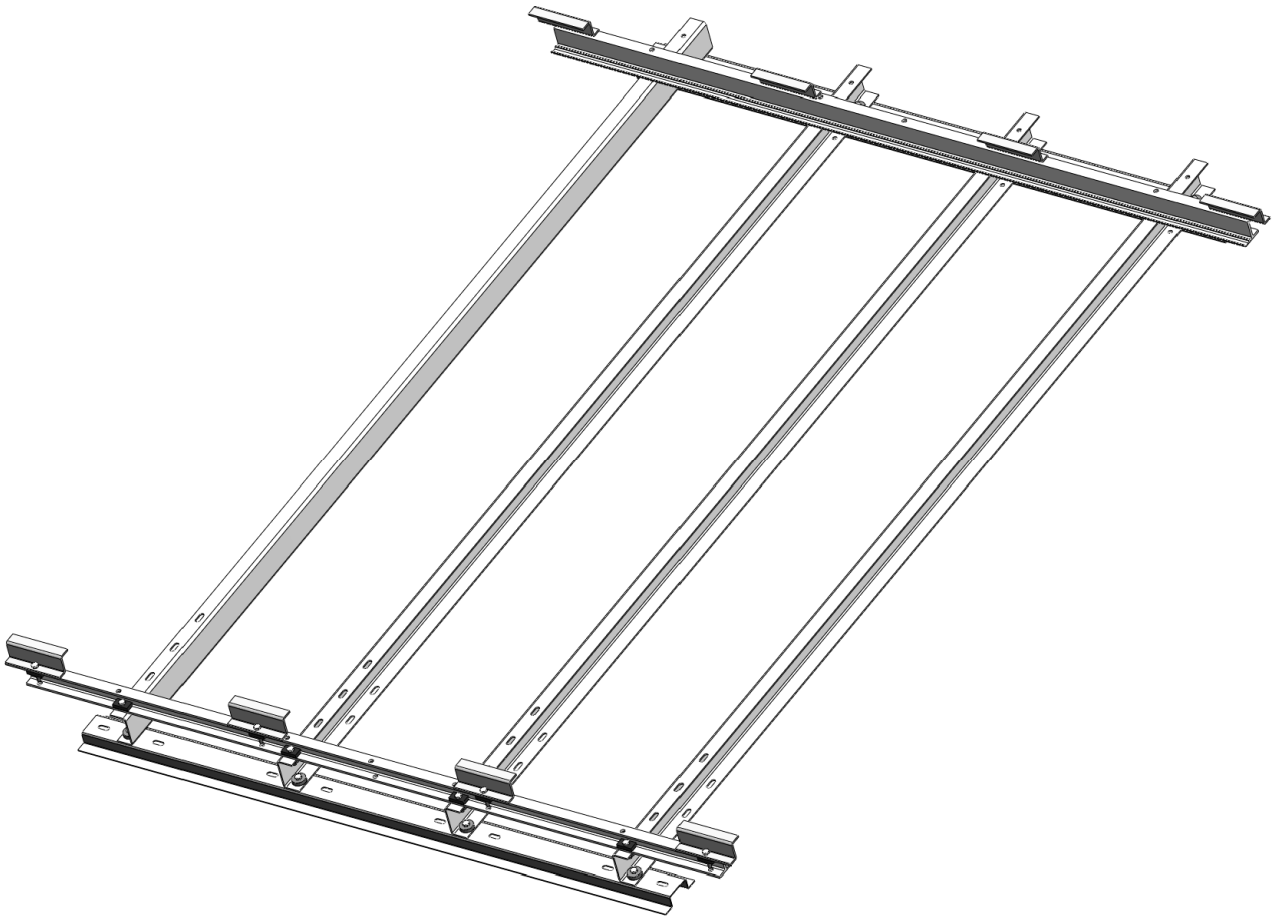
# *With Pitch Collector Frame*

# INSTALLATION INSTRUCTIONS

FOR SOLAR WATER HEATER SYSTEMS



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

SOLAHART INDUSTRIES PTY LTD - ABN 45 064 945 848 – 112 Pilbara Street Welshpool WA 6106 Australia
RHEEM AUSTRALIA PTY LTD - ABN 21 098 823 511 - 1 Alan Street (PO Box 6) Rydalmere NSW 2116 Australia
EDWARDS SOLAR HOT WATER (A Division of Rheem Australia Pty Ltd) – 112 Pilbara Street Welshpool WA 6106 Australia
AQUAMAX AUSTRALIA PTY LTD - ABN 37 138 189 689 - 463-467 Warrigal Rd Moorabbin VIC 3189
PO Box 8426 Heatherton VIC 3202 Australia

# CONTENTS

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

# ABOUT THE WITH PITCH FRAME

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

- Kit 12106899 With Pitch One Collector Frame
- Kit 12106900 With Pitch Two Collector Frame

**LIST OF COMPONENTS**

| Component Part No | Kit 12106899 With Pitch One Collector Frame Component Description | Quantity |
|---|---|---|
| 341562 | Base plate assembly 1 collector frame | 2 |
| 342515 | Cyclone U-frame (2130 mm) | 2 |
| 344671 | Collector rail extra heavy duty (T6) 1 collector frame | 2 |
| | **Contents of polyethylene bag** | 1 |
| 348033 | Set screw hex 5/16" UNC x 1 ½" SS | 12 |
| 348032 | Washer round Ø 30 mm x 8 mm SS | 8 |
| 348036 | Washer rectangular 35 x 19 x 8 mm SS | 8 |
| 330806 | Nut 5/16" SS | 8 |
| 344120 | Collector clamp Cat D cyclone (aluminium) | 4 |
| 347663 | Installation instructions – With Pitch Collector frame | 1 |

| Component Part No | Kit 12106900 With Pitch Two Collector Frame Component Description | Quantity |
|---|---|---|
