

SOLARSHEAT

**The SolarSheat
Installation Manual**
By
Your Solar Home, Inc.

Version 1.8
January 5, 2006

All building, plumbing, electrical, and safety codes supersede the instructions in this manual. Use this manual at your own risk.

Welcome

Thank you for purchasing the SolarSheat. We hope you will get many years of solar heating from the SolarSheat 1500, 1500s, and 1500g. The instructions below are for a Do-it-yourself system with a second person assisting. You may choose to hire a contractor or SolarSheat installer as well. We have provided diagrams for wall, roof mounting, mounting the SolarSheat, connecting the duct kit, and an electrical diagrams for all necessary electrical connections.

Tools Required for Installation

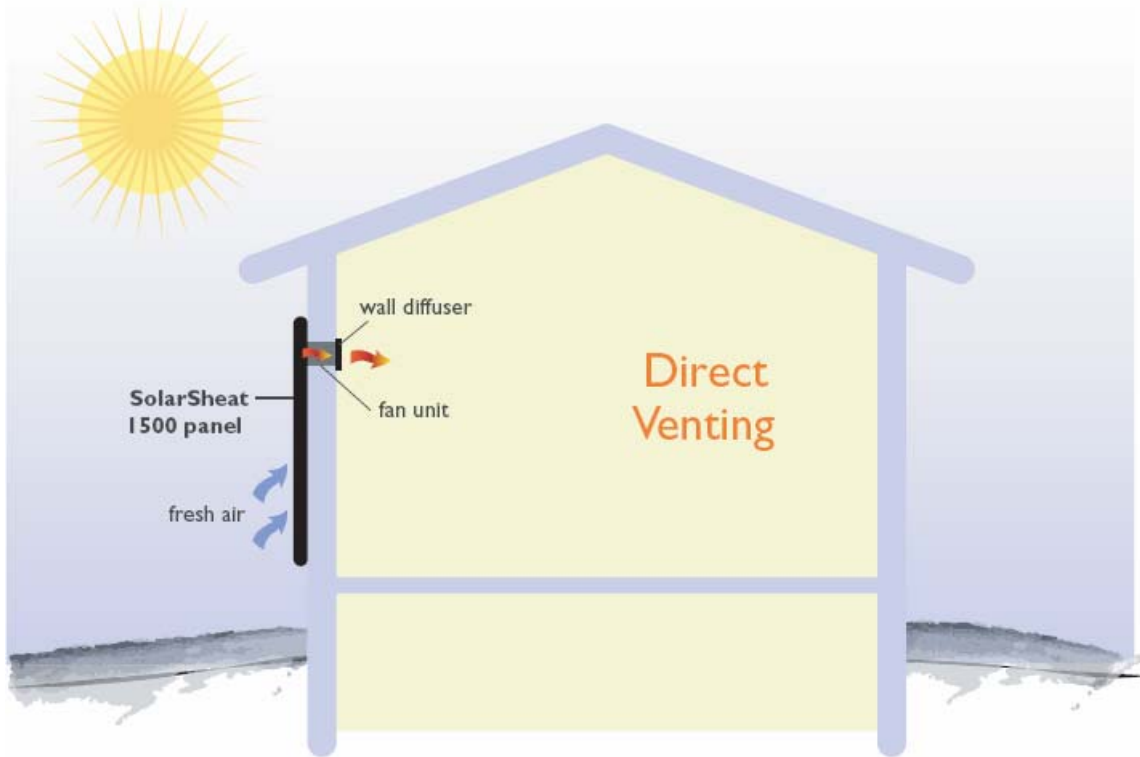
1. Safety glasses
2. Steel toe work boots or safety shoes
3. Ear protection (not essential)
4. Power drill with extension cord or cordless drill
5. 3/8" socket for driving the tek screws
6. 5" Hole Saw or reciprocating saw – for duct holes
7. Drill bit - for pilot holes for wall/roof and aluminum mount
8. Measuring Tape – for locating SolarSheat and finding the length of the duct (when applicable)
9. Level – for leveling the lower mount
10. Screws – for fastening the mount to the wall
11. Caulking gun and sealant (UV/outdoor grade polyurethane or silicon) – for sealing the control wire, duct hole(s), collar(s), foam, and (if applicable) roof penetrations.
12. Screwdriver or driver bits for drill – for screwing the grill & wall mount screws
13. Tin snips or duct cutting shear – for cutting the duct (when applicable)
14. Marker or industrial pencil - for marking the duct (when applicable)
15. Step ladder – for accessing upper most portion of the collector & upper mount (when applicable)
16. roof jacks, at least ~6" wide planks for the jacks, & approved fall protection equipment, – for working on a sloped roof
17. Partner – for lifting the SolarSheat onto the mount and holding it
18. Wire strippers – for stripping ends of control wire
19. Utility knife – for cutting control wire sheathing and shingles (when applicable)
20. Drywall screws – for digital temperature control
21. Stud finder – for locating obstructions in the wall (usually not useful on a shingled roof)
22. Insulated 5" Duct (R12 rated (from Canadian Building Code)) and 18" long zip ties - for running through attics (when applicable)

How It Works

All of our SolarSheat products are designed for maximum performance. The ideal orientation should be due South on a wall for optimal performance. If you do not have a southern exposed wall, you can roof mount the SolarSheat as well. You can mount the SolarSheat in east or west orientation but it will reduce the exposure time compared to a south facing exposure. The SolarSheat 1500 and 1500G should not be mounted upside down. The SolarSheat can, however can be mounted horizontally if you don't have the available vertical height on the wall or roof.

SH1500





The SolarSheat 1500 is made to provide fresh air during the heating season without increasing the building's heating bill. It heats the cold outdoor air and blows warm fresh air into a space, at a little over room temperature. The unit is self-powered. It has a built-in fan which is powered by an electricity producing Photo Voltaic (PV) panel. The SolarSheat 1500 connects to a digital temperature control (DC thermostat), which enables the user to set a maximum room temperature. The SolarSheat 1500 is designed so that it will not allow the internal fan to come on if the air is below roughly 68 degF (20 degC) inside the collector.

SH1500S



The SolarSheat 1500S is made to provide fresh air during the heating season without increasing your building's heating bill. It pre-heats incoming outdoor (make-up) air. It requires an external fan to pull air through it. It is used to increase the heating power of the SH1500 unit, the Solar HRV, and the Solar Furnace. It is also used in commercial applications which can be assembled into large SolarSheat walls.

SH1500G



The SolarSheat 1500G is made to provide space heating and to decrease your building's heating bill. It pulls room temperature air from inside the building, heats it with the power of the sun, and pushes the hot air back in. The unit is self-powered. It has a built-in fan which is powered by an electricity producing Photo Voltaic (PV) panel. The SolarSheat 1500G connects to a digital temperature control (DC thermostat), which enables the user to set a maximum room temperature. The SolarSheat 1500G is designed so that it will not allow the internal fan to come on if the air is below roughly 68 degF (20 degC) inside the collector.

Unpacking the SolarSheat Mount

Cut the end corner of the container and gently pull out the SolarSheat mount out of the box. There may be different sizes of mounts in the containers depending on how many SolarSheats you have purchased. There is usually more than one mount facing each other inside the container. Be careful of the sharp corners at the ends of the mounts.



Installing the Lower Mount

Next, determine where the mount is going to be installed on the wall or roof. The SolarSheat should be installed on a south facing wall or roof surface for optimal performance (see the attached drawings of mount and exploded cross sectional views).

The mount should be installed high enough from the ground to prevent snow load in the winter time. This should be based on prior winter observation of snow load. If this is the first winter you have been in the property then the mount should be at least 24" above the ground. You may have to clear snow from the collector in the winter time if you cannot place the mount at this height.

Find the Mounting diagram for your collector. The collectors are shown mounted in the vertical or "upright" position. Do not install them upside down. If it will be installed horizontally, then make sure that the control wire coming out of the back will be located above the fan, not below it. For wall mounting, the clearances required between the roof overhang and the top of the collector and the ground and bottom of the collector need to be considered during installation. The lower mount and upper mounts would still be located below and above the collector, respectively.

Locate the studs (if applicable) in an area of the wall where there is no electrical, plumbing, gas piping, ducting, in the wall. If you have building drawings this can help

with this process. Heating registers, plumbing and electrical fixtures indicate the presence of these obstructions. For roof mounting, finding the rafters has proven difficult on conventional roofs, so drilling into the roof decking has worked well in previous installations.

Have someone hold the mount with you in the position where it is going to be fastened. Next, drill a hole with a power drill through the wall or roof. Make sure you use the right type of bit for the material that you are drilling through. Please also make sure you are not drilling into any wires, water or gas piping, ductwork etc. that may be behind the wall or roofing.

