TITLE 24 REPORT

Title 24 Report for:

[redacted]
1348 Appleton Way
Venice, CA 90291

Project Designer:

[redacted]

Report Prepared By:

Troy Lindquist
Alternative Energy Systems
229 N. Central Ave., Suite 500
Glendale, CA 91203
(818) 246-2844

Job Number:

080625

Date:

1/16/2012

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

TABLE OF CONTENTS

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

[redacted] Residence
Project Title

1/16/2012
Date

1348 Appleton Way Venice
Project Address

Building Permit #

Alternative Energy Systems (818) 246-2844
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 06
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	4.43	5.86	-1.44
Space Cooling	2.49	0.88	1.62
Fans	0.66	0.51	0.15
Domestic Hot Water	5.63	0.51	5.12
Pumps	0.00	0.00	0.00
Totals	13.22	7.77	5.45
Percent better than Standard:			41.2%

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [X] Single Family [ ] Addition [ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (NW) 315 deg

Fuel Type: Natural Gas

Fenestration:
Area: 2,099 ft² Avg. U: 0.69
Ratio: 43.3% Avg. SHGC: 0.35

Total Conditioned Floor Area: 4,852 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 456 ft²
Slab on Grade Area: 2,962 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Radiant Heating System	4,852	38,816	1.00	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Wall	Wood	466	0.057	R-25	R-0.0	45	90	X		New	09-A9	1st Floor Zone
Door	None	20	0.500	None	R-0.0	45	90	X		New	28-A4	1st Floor Zone
Wall	Wood	104	0.057	R-25	R-0.0	135	90	X		New	09-A9	1st Floor Zone
Door	None	40	0.500	None	R-0.0	135	90	X		New	28-A4	1st Floor Zone
Wall	Wood	278	0.057	R-25	R-0.0	225	90	X		New	09-A9	1st Floor Zone
Wall	Wood	454	0.057	R-25	R-0.0	315	90	X		New	09-A9	1st Floor Zone
Door	None	60	0.500	None	R-0.0	315	90	X		New	28-A4	1st Floor Zone
Roof	Wood	665	0.029	R-38	R-0.0	360	22	X		New	02-A11	1st Floor Zone
Wall	Wood	171	0.057	R-25	R-0.0	180	90	X		New	09-A9	2nd Floor Zone
Wall	Wood	612	0.057	R-25	R-0.0	45	90	X		New	09-A9	2nd Floor Zone
Wall	Wood	6	0.057	R-25	R-0.0	135	90	X		New	09-A9	2nd Floor Zone
Wall	Wood	382	0.057	R-25	R-0.0	225	90	X		New	09-A9	2nd Floor Zone
Wall	Wood	116	0.057	R-25	R-0.0	315	90	X		New	09-A9	2nd Floor Zone
Roof	Wood	1,840	0.029	R-38	R-0.0	360	22	X		New	02-A11	2nd Floor Zone
Floor	Wood	456	0.048	R-19	R-0.0	0	180		X	New	21-A4	2nd Floor Zone
Wall	Wood	281	0.057	R-25	R-0.0	45	90	X		New	09-A9	Guest House
Wall	Wood	102	0.057	R-25	R-0.0	135	90	X		New	09-A9	Guest House
Wall	Wood	77	0.057	R-25	R-0.0	225	90	X		New	09-A9	Guest House
Wall	Wood	141	0.057	R-25	R-0.0	315	90	X		New	09-A9	Guest House

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

[redacted] Residence — 1/16/2012

Project Title — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Rear	(SE)	76.0	0.530 NFRC	0.22 NFRC	135	90	New	Double Metal Low-E	1st Floor Zone
2	Window	Rear	(SE)	298.7	0.530 NFRC	0.22 NFRC	135	90	New	Double Metal Low-E	1st Floor Zone
3	Window	Rear	(SE)	156.0	1.280 116-A	0.80 116-B	135	90	New	Single Metal Clear	1st Floor Zone
4	Window	Rear	(SE)	168.0	1.280 116-A	0.80 116-B	135	90	New	Single Metal Clear	1st Floor Zone
5	Window	Right	(SW)	188.5	0.530 NFRC	0.22 NFRC	225	90	New	Double Metal Low-E	1st Floor Zone
6	Window	Right	(SW)	19.5	1.280 116-A	0.80 116-B	225	90	New	Single Metal Clear	1st Floor Zone
7	Window	Front	(NW)	80.3	1.280 116-A	0.80 116-B	315	90	New	Single Metal Clear	1st Floor Zone
8	Window	Front	(NW)	248.7	0.530 NFRC	0.22 NFRC	315	90	New	Double Metal Low-E	1st Floor Zone
9	Window	Left	(NE)	239.4	0.530 NFRC	0.22 NFRC	45	90	New	Double Metal Low-E	2nd Floor Zone
10	Window	Rear	(SE)	47.5	0.530 NFRC	0.22 NFRC	135	90	New	Double Metal Low-E	2nd Floor Zone
11	Window	Right	(SW)	313.3	0.530 NFRC	0.22 NFRC	225	90	New	Double Metal Low-E	2nd Floor Zone
12	Window	Front	(NW)	45.3	0.530 NFRC	0.22 NFRC	315	90	New	Double Metal Low-E	2nd Floor Zone
13	Skylight	Front	(N)	49.5	0.790 116-A	0.59 116-B	360	22	New	Double Metal Tinted	2nd Floor Zone
14	Window	Left	(NE)	10.0	0.530 NFRC	0.22 NFRC	45	90	New	Double Metal Low-E	Guest House
15	Window	Right	(SW)	84.0	0.530 NFRC	0.22 NFRC	225	90	New	Double Metal Low-E	Guest House
16	Window	Front	(NW)	74.7	0.530 NFRC	0.22 NFRC	315	90	New	Double Metal Low-E	Guest House

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76	40.0	12.0	24.0	0.1	24.0	24.0						
2	Bug Screen	0.76												
3	Bug Screen	0.76	40.0	12.0	24.0	0.1	24.0	24.0						
4	Bug Screen	0.76												
5	Bug Screen	0.76												
6	Bug Screen	0.76	5.0	4.0	8.0	0.1	8.0	8.0						
7	Bug Screen	0.76												
8	Bug Screen	0.76												
9	Bug Screen	0.76												
10	Bug Screen	0.76	9.5	5.0	3.0	0.1	3.0	3.0						
11	Bug Screen	0.76												
12	Bug Screen	0.76												
13	None	1.00												
14	Bug Screen	0.76												
15	Bug Screen	0.76	805.0	10.0	6.0	0.1	6.0	6.0						
16	Bug Screen	0.76	8.0	9.3	24.0	0.1	24.0	24.0						

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments
Concrete, Heavyweight	488	4.00	28	0.96	2	26-A1	New	1st Floor Zone / Slab on Grade
Concrete, Heavyweight	1,950	4.00	28	0.96	0	26-A1	New	1st Floor Zone / Slab on Grade
Concrete, Heavyweight	104	4.00	28	0.96	2	26-A1	New	Guest House / Slab on Grade
Concrete, Heavyweight	420	4.00	28	0.96	0	26-A1	New	Guest House / Slab on Grade

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	47	None	No Insulation	26-A1	New	1st Floor Zone
Slab Perimeter	187	None	No Insulation	26-A1	New	1st Floor Zone
Slab Perimeter	19	None	No Insulation	26-A1	New	Guest House
Slab Perimeter	77	None	No Insulation	26-A1	New	Guest House

Certificate Of Compliance : Residential (Part 4 of 4) CF-1R

Petruzzi Residence
Project Title

1/16/2012
Date

Special Features and Modeling Assumptions

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

	Plan	Field
The Roof R-38 Roof Cathedral is a CRRC Certified Roof with Reflectance = 0.30, Emittance = 0.75.		
The DHW System "Versa Hydro PHE -199-80" is a Large Gas water heater with Pilot Loss = 0 btuh.		
The DHW System "Versa Hydro PHE -199-80" includes a Solar System with a 85.0% Solar Fraction (see CF-SR).		
The HVAC System "Radiant Heating System" is a Combined Hydronic System that uses a Boiler for DHW and Space Heating.		
HIGH MASS Design - Thermal Mass: 468 sqft Covered Slab Floor, 4.00" thick at 1st Floor Plan		
HIGH MASS Design - Thermal Mass: 1950 sqft Exposed Slab Floor, 4.00" thick at 1st Floor Plan		
HIGH MASS Design - Thermal Mass: 104 sqft Covered Slab Floor, 4.00" thick at Guest House		
HIGH MASS Design - Thermal Mass: 420 sqft Exposed Slab Floor, 4.00" thick at Guest House		

HERS Required Verification

Items in this section require field testing and/or verification by a certified home energy rater under the supervision of a HERS provider using approved testing and/or verification methods.

