



CATEGORY 2 GENERATOR INTERCONNECTION APPLICATION
FOR ALL PROJECTS WITH AGGREGATE GENERATOR OUTPUT OF MORE THAN 20 KW BUT LESS THAN OR EQUAL TO 150 KW

Electric Utility Contact Information

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For Office Use Only
Application No.
Date & Time Application Received

Customer / Account Information

Electric Utility Customer Information: ( As shown on utility bill )

Customer Name ( Last, First, Middle):
Customer Mailing Address:

Form for Customer Name, Mailing Address, E-Mail Address, Service Account #, and Service Meter Number.

Customer E-Mail Address: ( optional )

Electric Service Account #

Electric Service Meter Number:

Are you interested in selling Renewable Energy Credits (REC's)

Yes No

Generation System Site Information

Physical Site Service Address (if not Billing Address):

Form for Physical Site Service Address

Annual Site Requirements Without Generation in Kilowatthours

Peak Annual Site Demand in Kilowatts (only for customers billed on demand rates)

Form for Annual Site Requirements and Peak Annual Site Demand

Attached Site Plan:

Attached Electrical One-Line Drawing (See the Appendix D for a sample Inverter Type Project)

(Per MPSC Order in Case No. U-15787- The one-line diagram must be signed and sealed by a licensed professional engineer, licensed in the State of Michigan or by an electrical contractor licensed by the State of Michigan with the electrical contractor's license number noted on the diagram.)

Form for Attached Site Plan and Attached Electrical One-Line Drawing

Synchronous/Induction Generators: Must fill out Appendix A or B and provide a Detail One-Line Diagram

See Appendix E and F for a sample the Detail One-Line Diagram for Synchronous or Induction projects

Note: The following information on these system components shall appear on the preliminary Detail One-Line Diagram

Form for Synchronous/Induction Generators

- Breakers - Rating, location and normal operating status (open or closed)
Buses - Operating voltage
Capacitors - Size of bank in Kvar
Circuit Switchers - Rating, location and normal operating status (open or closed)
Current Transformers - Overall ratio, connected ratio
Fuses - normal operating status, rating (Amps), type
Generators - Capacity rating (kVA), location, type, method of grounding
Grounding Resistors - Size (ohms), current (Amps)
Isolating transformers - Capacity rating (kVA), location, impedance, voltage ratings, primary and secondary connections and method of grounding
Potential Transformers - Ratio, connection
Reactors - Ohms/phase
Relays - Types, quantity, IEEE device number, operator lines indicating the device initiated by the relays.
Switches - Location and normal operating status (open or closed), type, rating
Tagging Point - Location, identification

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 MORE THAN 20 KW BUT LESS THAN OR EQUAL TO 150 KW

**Generation System - Manufacturer Information**

System Type ( Solar, Wind, Biomass, Methane Digester, etc):	
Generator Type ( Inverter, Induction, Synchronous):	
Total Generator(s) Nameplate AC Rating:	kW
Total Generator(s) Nameplate DC Rating (solar only):	kW
Expected Annual Output in Kilowatthours	kWh/year
AC Output Operating Voltage:	
Generator Wiring Configuration ( Single Phase, Three Phase):	
Is the Inverter tested to IEEE1547.1?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Applicable

**Inverter Based Systems:**

Manufacturer	
Model ( Name / Number )	
Inverter Output Power Rating (kW)	
No. of Inverter(s)	

**Induction & Synchronous Based Systems**

Manufacturer	
Model ( Name / Number )	

**Installation Information**

**Project Single Point of Contact: ( Electric Utility Customer, Developer, or other )**

Name:	
Company ( If Applicable ):	
Phone Number:	
E-Mail Address:	

Requested In Service Date:

Licensed Professional Engineer Name (If applicable)	
Licensed Electrical Contractor Name (If applicable)	
Electrical Contractor/PE Phone #:	
Electrical Contractor/PE E-Mail:	

**Customer and Contractor Signature and Fees**

Attached \$100 Interconnection Application Fee

(Check # / Money Order # )

( Sign and Return complete application with Application Fee to Electric Utility Contact )  
**To the best of my knowledge, all the information provided in this Application Form is complete and correct.**

\_\_\_\_\_  
**Customer**

\_\_\_\_\_  
**Project Developer/Contractor (If Applicable)**

Note: Refer to the applicable "Michigan Electric Utility Generator Interconnection Procedures" for a detailed explanation of the Interconnection Process, Fees, Timelines, and Technical Requirements.

