

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



# CITY OF PORTLAND

# BUILDING PERMIT

This is to certify that STEPHEN JAMES HAWKES

Located At 70 DEMEREST ST

Job ID: 2012-06-4193-ALTR

CBL: 410- F-005-001

has permission to Adding 12 Solar Panels to roof

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

**Fire Prevention Officer**

**Code Enforcement Officer / Plan Reviewer**

**THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY  
PENALTY FOR REMOVING THIS CARD**

## BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: [buildinginspections@portlandmaine.gov](mailto:buildinginspections@portlandmaine.gov)

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

### Final Inspection

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



# PORTLAND MAINE

*Strengthening a Remarkable City, Building a Community for Life* • [www.portlandmaine.gov](http://www.portlandmaine.gov)

Acting Director of Planning and Urban Development  
Gregory Mitchell

Job ID: 2012-06-4193-ALTR

Located At: 70 DEMEREST ST

CBL: 410- F-005-001

## **Conditions of Approval:**

### **Building**

Separate permits are required for any electrical, plumbing, sprinkler, fire alarm HVAC systems, heating appliances, commercial hood exhaust systems and fuel tanks. Separate plans may need to be submitted for approval as a part of this process.

**City of Portland, Maine - Building or Use Permit Application**

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No: 2012-06-4193-ALTR	Date Applied: 6/8/2012	CBL: 410- F-005-001	
Location of Construction: 70 DEMEREST ST	Owner Name: STEPHEN JAMES HAWKES	Owner Address: 70 DEMEREST ST. PORTLAND, ME 04103	Phone:
Business Name:	Contractor Name: REVISION ENERGY	Contractor Address: 142 PRESUMPCOT STREET, PORTLAND, ME 04103	Phone: (207) 221-6342
Lessee/Buyer's Name:	Phone:	Permit Type: BLDG ADD	Zone: R-3
Past Use: Single Family Dwelling	Proposed Use: Same: Single Family Dwelling - to add 12 solar electric panels on the roof & connecting into the utility grid	Cost of Work: \$12,000.00	CEO District:
		Fire Dept: <input type="checkbox"/> Approved <input type="checkbox"/> Denied <input type="checkbox"/> N/A	Inspection: Use Group: Type: <i>Star</i>
		Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>
Proposed Project Description: Adding 12 Solar Panels to roof		Pedestrian Activities District (P.A.D.)	
Permit Taken By: Brad		<b>Zoning Approval</b>	

- This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
- Building Permits do not include plumbing, septic or electrical work.
- Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.

Special Zone or Reviews	Zoning Appeal	Historic Preservation
<input type="checkbox"/> Shoreland <input type="checkbox"/> Wetlands <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan  Date: <i>ok</i> <i>6/15/12</i> ___ Maj ___ Min ___ MM	<input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied  Date:	<input checked="" type="checkbox"/> Not in Dist or Landmark <input type="checkbox"/> Does not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied  Date: <i>[Signature]</i>

**CERTIFICATION**

I hereby certify that I am the owner of record of the named property, or 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 his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT ADDRESS DATE PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE DATE PHONE



# General Building Permit Application

Entered 6/8/12  
R-3  
13

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: <u>70 Demerest St</u>		
Total Square Footage of Proposed Structure/Area	Square Footage of Lot	Number of Stories
Tax Assessor's Chart, Block & Lot Chart#      Block#      Lot#  <u>410      7005</u>	Applicant: (must be owner, lessee or buyer) Name <u>Revision Energy</u> Address <u>142 Presumpscot St</u> City, State & Zip <u>Portland, ME 04103</u>	Telephone:  <u>221-6342</u>  <u>12000</u>
Lessee/DBA <b>RECEIVED</b>  <b>JUN 08 2012</b>  Dept. of Building Inspections City of Portland Maine	Owner: (if different from applicant) Name <u>Stephen Hawkes</u> Address <u>70 Demerest St</u> City, State & Zip <u>Portland, ME 04103</u>	Cost of Work: <u>\$11,233</u> C of O Fee: \$ _____ Historic Review: \$ _____ Planning Amin.: \$ _____  Total Fee: \$ <u>140.00</u>
Current legal use (i.e. single family) <u>single family</u> Number of Residential Units _____ If vacant, what was the previous use? _____ Proposed Specific use: _____ Is property part of a subdivision? _____ If yes, please name _____ Project description: <u>Adding (12) solar electric panels to roof and connecting into utility grid</u>		
Contractor's name: <u>Revision Energy</u> Email: _____ Address: <u>142 Presumpscot St</u> City, State & Zip: <u>Portland, ME 04103</u> Telephone: <u>221-6342</u> Who should we contact when the permit is ready: <u>Jennifer Hatch</u> Telephone: _____ Mailing address: <u>142 Presumpscot St Portland, ME 04103</u>		