| 341564 | Base plate assembly 2 collector frame | 2 |
| 342515 | Cyclone U-frame (2130 mm) | 4 |
| 344672 | Collector rail extra heavy duty (T6) 2 collector frame | 2 |
| | **Contents of polyethylene bag** | 1 |
| 348033 | Set screw hex 5/16" UNC x 1 ½" SS | 24 |
| 348032 | Washer round Ø 30 mm x 8 mm SS | 16 |
| 348036 | Washer rectangular 35 x 19 x 8 mm SS | 16 |
| 330806 | Nut 5/16" SS | 16 |
| 344120 | Collector clamp Cat D cyclone (aluminium) | 8 |
| 347663 | Installation instructions – With 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 this With Pitch Collector frame.

**MODEL TYPE**
The With Pitch Collector frame mounting kit is designed for pitched roof installations.

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

| | | | | |
|---|---|---|---|---|
| Wind Region | D | Terrain category | TC2 | Wind Class * |
| Ultimate wind speed | 88 m/s | Height (Hz) | 10 m | N6 / C4 |

* 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 collectors 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 the solar collectors 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 in geographic locations up to and within Wind Region D (where the "On Roof Mounting" method 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 13 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 solar collectors. 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 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.

**GENERAL DESIGN CRITERIA, LIMITATIONS AND NOTES**

- The roof pitch angle is to be not less than 10° and not greater than 45°.
- Trusses and rafters are to be spaced at a maximum 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.

