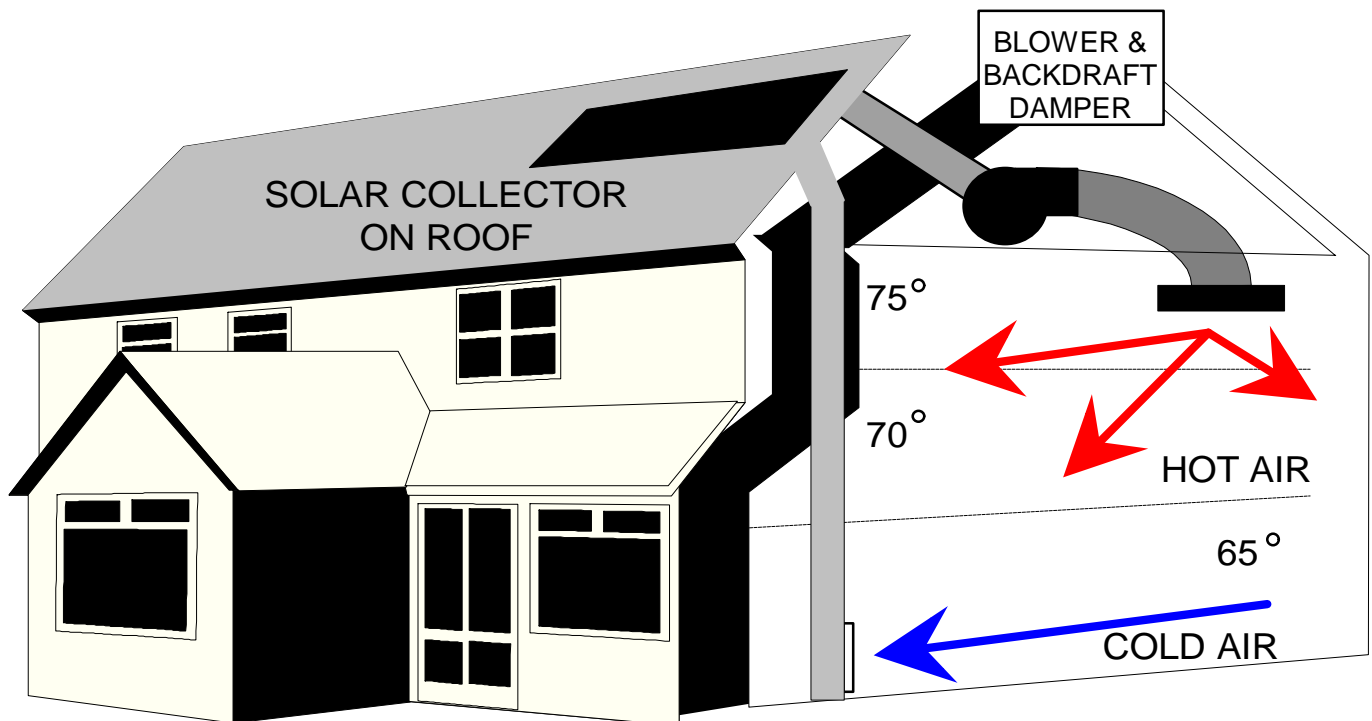


**21st CENTURY ENERGY
SOLAR AIR COLLECTOR
INSTALLATION GUIDE**

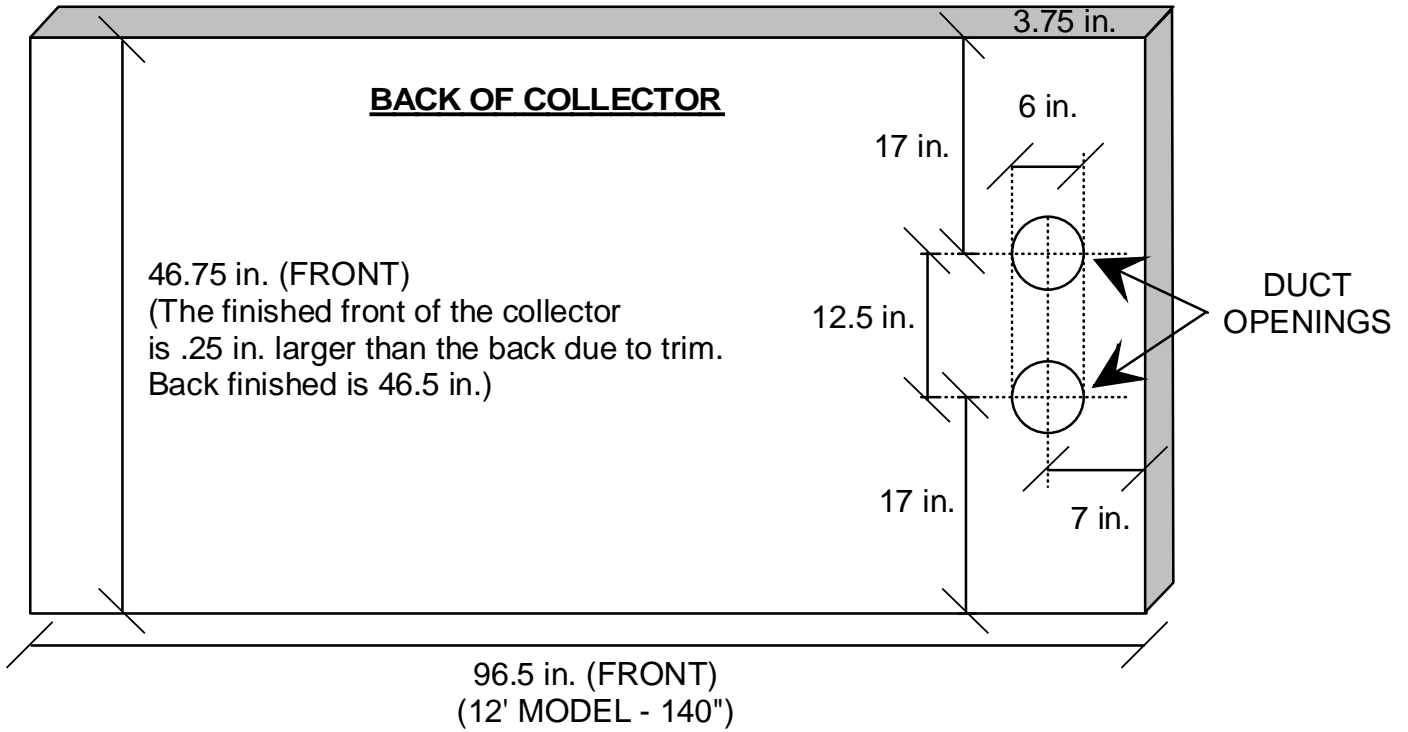
CONTENTS

COLLECTOR SPECIFICATIONS
EQUIPMENT, MATERIALS AND TOOLS
ORIENTATION AND TILT
COLLECTOR MOUNTING
ROOF PENETRATIONS
SYSTEM LAYOUT
COLD AIR RETURNS
DUCTING GUIDELINES
HOT AIR AND BLOWER
TWO COLLECTORS IN SERIES
WIRING

