



Installation Instructions

TZ58-1800 Heat Pipe Collector



SALES CODE: SOL000BKL

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1. Introduction

Thank you for purchase the Firebird range of TZ58 heat pipe solar collectors. We hope that you enjoy many years of free solar energy. The Firebird TZ58 heat pipe collectors are built to the highest high quality standards and are suitable for both domestic and commercial use.

We would ask that you carefully read these instructions before commencing the installation. Should you have any questions please contact our technical department. Failure to adhere to installation instructions may invalidate your product warranty and any extended warranty programme that is in place.

Please note that the installer must conform to local regulations and the responsibility for proper solar system design lies with the installer/ building contractor.

Transport and Handling

The glass used on the vacuum tubes is fragile so great care should be taken when transporting and handling the tubes.

Under no circumstances should vacuum tubes be exposed to the sunlight before the system is fully commissioned. The TZ58 heat pipes should only be inserted into the manifold when the system has been commissioned and filled with glycol.

2. Health & Safety

When installing, commissioning or servicing a Firebird solar system you must always comply with all relevant health and safety regulations and recommendations. Proper safety and protective clothing should be worn, including hats, boots gloves and appropriate eye protection.

	If no mechanical fall protection or fall arrest systems are provided, working without suitable safety harnesses can lead to falls from great heights, thus causing serious or lethal injuries.		Safety harnesses should be fixed above the users where possible. These harnesses should only be fixed to structures or fixing points with sufficient load-bearing capacity.
	If mechanical fall protection or fall arrest systems cannot be installed for technical reasons, safety harnesses must be worn.		Do not use damaged ladders.
	Only use safety harnesses that have been tested and certified by authorised testing bodies.		Ensure that ladders are put up safely. Observe the correct leaning angle (68°-75°).
	Ladders not properly secured against sinking in, sliding or falling over may lead to dangerous falls.		Only lean ladders against secure points.
	Contact with live overhead cables can be lethal.		Wear protective goggles when drilling.
	Wear cut-proof safety gloves when carrying out installation work.		Wear safety shoes when carrying out installation work.
	Wear a helmet when carrying out installation work.		

3. Technical Specifications

Firebird supply TZ58 heat pipes in sets of 20 and 30 tubes. Specifications for both are as follows;

Type	TZ58-1800 20 tube set	TZ58-1800 30 tube set
Collector Outer Dimensions: Height [mm] Width [mm] Depth [mm]	2020 1825 155	2020 2655 155
Heat Pipe dimensions Diameter [mm] Length [mm]	58 1800	58 1800
Weight [Kg]	78	115
Gross collector area [m ²]	3.507	5.005
Aperture area [m ²]	1.867	2.791
Max Operating Pressure [bar]	6	6
Stagnation temperature [°C]	200	200
Angle of inclination permitted	15° to 75°	
Flow rate	0.5 to 1.5 l/min per m ² of aperture	
Solar fluid	Recommend Tyfoclor LS	

Performance data;

Zero-loss collector efficiency, η_0 (based on aperture area)	73.4%
Collector heat loss coefficient, a_1 [W/m ² K]	1.529
Collector performance ratio, a_1/η_0 [W/m ² K ²]	0.0166
Absorption	> 94 %
Emission	< 7%
Annual Energy Yield [kWh/m ²] (based on aperture area)	> 525

4. Scope of delivery

Firebird supply TZ58 heat pipes in sets of 20 and 30 tubes. Contents and Firebird sales codes for both sets are set out below.

20 Tube Set

2 x SOL161VHP	10 tube set
1 x SOL166MAN	20 Tube Manifold kit & Tail stock kit
1 x SOL164RMF	Mounting frame; consisting of 2 x box sections 3 x u-channel uprights 3 x cross members 6 x angle brackets Assortment of M8 and M6 screws, nuts & washers
1 x SOL169MKT	Roof mounting kit; consisting of 1 x mounting bracket for tile roof 6 x stainless steel supports 6 x M10 bench screws, washer and nuts

30 Tube Set

2 x SOL162VHP	15 tube set
1 x SOL167MAN	30 Tube Manifold kit & Tail stock kit
1 x SOL165RMF	Mounting frame; consisting of 2 x box sections 3 x u-channel uprights 3 x cross members 6 x angle brackets Assortment of M8 and M6 screws, nuts & washers
1 x SOL169MKT	Roof mounting kit; consisting of 1 x mounting bracket for tile roof 6 x stainless steel supports 6 x M10 bench screws, washer and nuts

5. Pre-installation Checks

Before commencing the installation of the TZ58 solar collectors the following points must be checked.