Place the lower mount with the new hole over the building hole and fasten with an appropriate screw. Level the lower mount. Drill the rest of the holes in the lower mount, according to the attached air collector mounting diagram. For a roof mounted collector, inject outdoor polyurethane into and around each pilot hole for screws (not included). Fasten the lower mount to the wall or roof. For a roof mounted collector, apply additional outdoor grade polyurethane over and around the head of the screw to help prevent water from getting in.

Installing Duct Kit

Find the air collector Mounting Template and Mounting Template Guide. The Mounting Template (a large piece of cardboard with two holes and arrows pointing up, on it) will be used to locate the hole(s) to be drilled in the wall or roof for the duct kit that will match the corresponding duct hole(s) already in the back of your SolarSheat. The Mounting Template Guide will help you use the Mounting Template.

Place the template on the lower mount, with the appropriate edge on the lower mount, as indicated in the Mounting Template Guide. If you are mounting it horizontally, make sure that the control wire coming out of the collector will end up above the collector fan. The arrows on the template point “up”, or for the SH1500 and SH1500G, towards the PV panel. Center the template on the lower mount.

If you have a SH1500 or a SH1500S with only one hole in the back, it will only be necessary to drill one 5” diameter hole all of the way through the wall or roof, as shown on the Template Guide and Wall or Roof Mounting Diagrams. A SH1500G requires two holes (one supply, one return). A 5” hole-saw or a 5.0” by 5.0” square hole using a reciprocating saw can be used. If using a reciprocating saw, make sure the hole is cut within a ¼” of a true 5” by 5” square hole to avoid misaligning the ducting and the SolarSheat hole. Misalignment restricts and reduces the air flow rate. For roof mounting, you should use a utility knife to cut a hole in the shingles that will block the duct, before using the hole saw. For a wall mounted collector, make sure you drill all of the way through the wall into the room.

After the hole(s) is/are drilled for the duct kit, remove the template from the lower mount. If you have a SH1500 or SH1500G with a digital temperature control, a ¼” hole must be

drilled for control wiring. Drill a 1/4" hole in the wall, all the way through, at a level where the digital control is convenient to operate from within the house and where the collector would cover and therefore protect from direct rain and snow. For a roof installation, drill a 1/4" hole through the roof, where it will be protected from rain by the collector. Apply sealant into the holes.

Find the appropriate Duct Kit & Mounting diagrams. Cut and apply the included foam tape to the collar(s) as shown in the Duct Kit diagram. For roof mounting, assemble the duct, backdraft damper, and collar, as shown in the Roof Mounting Diagram. Apply outdoor water sealant evenly on the collar assembly(ies) as shown. Push it/them into the duct kit hole(s). In order to help keep rain from entering the duct kit collar, the foam on the collar(s) should be in same position as it appears in the mounting diagrams. Apply an additional bead of outdoor water sealant on the upper edge of the collar(s).

Installing the Upper Mount

Two people are necessary for this step. Lift the air collector into position on to the bottom mount, as shown in the Mounting Diagram, and have one assistant hold it there. For the SH1500 or SH1500G, push the control wire through the 1/4" hole that was drilled. Apply outdoor water sealant around the control wire. Make sure to match the hole locations on the back of the SolarSheat with the duct hole(s) in the wall or roof, or it will restrict the air flow to and from the collector. To help with duct hole alignment, either match them up visibly, behind the collector, or mark the center of the lower mount and the center of the collector, and then aligning those marks.

Place the second mount (the top mount) on top of the SolarSheat as shown in the Mounting Diagram, so it mirrors the bottom mount. Drill the holes on the top mount as shown in the Mounting diagram. Remove the top mount temporarily and drill matching holes in the building wall. For a roof mounted collector, inject outdoor grade polyurethane into and around the holes in the roof. Position the upper mount back in place on the building and fasten the upper mount. For roof mounting, apply additional outdoor sealant onto and around the lag bolt heads.

Find the black self-drilling (tek) screws. Drill them through the collector frame and into the upper and lower mounts as shown in the diagram. If two or more collectors are being mounted, then additional SolarSheats will be slid in place next to SolarSheat with the hole in the back, so that the side holes match. Then screw the collector frames together as shown in the Mounting diagram.

The work on the outside of the building is finished. If you ever need to remove the collector, you can slide the collector off without removing the mounts from the wall or roof.

Installing the Rest of the Duct Kit (Wall Mounted Collectors)

For wall installations, from inside the building, measure the distance from the collar face to the outside of the wall, and cut the piece(s) of duct as shown in the Mounting diagram. For the supply side (collector exhaust), place the backdraft damper into the supply duct so that it will open towards the inside of the home. For the return (collector intake, SH1500G only) side, it should open towards the collector. The damper(s) should be located as close to the collector in the duct as possible to avoid condensation problems. The shaft of the backdraft dampers should be installed so they run vertically. You will need to compress the foam around the perimeter/circumference of the backdraft damper with your hands to fit it into the duct. Push the grill and duct assembly through the inside of the wall and onto the collar. Fasten the grill to the wall with the included screws.

Installing the Duct Kit & Fan Kit (Roof Mounted Collectors)

Find the inline fan kit electrical diagram. Attach the wires, AC/DC adapter, and connectors to the sensor from the Inline-fan kit, as shown in the in the Inline-fan kit electrical diagram.

From below the roof, insert the inline fan into the short piece of 5" duct on the supply side of the collector (exhaust). Screw the inline fan to the duct with a couple screws. Next zip-tie the 5" round insulated duct (R12) to the collars. Run them to the locations above the ceiling of the room to be heated. Drill 5" round holes in the ceiling, at least 5' apart, where the return (intake) and supply (exhaust) diffusers will go (don't hit the joists/truss member). From the room below, insert the ceiling diffusers into the holes. From the attic, attach the R12 flexible insulated duct to the ceiling diffusers and zip tie them.

Next, drill a 1/4" hole into the collar/duct/backdraft damper assembly. The hole should be located as close as possible to the collector (between the backdraft damper and the collector) as shown on the Roof Mounting Diagram. Apply sealant (silicon for example) to the electrical contacts on the sensor (to protect against corrosion and shorting the circuit). Insert the sensor just into the new 1/4" hole. The sensor should not be pushed in far enough to interfere with either the fan or the backdraft damper operation. Apply sealant to hold the sensor.

Run the wires from the inline fan and the SolarSheat control wires that were pushed through the 1/4" hole previously drilled in the roof (SH1500 & SH1500G) to the desired location for the Digital Temperature Control (included with the SH1500 & SH1500G), and attach according to the inline fan kit and the SH1500 & SH1500G electrical diagrams.

Installing the Digital Temperature Control (SH1500 & SH1500G)

Find the control wire that was pushed through the wall/roof earlier from the collector. Trim the control wire and/or push the excess wire into the wall cavity, so that enough wire hang out of the wall/roof to attach to the digital control. Cut and remove enough

wire shielding on the control wiring cable to access the red and white wires within the cable. Use wire strippers to strip the insulation ½” (~1cm) from the ends of the red and white wires. The wires may have up to 24 volts DC, so don't touch the bare ends of the wires at the same time.

Find the digital temperature control and remove the rear panel. Use a flat-headed screwdriver to loosen the screws on the “RH” and “W” terminals on the back of the face of the control. Pull the wires through the center hole in the back of the controller. Attach the red wire to the “RH” terminal, and the white wire to the “W” terminal (as shown in the electrical diagram). Screw the back of the control to the wall. Insert the included batteries to power the digital control. Push the face of the control onto the back.

Using the SolarSheat

For the SH1500 and SH1500G SolarSheats, collector will only blow in warm air, when the temperature control is set to “heat”, the temperature is set higher than the current temperature, when the sun is out, and when the temperature on the inside of the SolarSheat SH1500 and SH1500G reaches 68 degF (20 degC). When the sun is shining on the entire collector, it should only take 4-15 minutes for the fan to operate. The output temperatures of each collector depend on outdoor temperature, incoming air temperature, and sunlight. The 1500 and 1500G work well under sunny conditions, but will not work well (if at all) when it is overcast.

To use the SolarSheat 1500 and 1500G panels, simply set the digital control to as high of a temperature as comfortable, during heating season. All of this heat is free. During the summer switch the digital temperature control “Off”.

The SolarSheat 1500S panels will provide solar pre-heated ventilation/make-up air on-demand when the sun is out and when air is being pulled through it by a fan (either in a SH1500, a SolarHRV, or the SolarFurnace).