**A SPACE HEATING SYSTEM WITH
SOLAR AIR COLLECTORS**



SUN AIRE AIR COLLECTOR SPECIFICATIONS



ALUMINUM FRAME →

LOW IRON TEMPERED GLASS →

ALUMINUM ABSORBER →

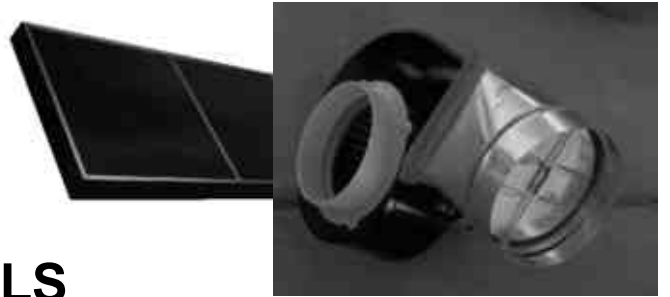
INSULATED ALUMINUM ENCLOSURE →



- ENCLOSURE - .024 BROWN ALUMINUM
- ABSORBER - .019 BLACK ALUMINUM
- INSULATION - R-8 ISOCYANURATE BACK & SIDES
- AIR FLOW - DUAL PASS BEHIND ABSORBER
- GLAZING - LOW IRON TEMPERED GLASS
- WEIGHT - 98 LBS.
- SHIPPING WEIGHT (CRATED) - 190LBS.
- BLOWER - 362 CFM, 488 CFM FOR TWO COLLECTORS
- DUCT - 6" INSULATED FLEX
- TILT - LOCAL LATITUDE + 15 DEGREES
- MAXIMUM COLLECTORS RECOMENDED PER BLOWER - 4

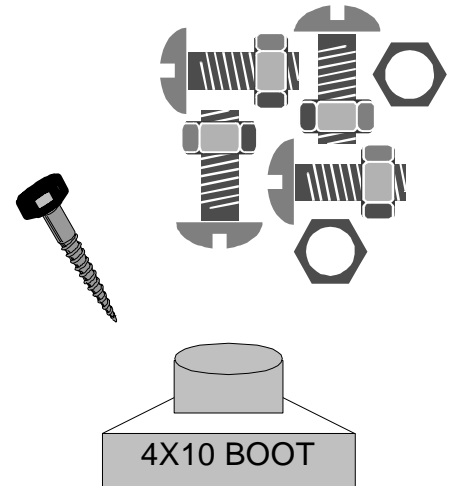
EQUIPMENT

AIR COLLECTOR(S)
MOUNTS
BLOWER AND BACKDRAFT DAMPER
110/90 SNAP DISC OR DIFFERENTIAL CONTROL
LINE VOLTAGE THERMOSTAT



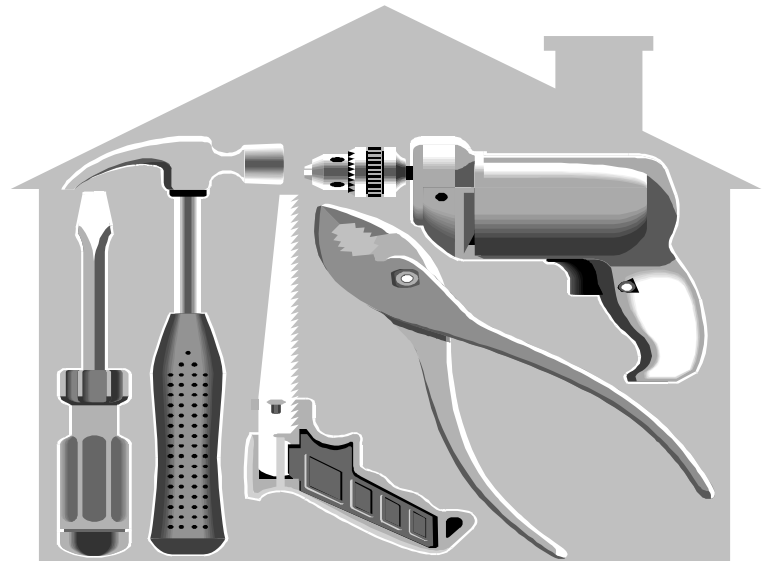
MATERIALS

25 FT. 6" ROUND INSULATED FLEX DUCT (50 FT. FOR 2 STORIES)
2 - 7" ROOF JACKS
5 FT. 8" GALVANIZED ROUND DUCT (10' FOR 2 COLLECTORS)
2- 8" GALV. ELBOWS (4 FOR 2 COLLECTORS)
3 - 6" STARTING COLLARS (5 FOR 2 COLLECTORS)
6" ROUND X 6 X 10 GALV. BOOT
6" ROUND X 4 X 10 GALV. BOOT
6" X 10" HOT AIR REGISTER
8" X 10" RETURN AIR GRILLE
1/4" X 4 LAG SCREWS (6" FOR SHAKE OR FOAM ROOFS)
1/4 " HEX HEAD HEAD ZIP SCREWS
20 FT. 14/2 ROMEX WITH GROUND
ELECTRICAL WIRE NUTS
PLASTIC REMOD ELECTRICAL BOX
DUCT TAPE
PLASTIC ROOF CEMENT
SILICONE SEALANT
PLUMBERS TAPE