# ASSEMBLY DIAGRAMS

**WITH PITCH ONE COLLECTOR FRAME ASSEMBLY**

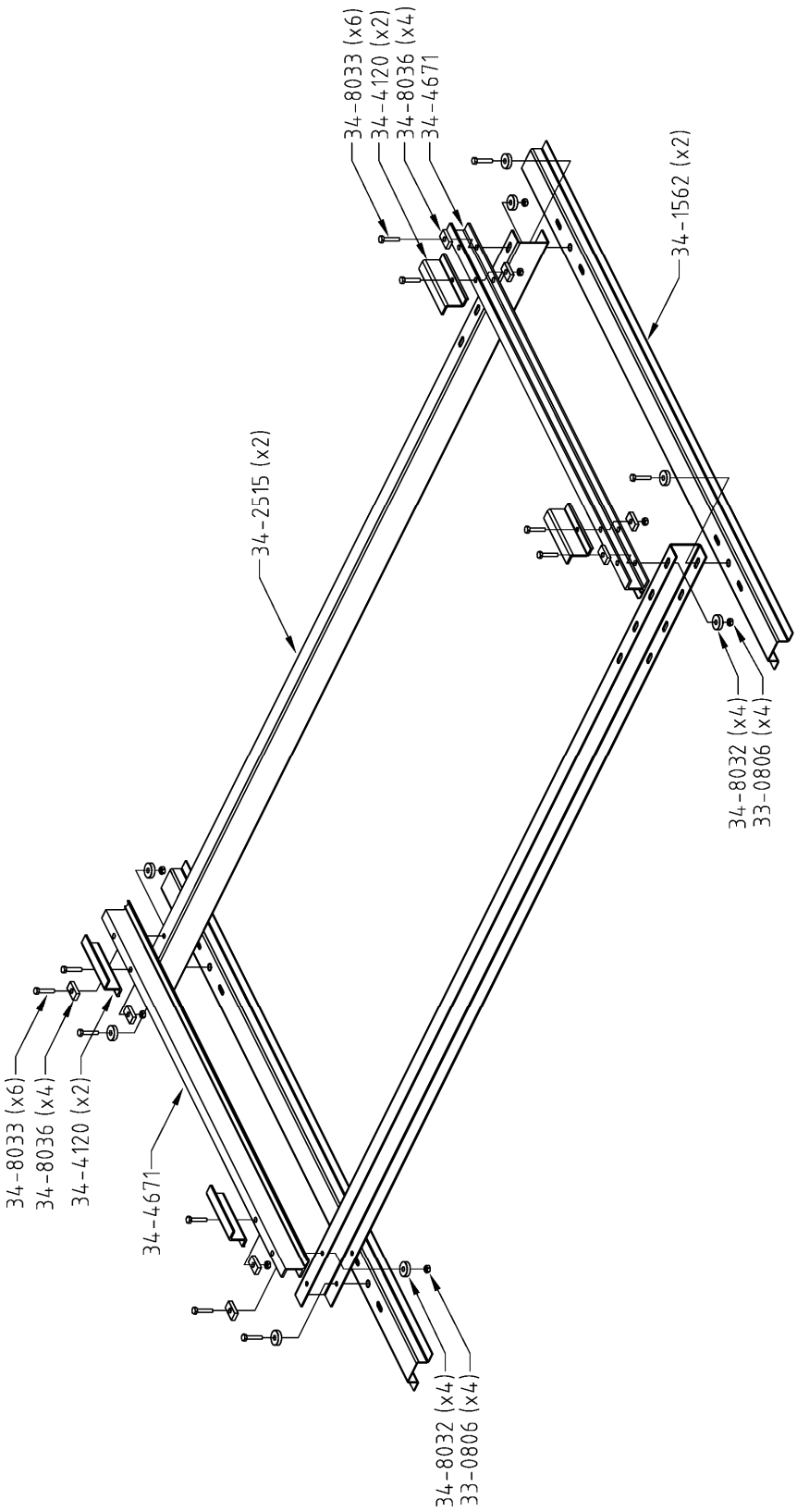



**Diagram 1**
**With Pitch One Collector Frame Kit No 12106899**

**WITH PITCH TWO COLLECTOR FRAME ASSEMBLY**

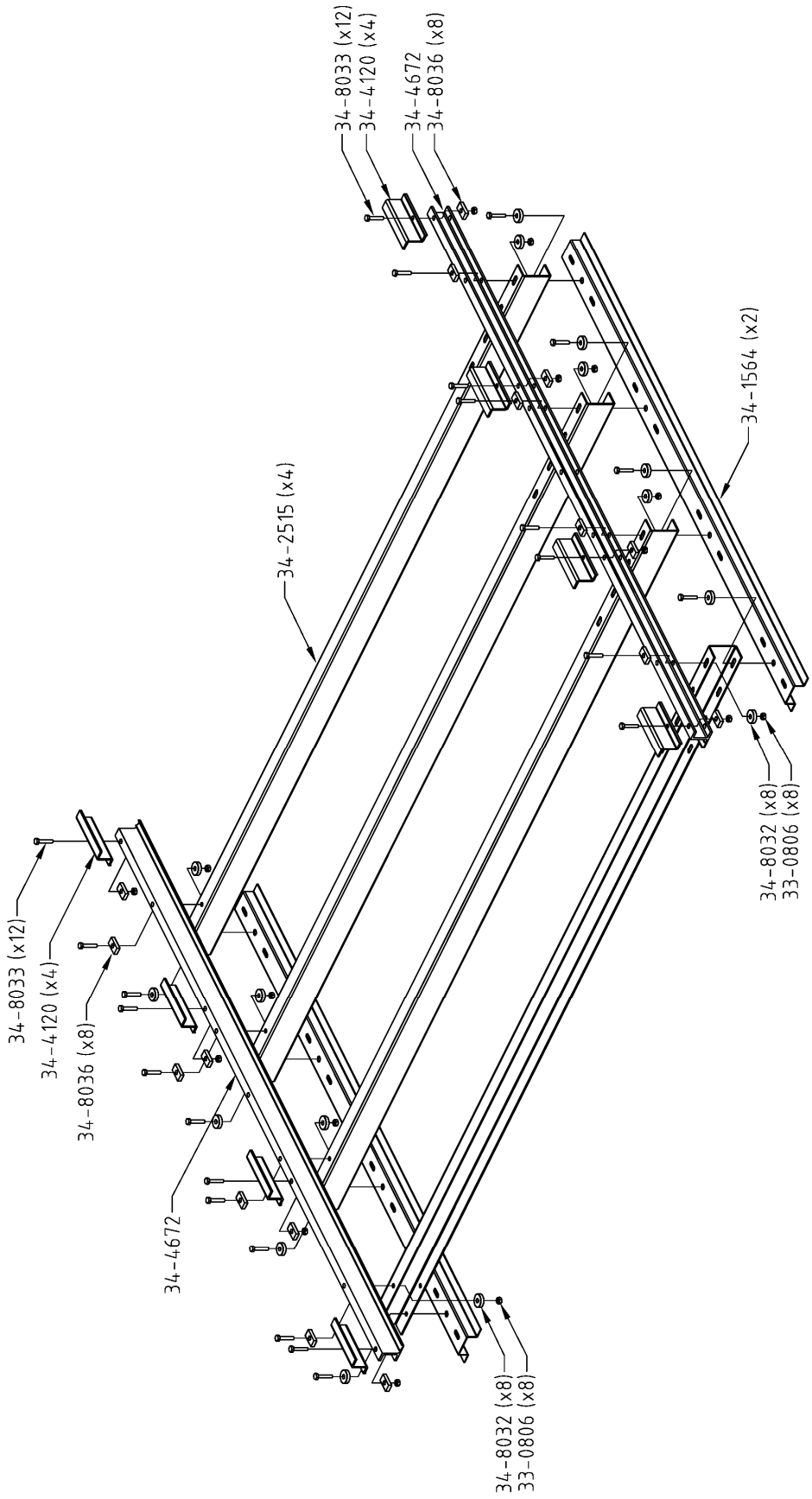



**Diagram 2**
**With Pitch Two Collector Frame Kit No 12106900**

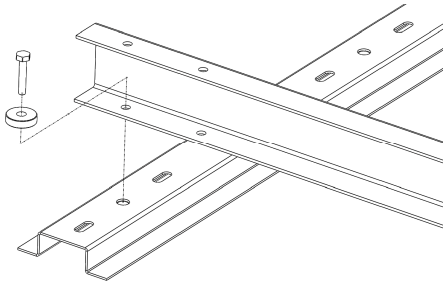
# ON ROOF MOUNTING

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

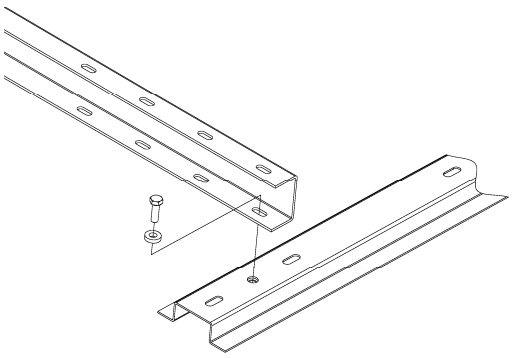
Refer to the assembly diagrams Diagram 1 (one collector) or Diagram 2 (two collectors).

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

- Determine the position on the roof where the frame and solar collectors are to be installed.