Maintenance

The SolarSheat is designed for long life. The coating on the collector is a very high quality Kynar coating. It should last for many years. The PV (Photovoltaic Panel) is also rated for many years of use. You only need to clean the collector should it become dirty with a soap and water combination. Never use heavy chemical compounds, solvents and sprays. Using these types of products could damage the collector.

Replace the two “AAA” batteries in the digital control if there is a problem with the control after a few years of operation. The digital control relies completely on these batteries to turn on and off the SolarSheat 1500 & 1500G.

The silicon that holds the PV panel in place should last many years. Should the PV

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Panel become loose or the silicone breaks away use an industrial grade silicone to caulk
You should not have to do this because there is a large amount of high quality silicone applied to the product during the time of manufacturing. If the air flow seems poor, you can try and remove one of the two backdraft dampers. The stainless steel backdraft dampers are very high quality and are used to prevent thermosyphoning at night, which can cool the building.

We hope you enjoy using your SolarSheat!

Please send us a picture of your newly installed SolarSheat via email to info@yoursolarhome.com. We would like to have your testimonials and install to show others how you are using your SolarSheat.

Todd Kirkpatrick
President

Appendixes

Wall Mounting Diagram (*SH1500, SH1500G, SH1500S, PAK 1500*)

Roof Mounting Diagram (*SH1500 & SH1500G*)

Frame and Mount Close Up Diagram

Duct Kit Diagram (*SH1500, SH1500S, SH1500G*)

Electrical Diagram (*SH1500 & SH1500G*)

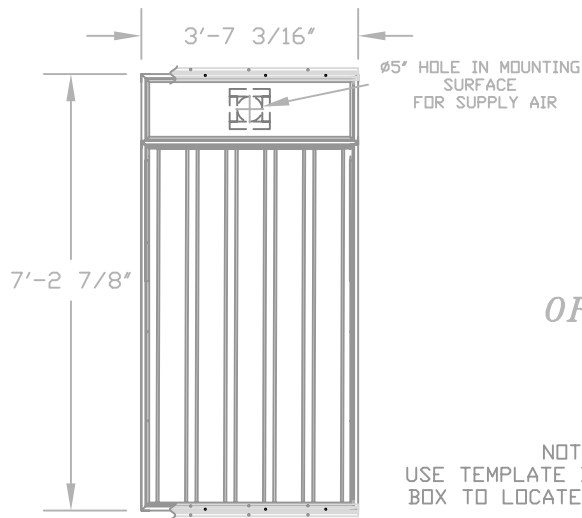
Inline Fan Electrical Diagram

Mounting Template Guide

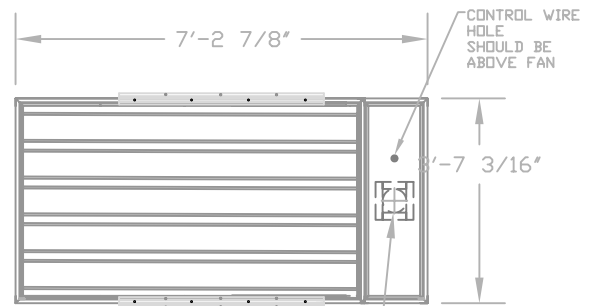
Mounting Template (*can be found in the SolarSheat box*)

WALL MOUNTING – SOLARSHEAT 1500

VERTICLE MOUNT



HORIZONTAL MOUNT (OPTIONAL)

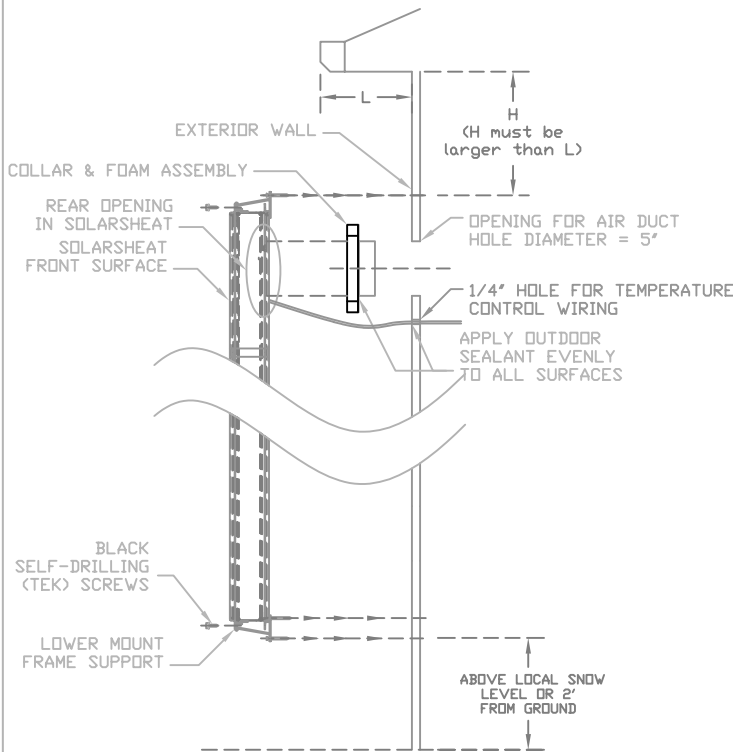


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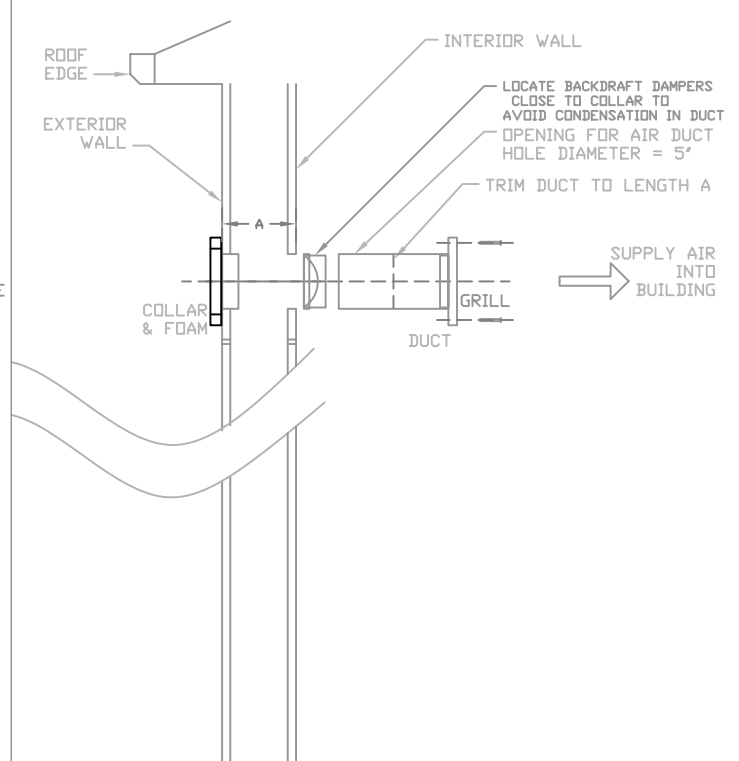
NOTES:
USE TEMPLATE IN SOLARSHEAT
BOX TO LOCATE DUCT HOLE(S)

Ø5" HOLE IN MOUNTING
SURFACE
FOR SUPPLY AIR

FRONT VIEW



SIDE VIEW – EXTERIOR



SIDE VIEW – INTERIOR

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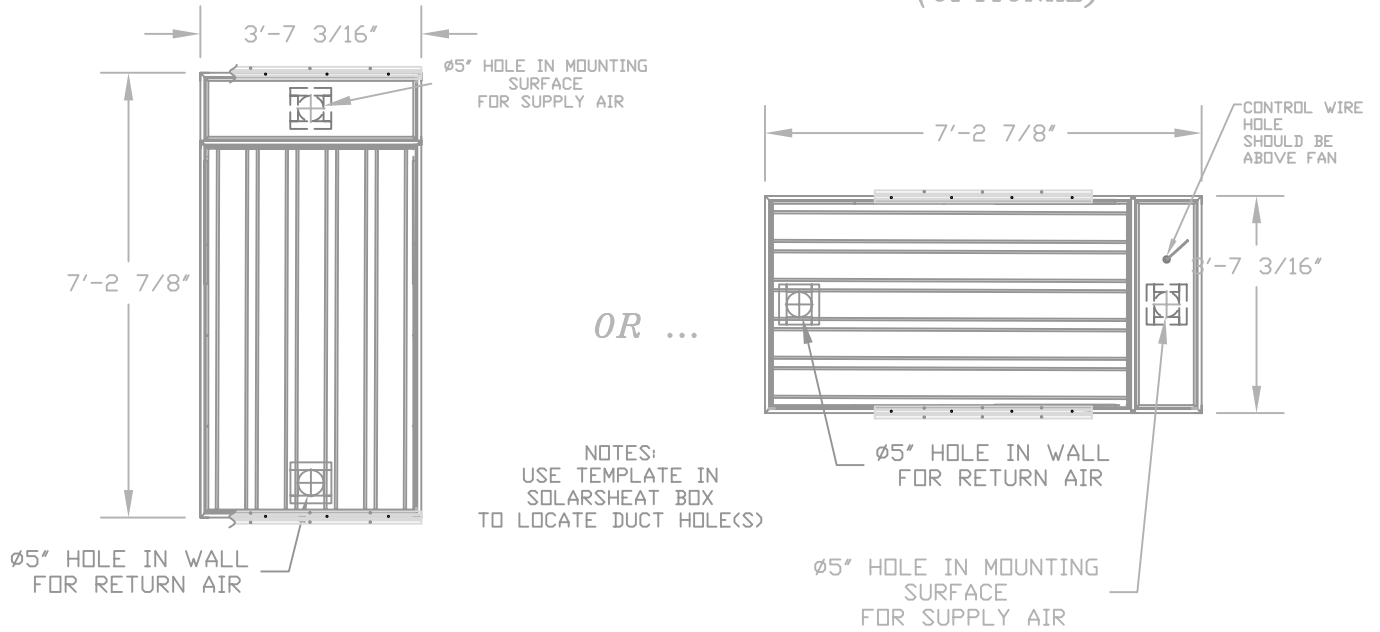


