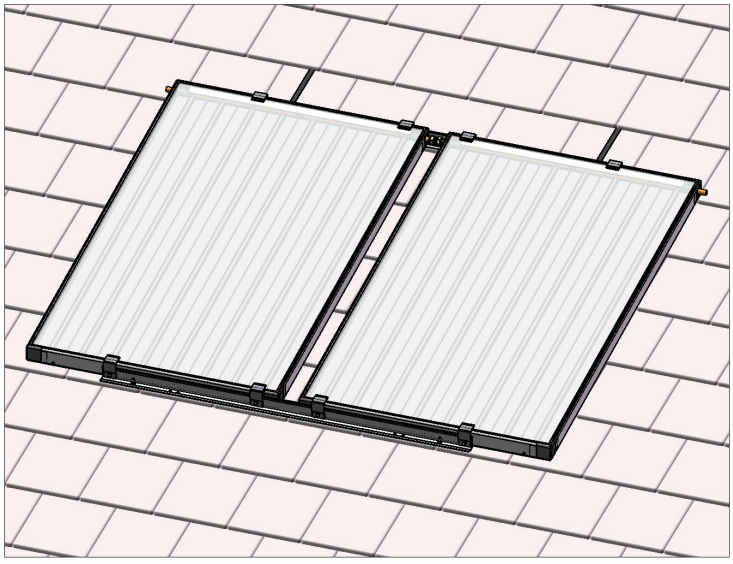
Rinnai

Solar Split Systems
E-Frost Collectors
Installation Manual for
RINNAI 'PRESTIGE'® and
RINNAI 'SUNMASTER'®
Solar Split Systems Electric and Gas Boosted



NOTE The appliance must be installed, commissioned and serviced by an authorised person in accordance with all applicable local rules and regulations.

WARNING The collector flow and return pipes should be 15mm copper tube or alternative tube supplied by Rinnai.
Plastic pipe must not be used. Plastic pipe is not suited to the high water temperatures and pressures that may occur in the collector flow and return system.
- NOT SUITABLE FOR CLOSE COUPLED SYSTEMS
- NOT SUITABLE AS A POOL OR SPA HEATER

The Australian Gas Association
All Rinnai gas products are A.G.A. certified.

Certified Product
WaterMark
AS3498 Lic W169
SAI Global

Quality System
AS 2712
Lic No.1849
SAI Global

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PLEASE NOTE:
THIS DOCUMENT ONLY CONTAINS INFORMATION ON MOUNTING E-FROST COLLECTORS TO THE ROOF FOR A SPLIT SOLAR HOT WATER SYSTEM.

FOR DETAILS ON CYLINDER AND CONNECTING PLUMBING INSTALLATION, PLEASE REFER TO THE RINNAI OPERATION / INSTALLATION MANUAL PRESTIGE® AND RINNAI SUNMASTER® SOLAR SPLIT SYSTEMS - ELECTRIC AND GAS BOOSTED.

SPECIFICATIONS FOR SOLAR E-FROST COLLECTORS

Table 1: Model Numbers and Specifications		
CHARACTERISTICS		**E-FROST (HPFTC- 8-10)**
TYPE		Flat Plate / Heat Pipe
CONSTRUCTION		
- Waterways		Copper
- Absorber		Aluminium
- Selective Surface		High Performance
Maximum Operating Pressure	(kPa)	850
Casing Material		Aluminium
Overall Dimensions (Length x Width x Height)	(mm)	1940 x 1025 x 80
Weight empty (Standard / Frost Tolerant)	(Kg).	34
Water volume	(Litres)	0.6
Number of Risers		10
Potential Solar Output at PTR relief conditions	(kW)	1.25
Approximate Roof Space Required: Length x Width		
- 1 collector	(mm)	1940 x 1025
- 2 collectors	(mm)	1940 x 2130
- 3 collectors	(mm)	1940 x 3235
Commercial systems		Refer to Figure 11 for details
Frost Protection		Frost protection to -12°C. Power must be on at the pump and controller must be in low temperature mode (factory default).

INSTALLATION INFORMATION

REGULATIONS AND OCCUPATIONAL HEALTH AND SAFETY (OH&S)

Installation and commissioning must be performed by authorised persons. Rinnai Solar Systems Collectors must be installed in accordance with these Instructions and all regulatory requirements which exist in your area including those in relation to manual lifting, working at heights and on roofs. Applicable publications and regulations may include:

- AS 5601 Gas Installations
- AS/NZS 3500 National Plumbing and Drainage
- AS/NZS 3000 Wiring rules
- Building Codes of Australia
- Local Occupational Health and Safety (OH&S) regulations

WARNING

- **Solar collectors are heavy and bulky items and are usually positioned on the roofs of buildings. Each Australian State and Territory has a principal Occupational Health and Safety (OH&S) Act which contains requirements relating to the handling of large, bulky or awkward items and the prevention of falls from elevated surfaces. Persons installing solar collectors must be aware of their responsibilities and be adequately trained and qualified, in accordance with local OH&S requirements.**

SYSTEM ORIENTATION AND INCLINATION

The performance of any solar hot water system is determined by the way that the system is installed.

