for cause in writing.

3.3.3 Partial Payments

When a partial payment is made prior to the delinquent date and without designation as to the utility being paid, the payment shall be credited pro rated between the bill for municipal utility utilities and related taxes.

3.3.4 Where Payable

Bills shall be paid by mail, by direct deposit through a financial institution, by deposit in a designated receptacle, or in person at the utility's business office - City Hall Building - Holdrege, NE.

3.3.5 Level Payment Plan

All residential customers or other customers whose consumption is less than three thousand kWh per month may select a level payment plan. The plan shall:

1) Limit enrollment to customers that have had service at the account for which the application is being made for at least one year prior and has had no more than one delinquent balance in the past twelve months
2) have a date of delinquency the same as other accounts in the same billing cycle which can be change if request in writing for reasons; such as, but not limited to, fifteen days from approximate date each month upon which income is received by the person responsible for payment
3) provide for entry into plan at any time during the calendar year.
4) have level payments equal to the sum of estimated charges provided by the number of standard billing intervals, all for the next twelve consecutive months.
5) carry forward the account credit or debit on the recalculation date, which shall be added to the estimated charges in determining the level payment amount for the next year.
6) have the level payment amount computed at the time of entry into the plan. It will be recomputed twice every year, when requested by the customer, or whenever price or consumption, alone or in combination result in a new estimate differing by ten percent or more from that in use.
7) notify the customer of a revised payment amount and the reason for the change. The notice shall be sent prior to the bill affected by the revised payment amount.
8) provide that the account be balanced upon termination of utility or when customer withdraws from the plan.
9) regardless of account balance, provide that a delinquent bill payment shall subject the customer to a late payment penalty on the level payment amount and to other procedures for collection and termination of utility.
10) be terminated by the utility if customers becomes delinquent in their agreed upon budget payments

3.3.6 Reasonable Agreement to Pay

A residential customer who has been disconnected or is about to be disconnected due to inability to pay in full may be offered the opportunity to enter into a reasonable agreement to pay in accordance with applicable rules. **See 3.3.20**

3.3.7 Minimum Bill

The minimum bill provided for in the rate schedule for each class of utility will apply to any billing period during which the utility remains connected and the minimum quantity of utility is not used.

3.3.8 Temporary Disconnection

The utility may, upon reasonable notice by a customer, make temporary Disconnection for the customer's convenience. The customer shall be required to pay a fee for such utility in an amount to be determined by the governing body.

Charges for temporary disconnection and reconnection made for the convenience for the customer shall be as follows:

a) No charge shall apply to disconnections of short duration made during normal business hours and necessary for such purposes as rewiring, changes in customer wiring, piping or appliances, remodeling, and construction.
b) A charge for shall apply when either disconnection or reconnection is required after regular business hours of the utility.
c) A charge shall apply when the period of disconnection includes a billing period for which a minimum bill is assessed.
d) A charge will be assessed when an account is disconnected or transferred to a new name

3.3.9 Utility Calls

The customer shall be billed for the cost of a service call if the trouble is not the responsibility of the utility, as follows:

A. For a utility call where the trouble is found to be on the customer's equipment, the customer shall be billed in accordance with terms and conditions established by the governing body.
B. For a utility call requesting the relocation of facilities belonging to the utility, the customer shall be billed for the direct cost of labor and replacement of materials. An advance deposit equal to the total estimated cost may be required where the estimate exceeds one hundred dollars.
C. For a utility call requesting temporary relocation of electric lines or other utility facilities to accommodate movement of buildings or large equipment, the person responsible for the move shall be billed for the direct cost of labor and materials. The utility shall be given notice of the move at least two business days in advance and shall be consulted regarding the route of the move. An advance deposit or cash bond may be required to cover estimated costs.

3.3.10 Customer Requested Meter Tests

The utility will periodically inspect and test meters in accordance with accepted engineering practice. In addition to regular testing, the customer may request a meter test, providing that such tests need not be made more frequently than once each twelve months. The customer or the customer's representative may be present when the meter is tested and the results shall be reported to the customer within a reasonable time. If the meter is within the allowable tolerance, the customer shall be billed for the cost of the test in an amount established by the governing body.

3.3.11 Adjustment of Bill for Meter Error

Whenever a meter is found to have an average error exceeding the allowable tolerance by more than 2.0 percent, or in the case of a demand meter, by more than 1.5 percent, the utility shall adjust a current customer's bill or issue a refund or back bill to a past customer. The amount of the adjustment shall be calculated on the basis of metering accuracy of one hundred percent. The adjustment period shall extend from the date the error began. If that date cannot be determined, it shall be assumed the error has existed for the shortest time calculated as five years from the date the error was discovered, one half the time since the meter was installed, or one half the time since the last previous meter test. When the adjustment is due to meter "creep" it shall be assumed that creeping affected meter registration 25 percent of the adjustment period. The adjustment period for slow meters shall not exceed six months without the approval of the governing body. When a meter is found not to register, the utility shall issue an estimated bill.

An adjustment, refund or back-billing shall be made for any overcharge or undercharge resulting from incorrect reading of the meter, incorrect application of the rate schedule, incorrect meter connection or other similar reason.

This section shall not be construed to require a cash refund to a current customer nor a refund or back-billing to a previous customer in an amount less than two dollars. The utility further reserves the rights to forego back-billing procedures which it determines are not cost effective.

3.3.12 Adjustment of Bill for Accidental Wastage of Electricity

When a customer provides reasonable evidence to the utility that an accidental ground has existed on the customer's equipment, the utility shall estimate the normal usage for each billing period during which the ground is reasonably believed to have existed, not to exceed two months. The bill for each such period shall be recomputed, treating the amount of above-normal energy consumption as "lost energy". Lost energy shall be billed at the lowest rate on the customer's rate schedule and the total difference will be credited to the customer's account.

3.3.13 Returned Checks

A utility charge in an amount established by the governing body shall be assessed to any customer whose check is returned unpaid by the bank on which it was drawn. The utility charge shall be in addition to the late payment penalty if the check is not made good and the utility fee not paid prior to the delinquent date of the bill.

If two or more checks are dishonored, the utility may require future payments to be by cash, cashiers check, or postal money order.

A utility charge of an amount determined by the Council shall apply to each check returned unpaid by the bank on which it was drawn.

3.3.14 Rental Property

To establish responsibility for payment of utility bills, when service is provided to other than the property owner. The City of Holdrege shall in all cases except for service to political subdivisions, provide service to the property owner(s) of record.

As the owner(s) of the property to which service is provided, said individual(s), corporation(s), or estate(s) shall be responsible for all debts due to City of Holdrege Utilities for service supplied to such property.

Owners of rental property will be responsible for the tenant's final utility bill, if bill is unsettled after tenant has relocated and has failed to settle final bill.

Owner's responsibility for the tenants final bill will be limited to $300 provided;

(a) The owners have completed a Rental Property Utility Agreement for that property and;

(b) The owners portion of the final bill is paid in full within 60 days of notification to the owner(s).

3.3.15 Connection Fee

1. A connection fee will be charged for any utility that a customer is requesting. The customer shall be required to pay an amount to be determined by the governing body. All new accounts will be charge a connection fee.
2. All rental property, where the Landlord/ Owner has signed and returned to the city office a Landlord Tenant Agreement and the service is being transferred to the Landlords name, the city will charge a Landlord Connection Fee, except where the service has been disconnected. Utility service will only be put in the name of the person(s) on the Landlord Agreement form.
3. At all Rental Property where the utility service(s) have been disconnected a full connection fee will be charged to the one who is requesting the service to be established.
4. When ever the utility is requested to be transferred or disconnected the utility will contact the owner of the property.

A utility connection fee shall apply to each new utility connection and to each reconnection of utility to a premise where utility has been disconnected and is being reconnected or transfer to a new customer/account.

When the utility is disconnected because of an act of omission by the customer or when utility is disconnected because of nonpayment of a bill or deposit the customer shall be required to pay a reconnection fee an amount to be determined by the governing body.

3.3.16 Overdue Bill

All accounts that are overdue in excess of twenty days (20) will be subject to a penalty of an amount to be determined by the governing body. ***See 3.3(2)***

3.3.17 Past Due Bill

All accounts that are in excess of (30) days will be subject to disconnection.

3.3.18 Late Bill

All accounts that are in excess of sixty (60) days will be subject to be transfer to a collection agency for collection or will have property assets for the amount owed to the utility.

3.3.19 Reconnection after Disconnected for Non Payment

All accounts that are disconnected for non payment shall require full payment before the utility is restored. Full payment is bringing the account current which would include paying both the past due and current billing balance.

Customer may also be required to pay a deposit or an increase of their current deposit as stated in section 3.2.2 of this manual.

3.3.20 Payment Arrangements

When any Customer makes a payment arrangement to pay their utility bill the payment arrangement will follow the following guidelines:

- Payment arrangement shall be a means for customers who need occasionally assistance in paying their utility bill. This should not be a continuous approach for customers to pay their bills.
- When customers request a payment arrangement the arrangement shall be made on the total amount of their bill, not just the past due balance.
- All payment arrangements must be established prior to the customer's disconnection date
- Customers who have a payment arrangement cannot enter into an additional or extend the original agreement
- Customer who fail to meet the requirement of the payment agreement will have their utility service disconnect and will not be allowed any additional payment arrangement
- The payment arrangement should not extend past the disconnection date for that bill, if the customer should request addition time past the disconnection date then the customers next billing amount should be including in the payment arrangement.

- Customer who request a payment arrangement must come into city office and sign a payment arrangement form

3.4 DISCONNECTION OR DENIAL OF UTILITY

The utility reserves the right to disconnect or deny utility in accordance with applicable rules.

A reconnection fee in an amount established by the governing body shall be applicable when utility has been disconnected pursuant to this section.

Before any termination, the Utility Department shall give notice by first class mail or in person to any domestic subscriber whose service is proposed to be terminated. Service shall not be discontinued for at least seven (7) days.

Any customer who has previously been identified as a welfare recipient to the Utility Department by the County Welfare Department, such notice shall be by certified mail and notice of such proposed termination shall be given to the County Welfare Department.

The notice shall contain the following information:

a) The reason for the proposed disconnection;
b) A statement of the intention to disconnect unless the domestic subscriber either pays the bill or reaches an agreement with the Department regarding payment of the bill;
c) The date upon which service will be disconnected if the domestic subscriber does not take appropriate action;
d) The name, address, and telephone number of the employee or department to whom the domestic subscriber may address an inquiry or complaint;
e) The domestic subscriber's right, prior to the disconnection date, to request a conference regarding any dispute over such proposed disconnection;
f) A statement that the Department may not disconnect service pending the conclusion of the conference;
g) A statement to the effect that disconnection may be postponed or prevented upon presentation of a duly licensed physician's certificate which shall certify that the domestic subscriber or resident within such subscriber's household has an existing illness or handicap which would cause such subscriber or resident to suffer an immediate and serious health hazard by the disconnection of the utility's service to that household. Such certificate shall be filed with the Department of Utilities within five (5) days of receiving notice under this Section and will prevent the disconnection of the Department's services for a period of thirty (30) days from such filing. Only one (1) postponement of disconnection shall be allowed under this sub-section for each incidence of non-payment of any due account;
h) The cost that will be borne by the domestic subscriber for restoration of service;

i) A statement that the domestic subscriber may arrange with the Department for an installment payment plan;
j) A statement to the effect that those domestic subscribers who are welfare recipients may qualify for assistance in payment of their utility bill and that they should contact their caseworker in that regard; and
k) Any additional information not inconsistent with this Section which has received prior approval from the Governing Body.

A domestic subscriber may dispute the proposed discontinuance of service by notifying the utility with a written statement that sets forth the reasons for the dispute and the relief requested. If a statement has been made by the subscriber, a conference shall be held before the utility may discontinue services.

The procedures adopted by the Governing Body for resolving utility bills, three (3) copies of which are on file in the office of the Municipal Clerk, are hereby incorporated by reference in addition to any amendments thereto and are made a part hereof as though set out in full.

This Section shall not apply to any disconnections or interruptions of services made necessary by the utility for reasons of repair or maintenance or to protect the health or safety of the domestic subscriber or of the general public. (Ref. 19-2601 et seq. RS Neb.)

3.4.1 Unauthorized Use of Service

Any tampering, breaking of meter seals, opening or damaging of city locks, interference, or work performed on meter installations or other property of the City is prohibited. The City may at any time and without notice discontinue supply of service to the customer, and remove its meters and metering equipment in the event of such tampering or interference. The customer shall be responsible for payment of all costs which result from such tampering or interference with City property.

These costs may include, but are not limited to, disconnection and reconnection charges, investigation-related costs, damage to City property, and payment for electric energy consumed but not metered. Service will not be restored to such customer until payment has been made to the City for all costs

3.4.2 Electrical Code Violations / Safety

At any location where it is determined that the service to the property is in violation of an Electrical Code and /or the electrical wiring is determined to be unsafe to either the building or the public, the City may at any time and without notice discontinue supply of service to the customer, and remove its meters and metering equipment. The service will not be restored until all codes or unsafe conditions are corrected.

3.5 CUSTOMER OBLIGATIONS

Acceptance of utility shall obligate a customer to the conditions imposed by these rules and applicable rules. Customers should note that other sections of these utility rules prescribe standards of engineering practice and establish special conditions for the installation of certain motors and other equipment, common to industry and agriculture.

When a governing authority requires either permits or inspections of new installations, the City will not make service connections until such permits are obtained and the installation passes the required inspections.

The City reserves the privilege for protection of its facilities and safeguarding its service to others, to inspect the customer's installation at any time and to refuse service whenever such installation fails to meet minimum safety and operating standards.

No inspection by the City, nor failure to object to the customer's installation, shall render the City liable for injury or damage resulting from any defective installation by the customer

3.5.1 Wiring and Electrical Equipment

Except for the meter socket and meter and other facilities defined in utility extension policies as the responsibility of the utility, the customer shall be responsible for all wiring and electrical equipment on his or her premises. The installation and maintenance of customer facilities shall be consistent with standards imposed by these utility rules and any other applicable laws or regulations. Location of the meter loop and meter socket shall be at the discretion of the utility, consistent with the customer's reasonable convenience.

The installation and maintenance of the customer facilities shall be consistent with standards imposed by section 2.2 of these rules, the special conditions of this section, and any other applicable laws or regulations.

All facilities will be subject to an electric inspection by an employee of the Utility. **(See inspection Policy & Procedure Attachment)**

No inspection or approval of a customer's compliance with this section by the utility or other agent of the municipal government shall be construed to impose any duty or liability on the utility but shall be considered solely for the purpose of ensuring protection of the utility's property and for ensuring continuity of utility to customers of the utility.

3.5.2 Damage to Utility Facilities

The customer shall not use the equipment or structures of the utility for reasons other than those incidental to normal utility nor create a condition likely to interfere with the functions of such equipment and structures, without written consent of the utility. The customer shall be held responsible for his or her

actions which cause damage to or loss of equipment or structures located on property occupied by the customer.

It shall be unlawful for any person to willfully or carelessly break, injure, or deface any building, machinery, apparatus, fixture, attachment, or appurtenance of the Municipal Electrical System. (Ref.28519RS Neb)

3.5.3 Customer Premises

The customer and owner shall grant the utility, without charge, right of way over and on the premises on which equipment and structures of the utility are located. Access to the equipment and structures shall be granted to the utility at reasonable times for installation, inspection, testing, repair, and other functions necessary for the maintenance of satisfactory utility.

At any premise where special arrangements are needed to access metering equipment for inspection, testing, repair, and other functions necessary for the maintenance of satisfactory utility the customer may be charged a Utility Call Out as described in section 3.3.9.

3.5.4 Notice by Customer to Connect Utility

A customer shall give the utility not less than three business days notice prior to expected connection of utility. Connection of utility under this section shall be during the regular business hours of the utility.

3.5.5 Notice by Customer to Terminate Utility

A customer shall give the utility not less than three business days notice prior to final termination of utility. Disconnection of utility under this section shall be during the regular business hours of the utility.

3.8 CUSTOMER COMPLAINTS

Customers may be asked to submit complaints in writing, specifying the nature of the complaint and the relief sought. Complaints concerning the charges, practices, facilities or utility of the utility shall be investigated promptly and thoroughly. A customer may appeal the findings of the investigation and shall be given reasonable opportunity for a full hearing of the matter before the governing body or hearing officer(s) appointed by the governing body.

4.1 SMALL POWER PRODUCTION AND COGENERATION FACILITIES

The utility shall purchase electric power from and sell electric power to qualifying small power facilities as required by state and federal law. The rate, terms and conditions of purchase and sales shall be in accordance with an agreement or contract between the

utility and the qualifying small power facility, consistent with applicable state and federal regulations.

4.2 DEFINITIONS

Unless another meaning is specifically indicated, definitions of terms used in this division.

i) ”Qualifying Facility” means a cogeneration facility or small power production facility which is a qualifying facility under 18 CFR 292, Subpart B and which is not a qualifying alternate energy production facility or a qualifying small hydro facility.

ii) “Qualifying alternate energy production facility” means;

(a) Uses as its energy source either methane, wind, solar resources, biomass, hydropower resources, or geothermal resources;
(b) Is controlled by the customer-generator and is located on premises owned, leased, or otherwise controlled by the customer-generator;
© Interconnects and operates in parallel with the local distribution system;
(d) Is intended to meet or offset the customer-generator’s requirements for electricity;
(e) Is not intended to offset or provide credits for electricity consumption at another location owned, operated, leased, or otherwise controlled by the customer-generator or for any other customer;
(f) Has a rated capacity at or below twenty-five kilowatts;
(g) Meets all applicable safety, performance, interconnection, and reliability standards established by the National Electric Code filed with the Secretary of State and adopted by the State Electrical Board under subdivision (5) of section 81-2104, the National Electrical Safety Code, the Institute of Electrical and Electronics Engineers, and the Underwriters laboratories, Inc.; and
(h) Is equipped to automatically isolate the qualified facility from the electrical system in the event of an electrical power outage or other conditions where the line is de-energized.

iii) Customer-generator means an end-use electricity customer that generates electricity on the customer’s side of the meter from a qualified alternate energy production facility.

4.3 SYSTEM COST DATA

Upon request, the utility shall provide the information required by federal regulation, intended to enable qualifying alternate energy production facilities to estimate the utility’s avoided costs for energy and capacity.

4.4 OBLIGATIONS OF THE UTILITY

Pursuant to applicable state and federal regulations the utility shall:

1 Purchase electric power directly or indirectly from qualifying alternate energy production facilities.
2 Sell power to qualifying alternate energy production facilities.