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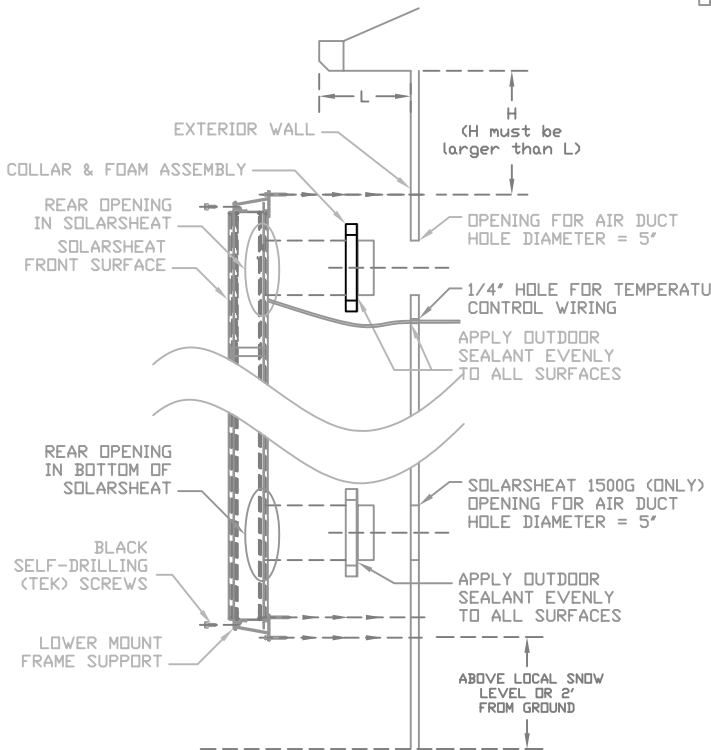
WALL MOUNTING – SOLARSHEAT 1500G

VERTICLE MOUNT

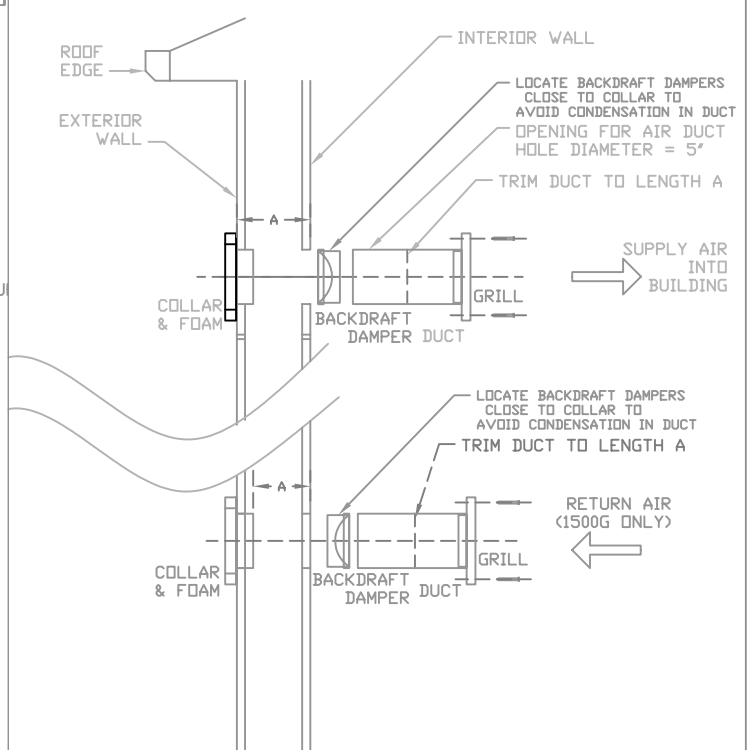
HORIZONTAL MOUNT (OPTIONAL)



FRONT VIEW



SIDE VIEW – EXTERIOR



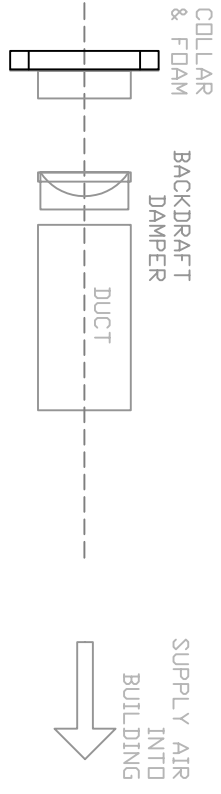
SIDE VIEW – INTERIOR

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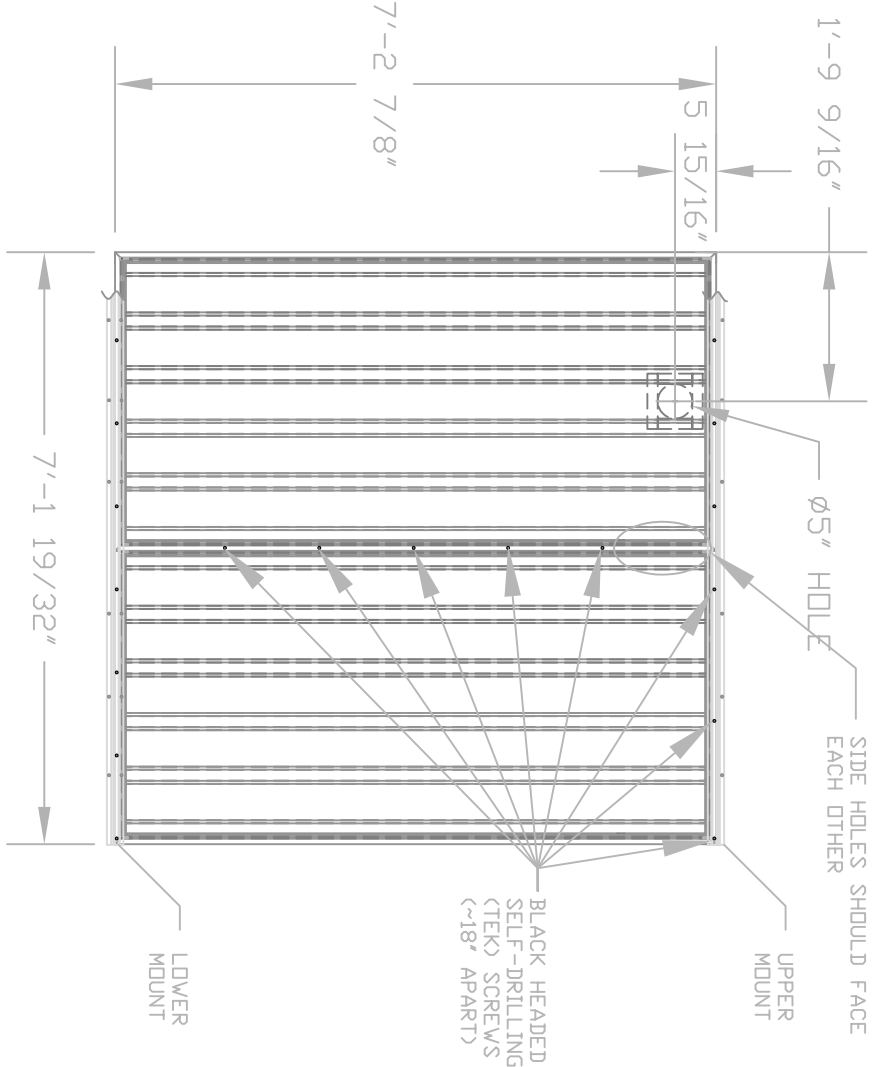
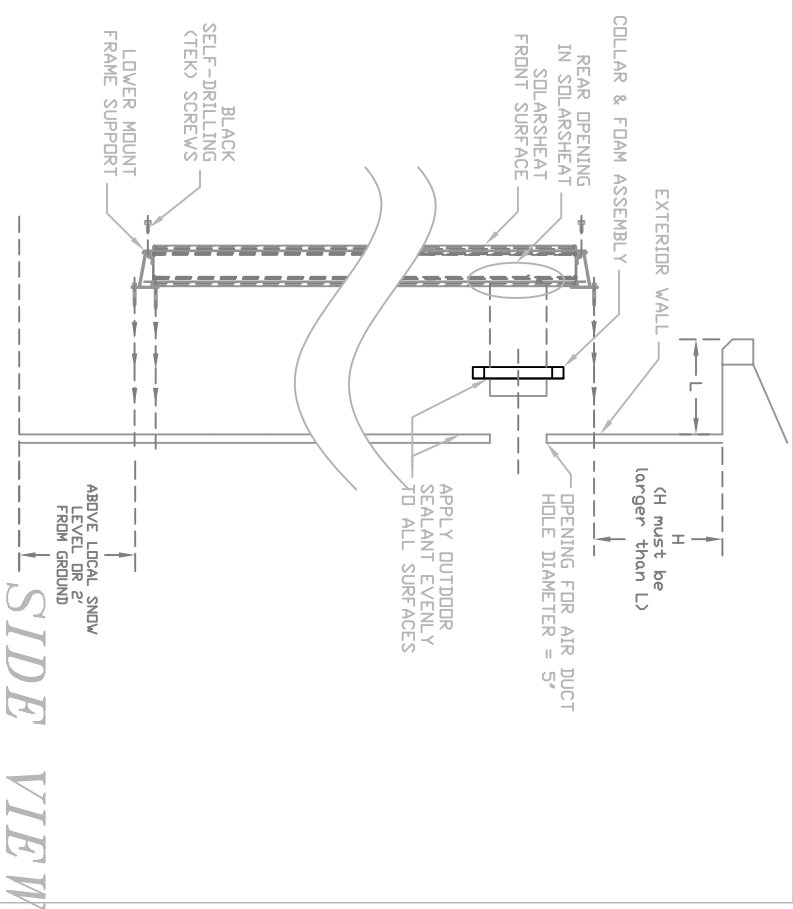
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Rev#	Date	Description			

