



Oncor Application for Interconnection of Distributed Generation

Small Induction and Non-Certified Systems (05-10-2023)

This application is for non-certified inverter systems or smaller induction generator systems that are not certified to meet the testing requirements of IEEE-1547 2018 or applicable UL-1741 certifications. For synchronous generators, please utilize the application, Generation Paralleling Longer than 100 milliseconds or Generation Paralleling Less than 100 milliseconds. Please contact Oncor for interconnection request of large induction generators over 50 hp single phase or 100 hp three phase.

General Process

- Oncor receives completed application and secures Impact Study Fee.
- Oncor prepares and submits to customer Impact Study.
- Oncor secures funding for any required system impacts.
- Oncor prepares, submits and secures an Interconnection Agreement with customer.
- Oncor schedules and completes any required system changes.
- Oncor reviews customer preliminary and final relay test reports.

| Application Check List | Yes | No |
|---|-----|----|
| Interconnection Application 6.3 (tariff document) | | |
| Pre-Interconnection Study Fee | | |
| One-line diagram | | |
| Relay functional diagram | | |
| Layout sketch (showing the Point of Common Coupling (PCC) in relation to your generation) | | |
| Preliminary relay settings | | |

Study Fee

The Distributed Generation Pre-Interconnection Study Fee schedule states the terms, “network” and “pre-certified.” ***Pre-certified*** typically refers to UL-1741 for inverter technologies and ***network*** refers to downtown grids found in Dallas and Fort Worth. This application is normally classified as “***Not pre-certified.***” Use this schedule to obtain the study fee amount.

Email Application Submissions to: dg@oncor.com

(Email submittals larger than 8MB will not be delivered through Oncor servers)

**Tariff for Retail Delivery Service
Oncor Electric Delivery Company LLC**

6.3 Agreements and Forms

Applicable: Entire Certified Service Area
Effective Date: May 1, 2023

Sheet: 3
Page 2 of 3
Revision: Five

Application for Interconnection and Parallel Operation of Distributed Generation

Return Completed Application to:

Oncor Electric Delivery Company LLC
Attention: Distributed Resource Specialist
1616 Woodall Rodgers Fwy
Dallas, TX 75202-1234

Customer's Name: _____

Address: _____

Contact Person: _____

Email Address: _____

Telephone Number: _____

Service Point Address: _____

Information Prepared and Submitted By: _____

(Name and Address) _____

Signature _____

The following information shall be supplied by the Customer or Customer's designated representative. All applicable items must be accurately completed in order that the Customer's generating facilities may be effectively evaluated by Oncor (Company) for interconnection with the utility system.

GENERATOR

Number of Units: _____

Manufacturer: _____

Type (Synchronous, Induction, or Inverter): _____

Fuel Source Type (Solar, Natural Gas, Wind, etc.): _____

Kilowatt Rating (95 F at location) _____

Kilovolt-Ampere Rating (95 F at location): _____

Power Factor: _____

Voltage Rating: _____

Number of Phases: _____

Frequency: _____

Do you plan to export power: _____ Yes _____ No

If Yes, maximum amount expected: _____

Do you wish Oncor to report excess generation to your REP? _____ Yes _____ No

Pre-Certification Label or Type Number (e.g., UL-1741 Utility Interactive or IEEE 1547.1): _____

Expected Energization and Start-up Date: _____

Normal Operation of Interconnection: (examples: provide power to meet base load, demand management, standby, back-up, other (please describe)) _____

One-line diagram attached: _____ Yes

For systems not using pre-certified inverters (e.g., inverters certified to UL-1741 or IEEE 1547.1), does Oncor have the dynamic modeling values from the generator manufacturer? _____ Yes _____ No

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If not, please explain: _____
(Note: For pre-certified equipment, the answer is Yes. Otherwise, applicant must provide the dynamic modeling values if they are available.)

