

**Split Solar Hot Water Systems**  
**Enduro SP200B, Enduro XL SP250B and**  
**Excelsior SP200BEX Collectors**  
Installation Manual

**Rinnai**



Congratulations on the purchase of your Rinnai Solar Hot Water System. We trust you will have many years of comfort and enjoyment from your appliance.



## **BEFORE USING THIS APPLIANCE**

**Before proceeding with the operation or installation read this manual and any other manuals supplied with the system thoroughly and gain a full understanding of the system, to ensure safe and correct use.**

This manual covers the installation of Enduro SP200B, Enduro XL SP250B and Excelsior SP200BEX solar collectors as part of complete solar hot water systems.

Full instructions on the installation of the complete system can be found in the “Operation / Installation Manual - Rinnai Split Solar Hot Water Systems”.

All information and warnings in the “Operation / Installation Manual - Rinnai Split Solar Hot Water Systems” are applicable to this installation.

This appliance must be installed in accordance with:

- Manufacturer's Installation Instructions
- Current AS/NZS 3000, AS/NZS 3500 & AS/NZS 5601
- Plumbing Code of Australia (PCA)
- Local Regulations and Municipal Building Codes including local OH&S requirements

The solar hot and cold pipes between the solar storage tank and the solar collector(s) must be suited to the high water temperatures and pressures that may occur. Fittings used to join these pipes must use metallic materials to achieve sealing. Plastic pipe and fittings must not be used as they are not suitable for the high temperatures and pressures that may occur.

Failure of plastic pipe and/or fittings can lead to the release of high temperature water and cause severe flooding and water damage.

This appliance must be installed, maintained and removed by an Authorised Person.

For continued safety of this appliance it must be installed and maintained in accordance with the manufacturer's instructions.

Not suitable as a pool or spa heater





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# SPECIFICATIONS

## SOLAR COLLECTORS

	ENDURO SP200B	ENDURO XL SP250B	Excelsior SP200BEX
Type	Flat plate	Flat plate	Flat plate
Waterways	Copper	Copper	Copper
Absorber	Aluminium	Aluminium	Copper
Selective Surface	High Performance	High Performance	Sputtered Titanium Oxide
Maximum Operating Pressure	1000 kPa	1000 kPa	1000 kPa
Casing Material	Aluminium	Aluminium	Aluminium
Overall Dimensions (L x W x H) (mm)	1960 x 1050x 80	1960 x 1290 x 80	1960 x 1050x 80
Weight empty (kg).	40	48	40
Water volume (litres)	1.95	2.4	2.0
Number of risers	9	10	10
Potential Solar Output at PTR relief conditions (kW)	1.25 kW	1.4 kW	1.25 kW
Frost Protection	<p>The Rinnai solar hot water warranty booklet specifies the locations and conditions that apply for flat plate collectors to be warranted against frost damage.</p> <p>For full warranty terms, conditions and exclusions refer to the Rinnai Warranty Booklet for solar hot water. The warranty booklet is available at <a href="http://www.rinnai.com.au">www.rinnai.com.au</a>.</p>		

# INSTALLATION INFORMATION

## REGULATIONS AND OCCUPATION HEALTH AND SAFETY (OH&S)

Installation and commissioning must be performed by authorised persons. Rinnai solar systems 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/NZS 3500 National Plumbing and Drainage
- Building Codes of Australia
- Local Occupational Health and Safety (OH&S) regulations



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.

## WATER QUALITY

The water quality of most public supplies is suitable for the water heating system. The water quality from bore wells is generally unsuitable for the water heating system. Refer to separate 'Warranty Terms and Conditions' document for water quality parameters and how they affect the warranty conditions. If in doubt about the water quality, have it checked against the parameters listed in the warranty conditions. The system is not suitable as a pool or spa heater.

## SYSTEM ORIENTATION AND INCLINATION

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

For Australian installations, solar collectors should face the equator (True North) for optimum performance. Installing solar collectors facing up to 45 degrees away from North (between North-East and North-West) will reduce efficiency by approximately 5%.

For Australian installations the inclination of solar collectors should be the same as the latitude of the site for optimum performance. Inclinations within 20 degrees of the latitude of the site will reduce efficiency by approximately 5%. Most roofs in Australia have a slope of between 20° and 25° and provide an appropriately angled mounting surface.

**Installers must ensure they comply with relevant local regulations regarding solar collector inclination and orientation.**

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

Latitudes of Australian Cities



## ROOF MOUNTING OPTIONS

For roofs with a slope of 10° or less a flat roof frame must be used.

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).

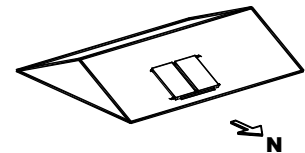
The roof mounting option must be appropriate for the wind loading that is likely in the installed location. See the section 'Mounting Location Suitability' on page 10.

For buildings higher than 10 metres the specifications for securing solar collectors to the building structure need to be determined on a case by case basis for each building by a person qualified to do so in accordance with the Building Code of Australia (BCA). Such specifications relate to the type of fastenings, the number of fastenings and their embedment into the building structure. They are determined from factors including the geographical location and topography, the prevailing wind conditions, building dimensions, rooftop form and structural materials, and the intended location of the solar panels relative to building internal, edge and corner zones. The BCA references AS1170.2 "Structural Design Actions Part 2: Wind Actions", AS3600 "Concrete Structures" and AS4100 "Steel Structures" in relation to these specifications.

A solution may be provided using either kit DDHRKIT2 (2 collector) or DDHRKIT3 (3 collector), in accordance with the instructions in the Rinnai document "High Rise Roof Mounting Frame Installation Instructions (Part Number 15401103)

### Standard Installation

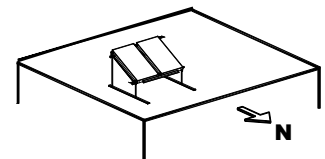
Installation details are in the section 'Collector Installation' on page 14. This type of installation is not suitable for use on roofs over 10 m high.



### Flat Roof Frame

For use on a flat roof or where the roof pitch is too low. This type of installation is not suitable for use on roofs over 10 m high.

Additional information is provided in the roof frame manual provided with the frame.