	Plan	Field
This building has credit for Insulation Quality Installation. A certified HERS rater must visually verify the installation of all insulation.		

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

[redacted] Residence — Project Title

1/16/2012 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Radiant Heating System	Combined Hydronic	see below	No Cooling	13.0 SEER	New	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Radiant Heating System	Ducted	Ducted	Attic	6.0	New	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
Versa Hydro PHE -199-80	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Versa Hydro PHE -199-80	Large Gas	No Pipe Insulation	1	199,000	80	New	0.96	0.00%	0.0

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:

Title/Firm: [redacted]

Address: [redacted]

Telephone: [redacted] Lic. #:

(signature) (date)

Documentation Author

Name: Troy Lindquist

Title/Firm: Alternative Energy Systems

Address: 229 N. Central Ave., Suite 500
Glendale, CA 91203

Telephone: (818) 246-2844

(signature) (date)

Enforcement Agency

Name:

Title/Firm:

Address:

Telephone:

(signature) (date)

Mandatory Measures Summary: Residential (Page 1 of 2) MF-1R

NOTE: Lowrise residential buildings subject to the Standards must contain these measures regardless of the compliance approach used. More stringent compliance requirements from the Certificate of Compliance supercede the items marked with an asterisk (*) below. When this checklist is incorporated into the permit documents, the features noted shall be considered by all parties as minimum component performance specifications for the mandatory measures whether they are shown elsewhere in the documents or on this checklist only.

DESCRIPTION — Check or initial applicable boxes or check NA if not applicable and included with the permit application documentation.	N/A	DESIGNER	ENFORCEMENT
Building Envelope Measures			
* § 150(a): Minimum R-19 in wood ceiling insulation or equivalent U-factor in metal frame ceiling.	☐	☒	☐
§ 150(b): Loose fill insulation manufacturer's labeled R-Value:_____.	☐	☒	☐
* § 150(c): Minimum R-13 wall insulation in wood framed walls or equivalent U-factor in metal frame walls (does not apply to exterior mass walls).	☐	☒	☐
* § 150(d): Minimum R-13 raised floor insulation in framed floors or equivalent U-factor.	☐	☒	☐
§ 150(e): Installation of Fireplaces, Decorative Gas Appliances and Gas Logs.			
1. Masonry and factory-built fireplaces have:			
a. closable metal or glass door covering the entire opening of the firebox	☐	☒	☐
b. outside air intake with damper and control, flue damper and control	☐	☒	☐
2. No continuous burning gas pilot lights allowed.	☐	☒	☐
§ 150(f): Air retarding wrap installed to comply with §151 meets requirements specified in the ACM Residential Manual.	☐	☐	☐
§ 150(g): Vapor barriers mandatory in Climate Zones 14 and 16 only.	☐	☐	☐
§ 150(i): Slab edge insulation - water absorption rate for the insulation alone without facings no greater than 0.3%, water vapor permeance rate no greater than 2.0 perm/inch.	☐	☐	☐
§ 118: Insulation specified or installed meets insulation installation quality standards. Indicate type and include CF-6R Form: _____	☐	☐	☐
§ 116-17: Fenestration Products, Exterior Doors, and Infiltration/Exfiltration Controls.			
1. Doors and windows between conditioned and unconditioned spaces designed to limit air leakage.	☐	☒	☐
2. Fenestration products (except field fabricated) have label with certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration certification.	☐	☒	☐
3. Exterior doors and windows weatherstripped; all joints and penetrations caulked and sealed.	☐	☒	☐
Space Conditioning, Water Heating and Plumbing System Measures			
§ 110-13: HVAC equipment, water heaters, showerheads and faucets certified by the Energy Commission.	☐	☒	☐
§ 150(h): Heating and/or cooling loads calculated in accordance with ASHRAE, SMACNA or ACCA.	☐	☐	☐
§ 150(i): Setback thermostat on all applicable heating and/or cooling systems.	☐	☒	☐
§ 150(j): Water system pipe and tank insulation and cooling systems line insulation.			
1. Storage gas water heaters rated with an Energy Factor less than 0.58 must be externally wrapped with insulation having an installed thermal resistance of R-12 or greater.	☐	☒	☐
2. Back-up tanks for solar systems, unfired storage tanks, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation and indicated on the exterior of the tank showing the R-value.	☐	☐	☐
3. The following piping is insulated according to Table 150-A/B or Equation 150-A Insulation Thickness:			
1. First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes shall be insulated to Table 150B.	☐	☒	☐
2. Cooling system piping (suction, chilled water, or brine lines), piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.	☐	☐	☐
4. Steam hydronic heating systems or hot water systems > 15 psi, meet requirements of Table 123-A.	☐	☐	☐
5. Insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.	☐	☐	☐
6. Insulation for chilled water piping and refrigerant suction piping includes a vapor retardant or is enclosed entirely in conditioned space.	☐	☐	☐
7. Solar water-heating systems/collectors are certified by the Solar Rating and Certification Corporation.	☐	☐	☐

Mandatory Measures Summary: Residential (Page 2 of 2) MF-1R

NOTE: Lowrise residential buildings subject to the Standards must contain these measures regardless of the compliance approach used. More stringent compliance requirements from the Certificate of Compliance supercede the items marked with an asterisk (*) below. When this checklist is incorporated into the permit documents, the features noted shall be considered by all parties as minimum component performance specifications for the mandatory measures whether they are shown elsewhere in the documents or on this checklist only.