Layout sketch showing lockable, "visible" disconnect device is attached: _____ Yes

Authorized Release of Information List

By signing this Application in the space provided below, Customer authorizes Oncor to release Customer's proprietary information to the extent necessary to process this Application to the following persons:

| | Name | Phone Number | E-Mail Address |
|------------------------------|------|--------------|----------------|
| Project Manager | | | |
| Electrical Contractor | | | |
| Consultant | | | |
| Other | | | |

Customer represents and warrants that it does not meet any of the ownership, control, or headquarters criteria listed in Lone Star Infrastructure Protection Act, Chapter 113 of the Texas Business and Commerce Code, as added by Act of June 18, 2021, 87th Leg., R.S., Ch. 975 (S.B. 2116) (relating to China, Iran, North Korea, Russia, and any other country designated by the Texas governor as a threat to critical infrastructure).

[COMPANY NAME]

[CUSTOMER NAME]

BY: _____

BY: _____

PRINTED NAME: _____

PRINTED NAME: _____

TITLE: _____

TITLE: _____

DATE: _____

DATE: _____

**Tariff for Retail Delivery Service
Oncor Electric Delivery Company LLC**

6.1.4 Discretionary Charges

Applicable: Entire Certified Service Area

Effective Date: May 1, 2023

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6.1.4.4 Distributed Generation

| | | |
|------|---|---------------|
| DD36 | <p>Distributed Generation Pre-Interconnection Study Fee Applicable to requests for studies that may be required and conducted by Company for the interconnection of distributed generation on the Company's delivery system.</p> <p style="text-align: center;">NON-EXPORTING</p> <p>A. 0 to 10 kW</p> <ol style="list-style-type: none"> 1. Pre-certified, not on network \$ 0.00 2. Not pre-certified, not on network \$ 144.15 3. Pre-certified, on network \$ 144.15 * 4. Not pre-certified on network \$ 144.15 <p>B. 10+ to 500 kW</p> <ol style="list-style-type: none"> 1. Pre-certified, not on network \$ 296.30 ** 2. Not pre-certified, not on network \$ 296.30 3. Pre-certified, on network \$ 296.30 * 4. Not pre-certified on network \$ 296.30 <p>C. 500+ to 2000 kW</p> <ol style="list-style-type: none"> 1. Pre-certified, not on network \$ 3,960.30 2. Not pre-certified, not on network \$ 3,960.30 3. Pre-certified, on network \$ 6,623.45 4. Not pre-certified on network \$ 6,623.45 <p>D. 2000+ kW</p> <ol style="list-style-type: none"> 1. Pre-certified, not on network \$ 6,927.85 2. Not pre-certified, not on network \$ 6,927.85 3. Pre-certified, on network \$ 9,591.00 4. Not pre-certified on network \$ 9,591.00 <p style="text-align: center;">EXPORTING</p> <p>A. 0 to 10 kW</p> <ol style="list-style-type: none"> 1. Pre-certified, not on network \$ 0.00 2. Not pre-certified, not on network \$ 144.15 3. Pre-certified, on network \$ 144.15 * 4. Not pre-certified on network \$ 144.15 <p>B. 10+ to 500 kW</p> <ol style="list-style-type: none"> 1. Pre-certified, not on network \$ 296.30 ** 2. Not pre-certified, not on network \$ 296.30 3. Pre-certified, on network \$ 296.30 * 4. Not pre-certified on network \$ 296.30 <p>C. 500+ to 2000 kW</p> <ol style="list-style-type: none"> 1. Pre-certified, not on network \$ 3,960.30 2. Not pre-certified, not on network \$ 3,960.30 3. Pre-certified, on network \$ 6,623.45 4. Not pre-certified on network \$ 6,623.45 <p>D. 2000+ kW</p> <ol style="list-style-type: none"> 1. Pre-certified, not on network \$ 7,458.30 2. Not pre-certified, not on network \$ 7,458.30 3. Pre-certified, on network \$ 9,591.00 4. Not pre-certified on network \$ 9,591.00 <p>* No cost for inverter systems less than 20 kW. ** No cost if generator supplies less than 15% of feeder load and less than 25% of feeder fault current.</p> | |
| DD37 | <p>Distributed Renewable Generation Metering Applicable to installation, upon request pursuant to Substantive Rule § 25.213(b), by Retail Customer or Retail Customer's Competitive Retailer, of metering equipment that separately measures both the Customer's consumption from the distribution network and the out-flow that is delivered from the Customer's side of the Meter to the distribution network. Equipment shall be installed within 30 days of receipt of request.</p> | As Calculated |