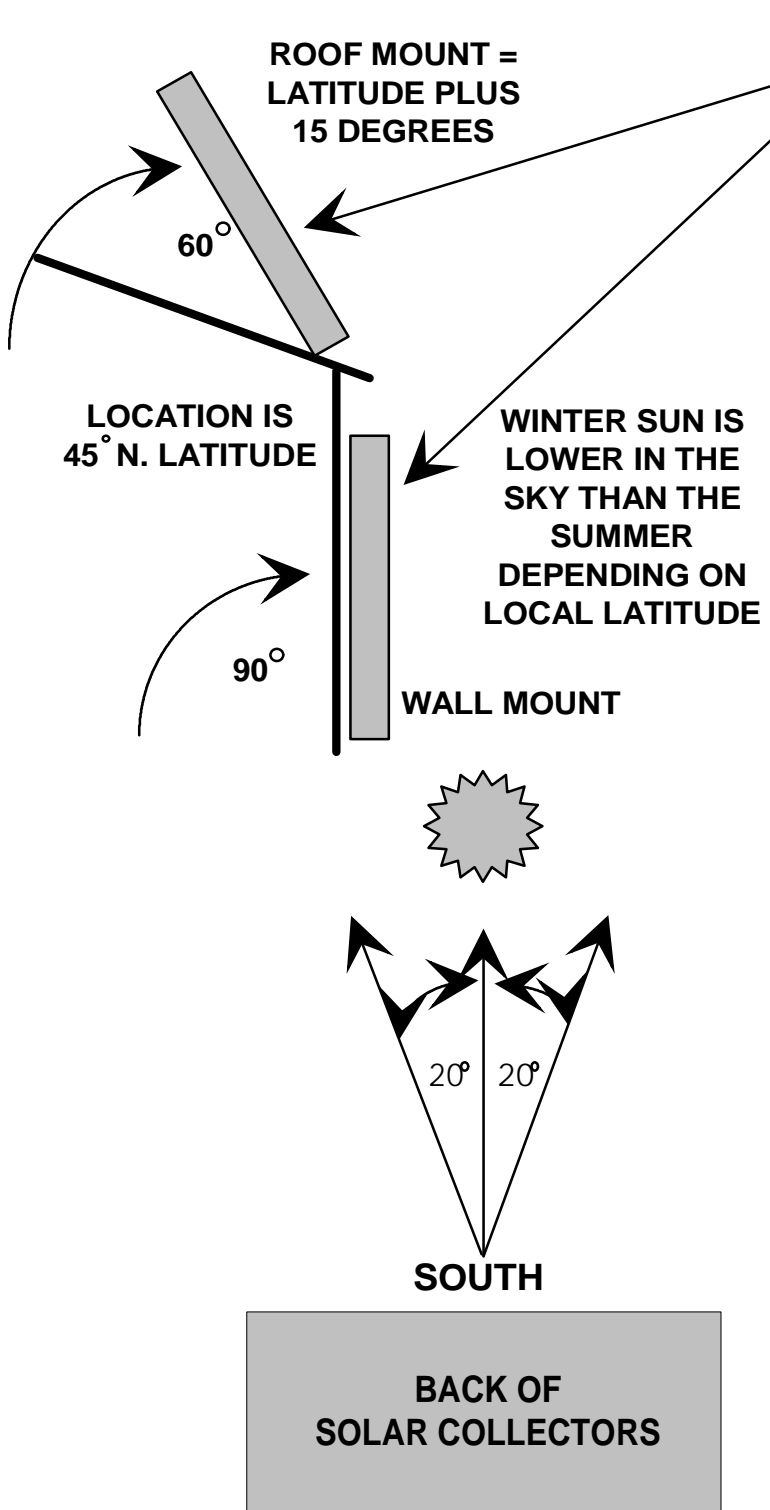
TOOLS

1/4" OR LARGER ELECTRIC DRILL
EXTENSION CORD
EXTENSION LADDER
STEP LADDER OR NBA BASKETBALL PLAYER
3/4" OR LARGER WOOD DRILL BIT
1/4" ZIP DRIVER BIT
SAWZALL AND/OR KEYHOLE SAW
SOCKET SET AND RACHET
HAMMER
WIRE CUTTERS AND STRIPPER
SCREWDRIVERS
CAULKING GUN



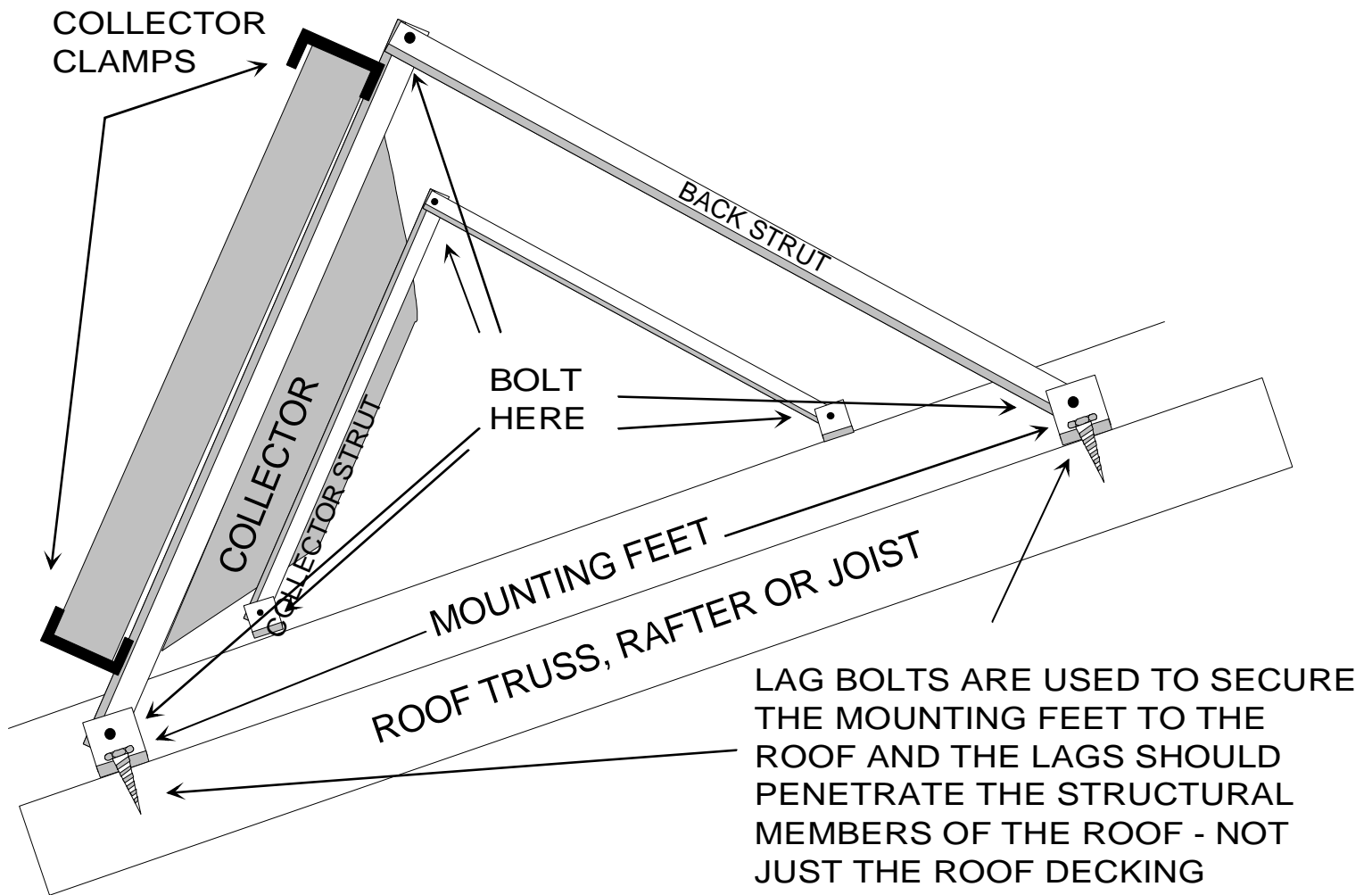
COLLECTOR TILT AND ORIENTATION

COLLECTOR TILT ANGLE FOR SOLAR SPACE HEATING



We recommend that solar air collector systems be tilted at an angle equal to your location's latitude plus 15° to optimize their production of heat in the winter. You may wish to mount the collectors vertically on a south facing wall. While this is not optimal, it is acceptable as the collectors will turn on earlier and off later even though they will not produce as much heat during the "Solar Window". The sun is most intense at noon every day when it is highest in the sky. The four to five hours in late morning and early afternoon are called the "Solar Window". This is when more than 80% of the total collectable energy falls on a solar collector. Collectors should face as true south as possible towards the solar window. A variation of up to 30° east or west of true south is acceptable. If the collector(s) are faced more than 30° off true south more collectors will be required. If a choice of east or west is available it is usually best to orient the collectors to the west. The outside temperatures are almost always warmer in the afternoon. Prevailing local weather patterns should also be considered in mounting the collector. For instance, if you are in an area where mornings are normally clear and afternoons are cloudy, it would be best to face the collector in a more easterly direction. A properly orientated solar collector can increase system payback up to fifty percent quicker than a haphazardly installed system.

