



SAFETY CODES
PLANNING & DEVELOPMENT SERVICES
SOLAR Photovoltaic (PV) GUIDELINES

This document is a guideline for applying for regulation approval and permit application requirements that are required for Solar PV systems. These systems may be placed on houses, duplexes, townhouses, and commercial buildings. In certain installations, registered professionals may be required by the RMWB (notification will be upon review of applications), and certified electrical contractors are mandatory for installation. This guide is separated into three parts to ensure that solar PV panels are installed correctly, safely and meet all compliance measures in accordance with the Canadian Electrical Code.

For installation requirements, there are three steps:

- Step One – Regulatory approval through Alberta Utilities Commission
- Step Two – Municipal Electrical Permitting Application
- Step Three – Municipal Building Permitting Application (if required)

If you have questions, email inspections@rmwb.ca, call 780-743-7813, or visit us in person, Planning and Development Services, located at 9909 Franklin Avenue.

Step One

Provincial Regulatory Approval Steps

- 1) Provincial utility approval is required to be in place from [Alberta Utilities Commission](#) and from [ATCO Electric](#) or other energy providers as applicable.

To access most current information please visit [Connecting to the Alberta Electricity Distribution Grid](#). Here, you will find information on how to connect to the grid and how to find the documents required for the utility's approvals. This approval must be in place prior to starting the Municipal permitting application process, as the documentation is required to be submitted with the application.

Here are some useful links:





- [Presentation Information - Howell-Mayhew Engineering Inc.](#)
- [Micro-Generator Application Guideline](#)
- [Single Line Diagram \(Does NOT have a battery bank\)](#)
- [Single Line Diagram \(with battery bank\)](#)

Step Two

Requirements for Electrical Permits

Apply here [RMWB Safety Codes Electrical Permit Application](#) for your electrical permit. The [Permit Regulation](#) requires an electrical permit for Solar PV installations. Details for the electrical permit application and the information to accompany the application are below.

The electrical permit application must contain:

1. The **name** of the licensed contractor who is responsible for installing the electrical components of the system. Permits will only be issued to an electrical contractor. All electrical contractors must have a Master Electrician and hold a valid [RMWB Business License](#). Solar PV system installations require installers to be certified electricians or registered apprentices working under the supervision of a certified electrician. Visit [Photovoltaic Systems Legislated Requirements](#) for more information.
2. A single-line **diagram** of the system. Canadian Electrical Code rule 84-030 requires a permanent single-line diagram be posted at the Supply Authority disconnect. This diagram is to show the Solar PV array configuration, the wiring methods, overcurrent protection, the inverter, rapid shutdown initiation device location and disconnect switches. A sample single line diagram is attached below.
3. Confirmation of **four main current and voltage ratings** for the Solar PV array as required by Canadian Electrical Code rule 64-200 - rated operating current and voltage; maximum photovoltaic source circuit voltage and rated short-circuit current. These values are all required for system design and for labeling. This information should be included on the single-line diagram.
4. **Equipment list** with the **manufacturer and model** number of each of the major components. Items required are:





- modules
- racking system
- inverter(s) (micro inverter or string inverter)
- dc-dc optimizers
- rapid shutdown system components

The electrical inspection is conducted during the system is installation. The inspector will have access to the roof top components and the inspection should be scheduled for the day of the installation. The Canadian Electrical Code requires that all electrical systems, including Solar PV systems, follow all relevant articles of the Canadian Electrical Code. Refer to section 84 for more information.

Operation of the system is only permitted once the inspection is complete, and a report of compliance is received. Authorization from ATCO Electric is required. ATCO may require a copy of your final electrical inspection report and copy of your application to your electrical Energy Retailer prior to installing a bi-directional cumulative meter.

Sample form for required single line diagram:

From Howell-Mayhew Engineering www.hme.ca





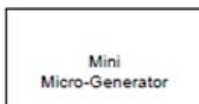
- Notes:**
1. Wiring arrows indicate direction of electrical energy flow.
 2. Grid-connection safety requirements are given by the Canadian Electrical Code Section 84, and the Wires Service Provider.
 3. All components shall meet Canadian electrical product certification standards.
 4. All components shall contain nameplate labels indicating the acceptable Certifying Organization.
 5. An inverter with a Canadian Certification Mark thus meets the CSA's standard C22.2 No. 107.1 for utility grid-connection.
 6. Separate Grid Disconnect is optional and may or may not be required by the Wires Service Provider.
 7. If installed, Grid Disconnect shall comply with Canadian Electrical Code Rule 84-024 (2006).
 8. Generator Disconnect and Grid Disconnects may be integral to the inverter.