DESCRIPTION — Instructions: Check or initial applicable boxes when completed or check N/A if not applicable.	N/A	DESIGNER	ENFORCEMENT
Space Conditioning, Water Heating and Plumbing System Measures: (continued)			
§ 150(m): Ducts and Fans			
1. All ducts and plenums installed, sealed and insulated to meet the requirements of the CMC Sections 601, 602, 603, 604, 605, and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minumum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used.	☐	☒	☐
2. Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.	☐	☒	☐
3. Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.	☐	☒	☐
4. Exhaust fan systems have back draft or automatic dampers.	☐	☒	☐
5. Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operating dampers.	☐	☒	☐
6. Protection of Insulation. Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.	☐	☒	☐
7. Flexible ducts cannot have porous inner cores.	☐	☐	☐
§ 114: Pool and Spa Heating Systems and Equipment			
1. A thermal efficiency that complies with the Appliance Efficiency Regulations, on-off switch mounted outside of the heater, weatherproof operating instructions, no electric resistance heating and no pilot light.	☐	☐	☐
2. System is installed with:			
a. At least 36" of pipe between filter and heater for future solar heating.	☐	☐	☐
b. Cover for outdoor pools or outdoor spas.	☐	☐	☐
3. Pool system has directional inlets and a circulation pump time switch.	☐	☐	☐
§ 115: Gas fired fan-type central furnaces, pool heaters, spa heaters or household cooking appliances have no continuously burning pilot light. (Exception: Non-electrical cooking appliances with pilot < 150 Btu/hr)	☐	☒	☐
§ 118 (i): Cool Roof material meets specified criteria	☐	☐	☐
Lighting Measures			
§ 150(k)1: HIGH EFFICACY LUMINAIRES OTHER THAN OUTDOOR HID: contain only high efficacy lamps as outlined in Table 150-C, and do not contain a medium screw base socket (E24/E26). Ballasts for lamps 13 Watts or greater are electric and have an output frequency no less than 20 kHz.	☐	☒	☐
§ 150(k)1: HIGH EFFICACY LUMINAIRES - OUTDOOR HID: contain only high efficacy lamps as outlined in Table 150-C, luminaire has factory installed HID ballast.	☐	☒	☐
§ 150(k)2: Permanently installed luminaires in kitchens shall be high efficacy luminaires. Up to 50% of the Wattage, as determined in Section 130(c), of permanently installed luminaires in kitchens may be in luminaires that are not high efficacy luminaires, provided that these luminaires are controlled by switches separate from those controlling the high efficacy luminaires.	☐	☒	☐
§ 150(k)3: Permanently installed luminaires in bathrooms, garages, laundry rooms, utility rooms shall be high efficacy luminaires. OR are controlled by an occupant sensor(s) certified to comply with Section 119(d).	☐	☒	☐
§ 150(k)4: Permanently installed luminaires located other than in kitchens, bathrooms, garages, laundry rooms, and utility rooms shall be high efficacy luminaires (except closets less than 70 ft) OR are controlled by a dimmer switch OR are controlled by an occupant sensor that complies with Section 119(d) that does not turn on automatically or have an always on option.	☐	☒	☐
§ 150(k)5: Luminaires that are recessed into insulated ceilings are approved for zero clearance insulation cover (IC) and are certified to ASTM E283 and labeled as air tight (AT) to less than 2.0 CFM at 75 Pascals.	☐	☒	☐
§ 150(k)6: Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires (not including lighting around swimming pools/water features or other Article 680 locations) OR are controlled by occupant sensors with integral photo control certified to comply with Section 119(d).	☐	☒	☐
§ 150(k)7: Lighting for parking lots for 8 or more vehicles shall have lighting that complies with Sections 130, 132, and 147. Lighting for parking garages for 8 or more vehicles shall have lighting that complies with Section 130, 131, and 146.	☐	☐	☐
§ 150(k)8: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires OR are controlled by occupant sensor(s) certified to comply with Section 119(d).	☐	☐	☐

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

PROJECT NAME	DATE
[redacted] Residence	1/16/2012
SYSTEM NAME	**FLOOR AREA**
Radiant Heating System	4,852

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	100,000
Total Output (Btuh)	100,000
Output (Btuh/sqft)	20.6
Cooling System	
Output per System	0
Total Output (Btuh)	0
Total Output (Tons)	0.0
Total Output (Btuh/sqft)	0.0
Total Output (sqft/Ton)	0.0
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0
Outside Air (cfm/sqft)	0.00

Note: values above given at ARI conditions

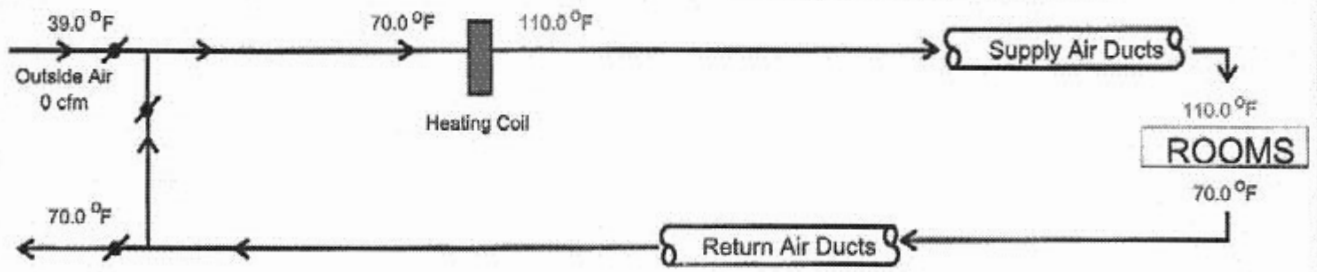
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	Sensible	Latent	CFM	Sensible
Total Room Loads	2,461	61,094	2,400	1,748	75,486
Return Vented Lighting		0			
Return Air Ducts		5,454			7,225
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		5,454			7,225
TOTAL SYSTEM LOAD		72,003	2,400		89,937

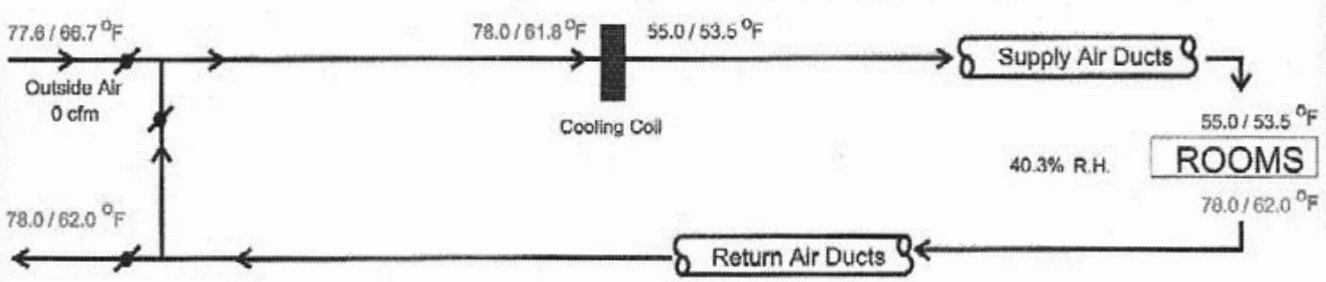
HVAC EQUIPMENT SELECTION

Radiant Floor System	0	0	100,000
Total Adjusted System Output (Adjusted for Peak Design Conditions)	0	0	100,000
TIME OF SYSTEM PEAK	Aug 2 pm		Jan 12 am

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



2030 CHALLENGE Targets: U.S. National Averages

U.S. Averages for Site Energy Use and 2030 Challenge Energy Reduction Targets by Space/Building Type[1]

From the Environmental Protection Agency (EPA): Use this chart to find the site fossil-fuel energy targets

