

Variable Pitch Collector Frame

INSTALLATION INSTRUCTIONS

FOR SOLAR WATER HEATER SYSTEMS



*This frame must be installed by an authorised person.
Please leave this guide with a responsible officer or the householder.*

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RHEEM AUSTRALIA PTY LTD - ABN 21 098 823 511 - 1 Alan Street (PO Box 6) Rydalmere NSW 2116 Australia
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PATENTS

This Variable Pitch Collector frame may be protected by one or more patents or registered designs in the name of Solahart Industries Pty Ltd or Rheem Australia Pty Ltd.

TRADE MARKS

® Registered trademark of Solahart Industries Pty Ltd or Rheem Australia Pty Ltd.
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Note: Every care has been taken to ensure accuracy in preparation of this publication.
No liability can be accepted for any consequences, which may arise as a result of its application.

CONTENTS

RESPONSIBLE OFFICER OR HOUSEHOLDER

This installation instruction booklet is intended for the installer but you may find it of interest.

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ABOUT THE VARIABLE PITCH COLLECTOR FRAME

This installation instruction is used with two models of Variable Pitch Collector frame. These frames are:

- Kit 12106870 Variable Pitch One Collector Frame
- Kit 12106871 Variable Pitch Two Collector Frame

LIST OF COMPONENTS

Component Part No	Kit 12106870 Variable Pitch One Collector Frame Component Description	Quantity
341562	Base plate sub-assembly 1 collector system	2
331137	Top chord variable pitch frame (galvanised)	2
331679	Bottom chord variable pitch frame (galvanised)	2
334280	Adjustable leg inner variable pitch frame	2
334281	Adjustable leg outer variable pitch frame	2
344671	Collector rail extra heavy duty (T6) 1 collector frame	2
336808	Rear brace 1021 mm long, 1 collector variable pitch frame (galvanised)	1
	Contents of polyethylene bag	1
330350	Set screw hex 5/16" UNC x 3/4" SS	10
348033	Set screw hex 5/16" UNC x 1 1/2" SS	4
330808	Set screw hex 5/16" UNC x 2" SS	8
348032	Washer round Ø 30 mm x 8 mm SS	4
348038	Isolation (fibre) washer ID 5/16 x OD 1 1/16 x 1/32	4
330806	Nut 5/16" SS	18
331932	Collector clamp heavy duty	4
347289	Installation instructions – Variable Pitch Collector frame	1

Component Part No	Kit 12106871 Variable Pitch Two Collector Frame Component Description	Quantity
343230	Base plate sub-assembly 2 collector system	2
331137	Top chord variable pitch frame (galvanised)	3
331679	Bottom chord variable pitch frame (galvanised)	3
334280	Adjustable leg inner variable pitch frame	3
334281	Adjustable leg outer variable pitch frame	3
344672	Collector rail extra heavy duty (T6) 2 collector frame	2
343211	Cross brace 935 mm long, 2 collector frame (galvanised)	2
	Contents of polyethylene bag	1
330350	Set screw hex 5/16" UNC x 3/4" SS	15
348033	Set screw hex 5/16" UNC x 1 1/2" SS	8
330808	Set screw hex 5/16" UNC x 2" SS	13
348032	Washer round Ø 30 mm x 8 mm SS	8
348038	Isolation (fibre) washer ID 5/16 x OD 1 1/16 x 1/32	6
330806	Nut 5/16" SS	30
331932	Collector clamp heavy duty	8
347289	Installation instructions – Variable Pitch Collector frame	1

PARTS SUPPLIED

This kit contains the parts required, including collector clamps, screws, washers and nuts, for assembling the frame and attaching the solar collectors to the frame.

This kit does not include the hardware for mounting the frame to the roof.

The collector clamps, screws, washers and nuts supplied with this kit must be used with these frames. They replace the collector clamps, screws, washers and nuts that may be supplied in the parts kit supplied with the solar water heater, which must not be used with the Variable Pitch Collector frame.

MODEL TYPE

The Variable Pitch Collector frame mounting kit is designed for the installation of solar collectors only. The total combined roof and frame pitch angle is not to exceed 45°.

Trusses and rafters are to be spaced at a maximum 1200 mm centres.

On Roof Mounting

The frame, when installed using the “On Roof Mounting” connection method, is rated to:

Wind Region	C	Terrain category	TC2	Wind Class *
Ultimate wind speed	65.3 m/s	Height (Hz)	10 m	N4 / C2

* Wind Class has been assessed in accordance with AS 4055-2006 ‘Wind loads for housing’.

Solar Water Heater Systems

The frame is suitable for installation with the systems listed below:

- One collector Aquamax / Edwards / Rheem / Solahart / Sunheat collector
- Two collectors Aquamax / Edwards / Rheem / Solahart / Sunheat collectors

The collector size is approximately 1935 mm x 1020 mm x 79 mm and is constructed with a folded metal tray.

LOCATION

The installation of solar collector(s) on this frame, subject to its design criteria and certification not being exceeded:

- provides an acceptable method of installation where it is necessary to satisfy the requirements of the Building Code of Australia for high wind areas, and
- is suitable for installation with solar collectors in geographic locations up to and within Wind Region C (where the “On Roof Mounting” is used) as defined in the Building Code of Australia, Australian Standard AS 4055-2006 and the Australian / New Zealand Standard AS/NZS 1170.2:2002.

Refer to “System Certifications” on page 19 for information on the certification of each system.

Refer to the Installation Instructions and Owner’s Guide supplied with the solar water heater in order to determine the most suitable direction for facing the system. Choose a mounting location with direction in mind that will allow the frame to be centrally located over at least either two rafters (one collector system) or three rafters (two collector system) and also provide the base plate sub-assemblies with suitable fixing access to the roof battens.

The installer must ensure the structural integrity of the building is not compromised by the solar collector(s) and frame installation and the roof structure is suitable to carry the full weight of the solar collector(s) and frame. If in doubt the roof structure should be suitably strengthened. Consult a structural engineer.