3 Interconnect with qualifying alternate energy production facilities.
4 Offer to operate in parallel with the qualifying alternate energy production facility.

Pursuant to applicable state and federal regulations the utility shall not provide net metering to additional customer-generators, regardless of the output of the proposed generation unit, after the date during the calendar year on which the total generating capacity of all customer-generators using net metering served by the utility is equal to or exceeds one percent of the capacity necessary to meet the utility's average aggregate customer monthly peak demand forecast for that calendar year.

4.5 RATES FOR PURCHASE

Rates for purchase of electrical power from a qualifying alternate energy production facility shall be determined by the utility in accordance with applicable state and federal regulations.

4.6 RATES FOR SALES

Rates for sales for electrical power to qualifying alternate energy production and small hydro facilities shall be determined in accordance with state and federal regulations.

4.7 INTERCONNECTION COSTS

Interconnect costs for all qualifying alternate energy production facilities will be those allowed by state and federal regulations.

4.8 SYSTEM EMERGENCIES

All qualifying alternate energy production facilities shall be required to provide energy capacity to the utility during a system emergency to the extent it is required to do so by agreement with the utility or as ordered under state or federal authority. The utility may discontinue purchases from and sales to a qualifying alternate energy production facility during a system emergency when purchases would contribute to the emergency and when discontinuance of sales is on a nondiscriminatory basis.

4.9 STANDARDS FOR INTERCONNECTION, SAFETY AND OPERATING RELIABILITY

Standards or interconnection, safety, and operating reliability for the utility and all qualifying small power facilities shall be those established by state and federal regulations.

4.10 THREE PHASE UTILITY EXTENSIONS

Three phase overhead lateral utility extensions & three phase underground lateral utility extensions installed by the utility may require an additional charge or advance of construction costs if, in the judgment of the utility, expected revenue does not justify the additional costs associated with such extensions.

4.11 EXTENSIONS OF TRUNK LINES AND LATERAL UTILITY EXTENSIONS AT PRIMARY VOLTAGES.

Three-phase extensions and extension at primary voltages may require a customer contribution in aid of construction or an advance for construction costs. The amount of such contribution or advance will be determined by the governing body of the utility. In making the determination, the governing body shall consider estimated construction costs, estimated revenue, and contributions required from similarly situated customers.

4.12 EXTENSIONS TO NEW SUBDIVISIONS

Extensions to newly platted subdivisions of four or more lots may require a contribution in aid of construction or an advance for construction costs in an amount determined by the utility governing body. In making the determination, the governing body shall consider estimated construction costs, estimated revenue, and contributions required from similarly situated customers.

4.13 UNDERGROUND UTILITY TO STRUCTURES

Underground utility laterals are required for all structures, except where the utility determines that underground installations are technically or economically undesirable.

The utility will designate a junction point for the connection of the customer's secondary underground utility lateral. The junction point will be a utility pedestal or junction box, the terminals of the pad-mounted transformer, or a meter enclosure. For residential utility extensions, the utility will own, install, operate, and maintain all facilities on the source side of the junction point, including the junction enclosure and connections. The customer will install, own, operate, and maintain all secondary cables, conduit, and related utility equipment specified by the utility at their expenses. For commercial utility extension, the customer may be required to install a transformer pad, constructed to utility specifications at their expenses.

All utility easements requested by the utility to provide utility to the designated junction point shall be granted to the utility by the customer, without cost.

On all new structures the services will be installed underground. The service lines will be furnished, installed, operated, and maintained by the owner at their expenses. The customer installed cable shall be approved by and installed in a manner satisfactory to the City.

Any existing structure were the service is replaced, upgraded, relocated or improved will be replace with an underground service. The service lines will be installed, operated, and maintained by the owner at their expenses. The city will supply the underground service conductors for residential services only to be installed by the contractor/owner.

If the under ground service is installed by the city the customer will be required to reimburse the cost of the installation to the city. This cost is governed by City tariffs and regulations in effect at the time of installation. Underground services that are installed by the city will only be done at the convenience and discretion of the city

4.14 SECURITY LIGHTING

Security lighting fixtures shall be installed on private property upon request of a customer and upon a determination by the utility that such lighting is necessary or prudent. The utility may install the fixture on the utility side of the meter. The customer may be billed for the cost of any additional wiring, poles, and labor required for the installation. Utility will bill at the current rate schedule.

4.15 BASIS OF COST

Where the cost of labor is to be assessed to a customer, the cost for work performed during regular business hours of the utility shall be based on an hourly rate per employee.

Where the cost of materials is to be assessed to the customer, the cost shall be deemed to be the replacement cost at the time of installation.

All above costs subject to change as deemed necessary by the City of Holdrege.

5.1 CUSTOMER SERVICE AND METERING MANUAL

5.1.1 Introduction

The purpose of this section is to supply essential information to customers, customers' representatives, employees, architects, engineers, contractors and others concerned with the electrical installations of City of Holdrege's customers. It is the City of Holdrege's objective to cooperate with and assist customers to obtain safe, efficient electric service.

Nothing contained in this section shall be construed to relieve or lessen the responsibility of the customer or the customer's representative from complying with all applicable codes, rules, and regulations. Consistent with the City's Tariff, no inspection by

the City, nor failure to object to the customer's installation, shall render the City liable for injury or damage resulting from any defective installation by the customer.

The drawings and written portion of this manual supplement each other. Materials and workmanship specified or implied by one and not the other shall be supplied and installed in accordance with the more stringent of the requirements. The drawings are general in nature and are not intended to be design specifications. This information is based on management-approved interpretation of the intended safe and practical application of the National Electrical Code, (NEC), the regulations of the City Tariff. National Electric Code and NEC are registered trademarks of the National Fire Protection Association, Inc., Quincy, MA 02269. Local governing authorities may impose more stringent requirements than shown in this manual. The city recognizes and enforces the current NEC and NESC manuals

This manual does not cover installations that are under the exclusive control of the City for the purpose of metering, generation, control, transformation, transmission or distribution of electric energy, or associated work practices of the City in the exercise of its function as a utility. The Electrical Safety Code and National Electrical Safety Code (NESC) contain provisions relating to City installations and work practices.

If you desire to discuss specific problems not covered or resolved by this manual, contact your City representative.

5.1.2 Availability and Characteristics of Service

The following table lists the nominal voltages offered to the customer, and the maximum size service entrance that the City may be able to accommodate without special consideration. Not all listed nominal voltages are available at all locations or for all loads. It is recommended that the customer contact the City before purchasing equipment. The City will provide one voltage to each service location.

SERVICE VOLTAGES AND LIMITATIONS

Max. Service Entrance Size Voltage	Service type	Amperes
120 V,	2-wire, single-phase	60
120/240 V,	3-wire, single-phase	200
120/208 V,	4-wire, three-phase	See Note 2
120/240 V,	4-wire, three-phase	See Note 2
277/480 V,	4-wire, three-phase	See Note 2
480 V,	3-wire, three phase	See Note 2

Note 1: 200 ampere service may be available in certain areas contact your city representative.

Note 2: Contact your City representative for service availability.

Higher voltage service may be available for approved loads upon application to the City. Availability and extension cost information is available at City business offices. All extensions of service will be installed according to the extension policy.

The City will normally permit only one service entrance per building.

5.1.3 Resale of Service

Electric service is only offered to the ultimate consumer, and shall not be remetered, resold or shared by others, nor shall it be extended outside the premises for service to other customers, except:

a. For customers receiving service which has been remetered, resold or shared continually since April 1, 1963. Service under this exception may continue until appropriate elimination of remetering, resale or sharing can be accomplished.

b. Where such consumer is an occupant of a unit of a multi-occupancy premise which, continually since January 1, 1979, has been normally held for rent and where service has been furnished to the tenant as an undefined part of a fixed rental or lease payment.

c. Where service is delivered to multi-occupancy premises for centralized heating, cooling, water heating, ventilation or common-area lighting systems.

d. Where individual metering of service used by separate tenants of multi occupancy premises is determined by the City to be impractical.

e. Where a facility is designated for elderly or handicapped persons and utility costs constitute part of the operating costs and are not apportioned to individual tenants.

5.1.4 Interruption and Liability

The City will use reasonable diligence to supply steady and continuous service, but does not guarantee its service against irregularities or interruption. When required by valid curtailment or proration orders, rules and regulations promulgated by State or Federal regulatory authorities, or as the result of an emergency; the City may not be able to deliver electric energy. Service also may be suspended for the purpose of making necessary repairs or changes in facilities; with notice, when practicable, to customers who would be seriously affected or without notice when necessary.

The City will use reasonable diligence to provide high quality service to its customers. However, the City shall not be liable for any loss or damage due to any failure or delay in providing service under the City tariff resulting from any cause beyond the City's reasonable control including, but not limited to: acts of God; acts or omission of civil or military authority; acts or omission of suppliers; equipment failure; fires; floods; epidemics; quarantine restrictions; severe weather; strikes or other labor disputes; embargoes; wars; sabotage; political strife; riots; delays in transportation; compliance with any regulations or directives of any national, state, local or municipal government, or any department thereof; or fuel, power, material or labor shortages.

5.1.5 Power Quality

The City provides electric service to its customers that meets or exceeds all requirements. In some instances such as major storms where lightning, high winds or similar adverse conditions occur; the City's electrical system may experience momentary outages and/or voltage spikes. In such cases when electrical service is interrupted and/or voltage spikes occur whether for fractions of a second or for hours, it is the customer's responsibility to install the necessary protective devices on equipment such as computers, motor controllers and electronic type equipment.

Microprocessor based home electronics and business computers have led to the need for increased protection against voltage transients. Sensitive electronics are more susceptible to damage due to voltage spikes or surges. Before any microprocessor based electronics are installed, wiring practices that meet manufacturer specifications need to be assured. For example, proper grounding and dedicated circuits are important. Consideration should also be given to installing transient voltage surge suppression at the main service entrance and at the point of use.

If a momentary voltage dip or outage would cause loss of data, an uninterruptible power supply (battery backup) should be considered.

If you have any questions concerning minimum protective requirements, contact the equipment supplier or your City representative. See Section 1 18.0.A for additional information.

5.1.6 Right of Way

The customer shall provide, without cost to the City, right-of-way for the equipment or facilities of the City over, across, under and upon the property owned or controlled by the customer as is necessary and incidental to supplying service to the City's customer(s), and shall permit access thereto by the employees of the City.

The customer shall provide and maintain safe, convenient, and unobstructed access to the City's meter(s) and shall permit entry thereto by employees of the City, at all reasonable times, for the purpose of inspecting, reading, testing, repairing, replacing or removing the meter(s) or equipment used in connection with the service.

At locations where access is inaccessible due obstruction created by owner and special arrangements have to be made to for the purpose of inspecting, reading, testing, repairing, replacing or removing the meter(s) or equipment used in connection with the service the owner may be charged a Utility Callout fee as determined by the City Council.

5.1.7 Relocating City Equipment or Facilities

When the City makes changes in its equipment or facilities to permit work to be done by contractors or others or for the convenience of the customer, the cost of the work shall be billed to and paid for by the party requesting the change. The customer or customer's representative shall notify the City in advance of any work which requires relocation of City equipment. An advance payment or deposit to recover these costs may be required. Only City personnel, its authorized agents, or its contractors may work on or detach City equipment.

5.1.8 Temporary Service

Temporary service is defined as a single-phase or three-phase electric service supplied to construction sites, holiday lighting, carnivals or similar purposes. The customer agrees to reimburse the City for all costs associated with providing for the temporary service. These costs include installation, removal, non salvageable materials and administrative costs. Electricity consumed will be billed at the applicable electric rate.

The City will connect the service conductor to the customer owned service entrance conductor.

5.1.9 Accessing Equipment and Energizing Connections

Entry into the City's locked or secured facilities or equipment by non-company personnel is strictly prohibited. When entry into secured City facilities is required by the customer, the customer or the customer's agent shall contact the City business office to make arrangements for City personnel to de-energize the facilities and provide access. For any exceptions, the customer or the customer's agent will be required to sign an indemnification agreement stating that they are qualified to work on and in the vicinity of electrical facilities.

All City transformers shall be located in an area accessible to City vehicles. If special equipment, such as a crane, is required for setting or replacing the transformer, the customer shall pay all expenses.

Customers should avoid plantings or construction that interferes with City's required maintenance access to its equipment. Refer to Appendix B.1.

All connections, permanent or temporary, between the City's service lines and the customer's facilities shall be made or removed only by authorized City representatives.

5.1.1 Recreational Vehicles

Service will be supplied to vacation and recreational vehicle parks through one metering installation and billed to the park owner/operator on the applicable general service rate. Service will be extended as provided in the extension policy. The park owner/operator shall own and maintain the distribution facilities beyond the point of delivery.

5.2 SERVICE AND SERVICE ENTRANCES

5.2.1 General Requirements

The City will normally permit only one service entrance per location.

The main switch and fuses or circuit breakers shall be of ample capacity to carry the load and to safely interrupt the available fault current at the particular location. If fault current information is required contact your City representative for the available fault current.

Section 230-70 of the NEC requires a service to have a disconnecting means. The service disconnecting means shall be installed at a readily accessible location either outside of the building or structure, or inside nearest the point of entrance of the service conductors. All properties shall have only one location for the service disconnection means. An over current device may not be required adjacent to the metering point, but shall be installed in accordance with the NEC at each entrance served through the meter.

The customer will provide, install and maintain the additional equipment necessary for the service, which may include the meter socket. The customer shall provide a service attachment of adequate strength to support the City's service conductors. (NEC Section 230-27, 230-28, 230-29). See Figures 3 and 4.

It is required that customer installed service conductor(s) ampacity be matched to the main breaker(s) size. On all Y systems the neutral conductor will be counted as a current carrying conductor.

Although it is not recommended, the grounded neutral may be reduced in ampacity in accordance with the NEC. However, if the neutral is reduced more than two sizes, calculations justifying the reduction must be accepted by the City. The grounded conductor may be a bare copper conductor or insulated and marked with a white or natural gray color. (NEC Section 200-6, 200-7, 230-41).

All service entrance equipment shall be UL listed. Any other type of meter sockets shall meet city specifications, see Appendix C. Service entrances for residences shall have a rated ampacity of at least 100 amperes at 120/240 volts, three-wire, single-phase.

No conductors other than service entrance conductors shall be installed in the service entrance conduit. Service entrance conductors shall not be spliced or tapped. Service entrance conductors are to extend 24 inches beyond the weatherhead.

If changes occur to a customer's property, such as grade changes, construction of decks or garages, which result in inadequate clearances, the customer will be required to relocate or bring the service into compliance with current NEC requirements Refer to Figures 1 and 2.

The City shall not be liable or responsible for any loss, injury, or damage, which may result from the use of, or defects in, the wiring or equipment beyond the point of delivery

5.2.2 Entrance and Meter Location

All meters shall be installed outside and securely attached to a permanent structure.

The point of attachment shall be on the side of the structure adjacent to the distribution facilities. All meter location shall be approved by the city. Exceptions will not be allowed. The meter location shall be accessible to City employees and protected from physical damage. If a meter pole is used it will be owned and installed by the customer and shall be in a location mutually agreed upon between customer and City. The meter pole will also be required to have a service disconnect below the meter. The meter pole shall be in an accessible location out of the way of traffic. The service wires should not cross adjoining property or livestock areas.

The City may refuse connection to any service entrance not installed in an approved location.

A clear working space of not less than 36 inches in front of the meter and 30 inches wide shall be maintained at all times or the meter shall be relocated at the customer's expense. (NEC Section 110-16).

Two or more meter sockets installed on the same structure must be grouped, with each meter socket and associated breaker or fuse panel plainly and permanently identified, i.e., apartment numbers, duplex numbers, house meter, water heater, etc. Identification and marking of these meter sockets and the breaker or fuse panel for each individual unit or apartment, is the responsibility of the customer. See Figures 23, 24, 25 and 26.

The customer shall contact the City representative for the meter location, material, and wiring requirements on 480 volt and instrument transformer metering installations.

Meters shall not be installed on or in a trailer, mobile home or any building not on a permanent foundation. Typical meter installations for these applications are referenced in Figures 14 and 15. Service wires should not cross adjoining property.

5.2.3 Overhead Service and Service Entrances

All overhead facilities located between the customer's property line and the first point of attachment to the customer's building or other structure shall be installed, operated and maintained by the City. Except for certain metering equipment, all aerial facilities on private property beyond the point of attachment, shall be installed, owned, operated and maintained by the customer. The attachment of the customer's metering equipment and distribution wiring will not be allowed on City poles. Service entrance conductors, between the weatherhead and the main disconnect, shall be installed in conduit. Check with your City representative concerning metering applications over 600 volts.

Existing overhead services shall be maintained by the City. Multifamily, commercial and industrial services on the customer's property, shall be maintained by the customer. The city's responsibility for maintenance will end at the attachment point.

With City approval a customer may install overhead service on their property, at their expense, to a location designated by the City. The cable shall be approved by and installed in a manner satisfactory to the City. Sufficient cable shall be left at the base of the service riser pole or gang socket to connect to the City's system.

The dimensional limitations and acceptable arrangements of conduit exits are shown on Figure 9. For conduit installations the elbow exit, at the ground line, must be tight against the pole. If more than one elbow is used, the exit ends must be tight together. This requirement is necessary to accommodate the City's cable guard.

5.2.4 Underground Service and Service Entrances

Underground utility laterals are required for all structures, except where the utility determines that underground installations are technically or economically undesirable.

The utility will designate a junction point for the connection of the customer's secondary underground utility lateral. The junction point will be a utility pedestal or junction box, the terminals of the pad-mounted transformer, or a meter enclosure.

For residential utility extensions, the utility will own, install, operate, and maintain all facilities on the source side of the junction point, including the junction enclosure and connections. The customer will install, own, operate, and maintain all secondary cables, conduit, and related utility equipment specified by the utility at their expenses. For commercial utility extension, the customer may be required to install a transformer pad, constructed to utility specifications.

All utility easements requested by the utility to provide utility to the designated junction point shall be granted to the utility by the customer, without cost.

On all new structures the services will be installed underground. The service lines will be furnished, installed, operated, and maintained by the owner. The customer installed cable shall be approved by and installed in a manner satisfactory to the City at their expenses.

Any existing structure where the service is replaced, upgraded, relocated or improved will be replace with an underground service. The service lines will be installed, operated, and maintained by the owner at their expenses. The city will supply the conductors for the customer/contractor to install.

