



SolarRoofs.com, Inc.

Wholly owned by ACR Solar International Corp.
5840 Gibbons Dr. Suite G Carmichael, CA 95608 (916) 481-7200



“Skyline” Open Loop System 3

SRCC OG300 Rated Systems

Permit Set

October 1, 2007

The solar energy system described by this manual, when properly installed and maintained meets or Exceeds the minimum standards established by the Solar Rating and Certification Corporation (SRCC) and the collectors meet or exceed SRCC OG100 and FSEC minimum standards. This certification does not imply endorsement or warranty of this product by SRCC. (Note: SkyLine formerly Fireball)

System 3 Components

Skyline System 3 with PV Powered Circulator.

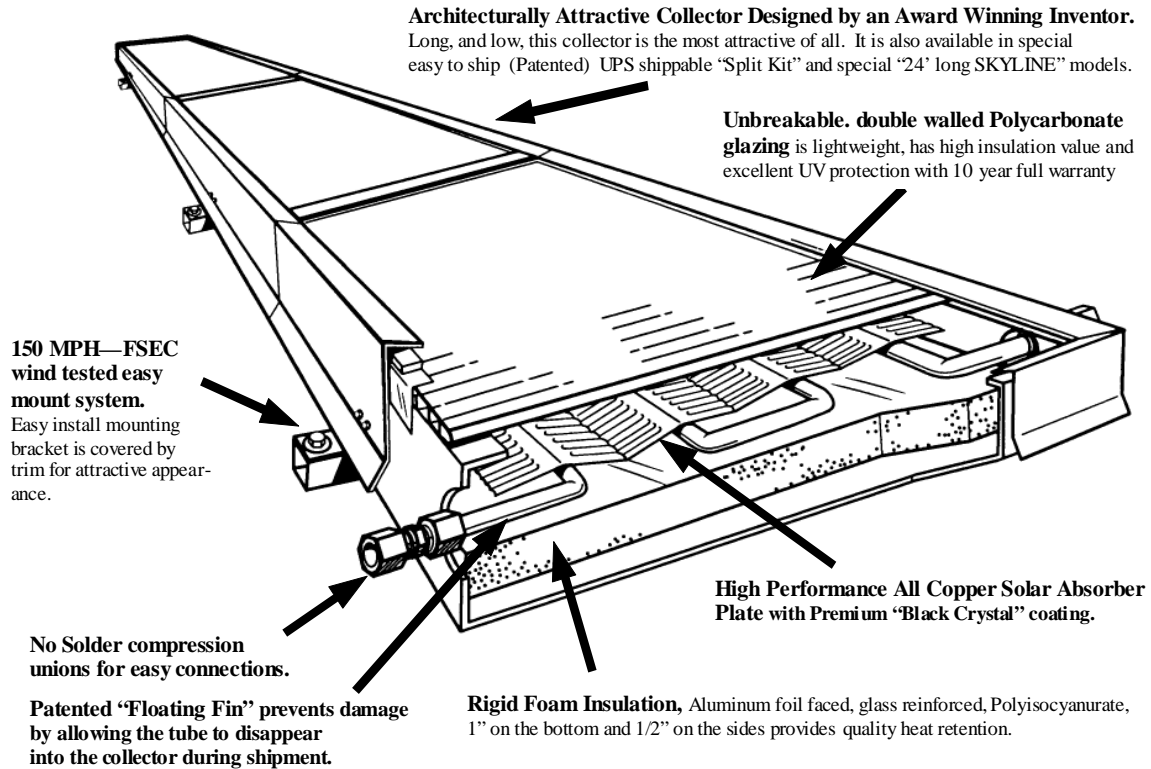
- Skyline 1001 or 2001 Collector(s), Split Kit, Single Piece or Parallel Flow,
- Includes 3 mounting rails and 6 EII brackets with 3 U brackets per additional collector.
- Solar Feed and Return line compression union and EII couplers.
- Air Vent, Pressure Relief Valve with Splash Pad.
- Very Light Freeze (VF01) Option: Thermal Freeze Valve.
- PV Panel with switch.
- Light Freeze* (FS03) Option: Recirculation freeze snap switch, 12 volt transformer.
- Storage Tank ‘Quick Connect’ unit including Isolation Ball Valves, Solar Loop Drain Hose Bibs and Check Valve.
- 12 Volt Electronic Pump and connections.
- 50’ 1/2” outside diameter copper solar loop lines.
- Solar loop installation parts kit including miscellaneous parts, fittings, screws, nuts, bolts, etc.,
- All hardware, two roof boots, 6' high temp. 1/2" wall high temperature insulation.
- 2 Thermometers, domestic hot water mixing valve.
- Installation Manual, Operation and Maintenance Manual (O & M manual) Quick Look Operation Guide Tag.