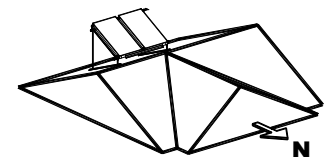


### Reverse Pitch Frame

These comprise of a Split System flat roof frame and a side/reverse pitch kit. This type of installation is not suitable for use on roofs over 10 m high.

They can be used when the collectors need to be installed in the reverse direction to the direction the roof is facing. For example, installing on a South facing roof enables the collectors to be oriented to the North.

Additional information is provided in the roof frame manual provided with the frame.

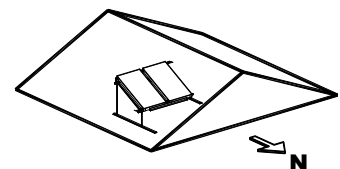


### Side Pitch Frame

These comprise of a Split System flat roof frame and a side/reverse pitch kit. This type of installation is not suitable for use on roofs over 10 m high.

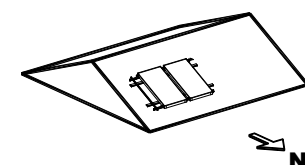
They can be used when the collectors need to be installed side on to the direction the roof is facing. For example, installation on an East or West facing roof enables the collectors to be oriented to the North.

Additional information is provided in the roof frame manual provided with the frame.



### Cyclone Frame

Additional information is provided in the manual provided with the cyclone frame.



## Mounting Location Suitability

The following table indicates which installation locations are suitable for different roof mounting options for Rinnai split solar hot water systems.

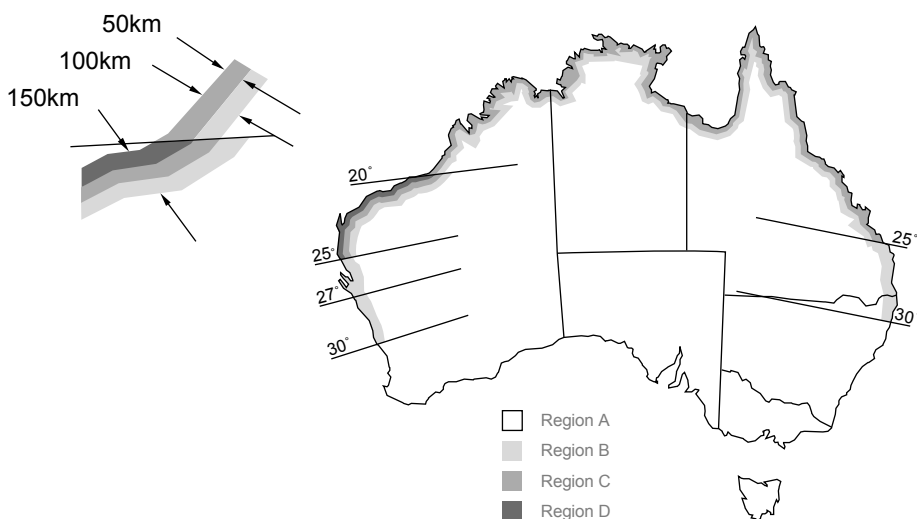
Wind Region	Region A			Region B			Region C		Region D	
Roof Area (see page "Roof Area" on page 11 for explanation)	Area 1	Area 2	Area 3	Area 1	Area 2	Area 3	Area 1	Areas 2 & 3	Area 1	Areas 2 & 3
1,2 or 3 collector(s) on a pitched roof	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
1 or 2 collector(s) on a cyclone frame.	✓	✓	✓	✓	✓	✗	✓*	✗	✓*	✗
1,2 or 3 collector(s) on a flat roof frame	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
1 or 2 collector(s) on a reverse or side pitch frame	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗

\*SP200B or SP200BEX only.

See cyclone frame manual for full details of mounting location suitability in cyclone areas.

## Wind Region

Australia has been categorised into 4 wind regions. Each region has varying wind load parameters such as wind speed and wind direction multipliers. The diagram below illustrates the region locations. For more information on how to classify site specific wind loading parameters see AS/NZS 1170.2 - Wind Actions, or consult a certified structural engineer.

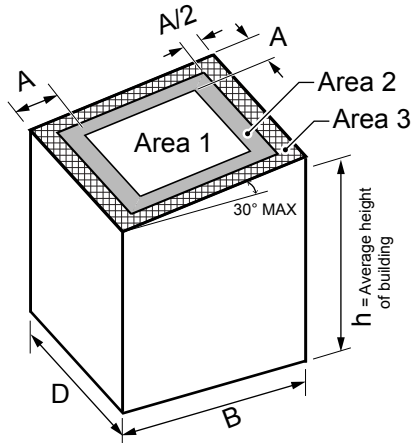


Region A	Region B		Region C		Region D
Callytharra Springs Gascoyne Junction Green Head Kununurra Lord Howe Island Morawa Toowoomba Wittanoom Bourke	Adelaide River Atherton Biloela Brisbane Christmas Island Collinsville Corindi Geraldton	Ivanhoe Kyogle Marble Bar Mullewa Norfolk Island Torres Strait Islands Wyndham	Borroloola Broome Bundaberg Burketown Cairns Cocos Islands Darwin Derby Karumba	Mackay Mareeba Millstream Moreton Nhulunbuy Normanton Rockhampton Townsville	Carnarvon Exmouth Karratha Onslow Port Hedland

Indicative selection of towns in Regions A,B,C &D

## Roof Area

As per AS/NZS 1170.2, domestic pitched and flat roof areas are classified into working areas. The diagram below illustrate these areas.



**A = minimum of  $0.2 \times B$ ,  $0.2 \times D$  and  $1 \times h$**

Area 1 - Internal of roof.

Area 2 - Intermediate area, wind pressures increased by 1.5 times.

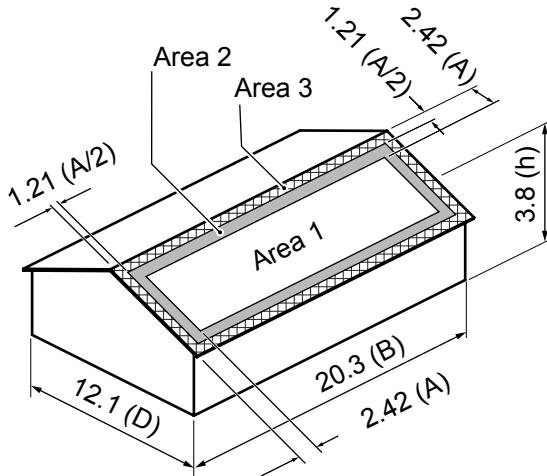
Area 3 - Roof edge including corners, wind pressures increased by 3 times. For installations in roof area 3, a minimum of 0.5m from the edge of the roof is recommended.