Primary Space / Building Type[2]	Available in Target Finder[3]	Average Source EUI[4] (kBtu/Sq.Ft./Yr)	Average Percent Electric	Average Site EUI[4] (kBtu/Sq.Ft./Yr)	2030 Challenge Site EUI Targets (kBtu/Sq.Ft./Yr)				
					50% Target	60% Target	70% Target	80% Target	90% Target
Administrative / Professional & Government Office	✓								
Education		170	63%	76	**38.0**	30.4	22.8	15.2	7.6
College / University (campus-level)		280	63%	120	**60.0**	48.0	36.0	24.0	12.0
K-12 School	✓								
Food Sales		681	86%	225	**112.5**	90.0	67.5	45.0	22.5
Convenience Store (with or without gas station)		753	90%	241	**120.5**	96.4	72.3	48.2	24.1
Grocery Store / Food Market	✓								
Food Service		786	59%	351	**175.5**	140.4	105.3	70.2	35.1
Fast Food		1306	64%	534	**267.0**	213.6	160.2	106.8	53.4
Restaurant / Cafeteria		612	53%	302	**151.0**	120.8	90.6	60.4	30.2
Health Care: Inpatient (Specialty Hospitals, Excluding Children's)		468	47%	227	**113.5**	90.8	68.1	45.4	22.7
Hospital (Acute Care, Children's)	✓								
Health Care: Long Term Care (Nursing Home / Assisted Living)		225	54%	124	**62.0**	49.6	37.2	24.8	12.4
Health Care: Outpatient		183	72%	73	**36.5**	29.2	21.9	14.6	7.3
Clinic / Other Outpatient Health		219	76%	84	**42.0**	33.6	25.2	16.8	8.4
Medical Office	✓								
Lodging		194	61%	87	**43.5**	34.8	26.1	17.4	8.7
Dormitory / Fraternity / Sorority	✓								
Hotel, Motel or Inn	✓								
Mall (Strip Mall and Enclosed)		271	71%	107	**53.5**	42.8	32.1	21.4	10.7
Office	✓								
Bank / Financial Institution	✓								
Public Assembly		143	57%	66	**33.0**	26.4	19.8	13.2	6.6
Entertainment / Culture		265	63%	95	**47.5**	38.0	28.5	19.0	9.5
Library		246	59%	104	**52.0**	41.6	31.2	20.8	10.4
Recreation		136	55%	65	**32.5**	26.0	19.5	13.0	6.5
Social / Meeting		102	57%	52	**26.0**	20.8	15.6	10.4	5.2
Public Order and Safety		189	57%	90	**45.0**	36.0	27.0	18.0	9.0
Fire Station / Police Station		157	56%	78	**39.0**	31.2	23.4	15.6	7.8
Courthouse	✓								

Data Source: U.S. Environmental Protection Agency; U.S. Energy Information Administration

Service (Vehicle Repair / Service, Postal service)		150	63%	77	**38.5**	30.8	23.1	15.4	7.7
Storage / Shipping / Nonrefrigerated Warehouse		56	56%	25	**12.5**	10.0	7.5	5.0	2.5
Self-storage		12	44%	4	**2.0**	1.6	1.2	0.8	0.4
Non-refrigerated Warehouse	✓			1	**0.5**	0.4	0.3	0.2	0.1
Distribution / Shipping Center		90	61%	44	**22.0**	17.6	13.2	8.8	4.4
Refrigerated Warehouse	✓								
Religious Worship		83	52%	46			.8	9.2	4.6
Retail Store (Non-mall Stores, Vehicle Dealerships)		191	67%	82			.6	16.4	8.2
Retail Stores	✓								
Other[5]		213	56%	104	**52.0**	41.6	31.2	20.8	10.4
Secondary Space / Building Type[2]									
Ambulatory Surgical Center	✓								
Computer Data Center	✓								
Garage	✓								
Open Parking Lot	✓								
Swimming Pool	✓								
Residential Space / Building Type[6,7]									
Single-Family Detached		76.6	-	43.8	**21.9**	17.5	13.1	8.8	4.4
Single-Family Attached		70.7	-	43.7	**21.9**	17.5	13.1r.7	4.4	
Multi-Family, 2 to 4 units		93.2	-	58.2	**29.1**	23.3	17.5	11.6	5.8
Multi-Family, 5 or more units		99.4	-	49.5	**24.8**	19.8	14.9	9.9	5.0
Mobile Homes		153.2	-	73.4				14.7	7.3

Yin Yang House 4.54. Nearly meets 90% target for 2030 Challenge

National Average EUI

90% Target 2030 Challenge

Notes

1. This table presents values calculated from the Energy Information Administration in the Commercial Building Energy Use Survey (CBECS), conducted in 2003; using the Environmental Protection Agency's Table 1: 2003 CBECS National Average Source Energy Use and Performance Comparisons by Building Type.

2. Space/Building Type use descriptions are taken from valid building activities as defined by the Energy Information Administration in the Commercial Building Energy Use Survey (CBECS), conducted in 2003.

3. A "✓" indicates that this Space/Building Type is included in Target Finder. On the input page, use the 2030 Challenge EnergyReduction Target option and select 50%.

4. The average Source EUI and Site EUI are calculated in kBtu/Sq.Ft./Yr as weighted averages across all buildings of a given space type in the CBECS 2003 data set.
Source Energy is a measure that accounts for the energy consumed on site and the energy consumed during generation and transmission in supplying energy to the site.
Converting Site to Source Energy:
Source Energy values are calculated using a conversion for electricity of 1 kBtu Site Energy = 3.34 kBtu Source Energy; a conversion for natural gas of 1 kBtu Site Energy = 1.047 kBtu Source Energy; a conversion factor for district heat of 1 kBtu site energy = 1.40 source energy and a conversion factor for fuel oil of 1 kBtu site energy = 1.01.

5. Other: For all building types not defined by the list above, these buildings may choose to use the performance benchmark categorized by "other". Note that this category is not well defined therefore source energy use varies greatly with source EUI ranging over 1500 kBtu/Sq.Ft. As categorized by EIA, "other" may include airplane hangers, laboratory, crematorium, data center, etc.

6. Energy Information Administration (EIA), U.S. Residential Energy Intensity Using Weather-Adjusted Primary Energy by Census Region and Type of Housing Unit, 1980-2001, Table 8c.

7. Energy Information Administration (EIA), U.S. Residential Energy Intensity Using Weather-Adjusted Site Energy by Census Region and Type of Housing Unit, 1980-2001, Table 6c.

EUI: Energy Use Intensity

Data Source: U.S. Environmental Protection Agency; U.S. Energy Information Administration

PVWatts * * * * *

AC Energy & Cost Savings

* * * * *

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 90 characters.)

Station Identification

Cell ID:	0174360
State:	California
Latitude:	34.1 ° N
Longitude:	118.6 ° W

PV System Specifications

DC Rating:	10.9 kW
DC to AC Derate Factor:	0.799
AC Rating:	8.68 kW
Array Type:	Fixed Tilt
Array Tilt:	4.0 °
Array Azimuth:	237.0 °

Energy Specifications

Cost of Electricity:	11.9 ¢/kWh

Results

Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	3.17	778	92.91
2	3.95	893	106.64
3	5.14	1299	155.13
4	6.12	1480	176.74
5	7.08	1767	211.02
6	7.33	1734	207.07
7	7.14	1723	205.76
8	6.73	1618	193.22
9	5.70	1325	158.23
10	4.35	1063	126.94
11	3.51	828	98.88
12	2.88	699	83.47
Year	5.27	15207	1816.02

Output Hourly Performance Data

(Gridded data is monthly, hourly output not available.)

Output Results as Text

Saving Text from a Browser

Run PVWATTS v.2 for another location

Run PVWATTS v.1

Please send questions and comments to Webmaster

Disclaimer and copyright notice.

RReDC home page (http://rredc.nrel.gov)

SunEarthTools.com

Tools for consumers and designers of solar

Converters Photovoltaic

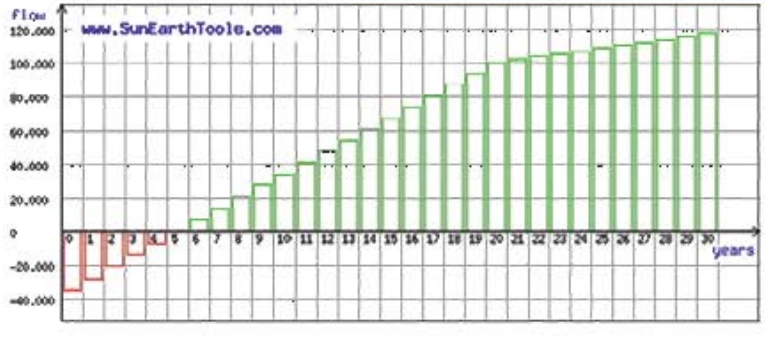
Photovoltaic FAQ

Photovoltaic payback

Economic analysis of a photovoltaic system, with the determination of payback.
Enter data of the photovoltaic energy, then the data estimated cost of the plant, then Data elettrica bill.
Verifying the results of operations in the graph and table. Repeat the data entry when you have more accurate and definitive.