Supplement to Application 6.3 Induction and Small Non-Certified Systems



1. Owner of Generation Resource – Name for Interconnection Agreement

Before final approval of distributed resource interconnection will be granted, Oncor will require an Interconnection Agreement be signed. Please indicate for use in the Interconnection Agreement the name and type of entity who is the owner of the distributed resource:

| | |
|---|--|
| Legal Name of the Owner of Renewable System | |
| Legal Name | |
| Type of Entity | |
| DBA (if applicable) | |

Following are examples of names and types of entities:

| | |
|--------------------------|---|
| <i>XYZ Business Inc.</i> | <i>a Texas corporation</i> |
| <i>XYZ Company LLC</i> | <i>a Delaware limited liability company</i> |
| <i>City of XYZ</i> | <i>a Texas governmental agency</i> |
| <i>XYZ Business LP</i> | <i>a Texas limit partnership</i> |

2. Account ID and Address Information

| | | | |
|---|---|---------------------------------|----|
| New Service | | Yes | No |
| Is this application for a new service account? | | | |
| If Yes, then provide proposed service address | | | |
| Service Address: City, State, Zip | | | |
| If No, the please provide existing account information: | | | |
| Existing Service Accounts | | | |
| Please provide 17 digit Electric Service Identifier ESI ID: <i>(this can be found on your electric bill)</i> | Oncor Company Code (1 st 10 digits) | Premise ID# (last 7 digits) | |
| ESI ID – Oncor OR | 1044372000 | | |
| ESI ID – (formerly SESCO) | 1017699000 | | |
| Oncor Meter Number (optional if ESI ID not provided) | | | |
| Is this ESI ID for a temporary service? | Yes | No | |
| Service Address: City, State, Zip | | | |
| Correspondence: (if different) Mailing Address: City, State, Zip | | | |

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3. Oncor Delivery Voltage Information

| | | | |
|---|--------------------------|--------------------------|--------------------------|
| Please indicate the Oncor delivery voltage: | | | |
| <input type="checkbox"/> | 120/240, 1 phase, 3 wire | <input type="checkbox"/> | 277/480, 3 phase, 4 wire |
| <input type="checkbox"/> | 120/240, 3 phase, 4 wire | <input type="checkbox"/> | |
| <input type="checkbox"/> | 120/208, 3 phase, 4 wire | <input type="checkbox"/> | Other: |

4. Normal Operation of Interconnection

| | | |
|---|-----|----|
| Please describe your proposed method of operation (non-exporting, exporting, generation to provide back-up for reliability, peak shaving, etc. and schemes that trigger paralleling events: <i>Examples: "Non-exporting operation with paralleling" and "for paralleling during monthly testing of generation, paralleling to off-set energy purchased", etc.</i> | | |
| | | |
| System Paralleling Times | | |
| Is the application for continuous paralleling where generation is operating for extended periods of time (such as providing base load)? | Yes | No |
| If No, what is the estimated maximum paralleling transition time per event? What is estimated operating time per month? | | |