**Please submit all of the information outlined on the applicable checklist. Failure to do so will result in the automatic denial of your permit.**

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information or to download copies of this form and other applications visit the Inspections Division on-line at [www.portlandmaine.gov](http://www.portlandmaine.gov), or stop by the Inspections Division office, room 315 City Hall or call 874-8703.

and I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature: J Hatch Date: 6/8/2012

**This is not a permit; you may not commence ANY work until the permit is issued**



# PORTLAND MAINE

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Receipts Details:

**Tender Information:** Check , Check Number: 64708

**Tender Amount:** 140.00

Receipt Header:

**Cashier Id:** bsaucier

**Receipt Date:** 6/8/2012

**Receipt Number:** 44788

Receipt Details:

Referance ID:	6832	Fee Type:	BP-Constr
Receipt Number:	0	Payment Date:	
Transaction Amount:	140.00	Charge Amount:	140.00
Job ID: Job ID: 2012-06-4193-ALTR - Adding 12 Solar Panels to roof			
Additional Comments: 70 Demerest			

Thank You for your Payment!



Professional design, installation and service of renewable energy systems

June 8, 2012

City of Portland  
389 Congress Street  
Portland, ME 04101

RE: ReVision Energy Solar Installation at 70 Demerest Street

Dear Code Enforcement,

ReVision Energy has been contracted to design and install a solar electric (PV) system at the above address in Portland. This letter is to confirm that all work will be performed by licensed and qualified installers, expert in the field and in compliance with both manufacturer's recommendations and all applicable local and state codes and standards. This also confirms that the roof structure can handle the weight of the panel load, in addition to snow load. The weight of the panels does not change the structural integrity of the building.

ReVision Energy employs licensed engineers, plumbers, and electricians and carries the solar industries highest certifications (NABCEP) in both solar thermal and photovoltaic installation. We're committed to high quality, code compliant work and look forward to working together with the city and the CEO to ensure that all your requirements and needs are met and that our customer ends up with a system that is beautiful, functional and safe.

Electrical and grounding:

All electrical work to be performed by a licensed ME electrician and will conform to NEC 2011 revision as well as NABCEP standards. Specifically, wiring and grounding of the photovoltaic system will be governed by manufacturer's recommendations and article 690. All installed metal components are grounded via the grounding electrode conductor.

If you have any questions or concerns, we'd like to address them as quickly and completely as possible. Please don't hesitate to call or e mail anytime.

Respectfully,

Fortunat Mueller, P.E.  
Co-owner  
ReVision Energy  
(207) 752-6358  
fortunat@revisionenergy.com

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**Bangor**  
207-570-4222

**Liberty**  
207-589-4171

**Portland**  
207-221-6342

**Portsmouth**  
603-486-7170



Professional design, installation and service of renewable energy systems

## 2.9 Kilowatt Grid-Tied Photovoltaic System Proposal

Client: Stephen & Michelle Hawkes  
 Address: 70 Demerest Street, Portland, ME 04103  
 Date: 18 April 2012



**Array Location**

**Roof Orientation:**  
 160 degrees  
 (south/southeast)

**Roof Pitch:**  
 7:12  
 30 degree angle

**Roof Material:**  
 Asphalt shingle

### Project Summary

System	Performance	Cost	Incentives	Net Cost
2.9 kw kilowatt grid-tied PV array coupled with an SMA 2500HF grid-tied inverter.	<ul style="list-style-type: none"> <li>Produce roughly 3,600 kilowatt hours of clean, renewable electricity annually.</li> <li>Offset roughly 4,800 lbs. of CO2 emissions annually.</li> </ul>	\$11,233 Installed	-(\$3,370) Fed tax credit  -(\$2,000) State rebate	\$5,863

### System Overview

Based on an evaluation of your electricity demand and rooftop solar gain, ReVision Energy proposes a roof-mounted photovoltaic array of 2.88 kilowatts (nominal), utilizing 12 Canadian Solar 240-watt photovoltaic panels and an SMA inverter. The panels will be flush mounted using an IronRidge aluminum rail mounting system and the total array area will be roughly 220 sq. ft.