System PV		Own consumption energy	
Peak power Wp	3000	Own consumption kWh/y	9210
Energy production KWh/y	12000	Cost €/kWh	0.202
Decay module PV %	0.7	Own consumption €	1860
Costs		**Contribution**	
Initial cost €	35000	Contribution €/kWh	0.45
Cost €/KWp	11667	initial contribution €	0.55
Annual cost €	100	Annual contribution €	0
Final cost of disposal €	0		
Analysis period		**Bank financing**	
Years contributions	20	Mutual interests %	0
Years economic analysis	30	Annual loan installment €	0
Result			
Pay back [years | months]	[4 | 12]		
YTD Return (20 years)	14.32%	Cash balance (20 years) €	100244
Compound interest (20 years)	6.99%	Cash balance (30 years) €	117664

execute



Back to top Content Data Chart Table

year	flow	revenue		Prod.	Bill	Cost	Loan	YTD
0	-34.999	0		0	0	0	0	0.00 %
1	-27.895	7.104		5.362	1.842	-100	0	-79.70 %
2	-20.828	14.171		10.687	3.684	-200	0	-29.76 %
3	-13.799	21.200		15.974	5.526	-300	0	-13.14 %
4	-6.806	28.193		21.225	7.368	-400	0	-4.86 %
5	149	35.148		26.438	9.210	-500	0	0.09 %
6	7.068	42.067		31.615	11.052	-600	0	3.37 %
7	13.951	48.950		36.756	12.894	-700	0	5.69 %
8	20.798	55.797		41.861	14.736	-800	0	7.43 %
9	27.610	62.609		46.931	16.578	-900	0	8.77 %
10	34.385	69.384		51.964	18.420	-1.000	0	9.82 %
11	41.125	76.124		56.962	20.262	-1.100	0	10.68 %
12	47.831	82.830		61.926	22.104	-1.200	0	11.39 %
13	54.502	89.501		66.855	23.946	-1.300	0	11.98 %
14	61.138	96.137		71.749	25.788	-1.400	0	12.48 %
15	67.740	102.739		76.609	27.630	-1.500	0	12.90 %
16	74.308	109.307		81.435	29.472	-1.600	0	13.27 %
17	80.842	115.841		86.227	31.314	-1.700	0	13.59 %
18	87.343	122.342		90.986	33.156	-1.800	0	13.86 %
19	93.810	128.809		95.711	34.998	-1.900	0	14.11 %
20	100.244	135.243		100.403	36.840	-2.000	0	14.32 %
21	101.986	136.985		100.403	38.682	-2.100	0	13.88 %
22	103.728	138.727		100.403	40.524	-2.200	0	13.47 %
23	105.470	140.469		100.403	42.366	-2.300	0	13.10 %
24	107.212	142.211		100.403	44.208	-2.400	0	12.76 %
25	108.954	143.953		100.403	46.050	-2.500	0	12.45 %
26	110.696	145.695		100.403	47.892	-2.600	0	12.16 %
27	112.438	147.437		100.403	49.734	-2.700	0	11.90 %
28	114.180	149.179		100.403	51.576	-2.800	0	11.65 %
29	115.922	150.921		100.403	53.418	-2.900	0	11.42 %
30	117.664	152.663		100.403	55.260	-3.000	0	11.21 %

Schüco S SPU-4 Series

Polycrystalline Photovoltaic Modules

PV module of the highest quality
The S SPU-4 series of Schüco PV modules are distinguished by multicrystalline solar cells with a cell efficiency of up to 15 % for high outputs per square foot of module area. Each module is flash-tested and the flash results are stated both on the module as well as the outside of the packaging for more effective string sizing.

A Performance Guaranteed
Schüco S SPU-4 modules have a 5-year extended parts and labor warranty. In fact, the guarantee on output values is considerably longer – after 12 years of operation, the Schüco module is guaranteed to deliver a minimum of 90 % of its rated output and even after 25 years the output is guaranteed to be at least 80 %.

Optimized labelling
Prior to delivery, each S SPU-4 module is subject to a visual and electrical quality test. The output data measured is indicated on the back of the module and on the packaging. Homogeneous module fields can be grouped together quickly and effectively during installation.

High level of operational reliability
Two connecting boxes with a total of three bypass diode bridges on the reverse of the module prevent individual solar cells from overheating (hot-spot effect). This ensures the reliable operation of the whole system from module fields to inverters.

Environmental protection
The use of lead-free solder in the manufacture of S SPU-4 modules results in a saving of 1.8 oz of lead per module, which makes a considerable contribution to environmental protection.

Attractive and robust
The black module frame made from torsion-proof, anodized aluminium meets the highest standards in terms of stability and corrosion resistance. A cross bar in the frame on the reverse increases the load-bearing capacity of the module. S SPU-4 modules can be installed with installation components from the Schüco SolarEZ mounting systems.

SCHÜCO

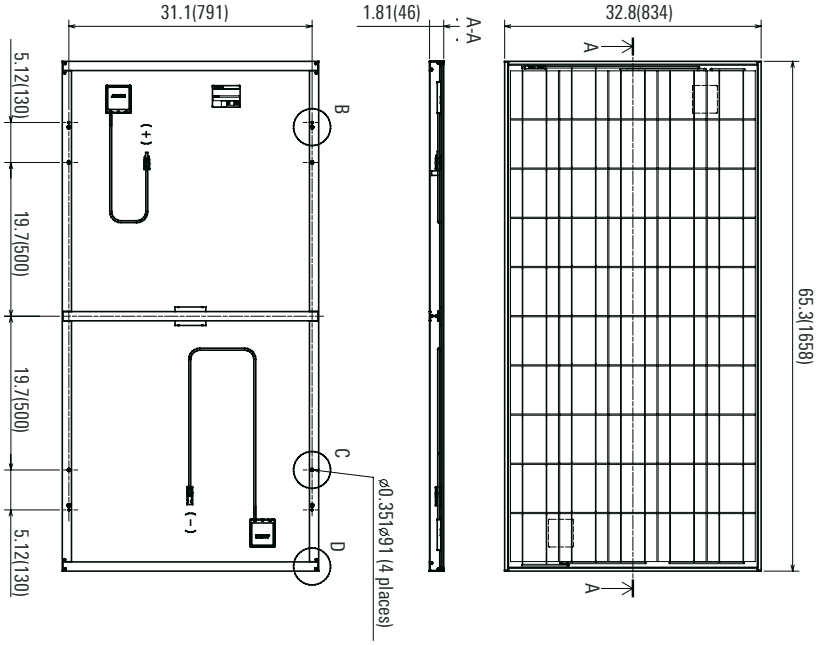
Technical Data

Electrical specifications	Module output classes			
Article Number	232 923	232 924	256 695	256 186
Power output under standard test conditions (STC)*	S 165 SPU-4	S 170 SPU-4	S 175 SPU-4	S 180 SPU-4
Rated power (P_{mpp})	165 W	170 W	175 W	180 W
Effective output tolerance (ΔP_{mpp})	+5 % /- 5 %	+5 % /- 5 %	+5 % /- 5 %	+5 % /- 5 %
Guaranteed minimum output ($P_{mpp\ min.}$)	165 W	170 W	175 W	180 W
Rated voltage (U_{mpp})	23,4 V	23,7 V	23,9 V	24,2 V
Rated current (I_{mpp})	7,06 A	7,19 A	7,32 A	7,45 A
Open circuit voltage (U_{oc})	29,7 V	29,9 V	30,2 V	30,4 V
Short circuit current (I_{sc})	7,73 A	7,83 A	7,93 A	8,03 A
Module efficiency	11,90 %	12,30 %	12,70 %	13,00 %
Normal Operating Cell Temperature (NOCT)**	46,2 °C	46,25 °C	46,25 °C	46,25 °C
Maximum system voltage permitted	600 V	600 V	600 V	600 V

* Irradiance 1.000 W/m², Air Mass 1,5, Cell temperature 25°C

** Irradiance 800 W/m², ambient temperature 20 °C, wind speed 1 m/s

Drawings and Dimensions



Mechanical Specifications
Outer dimensions:
65.28 x 32.83 x 1.81 in.
Design of aluminium:
frame black anodized
Front glass: Tempered safety glass
Weight: 37.5 lbs (17 kg)
Connecting system:
Multi Contact Type 4 compatible
Diameter of solar cable:
0.01 in. (4 mm²)
Length of positive/negative cable:
31.5 in./49.2 in. ± 1.97 in.

