

YOUR SOLAR HOME



INSTALLATION & TECHNICAL MANUAL ***SolarSheat Products: 1000G, 1500G, 1500GS & 2 PAK***

Copyright © 2010 Your Solar Home, All Rights Reserved

SolarSheat products must be installed in accordance to all local building, plumbing, electrical, and safety codes. Your Solar Home (YSH) does not warranty any installations that are not performed by an authorized YSH dealer/installer. YSH does not warranty any installations that do not use the recommended mounting hardware and mounting guidelines contained in this technical manual.



Manufacturers of renewable Solar Energy Products
for home, cottage & business.



TABLE OF CONTENTS

1.0 INTRODUCTION TO SOLARSHEAT AND SOLAR AIR HEATING

2.0 SITE ANALYSIS AND COLLECTOR PLACEMENT

3.0 SIZING YOUR SOLAR AIR HEATER

4.0 SOLARSHEAT KITS AND ACCESSORIES

5.0 SOLARSHEAT INSTALLATION BEST PRACTICES

6.0 COLLECTOR AND FAN INSTALLATION INSTRUCTIONS

6.1 WALL MOUNT INSTALLATION INSTRUCTIONS

6.2 ROOF MOUNT INSTALLATION INSTRUCTIONS

6.3 MULTI-COLLECTOR INSTALLATIONS: REFERENCE DIMENSIONS

6.4 FAN BOX MOUNTING INSTRUCTIONS

6.5 DC-POWERED INLINE FAN INSTALLATION INSTRUCTIONS

6.6 AC-POWERED FAN AND CONTROLS INSTALLATION INSTRUCTIONS

7.0 SYSTEM TROUBLESHOOTING

8.0 MAINTENANCE

9.0 WARRANTY

APPENDIX A: SOLARSHEAT SPECIFICATIONS

APPENDIX B: HOLE LOCATIONS FOR JOINING COLLECTORS END TO END



1.0 INTRODUCTION TO SOLAR^{Heat} AND SOLAR AIR HEATING

The Solar^{Heat} 1000G, 1500G & 1500GS solar collectors are designed to provide supplemental room heating through forced hot air exchange. Solar^{Heat} thermal collectors are fully modular and allow for series or parallel connection as required by large spaces or multi-room heating requirements. The Solar^{Heat} uses energy from the sun to heat household air by circulating it through the collector, refer to figure 1.1 for a typical single-panel wall mounted configuration.

The “G” series collectors are fully stand-alone units with an integrated photovoltaic “PV” module used to power the integral fan, while the GS does not include a PV module or fan and is intended for use with a “G” series module or to be coupled to an AC-connected fan.

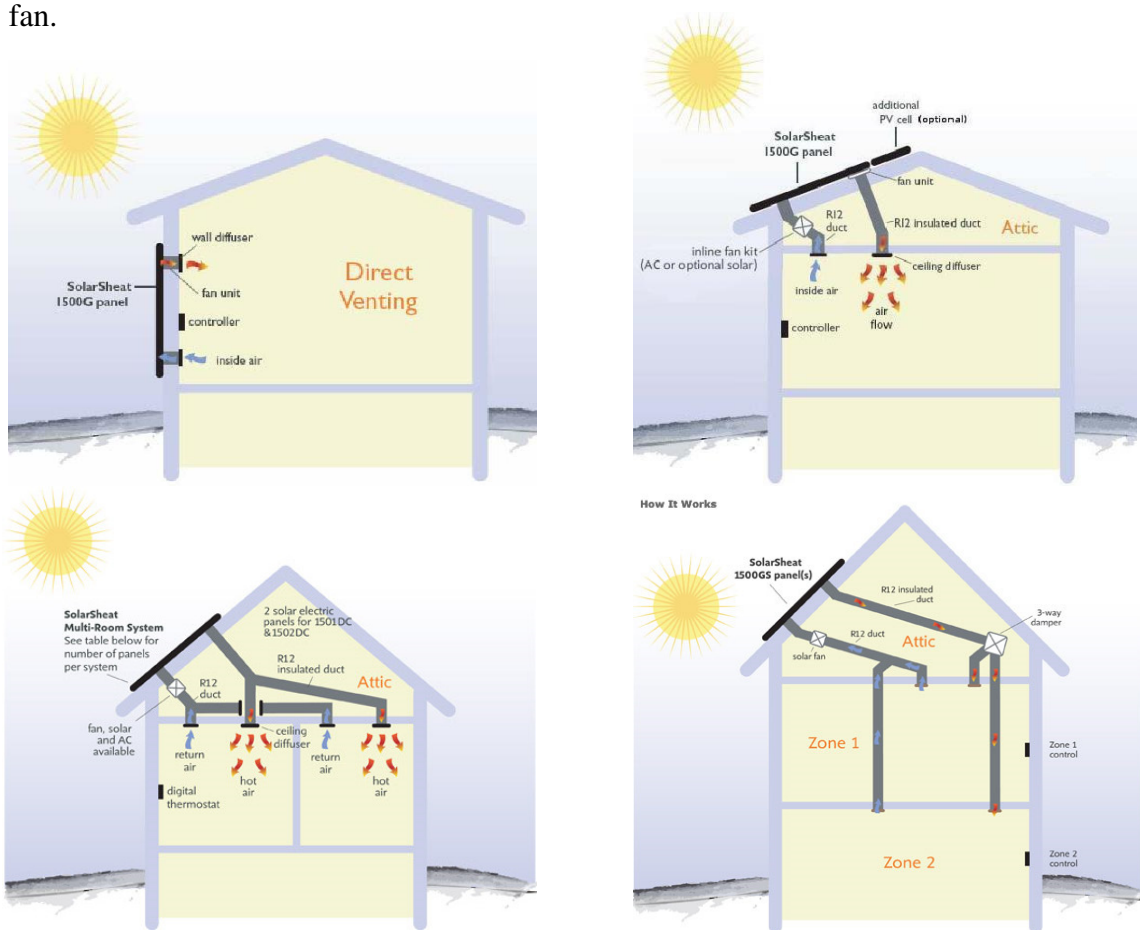


Figure 1.1: Typical wall and roof mounting for Solar^{Heat}

Every Solar^{Heat} model is SRCC OG 100 Certified and features an all-aluminum construction, designed to withstand harsh weather exposure. The Solar^{Heat} is designed to withstand typical snow and wind loading in accordance to CSA-F378.



Manufacturers of renewable **Solar Energy Products**
for home, cottage & business.

The Solar~~Heat~~ can achieve thermal conversion efficiencies in upwards of 50%, meaning that for every square meter of collector area, the Solar~~Heat~~ can produce roughly 500W of thermal energy on a clear and sunny day:

1 m² of COLLECTOR AREA* = 500W of HEAT
11 ft² of COLLECTOR AREA* = 1750 Btu of HEAT

* Measured for single collector setup, results may vary depending on collector arrangement and fan choice

Refer to Figures 1.2 to 1.5 for collector performance data at 0 deg Celsius:

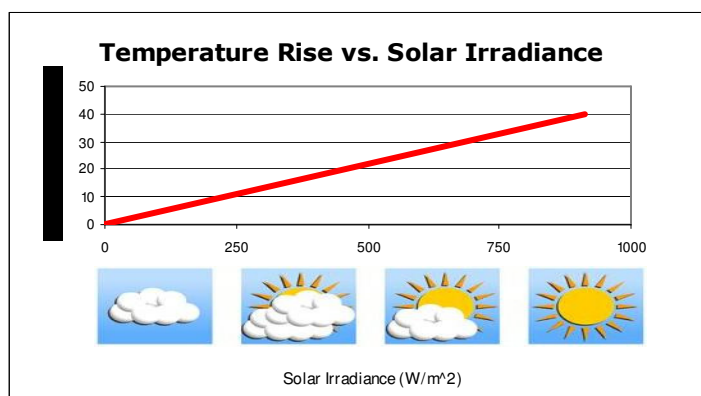


Figure 1.2: Delta Temperature @ 0 Cels

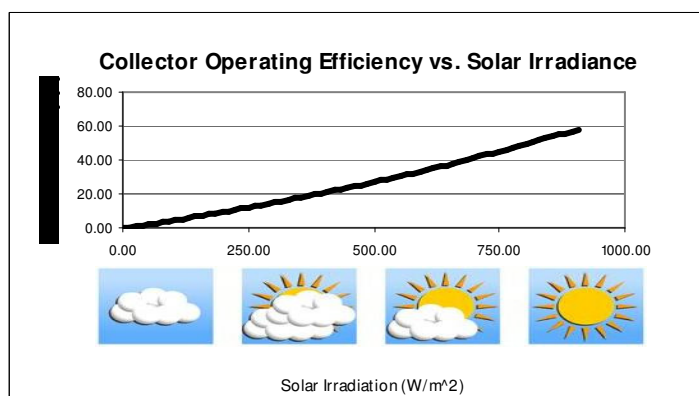


Figure 1.3: Collector Efficiency

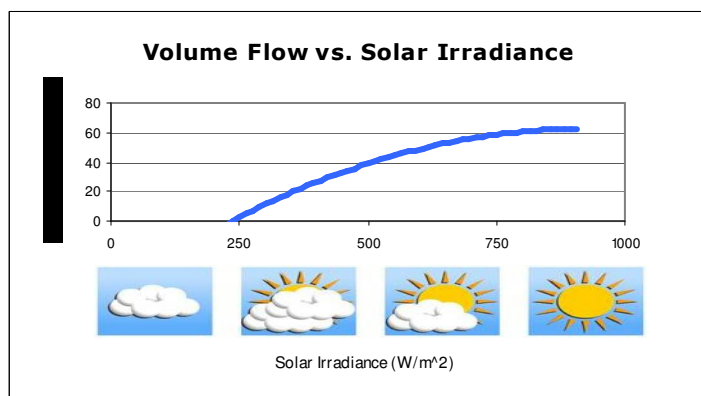


Figure 1.4: "G" Series Airflow (CFM)

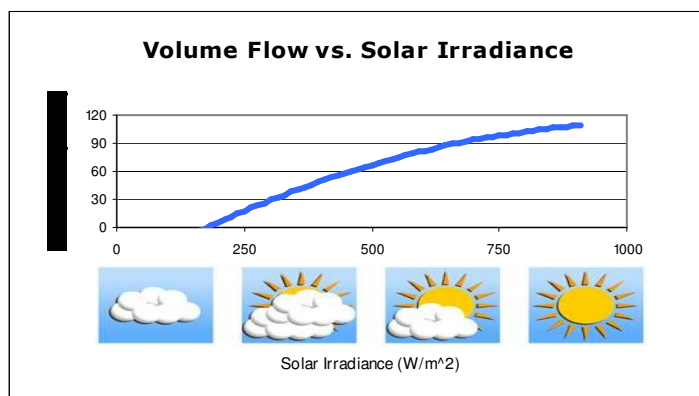


Figure 1.5: "G" Series Airflow (m³/hr)



2.0 SITE ANALYSIS AND COLLECTOR PLACEMENT

Since the SolarSheat air heater requires maximum sun exposure for optimal performance, be sure to find an un-shaded mounting location for your solar collector. A careful shading analysis should be performed using professional tools such as the *Sun Pathfinder™* or *Solar Eye™* to locate your collector properly. The SolarSheat can be mounted flush with an exterior wall or on any sloped or flat roof. Generally speaking if the installation location is in the northern hemisphere, the collector should face due south and if located in the southern Hemisphere, the collector should face due north.

When mounting the collector on a flat or pitched roof, you will want to ensure that the collector has been mounted at the optimal angle to receive maximum solar energy during the winter season. Table 2.1 recommends a number of collector tilt angles for various latitudes.

Latitude (Degrees)	Recommended Collector Tilt for Winter Season – From Horizontal (Degrees)	Recommended Collector Tilt for Year Round Performance – From Horizontal * (Degrees)
30	45	30
40	55	40
50	65	50
60	75	60
70	85	70
80	90	80

* Collectors should be tilted at a minimum of 45 deg to promote snow shedding during winter months

Table 2.1: Recommended Collector Tilt for Various Latitudes

For sloped roofs, it is necessary to measure the angle of the roof in order to calculate the angle between roof and collector. Refer to Table 2.2 for some common roof pitches and their corresponding angles.

Roof Pitch (Rise:Run)	Equivalent Roof Angle (Degrees)
3:12	14
4:12	18
5:12	23
6:12	27
8:12	34
10:12	40
12:12	45
14:12	49
16:12	53
18:12	56
20:12	59

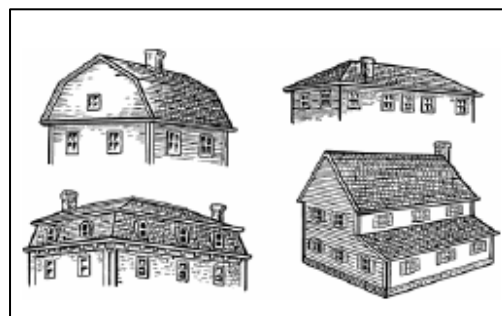


Table 2.2: Roof Pitch vs. Roof Angle



EXAMPLE: ROOF INSTALLATION

Follow the steps outlined below to determine the correct angle between roof and collector for a roof installation with the following characteristics:

Location Latitude = 40 degrees North

Roof Pitch = 12:12 Rise: Run

Roof Angle = 45 degrees

1. Using Table 2.2 and known latitude, determine the recommended collector tilt as measured from the horizontal plane = 55 degrees @ 40° Latitude
2. Subtract roof angle of 45 degrees from recommended collector tilt angle of 55 degrees = 10 degrees between roof and collector is required
3. Using Table 2.4, determine the correct length of elevator strut that is required to achieve the desired angle between roof and collector. To achieve the required 10-degree tilt between roof and collector we need a strut length of 10" for 1000 series collector and 15" for 1500 series collectors.

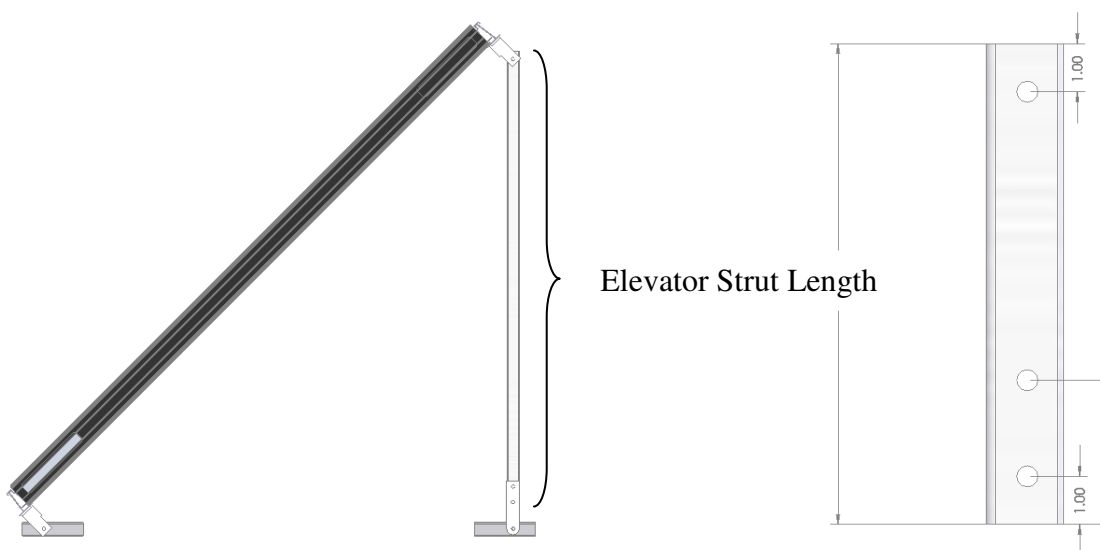


Figure 2.3: Elevator Strut Length detail

Desired Angle Between Roof & Collector (Degrees)	Elevator Strut Length 1000G mounted in any position or 1500G/GS landscape position (Inches)	Elevator Strut Length 1500G/GS portrait style only (Inches)
10	10	15
20	19	30
30	28	43
40	37	56
50	44	66
60	49	75

Table 2.4: Determining the correct elevator strut length for roof mounting

3.0 SIZING YOUR SOLAR AIR HEATER

The total area of the collector determines what size room can be heated to a comfortable temperature. Your Solar Home recommends that for every 250 ft² of living space, 11 ft² of collector area is required; refer to Tables 3.1 & 3.2 for SolarSh^{heat} sizing recommendations. Refer to Appendix A for SolarSh^{heat} specifications.