In Australia, the solar collectors should face the equator (North) as shown below. Where this orientation is not practical, collectors facing within 45 degrees from North (between North-East and North-West) area acceptable, with a reduction in efficiency of approximately 5%. If the bulk of hot water consumption occurs before 2 pm face the collectors in a North - Easterly direction. If the bulk of hot water consumption occurs after 2 pm face the collectors in a North Westerly direction.

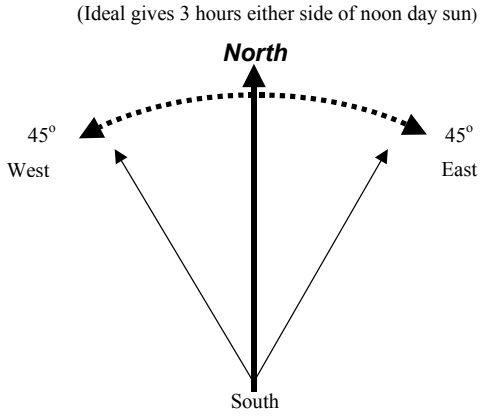


Figure 1 *- Orientation Angle of Collectors*

The inclination of the solar collectors should ideally be the same as the latitude angle of the site. Inclinations within 20 degrees of the latitude angle of the site are acceptable, with a reduction in efficiency of approximately 5%.

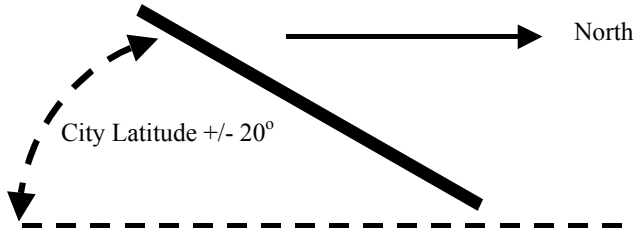


Figure 2 *- Inclination of Collectors*

Table 2: Latitudes of Australian Cities

City	Latitude	City	Latitude	City	Latitude	City	Latitude
Adelaide	35°S	Cairns	17°S	Hobart	42°S	Port Hedland	20°S
Alice Springs	24°S	Canberra	35°S	Mildura	34°S	Rockhampton	24°S
Brisbane	27°S	Darwin	12°S	Melbourne	38°S	Sydney	34°S
Broken Hill	31°S	Geraldton	28°S	Perth	32°S	Townsville	19°S

For all installations the collector bank must slope upwards approximately 8 mm per collector from inlet to outlet as shown below:

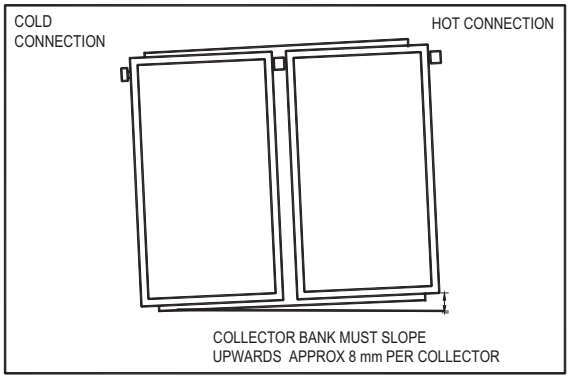


Figure 3 *- E-Frost Collectors*

A maximum of three collectors can be connected together in parallel. Inlet (Cold) and Outlet (Hot) connections are made at opposite corners of the collector array.

SOLAR COLLECTOR ROOF MOUNTING OPTIONS

For mounting options not shown in ***Figure 5***, for example in areas where the cyclone frame cannot be used, consult your nearest Rinnai Branch or Rinnai Representative.

It is normal to mount the solar collectors down close to the gutter. Roof construction must be checked to ensure that the roof timbers are capable of supporting the additional load. (Refer to AS 3500.4 Appendix H).

For tiled roof installations. Check for cracked or damaged roof tiles in the area of proposed installation. Replace any faulty roof tiles.

If spare roof tiles are not available, swap damaged roof tiles with good ones from along the gutter line.