Tilt Kit (option) Tilts collectors approximately 18 degrees from existing roof angle, Other angles available on request. Tilt kits are used when a better winter angle is desired on a low pitch roof or to “re-orientate” panels to face south by running the panels up and down an East or West facing roof. See Special Instructions.

Optional Colors Include: Colonial (light) Gray (CO102), Tahoe Blue (CO103), Colonial Red (CO104), Forest Green (CO105), White (CO106), Buckskin Brown (CO107), Beaver (medium) Brown (CO108), C.B. (medium) Blue (CO110), Spanish Green (CO111), Storm/Slate (dark) Gray (CO112), Royal Brown (CO113), Ivory (CO114), Sea Blue (CO115), Leaf Green (CO116), Pebblestone Clay (CO117), Woodbeige (CO118), Peach (great on many light orange tile roofs) (CO119), Almond (CO120), Black (CO121), Adobe Tan (CO121), Classic Cream (CO122), Bronze (CO123), Heritage Cream (CO124), Marine Green (CO125).

Collector Weight is less than 2 Lb. Per Square Foot Dry, 2.035 Lb. per Square Foot Wet

SolarRoofs "Skyline" 10-01 and 20-01 Solar Collectors: These rugged, powerful 10 and 20 Square foot collectors weigh only 19 and 38 pounds. They are easy to carry by one person and are much safer to get on the roof to install. They are available in architectural colors and have an attractive appearance on the roof. No soldering is required to install the collector (s).



COLLECTOR SPECIFICATIONS:

Trim & Frame Materials: Finished 27 mil Aluminum Trim and Frame = Total 54 mil (1.37 mm)
 Absorber Material: "Black Crystal" or Black Chrome coated absorber with all copper 1/2" od tube
 Glazing: Twinwall Polycarbonate UV Treated .236" (6.0 mm)
 Dimension / Weight: 72" / 144.1"x 20"x 3" 19 / 38 lb = 1.9 lb. s/f (3.67 m x 0.51 m x 0.076 m 17.24 Kg) 18.4 net s/f (1.71 m²)
 Recommended Flow Rate: .20 to .6 GPM
 Maximum Working Pressure: 150 PSI (10.21 atm) Maximum Stagnation Temp: 250 °F (121.11 °C).
 Heat Transfer Fluid: Potable water or Propylene glycol - Fluid Capacity: 10-01 = .15 gal. / 20-01 = .3 gal.
 Standard Components: Mounting Ell brackets with tech screws and 2 1 1/4" washers.
 Color: Standard: Musket Brown or Dove Gray. Optional trim colors are available.