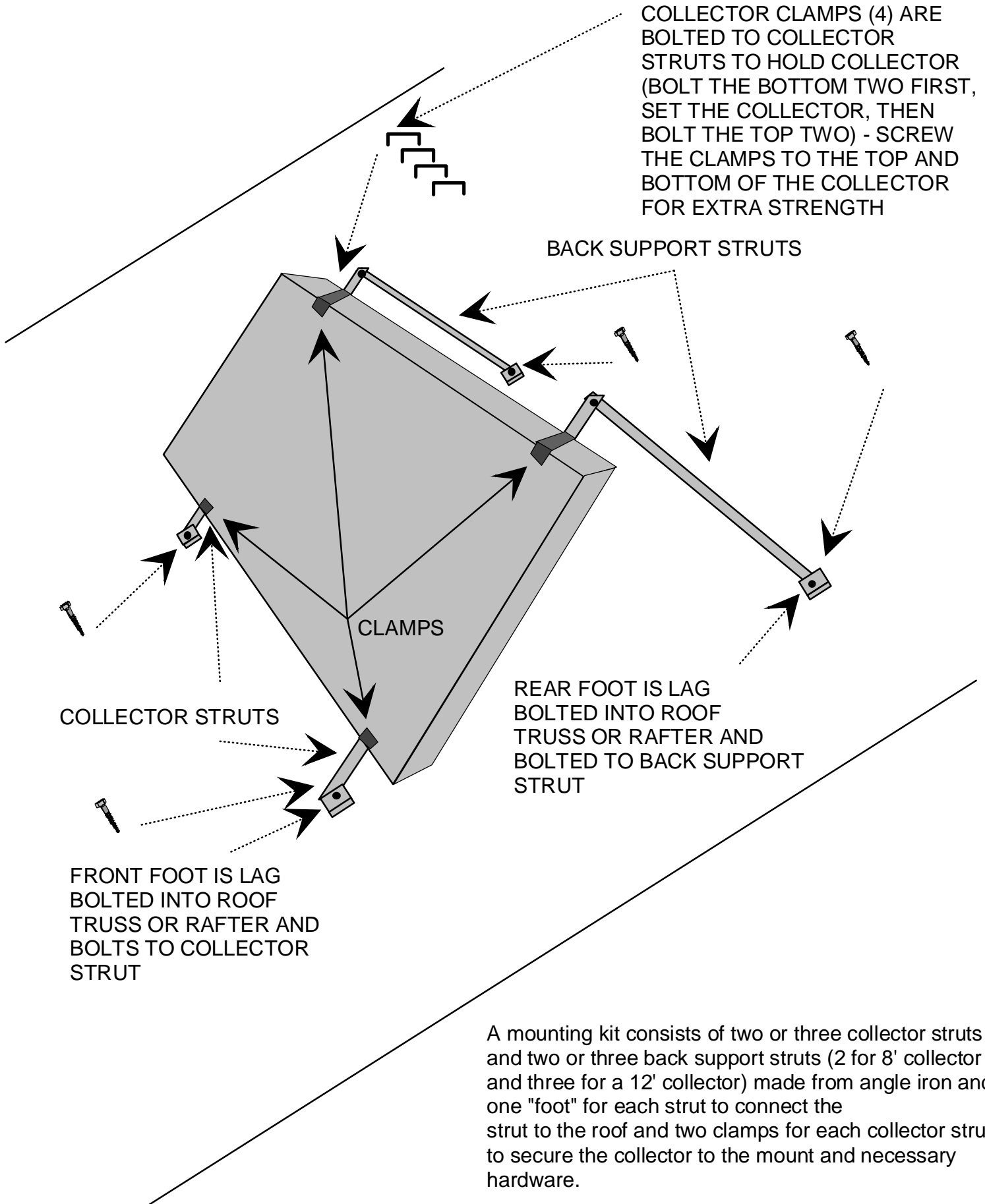
**TRUE SOUTH IS WHERE
THE SUN IS AT NOON**



COLLECTOR MOUNTING

THE AIR COLLECTOR MOUNTING SYSTEM CONSISTS OF COLLECTOR STRUTS, BACK STRUTS, MOUNTING FEET AND COLLECTOR CLAMPS. EACH COLLECTOR STRUT IS BOLTED TO A BACK STRUT FOR SUPPORT AND CORRECT TILT ANGLE. THE BACK STRUT SHOULD BE CUT TO THE CORRECT LENGTH AND DRILLED DEPENDING ON THE ROOF PITCH AND DESIRED TILT ANGLE. THE COLLECTOR STRUTS AND BACK STRUTS ARE BOLTED TO THE MOUNTING FEET AFTER THEY HAVE BEEN LAG BOLTED INTO THE ROOF. PLASTIC ROOF CEMENT SHOULD BE USED TO SEAL THE UNDERSIDE OF THE FEET AND COMPLETELY COVER THE FEET UPON COMPLETION TO PREVENT LEAKS. THE BOTTOM TWO COLLECTOR CLAMPS ARE BOLTED TO THE COLLECTOR STRUTS AND THE COLLECTOR CAN BE SET IN PLACE. AFTER THE DUCT, WIRING AND WEATHERPROOFING IS COMPLETED, THE TOP CLAMPS ARE BOLTED ON TO THE COLLECTOR STRUTS TO HOLD THE COLLECTOR IN PLACE...