Certifications & Warranties
Electrical classification:
Safety Class II
Product Certification:
UL 1703, CEC
Extended Product Warranty: 5 years
Performance Warranty
(90% of $P_{mpp\ min}$): 12 years
Performance guarantee
(80% of $P_{mpp\ min}$): 25 years

Schüco USA L.P.
schuco-usa.com

P 3206/USA/05.08/Printed in Germany

- Highest CEC efficiency in its class
- Integrated load-break rated lockable DC disconnect switch
- Integrated fused series string combiner

- Sealed electronics enclosure & Opticool™
- Comprehensive SMA communications and data collection options

- Ideal for residential or commercial applications
- Sunny Tower compatible
- 10 year standard warranty
- UL 1741/IEEE-1547 compliant

SUNNY BOY 5000US / 6000US / 7000US / 8000US

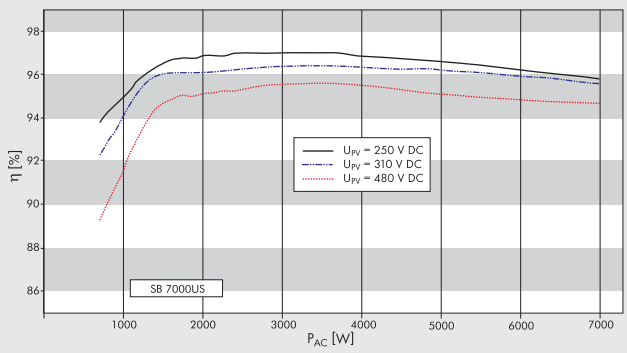
The best in their class

Our US series inverters utilize our proven technology and are designed specifically to meet IEEE-1547 requirements. Sunny Boy 6000US, Sunny Boy 7000US and Sunny Boy 8000US are also compatible with the Sunny Tower. Increased efficiency means better performance and shorter payback periods. All four models are field-configurable for positive ground systems making them more versatile than ever. Throughout the world, Sunny Boy is the benchmark for PV inverter performance and reliability.

Technical Data

	SB 5000US	SB 6000US	SB 7000US	SB 8000US
Recommended Maximum PV Power (Module STC)	6250 W	7500 W	8750 W	10000 W
DC Maximum Voltage	600 V	600 V	600 V	600 V
Peak Power Tracking Voltage	250–480 V	250–480 V	250–480 V	300–480 V
DC Maximum Input Current	21 A	25 A	30 A	30 A
Number of Fused String Inputs	3 (inverter), 4 x 20 A (DC disconnect)	3 (inverter), 4 x 20 A (DC disconnect)	3 (inverter), 4 x 20 A (DC disconnect)	3 (inverter), 4 x 20 A (DC disconnect)
PV Start Voltage	300 V	300 V	300 V	365 V
AC Nominal Power	5000 W	6000 W	7000 W	8000 W
AC Maximum Output Power	5000 W	6000 W	7000 W	NA @ 208 V 7700 W @ 240 V 8000 W @ 277 V
AC Maximum Output Current (@ 208, 240, 277 V)	24 A, 21 A, 18 A	29 A, 25 A, 22 A	34 A, 29 A, 25 A	N/A, 32 A, 29 A
AC Nominal Voltage Range	183 – 229 V @ 208 V 211 – 264 V @ 240 V 244 – 305 V @ 277 V	183 – 229 V @ 208 V 211 – 264 V @ 240 V 244 – 305 V @ 277 V	183 – 229 V @ 208 V 211 – 264 V @ 240 V 244 – 305 V @ 277 V	N/A @ 208 V 211 – 264 V @ 240 V 244 – 305 V @ 277 V
AC Frequency: nominal / range	60 Hz / 59.3 – 60.5 Hz	60 Hz / 59.3 – 60.5 Hz	60 Hz / 59.3 – 60.5 Hz	60 Hz / 59.3 – 60.5 Hz
Power Factor (Nominal)	0.99	0.99	0.99	0.99
Peak Inverter Efficiency	96.8%	97.0%	97.1%	96.5%
CEC Weighted Efficiency	95.5% @ 208 V 95.5% @ 240 V 95.5% @ 277 V	95.5% @ 208 V 95.5% @ 240 V 96.0% @ 277 V	95.5% @ 208 V 96.0% @ 240 V 96.0% @ 277 V	N/A @ 208 V 96.0% @ 240 V 96.0% @ 277 V
Dimensions: W x H x D in inches	18.4 x 24.1 x 9.5	18.4 x 24.1 x 9.5	18.4 x 24.1 x 9.5	18.4 x 24.1 x 9.5
Weight / Shipping Weight	141 lbs / 148 lbs	141 lbs / 148 lbs	141 lbs / 148 lbs	148 lbs / 152 lbs
Ambient Temperature Range	–13 to 113 °F	–13 to 113 °F	–13 to 113 °F	–13 to 113 °F
Power consumption at night	0.1 W	0.1 W	0.1 W	0.1 W
Topology	Low frequency transformer, true sinewave	Low frequency transformer, true sinewave	Low frequency transformer, true sinewave	Low frequency transformer, true sinewave
Cooling Concept	OptiCool™, forced active cooling	OptiCool™, forced active cooling	OptiCool™, forced active cooling	OptiCool™, forced active cooling
Mounting Location: indoor / outdoor (NEMA 3R)	●/●	●/●	●/●	●/●
LCD Display	●	●	●	●
Communication: RS485 / wireless	❍/❍	❍/❍	❍/❍	❍/❍
Warranty: 10 years / 15 years / 20 years	●/❍/❍	●/❍/❍	●/❍/❍	●/❍/❍
Compliance: IEEE-929, IEEE-1547, UL 1741, UL 1998, FCC Part 15 A & B	●	●	●	●
Specifications for nominal conditions	● Included ❍ Optional			
NOTE: US inverters ship with gray lids.				

Efficiency Curves



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SMA America, LLC

HTP

Advanced Heating
& Hot Water Systems

Versa-Hydro™

96% Efficient

The cost effective Versa-Hydro™ combines space heating, domestic hot water, and total system control into one compact, high efficiency mod-con unit.

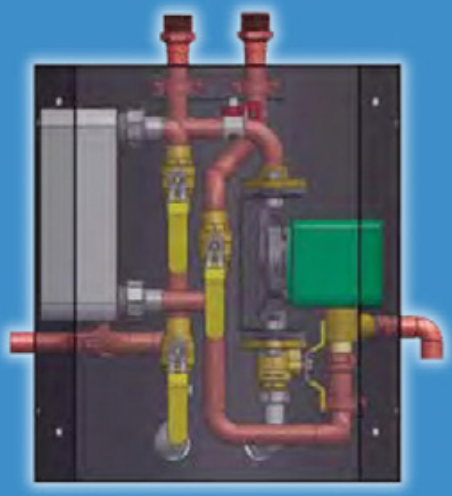
Superior Performance

Hydraulic Stabilization

The integrated space heating module utilizes the hydraulic mass stored in the tank to provide an abundant supply of energy for heat transfer. The thermal mass allows the appliance to draw heated water continuously from the tank which provides hydraulic stabilization to the system and prevents short-cycling. The entire unit is **96% thermal efficient** and the tank loses only ½ degree F per hour in standby heat loss. This allows the space heating module to utilize water from the DHW system efficiently without repetitive cycling of the burner.