250 ft² of Living Space = 11 ft² of Collector Area Required*
23 m² of Living Space = 1 m² of Collector Area Required*

**Calculations are based on a home having good to average thermal insulation and a ceiling height of 8 feet. Results may vary depending on overall thermal efficiency of your home.*

Collector Model	Collector Aperture Area ft ²	Collector Aperture Area m ²
1000G	11.0	1.0
1500G	19.4	1.8
1500GS	23.2	2.2

Table 3.1: Collector model vs. collector aperture area

Room Size ft ²	Room Size m ²	Total Collector Area Required ft ²	Total Collector Area Required m ²
500	46.5	22	2.0
1000	92.9	44	4.1
1500	139.4	66	6.1
2000	185.8	88	8.2
2500	232.3	110	10.2
3000	278.7	132	12.3

Table 3.1: Collector area and sizing requirements



EXAMPLE: SIZING COLLECTOR ARRAY

Follow the steps outlined below to calculate the number of collectors required to heat a room with the following characteristics:

Room Size = 1500 square feet
 Room Height = 8 feet
 Room Insulation = Well Insulated

1. Using table 3.2, determine the total collector area required by a 1500 square foot interior space = 66 square feet of collector area.
2. With a total required collector area of 66 square feet, determine how many collectors are needed using Table 3.1. Divide the “Total Collector Area Required” by the “Collector Aperture Area” of any given collector model to calculate the number of collectors required.
3. If using 1000G Series Collectors ($66\text{sqft} / 11\text{sqft}$) = 10 collectors are required (not recommended due to large room size)
4. If using 1500G Series Collectors ($66\text{sqft} / 19.4\text{sqft}$) = 4 collectors are required
5. If using 1500GS Series Collectors ($66\text{sqft} / 23.2\text{sqft}$) = 3 collectors are required

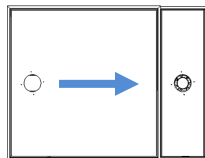
In situations where more than one collector is required to heat a large space or multiple rooms, Your Solar Home recommends the following configurations:

MOUNTING COLLECTORS IN LANDSCAPE:

Any number of the following combinations may be used repeatedly to satisfy heating requirements.

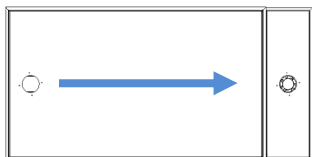
IMPORTANT NOTE: Full length, 87” wall mount bracket must be used for landscape mounting large collectors in order to achieve adequate support. For multiple collector arrangements other than 2 PAK configurations, select the mounting kit based on each individual collector.

1. Single 1000G Collector - Aperture Area = 11ft^2



Overall Dimensions = 56.5” x 43.25”

2. Single 1500G Collector – Aperture Area = 19.4ft^2



Overall Dimensions = 87” x 43.25”

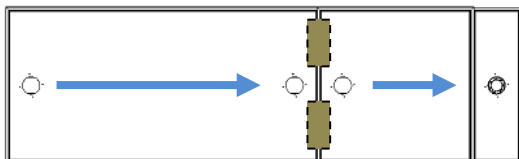


3. Single 1500GS Collector - Aperture Area = 23.2ft^2



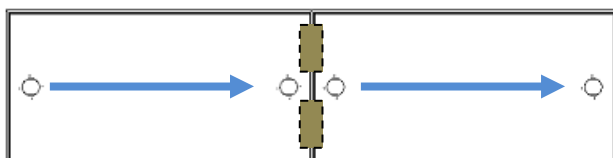
Overall Dimensions = $87'' \times 43.25''$
Separate Fan and Thermal Switch
Required

4. 1000G and 1500GS Collectors in Series – Aperture Area = 34.2ft^2



Overall Dimensions $130.5'' \times 43.25''$
Drilling Holes Required
2 Gasket Kits Required

5. Two 1500GS Collectors in Series - Aperture Area = 46.4ft^2

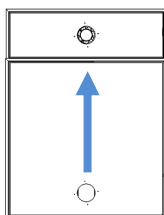


Overall Dimensions = $174'' \times 43.25''$
Drilling Holes Required
2 Gasket Kits Required

MOUNTING COLLECTORS IN PORTRAIT:

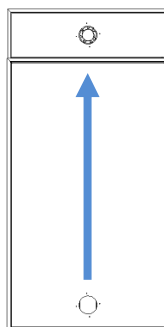
Any number of the following combinations may be used repeatedly to satisfy heating requirements.

1. Single 1000G Collector - Aperture Area = 11ft^2



Overall Dimensions = $43.25'' \times 56.5''$

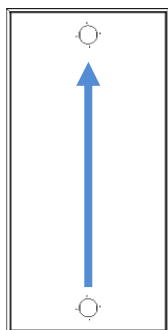
2. Single 1500G Collector - Aperture Area = 19.4ft^2



Overall Dimensions = $43.25'' \times 87''$

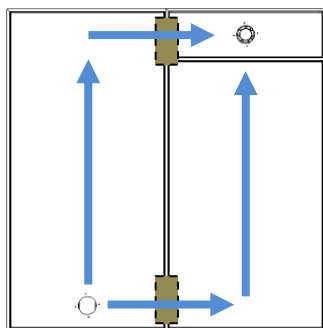



3. Single 1500GS Collector - Aperture Area = 23.2ft²



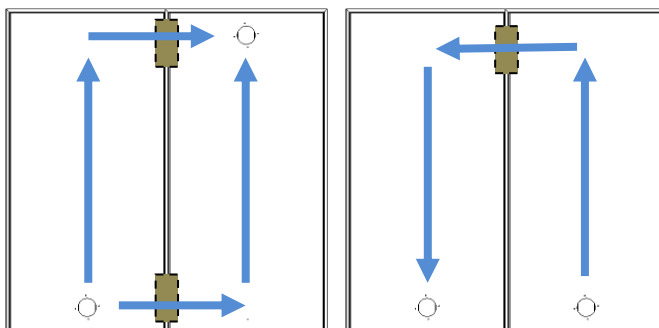
Overall Dimensions = 43.25" x 87"
Separate Fan and Thermal Switch
Required


4. 1500G and 1500GS Collectors in parallel - Aperture Area = 42.6ft²



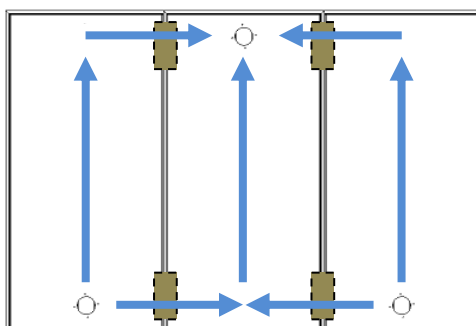
Overall Dimensions = 86.5" x 87"
Removal of Knockouts Required
Gasket Kit Required 
Use 2 PAK Mounting Configuration


5. Two 1500GS Collectors in parallel - Aperture Area = 46.4ft²



Overall Dimensions = 86.5" x 87"
Removal of Knockouts Required
Gasket Kit Required 
Use 2 PAK Mounting Configuration

6. Three 1500GS Collectors in parallel - Aperture Area = 69.6ft²



Overall Dimensions = 129.75" x 87"
Removal of Knockouts Required
2 Gasket Kits Required 



4.0 SOLAR^{HEAT} KITS AND ACCESSORIES

Contact Your Solar Home directly for assistance in choosing the most optimal solution for your heating needs or custom design of large systems

STANDARD COLLECTORS & ACCESSORIES:

	1000G – Collector includes PV head, internal DC powered fan, 20C/68F thermal switch, control wire and thermostat.	PN:1132
	1500G – Collector includes PV head, internal DC powered fan, 20C/68F thermal switch, control wire, and thermostat.	PN: 1001
	1500GS – Collector Only. Does NOT include a PV head, fan, thermal switch, or control wires. Note – No thermostat included	PN: 1002
	2 PAK 1500G and 1500GS – Collector array Includes PV head, internal DC powered fan, 20C/68F thermal switch, control wire and thermostat.	PN: 1023
	GASKET KIT – Side Hole Gasket Kit for joining multiple collectors together, two gaskets included for joining two collectors	PN: 1066
	FRESH AIR INTAKE KIT – Allows for fresh air intake to any Solar ^{Heat}	PN: 1127



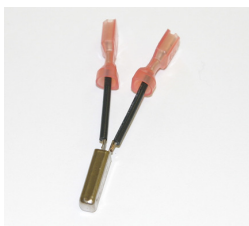
CONTROLS:

IMPORTANT NOTE: One single stage thermostat is required to control single or multi collector installations. For arrays using only 1500GS collectors, a 20C/68F thermal switch is also required.



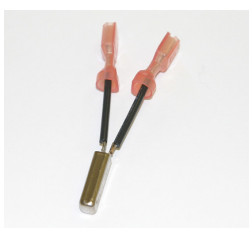
SINGLE STAGE THERMOSTAT – Used to control the internal fan on 1000G and 1500G models. Also used to control additional AC or DC powered fans for installations using 1500GS collectors.

PN: 1136



THERMAL SWITCH 20C/68F – Used to control fan operation whenever 1500GS models are used exclusively. When coupling a G and GS model together, the included thermal switch inside the G model should be used instead. 20feet of wire extension included.

PN: 1154



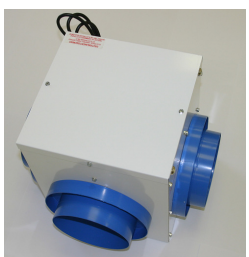
THERMAL SWITCH 25C/77F – Used to control fan operation whenever 1500GS models are used exclusively. When coupling a G and GS model together, the included thermal switch inside the G model should be used instead. 20 feet of extension wire included.

PN: 1207



2 STAGE ZONE CONTROL – This 2-way damper, thermostat and wiring kit allows for an additional thermostat to be mounted in an adjacent room. The thermostat controls the position of the 2-way damper and allows for prioritized temperature control of an adjacent room.

PN: 1022



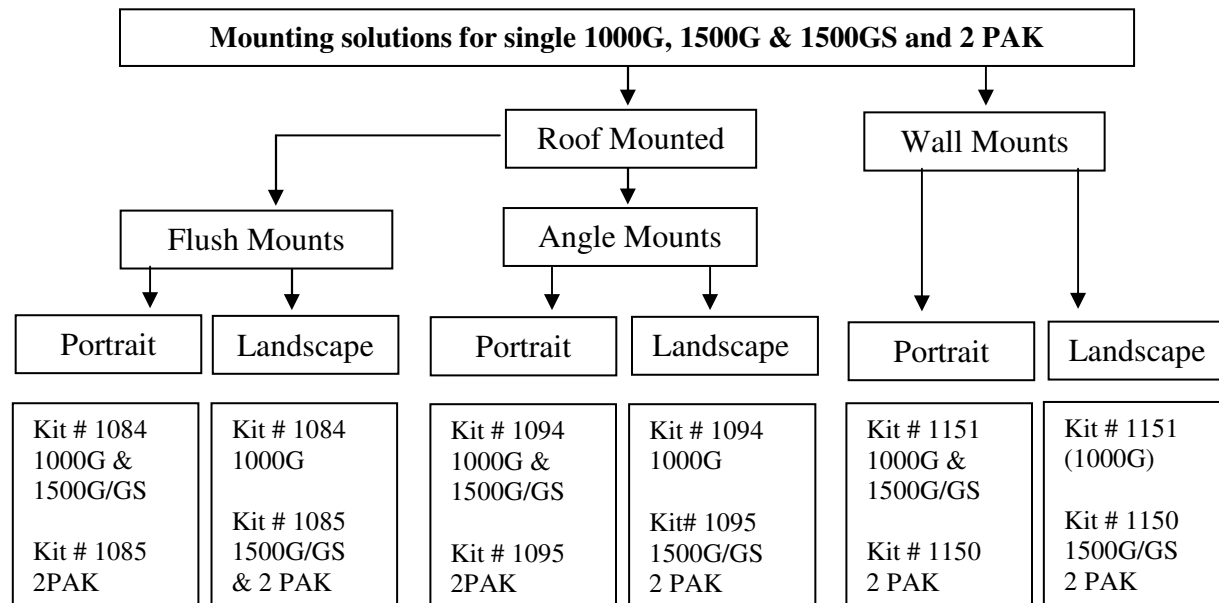
DAMPER – Intelligent 3 way damper used for HRV bypass applications or 3-way flow control

PN: 1020



MOUNTING KITS:

Use the flow chart below to aid in selecting the correct mounting hardware.



FLUSH ROOF MOUNT 43.5" – Kit includes two 43.5" mounting rails, four rail standoffs, four uni-strut roof mounts and hardware.

PN: 1084



FLUSH ROOF MOUNT 87" – Kit includes two 87" mounting rails, six rail standoffs, six uni-strut roof mounts and hardware.

PN: 1085



ANGLE ROOF MOUNT 43.5" – Kit includes two 43.5" mounting rails, four rail standoffs, two 75" elevator struts (cut to length), cross brace, four uni-strut roof mounts and hardware.

PN: 1094



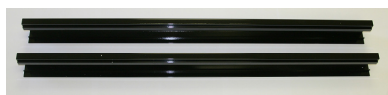
ANGLE ROOF MOUNT 87" – Kit includes two 87" mounting rails, six rail standoffs, three 75" elevator struts (cut to length), cross brace, and six uni-strut roof mounts.

PN: 1095



WALL MOUNT 43.5" – Kit includes two 43.5" mounting rails and hardware.

PN: 1151



WALL MOUNT 87" – Kit includes two 87" mounting rails and hardware.

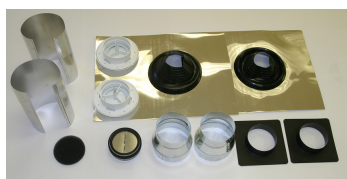
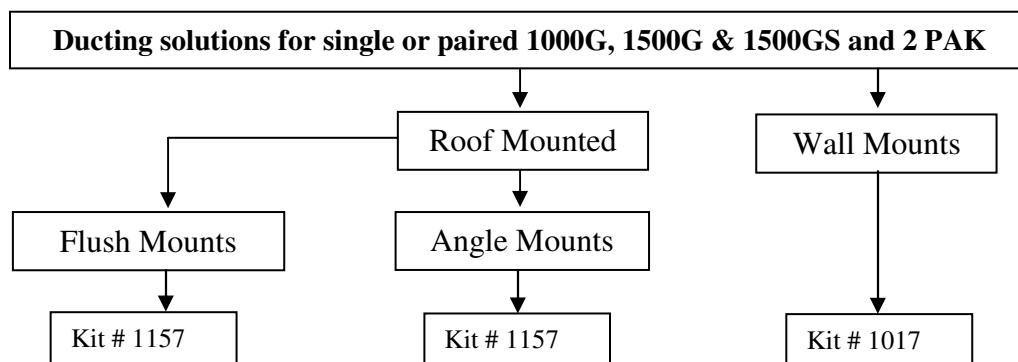
PN: 1150



DUCTING KITS:

Use the flow chart below to aid in selecting the correct mounting hardware:

IMPORTANT NOTE: If pairing two collectors to flow in parallel or series such as a 2 PAK, a single duct kit is sufficient.

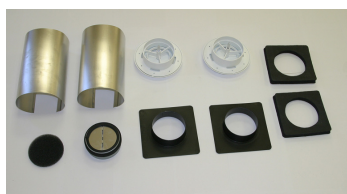


ROOF MOUNT DUCT KIT – Kit includes two 5” adapter collars for the collector, two roof flashing cones, two 5” to 6” adapters for increasing duct size once inside the attic, two snap ducts, 5” back-draft damper, and two ceiling diffusers.

PN: 1157

NOTE: It is recommended that all exterior and interior duct runs are well sealed and insulated to prevent heat loss. See PN: D019 for recommended exterior insulation.

It is assumed that the installer will provide all additional duct work and accessories to connect and seal all components as required.

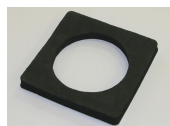
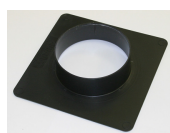
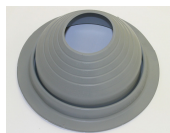
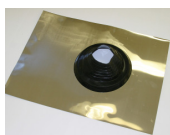


WALL MOUNT DUCT KIT – Kit includes two 5” adapter collars for the collector, two 5” foam seals, two snap ducts, filter element, back-draft damper, and two 5” wall diffusers.

PN: 1017

It is assumed that the installer will provide all necessary duct work to connect all components depending on type of installation.