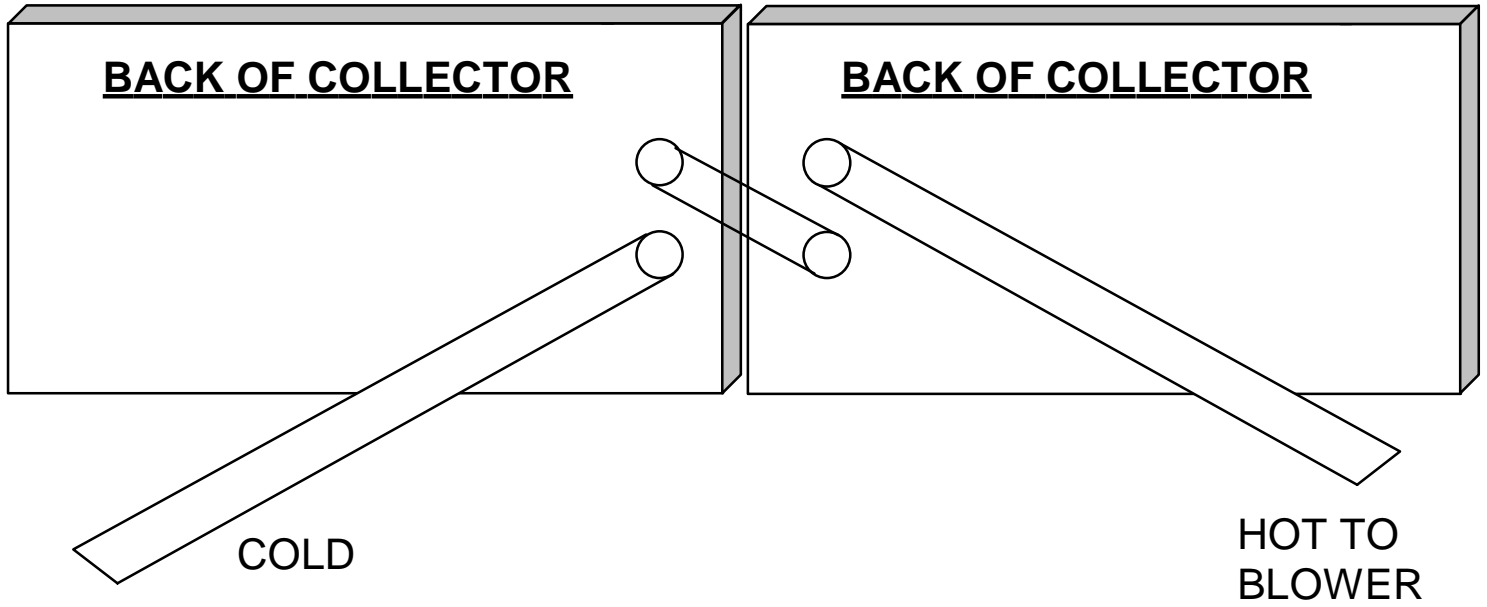
AIR COLLECTOR MOUNTING



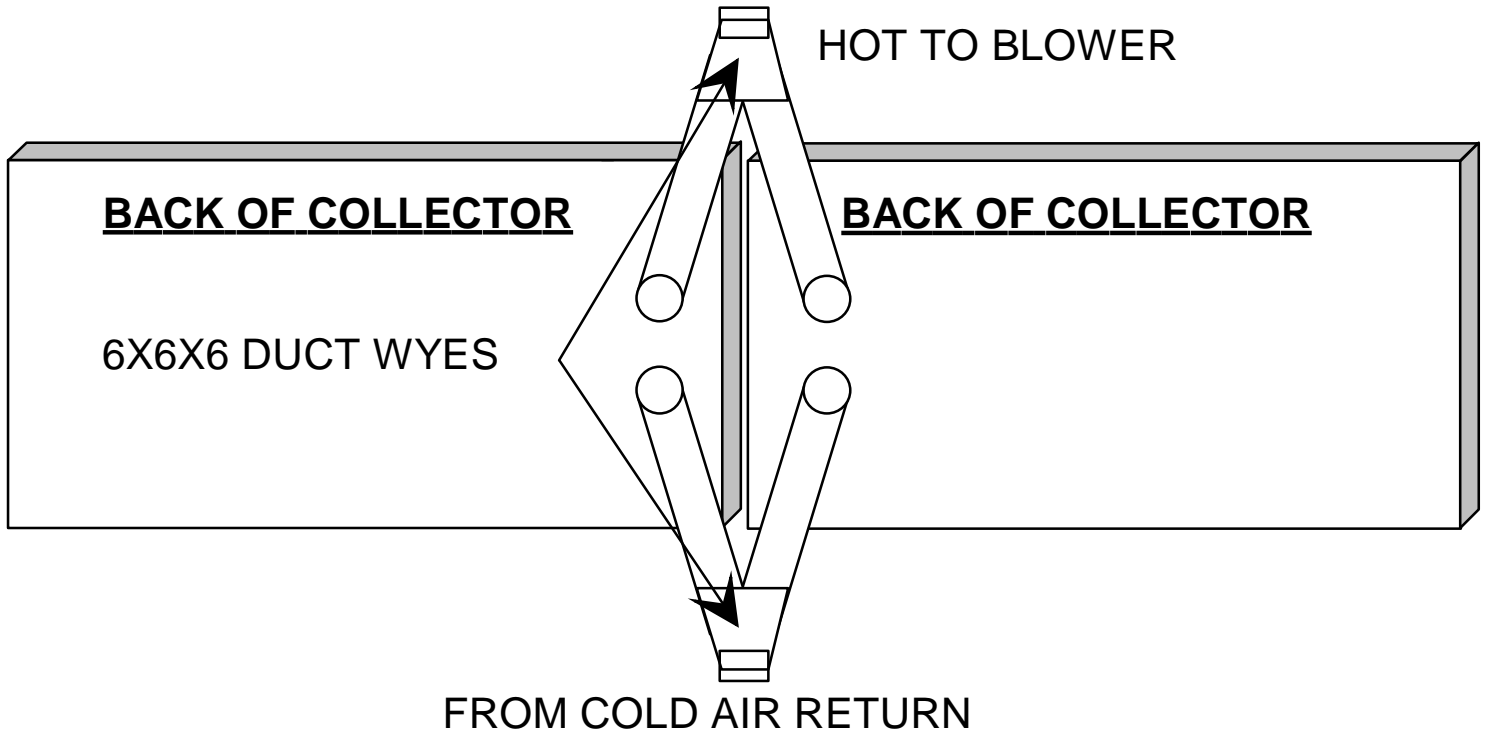
A mounting kit consists of two or three collector struts and two or three back support struts (2 for 8' collector and three for a 12' collector) made from angle iron and one "foot" for each strut to connect the strut to the roof and two clamps for each collector strut to secure the collector to the mount and necessary hardware.

