

GENERATOR INTERCONNECTION APPLICATION Category 4

For All Projects with Aggregate Generator Output of More Than 550 kW but Less Than or Equal to 2 MW

Upper Peninsula Power Company

ELECTRIC UTILITY CONT	ACT INFORMATION		FOR OFFICE USE ONLY	
Upper Peninsula Pow	er Company		Application Number	
ATTN: Dave Puskala		Date and Time Application Received		
500 N Washington Street				
(906) 485 - 2427				
dpuskala@uppco.com				
CUSTOMER / ACCOUNT INFORMATION Electric Utility Customer Information (As shown on utility bill)				
Customer Name (Last, First, Middle)		Customer Mailing Address		
Customer Phone Number		Customer E-mail Address (Ontional)		
INSTALLATION INFORMATION				
P	roject Developer/Si	ngle Point o	of Contact	
Name	Phone Number			
Address	1			
E-Mail Address				
Project Site Address				
GE	NERATION SYSTEM	M SITE INFO	ORMATION	
Project Type (Base load, Peaking, Intermediate)		Energization D	Date for Project Interconnection Facilities	
First Parallel Operation Date for Testing		Project Comm	nercial Operation Date	
Estimated Project Cost		Operation Mod	de	
Attached Customer's Proof of General Liability Insu	urance for a minimum of \$	1,000,000		
Page #				
(Per MPSC Order in Case No. U-15787 – Custome	er must maintain a minimu	m of \$1,000,000	0 General Liability Insurance.)	
Attached Site Plan				
Page #				
Attached Electrical One-Line Drawing				
Page #				
(Per MPSC Order in Case No. U-15787 – The One-Line Drawing must be signed and sealed by a licensed professional engineer, licensed in the State of Michigan.)				
See Page 6 for sample Site Plan				
See Page 7 for sample of Synchronous Generator Electrical One-Line Drawing				
Attached Specification for Equipment				
Page #				

ISOLATING TRANSFORMER(S)	3ETWEEN GENERATOR(S) AND UTILITY			
Transformer Model Number	Transformer Manufacturer			
Rated kV and connection (delta, wye, wye-gnd) of each winding	kVA of each winding (kW)			
BIL of each winding	Fixed taps available for each winding (kW)			
Positive/Negative range for any LTC windings	%Z impedance on transformer self cooled rating (kW)			
Percent Excitation current at rated kV	Load Loss Watts at full load or X/R ratio (kW)			
SYNCHRONOUS, INDUCTION AND INVERTER GENERATOR - BASED SYSTEMS (Must complete Page 3, Page 4 or Page 5 and attach Electrical One-Line Drawing				
 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 				
Manufacturer Model Name	Model Number			
CUSTOMER AND PROJECT DEVELO	PER/CONTRACTOR SIGNATURES AND FEES			
Attached \$250 Interconnection Application Fee Check # Money Order # Sign and Return Completed Application with Application Fee to Electric Utility Contact (at top of page 1). To the best of my knowledge, all the information provided in this application form is complete and correct				
Customer Signature:	Date			
Project Developer/Contractor Signature (if applicable):	Date			
Note: Refer to the applicable "Michigan Electric Utility Gene Interconnection Process, Fees, Timelines, and Technica	erator Interconnection Requirements" for a detailed explanation of the I Requirements.			

INVERTER GENERATORS				
GENERATOR INFORMATION				
System Type (Solar, Wind, Biomass, Methane Digester, etc)	Generation Nameplate Rating (kW or MVA)			
AC Operation Voltage	Manufacturer			
Model (Name/Number)	Attached Grid Configuration Page #			

