

Kingman Lake Havasu City

ELECTRIC SERVICE REQUIREMENTS

May 17, 2021

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INTRODUCTION

Contact the business office of UniSource Energy Services, hereinafter referred to as the "Company", for questions concerning application of these rules or for electric service requests. Questions can be answered by authorized representatives before customers and contractors purchase equipment or install wiring.

This information is not intended to take the place of the National Electric Code and its contents or to cover all local codes, but to give customers and contractors a guide to Company requirements in order to maintain safety for the workers and the public. The Rules and Regulations filed with the Arizona Corporation Commission allow the Company to refuse connection of a service or disconnect an existing service. This would occur when, in the Company's judgment, the customer's installation is not in proper operating condition or does not conform to these rules. Service may also be refused or disconnected if the customer's equipment or use thereof impairs the Company's equipment or service to other customers.

The characteristics of service the Company supplies in each case depend upon the size, nature and location of the load. These rules are not intended to be restrictive or burdensome, but rather that the requirements as a whole may serve to promote safety and expedite the establishment of electric service.

These rules will be revised or amended from time to time to conform to development and progress in the electrical industry as well as the Rules and Regulations that are filed with the Arizona Corporation Commission. It is the customer's and contractor's responsibility to verify that these rules are still applicable.

Note: For further information concerning electric service requirements, contact your local UniSource electric engineering department.

Kingman:	(928) 681-8969
Lake Havasu City:	(928) 505-7016
For billing questions or emergencies:	(877) UES-4YOU (877) 837-4968
Santa Cruz County:	(520) 761-7951

(See <u>http://www.tep.com/business/Construction/</u> for Santa Cruz County Electric Service Requirements.)

I. CITY/COUNTY INSPECTIONS

A. Inside Kingman, Lake Havasu, or Bullhead City Limits

Certain city ordinances prohibit the Company from supplying electric service to a customer until a certificate of inspection and acceptance, or "green tag" has been issued by the city inspector. Contact the City of Kingman Building department at (928) 753-5561, Lake Havasu City Community Development department at (928) 453-4149 or Bullhead building department at (928) 763-0124.

B. Outside City Limits

The Mohave County Planning and Zoning department will inspect the service entrance and issue an inspection tag or certificate of acceptance, or "green tag". Contact the Mohave County Planning and Zoning department at (928) 757-0903.

C. Inspection Tags

All inspection tags must be completed and approved by the appropriate authority, before accepted by the Company.

II. TEMPORARY AND PERMANENT SERVICE

A. Temporary Service

Temporary service will be charged the applicable estimated charges for the installation and removal cost of the facilities. Payment is nonrefundable. Permanent service connections will receive priority over temporary service. Temporary facilities will remain in service for a maximum of two (2) years.

B. Questionable Permanency Service

Questionable permanency will be charged the applicable estimated charges for the installation and removal cost of the facilities. If permanency is attained within five years, payment is refundable; otherwise, it is non-refundable. If the service remains beyond five years, the removal cost portion will be refunded. Permanent service connections will receive priority over questionable permanency service. Examples of questionable permanency services include such speculative ventures as mining, farming, and irrigation wells.

C. Permanent Service

Permanent Service is a service which, in the opinion of the Company, is of permanent and established character. A free extension allowance up to 550 feet is provided to permanent residential homes.

D. Permanent Residential Home Classification

In order to qualify for the line extension allowance, a permanent residential home should have the following characteristics: It is the first line of service; has a livable area of 400 square feet or greater with separate living quarters; have a water connection with plumbing, sewage or septic system; and a residential building permit was obtained with County or City.

The following structures <u>do not</u> qualify for the line extension allowance: second line of service; recreational vehicles; Park models smaller than 400 square feet and/or less than 10 feet in width; vehicle and RV garages; Tuff sheds and storage sheds; workshops; horse barns; or other accessory structures.

For any deviations, field verification by the Company is required.