## **APPENDICES**

Appendix A: Technical Information for Synchronous-Type Generators  
Appendix B: Technical Information for Induction-Type Generators  
Appendix C: Sample Site Plan  
Appendix D: Sample One-Line diagram for Inverter Type Project  
Appendix E: Sample One-Line diagram for Synchronous Type Project  
Appendix F: Sample One-Line diagram for Induction Type Project

Appendix A

Synchronous Generators

**Generator Information**

- a. Generator Nameplate Voltage
- b. Generator Nameplate Watts or Volt-Amperes
- c. Generator Nameplate Power Factor (pf)
- d. RPM

a.
b.
c.
d.

**Technical Information**

- e. Minimum and Maximum Acceptable Terminal Voltage
- f. Direct axis reactance (saturated)
- g. Direct axis reactance (unsaturated)
- h. Quadrature axis reactance (unsaturated)
- i. Direct axis transient reactance (saturated)
- j. Direct axis transient reactance (unsaturated)
- k. Quadrature axis transient reactance (unsaturated)
- l. Direct axis sub-transient reactance (saturated)
- m. Direct axis sub-transient reactance (unsaturated)
- n. Leakage Reactance
- o. Direct axis transient open circuit time constant
- p. Quadrature axis transient open circuit time constant
- q. Direct axis subtransient open circuit time constant
- r. Quadrature axis subtransient open circuit time constant
- s. Open Circuit saturation curve
- t. Reactive Capability Curve showing overexcited and underexcited limits (Reactive Information if non-synchronous)
- u. Excitation System Block Diagram with values for gains and time constants (Laplace transforms)
- v. Short Circuit Current contribution from generator at the Point of Common Coupling
- w. Rotating inertia of overall combination generator, prime mover, couplers and gear drives
- x. Station Power load when generator is off-line, Watts, pf
- y. Station Power load during start-up, Watts, pf
- z. Station Power load during operation, Watts, pf

e.
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g.
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j.
k.
l.
m.
n.
o.
p.
q.
r.
s.
t.
u.
v.
w.
x.
y.
z.

Appendix B

Induction Generators

**Generator Information**

- a. Generator Nameplate Voltage
- b. Generator Nameplate Watts or Volt-Amperes
- c. Generator Nameplate Power Factor (pf)
- d.RPM

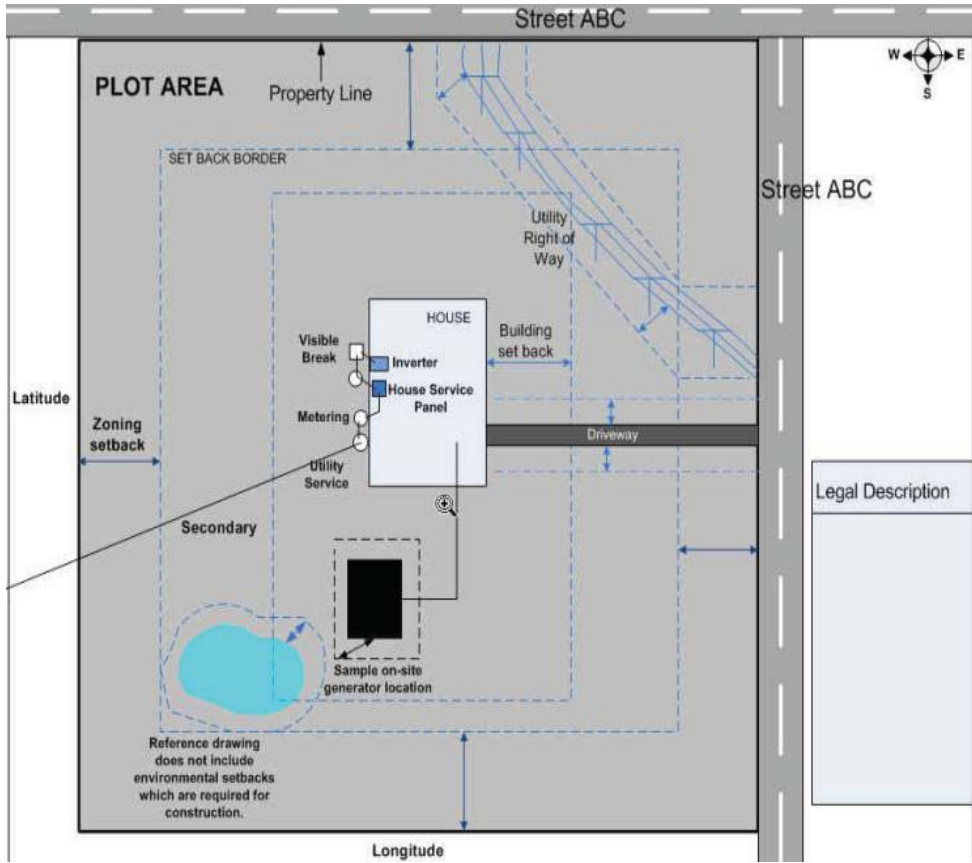
a.
b.
c.
d.

