



The BP 4160 photovoltaic module provides superior performance when operating DC loads directly or, in an inverter-equipped system, AC loads. Its 72 enhanced-efficiency monocrystalline silicon cells in series charge 24-volt batteries efficiently in virtually any climate. With 160 watts of nominal maximum power, it is well-suited to utility grid-supplemental systems and traditional applications of photovoltaics such as telecommunications, remote villages and clinics, water pumping, and land-based aids to navigation.

The BP 4160S and 4160H use our Universal frame, the strongest in the industry.

### Proven Materials and Construction

BP Solar's quarter-century of field experience shows in every aspect of this module's construction and materials:

- 72 monocrystalline silicon solar cells in series, efficiency enhanced by improved cell coating;
- Cells are laminated between sheets of ethylene vinyl acetate (EVA) and high-transmissivity low-iron 3mm tempered glass;
- Frame strength exceeds requirements of certifying agencies.



### DC Connectors

### Output Options

The BP 4160 is offered with two output options: Connector-equipped cables or a junction box.

**BP 4160S and BP 4160L** output is via heavy-duty AWG #12 (3.3mm<sup>2</sup>) output cables with polarized weather-proof DC-rated connectors which provide reliable low-resistance connections, eliminate wiring errors, and speed installation. Asymmetrical cables enable side-by-side or end-to-end module placement in arrays.



### Clear Anodized Universal Frame

**BP 4160H** output is via our Type B junction box. This junction box is raintight (IP65 rated), and accepts PG13.5 cable fittings. Equipped with a versatile 5-terminal Euro-style connection block, it enables most system array connections (putting modules in series or parallel) to be made right in the junction box. Two cable fittings that accept cable with a diameter between 6-12mm are included with each BP 4160H module.

### Limited Warranties

- Power output for 25 years;
- Freedom from defects in materials and workmanship for 5 years.

See our website or your local representative for full terms of these warranties.



BP 4160S



## Quality and Safety

These products are manufactured in our ISO 9001-certified factories to demanding specifications, and conform to European Community Directives 89/33/EEC, 73/23/EEC, and 93/68/EEC. The BP 4160S and 4160H are:

- certified by TÜV Rheinland as Class II equipment for use in systems up to 1000 VDC;
- listed by Underwriter's Laboratories for electrical and fire safety (Class C fire rating);
- comply with the requirements of IEC 61215, including:
  - repetitive cycling between -40°C and 85°C at 85% relative humidity;

- simulated impact of 25mm (one-inch) hail at terminal velocity;
- 2200 VDC frame/cell string isolation test;
- static loading, front and back, of 2400 pascals (50 psf);
- front loading (e.g. snow) of 5400 pascals (113 psf).

The BP 4160L is recognized by Underwriter's Laboratories for electrical and fire safety.

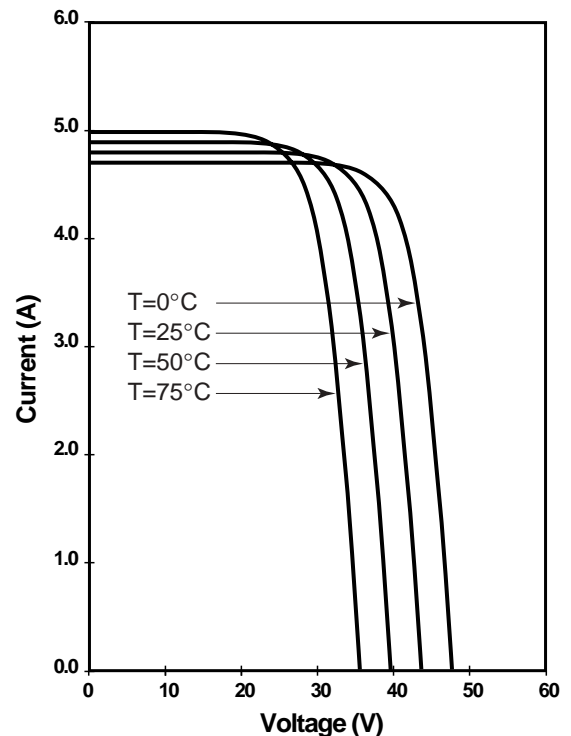
## Electrical Characteristics<sup>1</sup>

	BP 4170	BP 4160	BP 4150
Maximum power ( $P_{max}$ ) <sup>2</sup>	170W	160W	150W
Voltage at $P_{max}$ ( $V_{mp}$ )	35.6V	35.4V	34.8V
Current at $P_{max}$ ( $I_{mp}$ )	4.78A	4.52A	4.33A
Warranted minimum $P_{max}$	161.5W	152W	142.5W
Short-circuit current ( $I_{sc}$ )	5.1A	4.9A	4.75A
Open-circuit voltage ( $V_{oc}$ )	44.4V	44.2V	43.6V
Temperature coefficient of $I_{sc}$	(0.065±0.015)%/°C		
Temperature coefficient of voltage	-(160±20)mV/°C		
Temperature coefficient of power	-(0.5±0.05)%/°C		
NOCT <sup>3</sup>	47±2°C		
Maximum series fuse rating	20A (H version) 15A (S,L versions)		
Maximum system voltage	600V (U.S. NEC rating) 1000V (TÜV Rheinland rating)		

## Notes

1. These data represent the performance of typical BP 4170, 4160 and 4150 modules and laminates as measured at their output connectors. The data are based on measurements made in accordance with ASTM E1036 corrected to SRC (Standard Reporting Conditions, also known as STC or Standard Test Conditions), which are:
  - illumination of 1 kW/m<sup>2</sup> (1 sun) at spectral distribution of AM 1.5 (ASTM E892 global spectral irradiance);
  - cell temperature of 25°C.
 The power of solar cells varies in the normal course of production; specifications of these products reflect that variation.
2. During the stabilization process which occurs during the first few months of deployment, module power may decrease approximately 3% from typical  $P_{max}$ .
3. The cells in an illuminated module operate hotter than the ambient temperature. NOCT (Nominal Operating Cell Temperature) is an indicator of this temperature differential, and is the cell temperature under Standard Operating Conditions: ambient temperature of 20°C, solar irradiation of 0.8 kW/m<sup>2</sup>, and wind speed of 1m/s.