  - Select the position of and install the two roof battens to which the With 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 1800 mm, 1890 mm, 1980 mm or 2070 mm. Check this distance with the distance between the two holes on a U-frame which are to be used to secure the base plates to the U-frames and ensure the distances are equal.
- Loosely fit the base plates and the U-frames together, using screws and washers provided, securing a screw into each nutsert in the base plates.
  - Use one washer (round Ø 30 x 8 mm SS – 348032) per fixing, under the screw head.
  - There are two holes provided at approximately 49 mm to 137 mm from one end of the U-frame. This is the top end of the U-frame, is to be installed toward the ridge of the roof.
    - The first hole of these two, closest to the top end of the U-frame (49 mm from the end), must be used to secure the U-frame to the base plate.
  - There are four slotted holes provided at the other end of the U-frame. This is the bottom end of the U-frame, is to be installed toward the roof gutter.
    - Select the slotted hole that provides the correct batten to batten centre distance from the hole used to secure the top base plate to the top end of the U-frame.
  - 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.

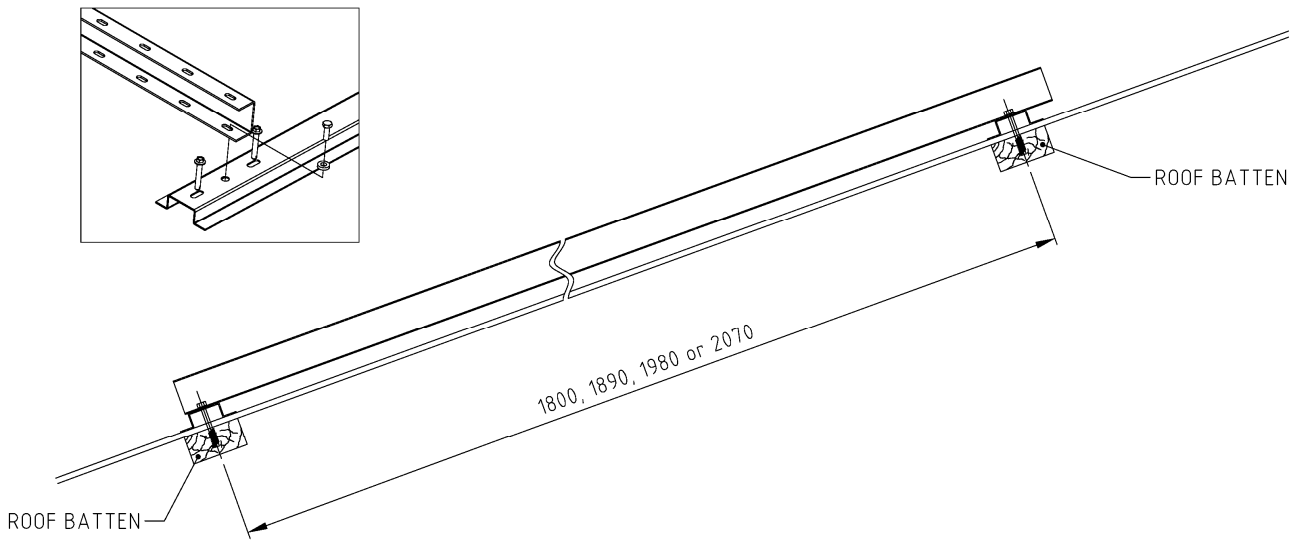


**top end of U-frame – assembly guidelines**



**bottom end of U-frame– assembly guidelines**

- 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.
  - 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 eight fixing points on each base plate for a two collector frame.