5. Relay Information and Protective Functions

Part A – Protective Functions Clearing Time and Points of Detection

| |
|--|
| Protective Functions, Clearing Time and Points of Detection |
| The protection function of the interconnection system shall detect the effective (rms) or fundamental frequency value of the phase-to-neutral voltage for single phase or wye-wye configuration installations. Detection shall be phase-to-phase when Oncor delivery configurations are delta. Clearing time is the time between the start of the abnormal condition and the distributed resource ceasing to energize the Oncor distribution system. |
| Oncor does not require tripping of the main breaker for systems where detection is at the PCC. Please indicate the tripping circuits on the relay functional diagram. |
| Voltages shall be detected at the <u>Point of Common Coupling</u> (PCC or commonly called the delivery point between Oncor and the customer) or may be <u>at the point of the distributed resource connection</u> when the aggregate capacity of the distributed resource system is less than 30 kW. |

| |
|--------------------------------------|
| Please describe the detection point: |
|--------------------------------------|

| | | |
|---|-----|----|
| Is the application for paralleling at the point of common coupling (PCC – commonly called point of delivery)? | Yes | No |
| If No, please describe the point of connection (s): | | |
| | | |

Part B – Required Relaying Elements Setting Guidelines

For small induction or inverter systems that are not certified to meet the requirements of UL-1741, normally over and under voltage and over and under frequency sensing is only required.

| Voltage Clearing Time (minimum required) | | | | |
|--|---------|------------|---------|-----------|
| | Step 1 | | Step 2 | |
| | Pick-Up | Timing | Pick-Up | Timing |
| Under-voltage (27)* | 90% | 30 seconds | 70% | 10 cycles |
| Over-voltage (59)* | 110% | 30 seconds | 116% | 10 cycles |
| * Per phase sensing is required | | | | |

| Frequency Clearing Time – One Step (minimum required) | | |
|---|------------|-----------|
| | Pick-Up | Timing |
| Under-frequency (81U) | 59.3 hertz | 15 cycles |
| Over-frequency (81O) | 60.5 hertz | 15 cycles |

Part C – Relaying Selection, VT, CT Information

| | | |
|--|----------|----------|
| If information is not provided on your relay functional diagram, please provide: | | |
| Relay Manufacturer | | |
| Relay Model Number | | |
| Voltage Transformers (VT's if applicable): | | |
| High Side | Low Side | Quantity |
| | | |
| Current Transformers (CT's if applicable): | | |
| | | |

Part D – Relay Functional Diagrams

Oncor requests relay functional diagrams to accompany this application. Example diagrams are included at the end of this application.

| Relay Functional Diagram Checklist for Induction Generators | Yes | No |
|---|-----|----|
| Does the diagram indicate high and low side voltages? | | |

| | | |
|---|--|--|
| Does the diagram show PT configuration symbols? (wye, delta, corner delta - if applicable)? | | |
| Does the diagram show (VT, CT) ratios and quantity (if applicable)? | | |
| Does the diagram show the tripping circuits (for Oncor required elements)? | | |
| Does the diagram show the transformer neutral resistor (if applicable)? | | |
| Does the diagram indicate the PCC (point of common coupling or point of delivery)? | | |
| Does the diagram show the incoming utility feeder point? | | |
| Does the diagram indicate the normal (open or closed) breaker position (N/O / N/C)? | | |

Part E – Relay Operation

| Relay Tripping Logic | | |
|--|--|----|
| | Yes | No |
| Will the Oncor interconnection relay <u>tripping logic</u> be enabled at all times? (Relay needs to be powered on at all times) | | |
| If No: | Please explain reasoning for why the <u>trip logic</u> is not enabled at all times: | |
| | What causes the <u>tripping logic</u> to become enabled? Oncor requires that the <u>trip logic</u> activate the tripping elements at least two seconds before the paralleling event begins to insure relay steady state operation. Please include the <u>scheme, sequence of events, and/or include logic variables in your description.</u> | |

| Relay Testing Agent Commissioning Logic |
|--|
| If the Oncor interconnection relay tripping logic is not enabled at all times then please explain the proposed scheme (or isolated test) to allow the relay testing agent the ability to verify the relay was in steady state operation. |

Part F – Proposed Relay Settings

Oncor requests preliminary relay settings for review prior to testing and commissioning. If settings are available, then please provide them with this application. If they are not available, then please provide an approximate date when they will be provided to Oncor.