If the under ground service is installed by the city the customer will be required to reimburse the cost of the installation to the city. This cost is governed by City tariffs and regulations in effect at the time of installation. Underground services that are installed by the city will only be done at the convenience and discretion of the city

Three-phase transformer pads shall be installed by the city or a contractor at the customer's expense at a mutually agreed upon location.

Consult your local governing authority regarding placement of transformers adjacent to building and building openings. It is necessary to have adequate and unobstructed space for the installation and maintenance of pad mounted transformers. Minimal clearances are shown in Appendix B-I for City installation and maintenance requirements. Normally, pads for single-phase transformers will be furnished and installed by the City.

5.2.5 Installation of Underground Conduit

The customer may be required to install conduit at a minimum depth of 30 inches below final grade. Conduit materials and installation methods are to be acceptable to the City and may be required under the following conditions (see Figure 8):

A. Under existing or likely future hard surface areas.
B. For both primary and secondary cables for townhouses, condominiums and mobile home parks.
C. Where area available for trenching is limited by any of the following:
    a. Less than 10 feet clear width
    b. Less than 10 feet clear height
    c. Slope greater than 3 to 1
    d. Distance between paved areas of less than 50 feet
    e. Where the edge of the nontrenchable surface on property line is parallel to and within 2 feet of the structure foundation
    f. Where single corridor is used for multiple utilities.
    g. Where future landscaping will make cable location and repair difficult.

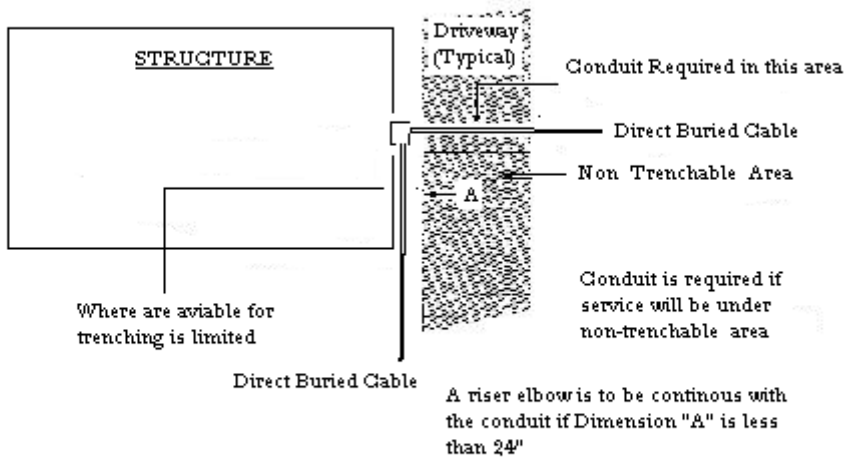
h. In locations where the customer wants to expedite cable installation.
i. Where a developer is paving a street with islands or medians, and it is necessary to install cable (either street lighting or primary) in those medians, the customer shall install conduit for the cable installation.

The customer shall install a pull wire or rope in the conduit. The end of the conduit must be capped and the location of the cap is to be marked with a stake.

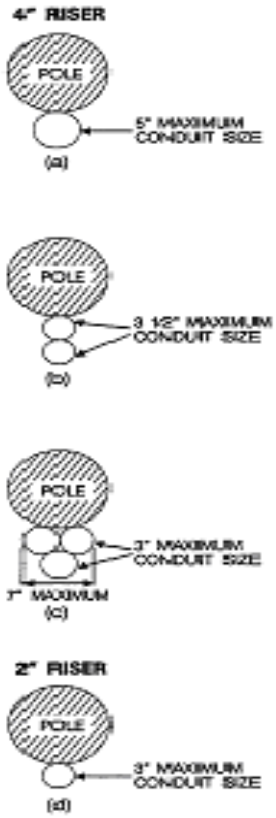
A riser elbow is to be continuous with the conduit if dimension “A", shown on Figure 8, is less than 24 inches.

The customer has the option to locate the service entrance on another less restricted surface of the structure to avoid these requirements. Where the customer owns and maintains the service, the requirements to install the conduit may be waived by the City. Contact your City representative.

UNDERGROUND CONDUIT INSTALLATION

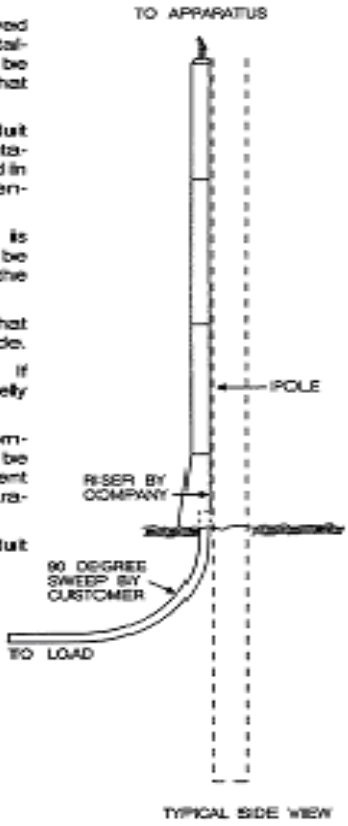


UNDERGROUND CONDUIT INSTALLATION AT RISERS



NOTES:

1. Contact the Company for approved conduit position, prior to each installation. Normally the riser should be mounted on the side of the pole that is opposite the direction of traffic.
2. Installations requiring larger conduit capacity or different conduit orientation than shown, must be approved in advance by your Company representative.
3. When more than one conduit is involved, the conduits must be placed tight together and against the pole.
4. Conduits are to be installed so that the top end is 4"-6" above final grade.
5. PVC conduit is recommended. If metal is used it must be effectively grounded.
6. Contact the Company for recommended length of conductor to be coiled at base of pole so sufficient length is available to reach apparatus.
7. See Section 13.0,D,3 for conduit installation requirements.



5.4 GENERAL SERVICE OVER 600 VOLTS (Primary Metering)

5.4.1 Overhead Service

The City will provide and install service conductors, current transformers, potential transformers, meter grounding and meter.

Customer will provide a CT – PT Cabinet as require by utility.

Location and design of the metering shall be referred to appropriate City technical personnel.

Location and design of the customer's primary system shall be submitted to the City representative for approval by appropriate technical personnel

The customer shall install and maintain overhead conductors beyond the primary meter pole. Proper clearances will be maintained by the customer. (See NESC Table 232-1).

The customer shall own, install and maintain a single visible break disconnecting means immediately beyond the metering pole. All wiring and equipment installed beyond the meter shall be in accordance with the NESC in addition to the requirements of the NEC.

5.4.2 Underground Service

The City will provide and install the primary underground conductors between the City's distribution system and the first point of attachment in the customer supplied switch gear. The City will also provide instrument transformers for metering which are to be installed by the customer. The City will provide and install the meter. The customer will provide Company-approved enclosed upright or pad mount switch gear, fuses, grounding bails, metering cubicle, concrete pads and conduits, in a Company-approved location. This location must provide, and the customer shall maintain adequate clearances around the switch gear for operating purposes. These clearance requirements will be determined by City technical personnel and meet minimum NESC requirements.
In the design, purchase, and installation of the switch gear package, close coordination is necessary between customers, switch gear manufacturer and City personnel. The customer shall furnish a minimum of three copies of the switch gear drawings and site plan for City engineering approval. A letter of agreement between City and customer is recommended before the switch gear is ordered.

The customer shall provide and install all wiring connected to and beyond the metal-clad switch gear according to the NESC in addition to the requirements of the NEC.

5.4.3 Transformers

The City or the customer may provide and install standard distribution transformers located beyond the primary meter. The customer shall provide the necessary primary fusing as determined by the City to protect all City transformers.

All City transformers shall be located in an area accessible to City vehicles and shall meet the clearance requirements of the NESC.

The City will provide load break bushing inserts for City owned pad mount transformers.

Pad mount transformer installations shall be in accordance with Appendix B.

All indoor, rooftop, or specialty transformers, shall be furnished and maintained by the customer unless the city agrees to furnish and/or maintain such equipment.

5.5 GROUNDING

The grounding of electric installations shall meet NEC specifications, Company requirements as shown in these construction standards, and all other applicable codes. The City does not permit the use of gas piping as a ground for electrical services. The service grounding electrode conductor shall be connected to the neutral bus in the service disconnect and over current device, rather than in the meter socket or instrument transformer cabinet.

The supplemental grounding electrode, required by NEC Section 250-83, shall be connected directly to the neutral bus in the service disconnect and over current device. See Figure 6.

NEC Section 250-86 prohibits using a lightning rod grounding electrode as one of the electrodes listed above.

5.6 CONDUCTOR IDENTIFICATION

Neutral conductor identification shall be in accordance with NEC Section 200-6. An insulated neutral conductor of No. 6 or smaller shall be identified by a continuous white or natural gray outer finish along its entire length.

An insulated neutral conductor larger than No. 6 shall be identified either by a continuous white or natural gray outer finish along its entire length, or at the time of installation by distinctive white or natural gray paint, or wrapped with white or natural gray tape at the weatherhead, other points of connection to City facilities, and all termination.

A grounded conductor may be un-insulated in accordance with NEC Section 230-41, except for neutral jumpers as indicated in Figures 27, 29, 30 and 31.

High phase identification shall be in accordance with NEC Section 230-56. On a 120/240 volt three-phase four-wire delta service, the phase conductor having the higher voltage to ground shall be identified by an outer finish that is orange in color, or at the

time of installation, painted orange or wrapped with orange tape at the weather head, other points of connection to City facilities, and all termination.

The high phase conductor must be on the RIGHT HAND TERMINALS OF SELF-CONTAINED METER SOCKETS (see Figure 30), but on the MIDDLE TERMINAL OF SWITCHBOARDS AND PANELBOARDS (see NEC Section 384-3(f)).

When multiple conductors per phase are needed for a service the phase wires shall be identified with paint or tape so the proper grouping can be determined.

5.7 ALLOWED SERVICE CONDUCTOR SIZES AND CONNECTIONS

The City will allow the use of any NEC approved service conductor as shown in Figure 7. The City will furnish and install all connectors necessary to connect service conductors to the source of power.

All service conductor connections made by the customer, ahead of the main disconnect, or connections to instrument transformers, must meet the following requirements:

1 All lugs must be UL listed and not modified.
2 Lugs may not be stacked unless specifically UL listed for the application.
3 Bolts must be Grade 5 or better, plated steel, assembled with a heavy flat washer and cupped spring washer (Belleville) and properly tightened, for other than UL listed, factory-assembled, terminal connector provisions.
4 Bolts must be the maximum diameter that the lug hole will accept, except as restricted by the terminal hole size of the instrument transformer. The instrument transformer terminal holes shall not be enlarged to accept larger bolts. An effort should be made to match the lug hole to the instrument transformer hole size.
5 Lugs must be attached with the maximum number of bolts possible. Two hole lugs are required on each side of bar type CT connections.

5.8 METERING EQUIPMENT

The City will normally supply meters and equipment for metering installations in accordance with the following:

a) Self-contained socket-type metering will normally be used where the capacity of the load-side wiring is 200 amperes or less and the voltage is 480 volts or less. See Figures 27, 29, 30, and 31.
b) A 200 ampere self-contained socket type meter may be used for single-phase, three-wire, 120/240 volt service, where the capacity of the load side wiring does not exceed 200 amperes. See Figure 28.
c) Socket-type five or six terminal metering, with space for test switch or automatic bypasses mounted in the socket, will be used where single-phase three-wire services require current transformers. See Figure 32.

d) Socket-type metering with test switches or automatic bypasses will normally be used with instrument transformers for three-phase installations where the capacity of the load-side wiring exceeds 200 amperes. See Figure 32.
e) Taps or splices for the purpose of service entrance conductor extensions to additional metering points shall not be permitted in instrument transformer cabinets or meter sockets.
f) The use of meter sockets and other City sealed enclosures as junction boxes and raceways for customer's circuits is prohibited.
g) Meter sockets with automatic bypass are allowed.
h) The City will furnish the instrument transformers, meter socket and meters. The customer shall furnish, install, and maintain the related cabinets, conduits and secondary leads from the instrument transformers to the meter socket. The secondary leads shall be No. 12 stranded copper wire with 600 volt type THWN insulation. The number and color of secondary leads are specified in the appropriate figures. Primary connections to the instrument transformers shall be made by the customer. Secondary connections to the instrument transformers, meter socket and meters will be made by the City. The meters will be installed by the City. Meter and instrument transformer cabinets shall be equipped with pad-lockable handle or other means to padlock or seal. Key locks will not be approved.
i) Under certain conditions, and only with special permission, the metering current transformers may be located within the service transformer housing. The City representative, in consultation with appropriate City technical personnel, can advise if this option is available at a particular location.
j) If the customer desires the use of a City meter signal for demand monitoring purposes, the City will install, at the customer's expense, dry contacts external to the meter socket or cabinets. These contacts will provide the customer with a real and/or reactive power pulse. The City will not provide an end-of-interval timing pulse.

5.9 MOTORS AND SPECIAL EQUIPMENT

The proper operation of motors and other electrical equipment is necessary to minimize objectionable motor starting effects and to otherwise protect the service to other customers. All motors require starting currents substantially greater than their normal running currents. Excessive starting currents will result in objectionable drops in the supply voltage to the customers in the vicinity. Therefore, the customer's equipment will normally conform to the following requirements and any exceptions thereto will be subject to agreement between the City and the customer.

5.9.1 Protection of Motors and Other Equipment

Customers are advised to provide protection in accordance with the NEC or other pertinent sources of information for all types of equipment including, but not limited to, motors, computers, electronic equipment, and equipment in which computers or electronic equipment form an integral operating part, to adequately protect such equipment under all conditions including the following:

1)Overload
2)Loss of voltage
3)High or low voltage
4)Loss of phase (single-phasing on poly phase motors)
5)Re-establishment of normal service after any of the above
6)Phase reversal
7)Motors that cannot be subjected to full voltage on starting
8)Harmonics or wave form irregularities

The failure of the customer to provide proper protection may result in needless damage to equipment and the expense of delay and repair. For further information about protective devices, the customer is urged to contact the equipment supplier or your City representative.

5.9.2 Guidelines for Motor Sizes

Single-phase motors, 5 horsepower (hp) and smaller, may be operated without special means of reducing starting current. Single-phase motors larger than 5 hp may be permitted with City approval, provided the City's electric facilities are adequate to supply the service and provided the use of such a motor or motors does not interfere with the quality of service rendered to other customers.

In general, single-phase motors up to 2 hp may be operated on 120 volts. Single-phase motors 2 hp and larger shall not be operated on 120 volts.

Motors which are rated 230 volts may not operate satisfactorily on 208 volts.

Polyphase motors larger than 5 hp which are operated from a single phase service by use of a phase converter will only be allowed with City approval.

Polyphase motors rated at 15 hp and less may be started at full line voltage. For larger motors, the City reserves the right to require the customer to limit the motor starting current by the use of reduced-voltage starters or other acceptable means. Contact the City regarding any starting current limitations or information on high-efficiency motors.

5.9.3 Group Motor Installations

Reduced-voltage starting requirements for the largest motor will be the maximum allowable across the-line starting current for smaller motors. In this case, the reduced-voltage starting requirements for smaller motors may be omitted.

5.9.4 Special Equipment Applications

The installation of welders, x-ray equipment, diathermy equipment, radio transmitters, etc., may adversely affect the electric service to adjacent customers. Prior to installation, contact your City representative for specific requirements for the installation.

5.9.5 Power Factor

A customer's electric system having a low power factor produces an adverse effect on the City's electric supply system and on the customer's electrical equipment. The City's electric tariffs may impose an additional cost on customers when a customer's power factor falls below a specified limit.

Cost justification may exist for the customer to install high power factor equipment and/or capacitors on the customer's electric system to maintain an acceptable power factor. Motors should be sized so that normal motor operation is at or near the rated capacity of the motor. Contact your City representative for information regarding power factor correction techniques.

5.10 STANDBY GENERATOR SERVICE

The City does allow a customer to have standby generators for temporary or emergency electric service. For the safety of City personnel, as well as protection of the customer's equipment, there must be a positive means to guarantee that the standby generator cannot accidentally be connected in parallel to the City's system.

A manual or automatic transfer switch shall be installed at the customer's expense.

This switch must be designed so that under no conditions will the standby generator and the City's electrical system operate in parallel. It must have a positive break-before-make design. For example, see Figure 17. The switch should also incorporate a visual break or some means of determining the physical position of the switch without removing a cover. The switch shall be installed in compliance with this manual and the NEC.

Before installing a system, please contact your City representative to be sure the proposed standby transfer switch installation meets the City requirements. If a standby generator is connected without an approved throw over device, service will be disconnected until

such device is installed. Safety of personnel demands this requirement.

5.11 PARALLEL GENERATION OPERATION

Operation of any customer-owned generating equipment in parallel with the Company's system is prohibited without express written agreement between the customer and the City. Contact your City representative before installing such equipment.

5.12 SERVICE CLEARANCES

5.12.1 Minimum Clearances for Conductors 480 Volt and Below

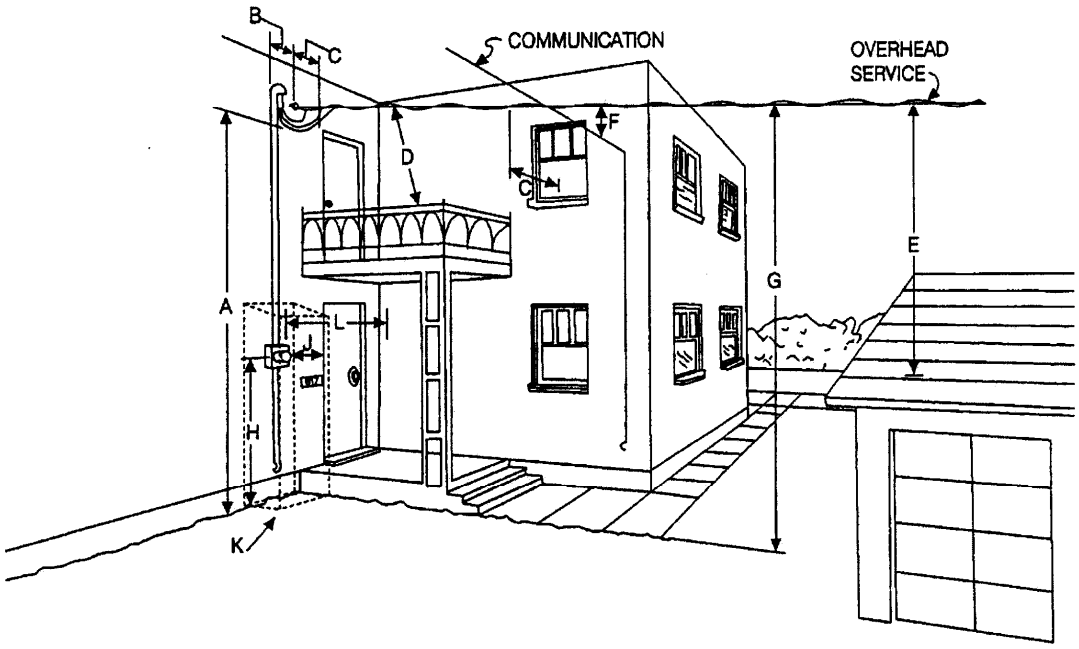
The following general clearances include City of Holdrege's requirements and interpretations derived from the National Electrical Safety Code (NESC) Rule 234 and the National Electric Code (NEC) Section 230-24. Refer to these codes for specific conditions not shown in Figure 1.