E. Application Changes

The Company reserves the right to charge customers any additional costs incurred by Company when a customer makes changes to the original electric service application without notifying the Company (UniSource Electric Engineering Department in your area) prior to construction. Charges may include costs associated with re-engineering, lost Company construction crew time, and material re-stocking expenses.

III. OVERHEAD SERVICES

A. Service Connection

The usual method of connection from the Company's distribution system to the customer's service entrance conductors is by an overhead service drop from the Company's pole to the customer's building or service support. A building or other structure shall be supplied by only one service.

B. Point of Attachment

The Company designates the point of attachment of the service drop on the customer's building or service support at the most practical location accessible from the Company's facilities.

C. Service Mast

The service mast shall be rigid metal conduit and have a minimum diameter of 1.5 inches for a 100 amp panel, 2 inches for a 200 amp panel, and 3 inches for a 400 amp panel. The mast shall not exceed 4 feet above or be less than 2 feet above the roofline, except as approved by the Company. (See Specification G.)

D. Vertical Clearance

The point of attachment to a building or service support shall be so located that the bottom wire of the service drop is not less than the clearances specified in this section, nor more than 25 feet above finish grade. In addition, the attachment shall be so located to provide clearances at the building as follows:

1.	Vertical clearance over roofs of buildings,	8 feet
	where permitted, with prior approval of the	
	Company.	

2.	Horizontal clearance to building openings such	3 feet
	as windows, doors, porches, fire escapes or	
	similar locations.	

- 3. Telephone service drop, radio or television 2 feet lead-in, etc.
- 4. Rainspout, gutter, vent pipe or ventilator 1 foot opening.

E. Service Drop Clearance

The bottom wire of a service drop, at the lowest point in the span, shall have the following minimum clearances. If clearances cannot be obtained, the customer may be billed for a mid-span pole:

1.	Public roads, streets, alleys, etc.	18 feet
2.	Walkway or space accessible to pedestrians only.	10 feet
3.	Private driveway to residence, garage, or over parking lot, excluding trucks	12 feet
4.	Drive to and over commercial parking lot or areas subject to truck traffic.	18 feet

F. Service Attachment and Anchorage

Where building construction does not lend itself to satisfactory anchorage for the service bracket, the customer shall install additional reinforcement to support the service drop attachment.

G. Swimming Pool Clearance Requirements

Service drop conductors shall not be installed above a swimming pool or surrounding area extending 10 feet horizontally from the pool edge, diving structure, and observation stands, towers, or platforms. (See service Specification N.)

IV. UNDERGROUND SERVICE

A. Residential

- 1. The Customer, at their own expense, will provide the necessary trenching, conduit, conduit installation, backfill, landscape restoration and paving and will also furnish, install, own and maintain termination facilities on or within the building to be served in accordance with UNS Electric Inc.'s current Rules and Regulations for Electric Service on file with and approved by the Arizona Corporation Commission.
- 2. Customer shall provide and install underground service conduit per Company specifications according to the following and including Specification B.
 - a. Conduit size requirements:

100 AMP and 200 AMP Panels

Minimum* 2 ¹/₂ inch conduit

*2 ½ inch x 2 inch swedged reducer, bell to plain end, may be used at conduit connection to panel when panel does not accept 2 ½ inch conduit.

320 AMP and 400 AMP Panels

Minimum* 3 inch conduit

*Contact your local UniSource Electric Engineering Department for exact conduit sizes with 320 AMP and 400 AMP applications.

- b. All exposed conduit shall be IMC, RMC, or Schedule 80 PVC. IMC and/or RMC below ground level shall be wrapped with protective tape.
- c. Conduit run from panel to ground shall be free of bends or sweeps, and the total of all sweeps between outlets shall not exceed 270° or the equivalent of three 90° sweeps. All sweeps shall have a minimum 24 inch radius with no sweeps installed back-to-back.
- d. Customer provided conduit connection to Company facilities:
 - 1) Conduit shall be free of any and all debris. Pull string shall be installed in all conduit runs, and conduit shall be taped or capped.