ALL HYBRIDS & HRV - AIR COLLECTOR MOUNTING



DUCT KIT

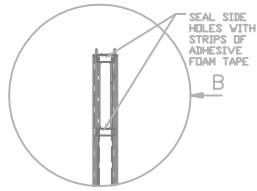
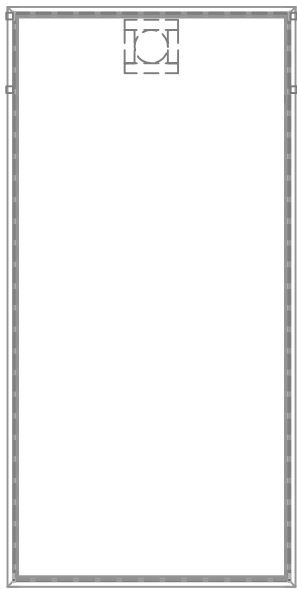


FRONT VIEW

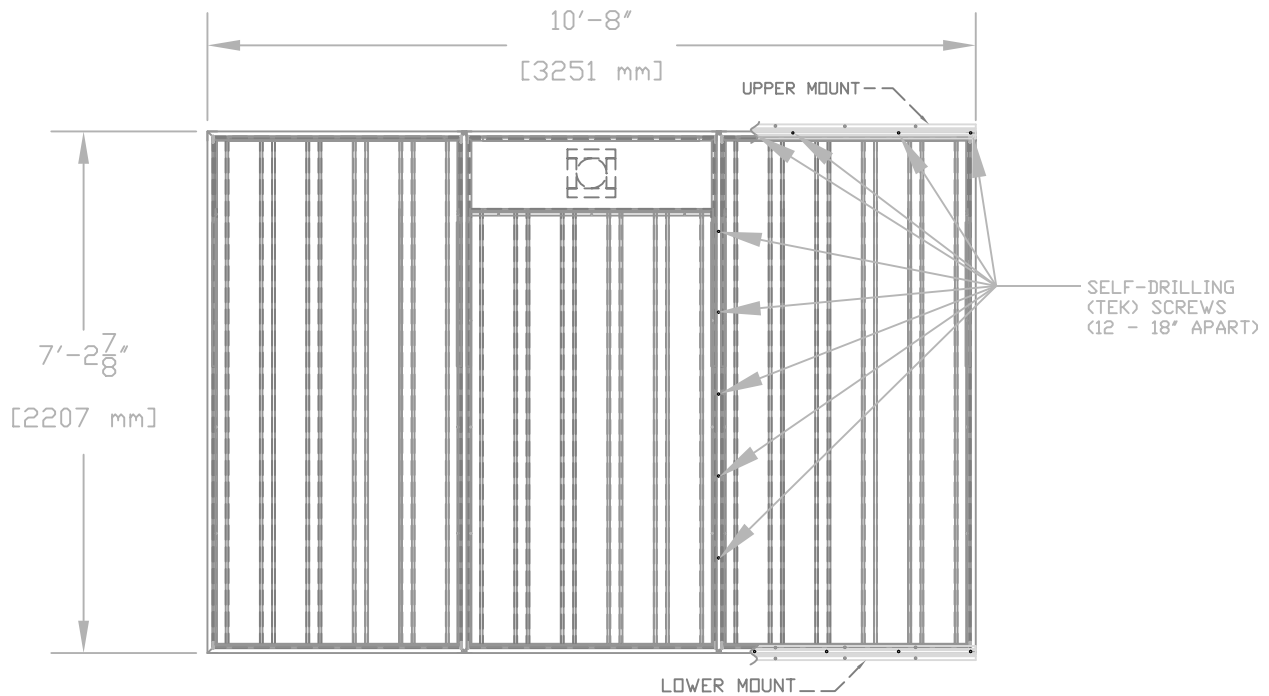
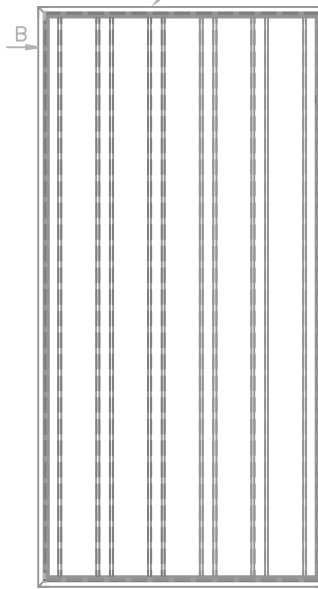
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Rev#	Date	Description	Customer:
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			Scale: 1/8" = 1'-0"
			Custom Dwg# G01205.3.01.01.00.7

SolarSheat
1500 or 1500S
(With Rear Hole)