DUCTING TWO COLLECTORS

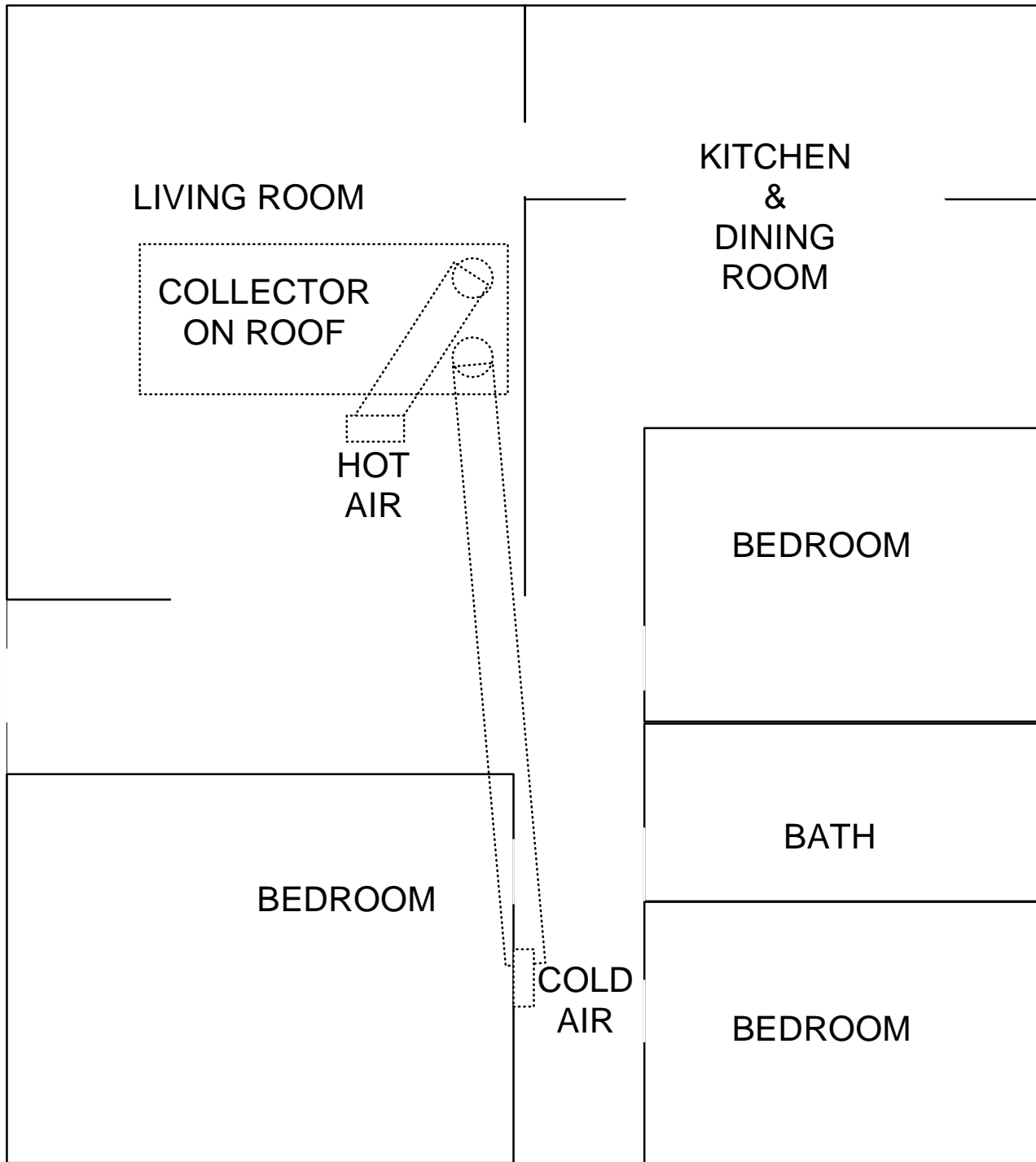
TWO COLLECTORS IN SERIES
NORMALLY ONLY DONE WITH 8' COLLECTORS



TWO COLLECTORS IN PARALLEL
USUALLY THE BEST METHOD OF DUCTING
TWO COLLECTORS

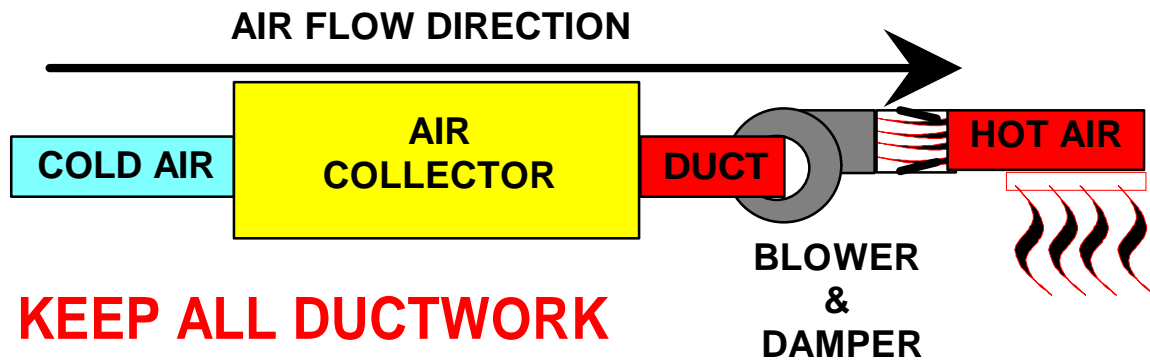


SYSTEM LAYOUT



THE COLLECTOR(S) SHOULD BE PLACED AS CLOSE AS POSSIBLE TO WHERE THE HOT AIR IS GOING TO BE SUPPLIED - NORMALLY A ROOM USED IN THE DAY AND EVENING. THE COLD AIR SHOULD BE PLACED WHERE A GOOD AIR CIRCULATION PATH CAN BE DEVELOPED TO KEEP A LARGE AREA COMFORTABLE. THE COLD AIR SHOULD ALWAYS BE ON THE FLOOR. IF A LARGE ROOM WITH HIGH CEILINGS IS TO BE THE CENTRAL POINT OF HEAT, THE COLD AIR RETURN IS OFTEN IN THE SAME ROOM AS THE HOT AIR SUPPLY. THE MOST IMPORTANT CONSIDERATIONS ARE TO KEEP THE HOT AIR DUCT AS SHORT AS POSSIBLE AND ALWAYS PUT THE COLD AIR RETURN ON THE FLOOR. THE MOST COMMON REASONS FOR POOR AIR COLLECTOR PERFORMANCE ARE COLD AIR RETURNS IN THE CEILING AND/OR LONG HOT AIR DUCT RUNS..

AIR COLLECTOR INSTALLATIONS DUCT WORK



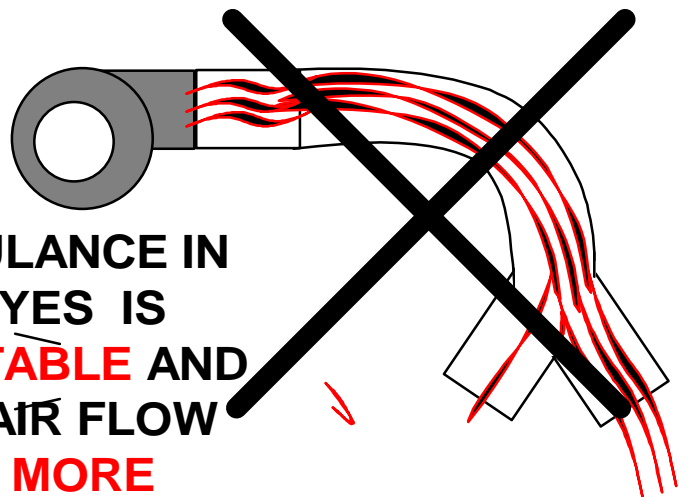
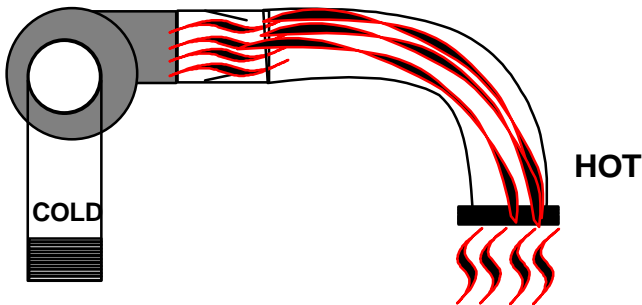
**KEEP ALL DUCTWORK
AS SHORT AS POSSIBLE**

**HOT AIR NO MORE
THAN 10 TO 15 FEET**

**COLD AIR CAN BE
UP TO 50 FEET LONG**

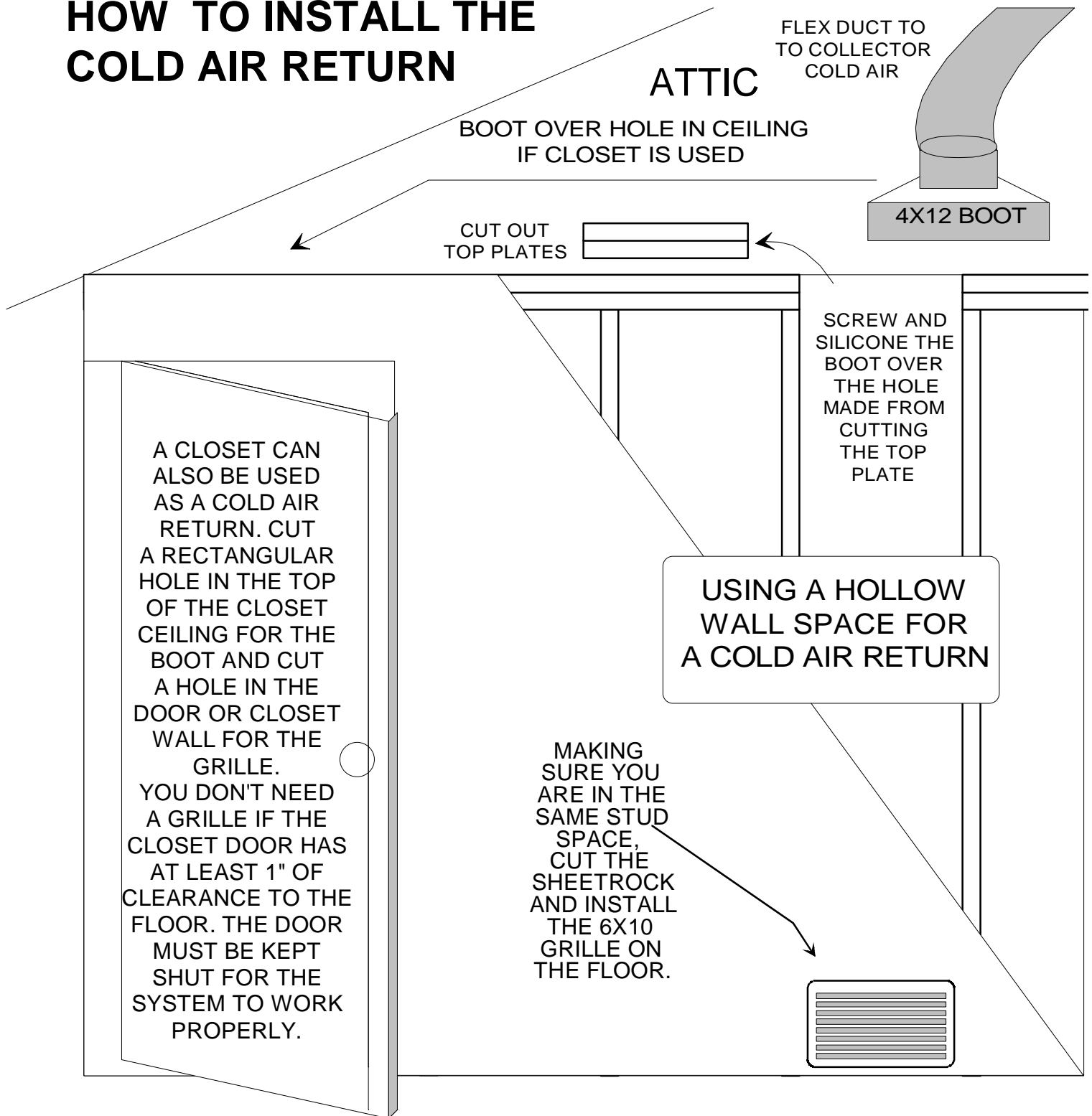
**ALWAYS PUT THE BLOWER
ON THE HOT AIR SIDE OF
THE COLLECTOR(S)**