- The solar system design, installation and commissioning must comply with all relevant European, national and local standards
- The roof or structure which will support the collectors must have sufficient load bearing capacity
- The intended orientation of the collectors should be as close to true south as possible. South-west or south-east facing installations are also acceptable and will only incur minor losses.
- For Northern Europe, the ideal inclination angle is between 40° and 50° to the horizontal
- Avoid shadowing from trees or nearby buildings

Determining location of collectors on roof

Make sure that there's enough free space on the roof to fit the intended number of collector tubes, bearing in mind position of velux windows, chimneys, etc. When joining two or more sets of collectors allow an additional 100mm for the connection joint

The total tube height is 2020mm; collector widths are as follows;

- 1 x 20 tubes 1825mm
- 1 x 30 tubes 2625mm
- 2 x 20 tubes 3750mm
- 3 x 20 tubes 5675mm
- 4 x 20 tubes 7600mm
- 5 x 20 tubes 9525mm
- 2 x 30 tubes 5350mm
- 2 x 30 tubes 8075mm

Please note that a maximum of 100 tubes can be connected in series, i.e. 5 x 20 tubes or 3 x 30 tubes.

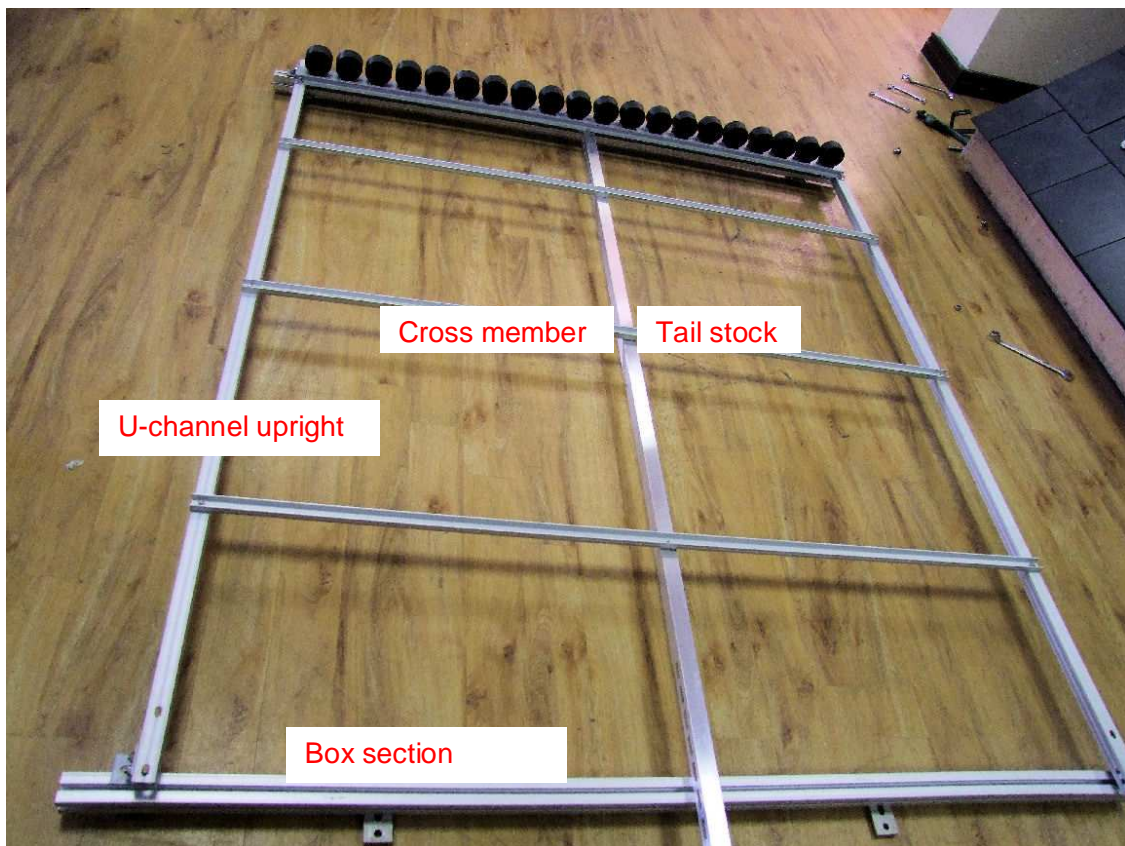
6. Installation

The installation of the TZ58 heat pipes can be broken into three stages

- A. Assembly of collector frame