ASSEMBLY DIAGRAMS

VARIABLE PITCH COLLECTOR FRAME – ASSEMBLY

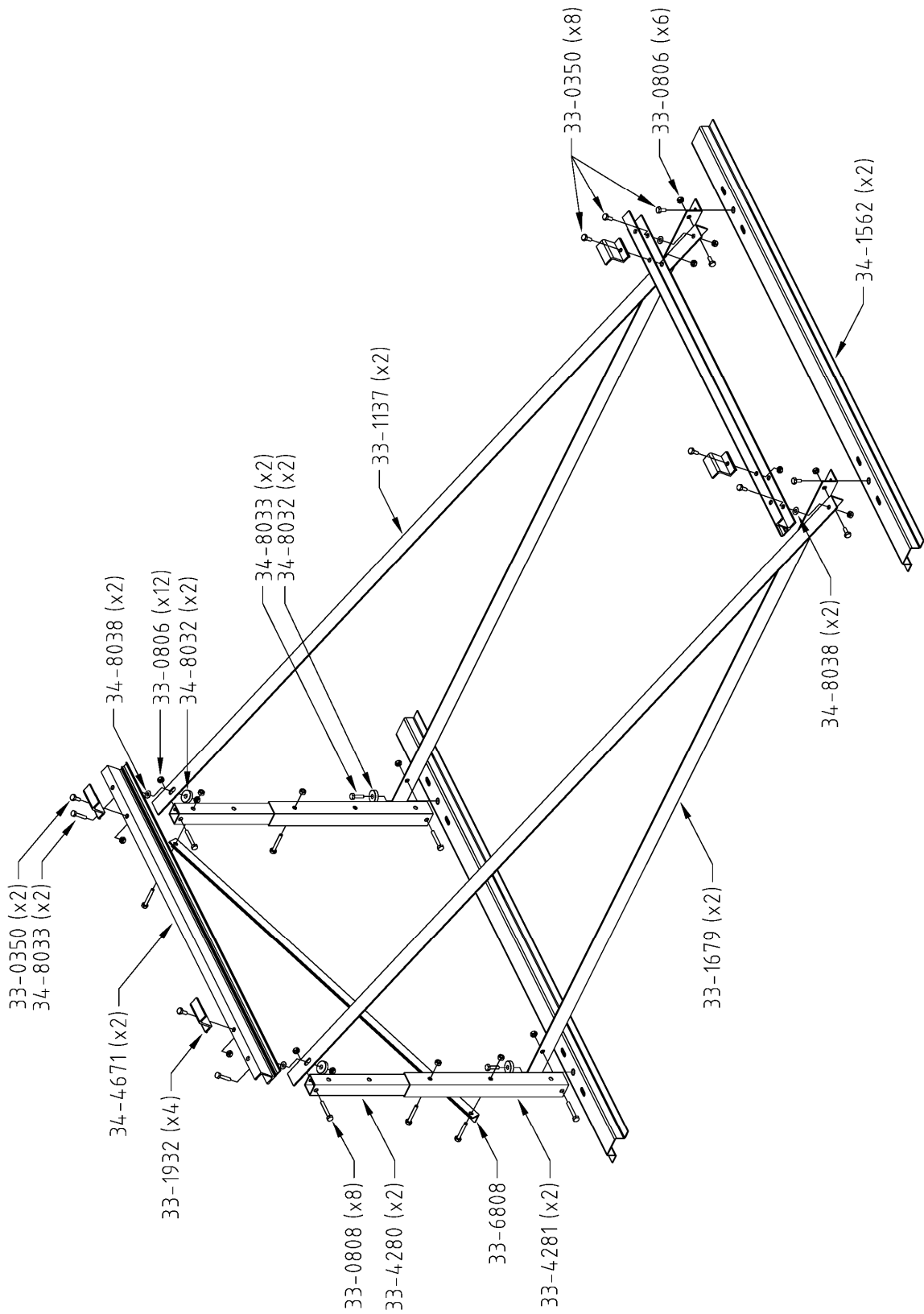


Diagram 1
Variable Pitch One Collector Frame Kit No 12106870