## BP 4160 I-V Curves



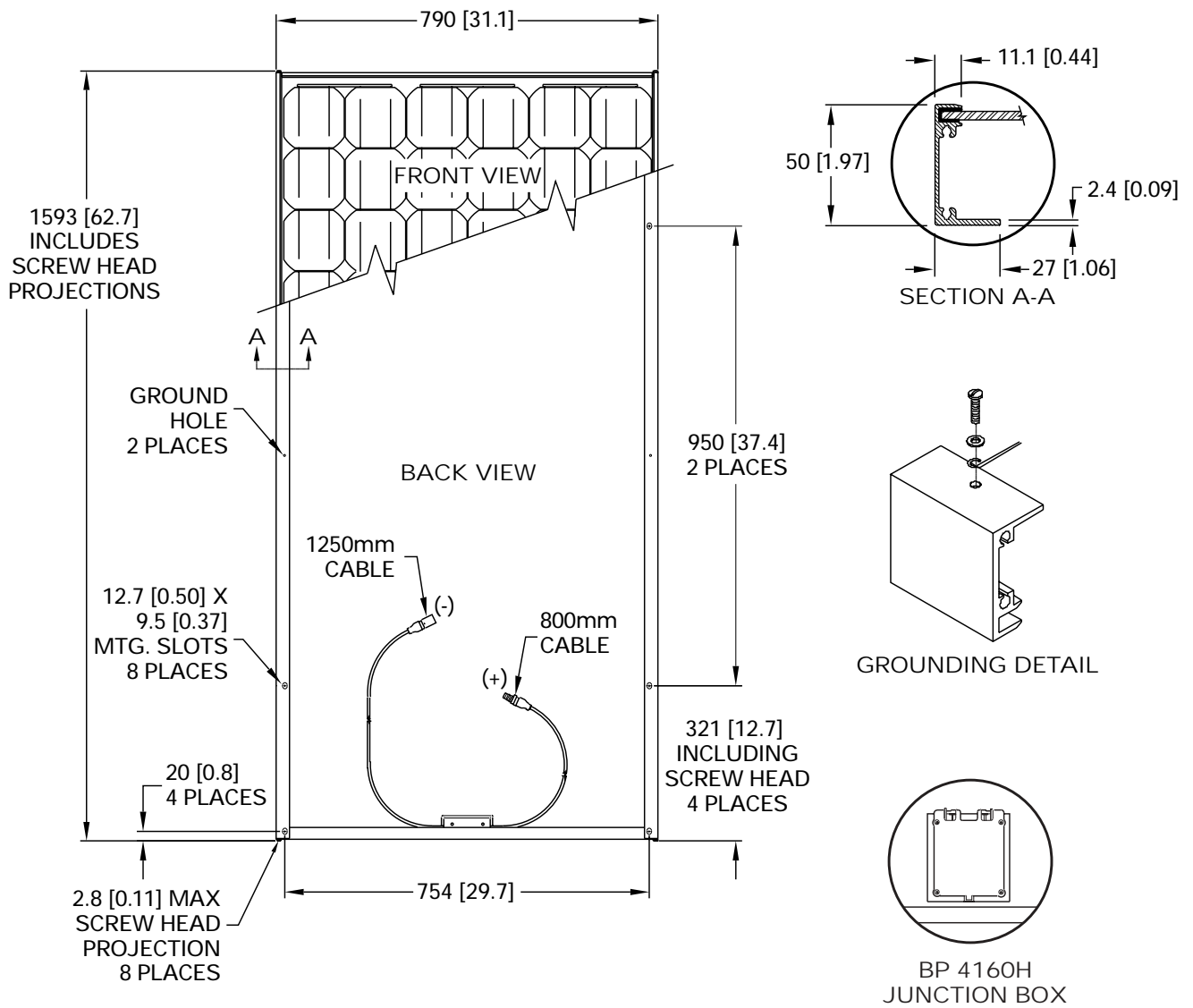
## Mechanical Characteristics

### Weight

BP 4160S, 4160H 15.4 kg (34 pounds)  
 BP 4160L 12.4 kg (27.3 pounds)

### Dimensions

BP 4160S, 4160H: See drawing  
 BP 4160L: 1580 [62.2] x 783 [30.8] x 19 [0.75]  
 Dimensions in brackets are in inches.  
 Unbracketed dimensions are in millimeters  
 Overall tolerances  $\pm 3\text{mm}$  (1/8")



**BP 4160S**



This publication summarizes product warranty and specifications, which are subject to change without notice and should not be used as the definitive source of information for final system design. Additional warranty and technical information may be found on our website [www.bpsolar.com](http://www.bpsolar.com) or may be obtained from your local representative.



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