



PHOTOVOLTAIC (PV) SUBMITTAL GUIDE

Pennsylvania Uniform Construction Code (UCC) as adopted by Manheim Township Ordinance

BUILDING PERMIT REQUIREMENTS: A building permit is required for all roof mounted and/or ground mounted photovoltaic systems as set forth in Sections 403.42 and 403.62 of the PA Uniform Construction Code as adopted per Manheim Township Ordinance. Submit the following for review:

- **BUILDING PERMIT APPLICATION**

Complete the [Application for Zoning Review, Building Plan Examination, and Building Permit](#). It is necessary to fill out all applicable areas of the permit application including the signature of the permit applicant. Our staff will assist applicants with questions regarding the permit application.

- **PERMIT FEE SCHEDULE WORKSHEET**

Complete the [Photovoltaic System Permit Fee Schedule Worksheet](#). Permit fees for a photovoltaic system are based on the dollar value of work to be performed and are to be calculated with the formula provided on the worksheet. Additional fees include UCC Educational Fee & a Planning & Zoning Fee.

A payment invoice will be provided to the permit applicant at the time of permit issuance.

- **BUILDING CODE PLAN REQUIREMENTS**

- Two (2) copies of a single line wiring diagram of the proposed PV system
- Two copies of site specific engineering (PA Engineer/Architect signed and sealed) for:
 - Verification of existing roof system & site specific connection details
- Completed [Photovoltaic \(PV\) Submittal Checklist](#)
 - Two (2) copies of manufacturer's specifications / specification sheets for:
 - Rack system / mounting assembly
 - Inverter(s) (string inverters or microinverters)
 - PV Modules
 - PV Circuit Combiner Panels / Junctions
 - AC Combiner Panels(s) / Load Center(s)
 - AC and DC Disconnects

- **ZONING PLAN REQUIREMENTS**

- An illustration indicating the arrangement of the solar energy system.
- A site plan showing the location of roof mounted solar energy system, whether mounted to the principal building or an accessory building, ground mounted solar energy system and associated mechanical equipment.
 - Include distances from adjacent property lines to the solar energy system.
 - Identify how the photovoltaic equipment will be screened from any adjacent property that is residentially zoned or used for residential purposes.
- Side elevation of structure including the solar energy system with height above grade.
- Distance of the solar energy system from roof surface on elevation or on engineer's plan.
 - Submit completed and signed [Solar Energy System Responsibility Acknowledgement](#) stating that he/she is the responsible party for owning/maintaining the solar system.
- If the solar energy system is connected to the utility grid, the applicant shall provide written authorization from the local utility company acknowledging/approving system.



PHOTOVOLTAIC (PV) SUBMITTAL CHECKLIST

Pennsylvania Uniform Construction Code (UCC) referencing the IRC and/or IBC & NEC
as adopted by Manheim Township Ordinance. This checklist is based on the 2020 NEC

ROOF ATTACHMENT INFORMATION

☐ SITE SPECIFIC ENGINEERING SUBMITTED UNDER SEAL & SIGNATURE OF DESIGN PROFESSIONAL

- ☐ Rack System manufacturer installation guidelines & specifications provided
- ☐ Verification that existing roof system(s) is adequate for the proposed roof mounted photovoltaic system
- ☐ Design assumptions provided to include applicable loads, roof type, roof slope and connection details
- ☐ Attachment methods including type, size and spacing of fasteners provided in engineering

WIRING DIAGRAM

☐ SITE SPECIFIC SINGLE LINE ELECTRICAL DIAGRAM

The Single Line Diagram is to include the following:

- ☐ System kW rating _____ ☐ Stand Alone System ☐ Utility Interactive System ☐ Storage batteries
- ☐ Number of modules in series _____ ☐ Number of parallel source circuits _____ ☐ Total number of modules _____
- ☐ Microinverters ☐ # of microinverters on each branch circuit ☐ total length of ac home run circuit(s)
 - ☐ **Circuit #1**, # of inverters _____ homerun length _____ ☐ **Circuit #2**, # of inverters _____ homerun length _____
 - ☐ **Circuit #3**, # of inverters _____ homerun length _____ ☐ **Circuit #4**, # of inverters _____ homerun length _____
- ☐ Combiner/junction box is identified & type/listing information noted
- ☐ Wiring method(s) and sizes between array and combiner/junction identified
- ☐ Overcurrent protection required with **3 or more parallel strings**
- ☐ **Equipment grounding** method and wiring type/size identified
- ☐ The PV **dc disconnect** is identified – 60 amp rated per NEC 230.79(D). **Manufacturer/Model #** _____
(If fused disconnect required, identify dc rating, voltage, current & interrupt rating) NEC 690.9(C)
- ☐ Wiring method(s) and sizes between combiner/junction and UL1741 inverter identified
- ☐ Inverter manufacturer, size and ratings provided
- ☐ Wiring method(s) and sizes between inverter/AC disconnect/house disconnect or panel identified
- ☐ Point of connection identified. If load side connection, circuit breaker size(s) _____ Breaker to match panel type
- ☐ The **ac disconnect** is identified – 60 amp rated per NEC 230.79(D). **Manufacturer/Model #** _____
- ☐ **Premise grounding** method and wiring type/size identified. Fully compliant ac grounding required per NEC 250.50

INVERTER INFORMATION **Manufacturer/Model#** _____

☐ MANUFACTURER'S SPECIFICATIONS, LISTING INFORMATION & APPLICABLE RATINGS

- ☐ UL 1741 listed equipment & identified for use in interactive Photovoltaic Power Systems
- ☐ Continuous output power & input voltage range of inverter provided

PV MODULE INFORMATION **Manufacturer/Model#** _____

☐ MANUFACTURER'S SPECIFICATIONS, LISTING INFORMATION & APPLICABLE RATINGS

- | | |
|---|--|
| <input type="checkbox"/> _____ Open-circuit voltage (Voc) | <input type="checkbox"/> _____ Max Power (Pmax) at STC |
| <input type="checkbox"/> _____ Maximum permissible system voltage | <input type="checkbox"/> _____ Voltage at Pmax |
| <input type="checkbox"/> _____ Short-circuit current (Isc) | <input type="checkbox"/> _____ Current at Pmax |
| <input type="checkbox"/> _____ Maximum series fuse rating | |

ARRAY INFORMATION *(Not applicable for microinverter installations)*

☐ PROJECT SPECIFIC VOLTAGE & CURRENT CALCULATIONS

- ☐ _____ Operating Voltage = (number of modules in series x module voltage at Pmax)
- ☐ _____ Operating Current = (number of parallel source circuits x modules at Pmax)
- ☐ _____ Maximum System Voltage = (Voc X 1.21 (per temp. adjust. NEC 690.7) X number of modules in series)
- ☐ _____ Short Circuit Current = (Isc X 1.25 X number of parallel source circuits)

WIRING & OVERCURRENT PROTECTION

- ☐ Wire type is 90 degree C & suitable for wet location. NEC 100, Table 310.4(A)
- ☐ Conductor ampacities are sufficient. ☐ Adjust ambient temperature for rooftop conduits per NEC Table 310.15(B)(1) or (2)
- ☐ Provide adjusted ampacities and calculations *(Not applicable for microinverter installations)*
 - ☐ _____ Maximum PV source circuit current (Isc X 1.25)
 - ☐ _____ Maximum PV source circuit conductor ampacity (Isc X 1.25 X 1.25)
 - ☐ _____ Maximum PV output circuit conductor ampacity (Isc X 1.25 X 1.25 X # of parallel source circuits)
 - ☐ _____ Minimum inverter output circuit conductor ampacity (inverter output in Watts divided by minimum operating voltage x 1.25 = minimum inverter output ampacity)
- ☐ Source circuit overcurrent protection sufficient
- ☐ Overcurrent protection provided with 3 or more parallel strings
- ☐ Overcurrent protection on Inverter Output Circuit is sufficient
- ☐ PV system point of connection complies with **NEC 705.11 (A-E) Supply Side or 705.12 (A-E) Load Side requirements**
Modifications are not to be made to electrical equipment unless approved by the manufacturer – i.e. tapping of bus bars)
- ☐ **Supply Side Connection.** Method of Supply Side Connection _____
- ☐ **Load Side Connection.** Method of Load Side Connection _____
 - ☐ _____ Electrical service panel buss bar rating ☐ PV breaker same manufacturer as the electrical panel
 - ☐ Circuit breaker(s) suitable for backfeed applications are in use
 - ☐ Total rating of overcurrent devices supplying power (main + PV breaker) max 125% of rating per NEC 690.9(B)
- ☐ Bonding fittings used with metal conduit for ac components per NEC 250.92 and dc components per NEC 250.97
- ☐ Expansion fittings used with rigid PVC conduit installations per NEC 352.44 & Table 352.44
- ☐ Ampacity adjustments taken for more than 3 current carrying conductors in conduits per NEC Table 310.15(c)(1)