**Bolts or Tek screws to penetrate either side of U-frame**

- 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 10 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 “Installation of Collector Rails” on page 11 for the procedure to install the collector rails, solar collectors and collector clamps to the U-frames (342515) of the frame.

**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.

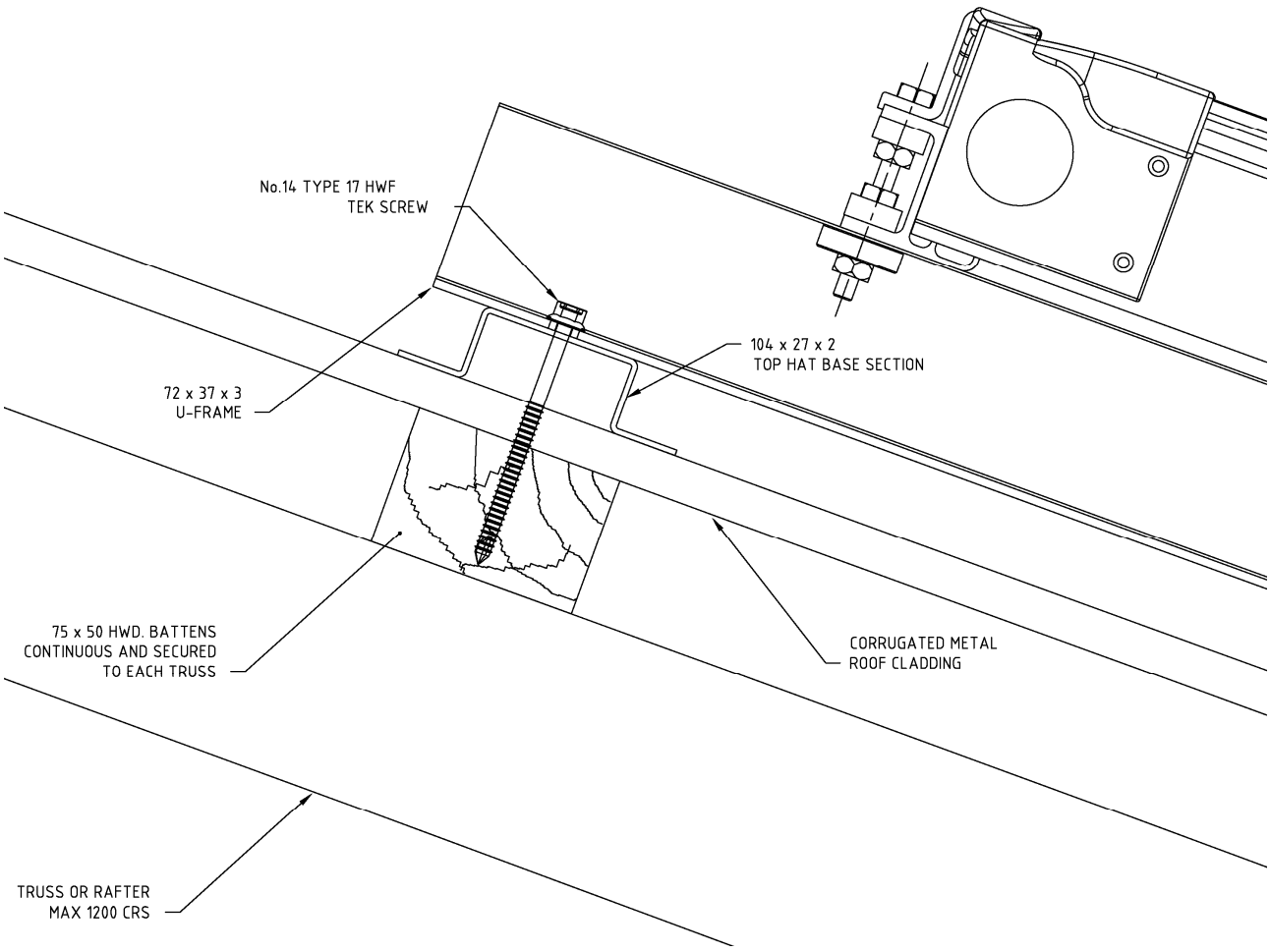
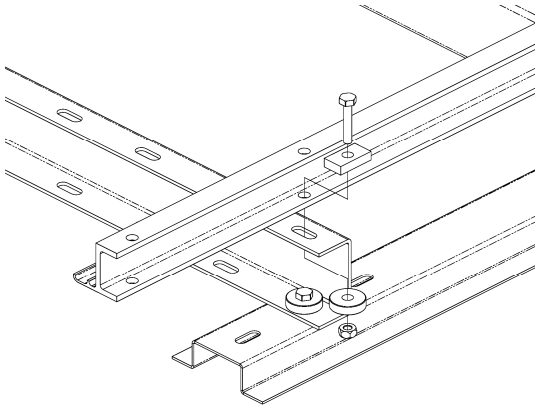



