

ELECTRICAL SERVICES NOTES

Quality fabrication or poor workmanship in any material, equipment, or installation will be considered justification for rejection. Materials and installation shall comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Where manufacturers provide warranties and guarantees as a customary trade practice, Contractor shall furnish to the State such warranties or guarantees. The location of conductors, conduit, junction boxes, duct cable, ground boxes, and electrical services are diagrammatic only and may be shifted by the Engineer to accommodate local conditions.

All material shall be new and unused. Alternate material equal to or better than those specified may be substituted with the approval of the Engineer. The Contractor shall contact the utility company for metering requirements and any additional requirements and shall comply with all utility company requirements.

All work, materials, services, and incidentals, whether or not specifically shown on the plans, which may be necessary to obtain electrical power and for a complete and proper electrical service installation as shown on the plans, shall be performed, furnished and installed by the Contractor except that the costs involved in extending primary lines to electrical service locations will be paid for under Force Account work. When primary line extensions are required, the Contractor shall consult with the appropriate utility company to determine costs and requirements and shall coordinate the utility company's work as approved by the Engineer.

Lugs on circuit breakers and contactors shall be large enough to accept branch circuit conductors sized as shown on the plans. Where branch circuit conductors are enlarged to reduce voltage drop beyond the capacity of lugs, the lugs shall be changed or distribution blocks shall be installed in the service enclosure to splice branch circuit conductors to the maximum wire size for which the circuit breaker or lighting contactor is rated to accept.

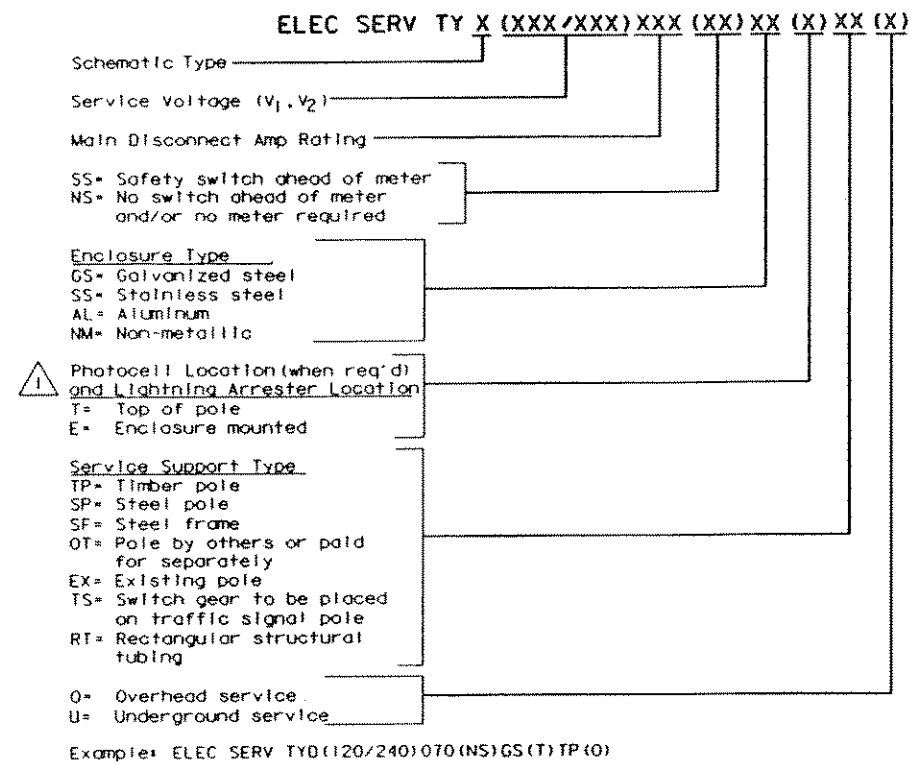
1. Safety switch. Shall be placed ahead of meter, when switch is required. The switch shall be of the heavy duty type, unfused, NEMA 3R enclosure and equipped with a solid neutral (S/N) assembly. Switch shall be UL listed. Switches shall be rated 480 VAC (min.) for 240/480V services and rated 240 VAC (min.) for 120/240V services. The Contractor shall modify switch to allow padlocking in the "on" position.
2. Meter. Where metering is required, utility company will provide the meter base. The Contractor shall install the meter base.
3. Service Assembly Enclosure for Type A, B, and C. Enclosure shall be sized to provide adequate wiring space in accordance with NEC. All external screws shall be type 302 stainless steel. All enclosures shall be fitted with equipment-mounting panels installed inside enclosure on collar studs or tapped bosses. Panels shall be 12-gauge steel or 0.10" thick aluminum, primed and painted white. All enclosure doors shall have stainless steel closure clamps and provisions for padlocking. Conduit entries into the top of enclosure shall have threaded hubs. Enclosure disconnect combination shall be UL listed and rated as service entrance equipment. Two 1/4" drain holes shall be placed in enclosure at opposite corners. All enclosures shall be permanently labeled "Danger High Voltage" on the front of the door, minimum one inch letters. The service pole descriptive code specifies that the enclosure shall be one of the following types.
 - a. GS: Galvanized steel enclosures shall be NEMA 3R-rated, constructed of 14-gauge galvanized steel, with piano hinged door, and drip shield.
 - b. SS: Stainless steel enclosure shall be NEMA 3R-rated, with piano hinged door, constructed of 14-gauge, type 304 stainless steel. All hardware, including hinge pin, shall be stainless steel.
 - c. AL: Aluminum enclosures shall be NEMA 3R-rated with piano hinged door, constructed from 0.08 inch thick aluminum. All hardware, including hinge pin, shall be stainless steel.
 - d. NM: Non-metallic enclosures shall conform to NEMA standard for Type 3R enclosures and shall be constructed of molded fiberglass, PVC, or other material approved by the Engineer.