LABEL & MARKING REQUIREMENTS

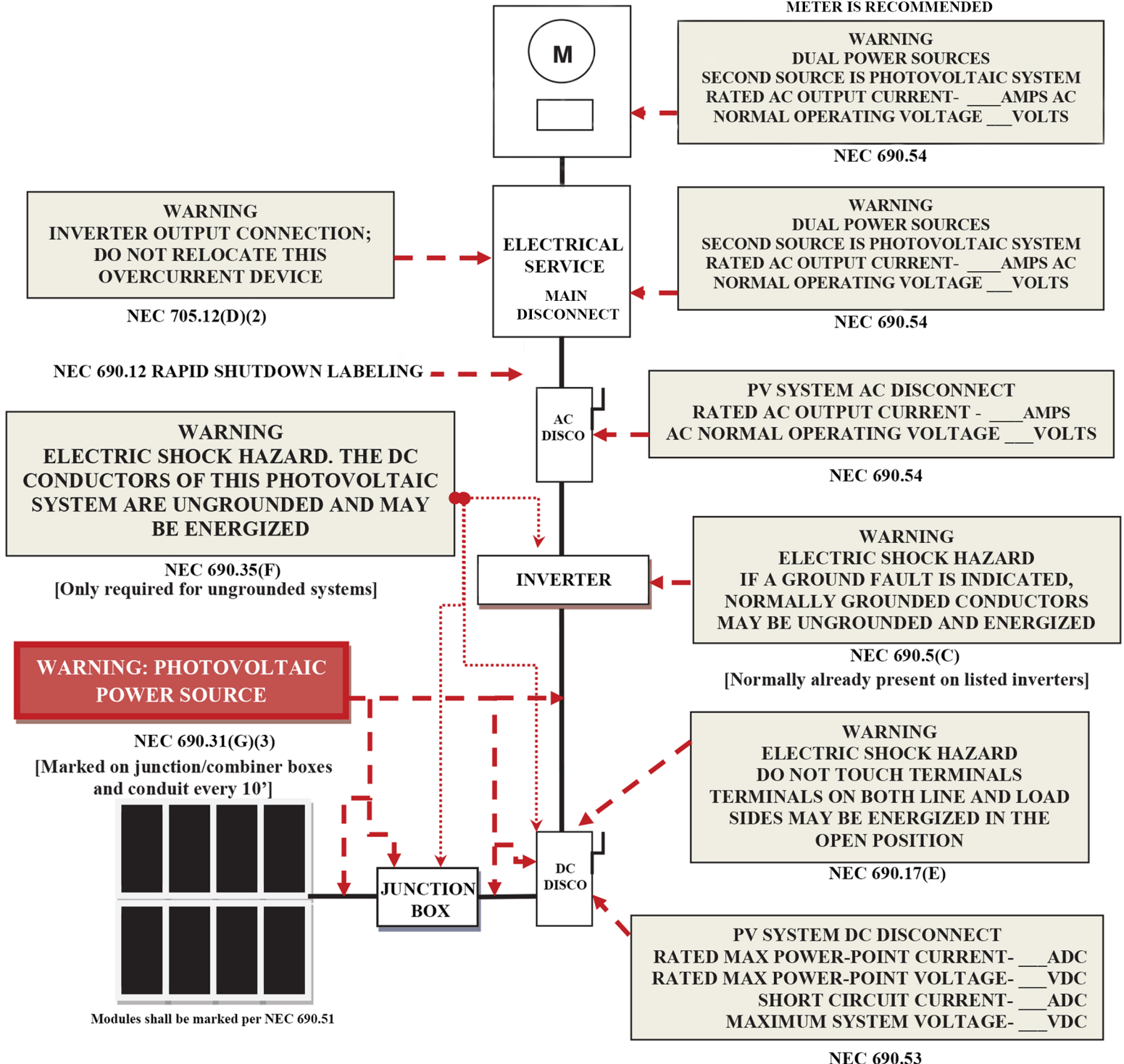
- ☐ Labels shall be made of sufficient durability to withstand the environments involved per NEC 110.21
- ☐ Labels/markings shall be permanently affixed to or adjacent to the equipment it is identifying
- ☐ Label/Marking Requirements: *(check all boxes that apply to your installation)*
 - ☐ Ground-Fault Protection and Interruption label on utility interactive inverter per NEC 705.11(E)
 - ☐ Electric Shock Hazard label at disconnecting means per NEC 690.13(B)
 - ☐ Wiring Methods and Enclosures that contain PV source conductors per NEC 690.31(D)(2)
 - ☐ DC Junction/Combiner/Disconnect labels per NEC 690.53
 - ☐ Modules shall be marked per NEC 690.51
 - ☐ DC Power Source labeling at the DC disconnect per NEC 690.53
 - ☐ Identify maximum ac operating current & operating ac voltage at ac disconnect per NEC 690.54
 - ☐ Rapid Shutdown of PV Systems on Building Identification per NEC 690.12, 690.56(B)&(C)
 - ☐ Identify remote locations of utility & PV disconnects - permanent plaque/directory location of each source NEC 705.10
 - ☐ Distribution equipment warning label per NEC 705.12(B)(3)(3)
- ☐ **General Requirements:** All equipment installations to be provided with working space clearances per NEC Section 110.26. Maintain no less than 30 wide x 36 deep working spaces about all electrical equipment.