| | |
|---|--|
| Estimated date planned to submit preliminary settings to Oncor: | |
|---|--|

| Relay Settings | | | Per Phase Sensing | |
|----------------|---------|--------|-------------------|----|
| Elements | Pick-up | Timing | Yes | No |
| 27 - Step 1 | | | Yes | |
| 27 – Step 2 | | | Yes | |
| 59 – Step 1 | | | Yes | |
| 59 – Step 2 | | | Yes | |
| 81O | | | | No |
| 81U | | | | No |

6. Generator Data

| | | |
|----------------------------|---|--|
| Generator Data Information | Generator Base (hp or KVA) | |
| Generating Quantity | Capacitors Starting or Run | |
| Manufacturer | RPM | |
| Model Number | Neutral Resistors (provide Ohm value) | |
| NEMA Design Code | Subtransient – Direct Axis X"d Reactance (if available) | |
| Voltage | Zero Sequence Xo Reactance (if available) | |
| FLA | | |

Control Power Description - Relay sensing for your system should be able to operate upon a loss of control voltage to the relay. Please explain how your system operates upon a loss of relay control power. If applicable, indicate the relay control voltage and source (battery or UPS) on the drawing.

7. Non-Certified Inverter Information (if applicable)

Please provide system specifics for non-certified system (not tested and approved to UL-1741)

| Qty | Inverter Manufacturer | Inverter Model Number | Power Rating (watts) | Inverter Voltage (VAC) | Single or Three Phase |
|-----|-----------------------|-----------------------|----------------------|------------------------|-----------------------|
| | | | | | |

| Other – Equipment Information (if applicable) | | |
|---|--------------|--|
| Manufacturer | Model Number | Rating / Voltage / Single or Three Phase |
| | | |
| | | |

8. Relay Testing and Relay Test Reports

An example form of a Relay Test Report is included at the end of this application. Unobjectionable relay test reports are required for final approval of the interconnection by Oncor.

| |
|--|
| Relay Testing Agent Requested Comments: |
| 1) Oncor asks the testing agent state in the comments section of the test report that the generator tripping device (breaker or contactor) was operated and that the agent witnessed the tripping of the generator disconnecting device. |
| 2) For installations utilizing <u>tripping logic</u> which is enabled and disabled, Oncor requests that the testing agent state the relay was in full active service when paralleling occurred or occurs. The testing agent should be able to confirm the relay was active before and during paralleling and state this in the test report comments. |

| |
|--|
| Relay Test Reports – An on-site relay test report from a certified testing agency will be required. Oncor has provided an example of a relay test report at the end of this application. |
|--|

| | |
|------------------------|--|
| Proposed Testing Date: | |
|------------------------|--|

| |
|---|
| Please provide information on who you plan on utilizing for this testing and when you expect this testing to occur. Oncor requests prior notification of the testing date in order to be able to witness the testing. |
|---|

9. Manual Disconnect Device, Layout, One-Line Sketch and Placards

Oncor’s interconnection requirements specify a manual disconnect device. The disconnect must have a visual break that is appropriate to the voltage level, be accessible to utility personnel, and capable of being locked in the open position.

For Interconnections at the PCC

Oncor requests that this visible AC disconnect be located on an exterior wall and within ten feet of the Oncor meter. If your visible AC disconnect is more than ten feet from the Oncor meter, then Oncor will request a site directory placard be installed on customer equipment beside the Oncor meter or where there is only an Oncor meter then on the Oncor meter base indicating the location of the visible AC disconnect. Customers requesting exceptions to this general rule will need to contact Oncor. An *Oncor Placard Guideline* is available upon request.

| |
|---|
| For Resource Connections Not Located at the PCC please describe disconnect devices: |
| |

Layout Sketch and One-Line Sketch Please submit a general Layout and One-Line Sketch of your facility with the emphasis of showing the relationship between Oncor metering, the visible lockable labeled AC disconnect, and the distributed resource. * Please do not use pictures for the layout sketch. If you use pictures, please use tracing paper to overlay the picture by tracing buildings, streets, etc. and prepare a “line type drawing.” Pictures are not legible after being scanned several times. These sketches are not required to show a high level of detail, but identify the components listed above. Generic examples of these sketches are provided at the end of this application for guideline purposes.