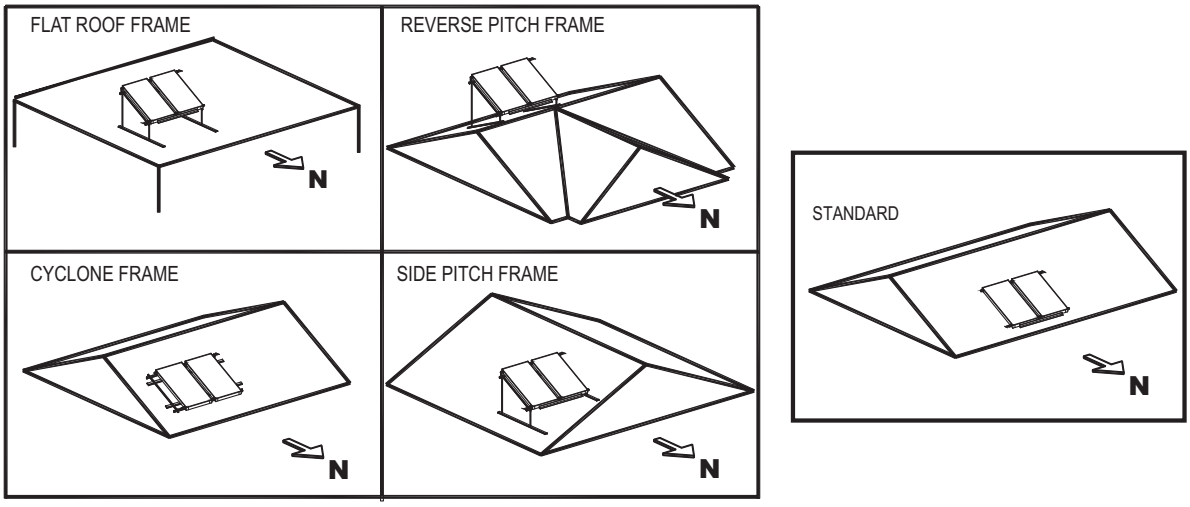


Figure 4 *- Solar Collector Roof Mounting Options*

SOLAR COLLECTOR INSTALLATION COMPONENTS

Table 3 - Components for mounting Collectors to Roof

COLLECTOR MOUNTING COMPONENTS (supplied in Collector Installation kit)				COLLECTOR CONNECTING COMPONENTS (supplied in Collector Installation kit)			
Number of Collectors				Number of Collectors			
1	2	3		1	2	3	
2	-	-	MOUNTING RAIL SMALL 	-	1	2	UNION BR COMP ¾" - ¾"  (Kits contain twice the number needed)
-	2	-	MOUNTING RAIL MEDIUM 	1	1	1	UNION BR COMP ¾" – ½" 
-	-	2	MOUNTING RAIL LARGE 	1	1	1	AIR BLEED VALVE 
4	4	4	COLLECTOR MOUNTING STRAP 	1	1	1	HOT SENSOR SHEATH 
4	4	4	M8 BOLT, WASHER AND NUT (used to bolt collector mounting strap to mounting rail) 	1	1	1	HOT SENSOR LEAD 
4	8	12	COLLECTOR RETAINER 	1	1	1	BRASS NUT ½" BSP COMP KINCO 
4	8	12	M6 BOLT (CUP HEAD), WASHER AND NUT (used with collector retainers) 	1	1	1	COPPER OLIVE KINCO ½" 

INSTALLATION KITS PART NUMBERS

1 collector : R33202739
2 collectors : R33202740
3 collectors : R33202741

STANDARD INSTALLATIONS

Collector Mounting Component Pre Assembly for a Standard Installation

- Assemble the collector rail components as shown in ***Figure 5*** below.
- Only loosely attach the collector retainers to the rails.