* A two or three point heavy duty hinge with stainless steel hinge pins may be used for load centers when approved by the Engineer.
4. Main Disconnect. Main disconnect device shall be a fusible switch or circuit breaker, as shown on Electrical Service Data Sheet. Switch shall be UL and NEMA-rated Type HD (heavy duty), flange mounted or front mounted in the service assembly enclosure. Switch shall be two-pole, rate 240 volts or 480 volts as required. Switch shall have clips for Class R fuses. Circuit breaker shall be UL and NEMA-rated thermal-magnetic circuit breaker, flange-mounted or front mounted in the service assembly enclosure. Breaker shall be two-pole, (one-pole 480V for Ty, B), rated 480 volts or 240 volts as required. Circuit breakers shall have a minimum interrupting rating of 14,000 Amps. Voltage and amperage rating of switches and breakers shall be as shown elsewhere on Electrical Service Data Sheet. Switch and breaker handles shall be capable of padlocking in "On" and in "Off" positions. Main disconnect shall be operable from the outside of the enclosure and shall be interlocked to prevent the service assembly enclosure door from being opened with disconnect in the "On" position. The interlock shall have a manual override such that the main disconnect is capable of being turned "On" with the enclosure door open.
5. Lightning Arrester. Arresters shall be MOV-type secondary surge arresters rated 600 volts for 480V services and 175 volts for 120/240V services and shall meet ANSI, IEEE, UL, and NEMA Standards. Mounting brackets shall be provided for mounting the arresters inside the service assembly enclosures. Lightning arrester leads shall be run as straight and short as practical.
6. Fuse Blocks. Fuse blocks shall be rated 600 volts (min.) and shall accept a 13/32" x 1 1/2" fuse. Fuse blocks shall be furnished with integral insulated fusepuller and be suitable for mounting to the back panel of the enclosure. Fuse for 120/240 volt service shall be rated 250 volts (min.) and fuses for 480 volt service shall be rated 500 volts (min.). Fuses shall be 3 amp, dual-element (time-delay) fuses.
7. Control Transformer. Control transformer shall be rated 250 sealed VA and a minimum inrush rating of 1200 VA at 30 percent power factor. Voltage rating shall be 480-120 volts.
8. Control Station ("H-O-A" Switch). Control station shall be a maintained-contact, three position selector switch in a NEMA 1 enclosure. Switch shall be rated 600 volts and shall be fitted with "Hand-Off-Auto" legend.
9. Photo Electric Control. Photo electric control shall consist of a photocell, internal lightning arrester and relay mounted inside a weatherproof enclosure with standard 3-prong twist lock photocell plug and receptacle. The enclosure shall be made of poly-acrylic with clear acrylic window. Enclosure chassis shall be molded phenolic plastic. The photocell shall have a polyethylene gasket, and shall have a hermetically sealed cadmium sulfide cell. The arrester shall have an enclosed type expulsion arrester rated 2.0 kv sparkover with 10,000 amps follow-through. Relay shall be time delay type with normally closed contacts. Photo electric control shall be rated 1800 VA, 105-285 volts. Enclosure mounted photocells shall be the same as above except that the photocell shall be mounted inside the enclosure. The enclosure shall have two acrylic windows, or other material approved by the Engineer, one on each side of the enclosure. Each window shall be approximately one inch by 2 inches or as otherwise approved by the Engineer. The photocell shall be mounted in a position to receive light from one window.