Clearances for utility owned service drops and cables, beyond the perimeter of the customer's building, will be controlled by the NEC & NESC requirements. The following alphabetical designations and respective dimensions apply to Figure 1 on the opposite page. Clearances shown are for multiplex (duplex, triplex and quadruplex) service drop conductors. Open wire service conductors require greater clearances.

a. The drip loop or service attachment fixture, whichever is the lowest point, shall have 12 feet minimum vertical clearance above final grade. A clearance of 15 feet is required for 480 volt services.
b. The clearance between the service attachment and weatherhead shall be 12 inches minimum and 24 inches maximum.
c. Service conductors that are not protected by conduit or raceway shall have a minimum clearance of 3 feet from windows designed to be opened, doors, porches, fire escapes, signs, and similar construction. Conductors run above the top level of a window shall be permitted to be less than the 3 feet requirement.
d. The diagonal distance from the nearest edge of a balcony or deck handrail to the service conductor shall be 3 feet minimum.
e. Clearances over all roofs shall be 8 feet minimum
f. Minimum vertical clearances between service drop and communication conductors shall be 2 feet at the conductor crossing and 40 inches at adjacent vertically spaced attachments to the building
g. The minimum clearance is 12 feet above sidewalk, ground, and residential driveways; 18 feet above commercial areas, public driveways, alleys and streets, and other land traversed by vehicles.

h. For individual settings, the clearance between the center of the meter and the finished grade is to be 6 feet maximum and 4 feet minimum
i. Clearance for open conductors are greater than the clearance listed here
j. The horizontal clearance from the nearest side of the meter socket enclosure to any structural protrusion shall be 3 inches minimum
k. A clear working space of not less than 36 inches in front of the meter and 30 inches wide shall be maintained at all times or the meter shall be relocated at the customer's expense. (NEC Section 110-16)
l. The dimension between the hinged side of a door or operable shutter and the nearest surface of the meter is to be door or shutter width plus 6 inches

5.12.2 Example Minimum Clearances for Conductors 480 Volt and Below



A

GENERAL NOTES

1) The house number must be clearly posted and readable from the street.
2) The service weather head is to be located no lower than the service attachment point to insure a positive drip loop.
3) Contact your City representative for entrance and meter location. The City will refuse connection to any service entrance not installed in an approved location.
4) The customer shall install a suitable service attachment point to obtain proper ground clearance.
5) Service entrance conductors must be in conduit.
6) Clearances shown are for multiplex (duplex, triplex, and quadruplex) service drop conductors. Open wire service conductors require greater clearances.

5.12.3 General Requirements

1. The customer shall install a suitable service attachment point. For proper ground clearance, see Figure 1. For adequate strength requirement, see Figures 3 and 4.
2. Eyebolts connected directly to the roof will not be approved.
3. The service weatherhead is to be located no lower than the service attachment point to insure a positive drip loop.
4. Service drop conductors shall not pass over or within 6 inches of furnace, fireplace, or sewer vents. See figure 2A.
5. If voltage between the conductors is 300 volts or less and the horizontal distance that the service drop conductors overhang the roof is 4 feet or less, (This distance is measured along the direction of conductor approach, see figure 2B), the vertical clearance of the conductors at the weatherhead is 18 inches minimum. (See figure 2B)
6. If the dimension is greater than 4 feet and the voltage between the conductors is 300 volts or less and the roof slope is greater than or equal to 4” in 12”. The vertical clearance of the conductors at the weatherhead is 3 feet minimum for a distance not to exceed 4ft at which time vertical clearance will increase to 8 ft. (see Figure 2C)
7. If the dimension is greater than 4 feet and the voltage between the conductors is 300 volts or less and the roof slope is less than 4” in 12”. The vertical clearance of the conductors at the weatherhead is 8 feet minimum.
8. If voltage between the conductors is 300 volts or greater special conditions are required by Figure 2(B) and Figure 2(C).
9. All vertical dimensions apply to any point on the roof surface directly under the conductors.

5.12.3 Roof & Service Attachment Requirements

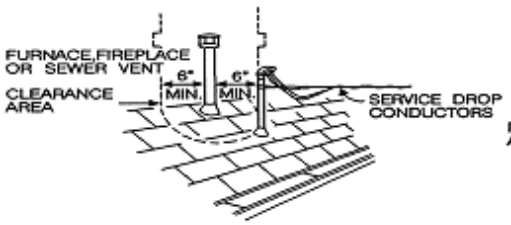


FIG. 2(A)

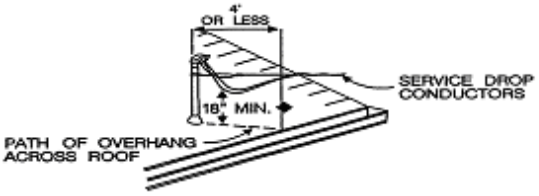


FIG. 2(B)

FIG. 2(C)

Distance from the edge of the roof to service mask is greater than 4 feet and the roof slope is equal to or greater than 4" in 12".

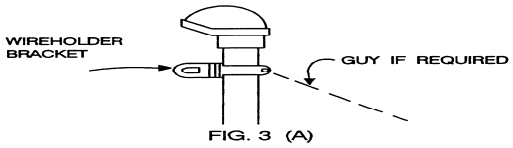


FIG. 3 (A)

SERVICE RISER MAST
(REFER TO FIG. 4 FOR
CONDUIT SIZE REQUIREMENTS)

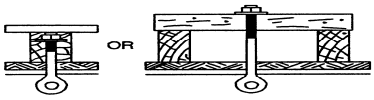


FIG. 3 (B)

BRICK, VENEER, STUCCO, PLASTER,
SHEET METAL WALLS, OR ANY
FRAME BUILDING

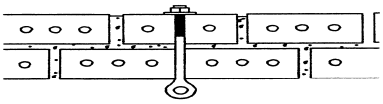


FIG. 3 (C)

SOLID MASONRY, BRICK, OR CEMENT:
EYE BOLTS MAY BE INSTALLED
THROUGH THE MORTAR JOINT

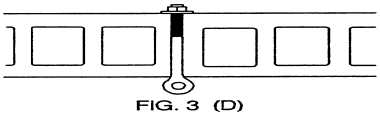


FIG. 3 (D)

CONCRETE BLOCK OR HOLLOW TILE:
EYE BOLTS MAY BE INSTALLED
THROUGH THE MORTAR JOINT

1 The customer shall be responsible for all service attachment provisions.

2 Eye bolts, where required, shall be galvanized, ½ inch minimum diameter, and installed by the customer. Screw point or lag type attachments are not permitted.

3 Other types of service attachments may be required for larger services.

4 Service drop conductors shall not be attached to fire walls, parapet walls or chimneys.

5.12.4 Typical Overhead Service Mast Requirements

ENTRANCE SIZE	Height Above Roof in Feet (Rigid or Intermediate)	MAXIMUM SERVICE DROP LENGTH (Ft.) 1.5	2	3	4	5
100A	2”	125	100	75	75	50
	2-1/2"or 3”	150	150	100	100	75
	3-1/2"or 4”	150	150	150	125	100
200A	2”	100	75	50	50	50*
	2-1/2"or 3	150*	100	75	75	50
	3-1/2"or 4”	150*	150*	125*	100*	75*
400A	2-1/2"or 3”	100	100	75	50	50
	3-1/2"or 4”	125	100	100	75	75

(*) Indicate that 25 ft. must be subtracted from the indicated span length if service is quadruplex

1. The maximum service drop lengths shown are for triplex and quadruplex services attached to unguyed riser masts.

2. Conductor supports for spans longer than the maximum service drop lengths, for a given condition listed in the above table, must be guyed or braced to withstand the following maximum actual service drop tension:

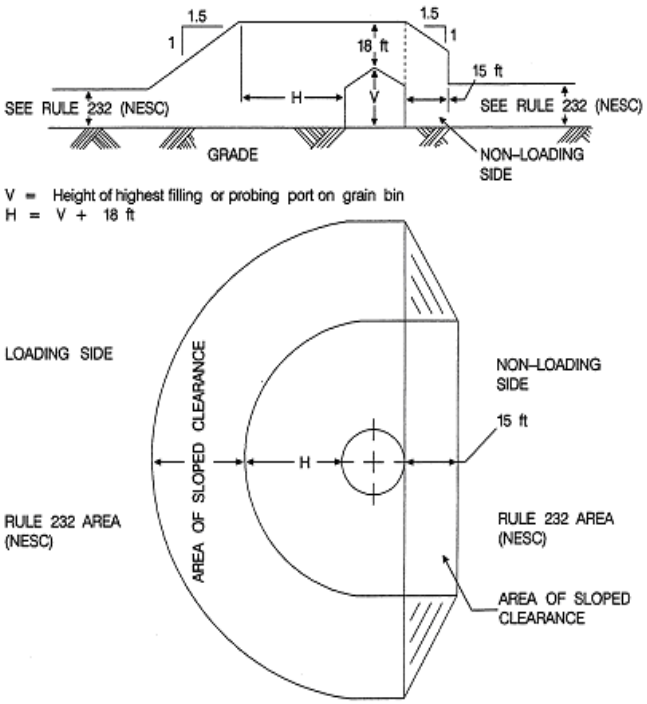
Entrance Size	Maximum Actual Tension
100A	1500 Lbs
200A	2000 Lbs
400A	3500 Lbs

The customer should consider providing additional strength as a “Safety Factor” (NEC Section 230-28).

3. The service conductor type and span length will be selected by the City representative as part of their inspection to determine the service entrance location. This information will be made available to the customer on request.

4. EMT (thin wall conduit) is not acceptable for any portion of the service mast.

5.12.5 Clearance requirements Around Grain Bins



1) Overhead service drop conductors should not be routed through the clearance envelope as shown above. For exceptions, see NESC Rule 234F.

2) The customer shall contact the City representative to review clearances between grain bins and City facilities.

3) This figure is reprinted from IEEE Std C2-1 993, National Electrical Safety Code.

5.13 GROUNDING REQUIREMENTS

1) All grounding of electric installations shall meet the requirements of NEC Article 250, requirements of the City as shown in these construction standards, and all other applicable codes.

2) The grounding electrode system shall consist of the provisions specified in NEC Section 250-81 and, when required, Section 250-83. The City does not allow the use of gas piping for grounding of electrical services.

3) Ground rods, when used, shall be at least 8 feet long and ½ inch in diameter if copper, copper clad, or stainless steel, or 5/8 inch in diameter if galvanized or steel. The top of the rod shall be 2 to 6 inches below ground level. In certain instances additional grounding electrodes may be required, see NEC Section 250-84.

4) A main bonding jumper shall be installed at the main service equipment as required by NEC Section 250-53b.

5) If a metal underground water pipe is in direct contact with the earth for 10 feet or more, it must be bonded to the grounding electrode system. In addition, a copper bonding conductor, or equivalent, must be connected around the water meter. See the following NEC Table 250-94, reprinted with permission from NFPA 70-1993, the National Electrical Code, Copyright 1992, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

5.13.1 Grounding Electrode Conductor for AC Systems

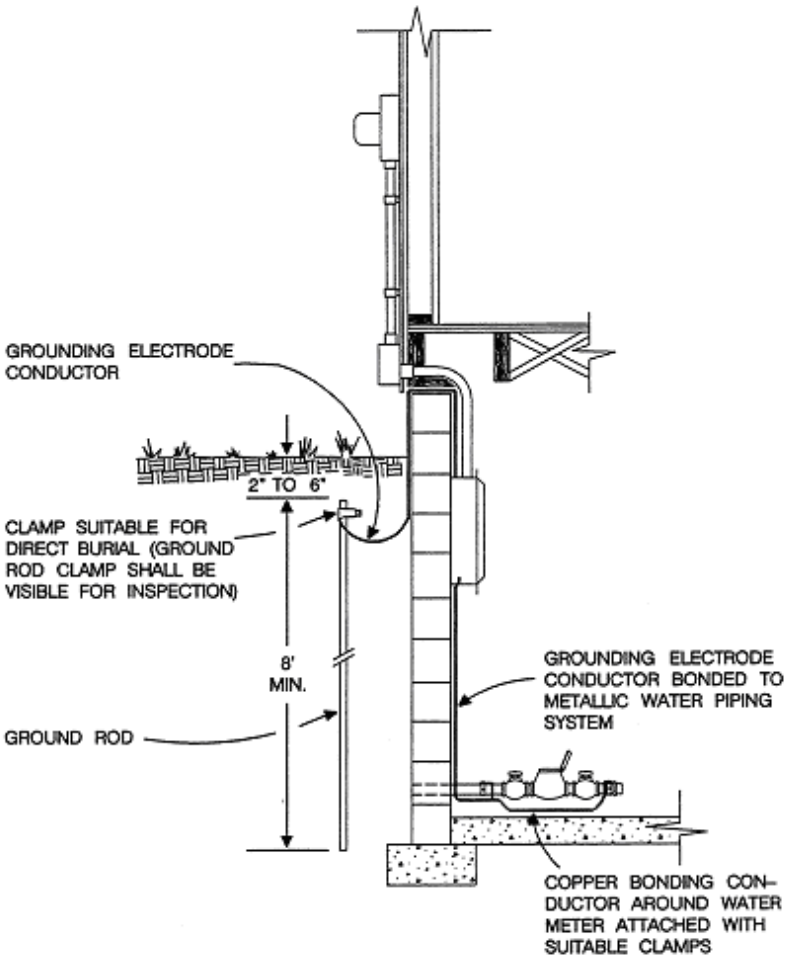
Size of Largest Service Entrance Conductor or Equivalent Area for Parallel Conductors		Sizing of Grounding Electrode Conductor	
Copper	Aluminum or Copper Clad Aluminum	Copper	Aluminum or Copper Clad Aluminum
2 or smaller	1/0 or smaller	8	6
1 or 1/0	2/0or3/0	6	4
2/0 or 3/0	4/0 or 250 kcmil	4	2
Over 3/0 thru350 kcmil	Over 250 kcmil thru 500 kcmil	2	1/0
Over 350 kcmil thru 600 kcmil	Over 500 kcmil	1/0	3/0

	thru 900 kcmil		
Over 600 kcmil thru 1100 kcmil	Over 900 kcmil thru 1750 kcmil	2/0	4/0
Over 1100 kcmil	Over 1750 kcmil	310	250 kcmil

Where multiple sets of service-entrance conductors are used as permitted in NEC Section 230-0, Exception No. 2, the equivalent size of the largest service-entrance conductor shall be determined by the largest sum of the areas of the corresponding conductors of each set.

NOTE: Where connected to made electrodes as in NEC Section 250-83 © or (d), that portion of the grounding electrode conductor that is the sole connection to the grounding electrode shall not be required to be larger than No. 6 copper wire or No. 4 aluminum wire.

See installation restrictions in NEC Section 250-92(a)



5.14 ALLOWABLE SERVICE CONDUCTOR SIZES

Allowable ampacities of insulated conductors rate 0-2000 Volts, 60 to 90C (140 to 194F) not more than three conductors in raceway or cable or earth (directly buried), based on ambient temperature of 30C(86F)

The following NEC Table 310-16 is reprinted from NFPA 70-1993, the National Electrical Code, Copyright 1992, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection

Association, on the referenced subject which is represented only by the standard in its entirety.

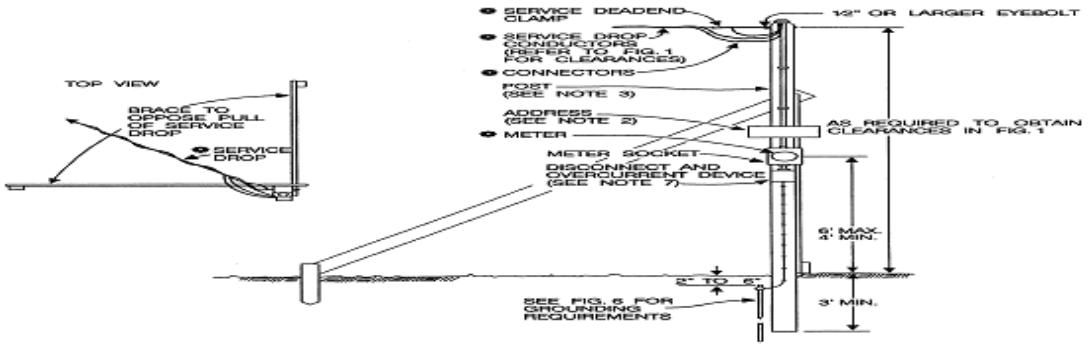
TEMPERATURES RATING OF CONDUCTOR SEE TABLE 310-13 OF THE NEC

Wire Size	TW,UF 60 C (140 F) COPPER	FEPW, RH, RHW, THHW,THW, THWN, XHHW, USE, ZW 75C (167 F)	TA,TBS, SA, SIS, FEP, FEPB, MI,RHH, RHW-2, THHN, THHW, THW-2, THWN-2, THW-2, THWN-2, XHHW-2, ZW-2 90C (194 F)	TW,UF 60 C (140F) ALUMINUM OR COPPER CLAD ALUMINUM	FEPW, RH, RHW, THHW,THW, THWN, XHHW, USE, ZW 75 C (167 F)	TA,TBS,SA, SIS, FEP, FEPB,MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, THW-2, THWN-2, XHHW-2, ZW-2 90 C (194 F)	Wire Size
6	55	65	75	-	-	-	
4	70	85	95	55	65	75	4
3	85	100	110	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	150	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0
250	215	255	290	170	205	230	250
300	240	285	320	190	230	255	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400
500	320	380	430	260	310	350	500
600	355	420	475	285	340	385	600
700	385	460	520	310	375	420	700
750	400	475	535	320	385	435	750

Note: For residential applications, see Note 3 following Table 310-19 of the NEC

5.15 SELF CONTAINED METER INSTALLATIONS

5.15.1 Overhead Temporary Service



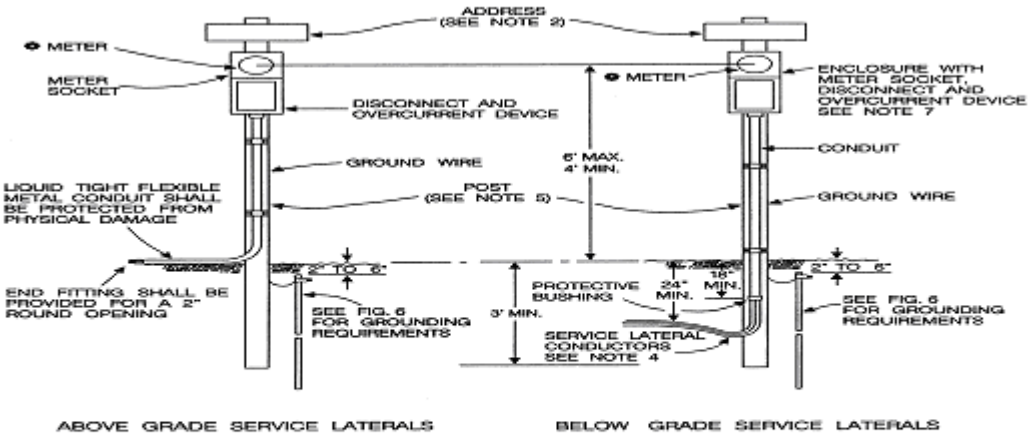
SERVICE CHARACTERISTICS		METER WIRING
VOLTAGE	SIZE	
1-PHASE 120 V 2-WIRE	60 A MAX.	FIG. 27
1-PHASE 120/240 V 3-WIRE	200 A MAX.	FIG. 27
1-PHASE 120/208 V 3-WIRE	200 A MAX.	FIG. 28
3-PHASE 120/240 V 4-WIRE	200 A MAX.	FIG. 30
3-PHASE 120/208 V 4-WIRE	200 A MAX.	FIG. 30

For other temporary service requirements, contact your Company representative.