Highly Efficient Condensing Technology

The major advantage of condensing technology is to extract more heat from the exhaust gas compared to conventional systems. The heat exchanger incorporates a larger surface area constructed of high-quality 90/10 cupronickel, which allows the unit to extract all of the latent energy from the water vapor contained within the exhaust gas. This reclamation of energy allows the appliance to use less fuel to meet desired heating loads.



Saves Fuel – Modulation Matters

The Versa-Hydro™ has an outstanding **5 to 1 turndown ratio** on the main combustion system and a **10 to 1 turndown ratio** on the space heating module. Greater turndown allows this appliance to modulate at lower firing rates, which conserves energy and improves component reliability. Modulation, along with thermal mass, eliminates the short-cycling effect of small zones or minimal DHW draws.

Space Heating Module

Virtually Maintenance Free

The Versa-Hydro™ is a virtually maintenance-free appliance. The robust material and sophisticated design of the appliance's heat exchanger minimizes buildup of lime and scale associated with hard water areas. The 5" diameter combustion tube and 1 1/8" secondary heat exchange spirals greatly enhance heat transfer and eliminate the blockage risk of small passageways that exist in low-mass boilers.

TSC TOTAL SYSTEM CONTROL

Total System Control

The Versa-Hydro™ Total System Control (TSC) manages pump speeds and temperature settings depending on the required BTU output. Contractors merely set the domestic tank temperature and the maximum heating temperature. The TSC will then automatically manage the appliance to provide the most efficient output depending on the load and outside temperature. This system gives contractors confidence that they are providing their customers with a product that is continuously maximizing efficiency.

Consumer Savings

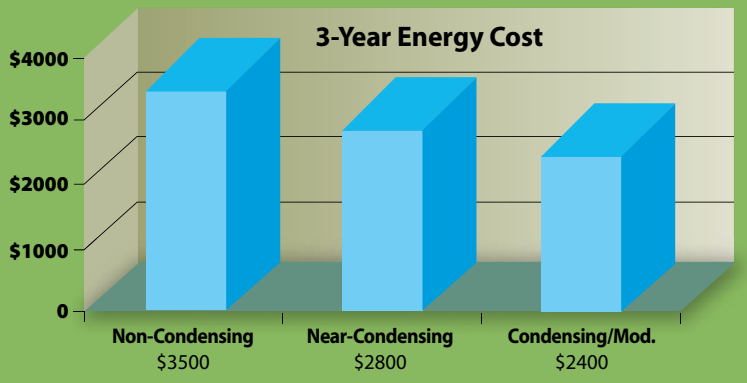
Customer Savings

Impact of the American Recovery and Re-investment Act

Homeowners who purchase and install a qualifying HTP boiler or water heater could receive a substantial tax credit (check our web site for more details: www.htproducts.com) .

In addition, many state and local governments and utility companies offer other incentives or rebates that can potentially further reduce the cost of installing energy-efficient products. An excellent source for additional information is the Database of State Incentives for Renewable Energy: www.dsireusa.org

Cost of Operation



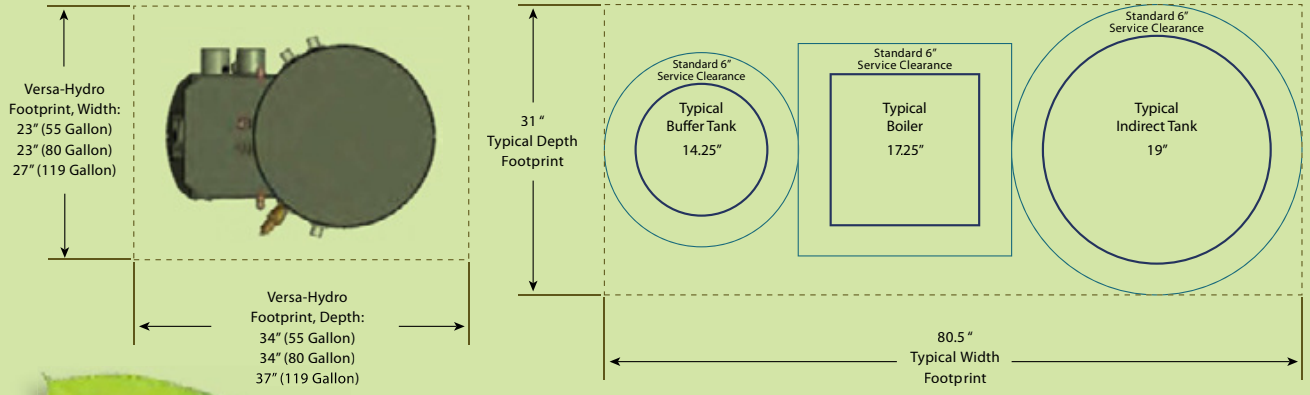
Modulating Condensing Technology

The cost of fuel in some areas of the country has increased almost 40% in just one year! Versa-Hydro™ combined appliances provide a maximum payback on fuel savings. Savings can result in payback periods of less than 3 years. Depending on the age of your present equipment, our products could save you as much as 50% on your fuel bills.

Space Savings

Imagine fitting a 55-gallon water heater, 135,000 BTU boiler, and buffer tank into a space as small as 34" x 53". The new Versa-Hydro™ does it!

FOOTPRINT COMPARISON

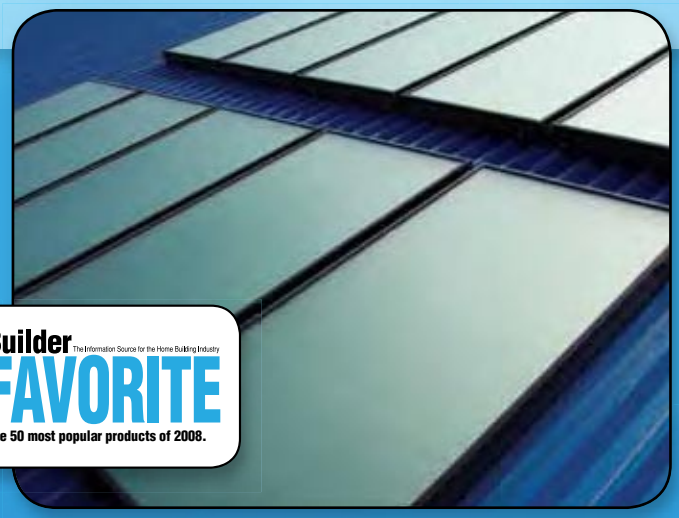


Versa-Hydro™ Solar Power

The First Solar Water & Space Heater with an Integrated Gas Fired Back-Up All in One High Efficiency Mod-Con Unit.

Versa-Hydro™ Solar Heater

The Versa-Hydro™ Solar is a truly revolutionary product that combines space heating and domestic hot water into one compact, high-efficiency mod-con unit. It is designed with a high-capacity internal solar heat exchanger for connection to solar panels or other renewable heat sources and with a highly-efficient 96% gas-fired back-up burner, all in one storage tank. The Versa-Hydro™ Solar will transfer energy from the sun on sunny days and still produce lots of hot water through the internal gas-fired back-up when the sun is not shining. Designed with advanced technology, the Versa-Hydro™ family of products optimizes efficiency and operating reliability.