The Contractor shall be responsible for proper operation of the photo-electric control. The Contractor shall move and/or adjust or shield the photocell from stray or ambient nighttime light or shall make any other adjustments required for proper operation. The photocell shall face North when practicable. The photocell shall turn on the illumination system at 1.0 (-) 0.5 footcandle and turn off the illumination system at two footcandles higher than turn on.
10. Lighting Contactor. Lighting contactor shall be a NEMA lighting contactor, two-pole, electrically held type designed to control high pressure sodium lighting loads, with silver alloy double break contacts rated at 480 volts or 600 volts.
11. Power Distribution Terminal Blocks. Power distribution terminal blocks shall be rated for 600 volts and shall be used for line side connections to branch circuit breakers where more than one circuit breaker is required. Lugs on blocks shall be properly sized for conductors being used. Only one conductor shall be placed under each lug.
12. Neutral/Ground Bus. Neutral/ground bus shall be a factory-made insulated, groundable bus with properly sized lugs for grounding and neutral conductors.

13. Branch Circuit Breakers. Unless otherwise shown on the plans, circuit breakers shall be the molded case thermal-magnetic type. Circuit breaker voltage shall be compatible with their use. Single pole circuit breakers mounted on high voltage (600V min.) insulating fabric shall be used for 480 volt type B service. Circuit breakers shall have a minimum interrupting capacity of 10,000 amps.
14. Circuit Breaker Panelboard. Panelboard shall be a commercial/Industrial type with bolt-on branch circuit breakers in a NEMA 3R enclosure. Panelboard for Type C service shall be a MLO (Main Lugs Only) three-wire single phase, S/N panelboard. Panelboards shall be UL-listed and shall meet Federal Specification W-P-115b, Type I, Class 1 requirements and shall have a minimum of 12 one-pole spaces. Tandem and half-width breakers will not be allowed. Conduit entries into the top of enclosure shall have threaded hubs. Panelboards shall have dead front trim.
15. Load Center. Load center shall be a circuit breaker panelboard rated 120/240 volts three wire, single phase, S/N in NEMA 3R enclosure with main breaker. Load center shall have a minimum rating of 70 amps and shall have space for a minimum of six full size breakers. Tandem and half-width breakers will not be allowed. Load centers shall be UL listed, and shall meet Federal Specification W-P-115c, Type I, Class 2 requirements. Load center shall have a threaded hub conduit entry for conduit entering the top of the enclosure. Load centers shall have dead front trim and shall be rated as service entrance equipment. Load center enclosures shall meet the requirements of Note 3 paragraph a, b, c, or d above. External operating handle shall not be installed. Closure clamps will not be required.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS-
ELECTRICAL SERVICES NOTES

ED(3)-93

REVISED	DATE	BY	REASON
5-93	10-93	1B	6
COUNTY		SECTION	JOB
ROCKWALL		104	03
SHEET		86	
DATE		10/1/93	
DRAWN BY		JW	
CHECKED BY		JW	
APPROVED BY		JW	