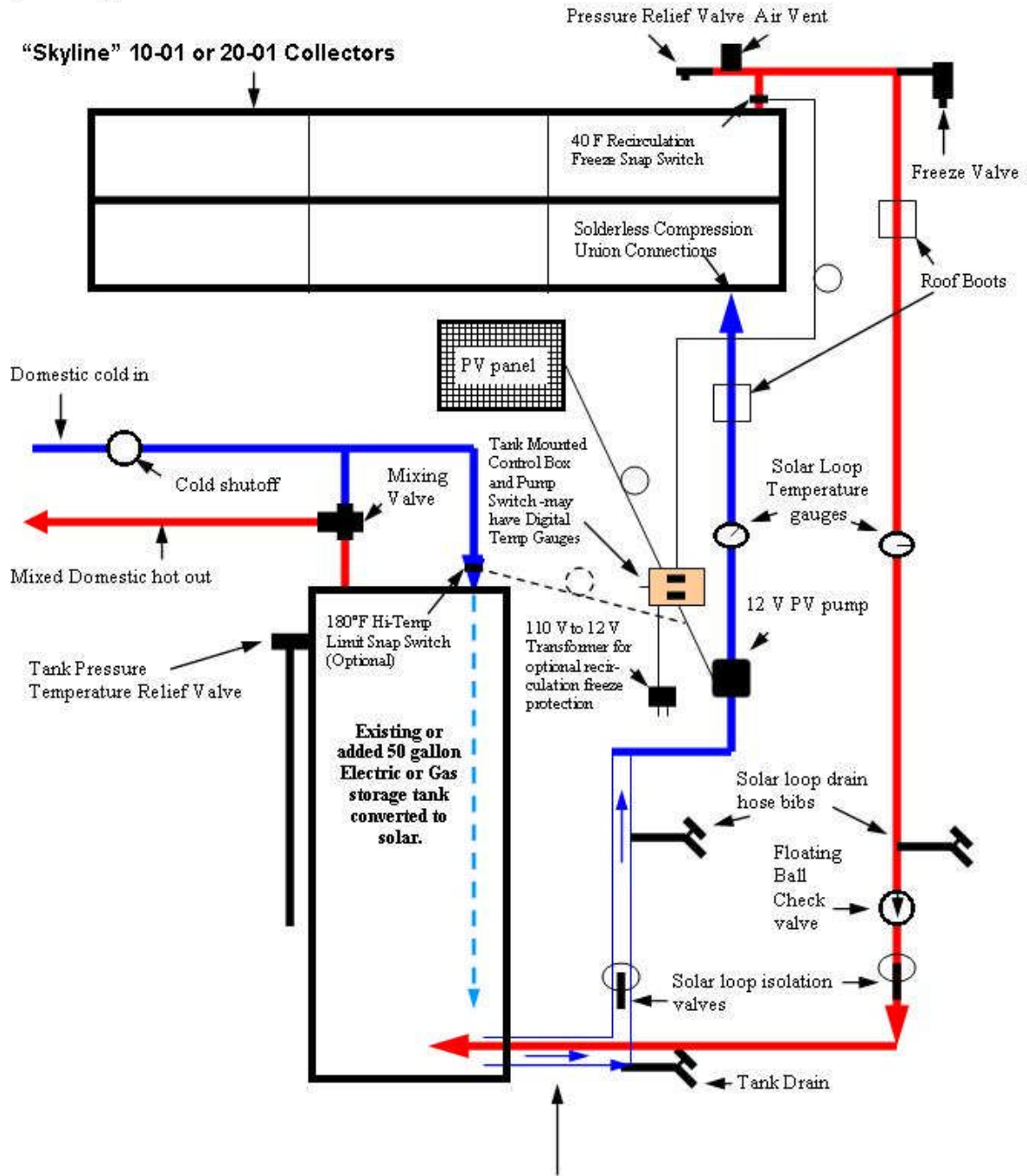
SolarRoofs 20-01 SRCC OG 100 Collector Rating:

| SOLAR COLLECTOR CERTIFICATION AND RATING | | COLLECTOR THERMAL PERFORMANCE RATING | | | |
|--|---|--------------------------------------|--|--|---|
| CERTIFIED SOLAR COLLECTOR | | Thousands of Btu Per Panel Per Day | | | |
| SOLAR SRCC CERTIFICATION | | CATEGORY (Ti-Ta) | CLEAR DAY 2000 Btu/ft ² -d | MILDLY CLOUDY 1500 Btu/ft ² -d | CLOUDY DAY 1000 Btu/ft ² -d |
| SRCC OG-100 | SUPPLIER: ACR Solar International 5840 Gibbons Dr. Suite G Carmichael, CA 95608 MODEL: Fireball Fireball 2001 COLLECTOR TYPE: Glazed Flat-Plate CERTIFICATION #: 100-2001-002A | A (-9 °F) | 23 | 17 | 12 |
| | | B (9 °F) | 20 | 15 | 9 |
| | | C (36 °F) | 17 | 11 | 6 |
| | | D (90 °F) | 10 | 6 | 1 |
| | | E (144 °F) | 6 | 2 | |
| | | | | | |

Web: www.SolarRoofs.com Email: richsolar@aol.com Phone: (916) 481-7200
Fax: (916) 481-7203 Address: 5840 Gibbons Drive Suite G, Carmichael CA 95608

Skyline System 3 OG300 Diagram

Skyline System 3 with bottom "Quick Connect"