- B. Securing collector frame to roof
- C. Insertion of heat pipe tubes

PART A – ASSEMBLY OF COLLECTOR FRAME

1. First lay out all pieces on the ground as shown below.

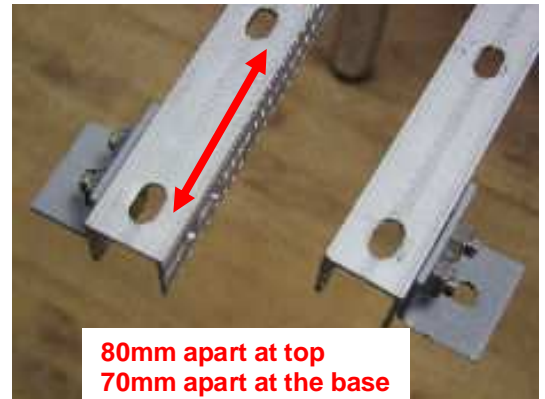


The collector frame for the 20 or 30 tubes set containing following components;

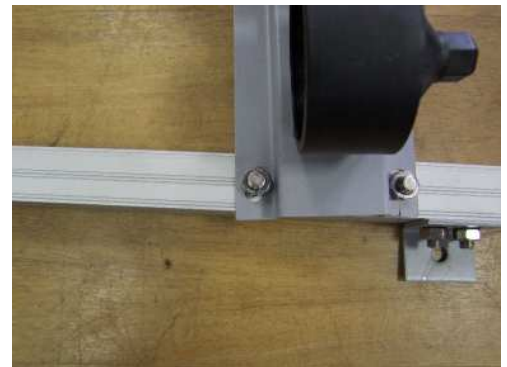
- 2 x box sections
- 3 x cross members
- 3 x uprights
- 1 tail stock
- 6 x angle brackets
- 20 x M8 x 20 screws
- 10 x M8 nuts
- 10 x M8 washers
- 6 x support brackets

2. Start by securing the six angle pieces to the top and bottom of the three U-channel uprights as shown right. Make sure that the top edge of the angle bracket does not protrude above the U channel.

NOTE: to distinguish between the top and bottom of the U-channel uprights measure the distance between elongated holes. At the top of the upright (manifold end) the holes are 80mm apart. The elongated holes are 70mm apart at the base (tail stock end).

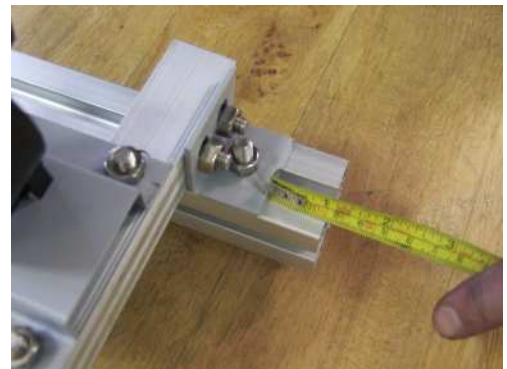


3. Secure the tail stock to the base of the u-channel upright using M8 screws and nuts.

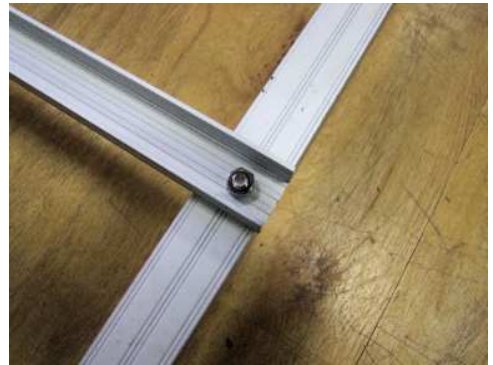


4. The next step is to secure the two box sections to the three u-channel uprights. Slide an M8 screw upside down into the box section and secure to the angle bracket attached to u-channel upright with a M8 nut and washer.