SolarSheat
1500S



FRONT VIEW SOLARSHEAT PAK

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SolarSheat Pak

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SOLARSHEAT1500s

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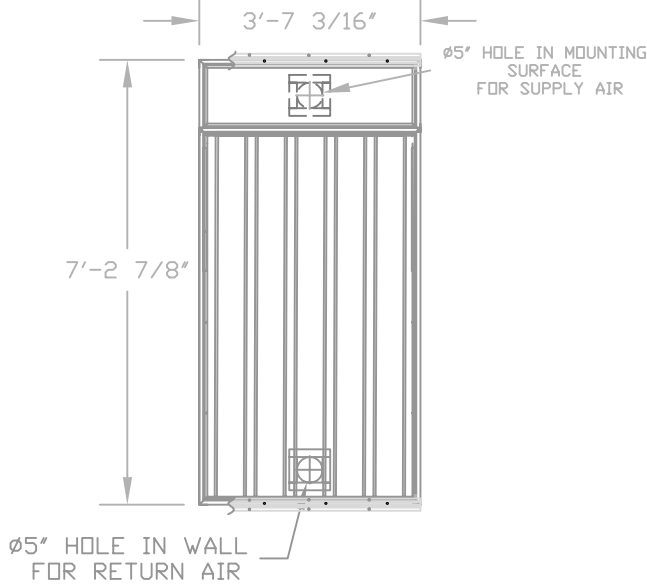
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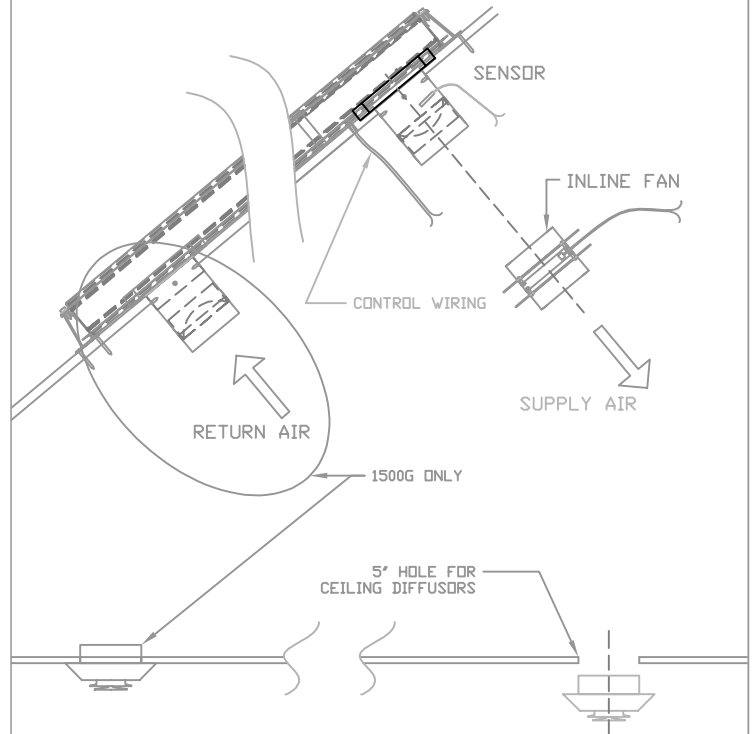
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ROOF MOUNTING – SOLARSHEAT 1500, 1500G

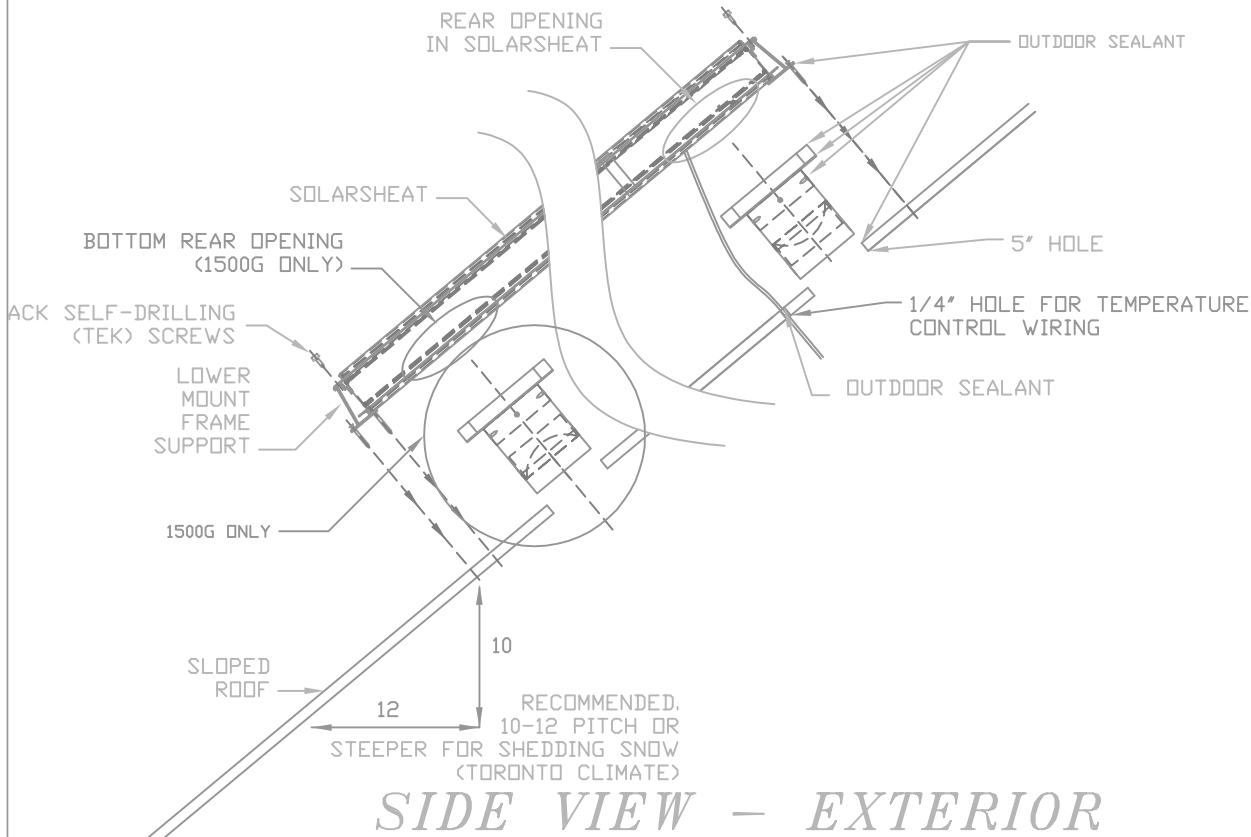
VERTICLE MOUNT (HORIZONTAL IS ALSO POSSIBLE)



FRONT VIEW



SIDE VIEW – INTERIOR



SIDE VIEW – EXTERIOR

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SOLARSHEAT MOUNTING – FRAME & MOUNT CLOSE UP

UPPER MOUNT

UPPER MOUNT

MOUNTING SURFACE

SOLARSHEAT FRAME

SOLARSHEAT FRAME

MOUNTING SURFACE

LOWER MOUNT

LOWER MOUNT

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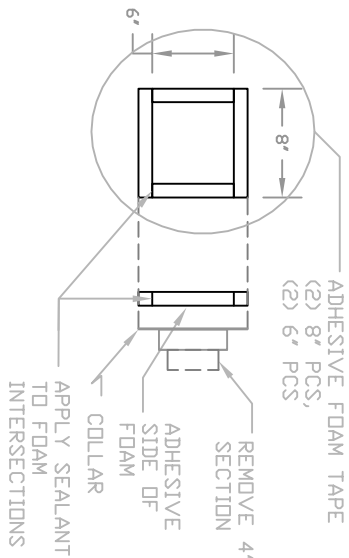
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Date: 1/4/2006 Scale: NOT SCALED Custom.Dwg# G.01205.3.01.01.00.7

Rev#	Date	Description

DUCT KIT

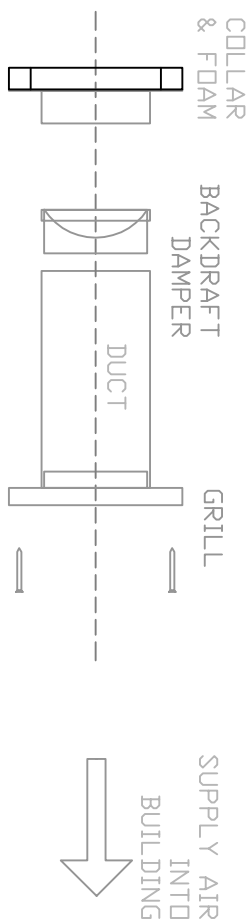
— 1500



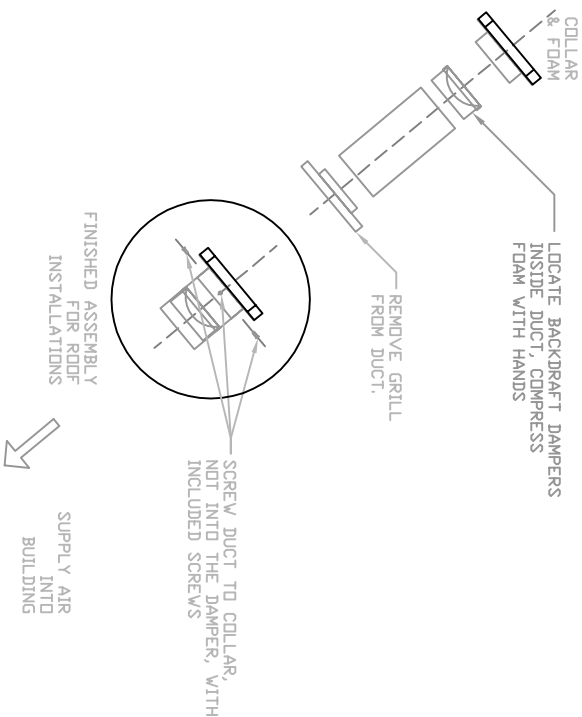
COLLAR & FOAM ASSEMBLY

- NOTES:**
 1) **OUTDOOR CAULKING SHALL BE USED TO SEAL WATER OUT OF PENETRATIONS IN EXTERIOR OF BUILDING**
 2) **DIGITAL CONTROL WIRE (LOCATED ON SOLARSHIELD 1500G & 1500) SHALL BE CONNECTED TO THE DIGITAL CONTROL**