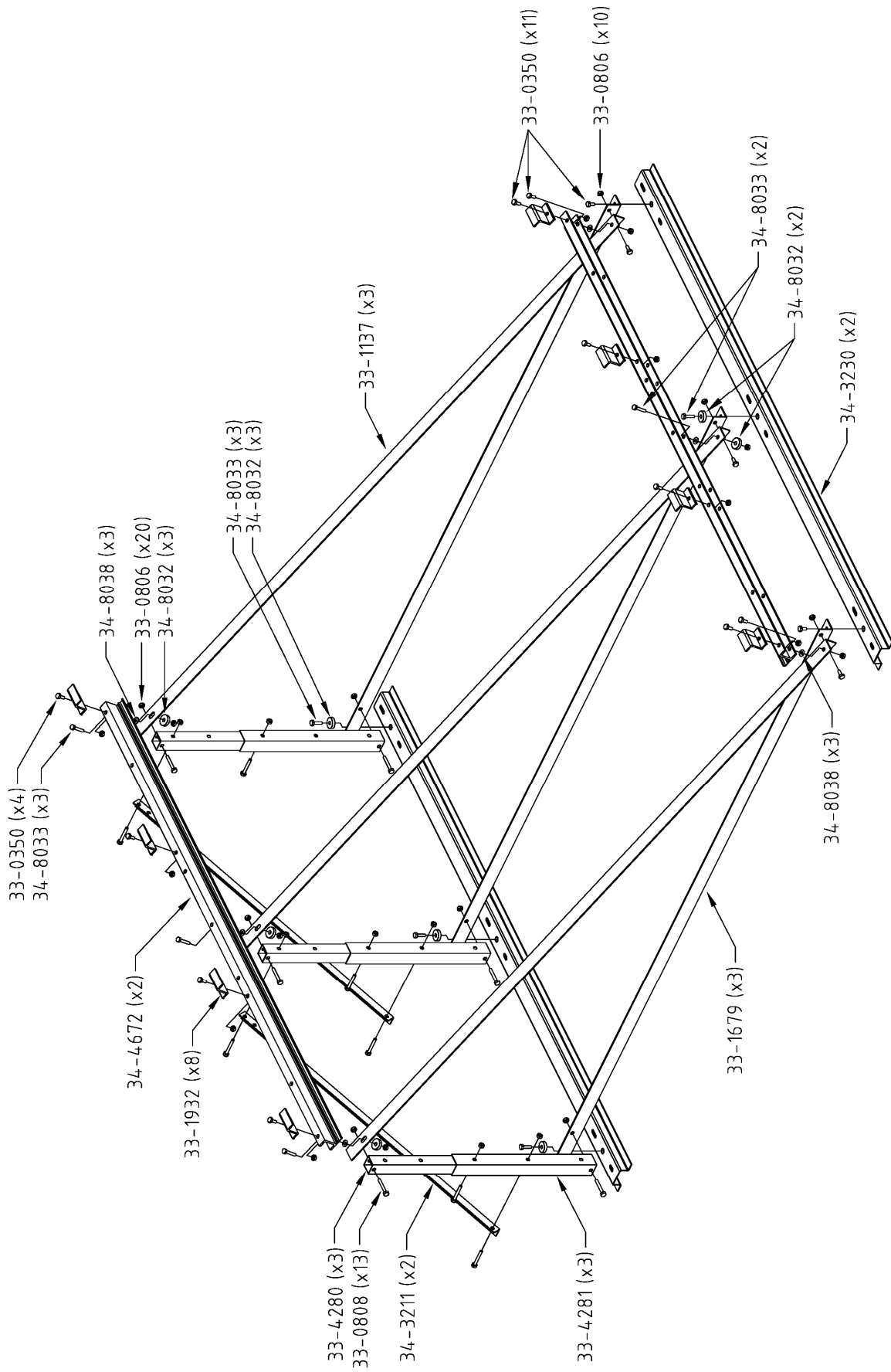
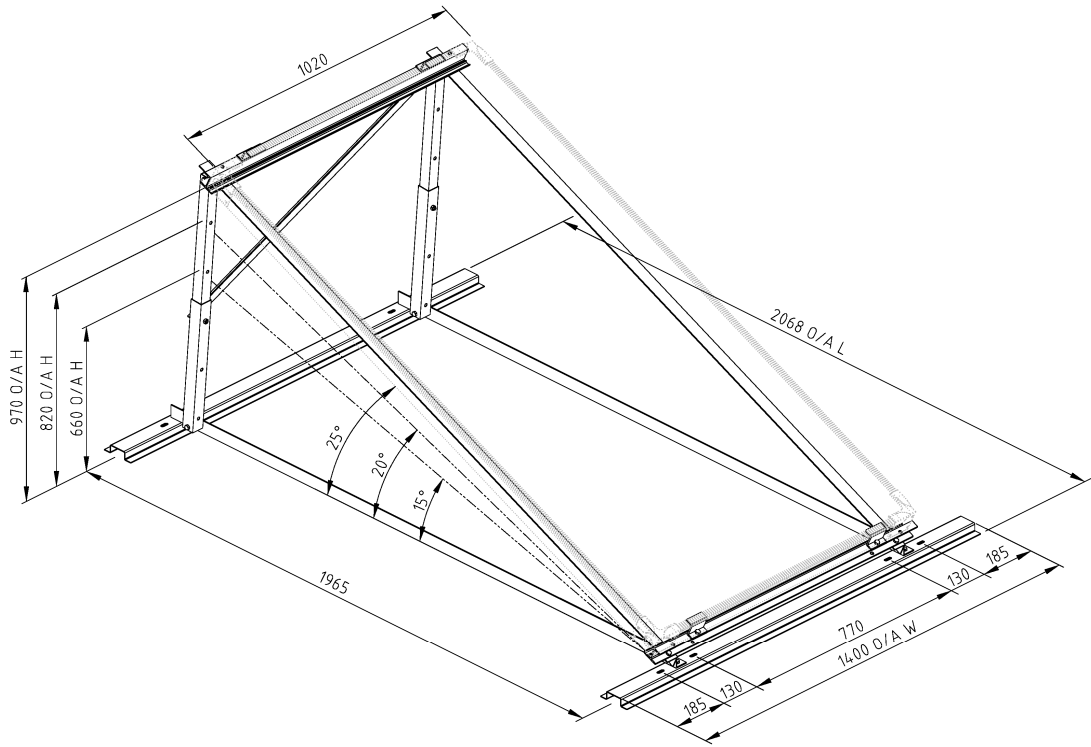
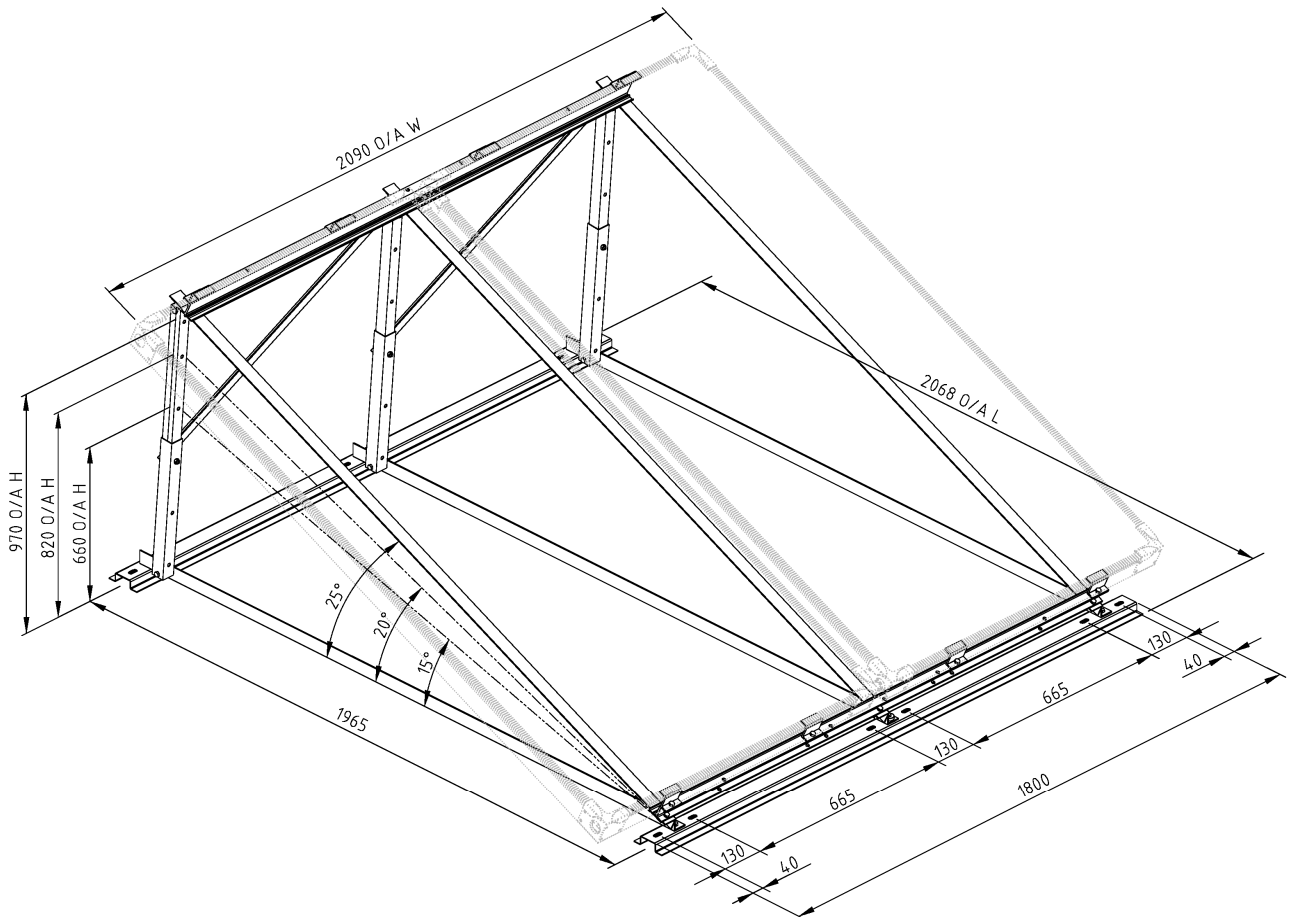