Signature of: **Owner/Contractor** _____ **Print Name** _____ **Date** _____



PHOTOVOLTAIC (PV) LABEL & MARKING REQUIREMENTS

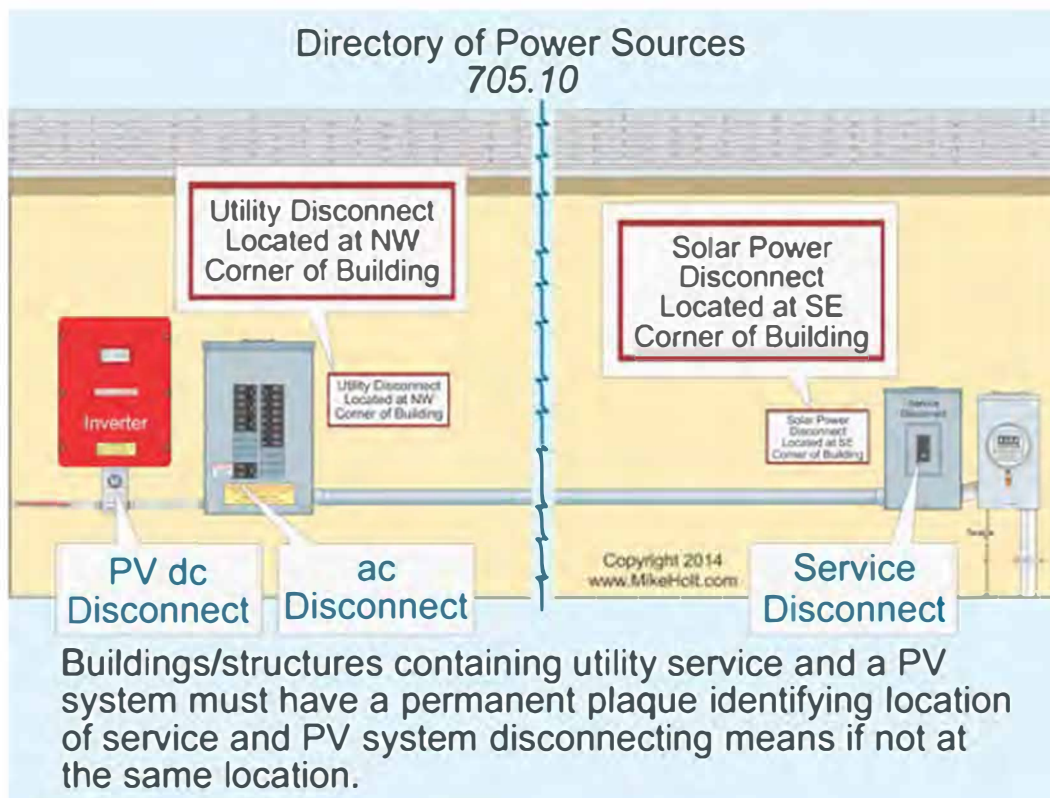
THIS LABEL IS NOT CODE REQUIRED, HOWEVER HAVING DUAL POWER SOURCE WARNING LABEL AT ELECTRICAL METER IS RECOMMENDED