**Technical Information**

- e. Synchronous Rotational Speed
- f. Rotation Speed at Rated Power
- g. Slip at Rated Power
- h. Minimum and Maximum Acceptable Terminal Voltage
- i. Motoring Power (kW)
- j. Neutral Grounding Resistor (If Applicable)
- k.  $I_2^2t$  or K (Heating Time Constant)
- l. Rotor Resistance
- m. Stator Resistance
- n. Stator Reactance
- o. Rotor Reactance
- p. Magnetizing Reactance
- q. Short Circuit Reactance
- r. Exciting Current
- s. Temperature Rise
- t. Frame Size
- u. Design Letter
- v. Reactive Power Required in Vars (No Load)
- w. Reactive Power Required in Vars (Full Load)
- x. Short Circuit Current contribution from generator at the Point of Common Coupling
- y. Rotating inertia, H in Per Unit on kVA Base, of overall combination generator, prime mover, couplers and gear drives
- z. Station Power load when generator is off-line, Watts, pf
- aa. Station Power load during start-up, Watts, pf
- bb. Station Power load during operation, Watts, pf

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x.
y.
z.
aa.
bb.

Appendix C: Sample Site Plan - Provided for Reference Only



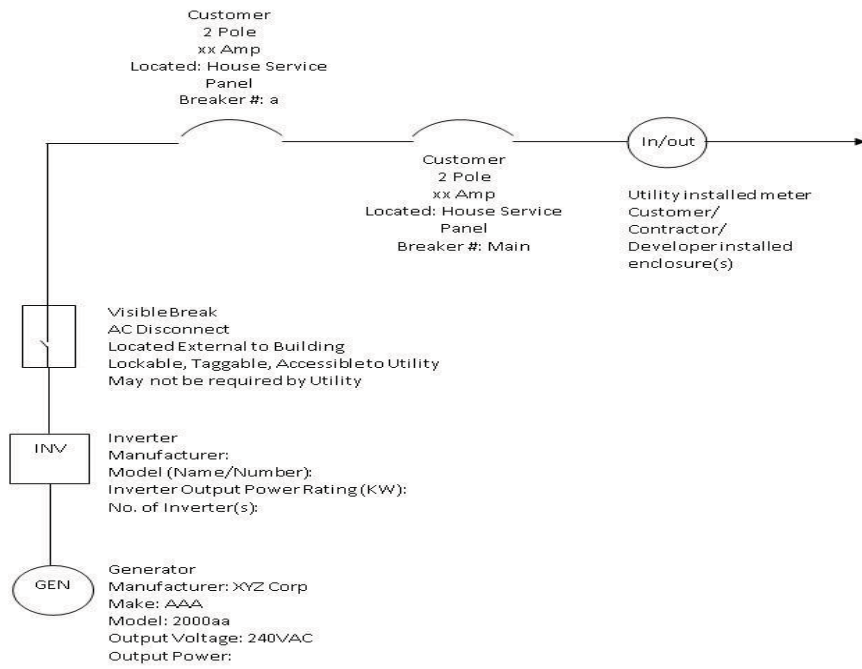
Customer Name: \_\_\_\_\_

Project Site Address: \_\_\_\_\_

Site Plan Prepared By: \_\_\_\_\_

Prepared Date: \_\_\_\_\_

**Appendix D - Sample One Line Drawing for Net Metering Inverter Based Generators**



**NOTE:** One-line diagram must be signed and sealed by a licensed Professional Engineer, licensed in the State of Michigan or by an electrical contractor licensed by the State of Michigan