1) The City will provide and install all ~ marked items. The customer shall be responsible for all other items.
2) An address sign that is visible from the street shall be posted on the meter setting. It shall be made of materials that provide a clearly legible address for the duration of the setting.
3) With the exception of pedestal type settings, the support shall be a square or round timber post, 4 inch x 4 inch minimum or equivalent.
4) Meters shall not be installed on or in trailers, portable houses, or any buildings not on a permanent foundation.
5) The weather head is to be located above the level of the service attachment point.
6) The customer shall provide, install and connect all grounding equipment.
7) All 120 volt circuits shall have ground fault circuit interrupters GFI (NEC Section 305-6).
8) All customers provided equipment shall be weatherproof.

9) The service drop conductors shall not cross adjoining property.

5.15.2 Underground Temporary Service

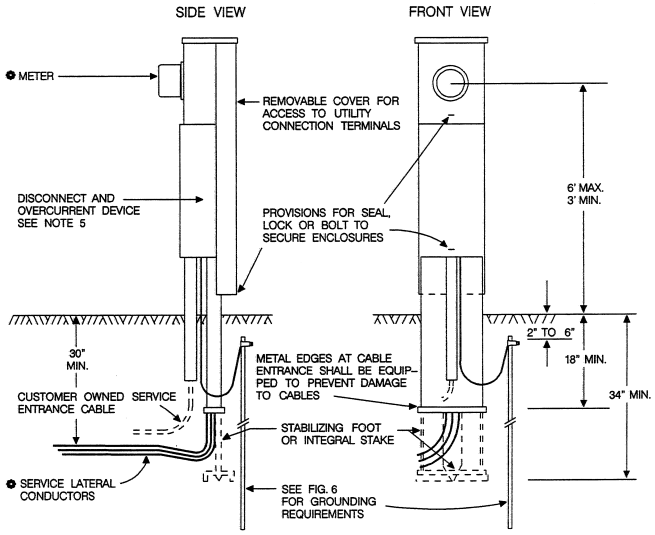


SERVICE CHARACTERISTICS		METER WIRING
VOLTAGE	SIZE	
1-PHASE 120 V 2-WIRE	60 A MAX.	FIG. 27
1-PHASE 120/240 V 3-WIRE	200 A MAX.	FIG. 27
1-PHASE 120/208 V 3-WIRE	200 A MAX.	FIG. 29
3-PHASE 120/208 V 4-WIRE	200 A MAX.	FIG. 30

1) An address sign that is visible from the street shall be posted on the meter setting. It shall be made of materials that provide a clearly legible address for the duration of the setting.
2) The City will provide and install all ~ marked items. The customer shall be responsible for all other items.
3) The service lateral conductors shall be suitable for direct burial.
4) The customer shall provide and install the service lateral conductors in a manner that provides a sufficient length of conductor coiled at the transformer, secondary hand hole or secondary pedestal, for connection to the power source by the City.
5) With the exception of pedestal type settings, the support shall be a square or round timber post, 4 inch x 4 inch minimum or equivalent.
6) The customer shall provide, install and connect all grounding equipment.
7) All 120 volt circuits must have ground fault circuit interrupters GUI) (NEC Section 305-6).
8) All customers provided equipment shall be weatherproof.
9) If the temporary meter setting is located adjacent to pad mount transformer, secondary pedestal or secondary hand hole, it shall be between 5 to 7 feet away from the enclosure.

5.15.3 Underground Residential Service Meter Pedestal

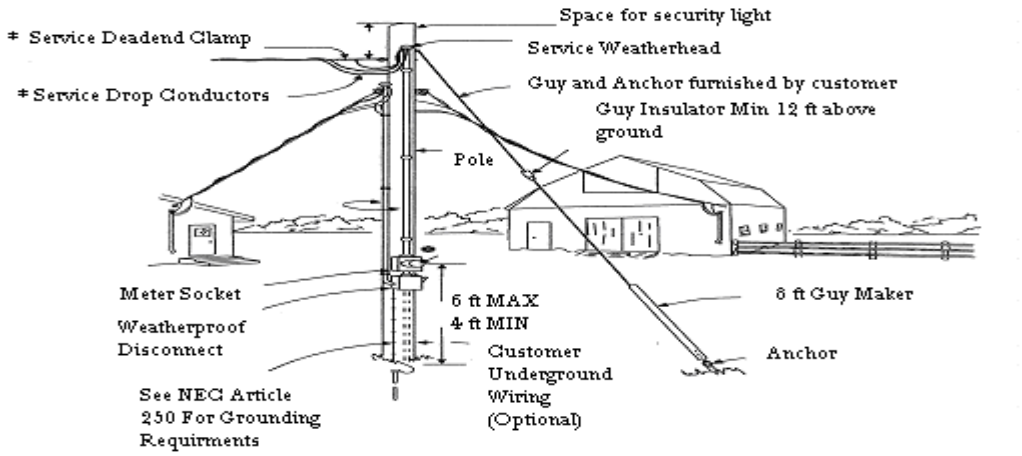
TYPICAL UNDERGROUND RESIDENTIAL SERVICE METER PEDESTAL



SERVICE CHARACTERISTICS		METER WIRING
VOLTAGE	SIZE	
1-PHASE 120/240 V 3-WIRE	400 A MAX.	FIG. 27

a. Meter pedestal shall have a removable cover for access to utility connection terminals.
b. Meter pedestal shall have provisions for seal, lock, or seal able bolt to secure the enclosure key locks will not be approved.
c. Meter mounting equipment shall meet the requirements listed in the City's Minimum Specifications for Meter Sockets. See Appendix C.
d. Pedestal materials shall be fiberglass or steel. Steel shall be minimum of 14 gauge and plated or galvanized. The finish shall be tough, non-fading and have long service life.
e. Metal pedestals shall be bonded to the neutral connector. The neutral connector shall be equipped with a lug for exclusive use of a copper ground wire.
f. Pedestals manufactured by the following meet the above requirements:
    i. Anchor
    ii. The Durham City
    iii. Midwest Electric Products, Inc.
    iv. Nordic Fiberglass, Inc.
g. Meter mounting equipment that meets the above criteria, but is not on the attached list will be evaluated on a case-by-case basis. If found acceptable, the equipment will be added to the list.

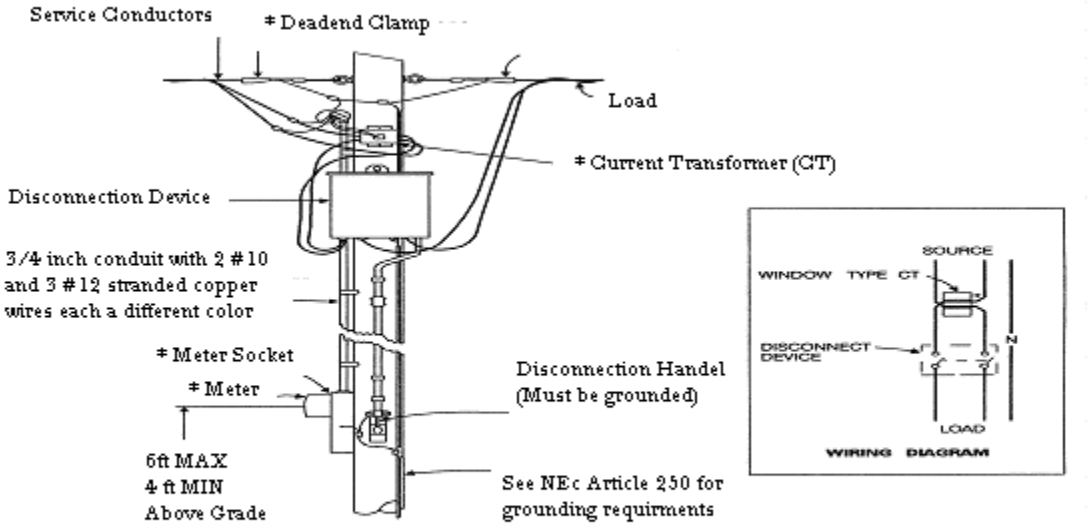
5.15.4 Rural Service Meter Pole with Disconnect



1) The City will provide and install all * marked items. The customer shall be responsible for all other items.
2) The attachment of the customer's metering equipment and distribution wiring will not be allowed on company poles.
3) The customer shall be responsible for providing and installing a pole that is in suitable condition for extended service life, to support the service drop conductors and equipment. The pole shall be in an accessible location out of the way of farm equipment traffic. The pole is to meet or exceed the following minimum requirements: Length: Sufficient to maintain proper clearances, Setting Depth: 5 feet Top Diameter: 5.5 Inches Treatment: Pentachlorophenol or equivalent
4) Contact your City representative to determine the need for an approved down guy
5) The City can provide and install, at the customer's expense, a pole and (if necessary) the down guy.
6) The customer's service riser, metering equipment and wiring shall conform to NEC requirements.
7) The service weatherhead is to be located above the service attachment point to insure a positive drip loop.
8) When using a pole top disconnect refer to Figure 16.
9) When facilities for a standby generator are installed refer to Figure 17
10) Locations of fuel storage tanks and dispensing devices shall be in accordance with NEC Table 514-2.
11) The City strongly requires that the customer install a disconnecting switch or an over current protection device on the load side of the meter.

12) The customer shall provide fuse or circuit breaker protection and grounding for each building supplied from the meter pole (NEC Articles 225 and 250).
13) The service conductors should not cross adjoining property or livestock areas.
14) Metered and unmetered conductors shall not be installed in the same conduit.

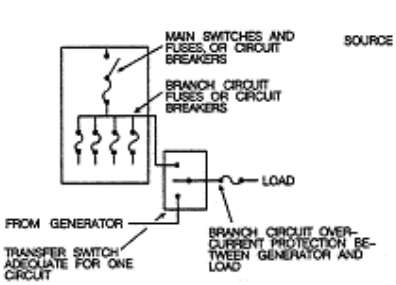
5.15.5 Rural Service Meter Pole with Pole Top Disconnect



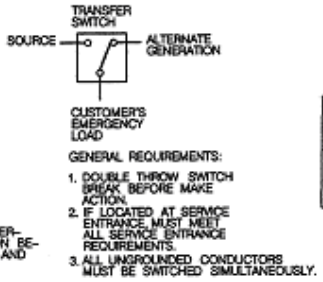
1) The City will provide and install all marked items. The customer shall be responsible for all other items except the current transformer (CT), which will be furnished by the City and installed by the customer.
2) The metering wiring conduit weather head shall be mounted above the current transformer to insure a positive drip loop.
3) The customer shall install five No. 12 stranded copper meter leads (blue, black, red, orange, and white) through the meter wiring riser conduit and provide sufficient length to reach the CT terminals. Connection of these leads to the CT terminals will be made by the City .
4) The phase conductors must pass through the CT window from opposite directions as shown in the wiring diagram.
5) Only window type current transformers will be mounted outdoors.
6) Use five terminal meter socket with space for test switch.
7) For pole, down guy and attachment provision requirements refer to Figure 15.
8) When facilities for a standby generator are involved refer to Figure 17.
9) Other service voltages may be available. Contact your City representative.

5.15.6 Meter Installation with Standby Generator

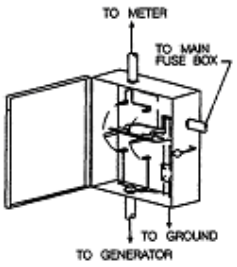
IF A STANDBY GENERATOR IS CONNECTED WITHOUT AN APPROVED TRANSFER SWITCH, SERVICE WILL BE DISCONNECTED UNTIL SUCH SWITCH IS INSTALLED. SAFETY OF PERSONNEL DEMANDS THIS REQUIREMENT. SEE SECTION 19 OF THIS MANUAL FOR ADDITIONAL INFORMATION.



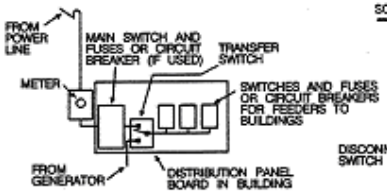
STANDBY GENERATOR CONNECTED TO ONE CIRCUIT



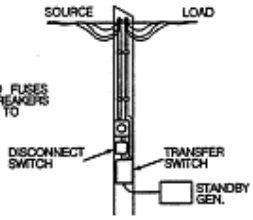
ONE LINE DIAGRAM



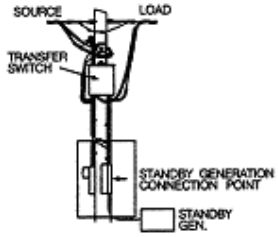
DOUBLE THROW SWITCH



STANDBY GENERATOR CONNECTED AT SERVICE ENTRANCE ON BUILDING



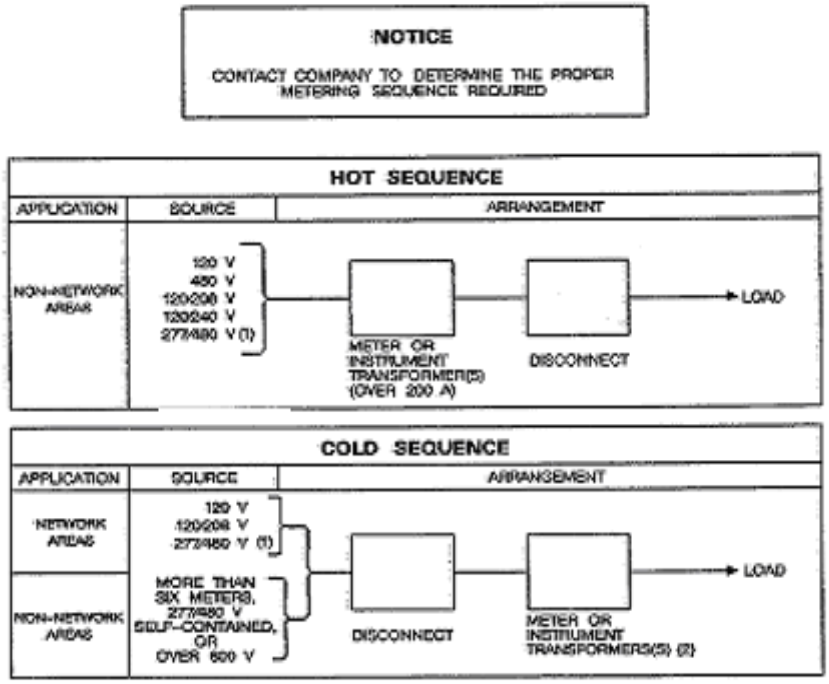
POLE MOUNTED SERVICE ENTRANCE WITH SELF-CONTAINED METER



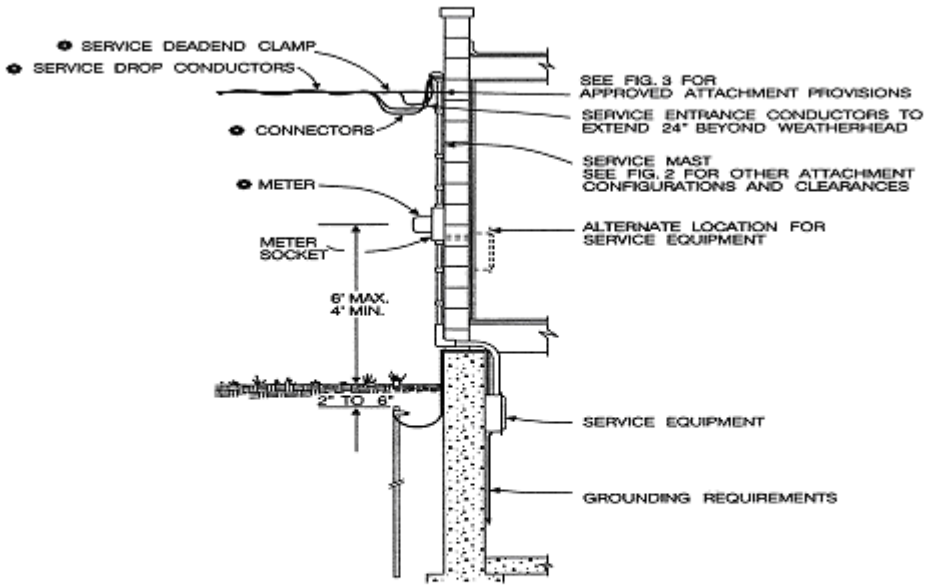
POLE MOUNTED SERVICE ENTRANCE WITH CT METERING

The position of the transfer switch, with respect to the main switch, can vary from that shown. Contact your Company representative to be sure that the proposed transfer switch installation meets the Company requirements.