BILL OF MATERIALS		
PART.	DESCRIPTION	QUANTITY
40	COLLAR (4/5")	1
41	FOAM (ADHESIVE, EPDM)	1
42	GRILL (5")	1
43	ROUND DUCT (5" DIA)	1
45	SCREWS	4
46	DIGITAL CNTRL (DC)	1
47	BACKDRAFT DAMPER (5" DIA)	1



WALL MOUNT DUCT ASSEMBLY



ROOF MOUNT DUCT ASSEMBLY

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Rev#	Date	Description
1		INITIALS

Customer: _____

Design: *gob*

Date: 1/5/2006

Scale: 1/8" = 1'

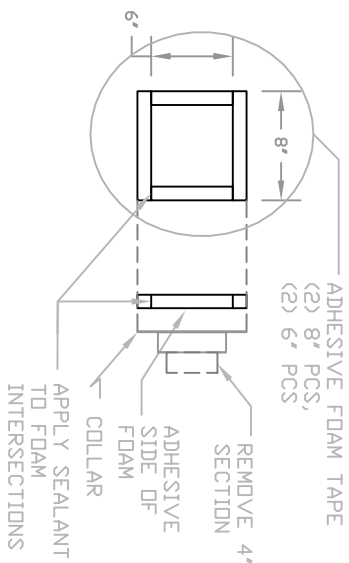
Part Name: SOLARSHIELD

Project Name: SolarSheet

Customer Drawing #: G01205.3.01.01.00.7

DUCT KIT -

1500S

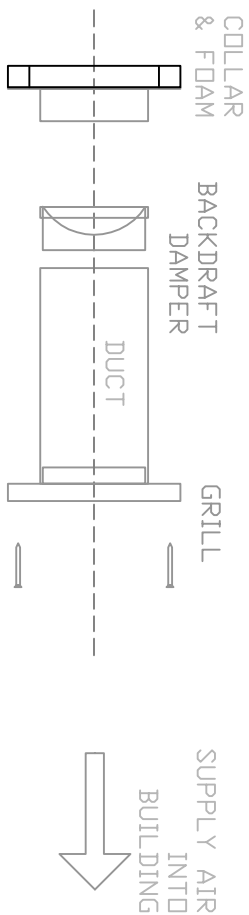


COLLAR & FOAM ASSEMBLY

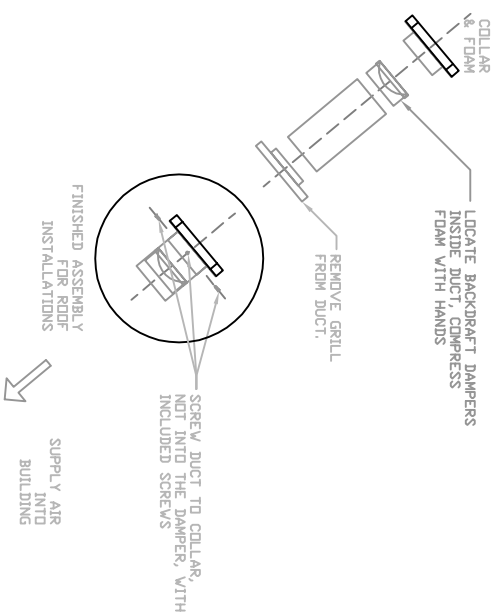
NOTES:
 1) OUTDOOR CAULKING SHALL BE USED TO SEAL WATER OUT OF PENETRATIONS IN EXTERIOR OF BUILDING

BILL OF MATERIALS		
PART.	DESCRIPTION	QUANTITY
40	COLLAR (4/5")	1
41	FOAM (ADHESIVE, EPDM)	1
43	ROUND DUCT (5" DIA)	1
47	BACKDRAFT DAMPER (5" DIA)	1

WALL MOUNT DUCT ASSEMBLY



ROOF MOUNT DUCT ASSEMBLY



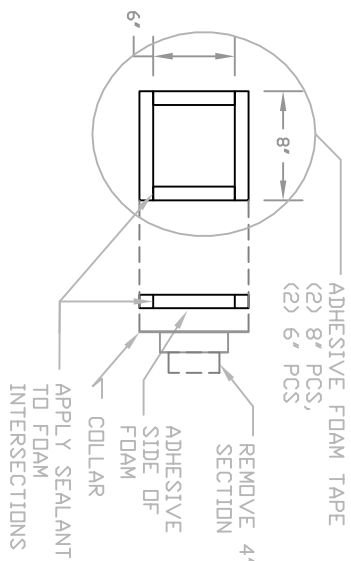
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Rev#	Date	Description
1		DATE OF DIMENSIONS

Customer#	_____
Design#	1/5/2006
Scale	1/8" = 1'-0"
Customer Dwg#	G01205.3.01.01.00.7
Project Name	SOLAR SHEAT
Part Name	SolarSheet
Material	Aluminum
Drawing#	G01205.3.01.01.00.7

DUCT KIT -

1500G



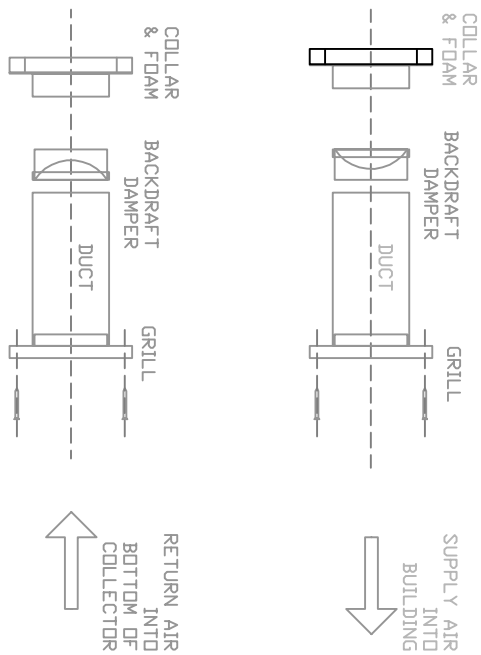
COLLAR & FOAM ASSEMBLY

NOTES:
 1) **OUTDOOR CAULKING SHALL BE USED TO SEAL WATER OUT OF PENETRATIONS IN EXTERIOR OF BUILDING**

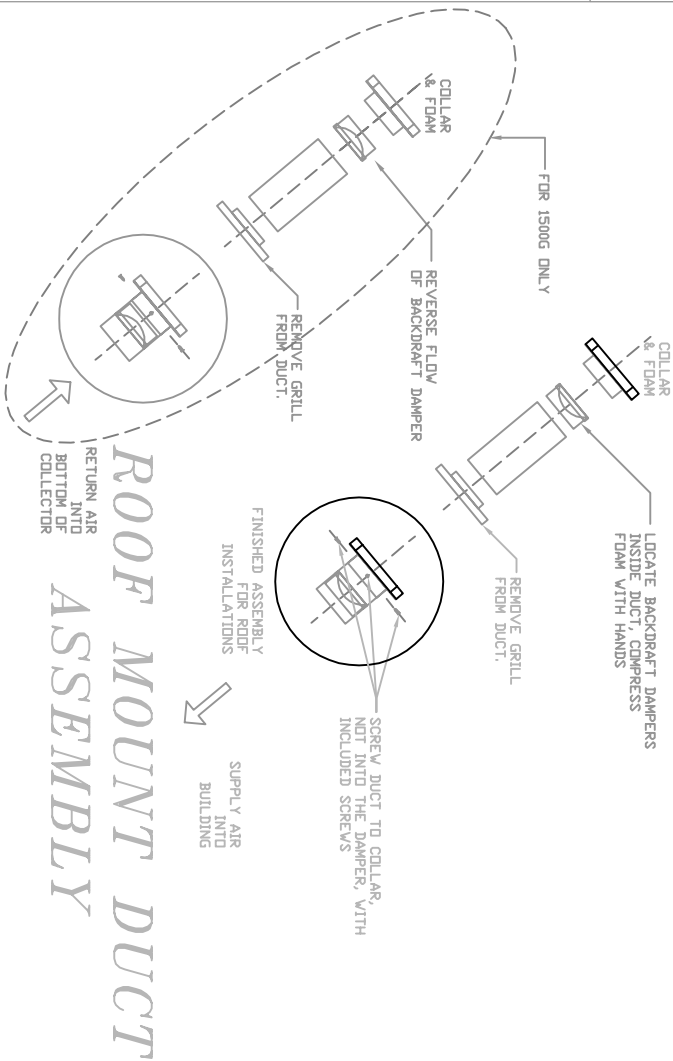
2) **DIGITAL CONTROL WIRE (LOCATED ON SOLARSHIELD 1500G & 1500) SHALL BE CONNECTED TO THE DIGITAL CONTROL**