**Liberty**  
 207-589-4171

**Portland**  
 207-221-6342

**Exeter, NH**  
 603-501-1822

[www.revisionenergy.com](http://www.revisionenergy.com)



# CS6P-230/235/240/245/250M

## Electrical Data

STC	CS6P-230M	CS6P-235M	CS6P-240M	CS6P-245M	CS6P-250M
Nominal Maximum Power (Pmax)	230W	235W	240W	245W	250W
Optimum Operating Voltage (Vmp)	29.9V	30.1V	30.2V	30.3V	30.4V
Optimum Operating Current (Imp)	7.70A	7.82A	7.95A	8.09A	8.22A
Open Circuit Voltage (Voc)	37.1V	37.2V	37.3V	37.4V	37.5V
Short Circuit Current (Isc)	8.22A	8.34A	8.46A	8.61A	8.74A
Module Efficiency	14.30%	14.61%	14.92%	15.23%	15.54%
Operating Temperature	-40°C~+85°C				
Maximum System Voltage	1000V (IEC) /600V (UL)				
Maximum Series Fuse Rating	15A				
Application Classification	Class A				
Power Tolerance	0 ~ +5W				

Under Standard Test Conditions (STC) of irradiance of 1000W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature of 25°C

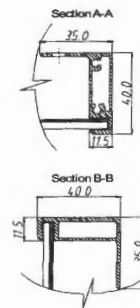
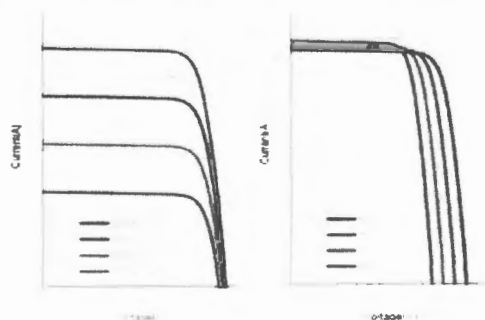
NOCT	CS6P-230M	CS6P-235M	CS6P-240M	CS6P-245M	CS6P-250M
Nominal Maximum Power (Pmax)	166W	170W	173W	177W	180W
Optimum Operating Voltage (Vmp)	27.3V	27.5V	27.5V	27.6V	27.7V
Optimum Operating Current (Imp)	6.09A	6.18A	6.29A	6.40A	6.51A
Open Circuit Voltage (Voc)	34.0V	34.1V	34.2V	34.3V	34.4V
Short Circuit Current (Isc)	6.65A	6.75A	6.85A	6.97A	7.08A

Under Normal Operating Cell Temperature, Irradiance of 800 W/m<sup>2</sup>, spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s

## Mechanical Data

Cell Type	Mono-crystalline 156 x 156mm, 2 or 3 Busbars
Cell Arrangement	60 (6 x 10)
Dimensions	1638 x 982 x 40mm (64.5 x 38.7 x 1.57in)
Weight	20kg (44.1 lbs)
Front Cover	3.2mm Tempered glass
Frame Material	Anodized aluminium alloy
J-BOX	IP65, 3 diodes
Cable	4mm <sup>2</sup> (IEC)/12AWG(UL), 1100mm
Connectors	MC4 or MC4 Comparable
Standard Packaging (Modules per Pallet)	24pcs
Module Pieces per container (40 ft. Container)	672pcs (40'HQ)