5.15.7 Metering Sequence Requirements – Non Residential Services



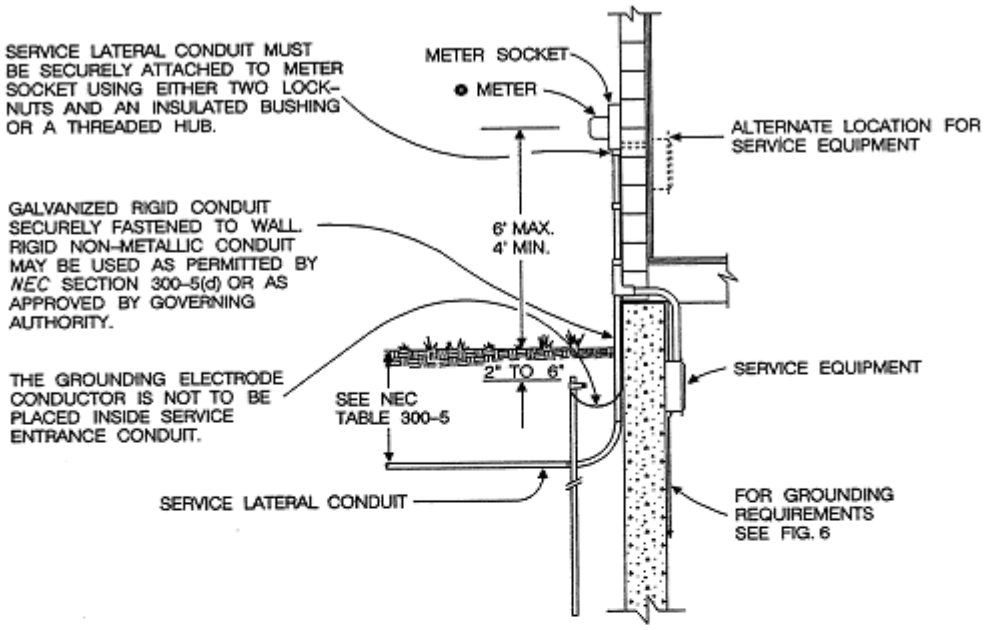
5.15.8 Overhead Commercial / Industrial Service



SERVICE CHARACTERISTICS		METER WIRING
VOLTAGE	SIZE	
1-PHASE 120 V 2-WIRE	60 A MAX.	FIG. 27
1-PHASE 120/240 V 3-WIRE	200 A MAX.	FIG. 27
1-PHASE 120/240 V 3-WIRE	400 A MAX.	FIG. 28
1-PHASE 120/208 V 3-WIRE	100 A MAX. ◆	FIG. 29
3-PHASE 120/208 V 4-WIRE	200 A MAX.	FIG. 30
3-PHASE 277/480 V 4-WIRE	200 A MAX.	FIG. 31

◆ Normally available only from a 3-phase 120/208 V 4-wire service entrance.
The Company will provide and install all ● marked items. The customer is responsible for all other items.

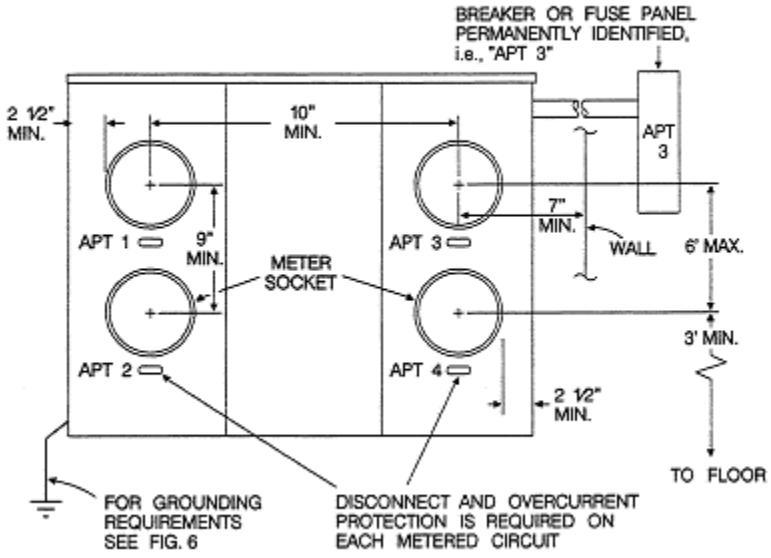
5.15.9 Underground Commercial / Industrial Service



SERVICE CHARACTERISTICS		METER WIRING
VOLTAGE	SIZE	
1-PHASE 120/240 V 3-WIRE	200 A MAX.	FIG. 27
1-PHASE 120/240 V 3-WIRE	400 A MAX.	FIG. 28
1-PHASE 120/208 V 3-WIRE	100 A MAX. ◆	FIG. 29
3-PHASE 120/208 V 4-WIRE	200 A MAX.	FIG. 30
3-PHASE 277/480 V 4-WIRE	200 A MAX.	FIG. 31

◆ Normally available only from a 3-phase 120/208 V 4-wire service entrance.
Other service voltages may be available. Contact your Company representative.

5.15.10 Group Metering Six or Less

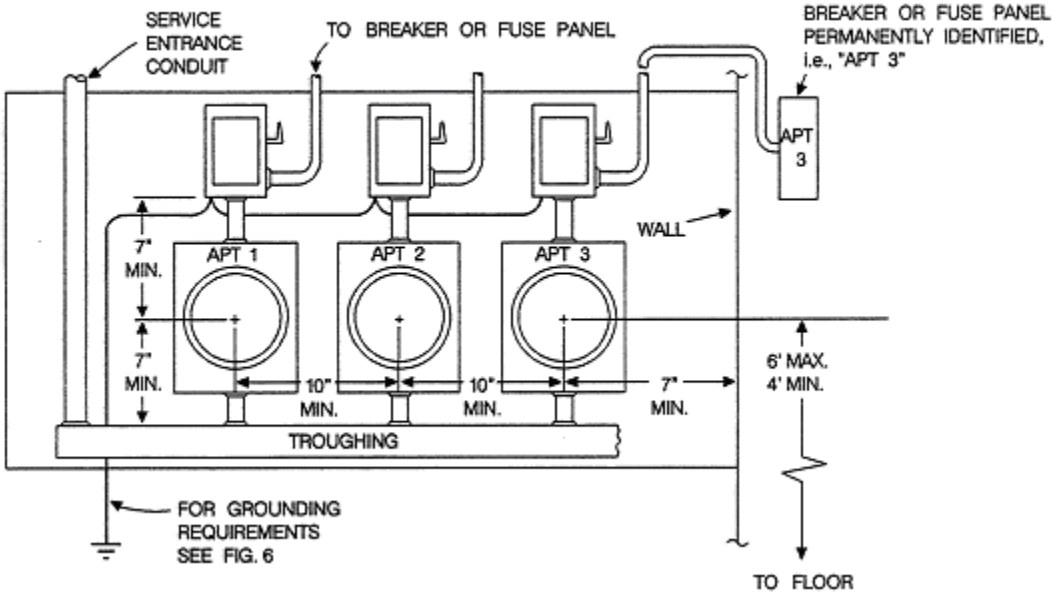


1) All service entrance equipment shall be UL listed.
2) All meter sockets shall meet City specifications, see Appendix C.
3) Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
4) Apartments, rooms, or suites shall have identical markings on the entry door, meter socket, and fuse or breaker panel.
5) Group metering installed in network areas, as defined in Figure 18, shall be of type shown in Figures 26 and 27.

SERVICE CHARACTERISTICS VOLTAGE	METER SIZE	WIRING
1-PHASE 120/240 V 3-WIRE	200 A MAX.	FIG. 28
1-PHASE 120/208 V 3-WIRE	100 A MAX.*	FIG. 9
3-PHASE 1201240 V 4-WIRE	200 A MAX.	FIG. 30
3-PHASE 120/208 V 4-WIRE	200 A MAX.*	FIG. 30

* Normally available only from a 3-phase 120/208 V 4-wire service entrance. Other service voltages may be available. Contact your City representative.

5.15.10 Group Metering Six or Less Field Fabricated

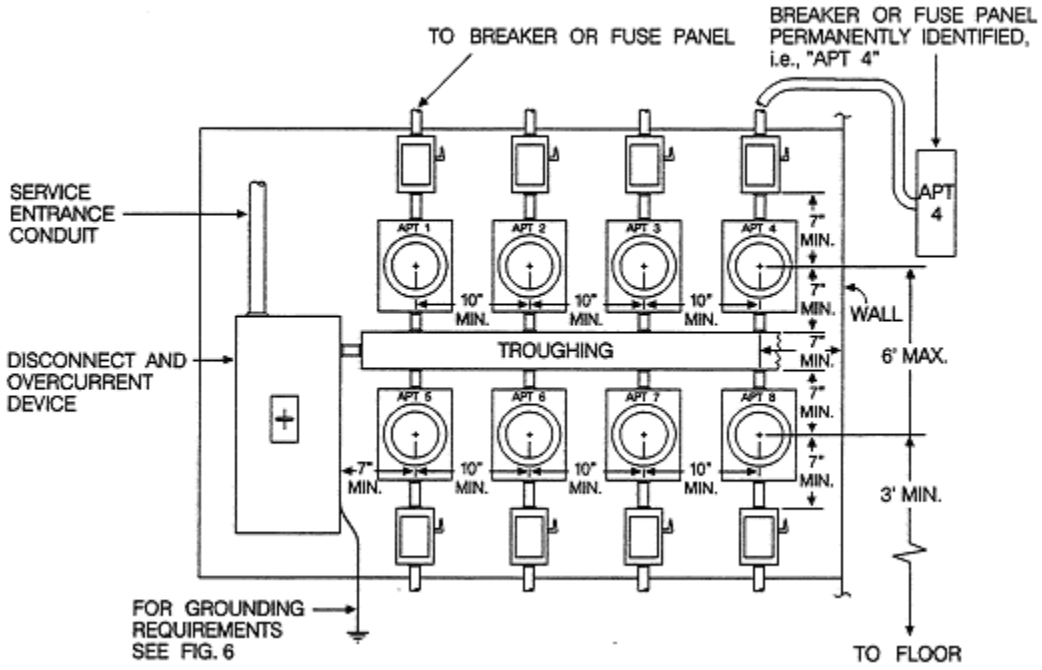


1) All service entrance equipment shall be UL listed.
2) All meter sockets shall meet City specifications, see Appendix C.
3) Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
4) Apartments, rooms, or suites shall have identical markings on the entry door, meter socket, and fuse or breaker panel.
5) Group metering installed in network areas, as defined in Figure 18, shall be of type shown in Figures 26 and 27.

SERVICE CHARACTERISTICS VOLTAGE	METER SIZE	WIRING
1-PHASE 120/240 V 3-WIRE	200 A MAX.	FIG. 28
1-PHASE 120/208 V 3-WIRE	100 A MAX.*	FIG. 9
3-PHASE 1201240 V 4-WIRE	200 A MAX.	FIG. 30
3-PHASE 120/208 V 4-WIRE	200 A MAX.*	FIG. 30

* Normally available only from a 3-phase 120/208 V 4-wire service entrance. Other service voltages may be available. Contact your City representative.

5.15.11 Group Metering Six or More Field Fabricated

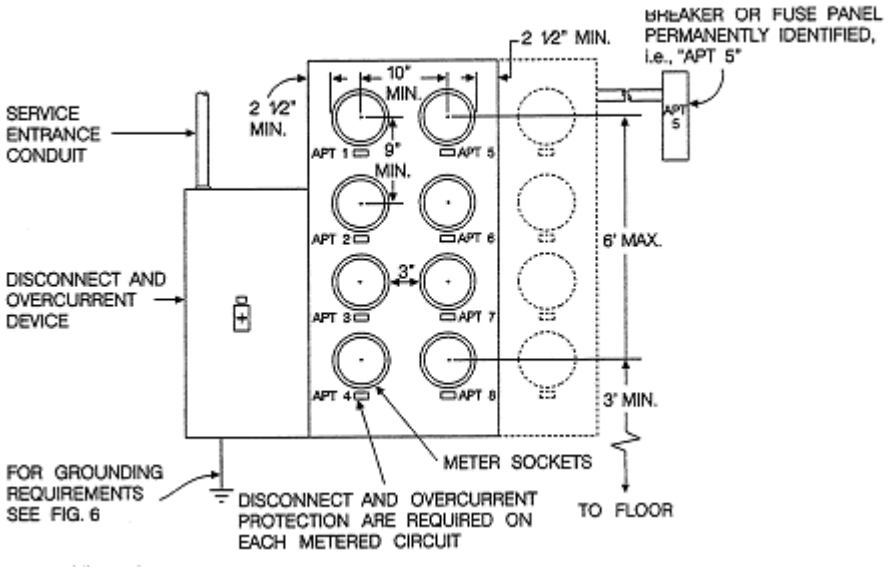


6) All service entrance equipment shall be UL listed.
7) All meter sockets shall meet City specifications, see Appendix C.
8) Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
9) Apartments, rooms, or suites shall have identical markings on the entry door, meter socket, and fuse or breaker panel.
10) Group metering installed in network areas, as defined in Figure 18, shall be of type shown in Figures 26 and 27.

SERVICE CHARACTERISTICS	METER	
VOLTAGE	SIZE	WIRING
1-PHASE 120/240 V 3-WIRE	200 A MAX.	FIG. 28
1-PHASE 120/208 V 3-WIRE	100 A MAX.*	FIG. 9
3-PHASE 1201240 V 4-WIRE	200 A MAX.	FIG. 30
3-PHASE 120/208 V 4-WIRE	200 A MAX.*	FIG. 30

* Normally available only from a 3-phase 120/208 V 4-wire service entrance. Other service voltages may be available. Contact your City representative.

5.15.12 Group Metering Six or More

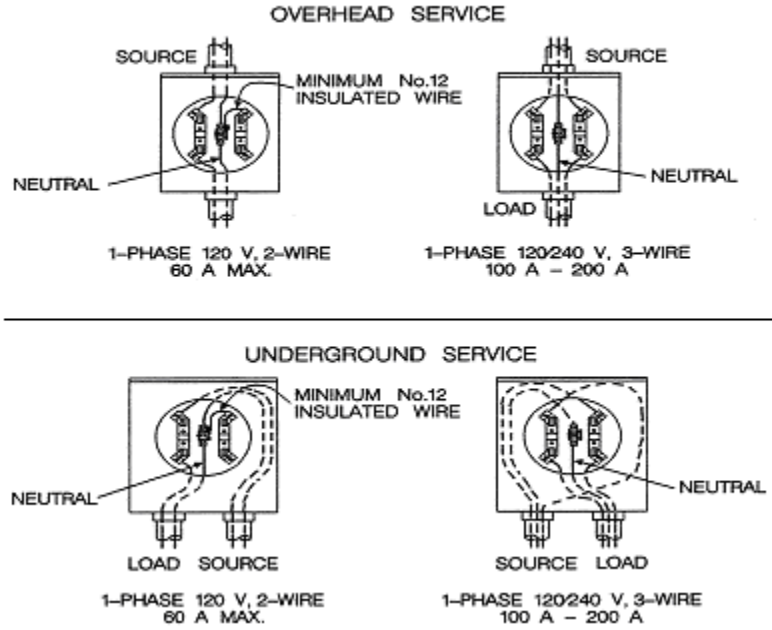


11) All service entrance equipment shall be UL listed.
12) All meter sockets shall meet City specifications, see Appendix C.
13) Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
14) Apartments, rooms, or suites shall have identical markings on the entry door, meter socket, and fuse or breaker panel.
15) Group metering installed in network areas, as defined in Figure 18, shall be of type shown in Figures 26 and 27.

SERVICE CHARACTERISTICS	METER	
VOLTAGE	SIZE	WIRING
1-PHASE 120/240 V 3-WIRE	200 A MAX.	FIG. 28
1-PHASE 120/208 V 3-WIRE	100 A MAX.*	FIG. 9
3-PHASE 1201240 V 4-WIRE	200 A MAX.	FIG. 30
3-PHASE 120/208 V 4-WIRE	200 A MAX.*	FIG. 30

* Normally available only from a 3-phase 120/208 V 4-wire service entrance. Other service voltages may be available. Contact your City representative.

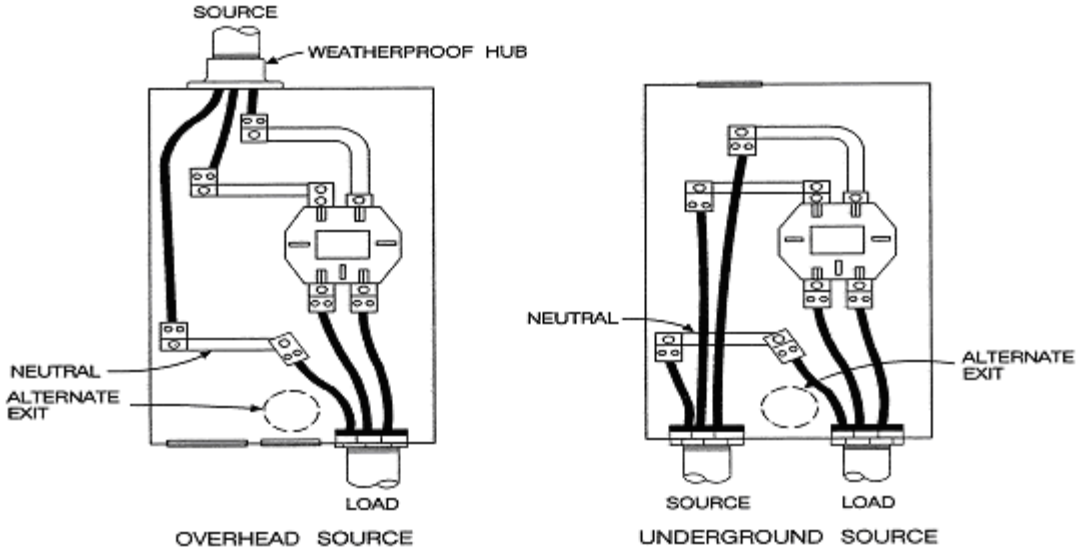
5.15.13 Meter Socket Wiring 1 Phase 120 – 240V, 2 - 3 Wire 200 Amp Maximum



CAUTION: Source conductors shall be positioned along the sides of the meter socket, utilizing adequate bending radius, to provide maximum clearance from other socket terminals.