Height limit for all installations is 10 metres.

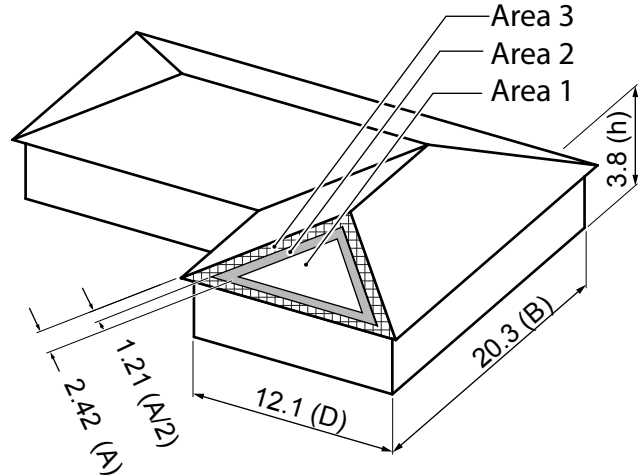
For more information on how to classify specific roof area installations, or for building heights exceeding 10 metres see AS/NZS1170.2 or consult a certified structural engineer.

Some examples are shown below.

**Example 1**



**Example 2**



In both examples :

$$A = \min \text{ of } \begin{aligned} &0.2 \times 20.3 = 4.06 \\ &0.2 \times 12.1 = 2.42 \\ &1 \times 3.8 = 3.8 \end{aligned}$$

$$\rightarrow A = 2.42$$

$$A/2 = 1.21 \text{ m}$$

## WATER PIPES, FITTINGS AND INSULATION



The solar hot and solar cold pipes between the solar storage tank and the solar collectors must be suited to the high water temperatures and pressures that may occur. As such, plastic pipe must not be used. Components used to join pipes must use metallic materials to achieve sealing. The collector flow and return pipes should be 15 mm copper tube and should be suitably insulated along their full length.



To meet the separation distance requirements of AS/NZS 3500.4, the 5V DC sensor leads shall maintain a separation distance of not less than 25mm from any above ground water piping.

Flow and return pipes must not contact other services including cold water pipes. 100mm minimum clearance must be provided, or otherwise as required in AS/NZS 3500.

All hot water pipework must be insulated with sealed polyethylene foamed or equivalent insulation to optimise performance and energy efficiency, and to protect against frost damage. Such insulation may also be mandatory under local regulations.

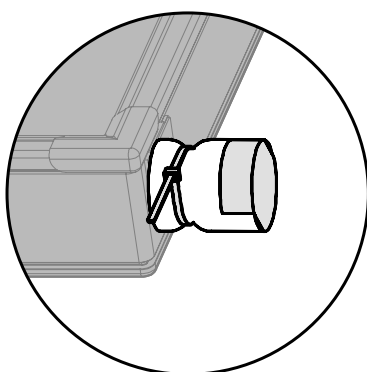
Rinnai recommend insulation to achieve at least the R value shown in the following table.

Location of Installation	Pipes on Roof	Pipe between tank and gas booster
<ul style="list-style-type: none"> <li>CER solar zone 4</li> <li>Any other area prone to frost conditions.</li> </ul>	$R = 1.0 \text{ K.m}^2/\text{W}$	$R = 0.6 \text{ K.m}^2/\text{W}$
<ul style="list-style-type: none"> <li>All other areas</li> </ul>	$R = 0.6 \text{ K.m}^2/\text{W}$	$R = 0.6 \text{ K.m}^2/\text{W}$

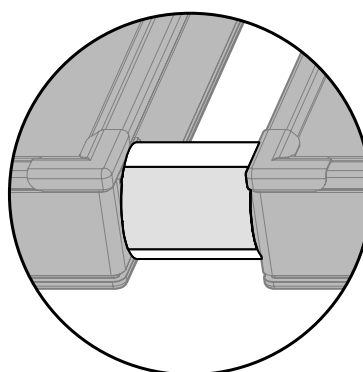
With the exception of solar collector flow and return pipes, water pipe sizing should be performed in accordance with AS/NZS 3500. All external pipework MUST be insulated to prevent frost damage.

The suggested maximum combined lengths of the solar flow and return pipes is 40 metres. Please refer to the system installation manual supplied with the pump kit for the maximum pipe length for the specific pump kit.

All supplied insulation materials must be fitted as shown to minimise heat losses. In frost prone areas this insulation will also protect against frost damage.



Insulation of cap, using insulation, tape and cable tie.

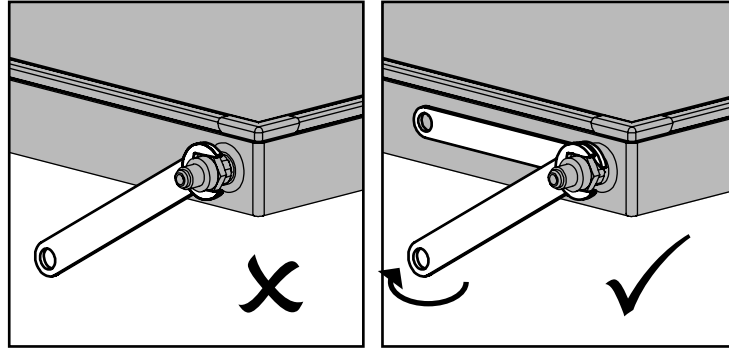


Insulation of barrel union with, insulation and tape

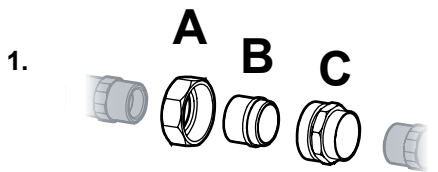
## CONNECTING FITTINGS TO COLLECTOR



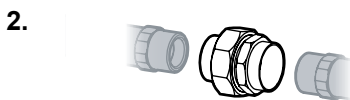
When connecting fittings to collectors ensure that the flats at the end of the collector header are held in place with one spanner, while another spanner is used to tighten fitting. Collector damage or leaks may occur if this isn't done correctly.