Mini Micro-Generation Source

- Solar PV DC
- Micro-wind DC or AC
- Stirling engine DC or AC
- Micro-hydro DC or AC
- Biomass DC or AC
- Fuel cell DC
- Other: _____

Type of Generator Interface

- DC to AC Inverter
- AC to DC to AC Inverter
- Non-Inverter with anti-islanding protection (equivalent to inverter)



Generator Disconnect



Generator to Utility Interface

- Will not be installed
- Will be installed

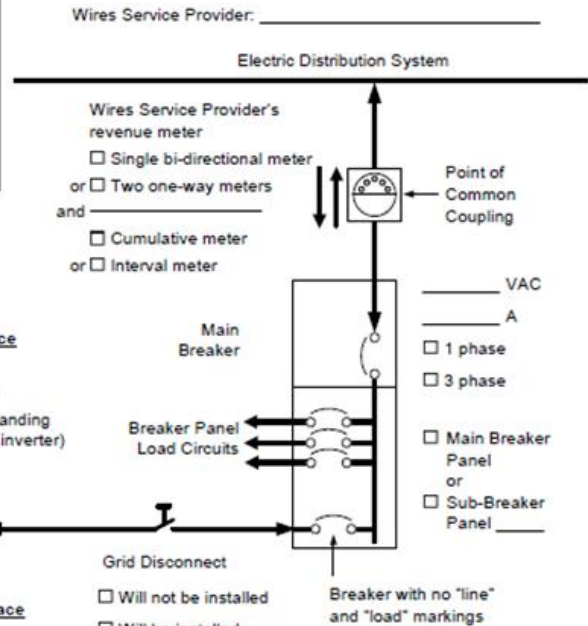
Location on site: _____

Mini Micro-Generator

Brand: _____
 Model: _____
 Rated capacity: _____ kW
 Certification Mark: _____
 Location on site: _____

Generator to Utility Interface

Brand: _____
 Model: _____
 Rated capacity: _____ kW_{AC}
 Certification Mark: _____
 Location on site: _____



<p>This single line diagram is intended for use in permitting and grid-connection approvals. It is not intended to be used for system design or installation.</p>	Site Name: _____	Drawn by: _____	
	<p>Single Line Diagram for Grid-Dependent, Mini Micro-Generator Connected to the Wires Service Provider's Electrical Distribution System</p>		
	<p>DRAWING NO. _____ REV _____</p> <p>SCALE: NOT TO SCALE</p>	<p>Drawing Date: _____</p> <p>Site Description: _____</p> <p>Site Location: _____</p>	
	<p>SCALE: NOT TO SCALE</p>		

***The notes above in this diagram state Canadian Electrical Code (2006) and it should read the Canadian Electrical Code (2024). ***

More online diagrams to fill out and print at:

<http://www.solarabcs.org/about/publications/reports/expedited-permit/forms/index.html>





Example of required labels:



LABEL 1
DISCONNECTING MEANS PROVIDED ON DC CIRCUITS SHALL BE MARKED FOR THE PURPOSE. INSTALL THIS STICKER ON THE INVERTER BESIDE THE DC DISCONNECT. CEC 64-060-9



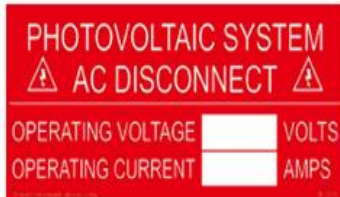
LABEL 6
A PHOTOVOLTAIC SYSTEM WITH RAPID SHUTDOWN IN ACCORDANCE WITH RULE 64-218 SHALL BE PROVIDED WITH A PERMANENT MARKING IN AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS FOR THE PHOTOVOLTAIC OUTPUT CIRCUIT STATING THAT THE PHOTOVOLTAIC SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN. INSTALL ON INVERTER.



LABEL 2
THE DISCONNECTING MEANS SHALL BEAR A WARNING TO THE EFFECT THAT THE TERMINALS ON BOTH THE LINE AND LOAD SIDES COULD BE ENERGIZED WHEN THE DISCONNECTING MEANS IS OPEN. INSTALL AT PANEL AND DISCONNECT. CEC 64-060-10



LABEL 7
A WARNING NOTICE OF AN INTERCONNECTED SYSTEM SHALL BE INSTALLED IN A CONSPICUOUS PLACE AT THE SUPPLY AUTHORITY DISCONNECTING MEANS OF RULE 64-022 AND THE SUPPLY AUTHORITY METER LOCATION. INSTALL LABEL AT METER. CEC 64-030-1