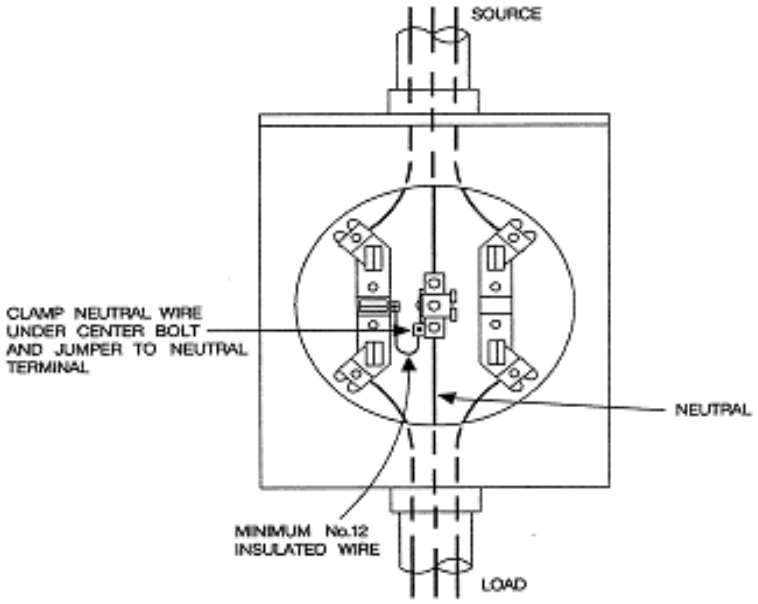
1. The meter sockets shall meet City specifications, see Appendix C.
2. Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
3. When using aluminum conductors, wire brush conductors and apply oxide inhibitor on all connections.
4. The neutral shall be grounded at the main disconnect in accordance with the NEC.
5. Please contact your City representative if any questions arise concerning this installation.

5.15.14 Meter Socket Wiring 1 Phase 120 – 240V, 3 Wire 400 Amp Maximum



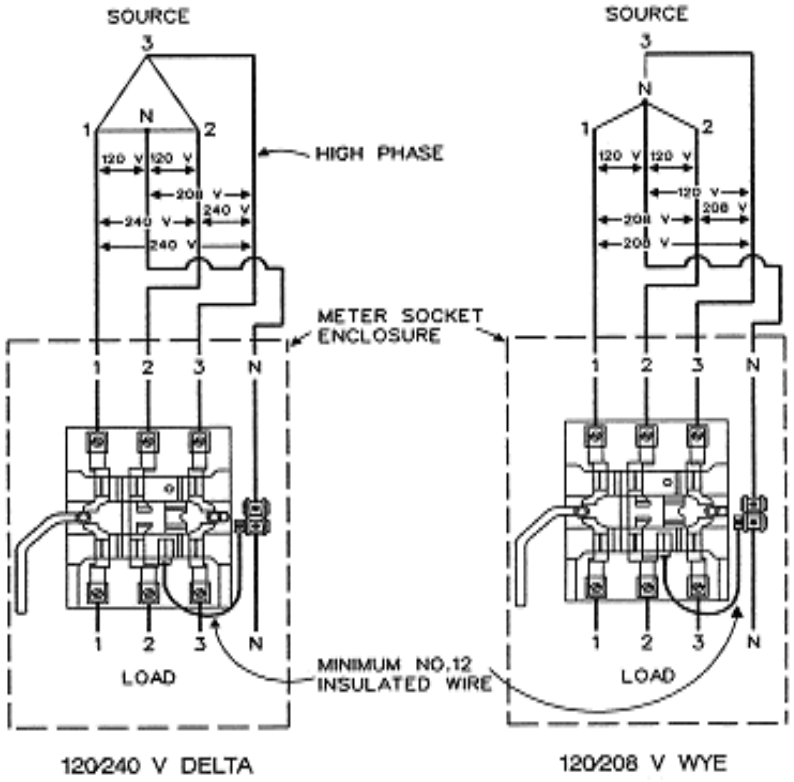
1. The meter sockets shall meet City specifications.
2. Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
3. When using aluminum conductors, wire brush the' conductors and apply oxide inhibitor on all connections.
4. When the neutral is not continuous through the meter socket, a dual lug neutral connector shall be used.

5.15.15 Meter Socket Wiring 1 Phase 120 – 208V, 3 Wire 200 Amp Maximum



1. The meter sockets shall meet City specifications.
2. Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
3. When using aluminum conductors, wire brush the' conductors and apply oxide inhibitor on all connections.
4. When the neutral is not continuous through the meter socket, a dual lug neutral connector shall be used.
5. 120/208 V 3-wire is normally available only from a 3-phase 120/208 V 4-wire service entrance.

5.15.16 Meter Socket Wiring 1 Phase 120 – 208V, 4 Wire 200 Amp Maximum

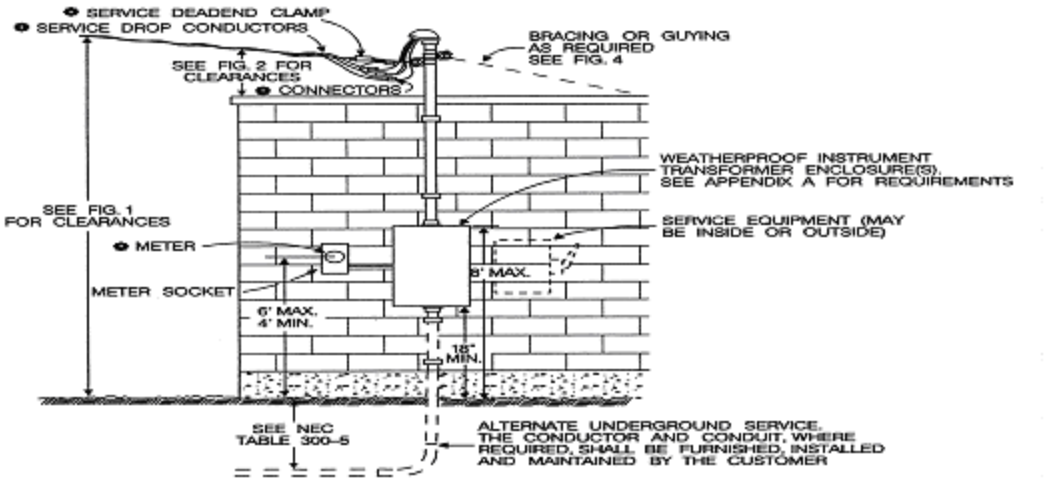


1. The meter sockets shall meet City specifications, see Appendix C.
2. Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
3. When using aluminum conductors, wire brush conductors and apply oxide inhibitor on all connections.
4. The neutral shall be grounded at the main disconnect in accordance with the NEC.
5. The neutral, if insulated, shall be identified by a white or gray covering, or white paint or tape.
6. The high phase of a 120/240 V installation shall be identified by orange color, either insulation, paint, or tape.
7. Please contact your City representative if any questions arise concerning this installation.

5.16 INSTRUMENT TRANSFORMER METERING

1) Meter sockets shall not be mounted more than 35 circuit feet from instrument transformers.
2) Test switches and meters will be furnished and installed by the City .
3) Meter sockets shall be grounded by bonding to the service entrance ground or neutral.
4) Insulated bushings are required on all conduits.
5) Working space in front of service entrance equipment and meter sockets shall be in accordance with NEC Section 110-16.
6) The customer shall furnish and install the specified number and color of No. 10 & 12 stranded copper meter leads through the meter wiring conduit. The customer shall provide sufficient length to permit neatly arranged connections to the test switch and meter terminals, by extending the wires a minimum of 42 inches into the metering and test switch socket.
7) Connection of the meter leads will be made by the City.

5.16.2 Commercial / Industrial Overhead with Transformer Metering Outdoor Mounting

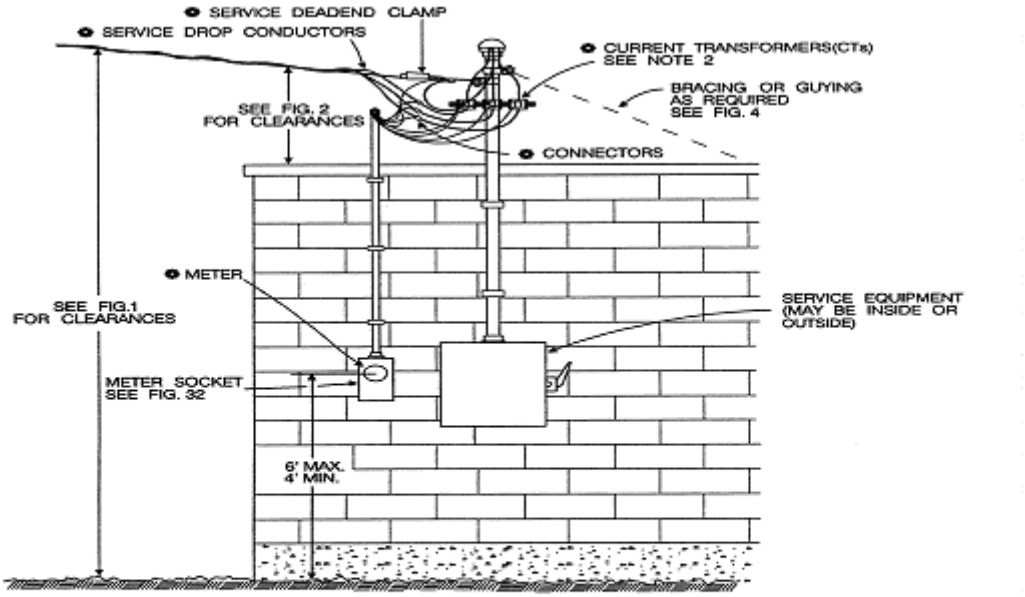


SERVICE CHARACTERISTICS				INSTRUMENT TRANSFORMER QUANTITY		INSTRUMENT TRANSFORMER WIRING
VOLTAGE	SIZE (SEE NOTE 7) MINIMUM	O.H. MAX.	U.G. MAX.	CTs	PTs	
1-PHASE 120/240 V 3-WIRE	OVER 400 A	1000 A	1000 A	2	-	FIG. 33
3-PHASE 120/240 V 4-WIRE	OVER 200 A	1600 A	N.A.	3	-	FIG. 34
3-PHASE 120/208 V 4-WIRE	OVER 200 A	1800 A	3500 A	3	-	FIG. 34
3-PHASE 277/480 V 4-WIRE	OVER 200 A	800 A	4000 A	3	3	FIG. 35
3-PHASE 480 V 3-WIRE	100 A	800 A	N.A.	3	2	FIG. 36

N.A. - NOT AVAILABLE

1) The City will provide and install all ~ marked items. The customer shall be responsible for all other items A maximum length of 50 feet of service conductor measured from the property line will be provided at no charge.
2) Current transformers and potential transformers are furnished by the City and installed by the customer. Submit current transformer and potential transformer mounting details to the City for approval.
3) Mount current transformers and potential transformers so that the polarity marks of each set are arranged in identical position.
4) Instrument transformer wiring shows indoor mounting bar type current transformers, wiring for outdoor installations is similar except that window type current transformers are used.
5) Bond all metal racks to the neutral wire when a neutral is present. If a neutral is not present, metal racks must be grounded.
6) Working space from electric equipment shall be in accordance with *NEC* Section 110-16.
7) Service entrance conduit shall be mounted on an exterior wall accessible to City personnel.

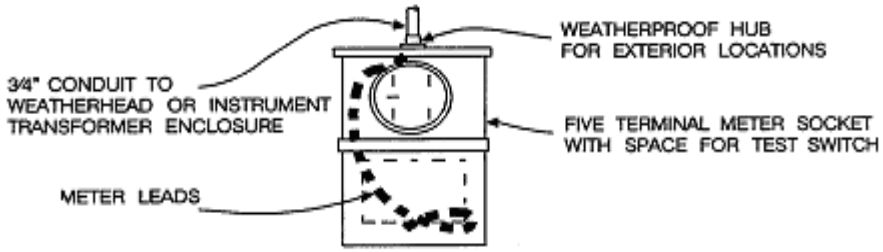
5.16.2 Commercial / Industrial Overhead with Transformer Metering Cabinet Mounting



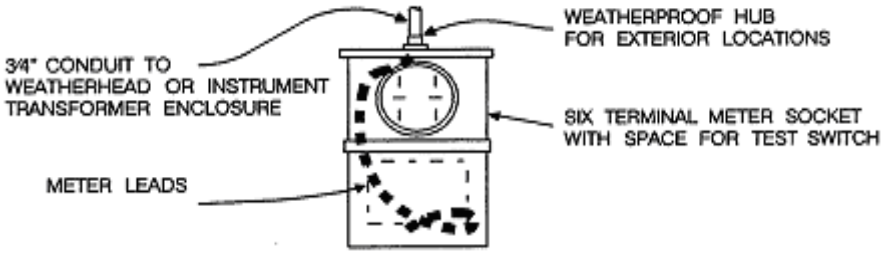
SERVICE CHARACTERISTICS		INSTRUMENT TRANSFORMER QUANTITY		INSTRUMENT TRANSFORMER WIRING
VOLTAGE	SIZE	CTs	PTs	
1-PHASE 120/240 V 3-WIRE	OVER 400 A THRU 1000 A	2	-	FIG. 33
3-PHASE 120/240 V 4-WIRE	OVER 200 A THRU 1600 A	3	-	FIG. 34
3-PHASE 120/208 V 4-WIRE	OVER 200 A THRU 1800 A	3	-	FIG. 34
3-PHASE 277/480 V 4-WIRE	OVER 200 A THRU 800 A	3	3	FIG. 35
3-PHASE 480 V 3-WIRE	UP THRU 800 A	3	2	FIG. 36

1) The City will provide and install all ~ marked items. The customer shall be responsible for all other items
2) A maximum length of 50 feet of overhead service conductor measured from the property line will be provided at no charge.
3) Current transformers and potential transformers are furnished by the City and installed by the customer.
4) Submit current transformer and potential transformer mounting details to the City for approval.
5) Mount current transformers and potential transformers so that the polarity marks of each set are arranged in identical position.
6) Instrument transformer wiring shows indoor mounting bar type current transformers. Wiring for outdoor installations is similar except that window type current transformers are used.
7) Bond all metal racks to the neutral wire when a neutral is present. If a neutral is not present, metal racks must be grounded.
8) Working space from electric equipment shall be in accordance with NEC Section 110-16.

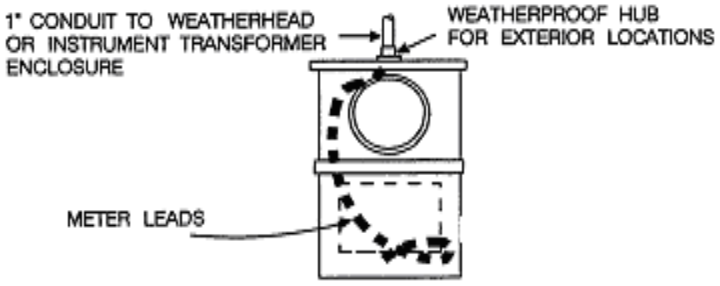
5.16.3 Meter Socket Requirements



1–PHASE 120/240 V 3–WIRE WITH ONE CT

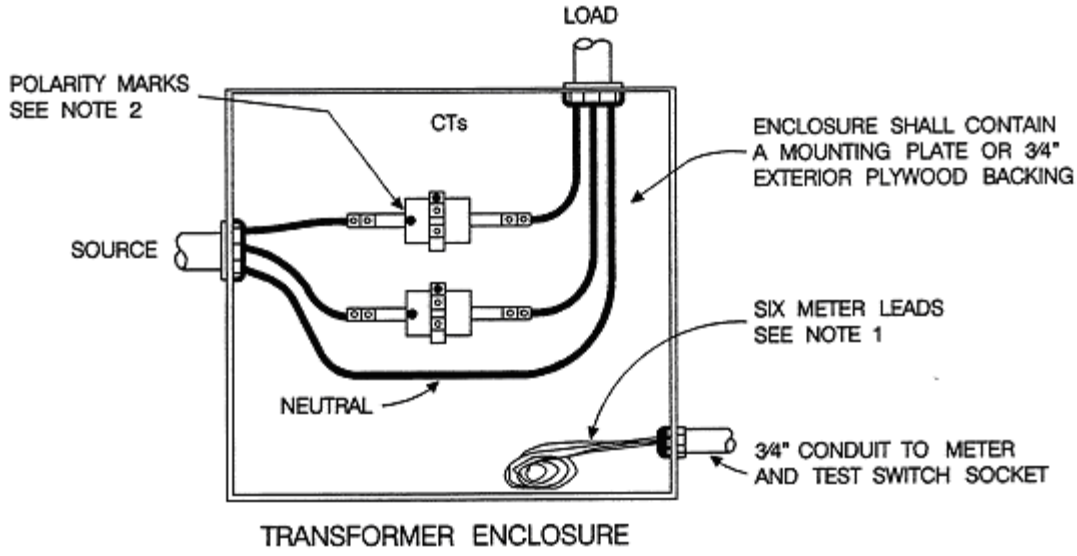


1–PHASE 120/240 V 3–WIRE WITH TWO CTs



3–PHASE 3–WIRE OR 4–WIRE WITH THREE CTs

5.16.4 Instrument Transformer Cabinet Wiring 1 Phase 120/240V 3Wire 400 Amps Maximum



1. The customer shall furnish and install two #12 and three #10 stranded copper meter leads (two blue, two red, white) through the meter wiring conduit and provide sufficient length to reach the CT terminals. Connection of these leads to the CT terminals will be made by the City .

2. The CTs shall be mounted so that the polarity marks are arranged in identical positions.

3. Insulated bushings are required on all conduits.

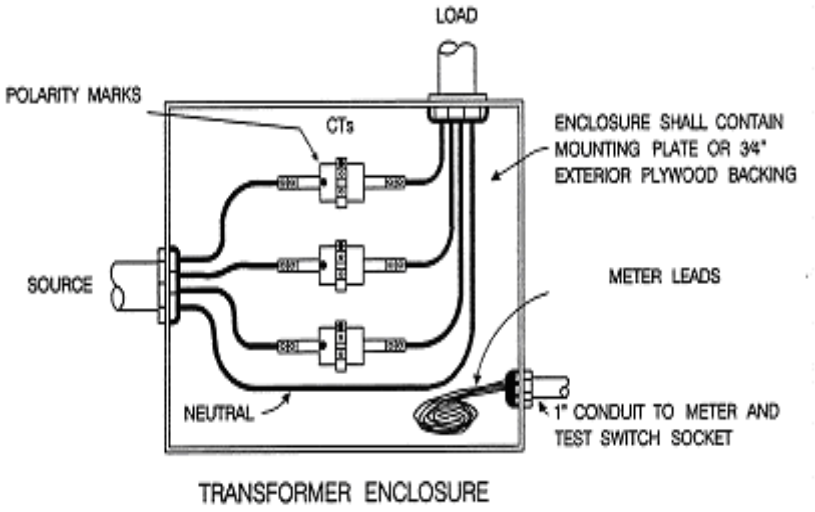
4. Instrument transformer enclosures shall be grounded by bonding to the service entrance ground or neutral.