**EACH SYSTEM WORKS BEST WITH
ONE HOT AIR SUPPLY AND ONE
COLD AIR RETURN**



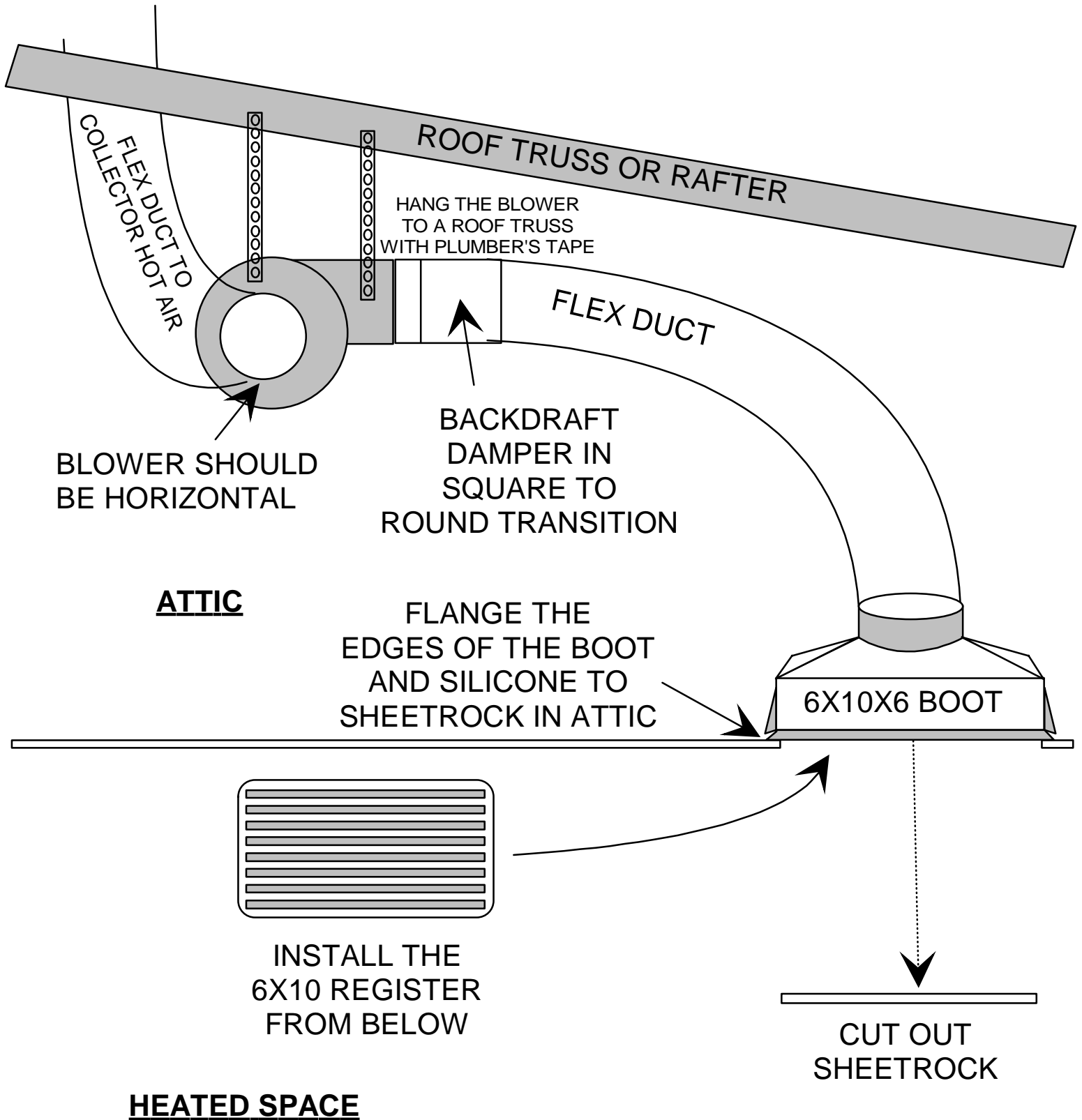
**AIR TURBULANCE IN
DUCT WYES IS
UNPREDICTABLE AND
CAN CUT AIR FLOW
50% OR MORE**

HOW TO INSTALL THE COLD AIR RETURN

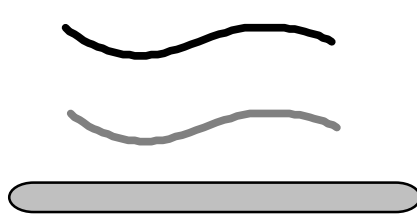
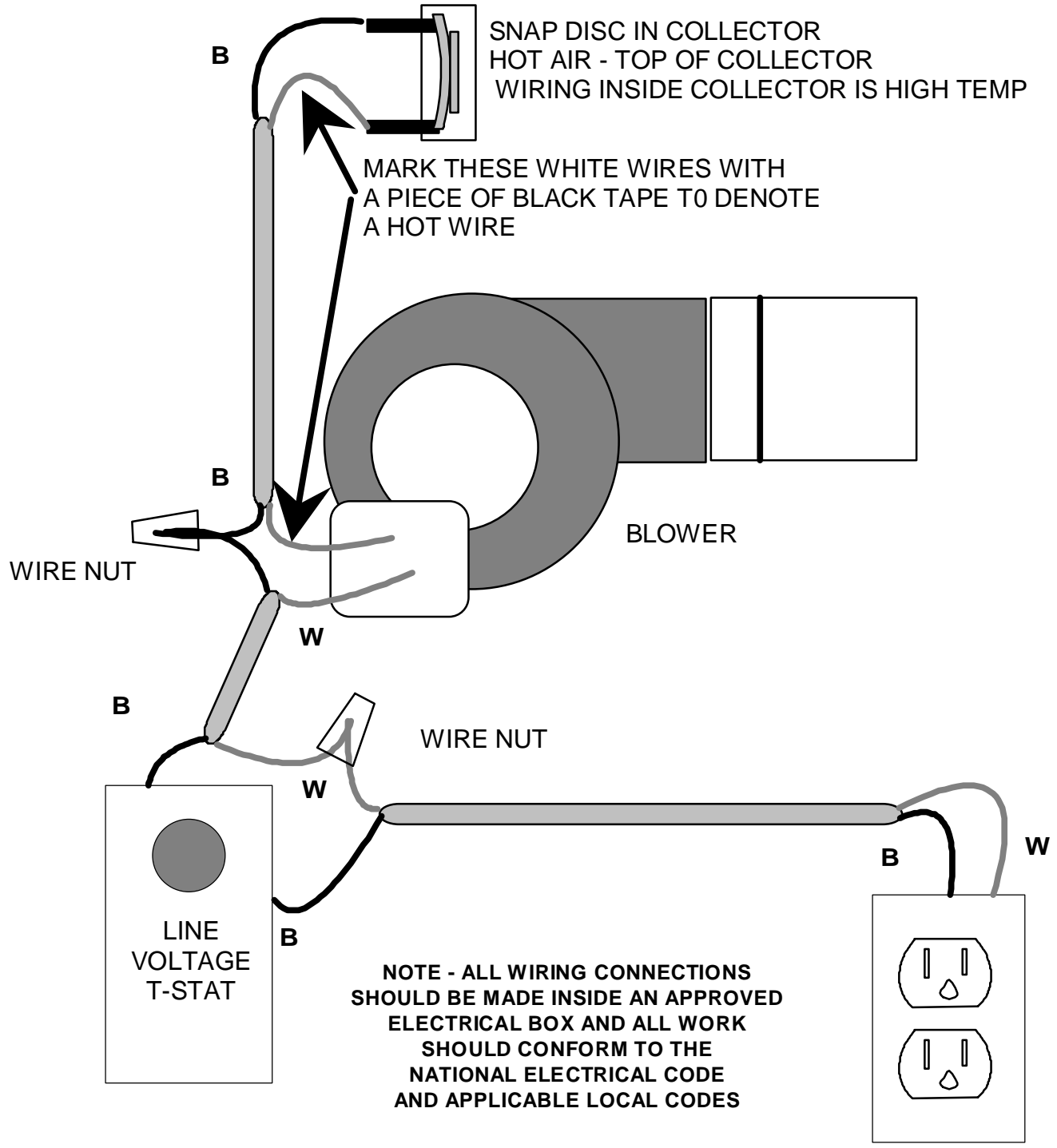