LABEL 3
ALL INTERACTIVE SYSTEM(S) POINTS OF INTERCONNECTION WITH OTHER SOURCES SHALL BE MARKED WITH THE RATED AC OPERATING VOLTAGE AND CURRENT. 2) THE MARKING REFERRED TO IN SUBRULE 1) SHALL BE PROVIDED AT THE DISCONNECTING MEANS FOR EACH INTERCONNECTING POWER SOURCE. INSTALL AT ELECTRICAL PANEL. CEC 64-072-1



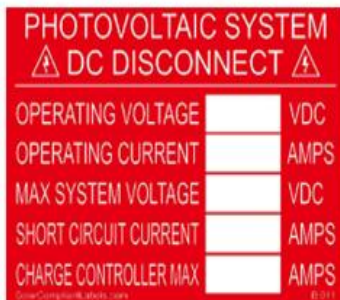
LABEL 8
AT DIRECT-CURRENT EXPOSED RACEWAYS, CABLE TRAYS, COVERS AND ENCLOSURES OF JUNCTION BOXES, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.



LABEL 4
A PERMANENT WARNING LABEL AT THE DISTRIBUTION EQUIPMENT TO INDICATE THAT THE OVERCURRENT DEVICE SHALL NOT BE RELOCATED. LOCATED AT THE INVERTER OUTPUT CIRCUIT (BREAKER IN MSP). REMEMBER THAT IF THE OUTPUT CIRCUIT IS INSTALLED IN A SUB PANEL, THE FEEDER BREAKER FROM THE MAIN PANEL TO THAT SUBPANEL MUST BE INSTALLED ALSO ON THE BOTTOM / OR FARTHEST AWAY SPOT FROM THE LUGS -AND LABELS MOUNTED ALSO ON THAT PANEL. CEC 64-112-4-B-III

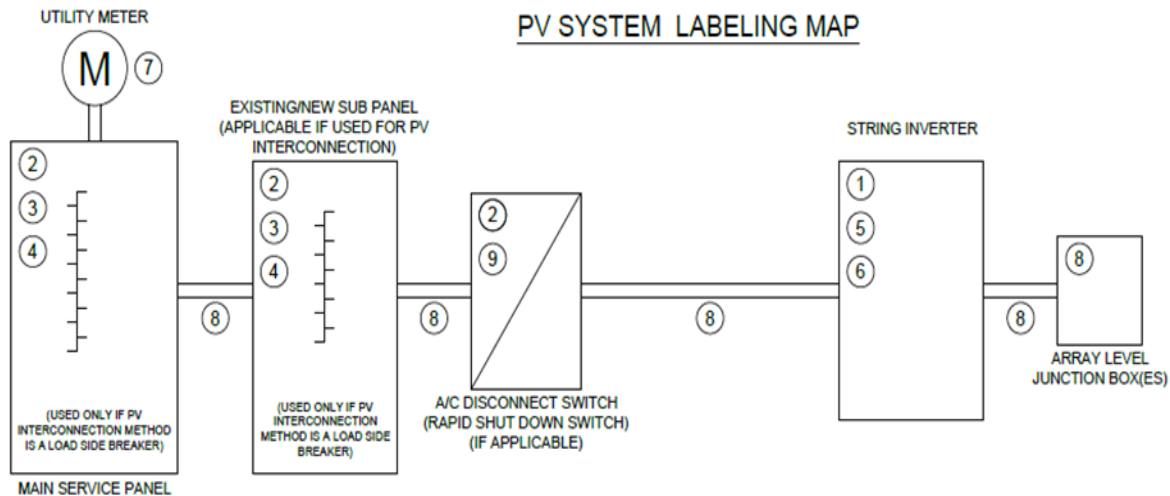


LABEL 9
IN ADDITION TO THE MARKING REQUIREMENTS GIVEN IN RULE 64-072, A PERMANENT MARKING SHALL BE PROVIDED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS FOR THE PHOTOVOLTAIC OUTPUT CIRCUIT, SPECIFYING THE FOLLOWING:
1. A) THE RATED OPERATING CURRENT AND VOLTAGE;
2. B) THE MAXIMUM PHOTOVOLTAIC SOURCE CIRCUIT VOLTAGE CALCULATED IN ACCORDANCE WITH RULE 64-202 1) AND 2); AND
C) THE RATED SHORT-CIRCUIT CURRENT.
INSTALL ON DISCONNECT CEC 64-200-1 PLEASE SEE SHEET PL-1 FOR LABEL 10



LABEL 5
IN ADDITION TO THE MARKING REQUIREMENTS GIVEN IN RULE 64-072, A PERMANENT MARKING SHALL BE PROVIDED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS FOR THE PHOTOVOLTAIC OUTPUT CIRCUIT, SPECIFYING THE FOLLOWING:
1. A) THE RATED OPERATING CURRENT AND VOLTAGE;
2. B) THE MAXIMUM PHOTOVOLTAIC SOURCE CIRCUIT VOLTAGE CALCULATED IN ACCORDANCE WITH RULE 64-202 1) AND 2); AND
3. C) THE RATED SHORT-CIRCUIT CURRENT.
INSTALL ON DISCONNECT CEC 64-200-1





Step Three

Requirements for Building Permits for Solar PV Systems

A building permit may be required if new elements are constructed to support the system. To confirm the loads involved are acceptable without structural changes, complete “Structural Review Checklist of PV Array Mounting System” located at the end of this guideline and attach to the electrical permit documentation.

