

LINE SIDE TAPS — INSTALLATION GUIDELINES

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Line Side Tap Overview

An installation of Alternate Energy (AE) systems for residential applications covers a wide geography and a number of jurisdictions, both for electrical inspectors as well as serving utilities. To maximize the benefit of the installation, the connection to the grid power is being planned on the line side of the main service disconnect (typically a circuit breaker) between the electric utility meter and the service main breaker onto the service entrance conductors as permitted by National Electrical Code (NEC) 230.82(6). The existing meter and main panelboard enclosure is presently certified (UL Listed) and this line side tap has been deemed by some serving utilities and local electrical inspectors to be a modification to the certified equipment as provided from the main panelboard manufacturer. This document covers only line side tap connections that are made on the customer side of the service. The meter enclosure will only have the service conductors going from the customer's meter socket terminals to the customer's equipment. The following are three typical installation concepts that might be used.

Line Side Tap 1 (LST1) – Line Side Tap connection is made directly to the existing Service Entrance Conductors inside the customer side of the service panelboard enclosure.

- Utilize certified connector such as an Insulation Piercing Tap or equivalent certified splicing connector rated for the appropriate conductor sizes and voltage.
- The main conductor is the existing or replaced unspliced service entrance conductor between the meter and the service main breaker.
- The tap conductor is from the (AE) AC disconnecting means.
- The tap installation would be inside the existing certified panelboard enclosure where sufficient space per the NEC permits the installation.
- See layout in the **(LST1) drawing** on last page as an example.

Line Side Tap 2 (LST2) – Line Side Tap connection installed inside an external certified Type 3R rated junction box.

- Utilize certified Insulation Piercing Tap connectors or equivalent certified splicing connector rated for the appropriate conductor size and voltage.
- New certified properly rated unspliced main Service Conductors will be installed between the Utility Meter load side terminals and the Main Service Breaker through the junction box.

- The piercing connectors or equivalent splicing connector will be used to tap into the (AE) tap conductors to the service entrance conductors in a new certified Type 3R junction box.
- The tap conductor is installed from the (AE) AC disconnecting means.
- See layout in the **(LST2) drawing** on last page as an example.

The LST2 diagram on the last page provides a partial detail of the tap connection. The position of the junction box will vary depending on the panel configuration and if the service is from overhead or underground to the meter.

Line Side Tap 3 (LST3) – Line Side Tap connection installed to the bus between the meter and service main breaker.

- Install connections to manufacture supplied and identified termination point. Existing holes in the bus may or may not be used for connection of a terminal.
- New connectors shall not be attached to existing bolted bus connection point without a review.
- A review and approval must be conducted if a hole is to be drilled into the bus to add a terminal.

UL Field Evaluation Process

Client Submittal Requirements:

1. Provide the design drawings detailing the installation from the Alternate Energy (AE) AC disconnect to the main service panelboard. Include the tap into the existing service entrance conductors. The drawing shall include the following:
 - a. Main service entrance conductor size
 - b. (AE) AC disconnect specifications (minimum 60 Amp rated per NEC 230.79(D))
 - c. Tap conductor size (minimum 6 AWG copper or 4 AWG aluminum per NEC 230.42(B) and 310.15(B)(7) or 310.15(B)(16))
 - d. Conductor routing in raceway and inside panelboard including the grounded circuit conductor (neutral) per NEC 300.3 and 250.24(C).
 - e. Tap conductor length limitation of 10 feet per NEC 705.31
 - f. Grounding and bonding connections from the (AE) AC disconnect connection to the service panelboard, and grounding electrode conductor as applicable.



2. Provide the method proposed to complete the tap installation and specify the tap connector product to be used.
3. Provide the bill of materials for the tapping system to be used and all specifications including applicable torque values.

UL Inspection Process:

The overall UL Field Evaluation process and documentation is outlined below:

1. LST Design:
 - a. Inspection will be made of the assembly including the tap connections, (AE) tap conductors, and the torqueing of the insulation piercing connector or equivalent tapping connector with a calibrated torque wrench / screwdriver.
2. LST 2 Design:
 - a. Inspection will be made of the assembly including the additional junction box, tap connections, (AE) tap conductors, and the torqueing of the insulation piercing connector or equivalent tapping connector, and the replacement service entrance conductor termination points with a calibrated torque wrench / screwdriver.
 - b. Inspect junction box for correct sizing per NEC 314.28 and suitable environmental rating.