- 2) Conduit runs from Company facilities:
 - Customer shall direct trench and conduit to secondary side of Company transformer.
 - Customer shall not dig within 2 feet of Company facilities unless Company personnel are present.
 - Customer shall provide sufficient amount of Schedule 40 conduit, including 90° sweeps with minimum 24 inch radius, to stub into the facility.
- e. Trench and conduit shall be inspected by Company **prior to backfilling**. Customer shall notify Company when ready for inspection and allow Company two (2) business days prior to backfill. Backfill material shall be available at time of inspection.
- f. Service lines not installed to Company specifications may be subject to a charge for repair or replacement at actual cost incurred, in accordance with UNS Electric Inc.'s current Rules and Regulations for Electric Service on file with and approved by the Arizona Corporation Commission.
- g. Customer shall be responsible for contacting Arizona 811 (1-800- STAKE-IT or 1-800-782-5348) and for securing all necessary permits required by local municipalities and/or governing bodies.

B. Commercial

- 1. The customer shall furnish all trenching, bedding, backfill, conduit, <u>underground</u> <u>cable</u>, connecting lugs, and installation. (See Specification C.)
- 2. Minimum depth of any service is 2 feet with rock-free soil or sand backfill, installed 6 inches above and below the service conduit.
- 3. All underground secondary from the Company's equipment to the service entrance shall be in conduit with a maximum of eight conduits.
- 4. All underground services will be maintained by customer at customer's expense.
- All transformer pads shall be constructed according to company specification. The Minimum clearance around transformers shall be 3 feet on the sides and back with 15 feet working space in front (See Specifications O & P)

V. OTHER SERVICE REQUIREMENTS

A. Voltages Available

- 1. For single-phase service, the Company will normally supply 120/240 volts. Other voltages may be available upon request and approval by the Company.
- 2. The following voltages are available for three-phase Commercial service:
 - a. Four-wire, 120/208 volts.
 - b. Four-wire, 277/480 volts.
 - c. Three-phase primary service is available upon request and approval by the Company.
 - d. Customer shall contact Company prior to project design to determine service voltage availability.

B. Service Panels

All meter and main disconnect device locations require Company approval. The Company will supply the meter, and if necessary, current transformers. Customer will provide and install the meter socket, current transformer cabinet, and a main disconnect. The mounting height of the meter socket shall be between 4 feet and 6 feet. The meter and disconnect shall be located outside the building and accessible to Company personnel. Service panels must be EUSERC approved and meet Company specifications. No panel less than 100 amp rating is accepted.

1. The following are available for Commercial three-phase, four-wire service (three-phase, three-wire will not be accepted on new service installations):

a. 120/208 volts 100-200 AMPS	7-terminal Safety socket
b. 277/480 volts 100-200 AMPS	7-terminal Safety socket
c. 120/208 volts over 200 AMPS.	13-terminal socket with test switch and CT's required
d. 277/480 volts over 200 AMPS	13-terminal socket with test switch and CT's required
(For CT Installation Visit <u>https://www.tep.com/wp-c</u>	ontent/uploads/2018/02/SR-422.pdf)
e. 277/480 volts over 2000 AMPS.	Contact Company

f. 120/208 volts over 3000 AMPS Contact Company

- 2. Unmetered conductors shall not be in the same enclosures as metered conductors.
- 3. For more information on what service equipment is acceptable or unacceptable, please contact UniSource Energy Services.

C. Multiple Meters at One Location

- 1. Where the installation requires more than one meter for service to the premises, each meter panel shall be permanently marked (not painted) by the contractor or customer to properly identify the portion of the premises being served.
- 2. The identification shall be the same as the apartment, office, etc. served by that meter socket. The identifying marking placed on each meter panel shall be impressed into or raised from a tag of aluminum, brass, or other approved non-ferrous metal with minimum ¼ inch-high letters. This tag must be riveted to the meter panel. The impression must be deep enough to prevent the identification(s) from being obscured by subsequent painting of the building and attached service equipment.