## I-V Curves (CS6P-250M)



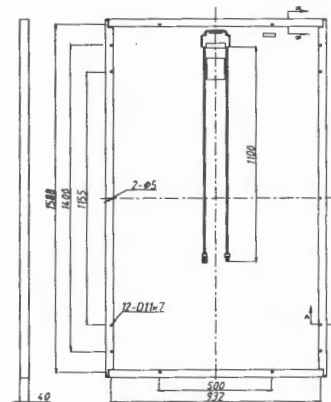
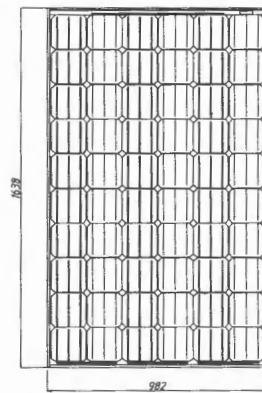
## Temperature Characteristics

Temperature Coefficient	Pmax	-0.45%/°C
	Voc	-0.35%/°C
	Isc	0.060%/°C
Normal Operating Cell Temperature		45±2°C

## Performance at Low Irradiance

Industry leading performance at low irradiation environment, +95.5% module efficiency from an irradiance of 1000w/m<sup>2</sup> to 200w/m<sup>2</sup> (AM 1.5, 25°C)

## Engineering Drawings



\*Specifications included in this datasheet are subject to change without prior notice.

## About Canadian Solar

Canadian Solar Inc. is one of the world's largest solar companies. As a leading vertically-integrated manufacturer of ingots, wafers, cells, solar modules and solar systems. Canadian Solar delivers solar power products of uncompromising quality to worldwide customers. Canadian Solar's world class team of professionals works closely with our customers to provide them with solutions for all their solar needs.

Canadian Solar was founded in Canada in 2001 and was successfully listed on NASDAQ Exchange (symbol: CSIQ) in November 2006. Canadian Solar has already expanded its module manufacturing capacity to 2.05GW and cell manufacturing capacity to 1.3GW in 2011.

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 Kitchener, Ontario | Canada N2K 3S2  
 Tel: +1-519-954-2057  
 Fax: +1-519-578-2097  
 inquire.ca@canadiansolar.com  
 www.canadiansolar.com

## IRONRIDGE XR ROOF MOUNT PLATFORM

### KEY FEATURES

- ◆ Extruded aluminum components are lightweight for easy handling yet strong enough for most roof mount applications
- ◆ Choice of XRL (lightweight) and XRS (standard) rails
- ◆ Both XRL and XRS rails come with slots for attaching L-feet and top slots for attaching panel clamps
- ◆ XRS rails has slot for bottom mounting clamps
- ◆ Hidden internal splice bars are aesthetically pleasing
- ◆ Internal splices provide superior strength and flexibility with L-feet placement
- ◆ Adjustable L-feet have vertical extension slots for easy adjustability of up to 1-3/8"
- ◆ Standoffs provide increased airflow and ventilation and enable precise placement of flashings
- ◆ Standoffs come in four standard heights: 3", 4", 6", and 7"
- ◆ XR platform compatible with popular flashings including QuickMount and Oatey
- ◆ Panel clamps for both top and bottom mounting
- ◆ Panel clamps for most popular photovoltaic modules
- ◆ Mid-clamp design maximizes panel density
- ◆ Ground clips eliminate the need for copper wire between modules
- ◆ The XR Roof Mount components are covered with an industry-leading 10 year limited product warranty and a 5 year limited finish warranty
- ◆ All XR Roof Mount components are PE certified



The IronRidge XR platform is a reliable, comprehensive, and feature rich photovoltaic mounting solution. Anchored by the XRS (Standard) and XRL (Light) rails, the XR platform includes all of the components necessary for supporting virtually any commercial or residential roof mount installation, regardless of surface material or roof grade.

The XRS and XRL rails are manufactured from extruded aluminum to maximize spans while minimizing weight for improved handling. The graceful curves of the XRS rail will please even the most aesthetically demanding customers. Rails can be extended with the IronRidge patent-pending internal splice bars, providing a strong support connection and ultimate flexibility in footing attachment locations. Installers have a variety of options in attaching IronRidge rails to the roof, including adjustable L-feet, aluminum standoffs, and tilt legs for optimizing power. In addition, IronRidge accommodates modules from most major manufacturers. Top-down panel clamps securely grip the outside frame of the module, freeing the installer from the constraints of panel mounting holes. The XRS rail has an additional side slot to enable the option of bottom mounting. Lastly, grounding clips pierce the anodized rails, creating a ground path through the equipment and eliminating the need to run copper wire between every module.