NOTE: Make sure that the outer brackets are centered on the box section by checking the distances as show left.



5. Now secure the three cross members using the pre-drill holes in the u-channel uprights using M6 screws and nuts.



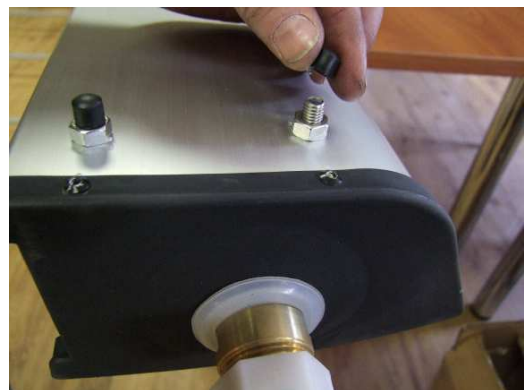
6. The frame should now look like the picture right.



7. Insert the seals provided into the manifold as shown.



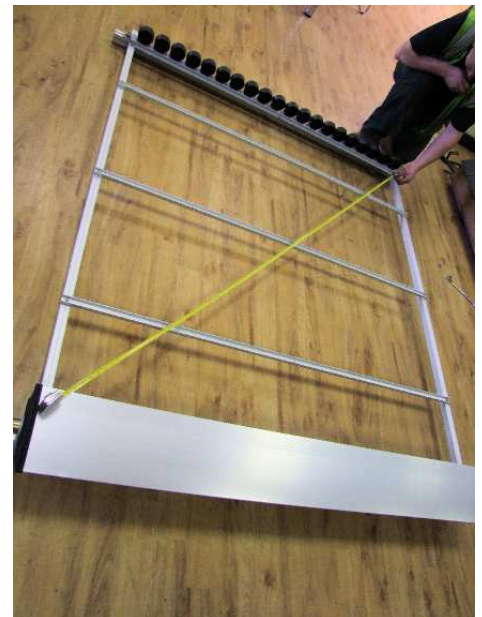
8. Remove the rubber protectors from the back of the manifold. Do not remove the nuts that are already on the manifold.



9. Secure the manifold to the top of the U-channel uprights using M6 nuts.



10. Finally check that the frame is square. If it's not, loosen the screws/nuts on the tail stock and manifold, and adjust before retightening everything.

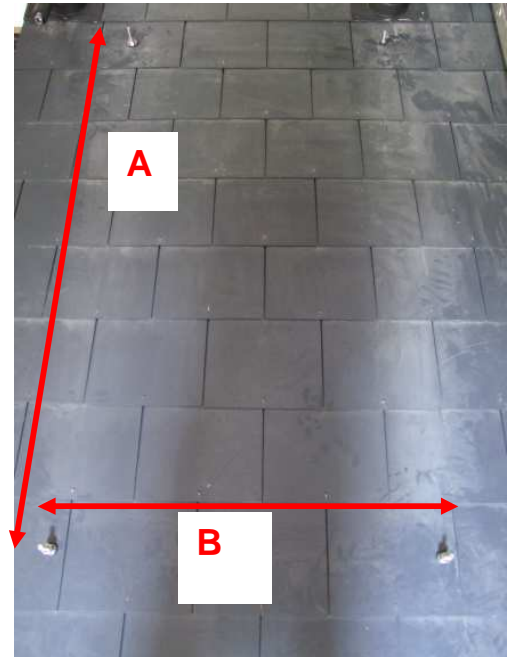


PART B – SECURING FRAME TO ROOF

For slate roofs the mounting frame is secured to the roof using coach bolts. The coach bolts can also be used on concrete tiled roof although special brackets can also be supplied

The fixing positions on the roof for the 20 and 30 tubes should be in accordance with the dimensions below.

	20 Tubes	30 Tubes
A	1800 ± 10mm	1800 ± 10mm
B	1200 ± 125mm	1600 ± 125mm



B1. SLATE ROOF INSTALLATION

11. Mark out the intended locations of the bench screws. Start with one side, positioning the screw on the nearest rafter. Measure across distance B – if this doesn't tie up with a rafter position, continue on to next rafter.