Diagram 2
Variable Pitch Two Collector Frame Kit No 12106871

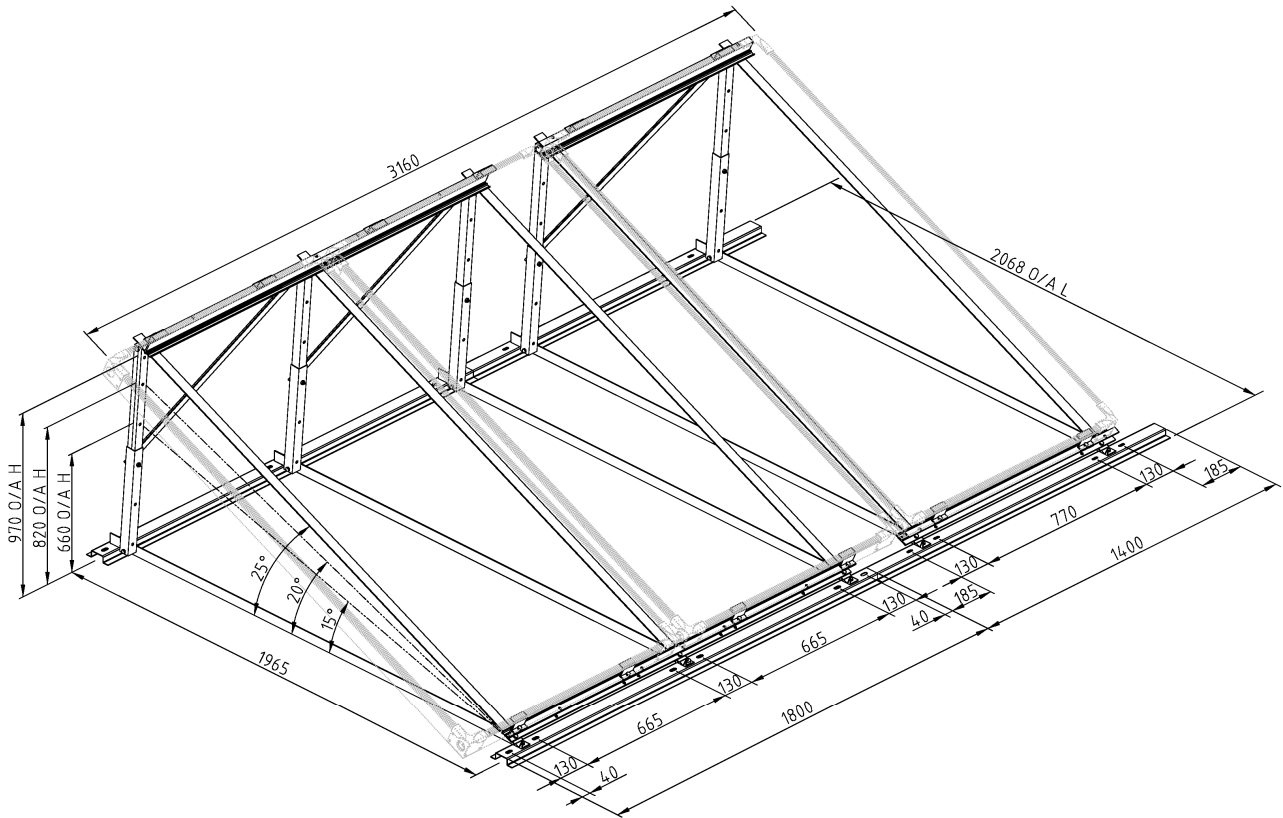
DIMENSION DRAWINGS



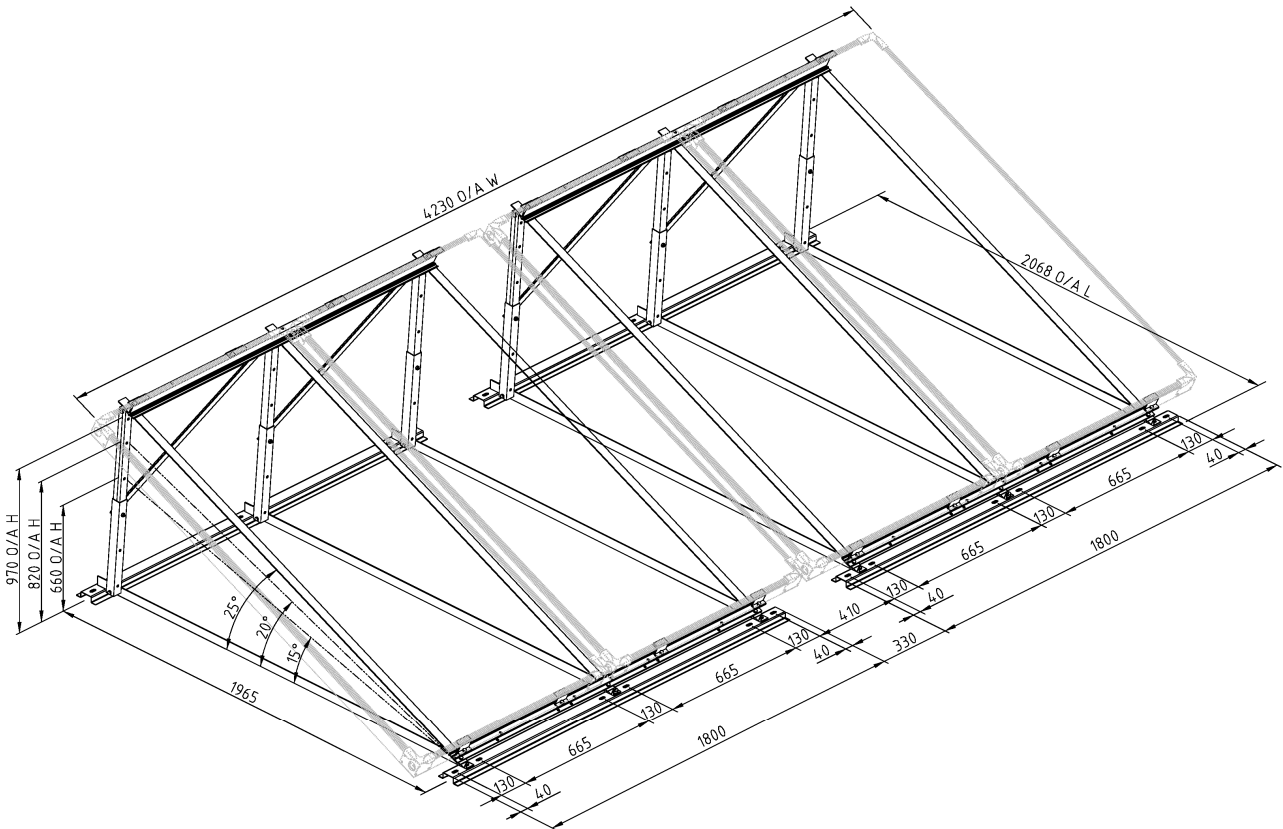
variable pitch one collector frame



variable pitch two collector frame



variable pitch one and two collector frames



two variable pitch two collector frames

INSTALLATION CRITERIA

GENERAL DESIGN CRITERIA, LIMITATIONS AND NOTES

- The total combined roof and frame pitch angle is not to exceed 45°. The maximum roof pitch can be:
 - 30° with frame set at 15° inclination
 - 25° with frame set at 20° inclination
 - 20° with frame set at 25° inclination
- The frame can be set at either 15°, 20° or 25°.
- Trusses and rafters spacing is not to exceed 1200 mm centres.
- This frame is not rated for installation on a free roof or a canopy as defined in AS 1170.2:2002 section 5.
- The roof construction should be verified to ensure that it can support the additional loads imposed by the installation of the solar collectors and the frame.
- The roof battens are to be continuous over not less than three rafters or trusses for either a one or two collector frame.
- Frames are certified for use in Australia.
- The installation shall be in accordance with these installation instructions.
- The installer is to provide the fixings for the frame to the roof. Fixings are to be in accordance with the methods and drawings outlined in these installation instructions.

ON ROOF MOUNTING

The “On Roof Mounting” method is suitable for roof types other than tiled roofs.

Refer to the assembly diagrams Diagram 1 (one collector) or Diagram 2 (two collectors).

To assemble the Variable Pitch Collector frame and install on the roof:

- Determine the position on the roof where the frame and solar water heater is to be installed.
 - Select the position of and install the two roof battens to which the Variable Pitch Collector frame is to be fixed.
 - The roof battens are to be a minimum 75 mm x 50 mm hardwood timber or a 104 mm x 27 mm x 2 mm top hat section and securely fixed to each rafter or truss.
 - The roof battens are to be continuous over not less than three rafters or trusses for either a one or two collector frame.
 - The centre to centre distance between the two roof battens is to be either 1450 mm, 1700 mm, 1710 mm or 1960 mm. Check this distance with the distance between the two holes on a bottom chord which are to be used to secure the base plates to the bottom chords and ensure the distances are equal.
- **Base Plate and Bottom Chord Connections:** Loosely fit the base plates and the bottom chords together, using screws and washers provided, securing a screw into each nutsert in the base plates.

There are two base plates per frame and two bottom chords with a one collector frame and three bottom chords for a two collector frame.

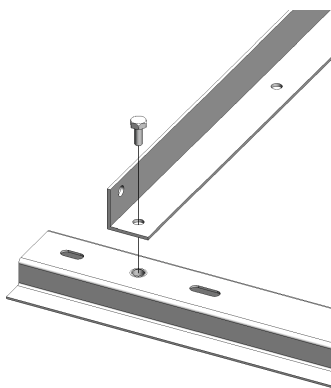
- **Bottom Chord:** The bottom chord has a horizontal face with four holes and the vertical face with two holes.

The front end of the bottom chord has a hole centred 25 mm from the end of the chord on the horizontal face and a hole centered 20 mm from the end of the chord on the vertical face. This end is to be connected to the front base plate.

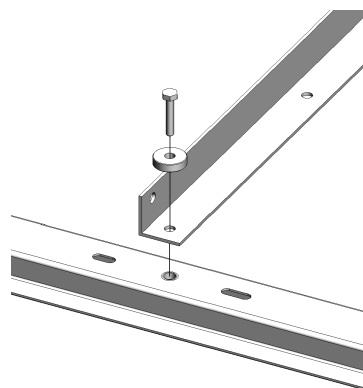
The rear end of the bottom chord has a hole centred 16 mm from the end of the chord on the horizontal face and a hole centered 107 mm from the end of the chord on the vertical face. This end is to be connected to the rear base plate.

- **Front Base Plate connection:** Use one screw (hex 5/16” UNC x 3/4” SS – 330350) to connect each outside bottom chord to the front base plate for a one collector frame and to connect the two outside bottom chords to the front base plate for a two collector frame.