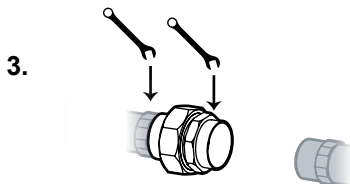
### Connecting Barrel Unions



Identify the 3 components of the barrel union as A, B or C

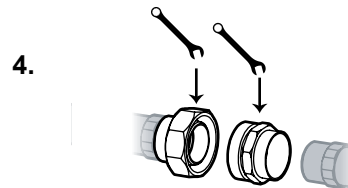


Fasten the barrel union components together.

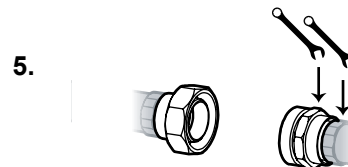


Attach the collector header to the entire barrel union with component B screwing onto the threaded end of the header.

Tighten with two spanners in the places indicated in the diagram above.

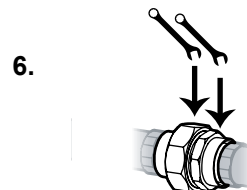


Separate component C from components A and B using two spanners in the places indicated in the diagram above.



Fasten component C to the header of the 2nd collector.

Tighten with two spanners in the places indicated in the diagram above.



Join the barrel union components together.

Tighten with two spanners in the places indicated in the diagram above.

# COLLECTOR INSTALLATION

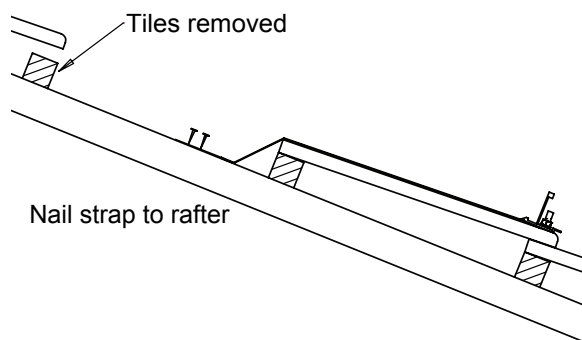
## FASTENING COLLECTORS TO A TILED ROOF



This type of installation is not suitable for use on roofs over 10 m high.

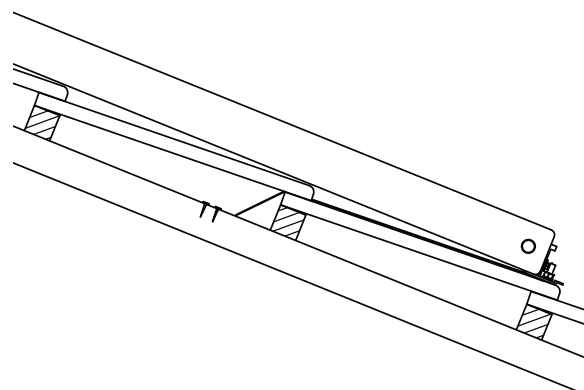
This type of installation is not suitable for use in cyclonic areas.

Attach the collector mounting straps to the rafter or truss under the tiles.



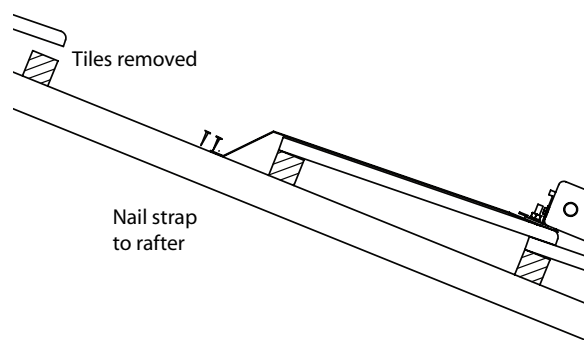
Place the collector(s) onto the roof above the lower rail. If more than one collector is being installed then join them together using the barrel unions supplied.

Using the supplied self drilling screws, fasten the rail to the collector, through the square holes in the rail as shown in the relevant diagram on page 16 to 23. Do not fasten in other locations as damage to the collector header pipe may occur. Be careful to adequately tighten the screws to ensure the connection is secure without stripping the threads in the collector case.

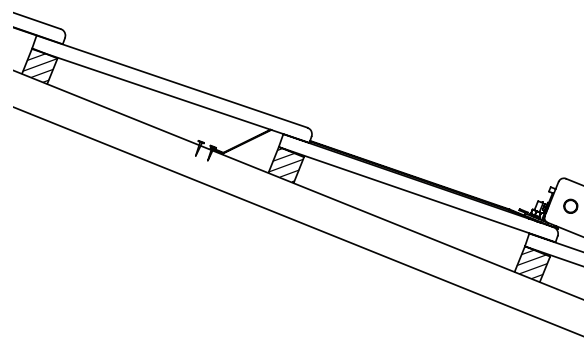


Position the upper collector rail above the collectors. Fasten the rail to the collector, through the square holes in the rail using the supplied self drilling screws.

Attach the collector mounting straps to the rafter or truss under the tiles.



Replace the tiles and ensure the collector is secure, and the roof is weather tight.



**FASTENING COLLECTORS TO A METAL ROOF**

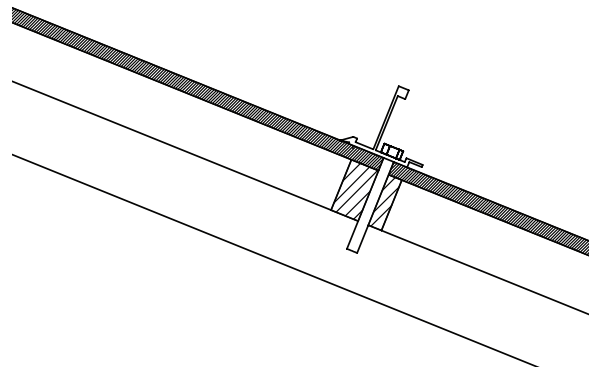
This type of installation is not suitable for use on roofs over 10 m high.