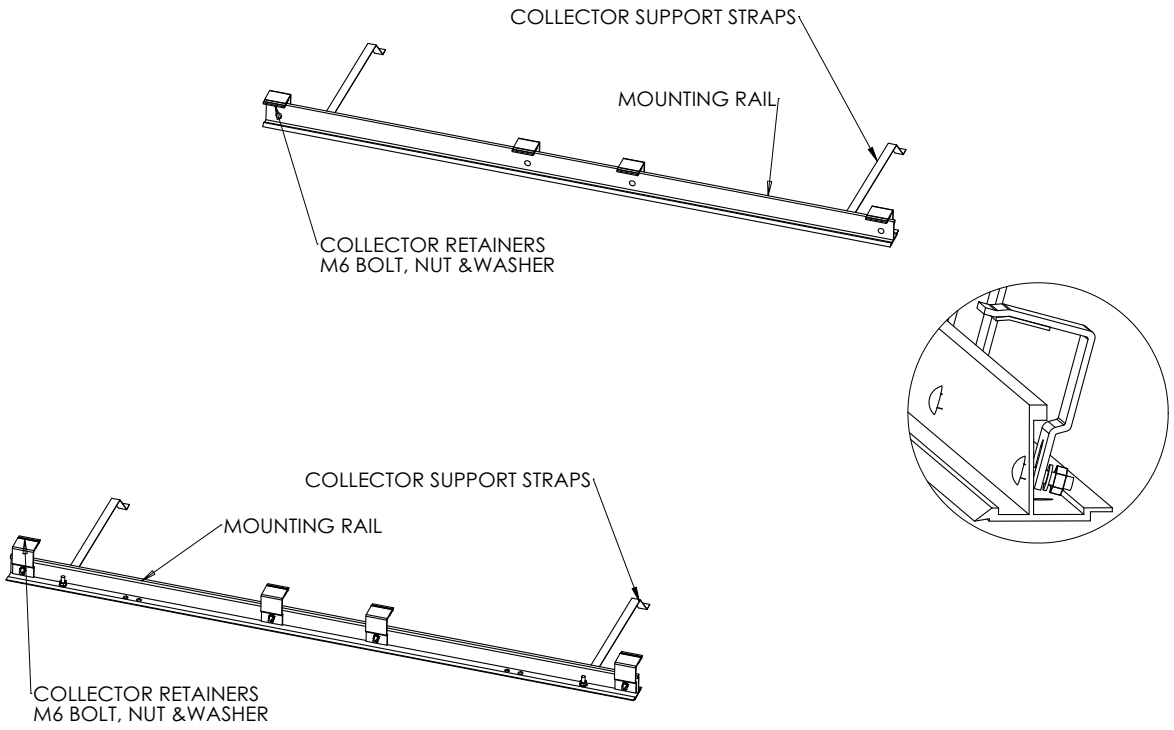


Figure 5 *- Collector Mounting Components*

NOTE

This installation is not suitable for use in cyclonic areas. For further details, please contact your local Rinnai Solar distributor.

STANDARD INSTALLATION CONTINUED

Fastening (Collectors to a Tiled Roof)

NOTE **This installation is not suitable for use in cyclonic areas. For further details, please contact your local Rinnai Solar distributor.**

- Position the lower collector mounting rail assembly so that the rail is angled to ensure the collectors have an 8 mm / collector rise.
- For aesthetic reasons it is best to mount as close as possible to the gutter.
- Attach the collector mounting straps to the rafter or truss under the roof tiles as shown in ***Figure 6.***

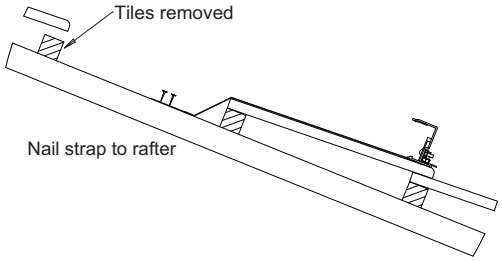


Figure 6 *- Mount Lower Collector Rail*

- Place the collector(s) onto the roof above the lower rail. If more than one collector is being installed then join them together using the compression fittings supplied.
- Push down on the collector retainers to clamp the collector and tighten the nuts as shown in ***Figure 7.***

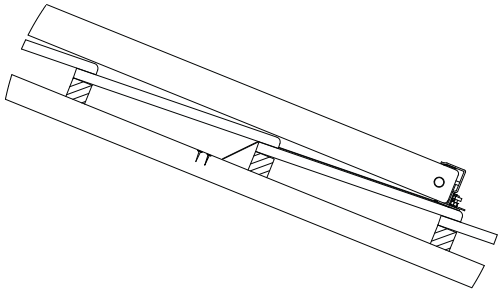


Figure 7 *- Mount collector on Roof*

- Position the upper collector rail above the collectors. Push down on the retainers to clamp the collector and tighten the nuts.
- Attach the collector mounting straps to the rafter or truss under the roof tiles as shown in ***Figure 8.***

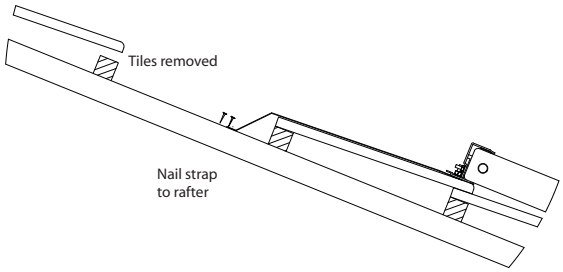


Figure 8 *- Attach Mounting Straps*

- Replace the roof tiles and ensure the collector is secure as shown in ***Figure 9.***

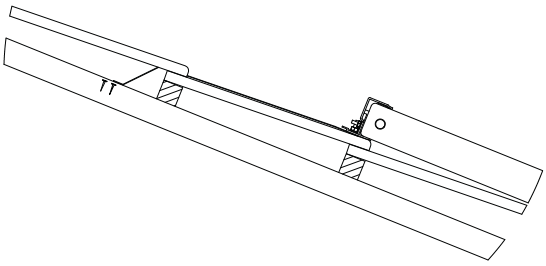


Figure 9 *- Replace Roof Tiles*

STANDARD INSTALLATION CONTINUED

Fastening (Collectors to a Metal Roof)

NOTE

This installation is not suitable for use in cyclonic areas. For further details, please contact your local Rinnai Solar distributor.

- Position the lower collector mounting rail assembly so that the rail is over the roof purlin and the rail is angled ensure the collectors have an 8 mm / collector rise. For aesthetic reason it is best to mount as close as possible to the gutter.
- Drill through the roof iron and purlin using the holes in the rail as a guide. Apply some silicone sealant down the holes to ensure no water leakage.
- Bolt the rail to the roof purlin using a suitable fastener as shown in ***Figure 10***.