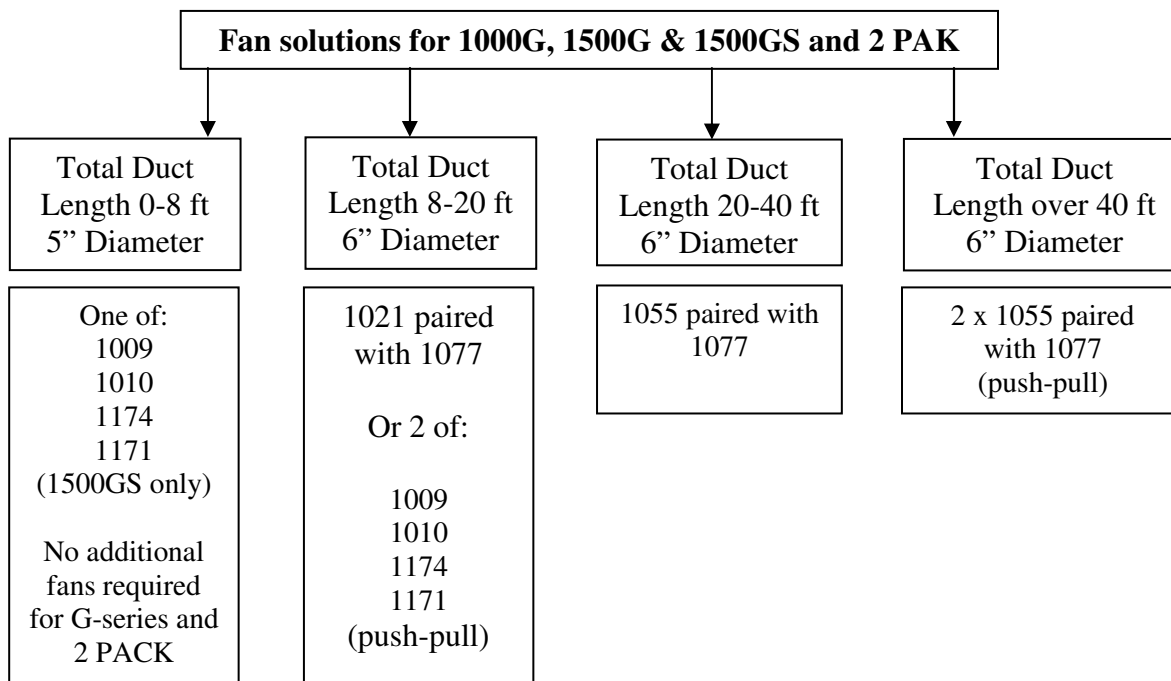
DUCTING ACCESSORIES:

BACK-DRAFT DAMPER 5"	PN: 1050
BACK-DRAFT DAMPER 6"	PN: 1051
BACK-DRAFT DAMPER 8"	PN: 1052
BACK-DRAFT DAMPER 10"	PN: 1053
BACK-DRAFT DAMPER 12"	PN: 1054
FLASHING CONE – Aluminum base for composite roofs.	PN: 1041
FLASHING CONE – All rubber construction for metal roofs.	PN: 1129
INSULATED FLEX DUCT 6" – Round insulated flex duct, R12, 25'	PN: 1058
INSULATED FLEX DUCT 7" – Round insulated flex duct, R12, 25'	PN: 1059
INSULATED FLEX DUCT 8" – Round insulated flex duct, R12, 25'	PN: 1060
CEILING DIFFUSOR 5"	PN: 1013
SOLARS HEAT 5" ADAPTER COLLAR	PN: 1142
FOAM GASKETS FOR 5" COLLAR	PN: 1152
SOLARS HEAT AIR FILTER ELEMENT	PN: 1153
DAMPER 6" – Used to control air distribution between two rooms.	PN: 1019
TEE 6" – Hard duct tee for multi room configurations	PN: 1026
INSULATING FOAM FOR DUCTS – Aerocel sheet insulation, 36" x 48" 6 pcs per carton, sealing tape 2"x82', and 1quart contact adhesive.	PN: 1196

FAN KITS:

IMPORTANT NOTE: 1000G and 1500G collectors are equipped with an integrated DC-powered fan and do not require additional fans except when total ducting lengths exceed 8 feet or more. Refer to flow chart below for recommendations on choosing fan options.

If multiple collectors or 2 PAKS are ducted together into one large duct or plenum, please consult Your Solar Home for custom fan and blower configurations. The following flow chart suggests fan options for single collector & 2 PAK ducting.

**DC-POWERED:**

DC FAN INLINE 5" WITH PV-HEAD – This inline fan is intended for use with 5" ducting, kit includes fan, thermal switch, wire, PV-Head (24Vdc) for power, PV mounting rails and hardware.

PN: 1009



DC FAN INLINE 5" WITH AC-DC ADAPTER – This inline fan is intended for use with 5" ducting, kit includes fan, thermal switch, wire, and AC-DC adapter (24Vdc) for power.

PN: 1010



DC FANBOX 5" WITH PV-HEAD – This fan and enclosure is intended for wall mounting and for use with 5" ductwork. Kit includes fan, wall-mounted enclosure, thermal switch, wire, PV-Head (24Vdc) for power, PV mounting rails and hardware.

PN: 1174



Manufacturers of renewable **Solar Energy Products**
for home, cottage & business.



DC FANBOX 5" WITH AC-DC ADAPTER – This fan and enclosure is intended for wall mounting and for use with 5" ductwork. Kit includes fan, wall-mounted enclosure, thermal switch, wire, and AC-DC adapter (24Vdc) for power.

PN: 1171

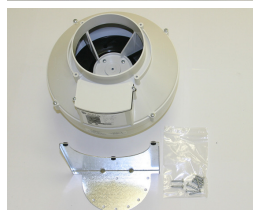
AC-POWERED:



AC FAN COMBI – Intended for use with 4", 5", and 6" ductwork, 83Watts.

Note: AC-powered fans require a fan control kit (AC005) for power and control

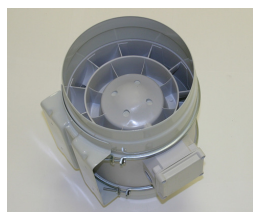
PN: 1021



AC FAN DEDICATED 6" – Intended for use with 6" ductwork, this AC fan can provide good volume flow to systems with long duct runs, 162 Watts.

Note: AC-powered fans require a fan control kit (AC005) for power and control

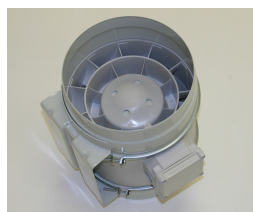
PN: 1055



AC FAN 8" - Intended for use with 8" ductwork, this AC fan can provide good volume flow to systems with long duct runs, 2spd 128/108 Watts.

Note: AC-powered fans require a fan control kit (AC005) for power and control

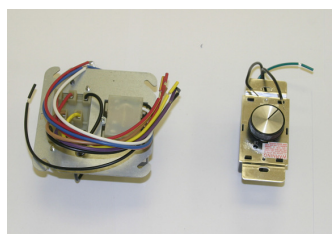
PN: 1061



AC FAN 10" - Intended for use with 10" ductwork, this AC fan can provide excellent volume flow to systems with long duct runs, 2spd 241/162 Watts.

Note: AC-powered fans require a fan control kit (AC005) for power and control

PN: 1075



AC FAN CONTROL KIT - This fan control kit includes a power centre and a speed control module required to power and control up to 2 AC-powered fans.

Note: Single stage thermostat (C001) and appropriate thermal switch (C002/C003) is required for this kit.

PN: 1077



5.0 SOLAR**HEAT** INSTALLATION BEST PRACTICES

IMPORTANT NOTE: *The successful operation of the Solar**Heat** solar collector depends entirely on the proper installation procedure and maintenance as outlined in this manual. Prior to installation please read the installation instructions completely*

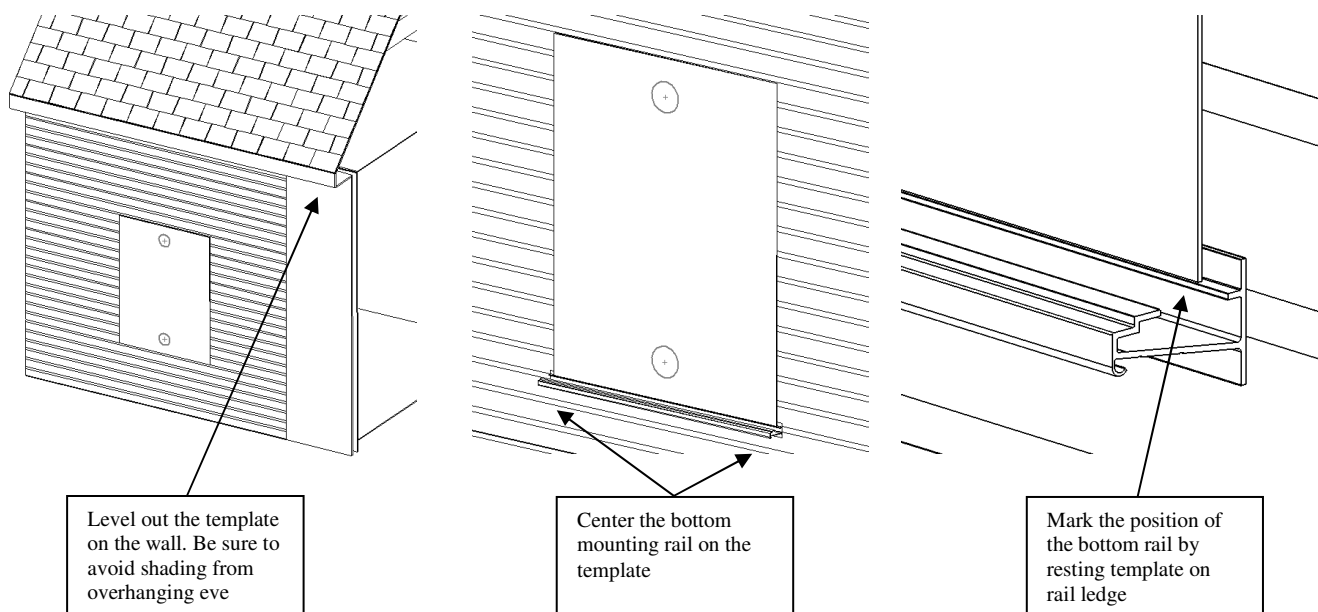
- **Keep ducting lengths to a minimum for best air flow**
- **Seal all connections and joints to prevent air leakage**
- **Insulate all system ducting to minimize unwanted heat loss and condensation**
- **Always use 6” hard ducting on runs greater than 8ft**
- **Minimize the use of corrugated tubing or flex duct**
- **Always use hard elbows for duct bends greater than 45deg**
- **For runs greater than 20ft, an AC-powered fan should be used**
- **For runs greater than 40ft, 2 AC-powered fans should be used in push-pull**
- **Do not use hard plastic piping due to high heat output from collector**
- **Always place thermostat unit at least 4ft from hot air exhaust diffuser**
- **Maintain all system filters on a regular basis**
- **Always install additional fans on the inlet/return side of the system**
- **Ensure all AC-electrical wiring is done by a certified electrician**
- **Ensure all local building code standards are followed**
- **Always work safely and wear appropriate safety equipment**



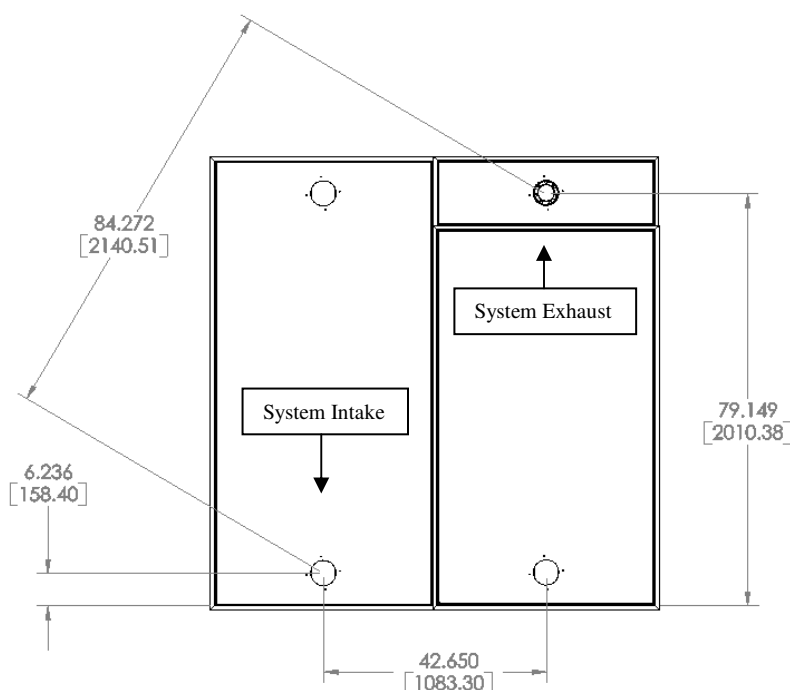
6.0 COLLECTOR AND FAN INSTALLATION INSTRUCTIONS

6.1 WALL MOUNT INSTALLATION INSTRUCTIONS

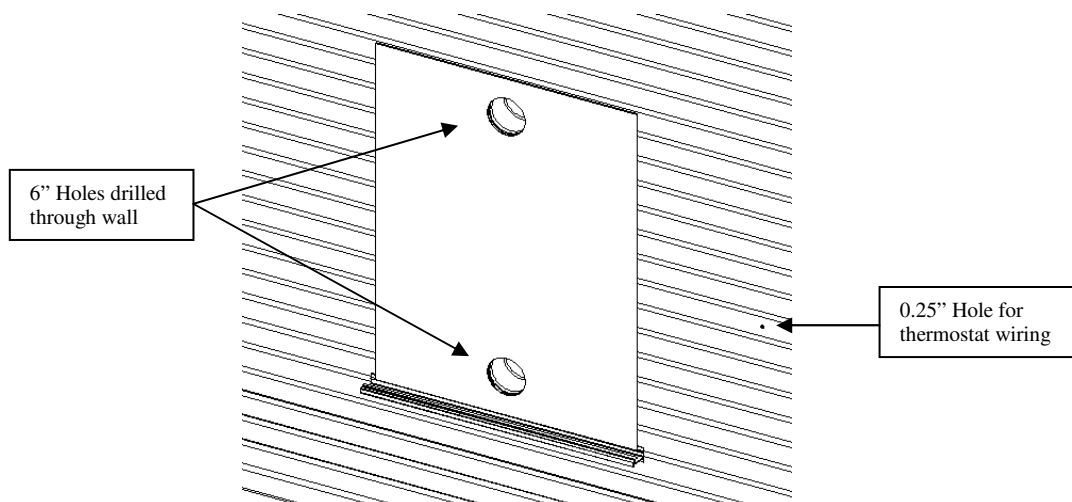
1. Locate un-shaded portion of the building for collector placement
2. Using a level and the included template, mark the location of the bottom mounting rail and intake & exhaust duct locations. Be sure to avoid wall studs and electrical wire



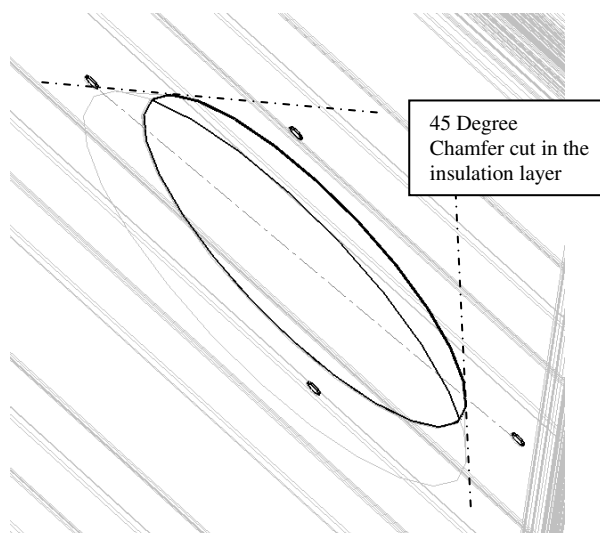
3. If mounting a 2 PAK or paired collectors, refer to hole location drawing below