**Diagram 3**
**On Roof Mounting Tek Screw into Timber Batten**

# INSTALLATION OF COLLECTOR RAILS

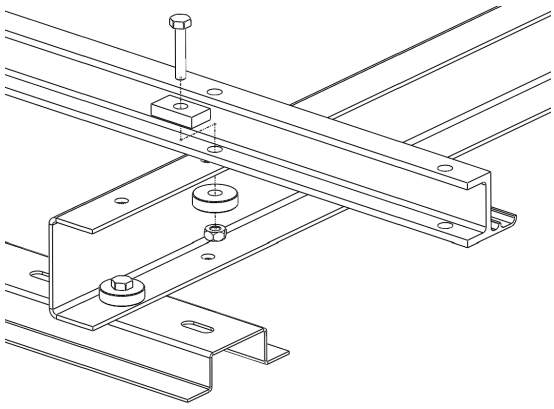
To install the collector rails to the U-frames (342515):

- Fit a collector rail to the bottom end of each of the U-frames, securing with screws, washers and nuts provided.
  - Use the lowest of the four slotted holes located at the bottom end of the U-frame.
  - Use two washers per fixing;
    - Use one washer (rectangular 35 mm x 19 mm x 8 mm SS – 348036) under the screw head.
    - Use one washer (round Ø 30 x 8 mm SS – 348032) under the nut.
  - Tighten up the nuts and screws.



**fit collector rail to bottom end of frame**

- Fit a collector rail to the top end of each of the U-frames, securing with screws, washers and nuts provided.
  - Use the lower of the two holes in the U-frame, located adjacent to the top base plate.
  - Use two washers per fixing;
    - Use one washer (rectangular 35 mm x 19 mm x 8 mm SS – 348036) under the screw head.
    - Use one washer (round Ø 30 x 8 mm SS – 348032) under the nut.
  - Tighten up the nuts and screws.

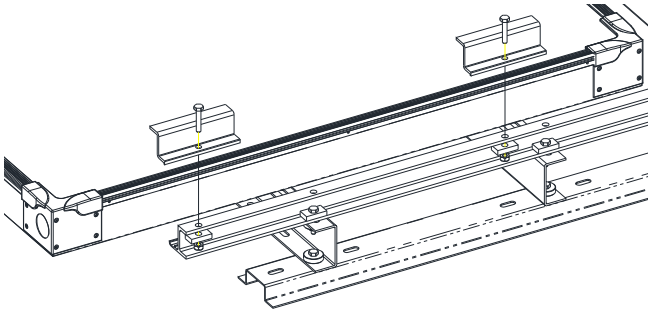


**fit collector rail to top end of frame**

To install the solar collectors onto the frame:

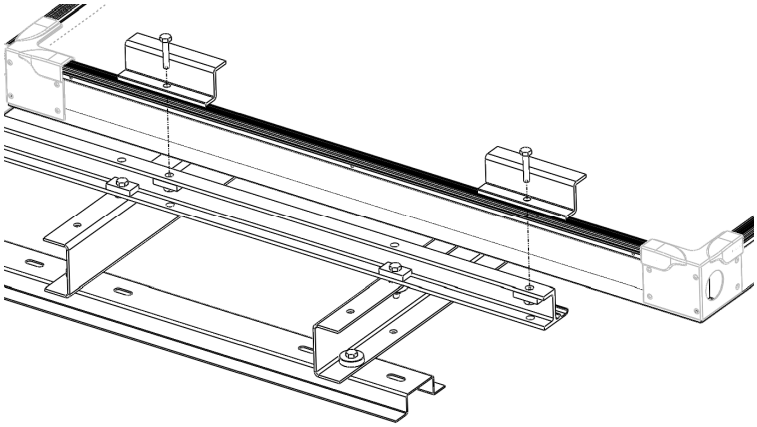
- Position the top of the first solar collector onto the top collector rail and the bottom of the solar collector onto the bottom collector rail.
- Insert the two collector unions (two collector system) into the sockets of the first solar collector and loosely screw each gland nut into its socket.
- Position the top of the second solar collector (two collector system) onto the top collector rail and the bottom of the solar collector onto the bottom 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).

- Loosely fit the collector clamps, two per solar collector, to the bottom collector rail, using a screw, washer and nut provided for each clamp.
  - Use one washer (rectangular 35 mm x 19 mm x 8 mm SS – 348036) per fixing, under the nut.



**loosely fit collector clamps to bottom collector rail**

- Loosely fit the collector clamps, two per solar collector, to the top collector rail, using a screw, washer and nut provided for each clamp.
  - Use one washer (rectangular 35 mm x 19 mm x 8 mm SS – 348036) per fixing, under the nut.



**loosely fit collector clamps to top collector rail**

- Conduct a final alignment of the solar collectors.
- Tighten up the nut and screw at each collector clamp to secure the solar collector(s) to the frame.
- Refer to the Installation Instructions supplied with the roof kit for details to complete the connections to the solar collectors of the solar cold and solar hot pipe work.

# SYSTEM CERTIFICATIONS

The structural engineering analysis and design of this With 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 With 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.

Cardno
Shaping the Future

Our Ref: 605744-LO-45-048

Contact: Ryan Feller

18 October 2010

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

www.cardno.com.au

Rheem Australia Pty Ltd
112 Pilbara St
WELSPOOL WA 6106

Attention: Mr. Gary Gendall

Dear Gary,

**RE: Solar Hot Water Support Frame No. 048**

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 only with pitch anti-cyclone frame

Manufacturer's Name: Rheem Australia PTY LTD

Drawing No. 048 Rev. 2 dated 14/10/2010

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 D, terrain category 2, installed at a maximum height of 10m (design wind speed 88m/s). This loading exceeds the requirements of Wind class N6/C4 when assessed in accordance with AS4055-2006 Wind loads for housing.

Cardno
Shaping the Future

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

Cardno
Shaping the Future

Our Ref: 605744-LO-45-049

Contact: Ryan Feller

18 October 2010

Cardno (NSW) Pty Ltd
ABN 95 001 145 035

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Rheem Australia Pty Ltd
112 Pilbara St
WELSPOOL WA 6106

Attention: Mr. Gary Gendall

Dear Gary,

**RE: Solar Hot Water Support Frame No. 049**

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 only with pitch anti-cyclone frame

Manufacturer's Name: Rheem Australia PTY LTD

Drawing No. 049 Rev. 2 dated 14/10/2010

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
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Cardno
Shaping the Future

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Yours faithfully,

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

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