5. Window or bar type CTs are allowed in enclosures and will be provided by the City .

6. The neutral shall be available in the instrument transformer enclosure for connection of the meter potential leads.

7. In unusual conditions contact your City representative.

5.16.5 Wiring 3 Phase 120 - 240V 3Wire



1. The customer shall furnish and install three #12 and four #10 stranded copper meter leads (two blue, two red, two black and white) through the meter wiring conduit and provide sufficient length to reach the CT terminals. Connection of these leads to the CT terminals will be made by the City .

2. The CTs shall be mounted so that the polarity marks are arranged in identical positions.

3. Insulated bushings are required on all conduits.

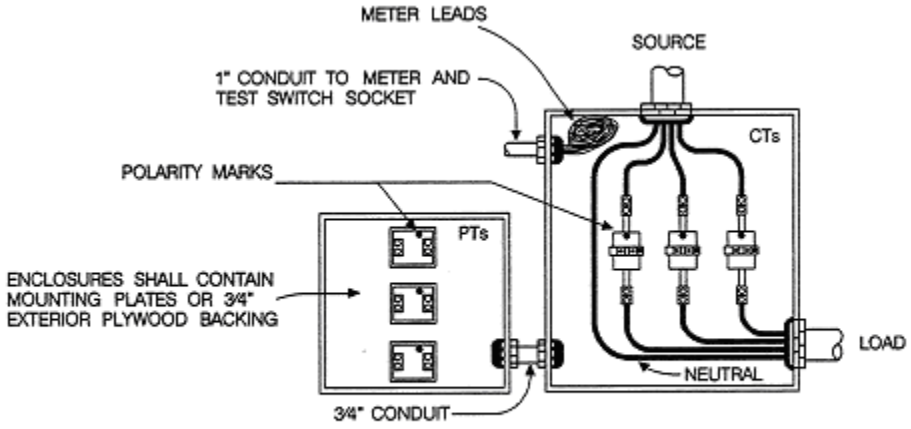
4. Instrument transformer enclosures shall be grounded by bonding to the service entrance ground or neutral.

5. Window or bar type CT's are allowed in enclosures and will be provided by the City .

6. The neutral shall be available in the instrument transformer enclosure for connection of the meter potential leads.

7. In unusual conditions contact your City representative.

5.16.6 Potential & Instrument Transformer Cabinet Wiring 3 Phase 600V or Less 3Wire



POTENIAL AND CURRENT TRANSFORMER ENCLOSURE

1. The customer shall furnish and install eight No. 12 stranded copper meter leads (blue, black, yellow, white, red, purple, brown, and orange) through the meter wiring conduit. These wires shall have sufficient length to permit neatly arranged connections between the appropriate instrument transformer and test switch terminals. Connection of these leads will be made by the City .

2. The CTs shall be mounted so that the polarity marks are arranged in identical positions.

3. Insulated bushings are required on all conduits.

4. Instrument transformer enclosures shall be grounded by bonding to the service entrance ground or neutral.

5. Window or bar type CT's are allowed in enclosures and will be provided by the City.

6. The high phase conductor of a 1201240 V Delta installation shall be identified by orange insulation, paint or tape at the weather head, CT connections, and all other termination.

7. The neutral shall be available in the instrument transformer enclosure for connection of the meter potential leads.

8. In unusual conditions contact your City representative.

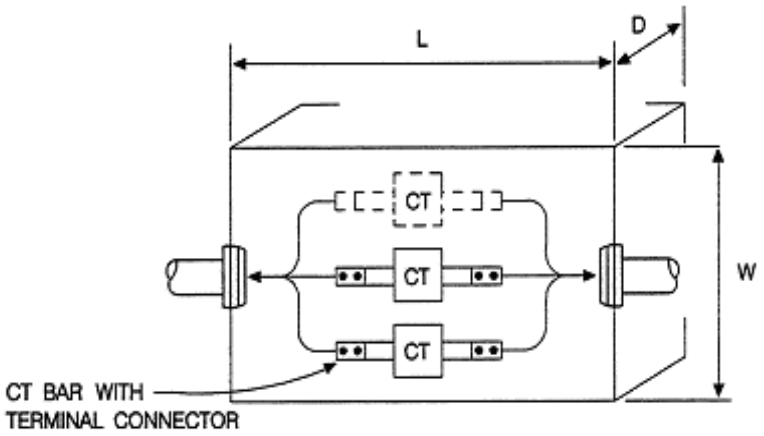
5.16.7 Instrument Transformer Cabinet

1) The fabrication requirements and minimum sizes for enclosures shall conform to NEC Article 373. The size of separate potential transformer (PT) enclosures, when required, is indicated in Note 4 below. The remaining information applies to the minimum sizes for current transformer (CT) enclosures.
2) Space requirements for wire bends as specified in NEC Tables 373-6(a) and 373-6(b) will affect these dimensions, depending on the wire exit arrangement. The customer has the option to use the CT size and spacing information shown in Appendix A-2, along with the NEC tables, to determine the minimum size required as directed by the NEC, or to use the simplified enclosure size reference shown on Appendix A-3 through A-6. The customer shall contact a City representative for approval of exceptions to these arrangements or when it is preferred to mount the CT's and PT's in the same enclosure.
3) The minimum CT enclosure depth will vary depending on entrance size as follows:

Entrance	Depth
1200 A or smaller	10"
Larger than 1200 A	12"

4) The minimum size of the PT enclosure shall be 22" wide x 22" high x 8" deep.
5) The top of instrument transformer enclosures shall be no more than 8 feet and the bottom no less than 18 inches above the floor. Working space in front of enclosures shall be in accordance with NEC Section 110-16.
6) A hook-on cover installed with the hooks at the top is acceptable if the box is 36 inches x 32 inches or smaller and the top of the enclosure is no more than 5 feet above the floor. Otherwise, a hinged cover (with hinges on the side of the box) is required, with a latch. If the enclosure is 48 inches or wider, the cover shall be split, and hinged at each side. All hinged covers shall be installed with sufficient clearance to open at least 90 degrees. All enclosures shall have provisions for sealing.
7) If located outdoors the enclosures shall be weatherproof.
8) Securing covers in place with multiple screws is not acceptable.
9) Current transformers and potential transformers may be mounted by the manufacturer in a customer's factory fabricated switch gear. Contact your City representative for details. Before fabrication, switch gear shop drawings shall be submitted to the appropriate City representative for review and approval of instrument transformer mounting details.

5.16.8 Instrument Transformer Cabinet Sizing



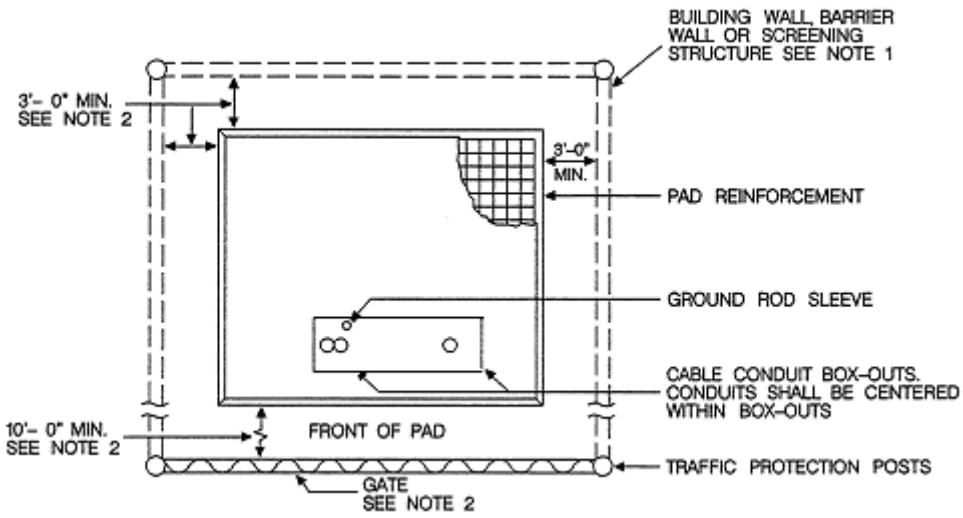
MINIMUM CT ENCLOSURE SIZE REQUIREMENTS (DIMENSIONS L, W, D)

WIRE SIZE	NUMBER OF WIRES PER TERMINAL CONNECTION				
	1	2	3	4	5
	L - W - D (INCHES)	L - W - D (INCHES)	L - W - D (INCHES)	L - W - D (INCHES)	L - W - D (INCHES)
4/0	29 - 26 - 10	30 - 26 - 10	32 - 26 - 10	----------	----------
250	32 - 26 - 10	32 - 26 - 10	33 - 26 - 10	35 - 26 - 10	----------
300	35 - 26 - 10	35 - 26 - 10	37 - 26 - 10	39 - 26 - 10	----------
350	39 - 26 - 10	39 - 26 - 10	41 - 26 - 10	43 - 26 - 10	----------
400	41 - 26 - 10	41 - 26 - 10	43 - 26 - 10	45 - 26 - 10	47 - 35 - 12◆
500	43 - 26 - 10	43 - 26 - 10	45 - 26 - 10	49 - 35 - 12◆	49 - 35 - 12
600	45 - 26 - 10	47 - 26 - 10	51 - 26 - 10	55 - 35 - 12◆	55 - 35 - 12
700	47 - 26 - 10	51 - 26 - 10	55 - 26 - 10	61 - 35 - 12	61 - 35 - 12
750	49 - 26 - 10	53 - 26 - 10	61 - 35 - 12◆	65 - 35 - 12	65 - 35 - 12

1) The above dimensions are for three CT's installations. Subtract 8" to obtain the W dimension for two CT's installations
2) Dimensions followed by a * may be reduced as follows if aluminum wire is used: reduce L by 2" and reduce W by 9". All other dimensions apply when aluminum or copper wire is used.
3) Two or three CT version of this arrangement may be installed horizontally (as shown) or vertically, or opposite hand. Rotate the page until the diagram fits the preferred arrangement.

5.17 PADMOUNT TRANSFORMER

5.17.1 Transformer Screening & Barrier



1) The installation of a screening or barrier structure is an optional feature that may be installed by the customer, or as required by your local governing authority, provided that the clearance limitations of notes 2 and 3 are accommodated.
2) A 3'-O" minimum clearance is to be maintained from pad sides and back, to the nearest structure. A 10'- 0" minimum clearance is to be maintained from the front of pad, to the nearest fixed structure. If a full length gate is installed, it shall be hinged and no closer than 3'-0" from pad front. Local government, fire protection, and building codes may require greater clearances.
3) All conduits shall extend beyond the pad and screening structure (if used) and the locations of the ends of primary conduits shall be identified.
4) When metallic conduit is utilized, customer shall install grounding bushings.
5) When necessary for traffic protection, set a 4" diameter concrete filled galvanized steel post 3'-O" diagonally from pad corner. Post shall be 7' long with a 3' concrete embedment.

5.17.2 Concrete Pad Specification 3 Phase Padmount Transformer

GENERAL

Scope of Work

The Contractor shall furnish all labor, materials, form work, equipment, and services required to complete all concrete pad work shown on the drawings specified herein.

Quality Assurance

Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
ACI 301 “Specifications for Structural Concrete for Buildings.”
ACI 318 “Building Code Requirements for Reinforced Concrete” Concrete Reinforcing Steel Institute, “Manual of Standard Practice.”

Concrete Testing Service:

The Contractor may be required to employ a testing laboratory acceptable to City to perform material evaluation tests and to design concrete mixes.

MATERIALS

Form Materials

Forms for Exposed Finish Concrete: Unless otherwise indicated, construct framework for concrete surfaces with construction lumber, plywood, metal, metal framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without deflection.

Reinforcing Materials

I. Reinforcing Bars (ReBar): ANSIIAS™ A 615 Grade 40, Deformed.
II. Welded Wire Fabric (WWF): ANSIIAS™ A 185, Welded steel wire fabric.
III. Supports for Reinforcement: Provide supports (including bolsters, chairs, and spacers) for positioning reinforcing bars and welded wire fabric in place.

Concrete Materials

Cement shall conform to the latest revised standard specification for Portland Cement, AS™ C 150, Type I, or standard specification for blended hydraulic cements, AS™ C 595.Concrete aggregates shall conform to the latest revised standard specification for concrete

aggregates, AS™ C 33. Use crushed limestone for all aggregates. Maximum coarse aggregate size shall be not more than 1 ½ inches. All mixing water shall be clean and free from deleterious amounts of acids, alkaline, or organic materials. Air-entraining admixtures for concrete shall conform to the latest revised standard specifications for air-entraining admixtures for concrete, AS™ C260.Calcium chloride not permitted. All other materials used in the concrete shall conform to current applicable AS™ specifications.

SUB GRADE PREPARATION

Material: All soft and yielding material and portions of the sub grade that will not compact readily when rolled or tamped shall be removed and replaced with suitable material.

Compaction: The sub grade shall be brought to a firm and unyielding condition.
Soil greater than/or equal to 95% Proctor density or 55 psi presumptive bearing value (pbv).
Soil should be compacted at or slightly above standard optimum moisture.

Moisture Barrier: A minimum 6 mil polyethylene film shall be placed on top of the sand leveling bed prior to pouring the concrete.

CONCRETE SPECIFICATIONS

General

All concrete shall have a minimum 28-day compressive strength of 3500 psi. Concrete shall be produced with a minimum cement content of 520 lb per cubic yard and an entrained air content of 7% by volume. Maximum allowable concrete slump shall be 4 inches. Where it can be shown that adequate strength, surface finish, and durability can be obtained on a consistent basis with mix designs other than those specified above, such designs may be used upon written approval.

Forms

Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work of finished structure.
Provide for openings, sink ages, chamfers and blocking in the structure.
Fabricate forms for easy removal without hammering or prying against concrete surfaces.

Placing Reinforcement

Clean reinforcement of loose rust, mill scale, earth, ice, and other materials which reduce or destroy bond with concrete. Accurately position, support, and secure reinforcement against displacement by form work, construction, or concrete placement operations.
Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers as required. Place reinforcement to obtain adequate concrete protection.

Concrete Placement
Pre placement Inspections: Before placing concrete the Contractor shall give City 48 hours notification. All items to be embedded will be exposed at the time of the inspection. City will not place a transformer on a concrete pad that has not been inspected. City has the right to request the Contractor to replace the pad due to failure to properly and timely request such inspection.

Temperature
When air temperature is between 85 F and 90 F, reduce mixing and delivery time from 1 ½ hours to 75 minutes. When air temperature is above 90F, reduce mixing and delivery time to 60 minutes. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures.
When air temperature has fallen to or is expected to fall below 40 F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 F and not more than 80 F at point of placement.
At any time the ambient temperature is expected to fall below 32 F, the concrete shall be immediately protected and maintained at a surface temperature of 40 F for a period of 7 days after placing.
Use of frozen materials or materials containing ice or snow is not permitted.
Concrete shall not be placed on frozen sub grade or sub grade containing frozen materials.
Deposit concrete continuously and as nearly as practicable to its final location to avoid segregation.

Consolidation
Consolidate placed concrete by mechanical vibrating equipment so that concrete is thoroughly worked around reinforcement and other embedded items.
Use equipment and procedures for consolidations of concrete in accordance with ACI recommended practices.
Excessive or over vibration will not be permitted.
Maintain reinforcing in proper position during concrete placement operation.
Bring slab surfaces to correct level with straight edge and strike-off. Use bull floats, darbies or hand floats to smooth surface free of humps or hollows. The finished slab shall be level.

FINAL INSPECTION

Finish Work
Apply non-slip broom-finish to exposed concrete. Seal concrete with a standard concrete sealer. Apply sealing compound to concrete as soon as final finishing

operations are complete (within two (2) hours). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Let concrete cure for 24 hours before removing forms without putting undo pressure on concrete that may cause chipping or cracking. Back fill and tamp around pad where applicable. All edges are to be finished with an edger.

5.18 REQUIREMENTS FOR METER MOUNTING EQUIPMENT

ENCLOSURE MATERIALS

Shall be steel (plated or made of galvanized steel) or aluminum. The finish shall be tough, non-fading and have long service life

INSULATING MATERIALS

Bus Support shall be high strength and track-resistant.
Sheet Insulation high dielectric strength and meets UL requirements for insulating materials

MOUNTING BASES

Shall be high impact strength, track-resistant.

SAFETY SHIELD BARRIERS

Shall be track-resistant.

CONNECTORS

Shall have high strength tops, single hex screw and floating pressure pad; shall be tin-plated, suitable for copper or aluminum wire; shall have a built-in anti-turn provision. Shall meet UL requirements for electrical connectors

JAWS

Shall be tin-plated electrolytic copper jaws rated 60 A and above shall be spring reinforced.

COVERS

Shall be lockable using a hasp-type lock.

INSTALLATION EASE

Components shall be factory-wired, door shall be removable for installation ease, terminals shall accept copper or aluminum wire for installation flexibility, and the enclosure shall have a broad range of concentric knock-outs to accommodate varied wiring needs.

METER MOUNTING EQUIPMENT IS NOT ACCEPTABLE IF

i. Designed for flush-mounting only
ii. Equipped with automatic by-pass
iii. Equipped with ring-type mounting cover
iv. Used for UG application when specifically manufactured only for overhead application.

MANUFACTURER
SINGLE POSITION SOC
150 AMP 4 TERMINAL
200 AMP 4 TERMINAL
200 AMP 4 TERMINAL
320 AMP 4 TERMINAL
200 AMP 5 TERMINAL
200 AMP 7 TERMINAL
MULTIPLE POSITION SO
150 AMP 2 POSITION
200 AMP 2 POSITION
200 AMP 3 POSITION
200 AMP 4 POSITION
TRANSFORMER RATED
5 TERMINAL
6 TERMINAL
8 TERMINAL
13 TERMINAL