IronRidge provides a complete technical support system that includes step-by-step installation guides, engineering certification documentation, easy-to-read span charts, and on-line configurator software.

See reverse for product specifications and ordering information. Please contact your local distributor for configuration assistance.

**SPECIFICATIONS**

- ◆ XRL/XRS Rail – 6105-T5 extruded anodized aluminum
- ◆ XRL/XRS Splice Bars – 6105-T5 extruded aluminum
- ◆ Standoffs – 6105-T5 extruded aluminum
- ◆ L-feet: 6105-T5 extruded aluminum
- ◆ Clamps: 5052-H32 aluminum
- ◆ Hardware: 18-8 Stainless Steel

**XRS PROPERTIES**

- ◆ Area = .807136 inches<sup>2</sup>
- ◆ Centroid relative to output coordinate system origin
  - ◆ X = 0.5556
  - ◆ Y = 1.4097
  - ◆ Z = 120.000
- ◆ Moments of Inertia of the area (at the centroid)
  - ◆ Lxx = 0.8430
  - ◆ Lxy = 0.1117
  - ◆ Lxz = 0.0000
  - ◆ Lyx = 0.1117
  - ◆ Lyy = 0.1822
  - ◆ Lyz = 0.0000
  - ◆ Lzx = 0.0000
  - ◆ Lzy = 0.0000
  - ◆ Lzz = 1.0252
- ◆ Polar Moment of Inertia
  - ◆ At Centroid = 1.0252<sup>4</sup>
- ◆ Principal Moments of Inertia
  - ◆ Ix = 0.1638
  - ◆ Iy = 0.8614
- ◆ Principal-Axis Angles
  - ◆ Angle = 99.343 degrees
- ◆ Moments of Inertia (output)
  - ◆ LXX = 11625.205
  - ◆ LXY = 0.5204
  - ◆ LXZ = 53.8153
  - ◆ LYX = 0.5204
  - ◆ LYY = 11623.1909
  - ◆ LYZ = 136.5369
  - ◆ LZx = 53.8153
  - ◆ LZY = 136.5369
  - ◆ LZZ = 2.8784

**ORDERING INFORMATION**

XR Rails		
Part Number	Description	Weight
51-7000-144a	XRS Standard Rail (1) – 12 feet	11.364 lbs
51-7000-168a	XRS Standard Rail (1) – 14 feet	13.258 lbs
51-7000-192a	XRS Standard Rail (1) – 16 feet	15.152 lbs
51-7000-216a	XRS Standard Rail (1) – 18 feet	17.046 lbs
51-6000-144a	XRL Light Rail (1) – 12 feet	6.288 lbs
51-6000-168a	XRL Light Rail (1) – 14 feet	7.336 lbs
51-6000-192a	XRL Light Rail (1) – 16 feet	8.384 lbs
51-6000-216a	XRL Light Rail (1) – 18 feet	9.432 lbs
29-7000-010	XRS Splice Kit (1)	0.442 lbs
29-7000-000	XRL Splice Kit (1)	0.151 lbs
Panel Clamps		
Part Number	Description	Weight
29-7000-xxx	End Clamps (4) – depends on panel	.251-.290 lbs
29-7000-10x	Mid Clamps (4) – depends on panel	.213-.251 lbs
29-7000-117	Under Clamps (4)	0.324 lbs
Footing Attachments & Flashings		
Part Number	Description	Weight
29-7000-017	L-foot Kit (4)	0.872 lbs
51-600x-500	3"-7" Standoffs – Specify L-foot or Tilt leg	.533-.710 lbs
31-1000-001	Oatey Galvanized Flashing 11830 (12)	8.750 lbs
31-1000-000	QuickMount QMSCA12 (12)	13.390 lbs
51-7200-0xx	Tilt Legs (7" – 40")	.0658 lbs/inch
51-7210-000	Tilt Leg Bracket	1.576 lbs
Grounding		
Part Number	Description	Weight
29-4000-001	WEEB DMC-Clip (100)	0.258 lbs
29-4000-002	WEEB Grounding Lug (100)	12.356 lbs
29-4000-003	WEEB Bonding Jumper (100)	17.614 lbs
29-4000-006	WEEB ACC-PV Wire Clip (100)	0.625 lbs

**L-FOOT DIMENSIONS**