PHOTOVOLTAIC (PV) LABEL & MARKING REQUIREMENTS

- Labels shall be made sufficiently durable to withstand the environment per NEC 110.21
- Labels/markings shall be permanently affixed to or adjacent to the equipment it is identifying
 - Ground fault protection and interruption label on inverter. NEC 690.5(C)
 - Electric shock hazard label at disconnecting means. NEC 690.17
 - Wiring methods and enclosures that contain PV conductors. NEC 690.31(G)(3)
 - dc junction/combiner/disconnect labels. NEC 690.35(F)
 - Modules marked per NEC 690.51
 - dc power source label at dc disconnect. NEC 690.53
 - Maximum ac operating current & operating ac voltage at ac disconnect label. NEC 690.54
 - Rapid shutdown of PV system identification. NEC 690.12, 690.56(B)&(C)
 - Distribution equipment warning label. NEC 705.12(D)(2)
 - Directory of power sources labels (see below). NEC 690.56(B) & NEC 705.10

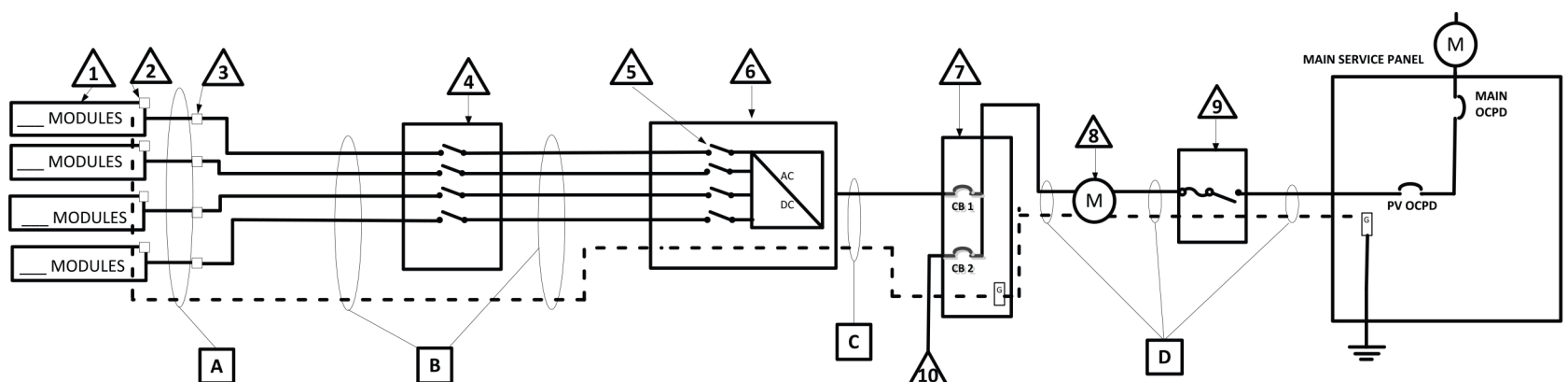


NEC 690.56(B) & 705.10 DIRECTORY OF POWER SOURCES A directory is required at EACH:

- dc PV System Disconnecting Means
- ac Disconnecting Means
- Service Disconnecting Means (not at the electric meter)

SAMPLE DIAGRAM #1

STRING INVERTER WITH NO COMBINED STRINGS

TAG	DESCRIPTION	SINGLE-LINE DIAGRAM #1 – NO STRINGS COMBINED PRIOR TO INVERTER
1	SOLAR PV MODULE / STRING	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>CHECK A BOX FOR WHETHER SYSTEM IS GROUNDED OR UNGROUNDED:</p> <div style="display: flex; align-items: center;"> <input type="checkbox"/> GROUNDED (INCLUDE GEC) <input type="checkbox"/> UNGROUNDED </div> <p>FOR UNGROUNDED SYSTEMS:</p> <ul style="list-style-type: none"> - DC OCPD MUST DISCONNECT BOTH CONDUCTORS OF EACH SOURCE CIRCUIT - UNGROUNDED CONDUCTORS MUST BE IDENTIFIED PER 210.5(C). WHITE-FINISHED CONDUCTORS ARE NOT PERMITTED. </div> <div style="width: 50%;">  <p style="font-size: small;">Fully compliant ac premise grounding system required per NEC 250.50. Make note of existing/added grounding on single line diagram.</p> </div> </div>
2	DC/DC CONVERTERS INSTALLED?: YES / NO (IF YES, STEPS 6 & 8 REQUIRED)	
3	SOURCE CIRCUIT JUNCTION BOX INSTALLED?: YES / NO	
4	SEPARATE DC DISCONNECT INSTALLED?: YES / NO	
5	INTERNAL INVERTER DC DISCONNECT: YES / NO	
6	CENTRAL INVERTER	
7	LOAD CENTER INSTALLED?: YES / NO	
8	PV PRODUCTION METER INSTALLED?: YES / NO	
9	*SEPARATE AC DISCONNECT INSTALLED?: YES / NO	
10	CONNECT TO INVERTER #2 (USE LINE DIAGRAM 2)	