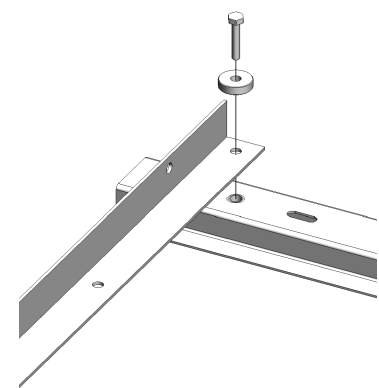
Note: Use one screw (hex 5/16” UNC x 1 1/2” SS – 348033) and one washer (round Ø 30 x 8 mm SS – 348032) under the screw head, to connect the centre bottom chord to the front base plate for a two collector frame.



front base plate and
outside bottom chord
assembly guidelines

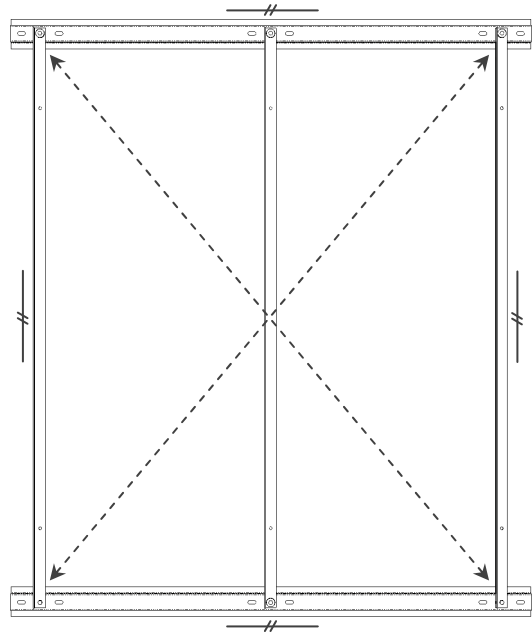


front base plate and
centre bottom chord
assembly guidelines



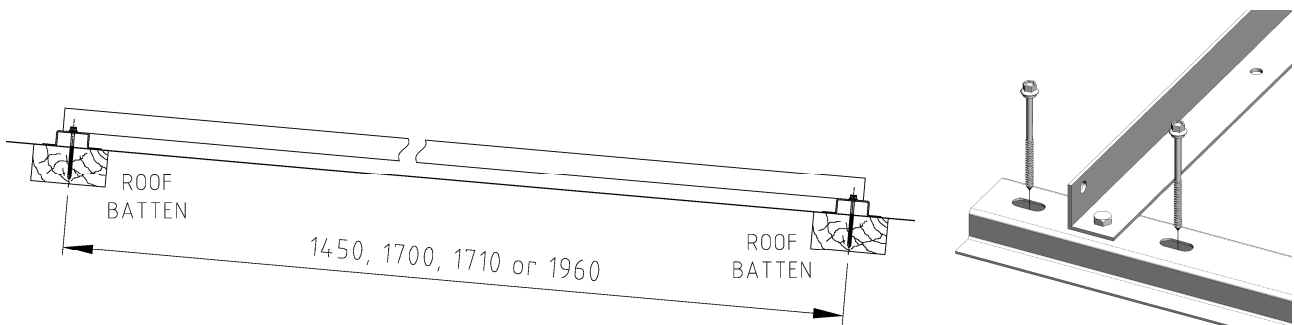
rear base plate and bottom chord
assembly guidelines

- **Rear Base Plate connection:** Use one screw (hex 5/16" UNC x 1 1/2" SS – 348033) and one washer (round Ø 30 x 8 mm SS – 348032) to connect each bottom chord to the rear base plate.
- Square up the frame by making sure the diagonals are equidistant and ensure the centre to centre distance between the two roof battens is equal to the centre to centre distance between the base plates.
 - Tighten up the screws in the nutserts.
- Position the assembled frame on the roof over the area where it is to be installed, ensuring the base plates are located over the two roof battens.
 - The frame should be located such that the Tek screws or M8 bolts are as close as possible to the rafters or trusses.
- Mark the locations where the Tek screws or M8 bolts are to penetrate the roof material.



square up frame and check distances

- No. 14 Type 17 HWF Tek Screws are required to fix the base plate to timber battens.
- M8 bolts are required to fix the base plate to steel battens.
- The Tek screws or M8 bolts penetrate both the top and bottom base plate through the slotted holes, one on either side of each of the U-frames.
- There are four fixing points on each base plate for a one collector frame and six fixing points on each base plate for a two collector frame.



Bolts or Tek screws to penetrate either side of bottom chord

- Drill through the roof cladding and into the battens.
- **Timber battens:** Fasten the base plates to timber roof battens using No. 14 Type 17 HWF Tek screws.
 - The Tek screws must penetrate at least 45 mm into the roof battens.

This is the minimum fixing requirement. Refer to Diagram 3 on page 13 for a connection detail.
- **Steel battens:** Fasten the base plates to steel roof battens using M8 bolts and nuts with 20 mm washers under both the bolt head and nut. This is the minimum fixing requirement.
- Refer to "Assembly of Frame" on page 14 for the procedure to assemble the remainder of the variable pitch collector frame and to mount the solar collectors.

Notes:

- Penetrations through the roofing material must be:
 - at the high point of the roof or metal sheet profile;
 - made neatly and kept as small as practicable;
 - waterproofed upon installation of the Tek screws or bolts.
- Care should be taken not to mark Colorbond or other metal roof sheet with a marking pen and to remove all swarf from the metal roof as these can cause deterioration of the metal roofing material.

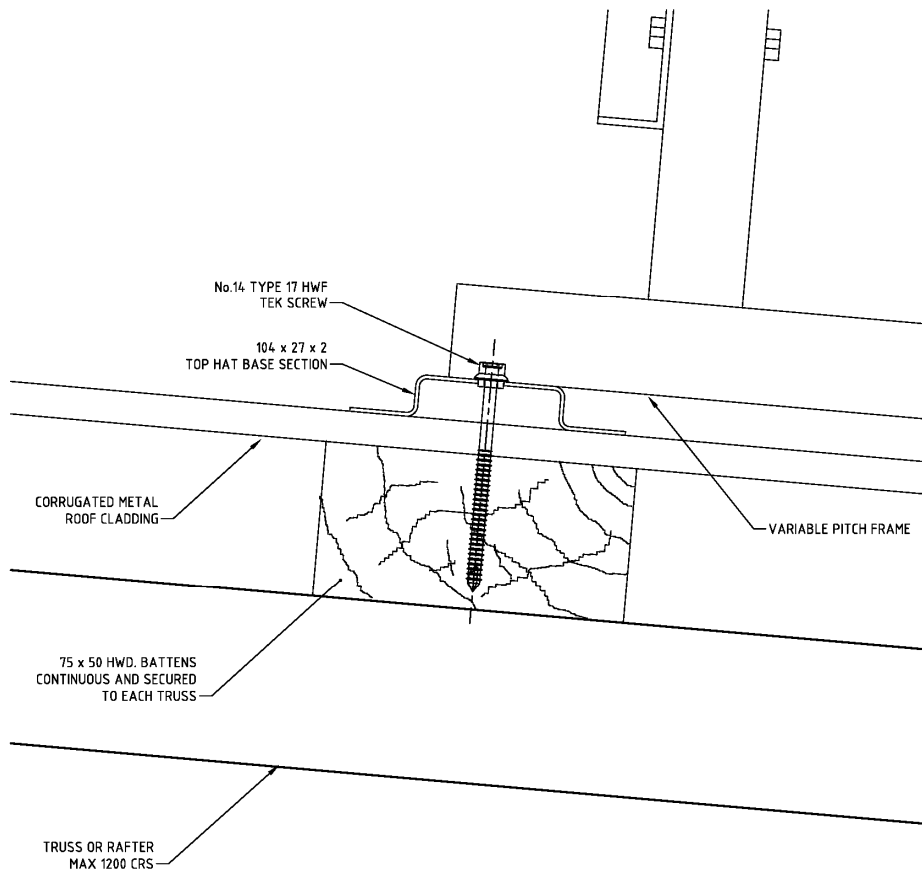


Diagram 3
On Roof Mounting Tek Screw into Timber Batten

ASSEMBLY OF FRAME

To assemble the remainder of the variable pitch collector frame and install the solar collectors:

- **Adjustable Outer Leg and Bottom Chord connections:** Fit the adjustable outer legs to the bottom chords, using screws and nuts provided.