SolarRoofs Tank Bottom "Quick Connect" Coaxial Connection

“Skyline” System 3 Solar Water Heater Specifications

COLLECTOR (Panel)

| | |
|---------------------------|--|
| Trim & Frame Materials: | Finished 27 mil Aluminum Trim and Frame = Total 54 mil (1.37 mm). |
| Insulation: | Bottom: 1" (2.54 cm) Foil Faced Celotex |
| Absorber Material: | “Black Crystal” coated - all Copper with compression unions. |
| Glazing: | .236" (6.0 mm) Twinwall Polycarbonate UV Treated |
| Dimension / Weight: | 10-01 - 72" x 20" x 3"; 19 lbs 2001-144.3"x 20."x 3" 38 lb |
| Fluid Capacity: | 1001 = .15 Gallons, 20-01 = .3 Gallons |
| Recommended Flow Rates: | .20 to .35 GPM (0.946 to 1.324 L/min) |
| Maximum Working Pressure: | 150 PSI (10.21 atm). |
| Maximum Stagnation Temp: | 250 °F (121.11 °C). |
| Heat Transfer Fluid: | Potable water |
| Standard Components: | 3 Mounting rails, mounting brackets, tech screws and lags |
| Color: | Musket Brown (C101 – default color) or Dove/Old Town Gray (C109) + optional colors |

PV (Photovoltaic) POWERED CIRCULATOR

| | |
|-------------|--|
| PV Panel: | 10 - 11 or 20 - 21 Watt, 12volt DC with switch. |
| Circulator: | 12 Volt - Laing D5 Solar, “El Sid,” or March 809 Pump. |

FREEZE PROTECTION

| | |
|----------------------|--|
| Type: | Freeze Valve - Passive Freeze Valve for light freeze protection down to 30F |
| Temperature to open: | Very light freeze (VF & LF) 40 °F - Starts to open and drip water at 40°F. |
| Type: | Light Freeze (LF) Recirculation with 40F Freeze Snap Switch for 12 Volt Circulator using 12 volt Transformer for light freeze protection down to 20F for up to 8 hours, includes switch box with diodes to prevent backflow. |
| Type: | Solar Loop quick shut off ball valve and drain valve set. |

CONNECTING LINES, INSULATION (standard)

| | |
|--|--|
| Tubing: | 1/2" (12.7 mm) OD copper - 50' (15.24 m) |
| Insulation, High Temperature (6' (1.83 m) supplied): | 1/2" (12.7 mm), 1/2" (13 mm) wall |

TUBING CONNECTION METHODS (standard)

| | |
|-------|---------------------------|
| Type: | Brass Union, Compression. |
|-------|---------------------------|

STORAGE TANK (Not Supplied)

| | |
|-----------------------|--|
| Standard Connections: | Use Existing 50 gallon minimum (189.27 L) tank for 1, 2 or 3 Collectors or 80 gallon (303 L) tank for 2 or 3 Collectors. |
| | Max. Temperature tank must withstand: 190 °F (87.77 °C) |
| | Max. Pressure tank must withstand: 150 psi (10.21 atm) |

Note: When a single electric tank is used, the lower element is to be disconnected from the upper element to meet SRCC guidelines.

CONTROL

| | |
|-------|--|
| Type: | 12 Volt PV Panel with switch which automatically regulates circulator operation. |
|-------|--|

Although we will make every effort to give notice, Specifications and prices subject to change without notice.

“Skyline” Open Loop System 3



Top: 2, 20-01 Stacked Collectors



Top Right: 4, 10-01 Stacked Collectors
(20-01 would be the same but with 3 rails)