| Goal of Layout Sketch – | Yes | No |
|---|-----|-----|
| Did you use a picture for your layout sketch? (* see explanation above) | | X * |
| Did you identify the location of the <u>Oncor meter and Visible, Lockable, Labeled, Disconnect</u> and the generator? | | |
| Did you identify the address on the layout sketch? | | |
| Does your Layout sketch have the words written on the sketch that says “Visible, Lockable, Labeled, Disconnect?” | | |
| Is your “Visible, Lockable, Labeled, Disconnect” within ten feet of the Oncor meter? | | |
| If No, then did you provide placard language for a) <u>beside</u> or <u>on the Oncor Meter base</u> indicating the location of the VLLD as well as placard language for the VLLD? | | |

| Goal of One-Line Sketch | Yes | No |
|---|-----|----|
| Does your one-line diagram indicate the location of the <u>Oncor meter, the Visible, Lockable, Labeled , AC Disconnect</u> and the generator? | | |
| Did you identify the address on the layout sketch? | | |

10. Caution or Warning Placard Language

Part A – Labeling for Placard on Visible Disconnect

Please indicate the placard warning language you plan on utilizing on the visible, lockable, A/C disconnect: (or attach separately)

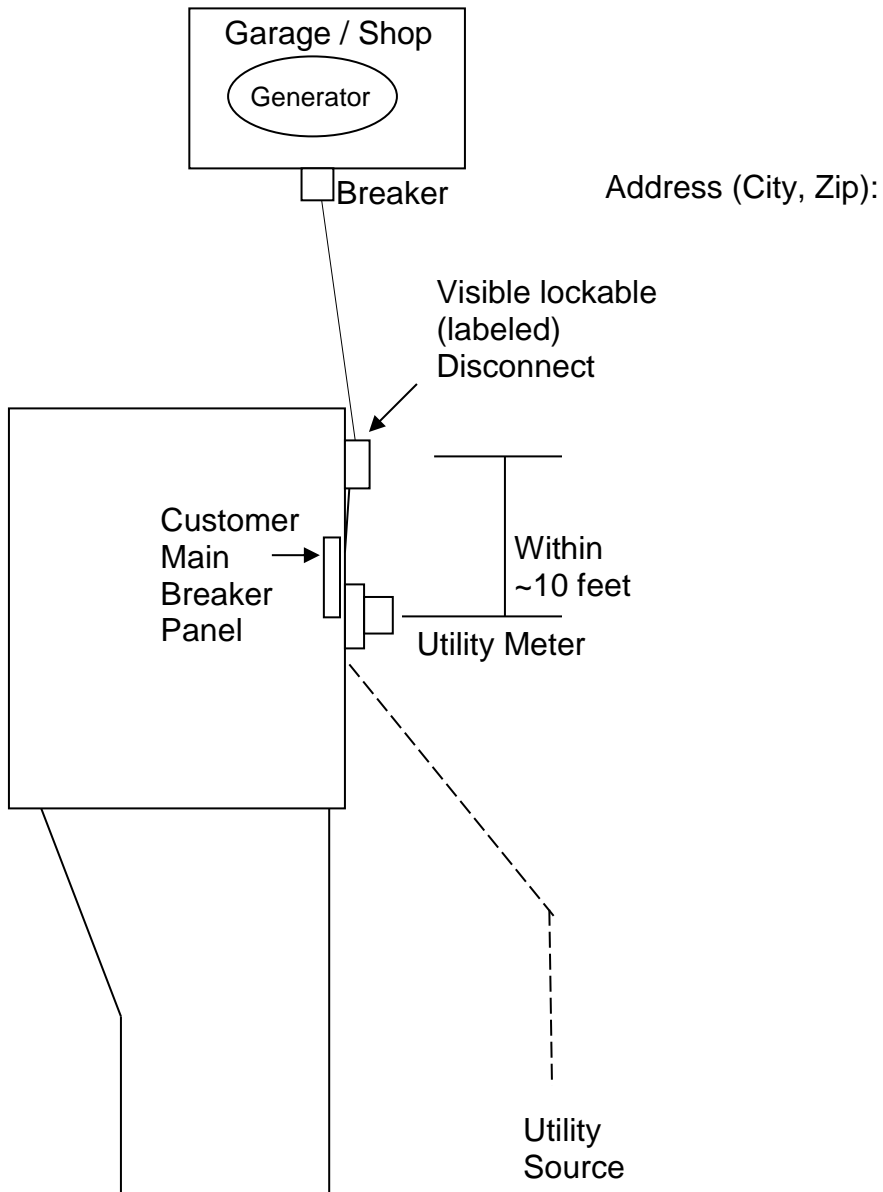
CAUTION
POWER TO THIS SERVICE
IS ALSO SUPPLIED FROM
ON-SITE INDUCTION GENERATION