There are two adjustable outer legs for a one collector frame and three outer legs for a two collector frame.

The adjustable outer leg has two sides with a single hole, centered 10 mm from one end (the bottom end). This end is to be orientated downwards and the hole used to connect the outer leg to the outer side of the bottom chord.

- Use one screw (hex 5/16" UNC x 2" SS – 330808) and nut (5/16" SS – 330806) per fixing to connect the outer leg to the bottom chord.

The other two sides of the outer leg have three holes. These holes are used to position the adjustable inner leg and secure the rear brace (one collector frame) or a cross brace (two collector frame).

- **Adjustable Inner Leg and Adjustable Outer Leg connections:** Locate the adjustable inner legs and connect to the adjustable outer legs, using the screws and nuts provided.

There are two adjustable inner legs for a one collector frame and three inner legs for a two collector frame.

The adjustable inner leg has two sides with a single hole, centered 10 mm from one end (the top end). This end is to be orientated upwards and the hole used to connect the inner leg to the top chord.

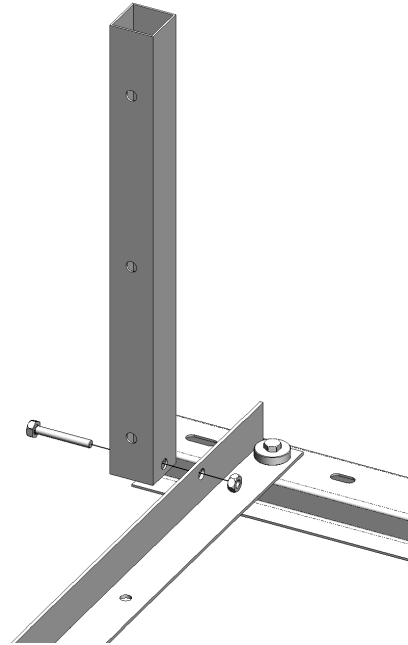
The other two sides of the inner leg have four holes. These holes are used to position the adjustable inner leg and secure the rear brace (one collector frame) or a cross brace (two collector frame).

- Insert the inner leg into the outer leg. Ensure the side of the inner leg with the four holes is lined up with the side of the outer leg with the three holes.
- Line up one of the bottom three holes in the inner leg with the top hole in the outer leg, insert a screw (hex 5/16" UNC x 2" SS – 330808) and secure with a nut (5/16" SS – 330806).

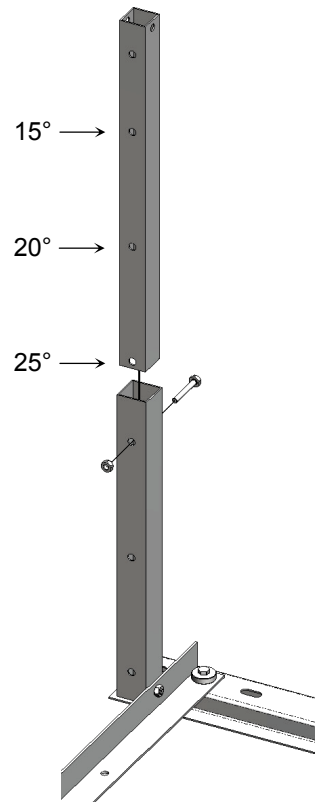
The inclinations are:

- Third hole from bottom 15° inclination
- Second hole from bottom 20° inclination
- Bottom hole 25° inclination

The top hole of the inner leg is to be left to secure the rear brace (one collector frame) or a cross brace (two collector frame).



outer adjustable leg and bottom chord assembly



inner and adjustable outer leg assembly

- **Top Chord connections:** Connect the top chord to the bottom chord and adjustable inner leg, using the screws and nut provided.

There are two top chords per one collector frame and three top chords per two collector frame.

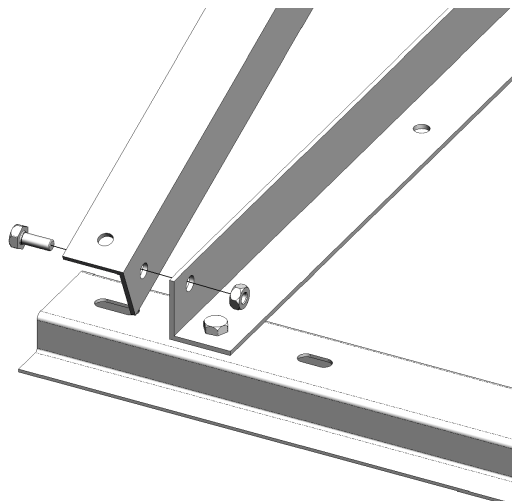
- **Top chord:** The top chord has a horizontal (inclined) face with one round and one slotted hole and a vertical face with two round holes.

The lower (front) end of the top chord has the two round holes, one on each face. This end is to be connected to the bottom chord at the front of the frame.

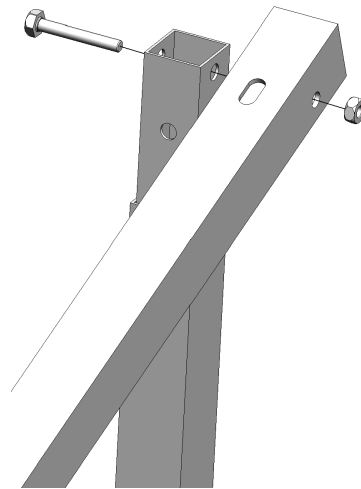
The upper (rear) end of the top chord has the slotted and round holes, one on each face. This end is to be connected to the adjustable inner leg at the rear of the frame.

- **Top Chord and Bottom Chord connection:** Use one screw (hex 5/16" UNC x 3/4" SS – 330350) and one nut (5/16" SS – 330806) to connect the top chord and bottom chord at their outer vertical faces.

Top Chord and Adjustable Inner Leg connection: Line up the round hole on the vertical face at the upper end of the top chord to the top hole on the inner leg, with the horizontal face of the top chord sitting over the top of the inner leg. Secure the top chord to the inner leg using one screw (hex 5/16" UNC x 2" SS – 330808) and one nut (5/16" SS – 330806) per fixing.



top and bottom chord connection



top chord and adjustable inner leg connection

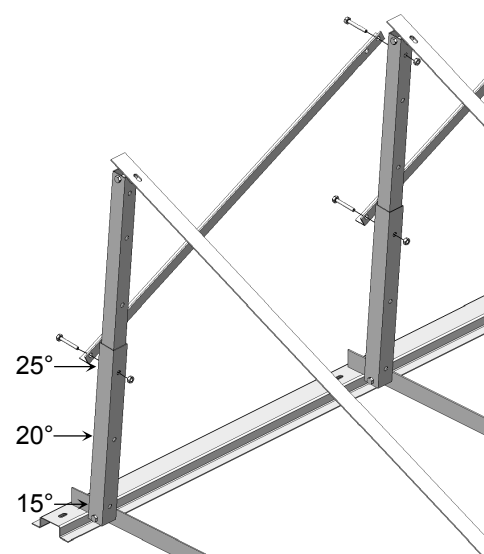
- **Cross / Rear Brace connections:** Connect the two cross braces to the adjustable leg members on a two collector frame or the rear brace to the adjustable leg members on a one collector frame.

Cross Brace: The cross brace has two holes at the upper end of the vertical face and one hole at the lower end of the vertical face. One cross brace connects to the top of the inner adjustable leg

Cross Brace and Adjustable Legs connection: Connect the upper end of the cross brace to the top hole on the rear face of the adjustable inner leg using one screw (hex 5/16" UNC x 2" SS – 330808) and nut (5/16" SS – 330806).