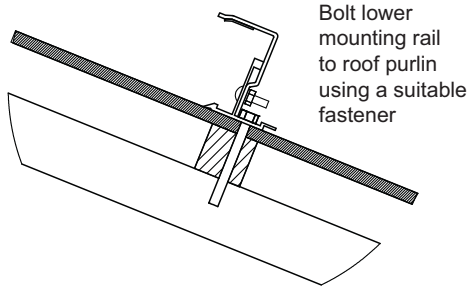


Figure 10 *- Mount Lower Collector Rail*

- Position the collector(s) onto the roof above the lower rail. If more than one collector is being installed, join them together using the compression fittings supplied.
- Push down on the collector retainers to clamp the collector and tighten the nuts.
- Place the upper collector mounting rail above the collectors. Push down on the collector retainers to clamp the collector and tighten the nuts.
- Drill through the roof iron and purlin using the upper mounting rail as a guide. Apply some silicone sealant down the holes to ensure no water leakage and secure with suitable fasteners as shown in ***Figure 11***. Alternatively the rail can be attached to the roof using the collector mounting straps.

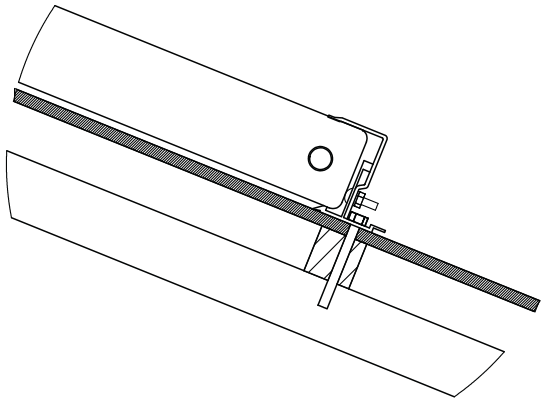


Figure 11 *- Mount Collector on Roof*

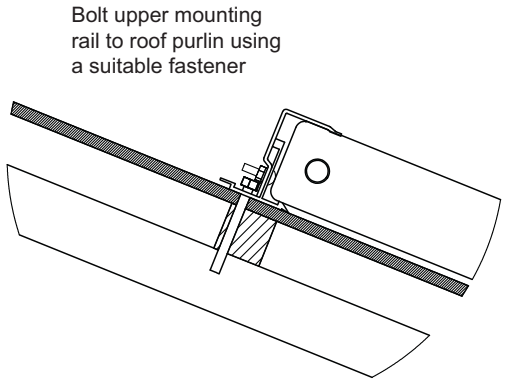
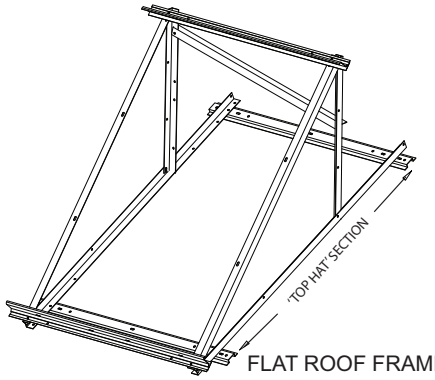


Figure 12 *- Attach Upper Rail*

INSTALLATION OF SOLAR E-FROST COLLECTORS

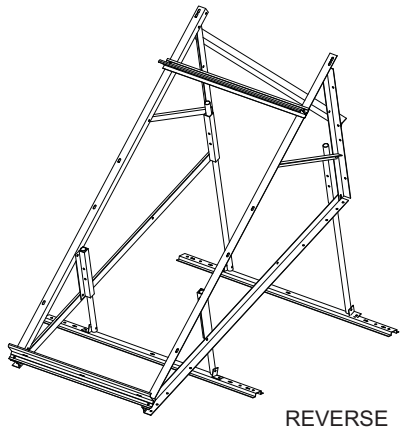
This installation is not suitable in cyclonic areas. For the correct frame for use in cyclone areas, contact your local Rinnai Solar distributor.

Table 4 - Framed Installations



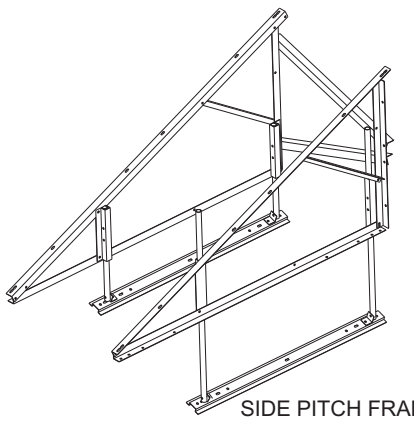
FLAT ROOF FRAME

- Assemble the flat roof frame as shown in the diagram supplied with the flat roof frame kit using the bolts, nuts and washers supplied.
- Position the frame on the roof ensuring that the 'top hat' sections are on suitable load bearing surfaces, and that the collectors have the required 8 mm per metre rise.
- Secure the frame to the roof in accordance with local building authority requirements using suitable fastening system.
- Attach the cylinder cradle and collector mounting rails to the frame. Loosely attach the collector retainer brackets to the collector mounting rails.
- Place the collector on the frame between the rails. If more than one collector is being installed join them together using the compression fittings supplied. Press down on the collector retainer to clamp the collector and tighten the nuts.