Customer Name: \_\_\_\_\_

Project Site Address: \_\_\_\_\_

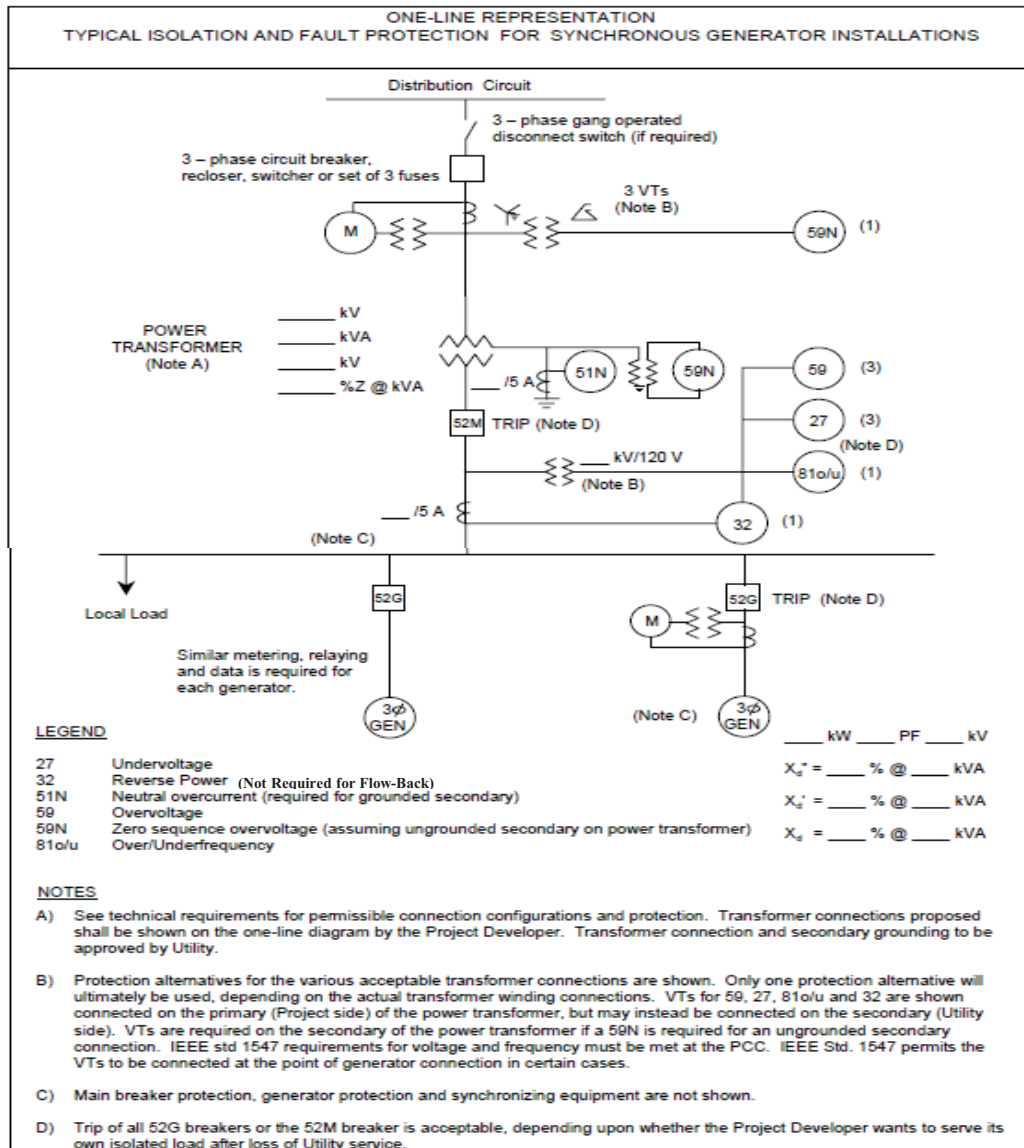
Licensed Professional Engineer Name (If applicable): \_\_\_\_\_

Licensed Professional Engineer Signature: \_\_\_\_\_

Electrical Contractor License Number: \_\_\_\_\_

Date: \_\_\_\_\_

Appendix E: Sample One-Line Drawing for Synchronous Generators



NOTE: One-line diagram must be signed and sealed by a licensed Professional Engineer, licensed in the State of Michigan or by an electrical contractor licensed by the State of Michigan