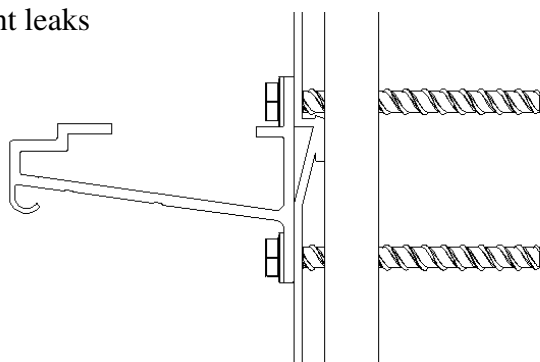
4. Carefully drill a pilot hole for the ducts and thermostat wire, be sure to locate the thermostat at least 4ft from the hot air duct
5. Cut 6" holes through the building wall



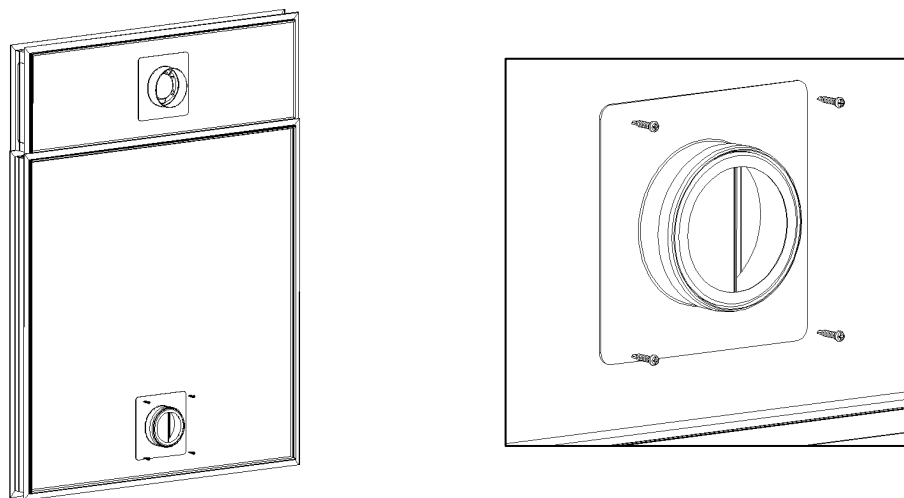
6. Cut holes in insulation layer on the back of the collector/s. Be sure to chamfer the insulation for improved airflow to and from the collector



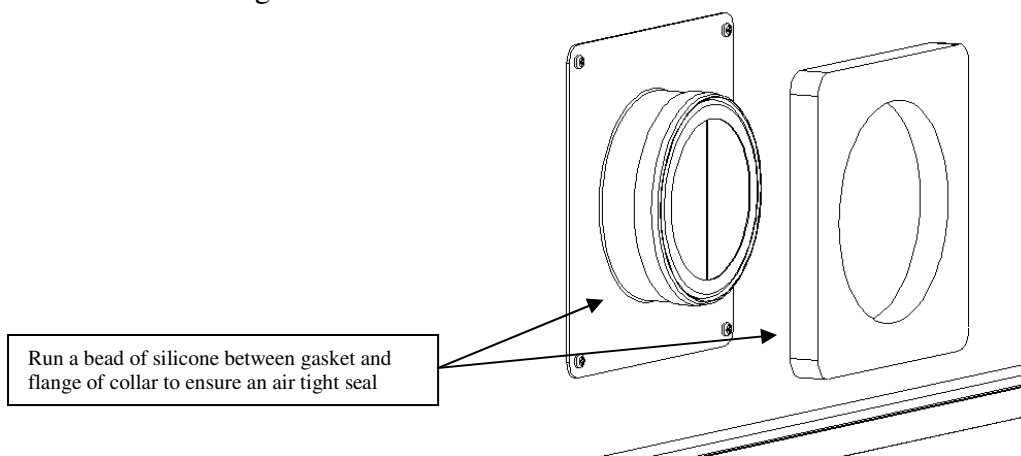
7. Secure the bottom support rail to the wall, ensure all wall penetrations are well sealed to prevent leaks



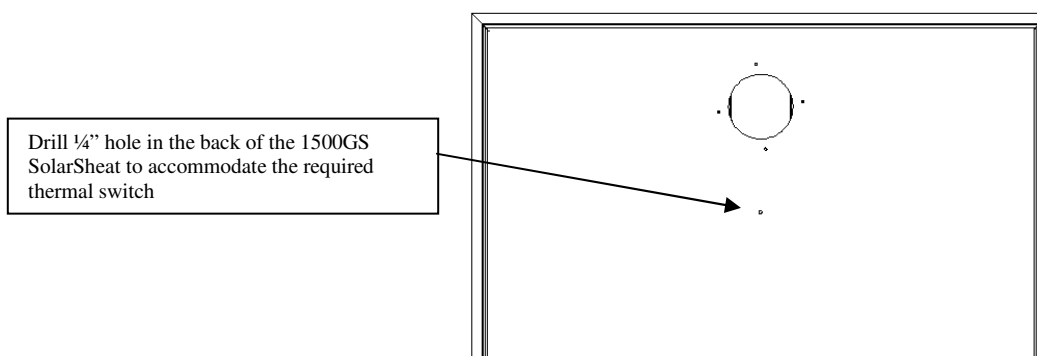
8. Attach the two collars to the back of the collector/s using ½” sheet metal screws. Use silicone to seal the collars to the back of the collector and tape the outer rim of the flange down to the collector to improve the seal. Ensure that the collar with back-draft damper is installed with the damper pivot pin in the vertical position



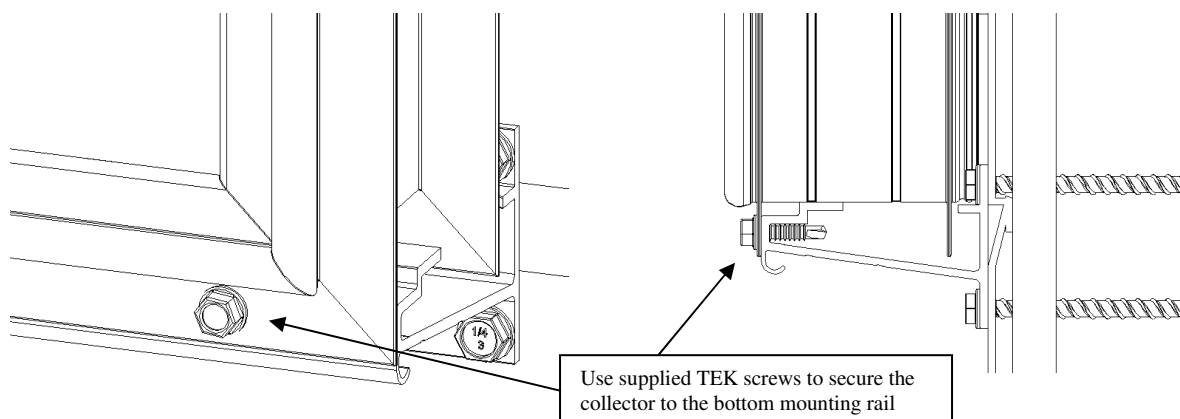
9. Place foam gaskets over each collar to provide a seal between the building wall and the SolarSheat. Run a bead of silicone between the gasket and the SolarSheat to ensure an air tight seal



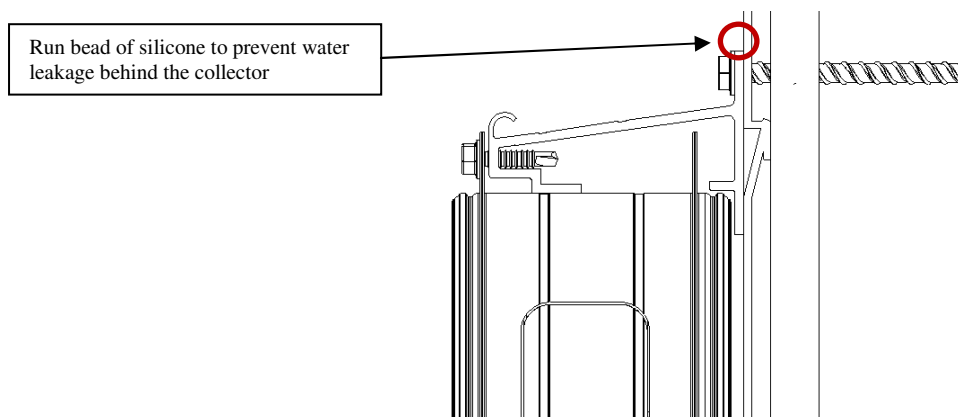
10. If mounting a 1500GS, drill a hole in the back of the collector as shown and secure the thermal switch into the collector ensuring a good seal



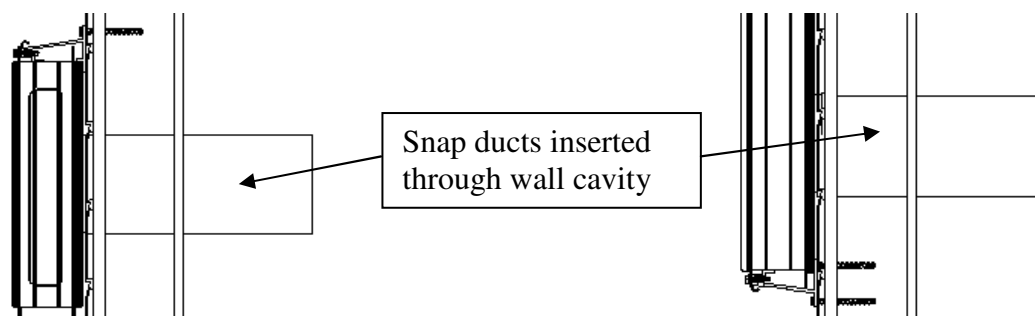
11. Feed the thermostat wire through the wall and connect to the collector thermal switch, ensure the wall penetration for the wires are well sealed
12. Secure the collector/s to the bottom rail one at a time and secure the collectors to each other if installing a 2 PAK or multiple collectors. Run bead of silicone between the collar gasket and the wall to ensure a good seal



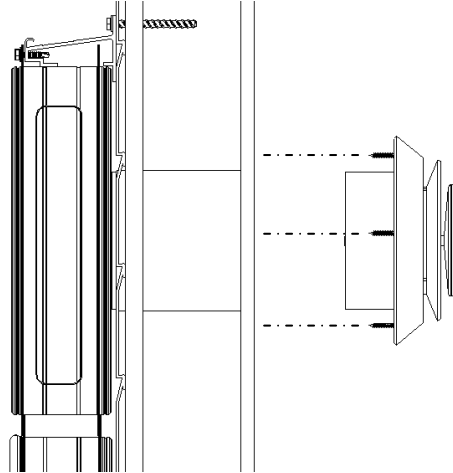
13. Assemble the top rail to the collector/s and then secure the top rail to the wall, again ensuring that all fastener penetrations are well sealed. Run a bead of silicone on the upper edge of the top mounting rail to prevent water running down the back side of the collector



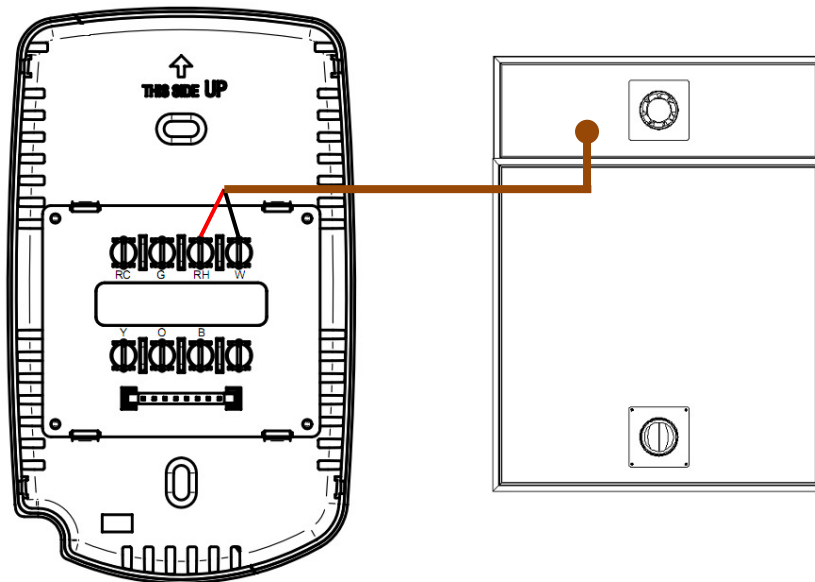
14. Insert the snap duct assemblies through the wall ensuring that the duct makes a good seal with the collars mounted to the collectors.



15. Trim the ducts flush with inner wall surface and secure in the wall, ensure ALL penetrated wall layers are thoroughly sealed to the duct using sealant or spray foam to minimize air leakage through the wall openings
16. Insert the filter into the intake/return duct
17. Mount diffuser assemblies to the ducts and wall, ensuring a good seal is made between duct and diffuser and wall and diffuser

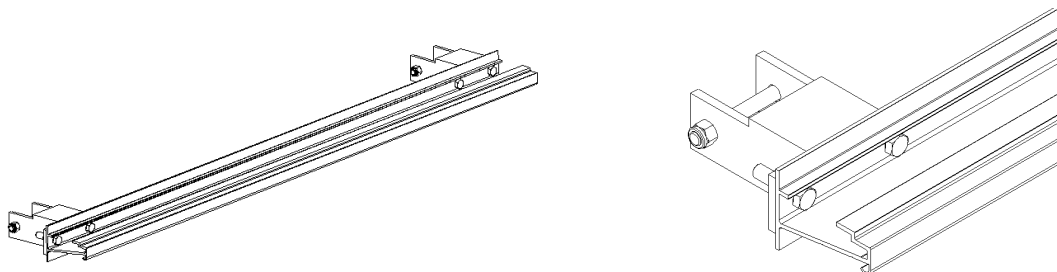


18. Mount the thermostat on the interior wall and connect the wires from the SolarS^{heat} to the “RH” and “W” terminals on the back of the thermostat. Snip the W904 jumper on the back to change display to Degrees Celsius

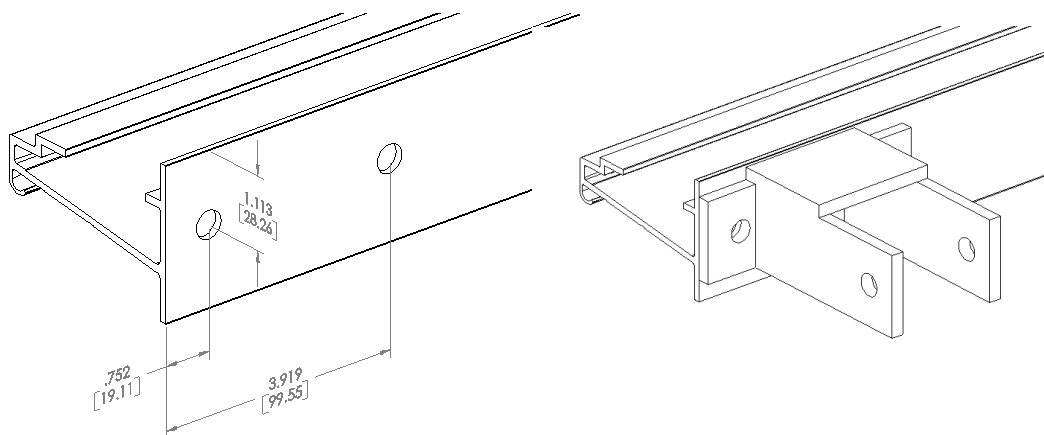


6.2 ROOF MOUNT INSTALLATION INSTRUCTIONS

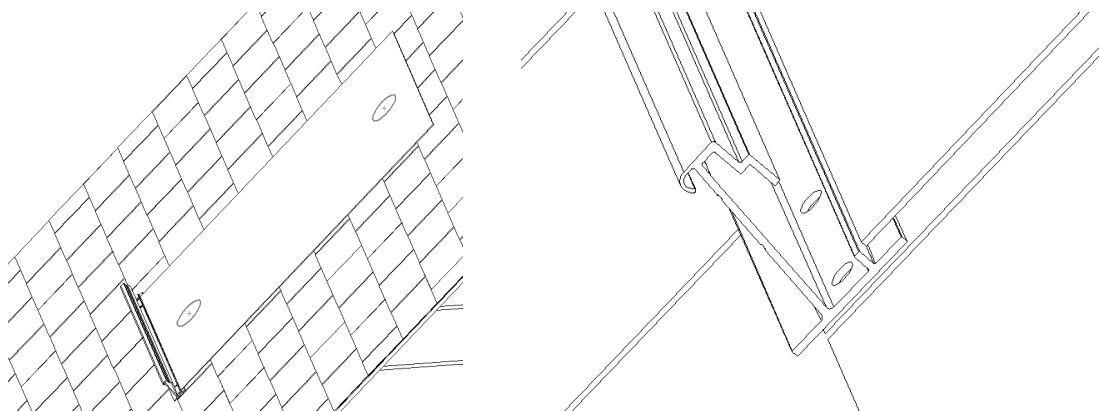
1. Locate un-shaded portion of the building for collector placement
2. If the bottom mounting rail and rail standoffs are received as an assembly, disassemble the rail from the standoffs.