REVERSE PITCH FRAME

- Both the Reverse and Side Pitch Frames comprise of a flat roof frame kit and an additional kit with leg components.
- Assemble the flat roof frame with the exclusion of the top hat sections using the bolts, nuts and washers supplied.
- Attach the leg sockets to the trusses.
- Fit the long and short legs into the sockets and attach the pivot brackets to the ends. Use the long and short legs in the correct sockets depending on whether a Reverse Frame or a Side Pitch Frame is required.
- Fasten the pivot brackets to the top hat sections.
- Position the frame on the roof ensuring the cylinder and collector load will be adequately supported.
- Adjust the frame to the approximately the correct level. Temporarily clamp in place.
- If necessary, cut the excess from the legs so that they will not protrude into the area where the collector will be mounted.
- Secure the frame to the roof in accordance with local building authority requirements using a suitable fastening system.
- Once the frame is fully fastened to the roof, use a spirit level to adjust the frame height on the legs ensuring that the collectors have the required 8mm per metre rise.
- Drill the legs through one of the holes in the leg sockets and secure with the nuts and bolts supplied.
- Attach the collector mounting rails to the frame. Loosely attach the collector retainer brackets to the collector mounting rails.
- Place the collector on the frame between the rails. If more than one collector is being installed join them together using the compression fittings supplied. Press down on the collector retainer to clamp the collector and tighten the nuts.



SIDE PITCH FRAME

FRAMED INSTALLATION - CYCLONE FRAMES

Assemble cyclone frame and mount collectors as described in instructions provided with cyclone frame kit.

COMMERCIAL INSTALLATIONS

Commercial system comprise of multiple of 2-3 collectors joined together. ***Figure 13*** shows the roof spacing required for the collector sets.

Figure 14 shows the flow and return piping layout for multiple collector sets.

NOTE **That the combined length of flow and return piping for each collector set is approximately the same. This will result in even flow to all collectors and optimum performance.**

Pipe sizing shown in table below:

Table 5 - Commercial Pipe Sizing

PIPE AND PUMP SIZING CHART - COMMERCIAL ARRAYS											
Total collectors in array	**Up to**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Pipe sizing for solar flow and return manifolds		DN20	DN20	DN25	DN32	DN32	DN32	DN40	DN40	DN40	DN50
Pump		20-60B	20-60B	20-60B	25-80B	25-80B	25-80B	25-80B	25-80B	25-80B	25-80B
	Maximum pipe run in collector circuit (m)										
Pump speed	1	30	-	-							
	2	60	40	20							
	3	100	100	100	100	100	100	100	100	100	100