AC SYSTEM DISCONNECT

Part B – Directory Warning Providing Visible Disconnect Location Language

Please indicate the placard language you plan on utilizing (at the Oncor meter location) if your visible AC disconnect is not located within ten feet of the Oncor meter: (or attach separately)

Example: Layout Sketch

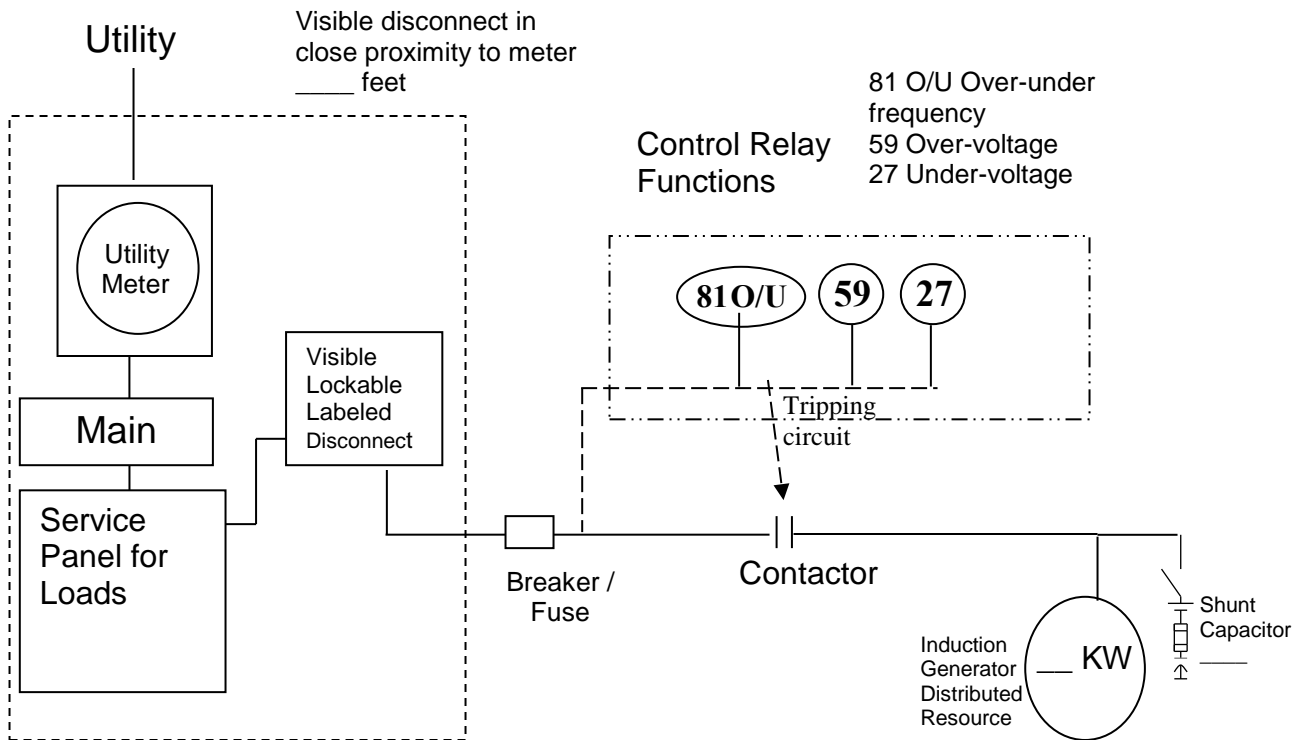


Customer Layout Sketch Requested

Example: One Line Relay Functional Diagram

Address (City-Zip):

Meter # (If available)



Customer One-Line Sketch Requested

Example Only * Relay On-Site Commissioning Test Report**
Customer Name, Address, and City

| GENERAL INFORMATION | |
|----------------------------|--|
| TEST REPORT NUMBER | |
| RELAY MODEL # | |
| RELAY SERIAL # | |
| TESTED BY | |
| TEST EQUIPMENT | |
| DATE TESTED | |
| ONCOR DELIVERY Voltage | |

| RELAY CONFIGURATION | |
|----------------------------|--|
| PHASE CT RATIO | |
| GROUND CT RATIO | |
| VT VOLTAGE | |
| VT SENSING | |

| PROTECTIVE ELEMENT SETTINGS AND TESTING | | |
|--|-----------------------------|------------------------|
| ELEMENT | SETTINGS | MEASURED VALUES |
| BUS UNDER VOLTAGE 1 | 0.9 x VT = 108V @ 30s DELAY | |
| PICKUP | 0.9 x VT = 108V | PHASE A = |
| | | PHASE B = |
| | | PHASE C = |
| TIME | 30 SECONDS = 1800 CYCLES | PHASE A = |
| | | PHASE B = |
| | | PHASE C = |
| BUS UNDER VOLTAGE | 0.7 x VT = 84V @ 10 CYCLE | |