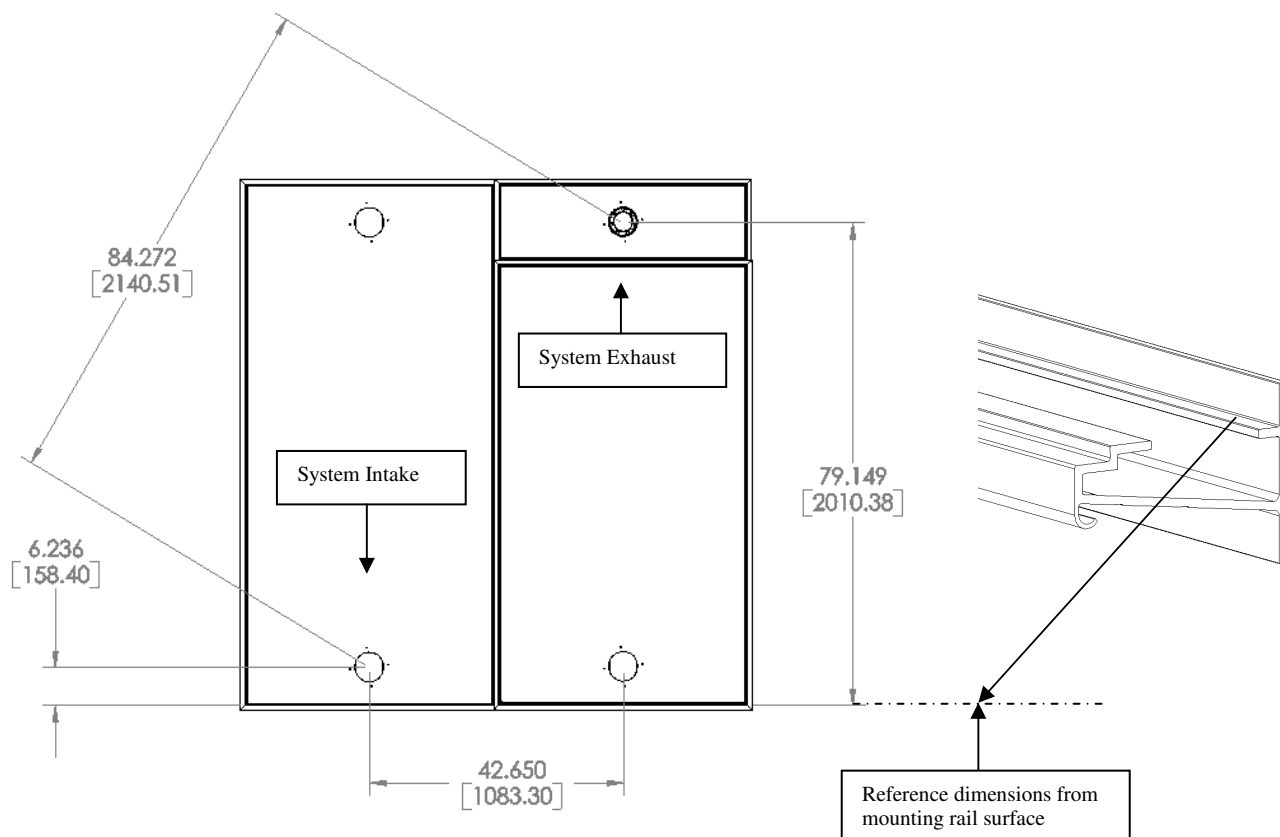
3. If the rail is not assembled, drill holes in the mounting rail for attaching the standoffs as shown. Do not assemble rail yet, you will need the drilled hole locations for marking the uni-strut positions on the roof.



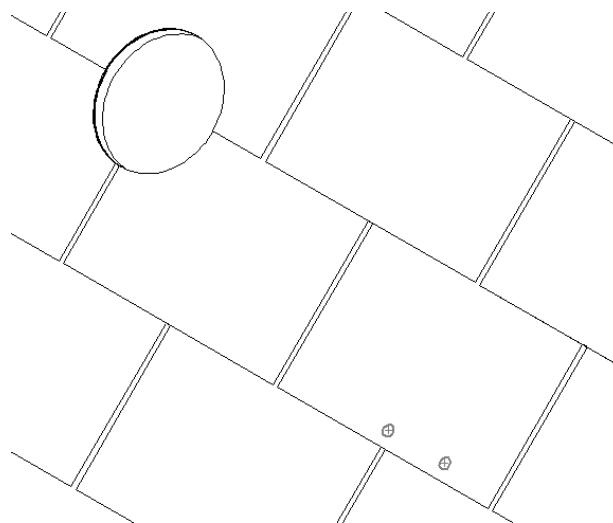
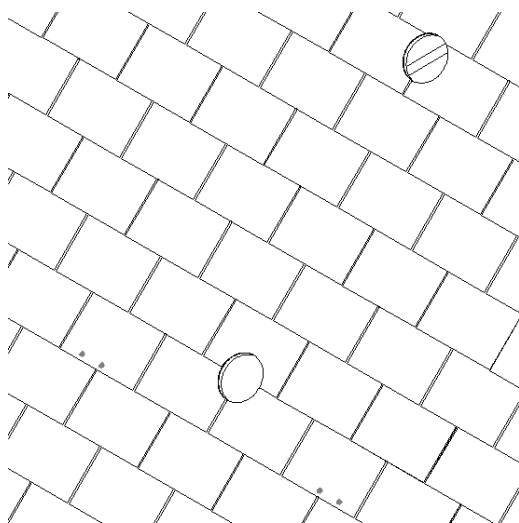
4. Using a level and the included template, mark the intake and exhaust duct locations on the roof by drilling a pilot hole. Align the bottom rail with the bottom of the template and mark the four hole locations on the roof as shown. Be sure to avoid roof rafters and electrical wires



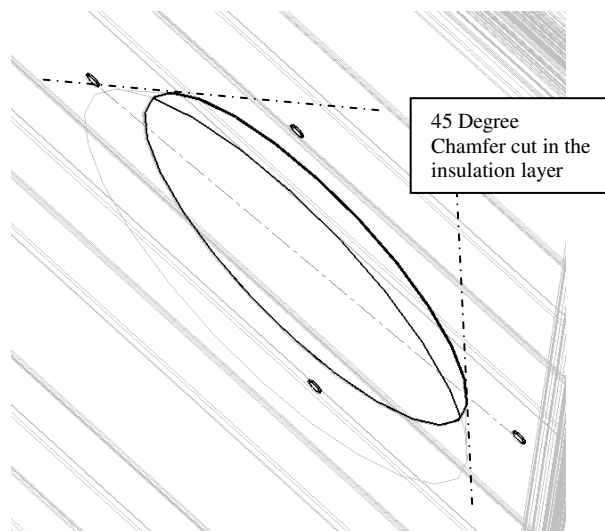
5. If mounting a 2 PAK or paired collectors, refer to hole location drawing below. As with a single collector installation, align the bottom rail with the template and mark the six hole locations used to secure the standoffs to the rail.



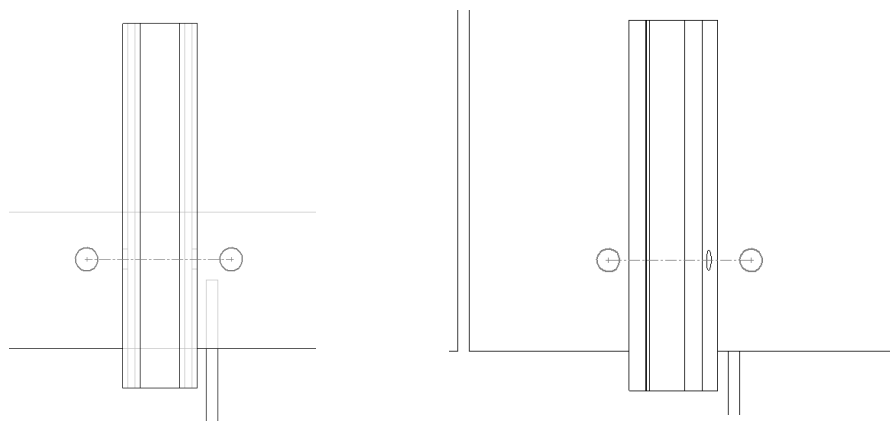
6. Cut 6" holes through the roof and drill a 1/4" hole for the thermostat wires.



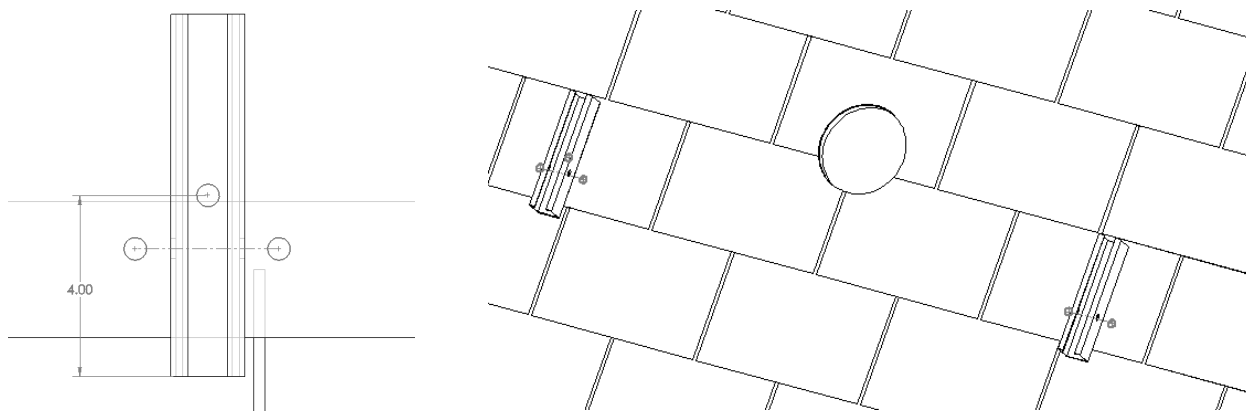
7. Cut holes in insulation layer on the back of the collector/s refer to drawing below. Be sure to chamfer the insulation to allow a sufficient gap inside the collector for airflow

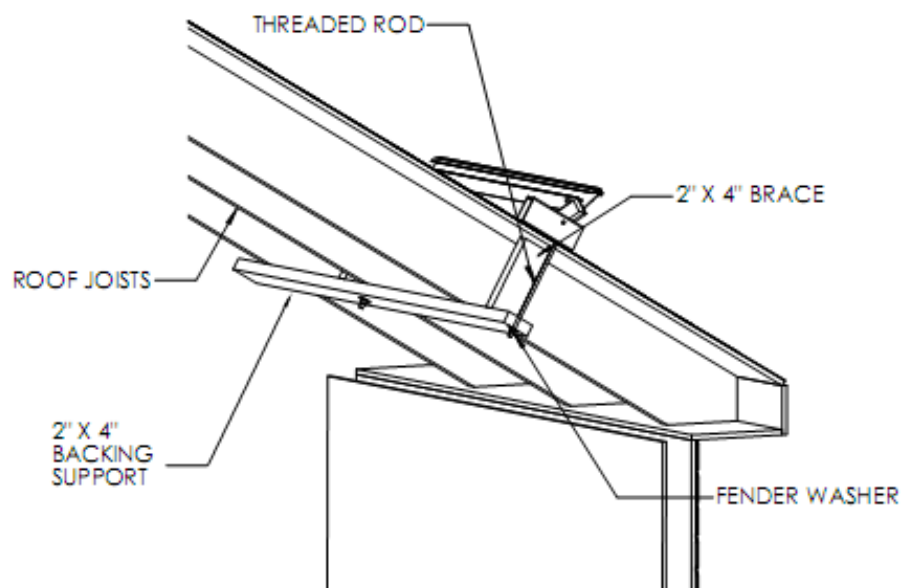


8. Using the marked positions from the bottom rail holes, align the uni-struts on the roof as shown. Mark the positions of both uni-struts on the roof..

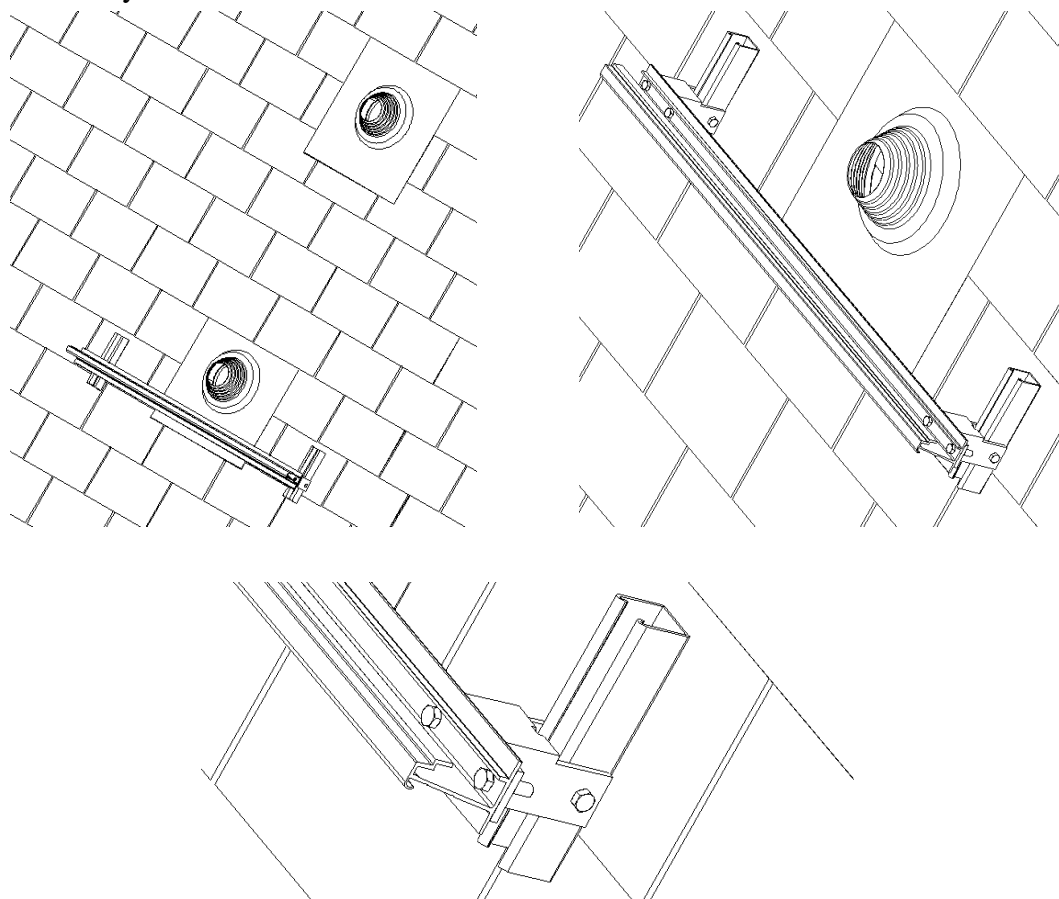


9. Secure the uni-struts to the roof. If local building code allows, fasten the uni-struts directly to the roof rafters or use a brace on the back of the rafters for fastening the uni-struts