This type of installation is not suitable for use in cyclonic areas.

Position the lower collector mounting rail assembly so that the rail is over the roof purlin.

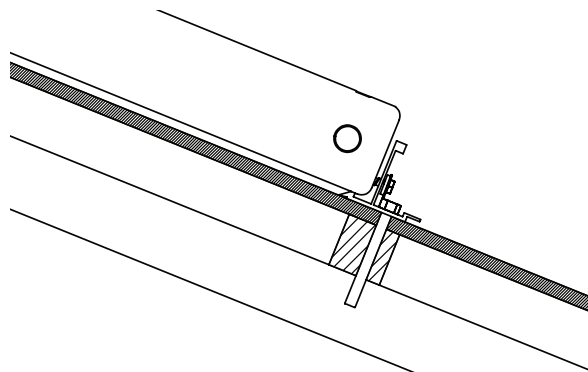
Drill through the roof iron and purlin using the holes in the rail as a guide. Apply some silicone sealant down the holes to ensure no water leakage.

Bolt the rail to the roof purlin using a suitable fastener.



Position the collector(s) onto the roof above the lower rail. If more than one collector is being installed, join them together using the barrel unions supplied.

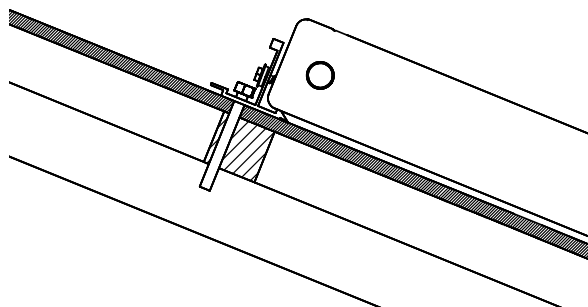
Using the supplied self drilling screws, fasten the rail to the collector, through the square holes in the rail as shown in the relevant diagram on page 16 to 23. Do not fasten in other locations as damage to the collector header pipe may occur. Be careful to adequately tighten the screws to ensure the connection is secure without stripping the threads in the collector case.



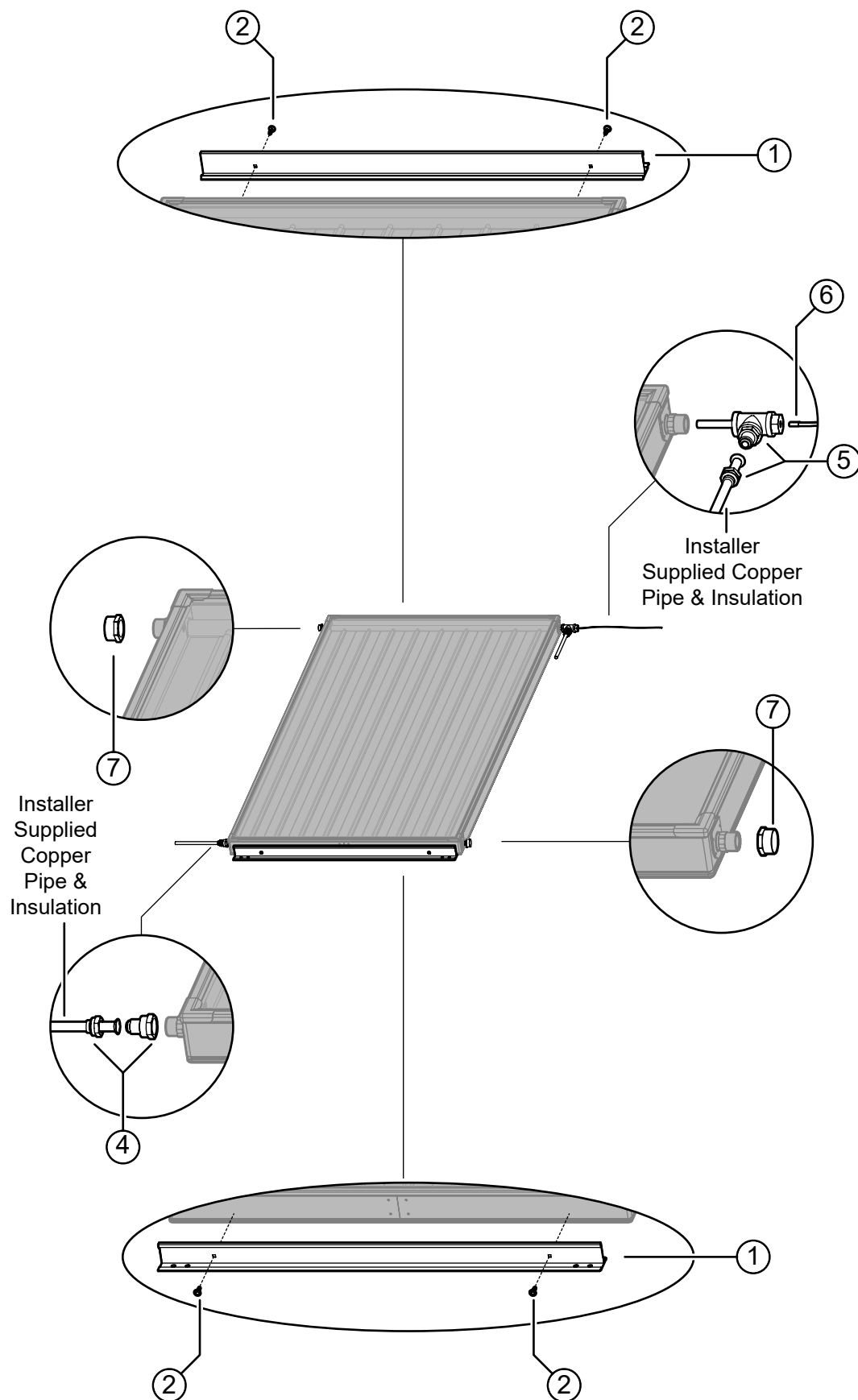
Position the upper collector rail above the collectors. Fasten the rail to the collector, through the square holes in the rail using the supplied self drilling screws.

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.

Alternatively the rail can be attached to the roof using the collector mounting straps.