CONDUCTOR/CONDUIT SCHEDULE					
TAG	DESCRIPTION AND CONDUCTOR TYPE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TYPE	CONDUIT SIZE
A	USE-2 <input type="checkbox"/> OR PV-WIRE <input type="checkbox"/>				
	EGC/GEC:				
B					
	EGC/GEC:				
C					
	EGC/GEC:				
D					
	EGC/GEC:				

ENTER "N/A" WHERE SUITABLE FOR
 WHEN NOT USING CONDUIT OR CABLE
 AS PERMITTED BY CODE

SAMPLE DIAGRAM #2

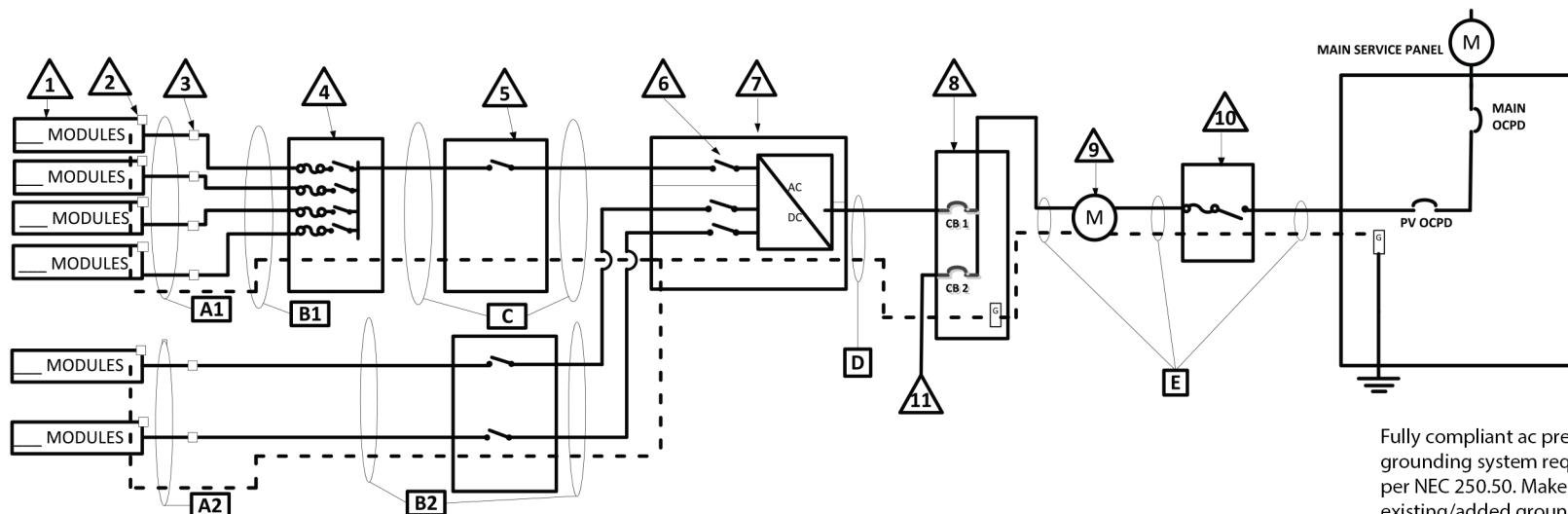
STRING INVERTER WITH COMBINED STRINGS

Δ TAG	DESCRIPTION
1	SOLAR PV MODULE / STRING
2	DC/DC CONVERTERS INSTALLED?: YES / NO (IF YES, STEPS 6 & 8 REQUIRED)
3	SOURCE CIRCUIT JUNCTION BOX INSTALLED?: YES / NO
4	COMBINER BOX (STEPS 11 & 12 REQUIRED)
5	SEPARATE DC DISCONNECT INSTALLED?: YES / NO
6	INTERNAL INVERTER DC DISCONNECT: YES / NO
7	CENTRAL INVERTER
8	LOAD CENTER INSTALLED?: YES / NO
9	PV PRODUCTION METER INSTALLED?: YES / NO
10	*SEPARATE AC DISCONNECT INSTALLED?: YES / NO
11	CONNECT TO INVERTER #2 (USE LINE DIAGRAM 4)