THE BEST PLACE FOR A COLD AIR RETURN IS A HOLLOW WALL SPACE. YOU NEED TO CAREFULLY MEASURE AND CUT OUT THE TWO TOP PLATES (NORMALLY 2 X 4s) AND USE A 4X12X6 ROUND STRAIGHT BOOT TO TRANSITION TO FLEX DUCT. A GOOD WALL SPACE IS CENTRALLY LOCATED AND HAS AN ADJACENT ELECTRICAL RECPCTACLE WHICH CAN BE USED FOR POWER FOR THE BLOWER. THE THERMOSTAT CAN BE INSTALLED ABOVE THE COLD AIR GRILLE 48" TO 60" ABOVE THE FLOOR.

DUCTING THE BLOWER AND HOT AIR



WIRING THE CONTROLS FOR A SOLAR AIR COLLECTOR

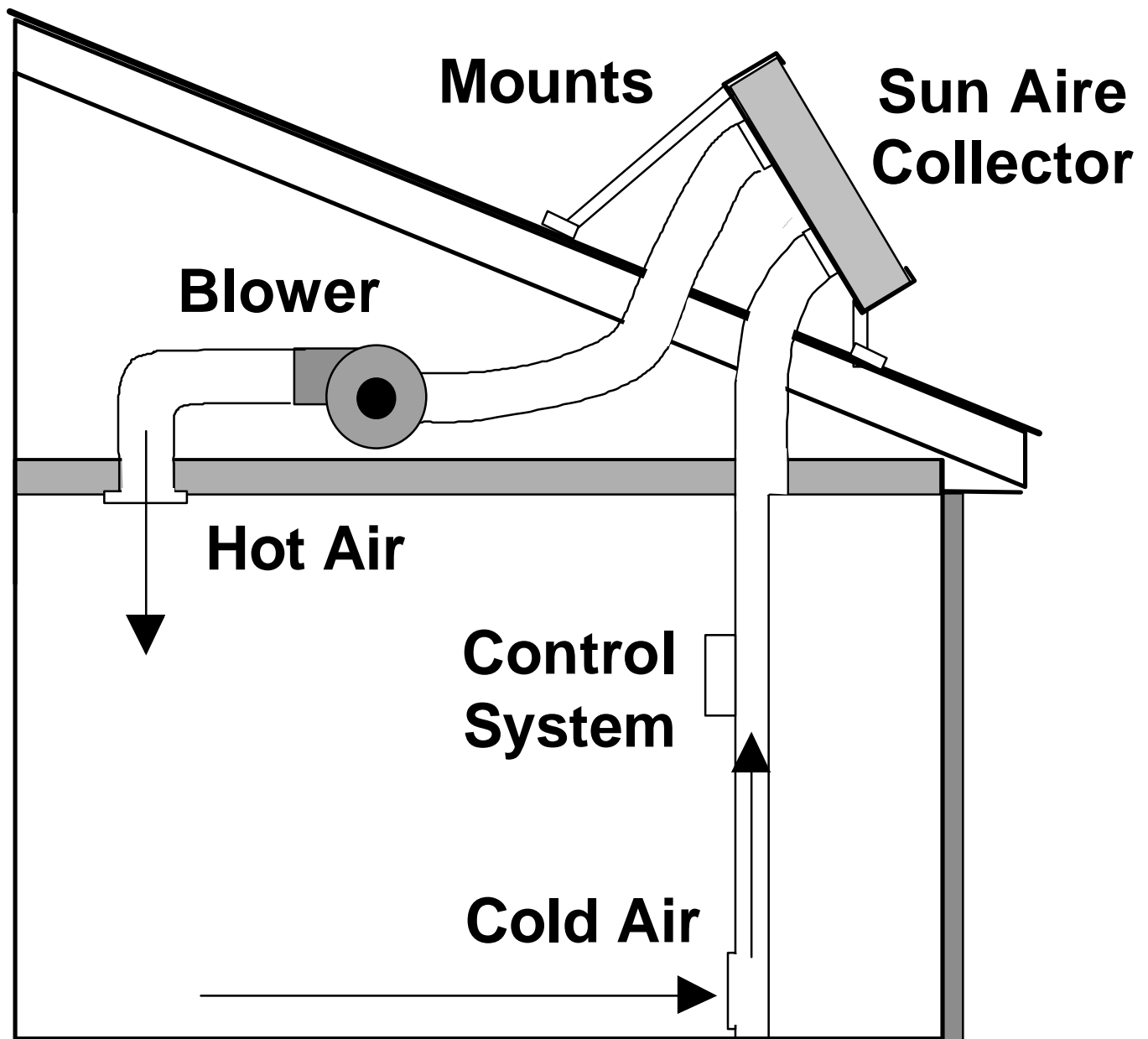


BLACK WIRE (B)

WHITE WIRE (W)

14-2 ROMEX ON A 15 A CIRCUIT
12-2 ROMEX ON A 20 A CIRCUIT

NOTE - ALL GROUND WIRES SHOULD BE TIED TOGETHER AND/OR CONNECTED TO THE APPROPRIATE GROUND SCREW



SYSTEM OPERATION

Cool air is drawn through the inlet of the collector and passed under the absorber plate which has captured the sun's energy. The air is turbulated as it passes through the collector and in a sense, the heat is "washed" from the absorber plate. The air, which is now heated, is delivered back into the home by a small blower. The thermostatic control system automatically turns the system "on" whenever the sun shines and "off" at sundown. A properly sized system can supply enough heat to your home to keep it warm well into the evening hours. The only thing added to the inside of your home are two attractive vents and a thermostat to allow you to call for heat when you need it.