The Company may require the assistance of the customer and/or the customer's contractor to open the apartments at the same time the meters are set, in order to verify that each meter socket actually serves the apartment or the office indicated by the marking tag.

D. Maximum Starting Horsepower

The maximum allowable horsepower for across the line starting is:

- 1. Single-phase..... 10 HP

VI. GROUNDING

A. Grounding, Wire and Equipment

- 1. The customer's wiring and equipment shall be grounded in accordance with the latest edition of the National Electric Code and any other codes or regulations in effect in the area served.
- 2. Each service location shall have a ground electrode system. In Lake Havasu City, a 20-foot long section of minimum #4 bare copper imbedded in the building footings or foundation (underground is the typical ground required by Lake Havasu City building codes).

- 3. In all other locations, the preferred grounding electrode shall be an 8 foot x 5/8 inches copper or copper-weld rod driven into the ground. Check local jurisdiction for grounding electrode system requirements. A concrete-encased electrode (Ufer ground) is an acceptable alternative where permitted by the appropriate inspecting authority. The grounded service conductor (neutral wire) shall be grounded on the supply side of the service entrance protective equipment by means of a grounded neutral terminal bus.
- 4. The neutral terminal bus shall be connected to the grounding electrode system by means of a grounding electrode conductor. The grounding electrode conductor shall be sized according to NEC Section 250, but not smaller than #6 copper wire. All service entrance raceways, metal cases of all switches, circuit breakers, or load centers shall be securely bonded and connected to the common ground connection.

VII. TRENCHING REQUIREMENTS-UNISOURCE'S FACILITIES

A. Coordination

Company shall be responsible for coordinating, routing, and inspecting all trenches

B. Digging Clearance and Permits - Call Before You Dig

Customer shall be responsible for contacting Arizona 811 (1-800-STAKE-IT or 1-800-782-5348) and for securing all necessary permits required by local municipalities and/or governing bodies.

C. Final Grade

Customer shall establish grade and flag all property corners before Company will survey the job. In addition, easements, alleys, water retention areas, and streets must be graded within 6 inches of finished grade and grade stakes set before Company will begin construction. Customer shall reimburse Company for any costs incurred in adjusting facilities due to change in the final grade.

D. Separations from Obstructions

1. If electric service is to cross over or under an existing underground obstruction, a minimum 12-inch clear vertical separation is required.

2. If electric service is to run parallel to water, sewer, or gas lines, a minimum 60-inch horizontal separation must be maintained unless special permission is granted by Company. Only the above horizontal separation is acceptable; vertical separation is not an acceptable alternative. **Note**: Check with your local city or county codes for possible greater clearances.

E. Trench Bottoms

- 1. Trench bottoms must be smooth, flat, and without surface irregularities. Otherwise, a sufficient amount of bedding material shall be installed to provide the required surface. The bedding material shall not contain rocks larger than 1½ inch. The bedding material shall contain sufficient materials to fill all voids.
- 2. Trench bottoms shall be free and clear of debris or any decomposable (organic) material. Any change in the level of the trench bottom shall be made over sufficient distance to provide as gradual a change as possible.
- 3. When changing elevations with straight conduit sections, a change in elevation of the trench bottom shall not exceed 1 foot in 12 feet.

F. Trench Depths

Below are minimum covered conduit depth requirements unless otherwise specified by the Company. All depths must meet or exceed all applicable local codes and requirements. All depths are measured from finish grade to top of conduit. (See Specification A.)

Covered Depth - Inches	<u>County</u>	<u>KGM</u>	LHC/BHC
Primary conduit - See	53	53	36
Specification K.			
Secondary	42	42	36
Service on Private property	24	24	24
Service in Right of Way	42	42	36

G. Shading Material

Customer shall provide 6 inches of approved shading material around all electrical conduit. Shading material shall not contain rocks larger than 3/8 inch. Material shall contain enough fines to fill all voids. The soil shall be free of decomposable material. Material shall be supplied in locations at a maximum of every 15 feet along the trench on the opposite side from spoils and no closer than 2 feet from the side of the trench.