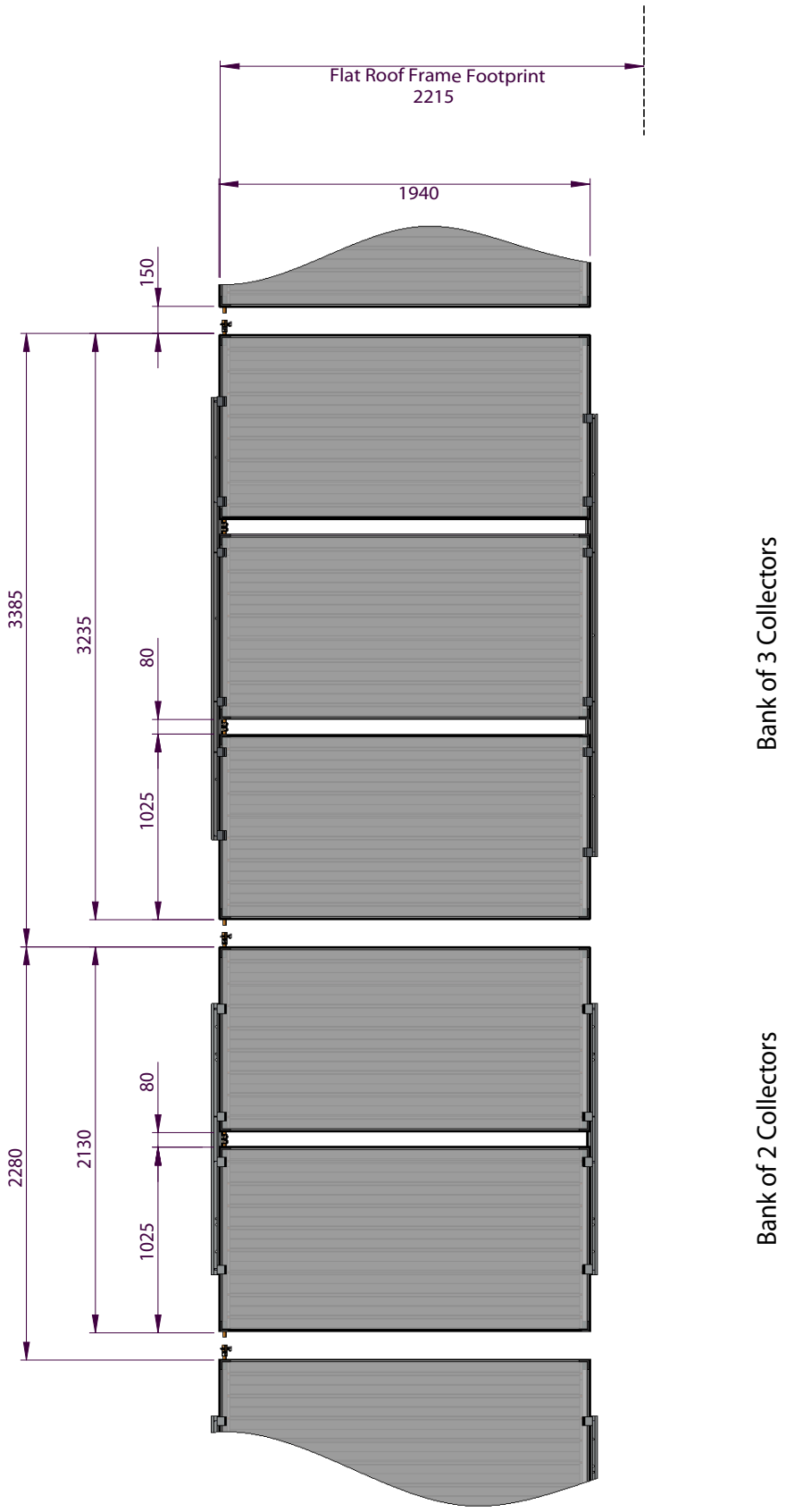


Figure 13 *- Commercial Collectors Installation*

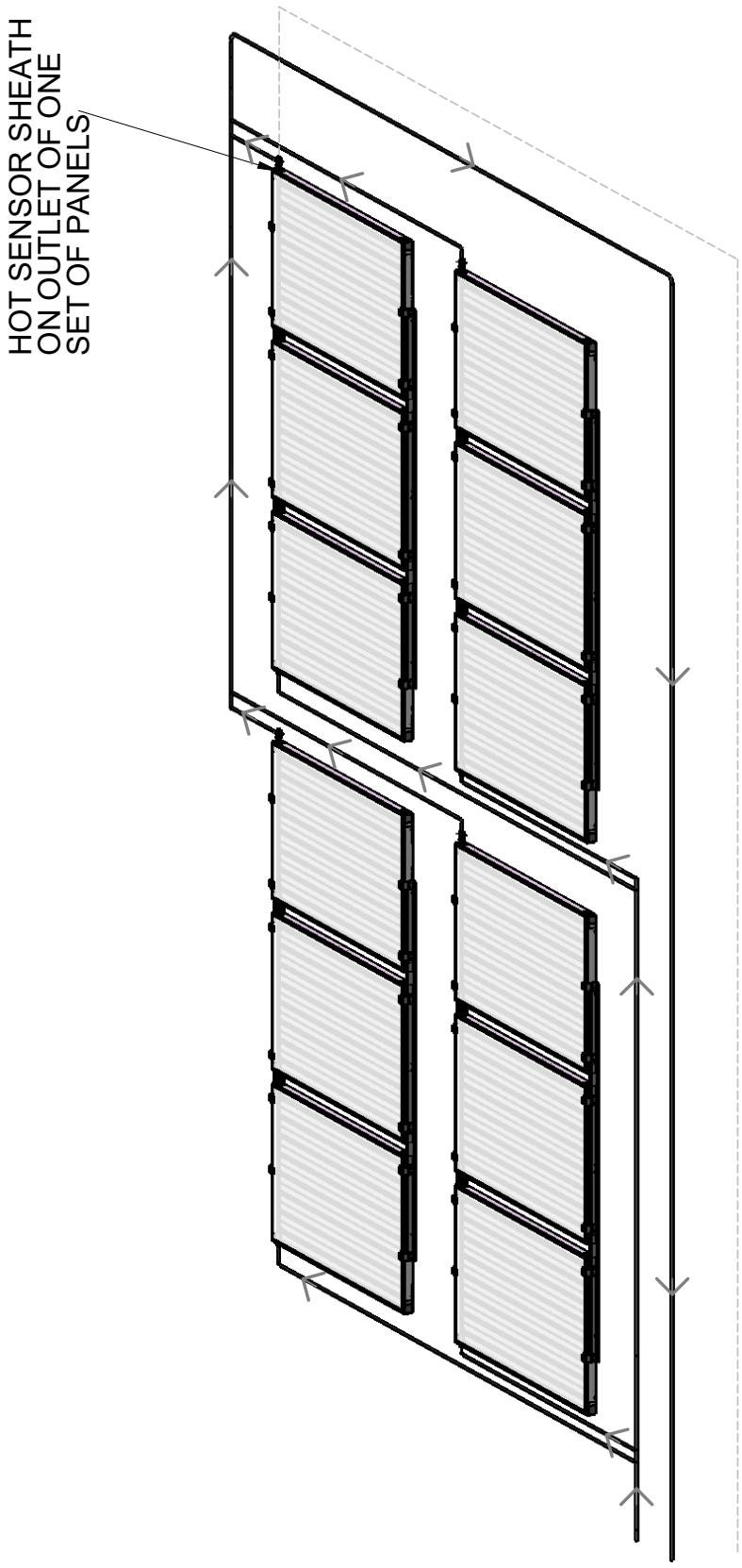


Figure 14 *- Flow and Return Lines for Commercial Systems*

COLLECTOR FITTINGS INSTALLATIONS

Connect the fittings to the collectors as shown in the diagrams below:

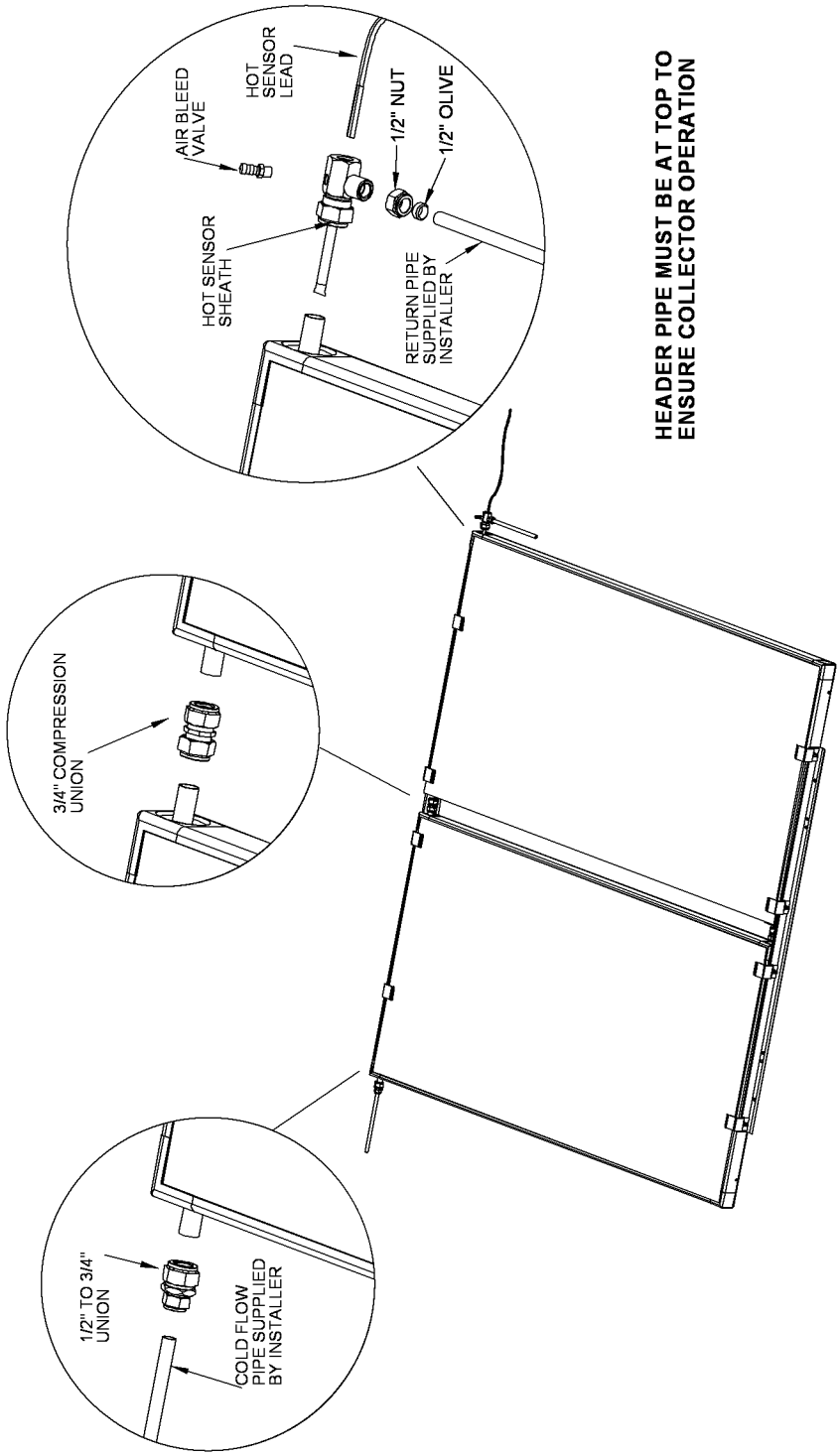


Figure 15 *- Collector Fitting Details (E-Frost Collectors)*

WARRANTY INFORMATION

E-Frost Solar Collector Warranty

Minimum Temperature Variation to Standard Warranty

The E-Frost Solar Collector is warranted for use with Rinnai Solar Split Systems in Frost Zones, other than Alpine areas, as defined in the Standard Collector warranty conditions, to a minimum temperature of -12°C.

The E-Frost Collector is only compatible with Rinnai Split (Pumped) Solar Systems. It is not compatible with any other type of System (including Close Coupled). Any incompatible installation will void all warranty.

All other warranty features and conditions remain as defined in the Rinnai Hot Water warranty booklet. www.rinnai.com.au

Rinnai

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