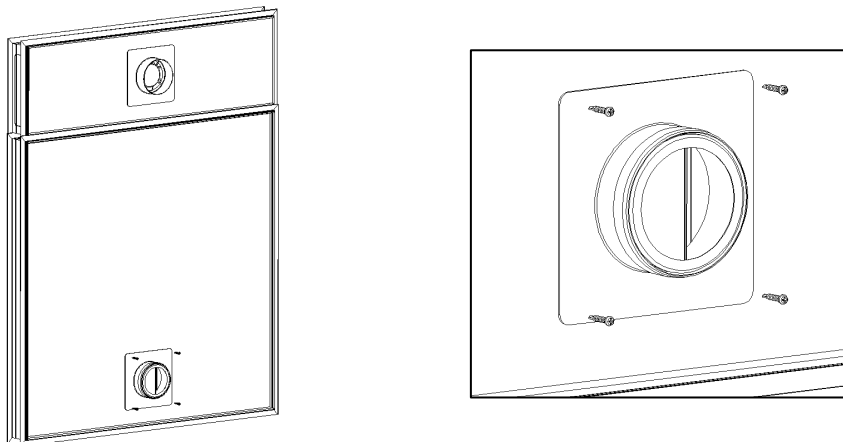




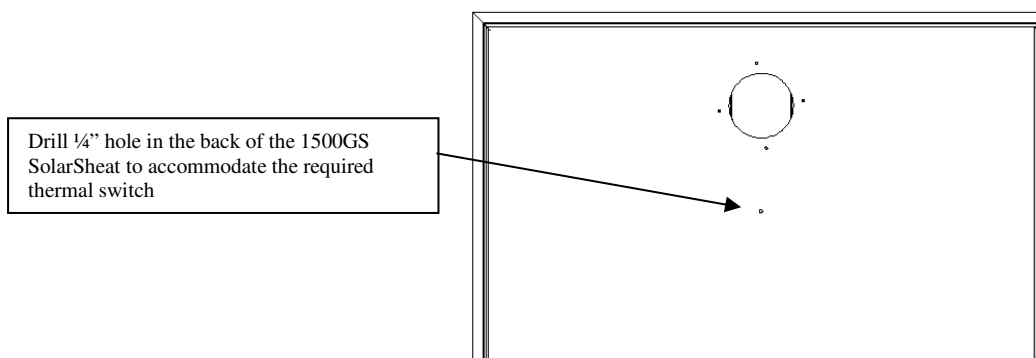
10. Install flashing cones under the roof shingles as shown, ensure all roof penetrations are well sealed to prevent roof leaks, trim collars to accommodate the duct diameter being used
11. Assemble the rail standoffs to the bottom mounting rail and fasten the bottom rail assembly to the uni-strut roof mounts as shown



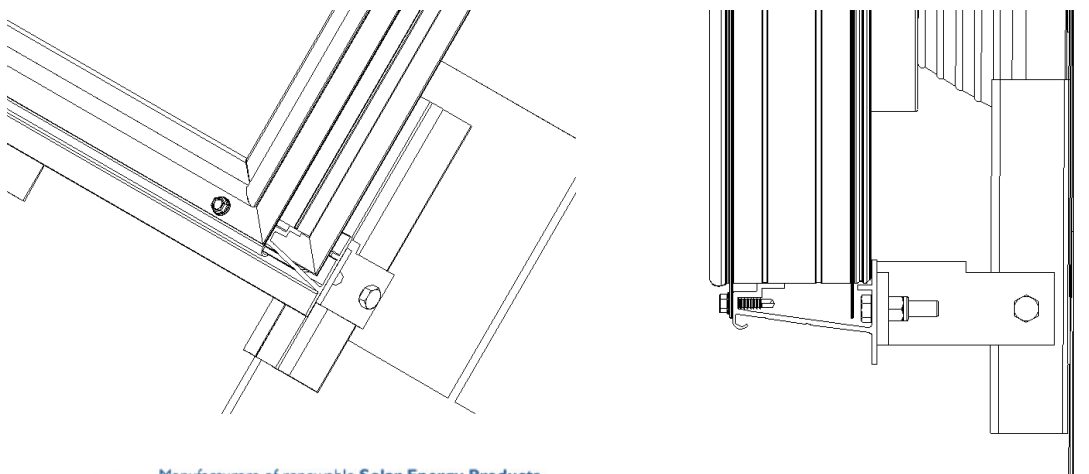
12. Attach the two collars to the back of the collector/s using ½” sheet metal screws. Use silicone to seal the collars to the back of the collector and tape the outer rim of the flange down to the collector to improve the seal. Ensure that the collar with back-draft damper is installed with the damper pivot pin in the vertical position



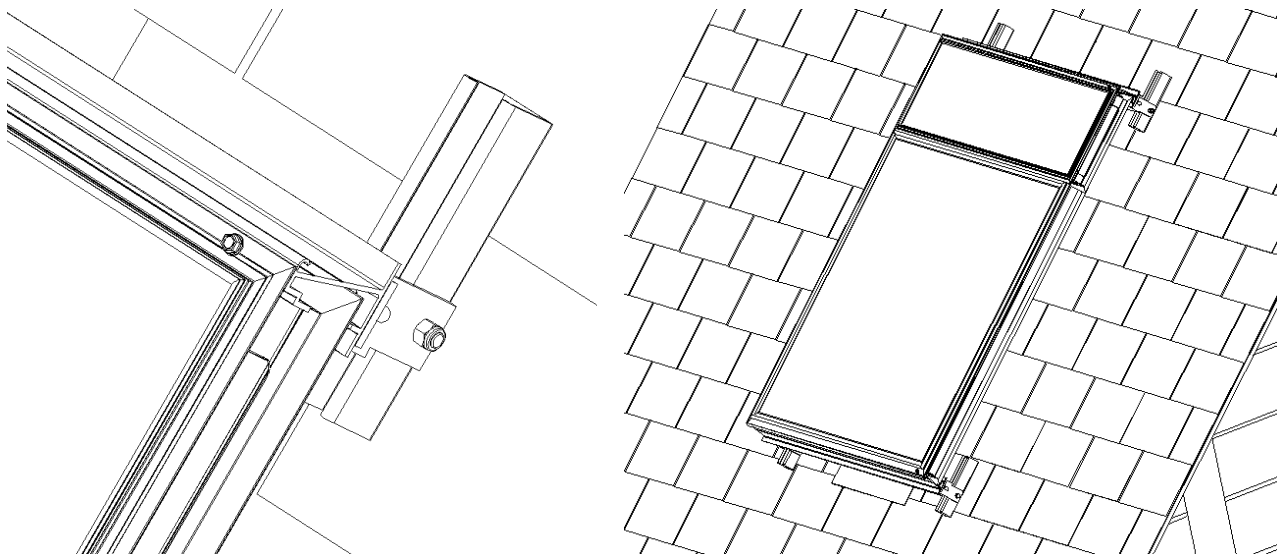
13. If mounting a 1500GS, drill a hole in the back of the collector as shown and secure the thermal switch into the collector ensuring a good seal



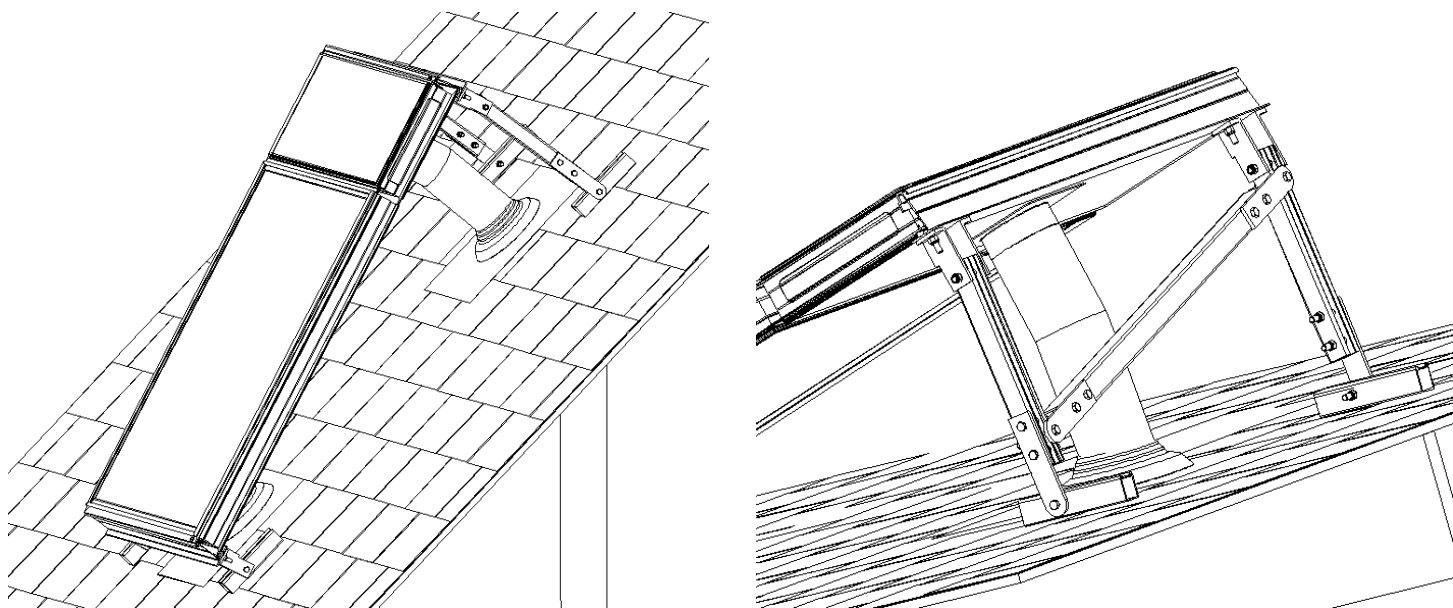
14. Hoist the collector/s onto the roof and fasten to the bottom rail. If mounting 2 collectors, secure each one to the bottom rail first. Ensure collectors have knockouts removed and side hole gaskets are secured in place with a bead of silicone make sure to push together both collectors such that a good seal is formed. Once secured to the bottom rail, fasten the collectors to one another



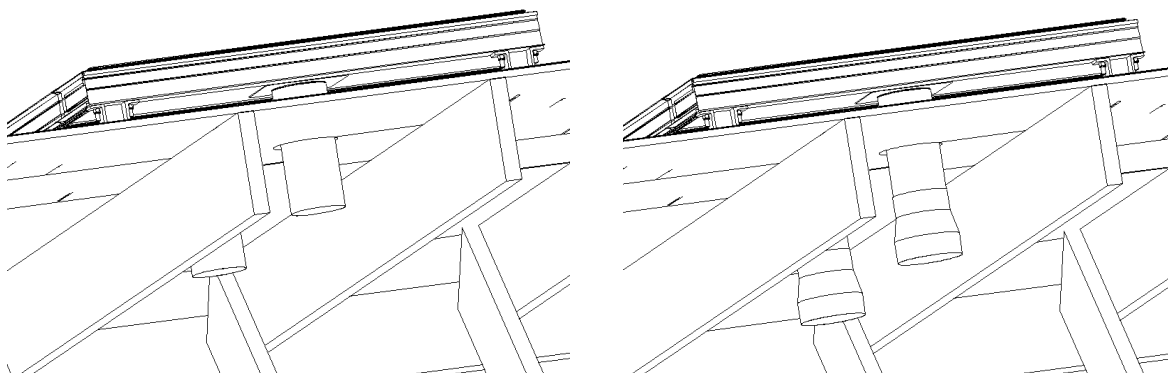
15. Assemble the top mounting rail to the rail standoffs and uni-strut roof mounts and fasten the mounting rail assembly to the top of the collector/s
16. Fasten the top uni-strut roof mounts to the roof in the same method as the bottom uni-struts



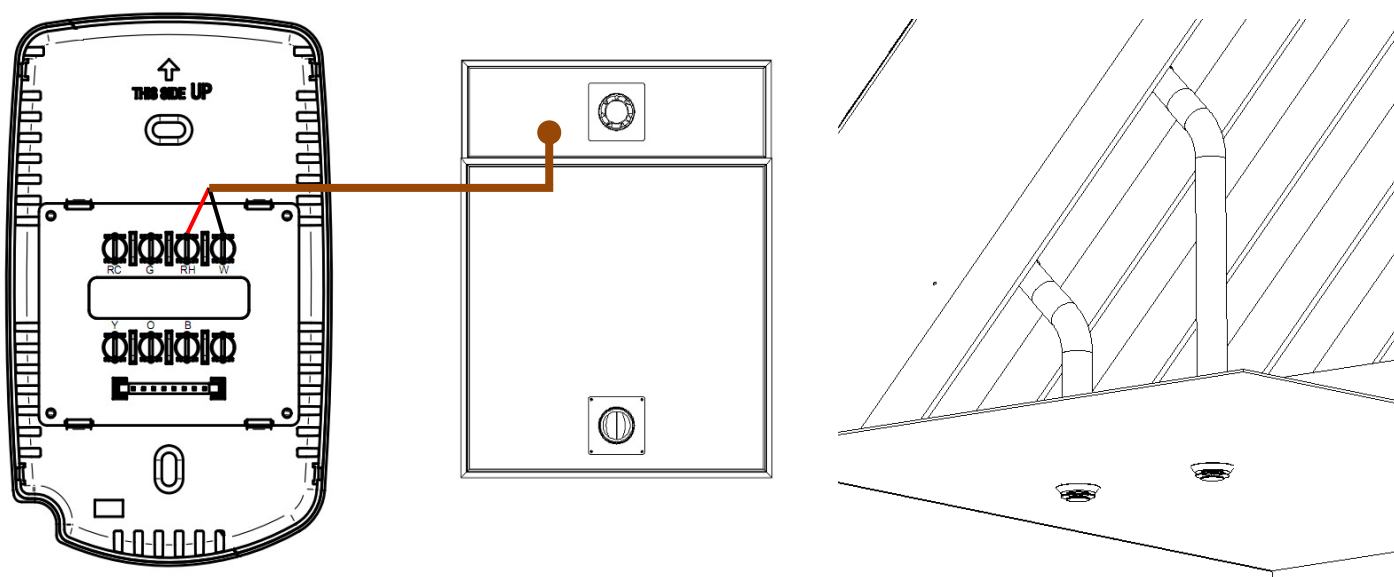
17. If the collector/s need to be angled off the roof surface, cut the elevator strut to the desired length using Table 2.4 and drill hole locations as shown in Figure 2.3. Assemble the elevator struts between the rail standoffs and the uni-strut roof mounts to elevate the collector. Install cross brace/s to the elevator struts



18. Mount the ductwork from inside the roof ensuring a good seal is made between the collars on the collectors and the ductwork. For duct runs over 8ft in length, a duct expander should be used to increase the duct diameter to 6" as close to the SolarS^{heat} as possible. If overall ducting length is less than or equal to 8 feet, 5" ductwork can be used throughout with no need to install the reducers or additional fans



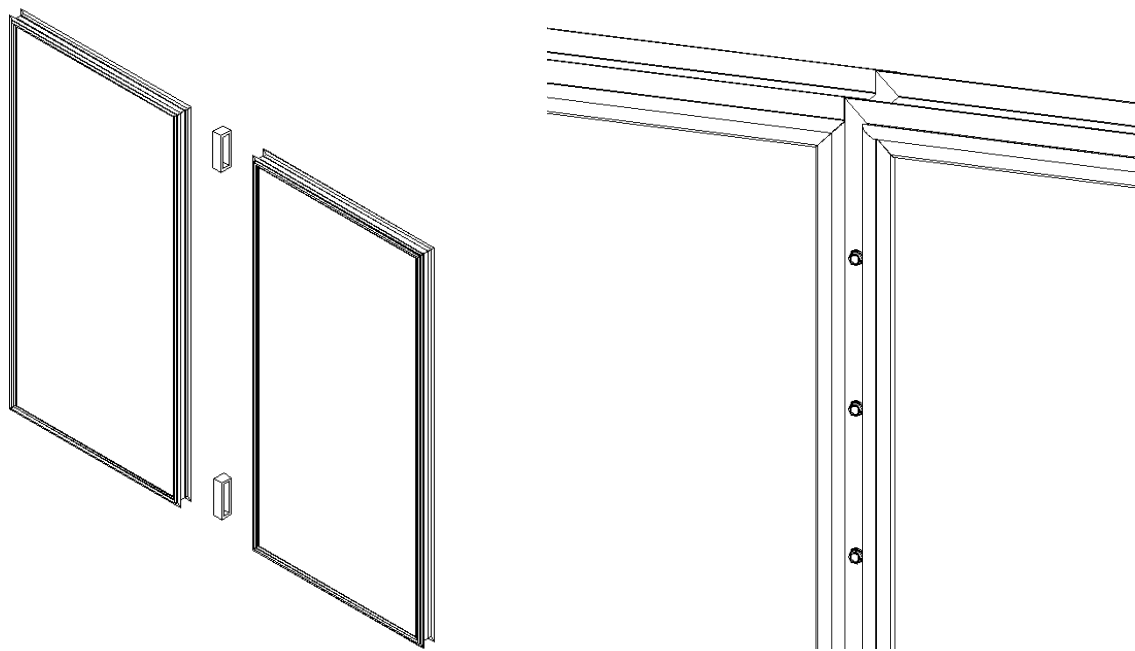
19. If duct runs over 8 feet are expected, additional fans may be required to improve the airflow, refer to the Fan Selection Flow Chart to determine what fan to use
20. Install the thermostat wall/ceiling diffusers and filter element where it can be accessed easily. Connect the ductwork inside the attic, seal and insulate all ductwork in the attic to prevent heat loss and air leaks. Connect the wires from the SolarS^{heat} to the "RH" and "W" terminals on the back of the thermostat. Snip the W904 jumper on the back to change display to Degrees Celsius



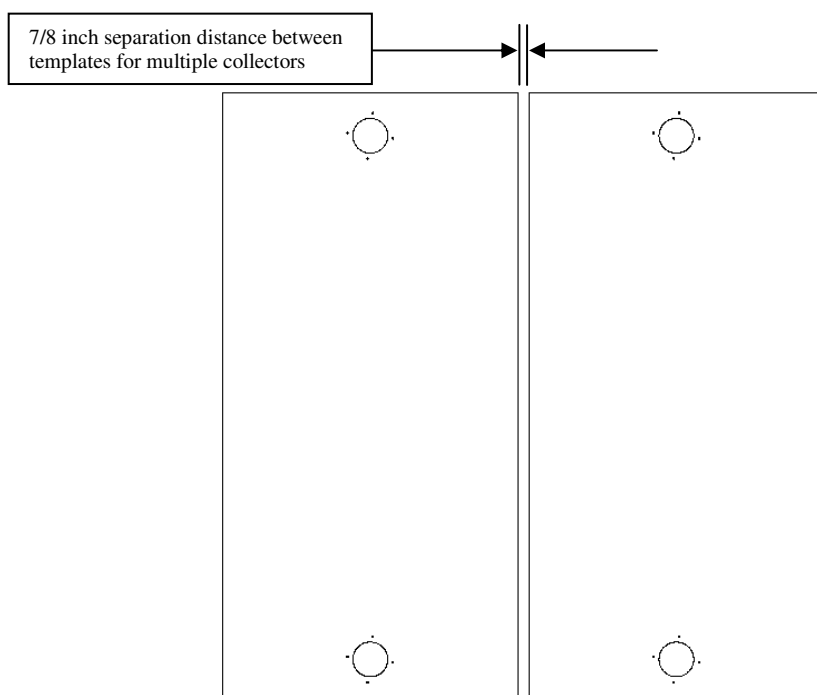
IMPORTANT NOTE: Always insulate and properly seal **ALL** ducting to prevent heat loss and air leakage.