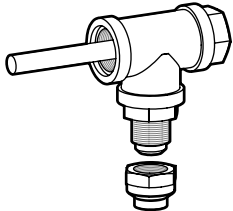
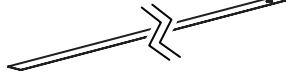


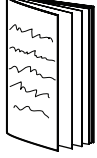


1 SP200B, SP250B OR SP200BEX INSTALLATION KITS - BIKSP1COLL

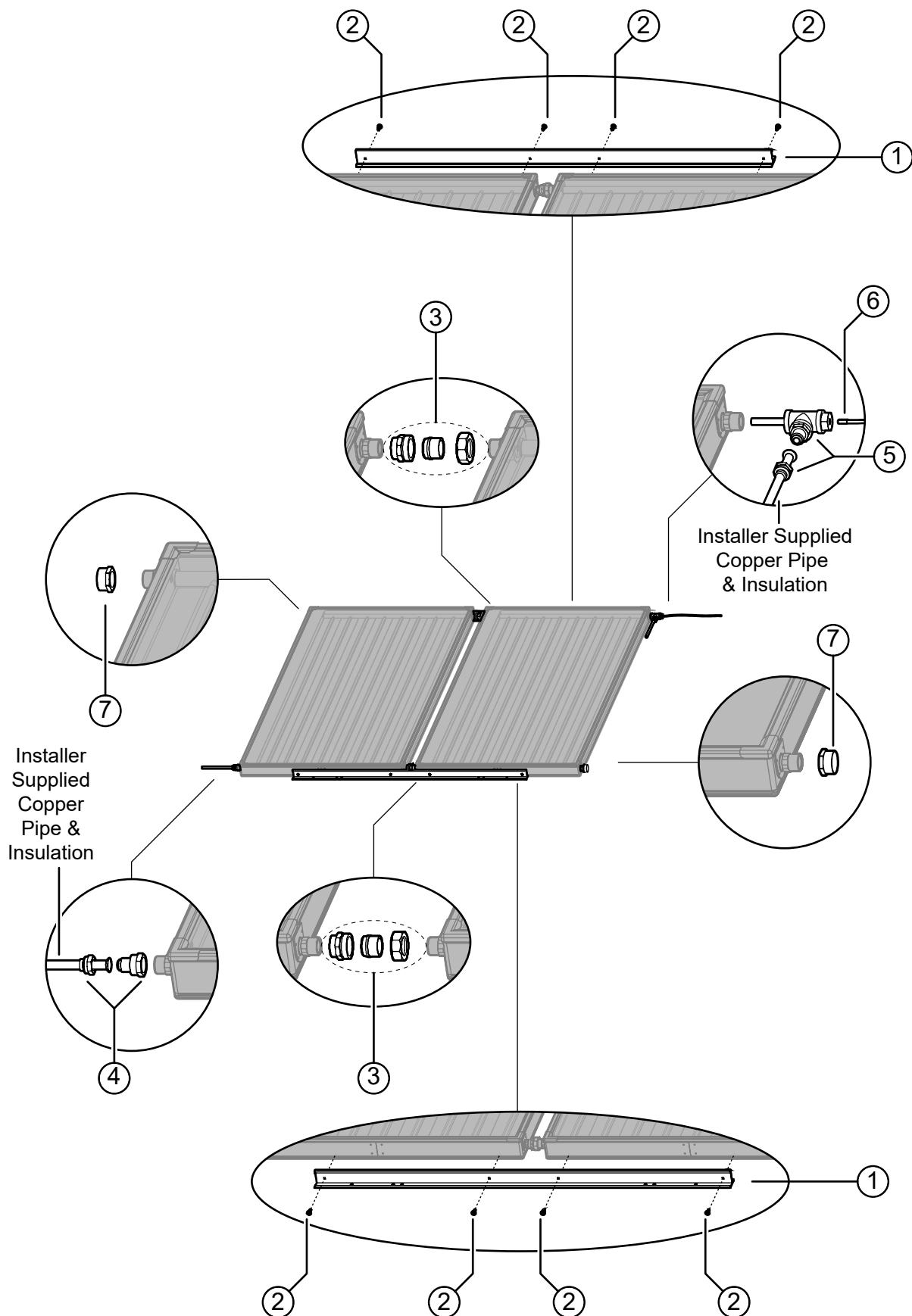




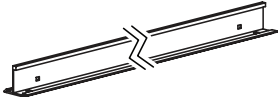




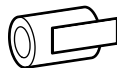
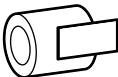


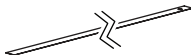
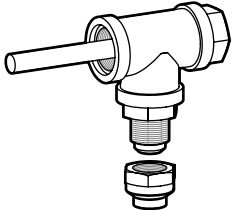


**1 SP200B, SP250B OR SP200BEX INSTALLATION KITS - BIKSP1COLL**

	Qty BIKSP1COLL	Item / Part Number		Qty BIKSP1COLL	Item / Part Number
①	2	 Mounting Rail Small (1.0 m) 14201196	⑦	2	 Cap 16001011
②	4	 Screw Self Drilling with Seal 12-11 x 25 mm 22601094	-	2	 Insulation and Foil Tape * 14601216 For use with Caps
④	1	 Union 3/4 - 1/2 32201736	-	2	 Cable Tie 39601035 to fasten insulation to cap
⑤	1	 Hot Sensor Assembly 10204715	-	4	 Collector Mounting Straps 12401012
			-	4	 M8 Bolt, Washer and Nut Bolt 22601052 (Used to fasten collector mounting straps to rail) Washer 17401072 Nut 16801062
⑥	1	 Hot Sensor Lead (20m) 31002715	-	1	 Solar Collector Installation Manual 15401113