12. Drill holes in predetermined position using suitable drill bit and using water to keep the material cool. Insert weatherproof silicon into hole.

13. Screw bench screw fully into roof. Slide seal, washer down over screw and lock and two nuts as shown below. Screw bench bolts fully into roof support.



14. Slot M10 screws into box section and secure support plate using the elongated slot as shown. Attach washer and M10 but hand tighten only at this stage.

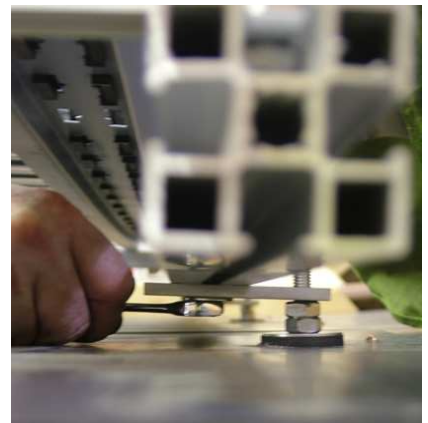
15. Position collector frame over bench screws and lower onto bench screws.



16. Fasten down with M10 nut.



17. Finally tighten the nuts securing the box section to the support plate.



B2. TILED ROOF

18. Mark out the intended locations for the support brackets. Measure across distance B – if this doesn't tie up with a rafter position continue on to next rafter.

	20 Tubes	30 Tubes
A	1800 ± 10mm	1800 ± 10mm
B	1200 ± 125mm	1600 ± 125mm

19. Drill holes into the roof rafters as shown in the picture right.



20. To ensure that the tile covering the bracket does not protrude up remove material from the underside of the tile as shown right.



21. Place tile over bracket and secure with roof nail.



22. Slot M10 screws into the box section and secure to the roof bracket as shown right.



PART C – INSTALLING HEAT PIPE VACUUM TUBES

IMPORTANT NOTE:

The solar circuit must be commissioned filled with a glycol mix before the heat pipes are installed and exposed to sunlight – otherwise overheating of the tubes may occur causing damage. See section 7 for full commissioning details.

23. Firstly, remove the plastic caps on the tail stock.



24. To ensure that the heat pipes fit easily into the manifold lightly lubricate with water or glass cleaning agent.



25. Gently slide heat pipe inside ring on tail stock and up into manifold; rotate the tube slow to assist the action.



26. Position the heat pipe tube into the tail stock and screw the plastic cap on again.



27. Insert collector sensor to flow side of the manifold. Use suitable conducting compound to ensure optimum contact.



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7. Commissioning

NOTE: The solar circuit must be commissioned filled with a glycol mix before the heat pipes are installed and exposed to sunlight – otherwise overheating of the tubes may occur.

The solar circuit should be filling using a suitable pump. The recommended system pressure is 2.5 to 3 bar. The flow rate should be set between 0.5 l/min and 1.5 l/min per m² of aperture.

8. Maintenance

A solar system should be checked annually. The following maintenance checks relate to the TZ58 heat pipes only;

- Ensure that mounting frame is firm and secure to the roof/support structure.
- Check the heat pipes tubes for visible damage, leaks, contamination or loss of vacuum (loss of silver tip). Replace any damaged tubes.
- Check system pressure; refill system if necessary.
- Check pH and freezing point of glycol mix. Ideally the pH should be around 7.5. If it's less and 7 replace the heat transfer fluid.

9. Warranty

Firebird provides five years manufacture warranty on the TZ58 heat pipe tubes from date of purchase.



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Republic of Ireland

Firebird
Udaras Industrial Estate
Baile Mhic Ire
County Cork

T: 026 45253
F: 026 45309

www.firebird.ie

Northern Ireland

Firebird Products
Shean
Forkhill
Newry
BT35 9SY

T: 028 3088 8330
F: 028 3088 8330

www.firebird.ie

United Kingdom

Firebird UK
East Central Ho. Central Ave.
Lee Mill Industrial Estate
Ivybridge,
Devon, PL21 9PE

T: 01752 691177
F: 1752 691131

www.firebirduk.co.uk

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