6.3 MULTI-COLLECTOR INSTALLATIONS: REFERENCE DIMENSIONS

IMPORTANT NOTE: Whenever combining two or more collectors in an array, a side hole gasket kit will be required as shown. During assembly, apply silicone bead to both sides of the side hole gaskets to ensure a good seal between the collectors. Be sure to push the collectors together as tightly as possible and fasten using self-tapping TEK screws on the front and back flanges.

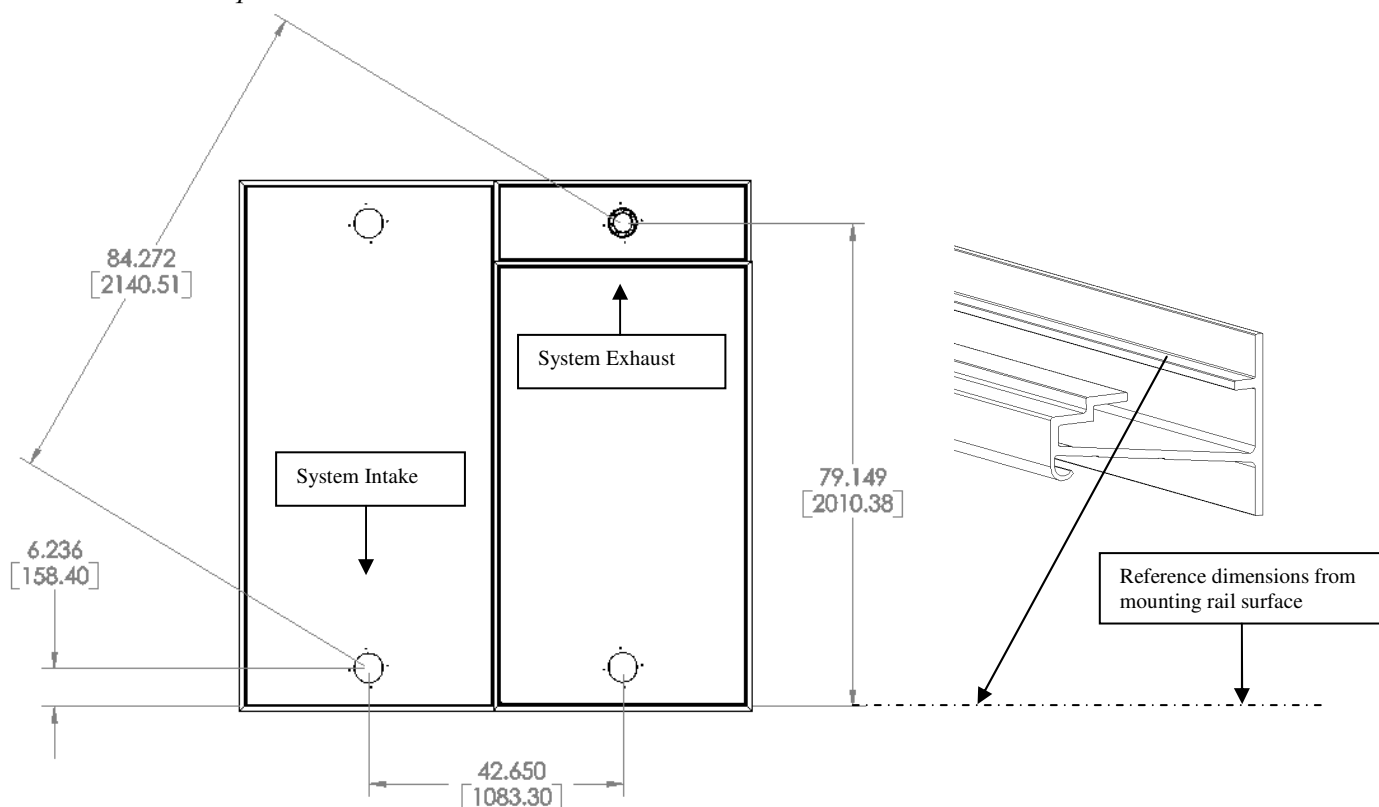


As a general rule, if using the supplied template to locate the duct locations, the templates should be separated by 7/8 inches as shown. Use the provided reference dimensions for the duct holes to verify that the hole positions are located correctly.



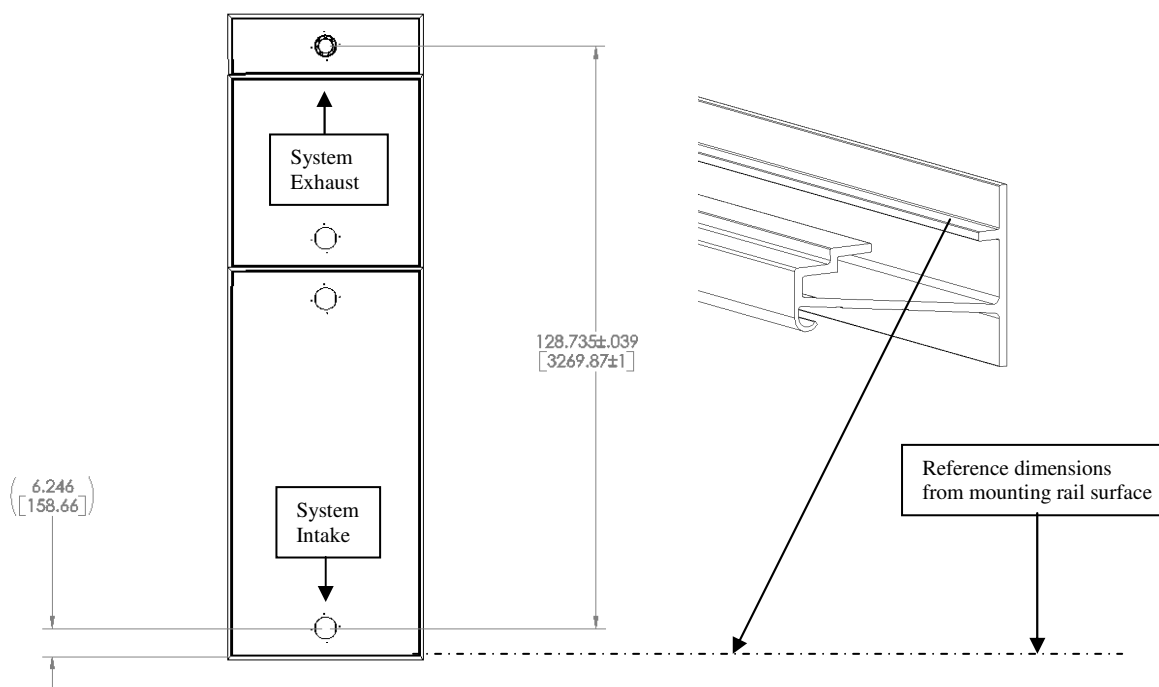
1. Reference dimensions for mounting 2 PAK or two 1500GS collectors

Note: If installing two 1500GS collectors, AC-powered fan and side hole gasket kit is required



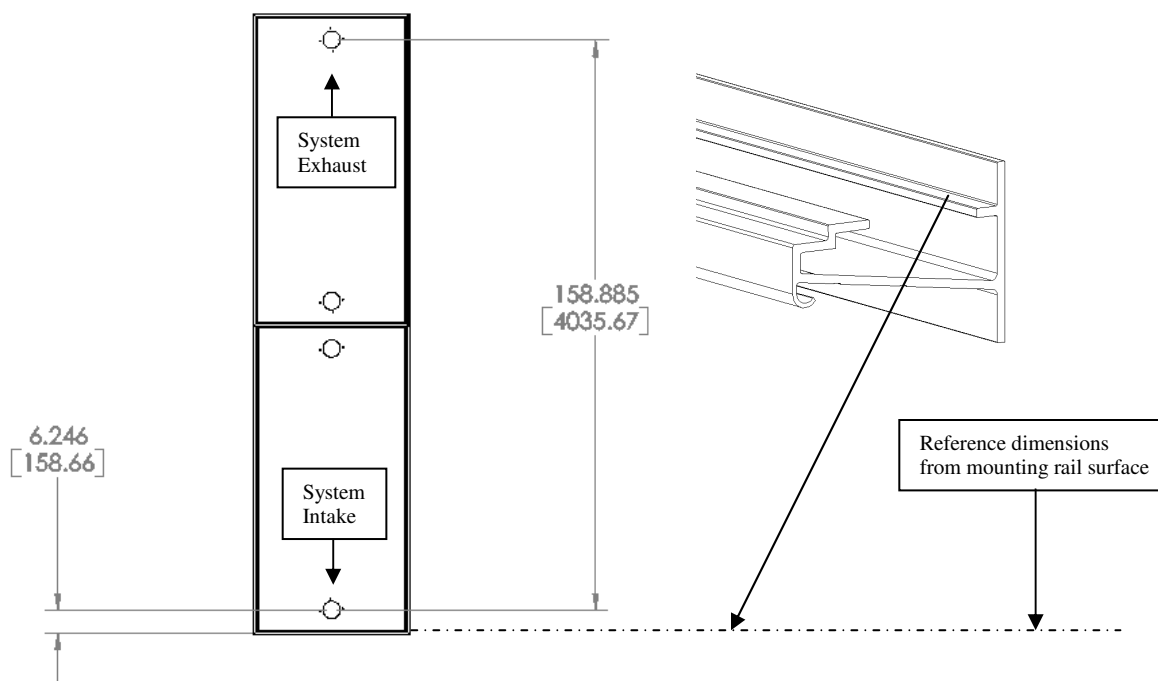
2. Reference dimensions for mounting 1000G and 1500GS in series/landscape

NOTE: Knockouts are not present on top or bottom of the collectors. Six 1.625" diameter holes must be drilled in each face of the collector to be joined this way, refer to Appendix B for proper hole location. Two side hole gasket kits are also required

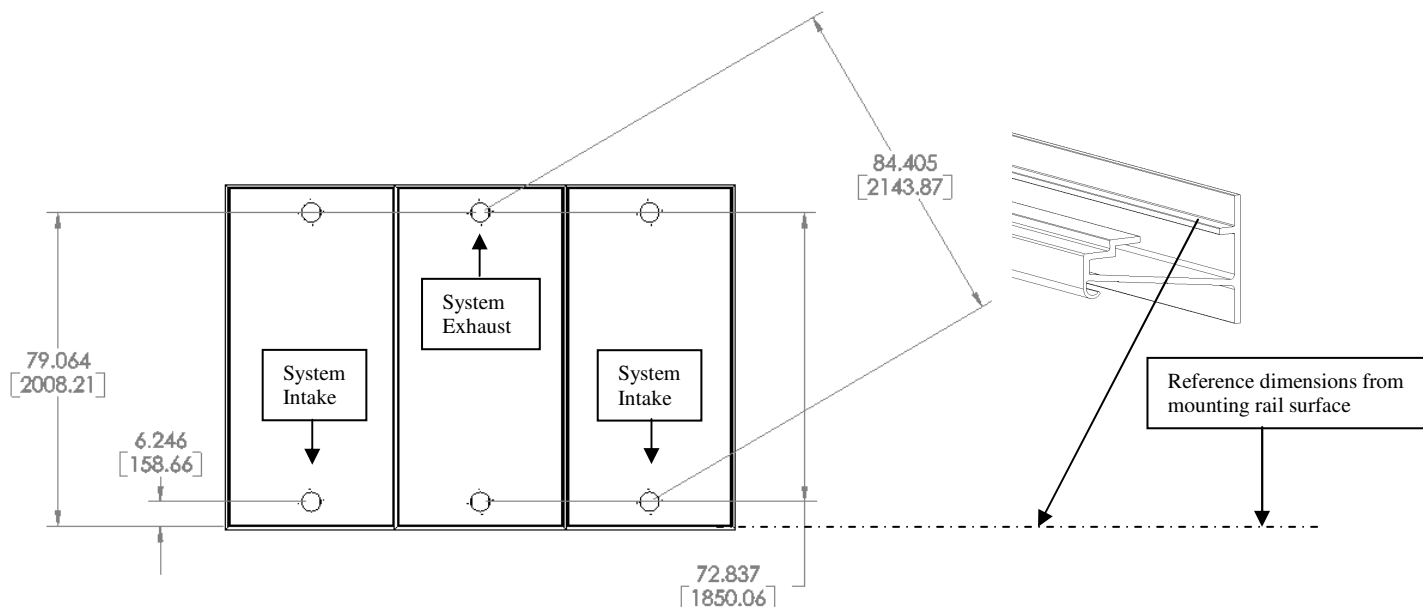


3. Reference dimensions for mounting two 1500GS in series. Separate fan and side hole gasket kit is required, refer to Fan Selection Flow Chart for help in selecting the correct fan kit.