This guideline will help you understand when a building permit (structural) may be required for installing Solar PV systems on the roofs of residential buildings in the RMWB under Alberta Building Code Part 9.

[Apply for a Building Permit](#)

It is the responsibility of the owner to ensure the building can withstand the loads from the system being installed and the array will not be torn off in the wind. The Solar PV array will add loads (such as from its weight and from wind) on the building which it is installed. In most cases these loads are small, but the building structure must have the ability to support those loads and/or reactions.





A building permit and inspection are required when reinforcement elements are necessary and constructed. In general, the weight, footprint, and layout in relation to overhangs and height of a Solar PV system determine the need for involving an engineer to design structural support elements. Engineers are to be involved where there is a need to reinforce the roof.

If the installation of Solar PV modules on a roof of a residential building falls within the following conditions, then the addition of the Solar PV array should not require additional structural support. This applies to flat roof and sloped roofs and roofs of rafter or truss construction. Permit applicants are to confirm loads for the building permits requirements found at the end of this document.

- 1) The roof must follow Part 9 of the [National Building Code 2023 Alberta Edition](#). Modern structures are built with factors of safety large enough to account for the small loads imposed by a Solar PV array. For older buildings or those built with non-standard construction practices, the structural members would need evaluation to ensure structural integrity.
- 2) The Solar PV array's distributed (dead) weight must be less than 5 pounds per square foot (24.4 kg/m²) and the roofing is a single layer of lightweight material (such as asphalt shingles, cedar shakes, or metal).
- 3) The Solar PV module's connections to the roof must result in the array's weight being evenly distributed. The maximum point load shall be less than 50 pounds (22.7 kg) per roof connection.
- 4) The Solar PV array will be mounted close to the surface of the roof with a maximum height of 18" (46 cm) above the roof surface. Modules must be below or flush to the roof ridge on sloped roofs and they cannot extend beyond the roof edges on all sides of the building. Solar modules must **not** be installed on any overhang area of the roof unless accompanied by a review of a Structural Engineer.
- 5) Solar PV racking systems **MUST** be approved. They can be certified by (1) A Certification Body accredited by the Standards Council of Canada or (2) Inspected by an Inspection Body under SPE 1000 to test for bonding/grounding accompanied with a separate engineering evaluation for structural capabilities.





Structural Review Checklist of Solar PV Array Mounting System

Is the array to be mounted on a defined, permitted roof structure? | Yes | No
If no due to non-compliant roof, provide engineering review.

Is any portion of the array on an overhang area of the roof? | Yes | No
If yes, provide engineering review.

Roof Information

1. Is the roofing type lightweight (Yes = shingles, shakes, metal, lightweight masonry) | Yes | No
If no, provide engineering review (No = heavy masonry, slate, etc....).

2. Does the roof have a single roof covering? | Yes | No
If no, provide engineering review.

3. Provide method and type of weatherproofing roof penetrations (e.g. flashing, caulk)

Mounting System Information

1. Is the mounting structure an engineered product designed to mount PV modules with no more than an 18" gap beneath the module frames? | Yes | No
If no, provide details of structural attachment certified by a design professional.

2. For the racking system, fill out information on the mounting system below:

a. Total Weight of PV Modules and Rails _____lbs

b. Total Number of Attachment Points _____

c. Weight per Attachment Point ($a \div b$) _____lbs (if greater than 50 lbs, provide engineering)

d. Maximum Spacing Between Attachment Points on a Rail _____inches
(see product manual for maximum spacing allowed based on maximum design wind speed)





e. Total Surface Area of PV Modules (square feet) _____ ft²

f. Distributed Weight of PV Module on Roof ($a \div e$) _____ lbs/ft²

***If distributed weight of the PV system is greater than 5 lbs/ft², you are required to provide engineering. ***

If you have questions regarding this guideline, please contact the Safety Codes branch by email at inspections@rmwb.ca or call 780-743-7813 and ask to speak with an Electrical Safety Codes Officer or visit us in person at 9909 Franklin Avenue.