Customer Name: \_\_\_\_\_

Project Site Address: \_\_\_\_\_

Licensed Professional Engineer Name (If applicable): \_\_\_\_\_

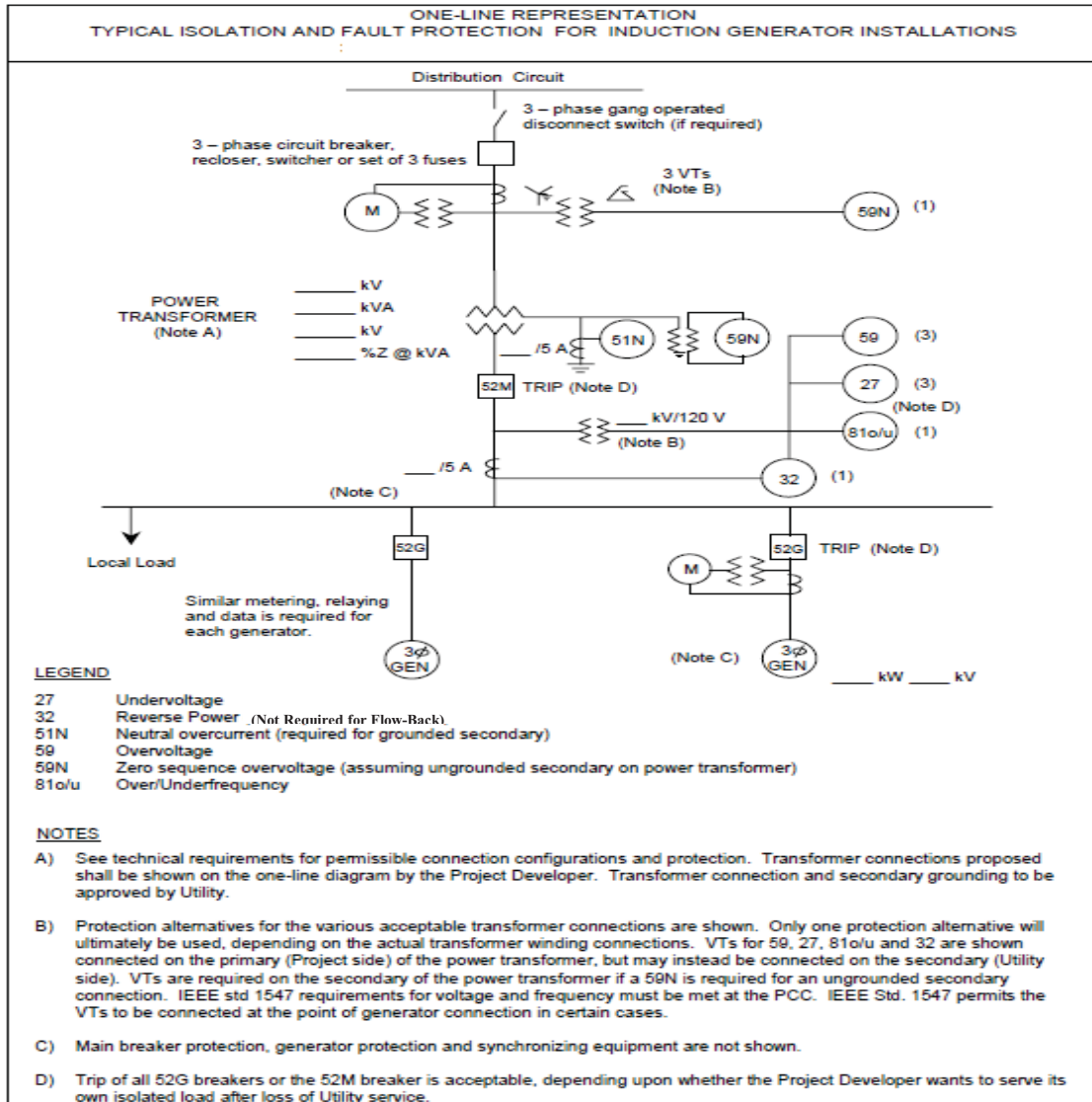
Licensed Professional Engineer Signature: \_\_\_\_\_

Electrical Contractor License Number: \_\_\_\_\_

Date: \_\_\_\_\_



Appendix F: Sample One-Line Drawing for Induction Generators



NOTE: One-line diagram must be signed and sealed by a licensed Professional Engineer, licensed in the State of Michigan or by an electrical contractor licensed by the State of Michigan

Customer Name: \_\_\_\_\_

Project Site Address: \_\_\_\_\_

Licensed Professional Engineer Name (If applicable): \_\_\_\_\_

Licensed Professional Engineer Signature: \_\_\_\_\_

Electrical Contractor License Number: \_\_\_\_\_

Date: \_\_\_\_\_