BILL OF MATERIALS		
PART.	DESCRIPTION	QUANTITY
40	COLLAR (4/5")	2
41	FOAM (ADHESIVE, EPDM)	2
42	GRILL (5")	2
43	ROUND DUCT (5" DIA)	2
45	SCREWS	8
46	DIGITAL CONTROL (DC)	1
47	BACKDRAFT DAMPER (5" DIA)	2

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WALL MOUNT DUCT ASSEMBLY



ROOF MOUNT DUCT ASSEMBLY

Rev#	Date	Description
1		INITIAL DESIGN DESCRIPTION OF CHANGES

Customer: _____

Design: *jeje*

Date: 1/5/2006

Scale: 1/8" = 1'-0"

Customer: _____

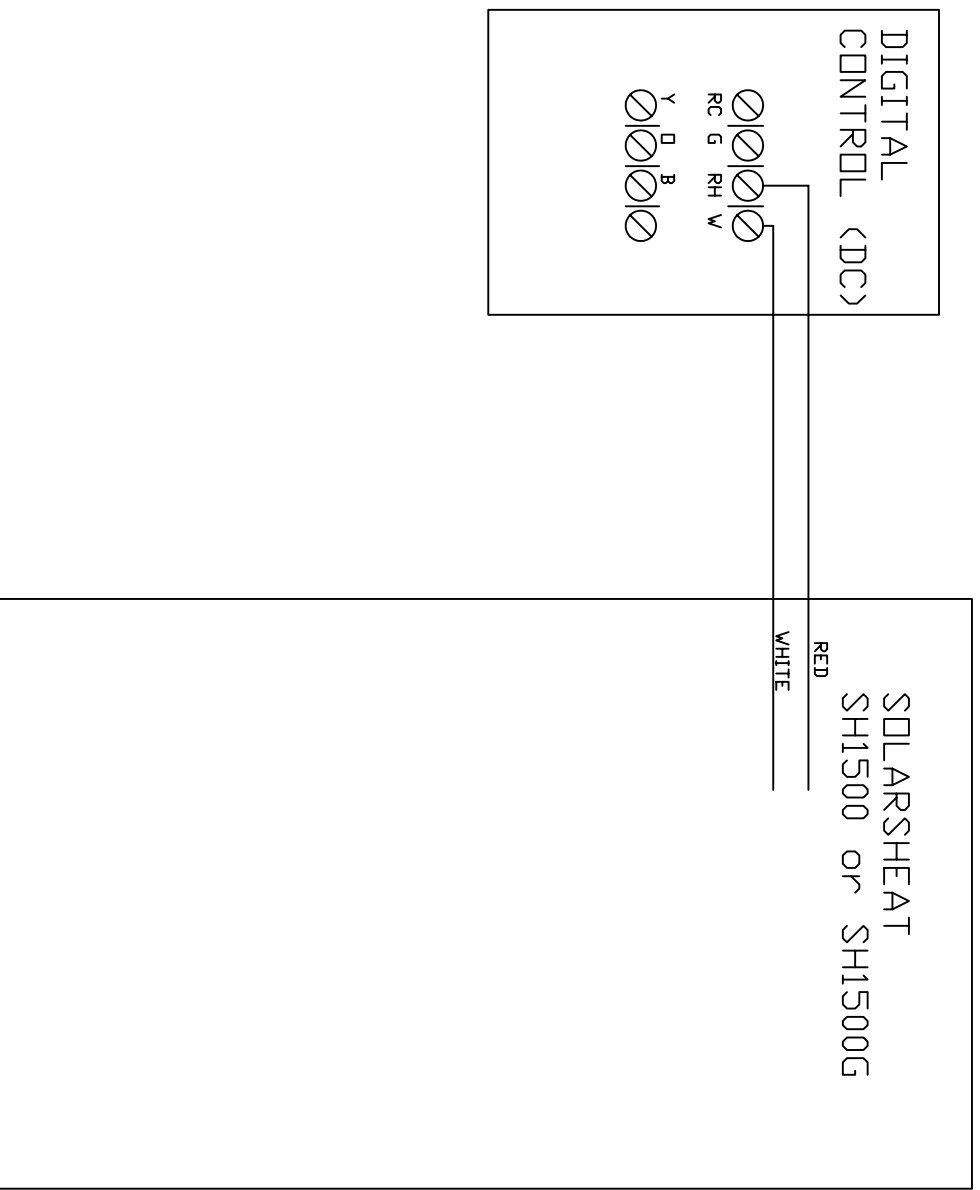
Part Name: SolarSheet

Project Name: SOLARSHIELD

Drawing #: G01205.3.01.01.00.7

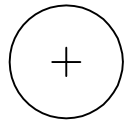
Part #: G01205.3.01.01.00.7

SOLARSHEAT SH1500 & SH1500G



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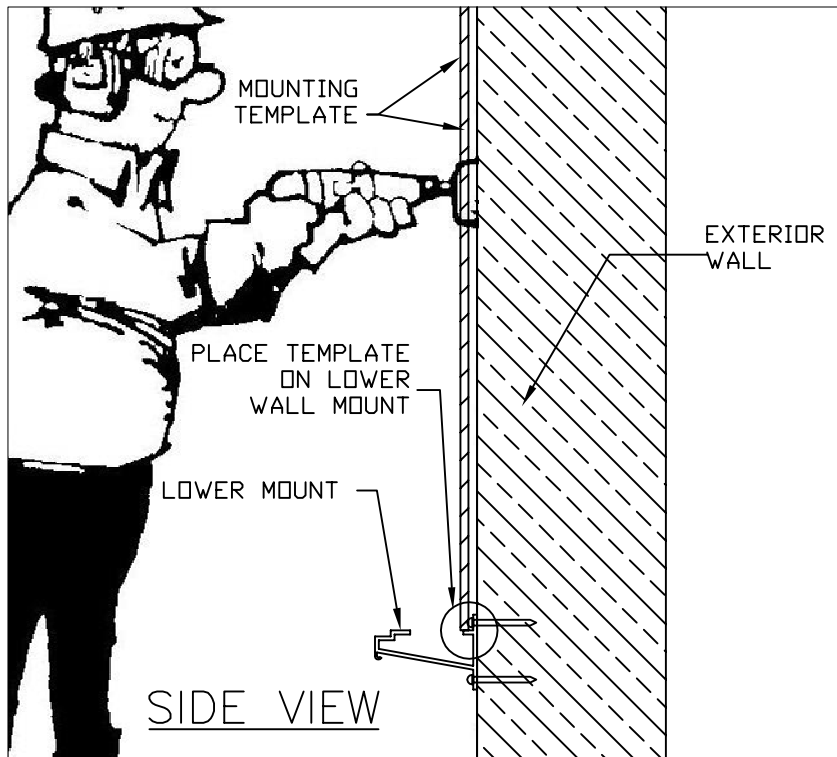
Rev#	Date	Description	Design	Date	Scale	Customer	Part Name
1	1/5/2006	DESCRIPTION OF CHANGES	YSH	1/5/2006	1/8" = 1'-0"	XXXXXXXXXXXX	YSH Solar System ELECTRICAL DIAGRAM



SUPPLY DUCT HOLE
 CUT 5" DIA HOLE
 ONLY IN WALL FOR:
 - SH1500
 - SH1500G
 - SH1500S (WITH A
 REAR HOLE)

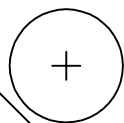
MOUNTING
 TEMPLATE

SOLARSHEAT MOUNTING TEMPLATE GUIDE



(OPTIONAL)
 FOR HORIZONTAL MOUNTING,
 FIND WHERE CONTROL WIRE WILL END
 UP COMING OUT OF THE COLLECTOR,
 ABOVE THE FAN. ROTATE THIS
 TEMPLATE ACCORDINGLY &
 PLACE ON
 LOWER MOUNT
 (SEE SIDE VIEW)

FOR
 VERTICAL MOUNTING
 PLACE ON
 LOWER MOUNT
 (SEE SIDE VIEW)



RETURN DUCT HOLE
 CUT 5" DIA HOLE
 ONLY IN WALL FOR:
 - SH1500G