| PICKUP | 0.7 x VT = 84V | PHASE A = |
| | | PHASE B = |
| | | PHASE C = |
| TIME | 10 CYCLES | PHASE A = |
| | | PHASE B = |
| | | PHASE C = |

Example Only * Relay On-Site Commissioning Test Report**
Customer Name, Address, and City

| | | |
|--------------------------------|-----------------------------------|-----------|
| BUS OVER VOLTAGE 1 (59) | 1.10 x VT = 132V @ 30s DELAY | |
| PICKUP | | PHASE A = |
| | 1.10 x VT = 132V | PHASE B = |
| | | PHASE C = |
| TIME | | PHASE A = |
| | 30 SECONDS = 1800 CYCLES | PHASE B = |
| | | PHASE C = |
| BUS OVER VOLTAGE 2 (59) | 1.16 x VT = 139V @ 10 CYCLE DELAY | |
| PICKUP | | PHASE A = |
| | 1.16 x VT = 139V | PHASE B = |
| | | PHASE C = |
| TIME | | PHASE A = |
| | 10 CYCLES | PHASE B = |
| | | PHASE C = |

| | | |
|-------------------------------|--------------------------|-----------|
| UNDER FREQUENCY (81 U) | 59.3 HZ @ 15 CYCLE DELAY | |
| PICKUP | | PHASE A = |
| | 59.3 HZ @ NOMINAL | PHASE B = |
| | | PHASE C = |
| TIME | | PHASE A = |
| | 15 CYCLE DELAY | PHASE B = |
| | | PHASE C = |
| UNDER FREQUENCY (81 O) | 60.5 HZ @ 15 CYCLE DELAY | |
| PICKUP | | PHASE A = |
| | 60.5 HZ @ NOMINAL | PHASE B = |
| | | PHASE C = |
| TIME | | PHASE A = |
| | 15 CYCLE DELAY | PHASE B = |
| | | PHASE C = |

Comments:

(Example): Functionally witnessed the tripping of the disconnecting breaker (MS-A) upon operation of the interconnection relay.