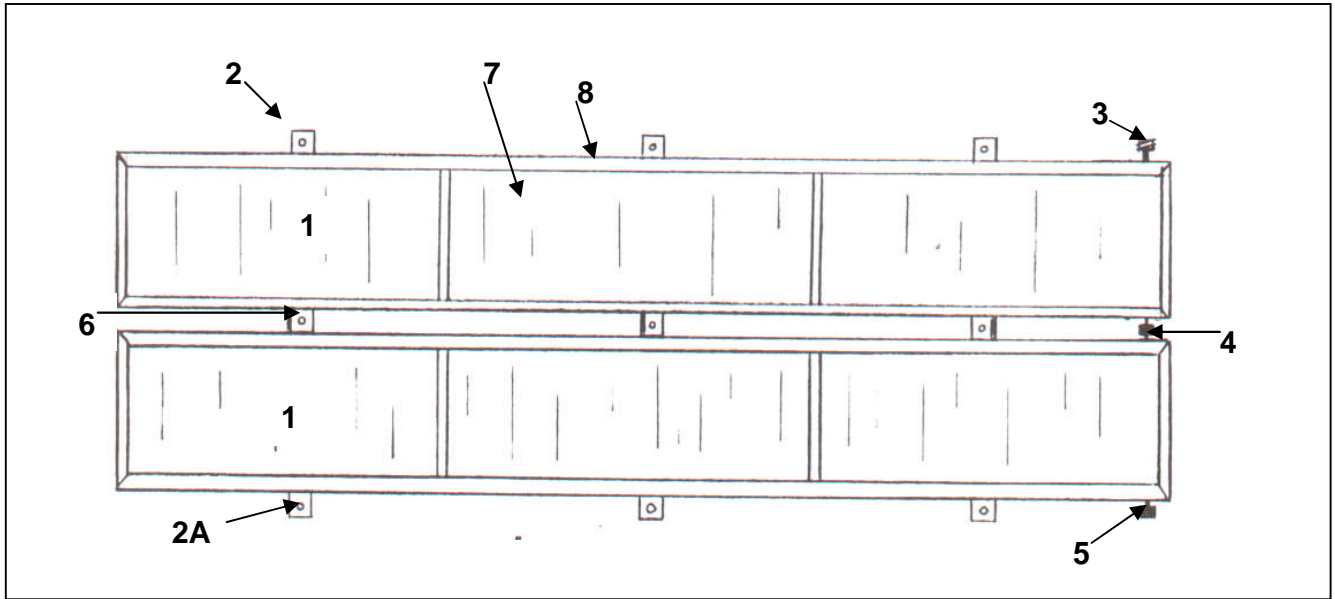


Right: 4, 10-01 Side by Side Collectors
(20-01 would be the same but with 6 rails)



Far Right: Storage Tank “Easy Connect “

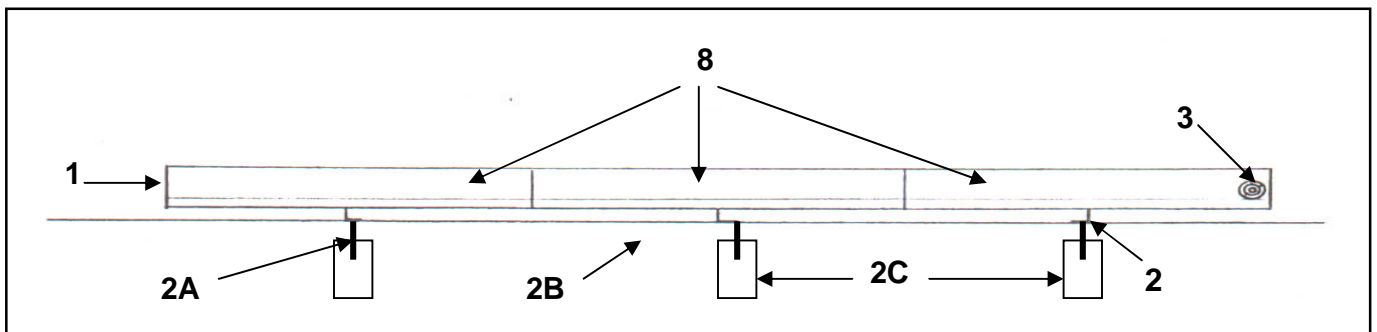
Two Collector Skyline 20-01 Top View (10-01 collectors use 2 rails about 1' in from the ends)



The Diagram above is a top view of two collectors installed together showing:

1. Two 20" x 12' Collectors mounted with connections to the right.
 2. The Mounting Rails with Mounting Brackets (3 rails and 6 Mounting Brackets plus 3 Quick Connect Clips (QCC) per additional collector set (6.), 3 two panel rails, 6 Mounting Brackets and 3 QCCs shown in this diagram).
 - 2A. Mounting Rail Lag holes top and bottom.
 3. The "Hot Out" Collector connection going to the storage tank.
 4. The between Collector connection.
 5. The "Cold In" Collector connection from the storage tank.
 6. The Quick Connect Clip bolts to the mounting rail here with the tabs overlapping the top of the collector.
 7. Collector Glazing (Lexan)
 8. Collector trim sections.

2001 Side View



The above Diagram shows a side view of the Collector installed on the roof and shows:

(Refer to Color Pictures for Details of Ell Brackets)

- | | |
|--|---|
| 1. Side view of a Collector. | 2C. Roof Rafter. |
| 2. Mounting Rails (3 per 20-01 collector). | 3. Collector feed or return connection. |
| 2A. Mounting Rail Lag. | 8. Collector Trim. |
| 2B. Roof sheathing. | |

LAGS AND RAFTERS:

For maximum strength, you want your mounting rail (2) lags (2A) to go into rafters. After locating the best area for the collector, "sound out" the roof for the rafters with a hammer and mark the rafter centers with chalk.