NOTE: Knockouts are not present on top or bottom of the collectors. Six 1.625" diameter holes must be drilled in each face of the collector to be joined this way, refer to Appendix B for proper hole location. Two side hole gasket kits are also required



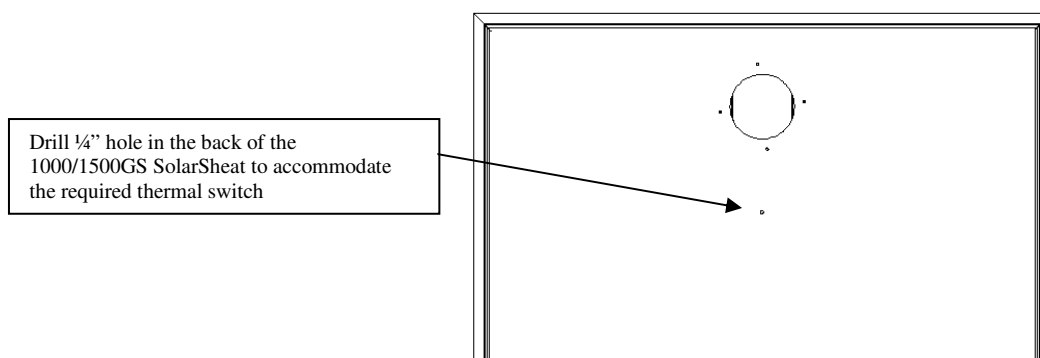
4. Reference dimensions for mounting three 1500GS in parallel. A 6" dedicated AC-Fan is required at a minimum for this configuration, refer to Fan Selection Flow Chart to determine if additional fans are required for long duct runs. Two side hole gasket kits are also required



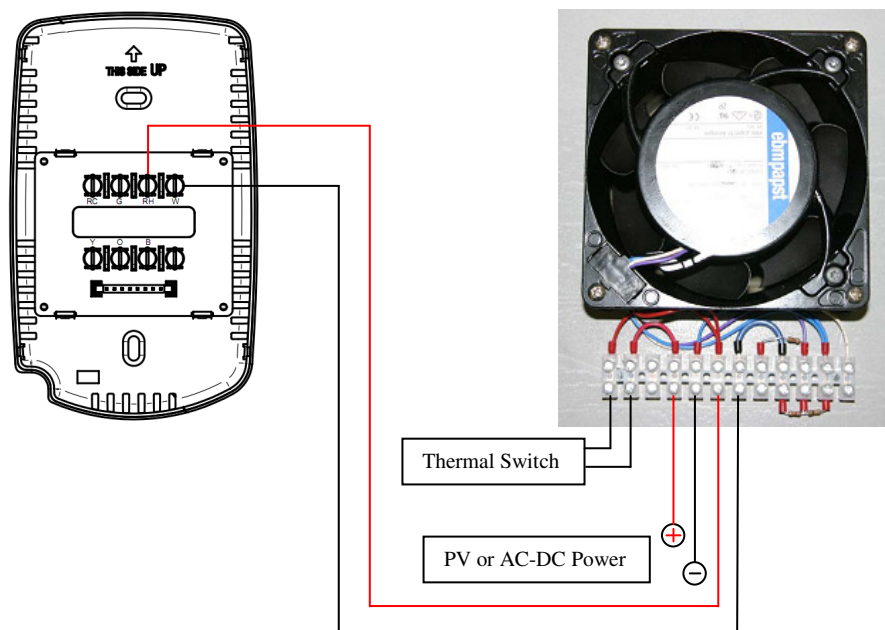
6.4 FAN BOX MOUNTING INSTRUCTIONS

NOTE: The fan box is intended to provide fan power to a 1000GS or 1500GS collector the “G” series collectors feature an integrated fan and PV-Head and thus do not require a fan box under normal circumstances.

1. The fan box can be powered by a PV-Head or an AC-DC adapter. If connecting to a PV-Head, the power leads from the PV panel will need to be brought through the wall in the vicinity of the system exhaust duct.
2. Secure the thermal switch into the back of the collector as shown and run the wire through the wall in the vicinity of the system exhaust duct. Be sure to seal all collector and wall penetrations to prevent air leakage.



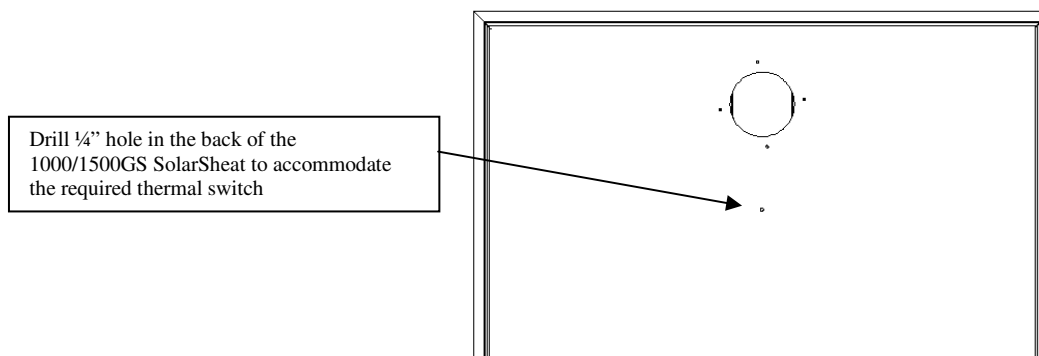
3. Locate the thermostat at least 4 feet from the exhaust duct and run the thermostat wire through the wall such that it exits in the vicinity of the system exhaust duct
4. Mount the fan box base on the wall, ensuring a good seal between the fan box collar and the duct inside the wall.
5. Connect the PV power leads, thermal switch and thermostat to the terminal block inside the fan box as shown and assemble the front cover onto the base of the fan box



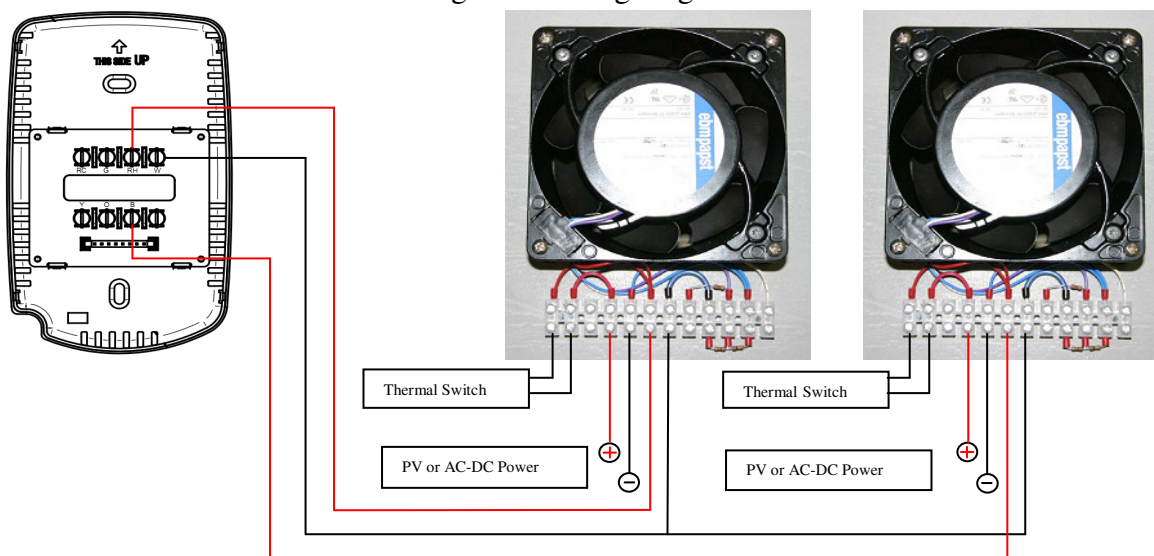
6.5 DC-POWERED INLINE FAN INSTALLATION INSTRUCTIONS

NOTE: The DC-powered inline fan is intended to provide fan power to a 1000GS or 1500GS or to supplement the “G” series collectors if long ductwork is expected. Refer to Fan Selection Flow Chart in section 4.0 for guidelines to help you choose the right fan for your application.

1. The DC inline fan can be powered by a PV-Head or an AC-DC adapter. If connecting to a PV-Head, the power leads from the PV panel will need to be brought through the wall in the vicinity of the fan location.
2. Secure the thermal switch into the back of the collector as shown and run the wire though the wall in the vicinity of the fan location. Be sure to seal all collector and wall penetrations to prevent air leakage.



3. If mounting a single fan, it is preferable to mount the fan such that it pressurizes the collector ie, installed to blow air into the collector on the return side of the system. Refer to the Fan Selection Flow Chart in section 4.0 for guidelines on choosing the number and type of fan required by your installation.
4. If using two of these fans, use them in a push-pull setup where one is mounted on the return/intake and the other is mounted on the supply/exhaust.
5. Ensure a good seal is made at all duct connections to the fan. Avoid thermally insulating the fan as it needs ambient air flow to cool the unit such that it doesn't overheat.
6. Connect the fan/s to the thermostat and power source as shown in the schematic, see fan box schematic for single fan wiring diagram.



1. If using a single fan configuration, install in-line with ductwork on the intake/return side of the system such that the fan blows air into the collector
2. If using a dual fan setup, install one fan to push air into the collector and the other fan to pull air from the collector in a push-pull configuration
3. Connect the fan to the thermostat and power/control box as shown in the schematic



7.0 SYSTEM TROUBLESHOOTING

Symptom	Problem Area	Corrective Action
Fan does not work PV-Powered DC fan	Shade on PV-Head Thermal switch or thermostat is faulty PV-Head faulty	Install PV-Head in sunny location When the collector is warmed up, bridge the two thermostat wires together, if fan begins to function, than thermostat is incorrectly connected or the unit is faulty If the fan does not function when the thermostat wires are bridged than the fan or thermal switch may be faulty Check for 24Vdc output from PV-Head
Fan does not work AC-Powered DC fan	AC Power adapter faulty Thermal switch or thermostat is faulty	Check for 24Vdc output from adapter When the collector is warmed up, bridge the two thermostat wires together, if fan begins to function, than thermostat is incorrectly connected or the unit is faulty If the fan does not function when the thermostat wires are bridged than the thermal switch may be faulty.
Fan does not work AC-Powered AC fan	AC Fan Control Box may be wired incorrectly or faulty	When the collector is warmed up, bridge the two thermostat wires together, if fan begins to function, than thermostat is incorrectly connected or the unit is faulty If the fan does not function when the thermostat wires are bridged than the fan, fan control box, or thermal switch may be faulty. When t-stat leads are bridged, check for correct relay operation and ac-voltage to the fan
Fan operates with poor system flow	Clogged system filter Back-draft damper installed incorrectly Poor ducting causing large pressure drop or incorrectly chosen fan	Clean or replace system air filter Make sure back-draft damper pivot pin is installed in the vertical position and that the back draft damper is installed in the correct orientation to allow air flow to enter the collector Ensure ducting is not clogged and is installed with minimal bends. Follow ducting best practices and ensure fan is correctly chosen as per Fan Selection Flow Chart
System continues to run after dark	Thermal switch is shorted Back-draft damper is not installed or installed backwards causing thermal-siphoning	After dark completely block off the inlet and outlet of the collector/s. Wait one hour and bridge the thermostat wires together, if system operates, thermal switch may be faulty. After dark completely block off the inlet and outlet of the collector/s. Wait one hour and bridge the thermostat wires together, if system does not operate, the back-draft damper may be installed incorrectly
Condensation appears on inside the collector	System is ok	Condensation is normal and usually goes away when system heats up
System fans operate correctly but cold air blows from diffusers	Poor ducting insulation or large air leaks in duct work	Seal and insulate all duct work to prevent heat loss. To verify temperature of the incoming air, use a thermometer for an accurate reading. Warm air may feel cool to the touch
Room does not heat up enough	Incorrectly sized system	Refer to chapter 3.0 Sizing your solar air heater for recommendations on correctly sizing your system



8.0 MAINTENANCE

- Change or clean filter element whenever system flow becomes weak
- Periodically ensure that all ducting connections are well secured and sealed to prevent leakage
- Wash collector surface using a low pressure stream of water to clean dirt, dust and debris.

9.0 WARRANTY

What Does This Warranty Cover? This warranty covers any defects in manufacture in your SolarSheat Flush Roof Mount or SolarSheat Wall Mount. This limited warranty extends to all components included in the Roof Mount or Wall Mount kit that you purchased, except the fan motor (if included in your kit) which is covered by its own manufacturer's warranty; a copy that warranty is packaged with the motor and is reproduced below. This warranty does not cover the cost of de-installation or re-installation.

How Long Does The Coverage Last? This warranty lasts for five years from the date on which you purchase your Roof Mount or Wall Mount unit or units. If you transfer the building on which the unit is mounted the new owner is entitled to the benefits of this warranty for the period remaining.

What Will Your Solar Home Inc. Do? Your Solar Home Inc. will replace any defectively manufactured part at no charge, other than the fan motor. You must pay any labor charges associated with de-installing or removing the defective component and re-installing its replacement.

What Does This Warranty Not Cover? Any problem caused by abuse, misuse, installation not in accordance with the enclosed installation manual, fading or discoloration caused by exposure to sunlight, an act of God (such as a flood or earthquake), and any other problem that is not the result of defect in manufacture are not covered. Also, consequential and incidental damages are not recoverable under this warranty. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

What Effect Does This Limited Warranty Have on Any Implied Warranty of Merchantability or Fitness? To the extent authorized by law, implied warranties of merchantability and fitness are applicable for the period of this warranty (i.e., five years from the date of purchase).

How Do You Take Advantage of this Warranty? If you suspect that your Roof Mount, Wall Mount or any component of either (other than the motor) was defectively manufactured, please contact us:

270 Industrial Parkway South, Aurora, Ontario, Canada L4G 3T9

Tel 905.841.2217 | Toll-Free 1.866.556.5504 | Fax 905.841.2207

General inquiries: info@yoursolarhome.com

If there is defect in manufacture within the terms of this warranty, we will send to you a pre-paid mailing envelope or carton so that your unit or component can be forwarded to us. You should also include in the envelope or carton a copy of the receipt that shows the date on which you purchased the unit. After we receive the unit or component and a copy of the receipt, and confirm the defect, we will at no charge to you either repair the unit or component or provide you with a new one. We will then ship the item to you, again at no charge.

How Does State Law Apply? This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

A buyer of this product in California has the right to have this product serviced or repaired during the warranty period. The warranty period will be extended for the number of whole days that the product has been out of the buyer's hands for warranty repairs. If a defect exists within the warranty period, the warranty will not expire until the defect has been fixed. The warranty period will also be extended if the warranty repairs have not been performed due to delays caused by circumstances beyond the control of the buyer, or if the warranty repairs did not remedy the defect and the buyer notifies the manufacturer or seller of the failure of the repairs within 60 days after they were completed. If, after a reasonable number of attempts, the defect has not been fixed, the buyer may return this product for a replacement or a refund subject, in either case, to deduction of a reasonable charge for usage. This time extension does not affect the protections or remedies the buyer has under other laws.

Fan Motors included in Your Solar^{Heat} Flush Roof Mount or Solar^{Heat} Wall Mount Kit are manufactured by ebm-papst Inc and are covered by that company's limited warranty is as follows:

ebm-papst Inc.
Limited Warranty

ebm-papst Inc. warrants that our product shall be free from defects in material, workmanship, and fabrication for a period of one year from the date of shipment to the buyer.

In the event of product failure, ebm-papst sole obligation is to repair or replace the defective product or to refund the purchase price of the product, at ebm-papst option.

In no event shall ebm-papst Inc. be liable for incidental or consequential damages of any nature.

ebm-papst Inc. makes no warranty – express, implied (including but no limited to warranties of merchantability and fitness for intended purpose) or statutory – other than the foregoing express warranty.

Appendix B: SOLAR^{HEAT} SPECIFICATIONS

Solar ^{Heat} Model	SH1000G	SH1500G	SH1500GS
Part No.	1132	1001	1002
Energy Rating	SRCC Certified OG 100	SRCC Certified OG 100	SRCC Certified OG 100
BTU/day	9,900 Btu/day – clear sunny day (6 peak sun hours)	15,300 Btu/day – clear sunny day (6 peak sun hours)	20,400 Btu/day – clear sunny day (6 peak sun hours)
Dimensions	56.6"X 43.15" X 3.8" 144cm x 109.6cm x 9.7cm	87"X 43.15" X 3.8" 221cm x 109.6cm x 9.7cm	87"X 43.15" X 3.8" 221cm x 109.6cm x 9.7cm
Gross Collector Area	13 ft ² or 1.2 m ²	22 ft ² or 2.0 m ²	26 ft ² or 2.4 m ²
Net Weight	68 lbs / 30.8 kg	94 lbs / 42.6 kg	82 lbs / 37.3 kg
Gross Weight	84 lbs / 38.2 kg	110 lbs / 49.89 kg	98 lbs / 44.5 kg
Color	Black	Black	Black
Type	Modular solar air collector	Modular solar air collector	Modular solar air collector
Material	Aluminum	Aluminum	Aluminum
Absorber	Corrugated Aluminum	Corrugated Aluminum	Corrugated Aluminum
Glazed	Tempered glass	Tempered glass	Tempered glass
Thermal insulation	Polyisocyanurate R4	Polyisocyanurate R4	Polyisocyanurate R4
Control	PV system, 14.5 watts	PV system, 14.5 watts	No control system included
Fan	DC, ball bearing	DC, ball bearing	No fan included
Fan Power	Solar Electric PV, 14.5 watts	Solar Electric PV, 14.5 watts	No fan included
Flow Rate	100 CFM (nominal)	71 CFM (nominal)	No fan included
Temp	90°F (32°C)	120°F (49°C)	120°F (49°C)
C02 Reduction	.18 ton	.35 ton	.35 ton
Mounting	Wall or roof (additional flashing and roof mount required)	Wall or roof (additional flashing and roof mount required)	Wall or roof (additional flashing and roof mount required)
Manufactured	Canada	Canada	Canada
Warranty	5 years on collector, 1 year on electronics	5 years on collector, 1 year on electronics	5 years on collector, 1 year on electronics



Appendix B: HOLE LOCATIONS FOR JOINING COLLECTORS END TO END