Note: If shading material is not contaminated by spoils, both shading material and spoils may be on the same side of the trench.

H. Backfill

- 1. Backfill within 6 inches above conduit shall be considered shading material and shall meet the above requirements.
- 2. Backfill within 6 inches above shading material shall not contain rocks larger than 3 inches in diameter. Trench run material may be used for the remainder of the backfill.

I. Unacceptable Backfill

- 1. Backfill containing foreign objects such as trash, cans, glass, decomposable material, or lava.
- 2. Backfill that contains concrete pieces larger than 3 inches in diameter or any asphalt material.
- 3. Any native soil that will not compact to achieve the required composition level (must have some fines).
- 4. Any backfill material not conforming to the requirements of the local government agency or other public regulatory agency.

J. Compaction

Backfill shall be compacted to 95% of maximum density as defined by ASTM D-6938 (formerly D-2922 and D-3017). Acceptable compaction methods are hand-tamping with pneumatic or vibrating equipment, and/or jetting or irrigation-style flooding of each backfill lift (each backfill lift not to exceed 12 inches). Vehicular-mounted tamping equipment or wheel rolling is not acceptable. Irrigation-style flooding must be controlled so that soil erosion of the shaded material does not occur in the trench. The Company reserves the right to check soil compaction through the use of a certified laboratory.

K. Inspection of Customer's Work

The Company reserves the right to inspect all and every part of the customer's work during or after completion of installation of conduit, trenching, trench bottom, shading, backfill, or compaction. If all or any part of the work does not meet Company's specification, the customer, at customer's own expense, must make corrections. The Company, at the customer's request, may perform the corrective action at the customer's expense. Neither inspection of the work by the Company nor lack of same shall relieve customer of customer's responsibility to provide and perform the work per Company's specifications.

VIII. GUIDE FOR SOLAR INSTALLATIONS

For your protection it is recommended that you obtain quotes from multiple installation companies in your area to ensure you are getting a fair price. State law requires Utility Approval of Grid-Tied Solar and the local Permitting Authorities will not issue a permit without proof of Application Approval from UniSource. Please make sure to receive UniSource approval before purchasing any system equipment, as size limits, and certain conditions, may require upgrades to the utility system at the customer's expense.

A. Technical Requirements and System Size Limits

All systems over 10 kWAC will require the installation of a dedicated transformer at the customer's expense, and smaller system sizes may require upgrades, at the customer's expense, when there are other Solar Systems on the same transformer. Contact the UniSource Energy Services department at 866-467-1229 or <u>pvtech@uesaz.com</u> to find out if a system upgrade will be required.

B. Equipment

Solar Installations require a load-break, visible air gap, gang operated, AC Disconnect that can be locked in the OFF position. The AC Disconnect will need to be installed between the Production Meter socket and the Customer's Load Center. A Production Meter Socket is also required, and will need to be installed between the Inverter output and the AC Disconnect. Specific labeling must be installed for protection of UniSource personnel, in addition to any required NEC labels. The Production Meter Socket, AC Disconnect, and the Billing Meter must all be within 10 feet and visible of each other. Please note that this guide does not encompass all details and requirements for a Solar Installation, and it is highly recommended that you contact us for more information.

C. How to Apply

- 1. Request a New Installer's Packet at <u>renewables@uesaz.com</u>
- 2. Email the completed packet to <u>renewables@uesaz.com</u>
- 3. Within a few days you will receive an email to setup a password for your PowerClerk Account.
- 4. Login to your account at <u>https://unsedg.powerclerk.com</u>
- 5. Click the New Application button, complete the form, and submit with the required documents attached.