This product certified by
Solar Rating and Certification
Corporation
c/o FSEC, 1679 Clearlake Road
Cocoa, FL 32922

SRCC Document OG-300
Conformance to HUD UM 100

ACR Solar
International
5840 Gibbons Dr.
Carmichael, CA 95608

Model No: Fireball 2001
Gross Area:
1,897 m² (20,33 ft²)
Serial Number:

Mildly Cloudy Day
Rating in Category C

12 MJ/day
11 Mbtu/day

SOLAR COLLECTOR CERTIFICATION

FLORIDA SOLAR ENERGY CENTER
1679 Clearlake Road
Cocoa, FL 32922-5703



FSEC 00030

MANUFACTURED BY:
ACR Solar International Corp.
5840 Gibbons Dr., Suite G
Carmichael, California 95608

MODEL #
Fireball 2001

SERIAL #

has been tested for thermal performance and meets the minimum
standards established by the Florida Solar Energy Center as
directed by Section 377.705 Florida Statutes.

THERMAL PERFORMANCE RATINGS*

| | | |
|----------------------------------|---------------|----------------|
| Low Temp. (35°C, 95°F) | 19,000 kJ/day | 18,100 Btu/day |
| Intermediate Temp. (50°C, 122°F) | 15,600 kJ/day | 14,800 Btu/day |
| High Temp. (100°C, 212°F) | 7,000 kJ/day | 6,600 Btu/day |

GROSS COLLECTOR AREA: 1,865 m² (20,07 ft²)
COVER PLATE AREA: 1,720 m² (18,52 ft²)
COLLECTOR LENGTH: 3,658 m (12,00 ft)
COLLECTOR WIDTH: 0.510 m (1.67 ft)
COLLECTOR WEIGHT: 17.2 kg (38.0 lb)
FLUID CAPACITY: 1.8 L (0.5 gal)
REG. FLOW RATE: 34 Liquid mL/s (0.5 gpm)
TEST PRESSURE: 1103 kPa gauge (160 psig)
MAX. WIND LOAD: 2394 Pa (50 psf)
THERMAL PERFORMANCE EFFICIENCY (ASHRAE 93-86)

Y INTERCEPT: 60.4

SLOPE: $373 \frac{\text{Watts}}{\text{m}^2 \cdot ^\circ\text{C}}$ $\left(66 \frac{\text{Btu}}{\text{ft}^2 \cdot \text{hr} \cdot ^\circ\text{F}} \right)$

INCIDENT ANGLE MODIFIER, AXIS 1: 0.21 AXIS 2: N/A

*Based on an assumed standard day for Florida.

| | | | |
|--|---|--|---|
| | <p>This product certified by Solar Rating and Certification Corporation c/o FSEC, 1679 Clearlake Road Cocoa, FL 32922</p> <p>SRCC Document OG-300 Conformance to HUD UM 100</p> | <p>ACR Solar International 5840 Gibbons Dr. Carmichael, CA 95608</p> | <p>Solar Energy Factor 1.4</p> |
| | | <p>System Model 200131C50</p> | <p>System Serial No. _____</p> |

| | | | |
|--|---|--|---|
| | <p>This product certified by Solar Rating and Certification Corporation c/o FSEC, 1679 Clearlake Road Cocoa, FL 32922</p> <p>SRCC Document OG-300 Conformance to HUD UM 100</p> | <p>ACR Solar International 5840 Gibbons Dr. Carmichael, CA 95608</p> | <p>Solar Energy Factor 2.0</p> |
| | | <p>System Model 200132C50</p> | <p>System Serial No. _____</p> |

| | | | |
|--|---|--|---|
| | <p>This product certified by Solar Rating and Certification Corporation c/o FSEC, 1679 Clearlake Road Cocoa, FL 32922</p> <p>SRCC Document OG-300 Conformance to HUD UM 100</p> | <p>ACR Solar International 5840 Gibbons Dr. Carmichael, CA 95608</p> | <p>Solar Energy Factor 2.9</p> |
| | | <p>System Model 200133C80</p> | <p>System Serial No. _____</p> |