General Field Evaluation Requirements for all Line Side Taps:

- 3 The main conductor shall be verified as having a thermoplastic (i.e. THWN, etc.) or thermoset (i.e. XHHW) insulation. AWM conductors will be investigated for suitability.
4. If the service entrance (main) conductor is replaced, the conductor shall have the proper ampacity.
5. The tap conductor will be confirmed as being a certified building wire identified in Chapter 3 of the NEC with a thermoplastic or thermoset insulation.
6. Any exposed end of the tap conductor shall be covered with a certified electrical insulating tape or equivalent means to provide suitable electrical insulation over exposed conductors as per the tap manufacturer's installation instructions.
7. Verify correct use of the certified tap device
8. Verify wiring space is provided in accordance with applicable NEC section and that wire bending space is provided.

9. Document the inspection points for the report.
10. A serialized UL Evaluated label will be applied to the service panel enclosure inside the cover near the panelboard nameplate by UL Field Engineer if the Line Side tap installation is found to be in compliance.
11. Complete a letter report documentation including:
 - a. Name of residence owner
 - b. Address of residence including street, city, state
 - c. Client job number
 - d. Client installation electrical permit number
 - e. Type of installation used for making the tap connection
 - f. Manufacturer's nameplate (mfg., model no.) of service panel where available
 - g. Inspection results
 - h. UL Evaluated label serial number
 - i. Photograph of overall installation and detail photograph of tap installation
 - j. Name of UL Field Engineer
 - k. Date of UL inspection

Unless requested in the job request scope of work, the UL inspection will not include any (AE) panel(s) or other (AE) source, DC conductor, DC disconnect, inverter, raceways (AC or DC), AC disconnect, overcurrent protection of (AE) system, grounding or bonding of (AE) components, (AE) system, or raceways. These items are typically the responsibility of the local inspection authority (AHJ) to review.

For more information or questions to UL on this procedure please contact the following:

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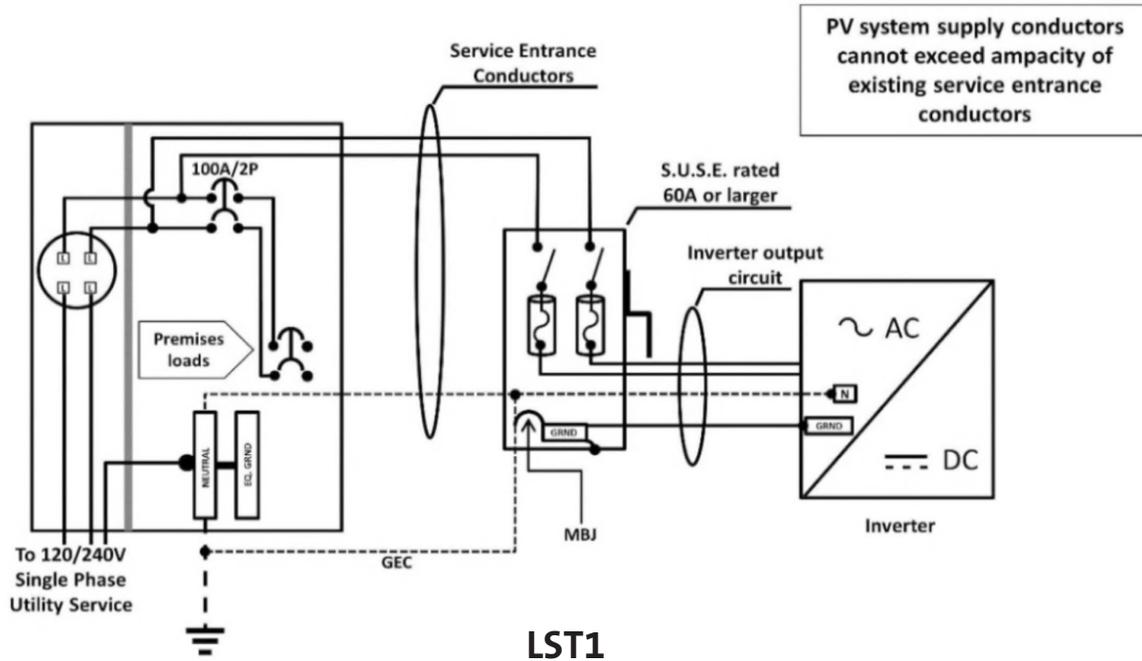
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Example Drawing Showing Option 1



Example Drawing Showing Option 2