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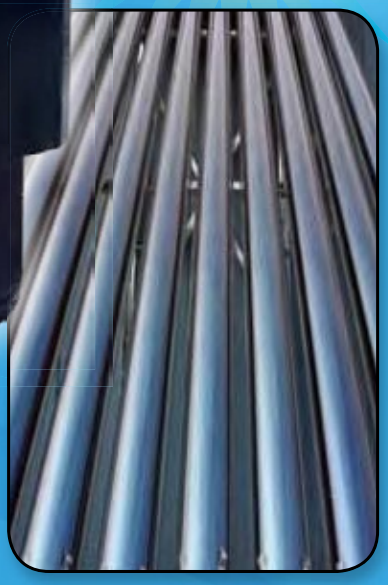
The Information Source for the Home Building Industry
The 50 most popular products of 2008.

Stop Paying for Your Heat: Harness the Power of the Sun



Easy to Set-Up! Easy to Use!

Controls

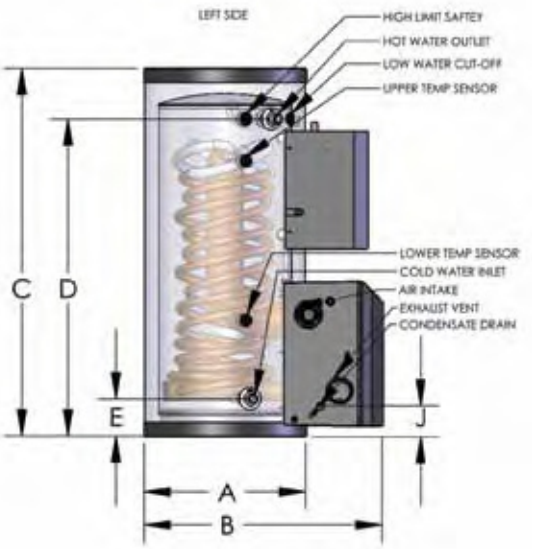
Line Sets

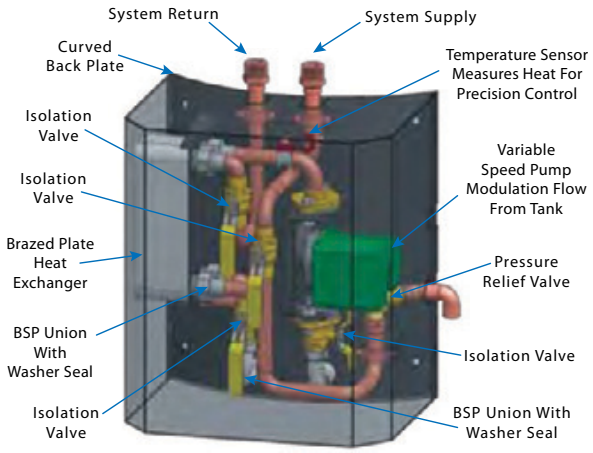
Panels

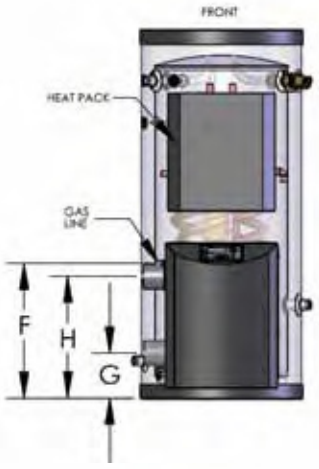
Tanks

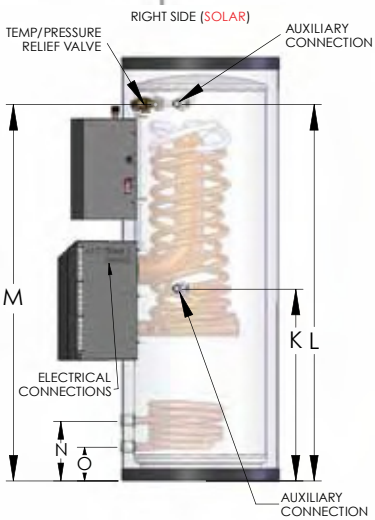
Everything for a Complete Solar System

Versa-Hydro™









VERSA-HYDRO WATER HEATER DIMENSIONS

MODEL #*	GALLONS	A	B	C	D	E	F	G	H	J	K	L	M		
PHE130-55 / PHE199-55	55	23"	34"	53"	46"	5½"	19½"	7-3/8"	14½"	5"	14"	46"	46"		
PHE130-80 /PHE199-80	80	23"	34"	72"	61"	5¾"	20½"	8-3/8"	15½"	6"	13"	61"	64½"		
PHE130-119 /PHE199-119	119	27"	37"	74"	65¾"	7½"	20½"	8-3/8"	15½"	6"	14¼"	65¾"	66½"		

VERSA-HYDRO SOLAR WATER HEATER DIMENSIONS

MODEL #*	GALLONS	A	B	C	D	E	F	G	H	J	K	L	M	N	O
PHE130-80S /PHE199-80S*	80	23"	34"	72"	61"	5¾"	38½"	26"	37"	24"	31¼"	64½"	64½"	10¼"	10¼"
PHE130-119S /PHE199-119S*	119	27"	37"	74"	65¾"	7½"	38½"	26"	37"	24"	33"	64½"	64½"	5¾"	5¾"

*NHX (No Heat Exchanger) Version of the Versa-Hydro is available.

VERSA-HYDRO WATER HEATER SPECIFICATIONS

MODEL #*	GALLONS	BTU'S	SPACE HEATING MODULE BTU'S	AIR INTAKE/ EXHAUST VENT SIZE	MAXIMUM SPACE HEATER TEMP.	WATER INLET/ OUTLET SIZE	AUX. CONN.	GAS LINE CONN.	SYSTEM RELIEF PIPE SIZE	SHIPPING WEIGHT
PHE130-55 / PHE199-55	55	130,000	100,000	2"	160°	1" NPT	1"	3/4"	3/4"	205 LBS.
		199,000	135,000	3"						
PHE130-80 / PHE199-80	80	130,000	100,000	2"	160°	1" NPT	1"	3/4"	3/4"	265 LBS.
		199,000	135,000	3"						
PHE130-119 / PHE199-119	119	130,000	100,000	2"	160°	1" NPT	1"	3/4"	3/4"	435 LBS.
		199,000	135,000	3"						

VERSA-HYDRO SOLAR WATER HEATER SPECIFICATIONS

MODEL #*	GALLONS	BTU'S	SPACE HEATING MODULE BTU'S	AIR INTAKE/ EXHAUST VENT SIZE	MAXIMUM SPACE HEATER TEMP.	WATER INLET/ OUTLET SIZE	AUX. CONN.	GAS LINE CONN.	SYSTEM RELIEF PIPE SIZE	SHIPPING WEIGHT
PHE130-80S / PHE199-80S	80	130,000	100,000	2"	160°	1" NPT	1"	3/4"	3/4"	275 LBS.
		199,000	135,000	3"						
PHE130-119S/ PHE199-119S	119	130,000	100,000	2"	160°	1" NPT	1"	3/4"	3/4"	445 LBS.
		199,000	135,000	3"						

Model	1st Hr. Rating	Recovery @ 100° F. Rise
PHE 130-55	205 Gal	148 GPH
PHE 130-80	227 Gal	150 GPH
PHE 130-119	257 Gal	152 GPH
PHE 199-55	295 Gal	229 GPH
PHE 199-80	314 Gal	229 GPH
PHE 199-119	335 Gal	230 GPH

* No suffix denotes natural gas and suffix "LP" denotes propane gas

In keeping with its policy of continuous product improvement, HTP reserves the right to make changes without notice.

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