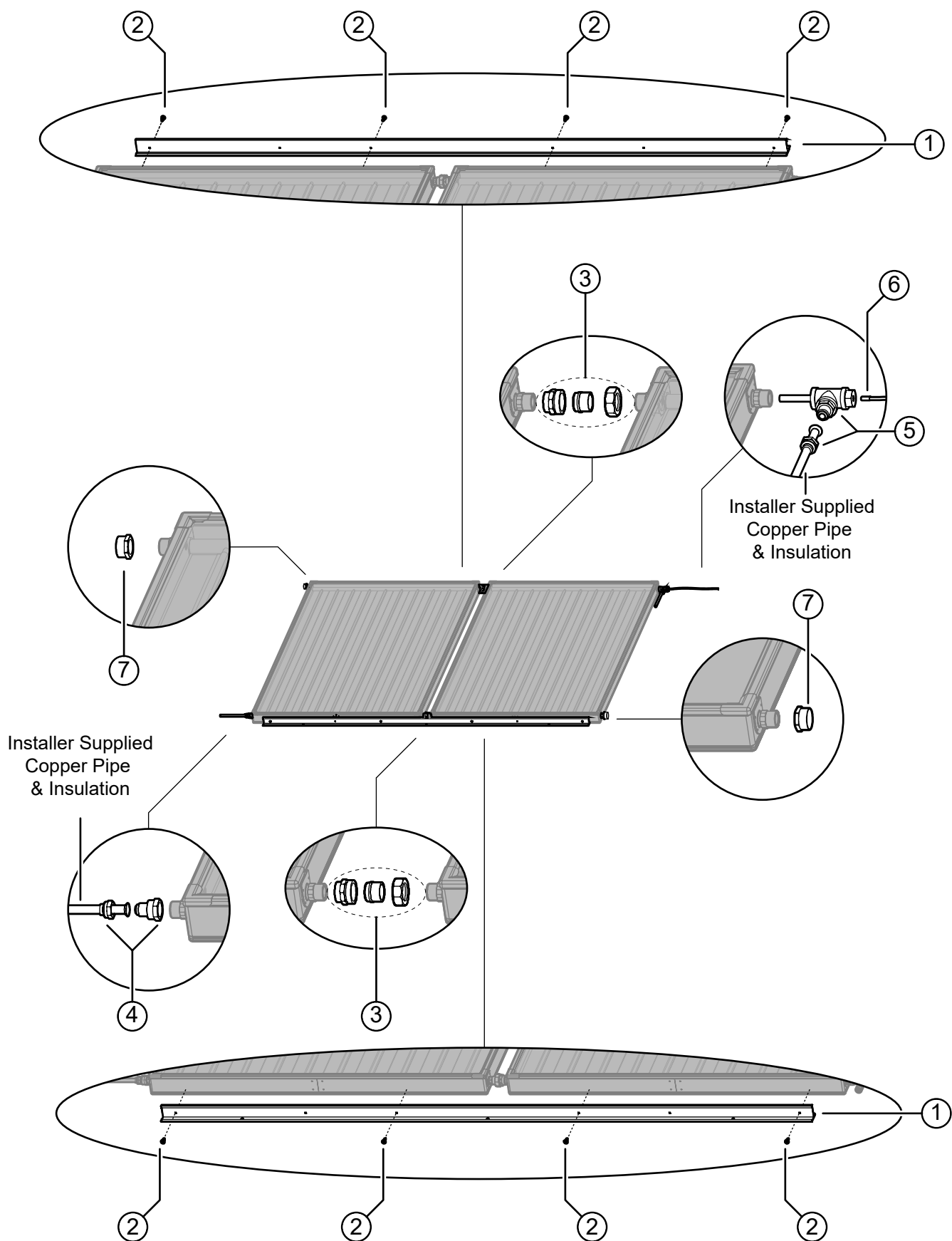
2 SP200B OR SP200BEX INSTALLATION KITS - BIKSP2COLL





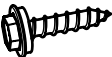


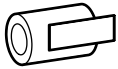
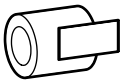


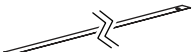
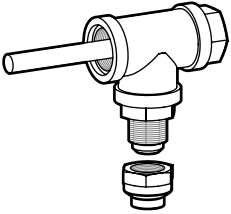


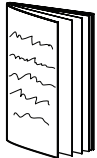
**2 SP200B OR SP200BEX INSTALLATION KITS - BIKSP2COLL**

	Qty BIKSP2COLL	Item / Part Number		Qty BIKSP2COLL	Item / Part Number
①	2	 Mounting Rail Medium (1.5 m) 14201197	⑥	1	 Hot Sensor Lead (20m) 31002715
②	8	 Screw Self Drilling with Seal 12-11 x 25 mm 22601094	⑦	2	 Cap 16001011
③	2	 Barrel Union $\frac{3}{4}$ - $\frac{3}{4}$ 32201105	-	2	 Insulation and Foil Tape * 14601216 For use with Caps
-	2	 Insulation and Foil Tape 14601217 For use with Barrel Unions	-	2	 Cable Tie to fasten insulation to cap 39601035
④	1	 Union $\frac{3}{4}$ - $\frac{1}{2}$ 32201736	-	4	 Collector Mounting Straps 12401012
⑤	1	 Hot Sensor Assembly 10204715	-	4	 M8 Bolt, Washer and Nut Bolt 22601052 (Used to fasten collector mounting straps to rail) Washer 17401072 Nut 16801062
			-	1	 Solar Collector Installation Manual 15401113