SYNCHRONOUS GENERATORS		
GENERATOR	INFORMATION	
Generator Nameplate Voltage	Generator Nameplate Watts or Volt-Amperes	
Generator Nameplate Power Factor (pf)	RPM	
TECHNICAL		
Minimum and Maximum Acceptable Terminal Voltage	NFORMATION	
Direct Axis Reactance (saturated)		
Direct Axis Reactance (unsaturated)		
Quadrature Axis Reactance (unsaturated)		
Direct Axis Transient Reactance (saturated)		
Direct Axis Transient Reactance (unsaturated)		
Quadrature Axis Transient Reactance (unsaturated)		
Direct Axis Sub-Transient Reactance (saturated)		
Direct Axis Sub-Transient Reactance (unsaturated)		
Leakage Reactance		
Direct Axis Transient Open Circuit Time Constant		
Quadrature Axis Transient Open Circuit Time Constant		
Direct Axis Sub-Transient Open Circuit Time Constant		
Quadrature Axis Sub-Transient Open Circuit Time Constant		
Open Circuit Saturation Curve		
Reactive Capability Curve Showing Overexcited and Underexcited Limits (Re	eactive Information if Non-Synchronous)	
Excitation System Block Diagram with Values for Gains and Time Constants (Laplace Transforms)		
Short Circuit Current Contribution From Generator at the Point of Common Coupling		
Rotating Inertia of Overall Combination Generator, Prime Mover, Couplers and Gear Drives		
Station Power Load When Generator is Off-Line, Watts, pf		
Station Power Load During Start-Up, Watts, pf		
Station Power Load During Operation, Watts, pf		

INDUCTION GENERATORS				
GENERATOR INFORMATION				
Generator Nameplate Voltage	Generator Nameplate Watts or Volt-Amperes			
Generator Nameplate Power Factor (pf)	RPM			
TECHNICAL INFORMATION				
Synchronous Rotational Speed	Rotation Speed at Rated Power			
Slip at Rated Power	1			
Minimum and Maximum Acceptable Terminal Voltage				
Motoring Power (kW)				
Neutral Grounding Resistor (If Applicable)				
I2 2t or K (Heating Time Constant)				
Rotor Resistance				
Stator Resistance				
Stator Reactance				
Poter Peoptaneo				
Magnetizing Reactance				
Short Circuit Reactance				
Exciting Current				
Temperature Rise				
Frame Size				
Design Letter				
Reactive Power Required in Vars (No Load)				
Reactive Power Required in Vars (Full Load)				
Short Circuit Current Contribution from Generator at the Point of Common Coupling				
Potating Inortia, H in Par Unit on KVA Page, of Ovorall Combination Constant, Prime Mover, Couplers and Coast Prives				
Station Power Load When Generator is Off-Line, Watts, pt				
Station Power Load During Start-Up, Watts, pf				
Station Power Load During Operation, Watts, pf				

SAMPLE SITE PLAN – PROVIDED FOR REFERENCE ONLY





STREET

Weblink to State of Michigan / Plats:

http://www.cis.state.mi.us/platmaps/sr_subs.asp

Legible hand drawn site plans are acceptable

SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY TYPICAL ISOLATION AND FAULT PROTECTION FOR SYNCHRONOUS GENERATOR

ONE-LINE DRAWING		
Licensed PE/Contractor	PE/Contractor License Number	
PE/Contractor Address	PE/Contractor Signature	



LEGEND

27 Undervoltage

- 32 Reverse Power (Not Required for Flow-Back)
- 51N Neutral overcurrent (required for grounded secondary)
- 59 Overvoltage
- 59N Zero sequence overvoltage (assuming ungrounded secondary on power transformer)

81o/u Over/Underfrequency

NOTES

- A) See technical requirements for permissible connection configurations and protection. Transformer connections proposed shall be shown on the one-line drawing by the Project Developer. Transformer connection and secondary grounding to be approved by Utility.
- B) Protection alternatives for the various acceptable transformer connections are shown. Only one protection alternative will ultimately be used, depending on the actual transformer winding connections. VT's for 59, 27, 81o/u and 32 are shown connected on the primary (Project side) of the power transformer, but may instead be connected on the secondary (Utility side). VT's are required on the secondary of the power transformer if a 59N is required for an ungrounded secondary connection. IEEE std 1547 requirements for voltage and frequency must be met at the PCC. IEEE Std. 1547 permits the VT's to be connected at the point of generator connection in certain cases.
- C) Main breaker protection, generator protection and synchronizing equipment are not shown.
- D) Trip of all 52G breakers or the 52M breaker is acceptable, depending upon whether the Project Developer wants to serve its own isolated load after loss of Utility service.

SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY TYPICAL ISOLATION AND FAULT PROTECTION FOR INDUCTION GENERATOR



- 27 Undervoltage
- 32 Reverse Power (Not Required for Flow-Back)
- 51N Neutral overcurrent (required for grounded secondary)
- 59 Overvoltage
- 59N Zero sequence overvoltage (assuming ungrounded secondary on power transformer)
- 81o/u Over/Underfrequency

NOTES

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