For more information or assistance, please contact us at 866-467-1229 or <u>renewables@uesaz.com</u>

IX. SPECIFICATIONS

The following pages display specific details for your convenience:

A - TYPICAL SERVICE TRENCH DETAIL



B - RESIDENTIAL UNDERGROUND SERVICE



C - COMMERCIAL UNDERGROUND SERVICE



D - UNDERGROUND PERMANENT SERVICE PEDESTAL





E - UNDERGROUND TEMPORARY OR MANUFACTURED HOME SERVICE PEDESTAL



F - OVERHEAD TEMPORARY OR MANUFACTURED HOME SERVICE POLE

THESE MINIMUM CLEARANCES APPLY TO THE LOWEST POINT OF SERVICE DROP SAG. RESIDENC 0 12' MIN 10' MIN. PRIVATE 12' MIN. V DRIVEWAY OUTER LIMITS OF C. OUTER LIMITRAFFIC, VEHICULAR ROADWAY VEHIC OR ROADWAY CENTERLINE 18' MIN. FIGURE 1 OR 2' MIN. 4' MAX t RESIDENCE – 4' MAX. 10' MIN. 18' MIN. 0 4' MIN. 6' MAX. AREAS ACCESSIBLE TO ROADS, STREETS, ALLEYS, AND PEDESTRIANS ONLY OTHER AREAS SUBJECT TO FIGURE 2 TRUCK TRAFFIC REVISIONS DATE NAME APPROVED RESIDENTIAL SERVICE SPECIFICATIONS UniSourceE TITLE CHANGE RAC 6/2/10 GMK **RESIDENTIAL OVERHEAD** PED. CLEARANCE 10/19 GMK SERVICE CONDUCTOR 7 SERVICES CLEARANCES ilename- RES-CLR

G - RESIDENTIAL OVERHEAD SERVICE CONDUCTOR CLEARANCES

H - COMMERCIAL OVERHEAD SERVICE CONDUCTOR CLEARANCES





J - ELECTRIC AND GAS METER SEPARATION DETAIL



24" FINISHED GRADE ջիներ արիկալ արիկալ արիկալ արի <u>diphdic debt debtdie debt.</u> 18" ARNING COMPACTED BACKFILL TAPE OTHER UTILITIES (TELCO, CATV, ETC.) 60" 3/8" MINUS OR PLANTING SAND 12" COMPANY OWNED PRIMARY AND SECONDARY CONDUITS 6" BEDDING (IF REQUIRED, EXTENDS TRENCH DEPTH) NOTES: 1. OSHA STANDARDS FOR TRENCHING MUST BE MET. 2. CUSTOMER IS RESPONSIBLE FOR ALL TRENCHING, SHADING, COMPACTION AND BACKFILL. 3. WATER, GAS AND SEWER LINES MUST BE IN A SEPARATE TRENCH OR MAINTAIN A MINIMUM 5 FOOT SEPARATION. 4. COMPANY SHALL INSPECT TRENCH PRIOR TO BACKFILL. CUSTOMER TO ENSURE SHADING IS TO COMPANY SPECIFICATIONS AND WARNING TAPE IS INSTALLED AT 5. PROPER DEPTH AND HAND SHADED PRIOR TO BACKFILL. 6. IF ONLY SECONDARY CABLE IS TO BE INSTALLED, TRENCH DEPTH MAY BE REDUCED TO 42". REVISIONS DATE NAME APPROVED SERVICE SPECIFICATIONS GMK RAC 5/4/10 DISTRIBUTION PRIMARY

K - DISTRIBUTION PRIMARY AND SECONDARY TRENCH DETAIL

UniSource ADD BEDDING, UPDATE NOTES AND SECONDARY SERVICES TRENCH DETAIL ilename-P-TRENCH

L - CURRENT TRANSFORMER CABINET SPECIFICATION 600 AMPS OR LESS





M - 320 AMP, 120/240V, THREE-WIRE SINGLE PHASE SERVICE PANEL

N - CLEARANCES FROM POOL STRUCTURES





Filename-TFMRPAD75_500



Filename- TFMRPAD750_2500