Connect the lower end of the cross brace to the adjacent outer adjustable leg using one screw (hex 5/16" UNC x 2" SS – 330808) and nut (5/16" SS – 330806). The hole in the outer adjustable leg to use is:

- Top hole – 25° setting
- Middle hole – 20° setting
- Bottom hole – 15° setting



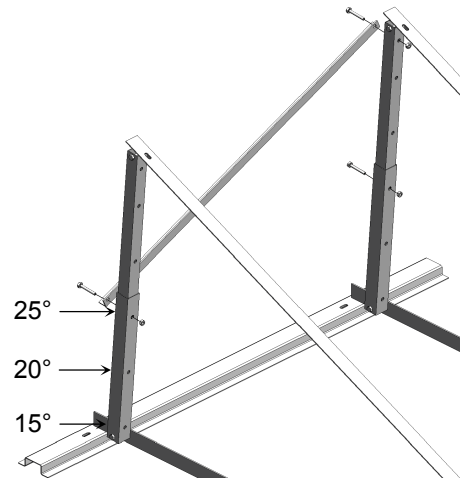
cross brace and adjustable legs connection
2 collector frame

Rear Brace: The rear brace has one hole at either end of its vertical face.

Rear Brace and Adjustable Legs connections: Connect the upper end of the rear brace to the top hole on the rear face of the adjustable inner leg using one screw (hex 5/16" UNC x 2" SS – 330808) and nut (5/16" SS – 330806).

Connect the lower end of the rear brace to the adjacent outer adjustable leg using one screw (hex 5/16" UNC x 2" SS – 330808) and nut (5/16" SS – 330806). The hole in the outer adjustable leg to use is:

- Top hole – 25° setting
- Middle hole – 20° setting
- Bottom hole – 15° setting



rear brace and adjustable legs connection
1 collector frame

- **Collector Rail connections:** Connect a collector rail across the top end of the top chords and one across the bottom ends of the top chords.

The collector rail has an 'h' profile. The closed section of the profile is to face outwards of the frame, whilst the open section of the profile is to face inwards of the frame.

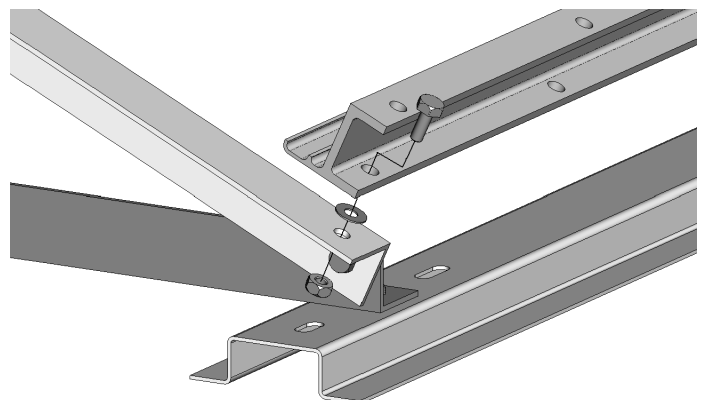
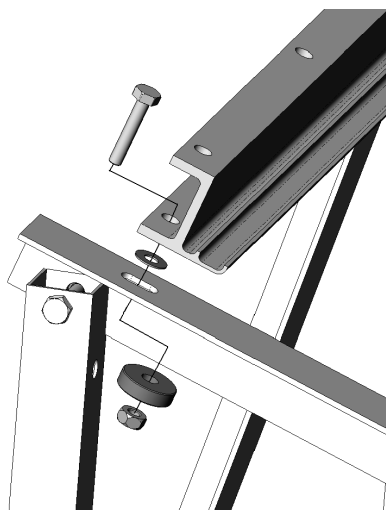
Collector Rail and Top Chord connections: Connect each collector rail across the top chords using;

Top end of frame - one screw (hex 5/16" UNC x 3/4" SS – 330350), one fibre isolation washer (ID 5/16 x OD 1 1/16 x 1/32 – 348038), one washer (round Ø 30 x 8 mm SS – 348032) and one nut (5/16" SS – 330806). The washer is located under the nut.

The fibre isolation washer is to be placed between the collector rail and top chord to act as a separation barrier.

Bottom end of frame - one screw (hex 5/16" UNC x 3/4" SS – 330350), one fibre isolation washer (ID 5/16 x OD 1 1/16 x 1/32 – 348038) and one nut (5/16" SS – 330806).

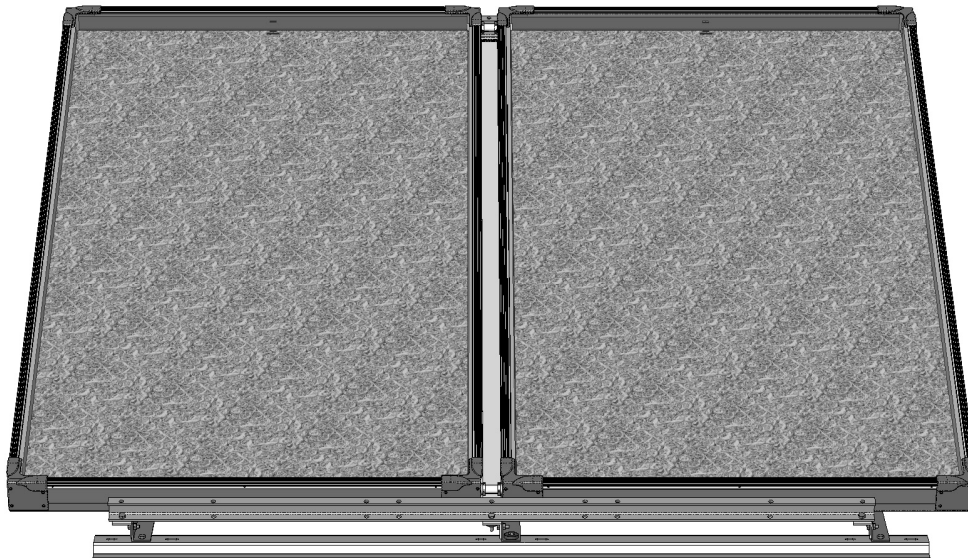
The fibre isolation washer is to be placed between the collector rail and top chord to act as a separation barrier.



collector rail and top chord connections

To install the solar collectors onto the frame:

- Position the first solar collector onto the bottom collector rail and the top collector rail.
- Insert the two collector unions (two collector system) into the sockets of the first solar collector and loosely screw each gland nut into its socket.
- Position the second solar collector (two collector system) onto the bottom collector rail and the top collector rail.
- Slide the second solar collector over the two collector unions and loosely screw each gland nut into its socket.
- Centralise the solar collector(s) on the frame and tighten the gland nuts (two collector system).



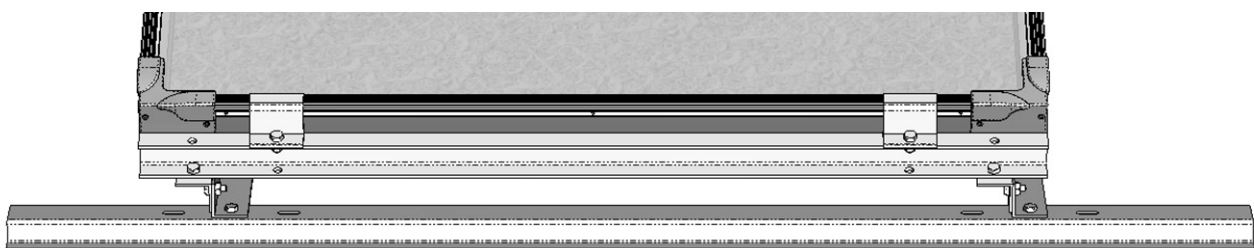
position collectors on collector rails

- *Collector Clamp connection:* Loosely fit the collector clamps, four per solar collector, to the bottom and top collector rails, using a screw (hex 5/16" UNC x 3/4" SS – 330350) and nut (5/16" SS – 330806) provided for each clamp.