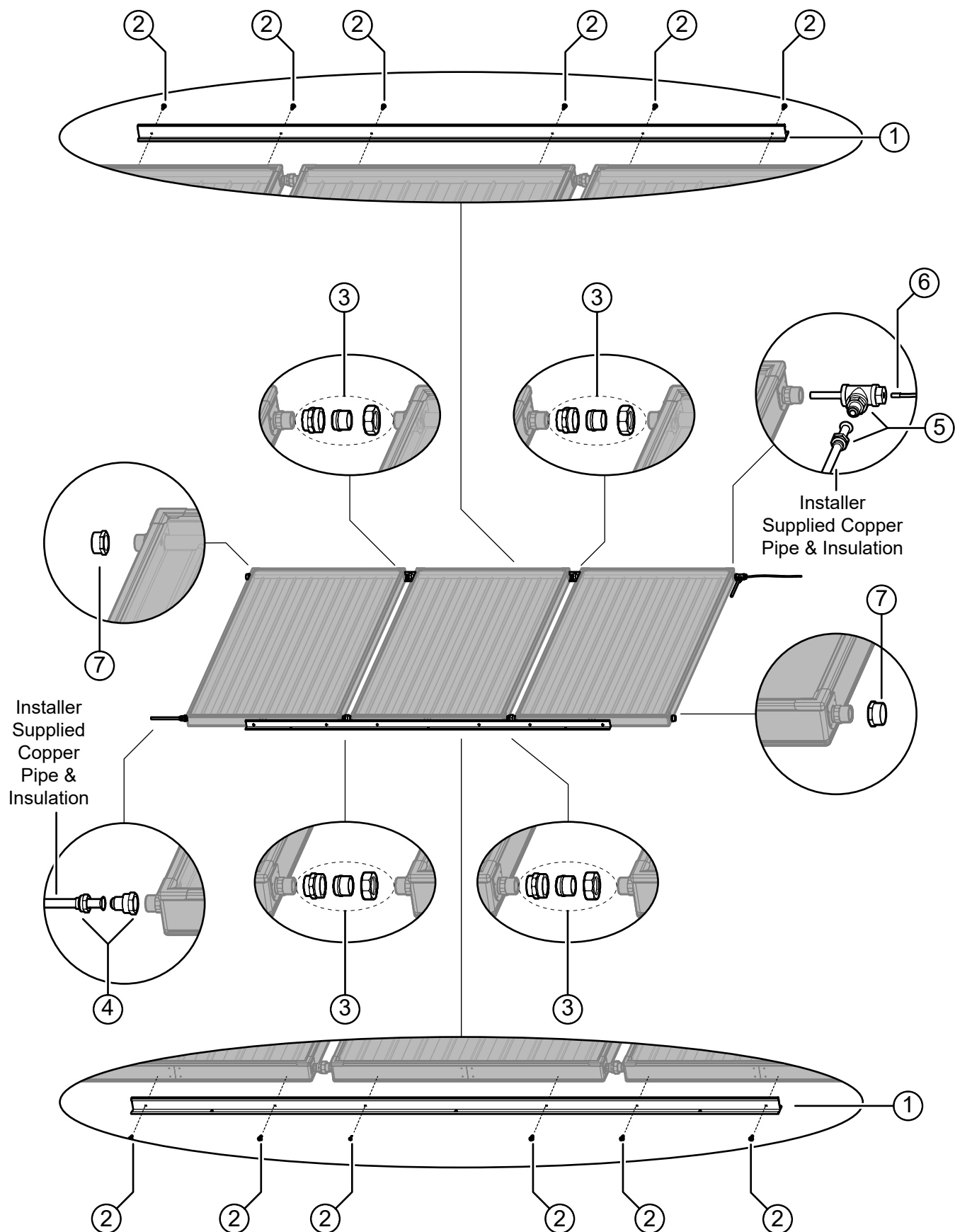
2 SP250B INSTALLATION KITS - BIKSP2COLLXL



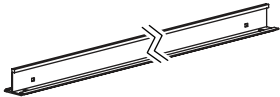




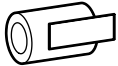
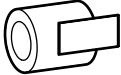


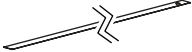
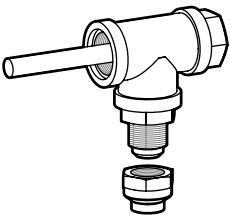

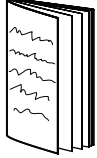
## 2 SP250B INSTALLATION KITS - BIKSP2COLLXL

	Qty BIKSP2COLLXL	Item / Part Number		Qty BIKSP2COLLXL	Item / Part Number
①	2	 Mounting Rail Large (2.5 m) 14201198	⑥	1	 Hot Sensor Lead (20m) 31002715
②	8	 Screw Self Drilling with Seal 12-11 x 25 mm 22601094	⑦	2	 Cap 16001011
③	2	 Barrel Union $\frac{3}{4}$ - $\frac{3}{4}$ 32201105	-	2	 Insulation and Foil Tape * For use with Caps 14601216
-	2	 Insulation and Foil Tape For use with Barrel Unions 14601217	-	2	 Cable Tie to fasten insulation to cap 39601035
④	1	 Union $\frac{3}{4}$ - $\frac{1}{2}$ 32201736	-	4	 Collector Mounting Straps 12401012
⑤	1	 Hot Sensor Assembly 10204715	-	4	 M8 Bolt, Washer and Nut Bolt 22601052 (Used to fasten collector mounting straps to rail) Washer 17401072 Nut 16801062
⑥	1	 Hot Sensor Lead (20m) 31002715	-	1	 Solar Collector Installation Manual 15401113

### 3 SP200B OR SP200BEX INSTALLATION KITS - BIKSP3COLL



## 3 SP200B OR SP200BEX INSTALLATION KITS - BIKSP3COLL

	Qty BIKSP3COLL	Item / Part Number		Qty BIKSP3COLL	Item / Part Number
①	2	 Mounting Rail Large (2.5 m) 14201198	⑥	1	 Hot Sensor Lead (20m) 31002715
②	12	 Screw Self Drilling with Seal 12-11 x 25 mm 22601094	⑦	2	 Cap 16001011
③	4	 Barrel Union $\frac{3}{4}$ - $\frac{3}{4}$ 32201105	-	2	 Insulation and Foil Tape * 14601216 For use with Caps
-	4	 Insulation and Foil Tape 14601217 For use with Barrel Unions	-	2	 Cable Tie to fasten insulation to cap 39601035
④	1	 Union $\frac{3}{4}$ - $\frac{1}{2}$ 32201736	-	4	 Collector Mounting Straps 12401012
⑤	1		-	4	 M8 Bolt, Washer and Nut Bolt 22601052 (Used to fasten collector mounting straps to rail) Washer 17401072 Nut 16801062
			-	1	 Solar Collector Installation Manual 15401113

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Fax: (03) 9271 6622

## **National Help Line**

Tel: 1300 555 545\* Fax: 1300 555 655  
*Monday to Friday, 8.00 am to 5.00 pm EST.*

## **After Hours Hot Water Service Line**

Tel: 1800 000 340\*

*\*Cost of a local call higher from mobile or public phones.*

For further information visit **[www.rinnai.com.au](http://www.rinnai.com.au)**  
or email **[enquiry@rinnai.com.au](mailto:enquiry@rinnai.com.au)**

Rinnai has a Service and Spare Parts network with personnel who are fully trained and equipped to give the best service on your Rinnai appliance. If your appliance requires service, please call our National Help Line. Rinnai recommends that this appliance be serviced every 3 years.

With our policy of continuous improvement, we reserve the right to change, or discontinue at any time, specifications or designs without notice.