SINGLE-LINE DIAGRAM #2 – COMBINING STRINGS PRIOR TO INVERTER

CHECK A BOX FOR WHETHER SYSTEM IS GROUNDED OR UNGROUNDED: ☐ GROUNDED (INCLUDE GEC) ☐ UNGROUNDED

FOR UNGROUNDED SYSTEMS:
 - DC OCPD MUST DISCONNECT BOTH CONDUCTORS OF EACH SOURCE CIRCUIT
 - UNGROUNDED CONDUCTORS MUST BE IDENTIFIED PER 210.5(C). WHITE-FINISHED CONDUCTORS ARE NOT PERMITTED.



Fully compliant ac premise grounding system required per NEC 250.50. Make note of existing/added grounding on single line diagram.

COMBINER CONDUCTOR/CONDUIT SCHEDULE					
□ TAG	DESCRIPTION AND CONDUCTOR TYPE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TYPE	CONDUIT SIZE
A1	USE-2 <input type="checkbox"/> OR PV-WIRE <input type="checkbox"/> EGC/GEC:				
B1	EGC/GEC:				
C	EGC/GEC:				
D	EGC/GEC:				
E	EGC/GEC:				

NON-COMBINED STRINGS CONDUCTOR/CONDUIT SCHEDULE (IF APPLICABLE)					
□ TAG	DESCRIPTION AND CONDUCTOR TYPE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TYPE	CONDUIT SIZE
A2	USE-2 <input type="checkbox"/> OR PV-WIRE <input type="checkbox"/> EGC/GEC:				
B2	EGC/GEC:				

ENTER "N/A" WHERE SUITABLE FOR WHEN NOT USING CONDUIT OR CABLE AS PERMITTED BY CODE

Fully compliant ac premise grounding system required per NEC 250.50. Make note of existing/added grounding on single line diagram.



1840 Municipal Drive Lancaster, PA 17601-4105
(717) 569-6406 ext. 6 Fax (717) 560-4183
codecompliance@manheimtownship.org
www.manheimtownship.org

Permit Code: _____ Permit No: _____

APPLICATION FOR ZONING REVIEW, BUILDING PLAN EXAMINATION AND BUILDING PERMIT

Please use ball point pen and press hard

"I hereby certify that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as an authorized agent and I agree to conform to all Manheim Township Ordinances as well as all statutes and regulations of the Commonwealth of Pennsylvania, including compliance by all sub-contractors with the Pennsylvania Worker's Compensation reform Act of 1993."

Signature of Property Owner or Authorized Agent's
(Permit Applicant)

Printed Name of Property Owner or Authorized Agent

Project Address: _____

Contact Name: _____ **Contact #:** _____ **e-mail:** _____

Applicant is: ☐ Owner ☐ Contractor ☐ Architect/Engineer ☐ Tenant ☐ Other _____

Property Owner (at time of application) No P.O. Boxes

Name: _____ **Address:** _____

Tenant Name (if applicable): _____ **City:** _____ **St.** _____ **Zip** _____

Contractor No P.O. Boxes PA Home Improvement Contractor's Registration No.

Name: _____ **Work #:** _____ **ext.** _____

Address: _____ **Fax #:** _____ **Cell #:** _____

City: _____ **St.** _____ **Zip** _____ **e-mail:** _____

Architect/Engineer No P.O. Boxes

Name: _____ **Work #:** _____ **ext.** _____

Address: _____ **Fax #:** _____ **Cell #:** _____

City: _____ **St.** _____ **Zip** _____ **e-mail:** _____

USE OF STRUCTURE (Check One)

- ☐ Single Family ☐ Multi-Family # of Units _____ of _____ ☐ Hotel, Motel, Dormitory # of Units _____
☐ Non-Residential (Describe) _____

DESCRIPTION OF WORK (Check All Spaces That Apply)

- | | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> New Building | <input type="checkbox"/> Addition | <input type="checkbox"/> Alteration | <input type="checkbox"/> Repair/Replace | <input type="checkbox"/> Demolition |
| <input type="checkbox"/> Porch | <input type="checkbox"/> Attached Garage | <input type="checkbox"/> Detached Garage | <input type="checkbox"/> Deck | <input type="checkbox"/> Shed/Outbuilding |
| <input type="checkbox"/> Above-ground Swimming Pool | <input type="checkbox"/> In-Ground Swimming Pool | <input type="checkbox"/> Interior Hot Tub/Spa | <input type="checkbox"/> Exterior Hot Tub/Spa | <input type="checkbox"/> Other: _____ (Describe) |
| | | <input type="checkbox"/> Photovoltaic | | |

WORK WILL INCLUDE: (Check All Spaces That Apply)

- | | | | |
|--|---|-----------------------------------|-------------------------------|
| <input type="checkbox"/> Energy/Insulation | <input type="checkbox"/> Electrical | <input type="checkbox"/> Plumbing | <input type="checkbox"/> HVAC |
| <input type="checkbox"/> Fire Protection System (Type) _____ | <input type="checkbox"/> Other (Describe) _____ | | |

Subdivision: _____ **Total Project Square Footage:** _____ **No. of Stories:** _____

Lot #: _____ **Total Project Dollar Value:** _____ **Structure Height:** _____

FOR OFFICE USE ONLY

Building Fee: _____ **UCC Fee:** _____ **Zoning Review Fee:** _____ **Impact Fee:** _____

Water Fee: _____ **Fire Fund:** _____ **Sewer Permit #:** _____ **Water Permit #:** _____

Parcel #: _____ **Zoning Review By:** _____ **Zoning Approval Date:** _____

Zoning District: _____ **Zoning Comments:** _____

Code Compliance Review By: _____ **Code Compliance Approval Date:** _____

Description of Work: _____



Manheim Township Code Compliance Department

Photovoltaic & Solar Hot Water Systems Permit Fee Worksheet

Street Address: _____

Permit No.: _____

Dollar value of work being performed (material & labor prior to Federal and State tax credits)

\$ _____

Project Dollar Value

\$100 to \$999.99

\$1,000 to \$1,999.99

\$2,000 and above

Permit Fee

\$50

\$100

\$200 + \$6 each add. \$1,000 (round up to nearest \$1,000)

Total Building Permit Fee \$ _____

- There will be additional fees including a \$4.50 UCC Mandated Education Fee and other fees assessed by the Planning and Zoning Department.
- A payment invoice will be provided to the permit applicant prior to the permit issuance.



**MANHEIM TOWNSHIP
SOLAR ENERGY SYSTEM
RESPOSIBILITY ACKNOWLEDGEMENT**

I hereby acknowledge that I am the property owner of the property mentioned below and I am the responsible party for owning and maintaining the solar energy system that is installed on the below mentioned property.

In addition, I agree that in the event the said solar energy system is abandoned and/or in a state of disrepair, it shall be my responsibility as the property owner and owner of the solar energy system to remove or maintain the solar energy system.

I understand that if I refuse to sign this acknowledgement, the below mentioned permit would not be approved.

Ownership and maintenance responsibilities for the solar energy system may be transferred to future property owners and/or heirs by executing a similar acknowledgement.

Name

Signature

Address

Tax account number

Permit Number



Affidavit

Inaccessible Inspections on Roofs of Photovoltaic Systems

I, _____, being duly sworn according to law, depose
Print Full Name of Individual

and say (1) That I or my company, _____,
Print Name of Individual or Company

(2) Installed a photovoltaic system at the following address _____,

(3) That the installer has installed a photovoltaic system in which some parts located on the roof may be inaccessible for code officials to safely perform inspection(s) and attest that this system is installed in accordance with the applicable edition of the National Electrical Code and the manufacturer's installation instructions of equipment for systems in Manheim Township; and

(4) That the undersigned is duly authorized to sign this affidavit.

This Affidavit is made subject to the penalties of 18 Pa. C. S. §4904 relating to unsworn falsification to authorities and subject to the penalties contained in Manheim Township Ordinance 1665-5 or any amendment thereto.

Signature

Print Name

Commonwealth of Pennsylvania
County of Lancaster

Sworn to and subscribed before me on this _____ day of _____ 20____

Notary Public Signature

My commission expires:

Notary Public Seal