One collector rail: The single collector rail has four holes in the web. Use the inside two holes to attach the collector clamps.

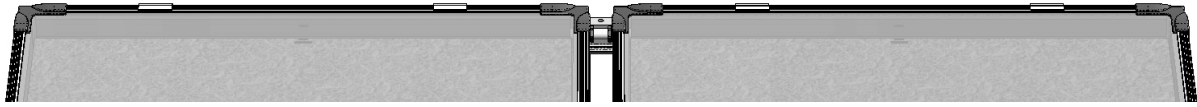


loosely fit collector clamps to top collector rail

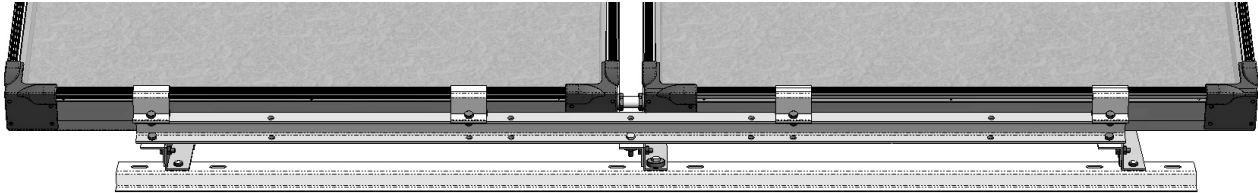


loosely fit collector clamps to bottom collector rail

Two collector rail: The two collector rail has six holes in the web. Use the two outside holes and the two holes, third in from each end to attach the collector clamps.



loosely fit collector clamps to top collector rail



loosely fit collector clamps to bottom collector rail

Make the pipe connections as per the installation instructions supplied with the roof kit.

SYSTEM CERTIFICATIONS

The structural engineering analysis and design of this Variable Pitch Collector frame has been conducted and certified by the engineering firm Cardno (NSW) Pty Ltd.

The design is in accordance with normal engineering practice and principles and the relevant sections of the following Australian Standards:

- AS / NZS 1170.0:2002 Structural design actions – Part 0: General principles
- AS / NZS 1170.1:2002 Structural design actions – Part 1: Permanent, imposed and other actions
- AS / NZS 1170.2:2002 Structural design actions – Part 2: Wind actions
- AS / NZS 4600:2005 Cold-formed steel structures
- AS 4100-1998 Steel structures
- AS / NZS 1664.1:1997 Aluminium structures Part 1: Limit design state
- AS 1720.1-1997 Timber structures Part 1: Design methods

To achieve the structural design capacity, it is essential this Variable Pitch Collector frame be constructed in strict accordance with the fixing details as outlined in these installation instructions.

The design of this frame does not consider the effects of any snow or earthquake loading.

Copies of each certification letter produced by Cardno (NSW) Pty Ltd are reproduced in the following pages.

The certification letter shall not be construed as relieving any other party of their legal responsibilities or contractual obligations.

Our Ref: 605744-LO-51-001

Contact: Sukayna Aly

23 November 2010

Rheem Australia Pty Ltd
112 Pilbara St
WELSPool WA 6106

Attention: Mr. Gary Gendall

Cardno (NSW) Pty Ltd
ABN 95 001 145 035

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910 Pacific Highway
Gordon NSW 2072
Australia

Phone: 61 2 9496 7700
Fax: 61 2 9499 3902

www.cardno.com.au

Dear Gary,

**RE: Solar Hot Water Support Frame No. 001
Revision #2**

The structural engineering analysis and design of the following solar hot water system support frame has been conducted by this firm:

Brand Name: Solahart/Rheem/Sunheat/Edwards/Aquamax

Product Description: 1 collector variable pitch anti-cyclone frame

Manufacturer's Name: Rheem Australia PTY LTD

Drawing No. 001 Rev. 3 dated 23/11/10

We certify that this design is in accordance with normal engineering practice and principals and the relevant sections of the following Australian Standards:

- AS/NZS 1170.0:2002 Structural design actions – Part 0: General principles
- AS/NZS 1170.1:2002 Structural design actions – Part 1: Permanent, imposed and other actions
- AS/NZS 1170.2:2002 Structural design actions – Part 2: Wind Actions
- AS/NZS 4600:2005 Cold-formed steel structures
- AS 4100-1998 Steel structures
- AS/NZS 1664.1:1997 Aluminium structures Part 1: Limit state design
- AS 1720.1-1997 Timber structures Part 1: Design methods

The design of this support frame does not consider the effects of any snow or earthquake loading. In conjunction with AS/NZS 1170.2:2002 the frame has been designed to withstand wind loads up to and including region C, terrain category 2, installed at a maximum height of 10m (design wind speed 65.3m/s). This loading exceeds the requirements of Wind class N4/C2 when assessed in accordance with AS4055-2006 Wind loads for housing.

To achieve the structural design capacity, it is essential that the steel frame structure be constructed in a strict accordance with the fixing details provided by the manufacturer's specification.

It is noted that this certification relates to the design of the framing systems only, and that no structural assessment of water storage tanks or collector panels has been conducted. It is further noted that verification of the roofs capacity to withstand any additional loads imposed by the solar hot water system is outside of the scope of this certificate.

This certificate shall not be construed as relieving any other party of their legal responsibilities or contractual obligations.

Yours faithfully,



MARK HICKEY
Discipline Leader - Structures
for **Cardno (NSW)**
NT Certifying Engineer Reference # 32942ES
RPEQ # 01649

Our Ref: 605744-51-002

Contact: Sukayna Aly

23 November 2010

Rheem Australia Pty Ltd
112 Pilbara St
WELSPool WA 6106

Attention: Mr. Gary Gendall

Cardno (NSW) Pty Ltd
ABN 95 001 145 035

Level 3
Cardno Building
910 Pacific Highway
Gordon NSW 2072
Australia

Phone: 61 2 9496 7700
Fax: 61 2 9499 3902

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Dear Gary,

**RE: Solar Hot Water Support Frame No. 002
Revision #2**

The structural engineering analysis and design of the following solar hot water system support frame has been conducted by this firm:

Brand Name: Solahart/Rheem/Sunheat/Edwards/Aquamax

Product Description: 2 collector variable pitch anti-cyclone frame

Manufacturer's Name: Rheem Australia PTY LTD

Drawing No. 002 Rev. 3 dated 23/11/10

We certify that this design is in accordance with normal engineering practice and principals and the relevant sections of the following Australian Standards:

- AS/NZS 1170.0:2002 Structural design actions – Part 0: General principles
- AS/NZS 1170.1:2002 Structural design actions – Part 1: Permanent, imposed and other actions
- AS/NZS 1170.2:2002 Structural design actions – Part 2: Wind Actions
- AS/NZS 4600:2005 Cold-formed steel structures
- AS 4100-1998 Steel structures
- AS/NZS 1664.1:1997 Aluminium structures Part 1: Limit state design
- AS 1720.1-1997 Timber structures Part 1: Design methods

The design of this support frame does not consider the effects of any snow or earthquake loading. In conjunction with AS/NZS 1170.2:2002 the frame has been designed to withstand wind loads up to and including region C, terrain category 2, installed at a maximum height of 10m (design wind speed 65.3m/s). This loading exceeds the requirements of Wind class N4/C2 when assessed in accordance with AS4055-2006 Wind loads for housing.

To achieve the structural design capacity, it is essential that the steel frame structure be constructed in a strict accordance with the fixing details provided by the manufacturer's specification.

It is noted that this certification relates to the design of the framing systems only, and that no structural assessment of water storage tanks or collector panels has been conducted. It is further noted that verification of the roofs capacity to withstand any additional loads imposed by the solar hot water system is outside of the scope of this certificate.

This certificate shall not be construed as relieving any other party of their legal responsibilities or contractual obligations.

Yours faithfully,



MARK HICKEY
Discipline Leader - Structures
for **Cardno (NSW)**
NT Certifying Engineer Reference # 32942ES
RPEQ # 01649

