

AAA
ECOENERGY®



SOLAR HEAT PIPE
COLLECTOR
TZ58/1800- R SERIES

Installation Manual



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Table of Contents

1. ASSEMBLY INSTRUCTIONS
2. STRUCTURE
3. CONNECTIONS
4. TECHNICAL DETAILS
5. TECHNICAL SPECS
6. PACKING DETAIL
7. INSTALLATION
8. COLLECTOR
9. INDOOR POOL EXAMPLE
10. WARRANTY

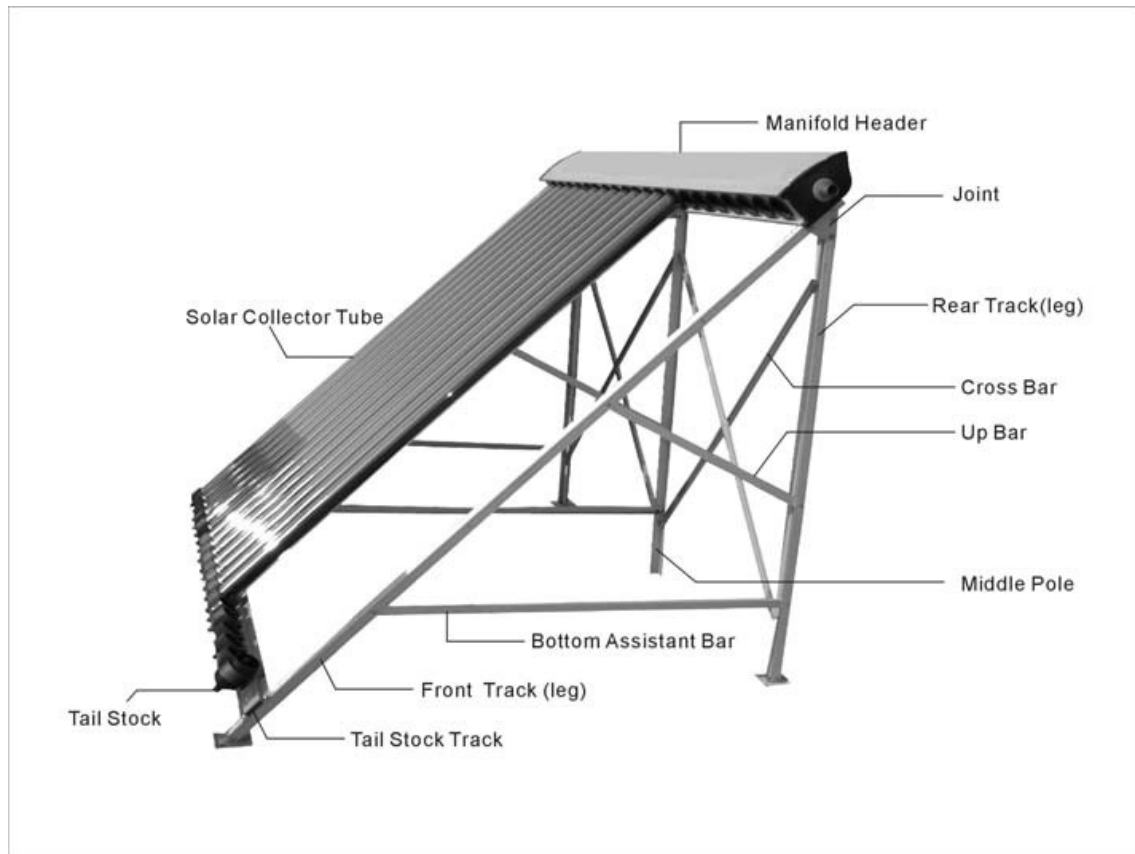
Overview

Vacuum tube solar collectors are amongst the most efficient and most costly types of solar collectors. These collectors are best suited for moderate temperature applications where the demand temperature is 50-95C. Vacuum tube solar collectors have a selective absorber for collecting sunlight that is in vacuum-sealed tube, so the thermal losses are very low even in cold climates.

Applications of vacuum tube collectors include heating of domestic and commercial hot water, and indoor and outdoor swimming pools. Our solar collector has been manufactured to the very highest standards, and will provide you with many years of service, with the minimum of maintenance required. This brochure explains how it works, and provides information of a solar water heating installation. Before assembly and installation, please read this brochure carefully.

TZ58/1800-15R, 20R, 30R WITH STAND

TZ58/1800-15R, 20R, 30R WITHOUT STAND



1. Assembly Instructions

The solar collector is suitable for flat roof, tiles roof, slate roof etc. The installation may only be carried out by qualified solar technician. Please inform yourself about the applicable local norms and regulations before mounting and operating the solar system.

Installing a collector on sloping roof means an intervention into an existing roof, please notice to protect the section from water penetration caused by wind pressure and snow. This substructure and its connections to the main building structure should be designed at the installation site in accordance with the local conditions.

The roof structure must be able to take the wind and snow loads that can occur in the respective region. The use of a carrying strap is recommended for transporting the collector. The collector must not be lifted at the connections or on the threading. Avoid impacts and mechanical action on the collector, especially on the solar glass and the pipe connections.

2. Structure

The collectors may only be mounted on sufficiently load-bearing roof surfaces and substructures. It is essential that the structural load-bearing capacity of the roof and the substructure must be tested at the installation site before mounting the collectors. Here, particular attention should be paid to the quality of the substructure in terms of the stability of the screw joints necessary for installing the collectors. In particular, it is essential to have the entire collector structure verified at the installation site according to country specific regulations in regions with heavy snowfalls and strong winds.

3. Connections

The collectors must be connected using $\frac{3}{4}$ inch fittings. Precautions must be taken to protect the collectors when connecting in series due to high fluid temperatures causing possibility of heat transfer fluid vaporization & over expansion of connection joints leading to joint failure. In this case, no more than 6 collectors (20R) or 4 collectors (30R) may be connected in series. Larger collector arrays must be assembled with larger expansion compensators.

Collector inclination

The collector should be assembled at angles between 15° (minimum) and 75° (maximum). Exemple : 42 will be the perfect angle for southern Ontario .

Steps must be taken to ensure that water and dirt are prevented from getting into the collector connections and air vents.

4. Technical Details

Filling

For safety reasons, you should only fill the collectors when there is no direct irradiation from the sun (or cover the collectors). Especially in regions exposed to frost, you should use non-mixable, premixed antifreeze. It is impossible to completely empty collectors once they have been filled. For this reason, collectors exposed to frost should only be filled with antifreeze, also for pressure and function tests. We recommend to fill the system with a pressure filling pump to eradicate any air bubbles within the manifold and solar circuit.

Installing the temperature sensor

The temperature sensor should be installed in the sensor sleeve nearest to the collector array flow to the hot water store. To ensure optimal contact between the sensor and the surrounding environment, the gap between the sensor sleeve and the sensor element is filled with a suitable conducting compound. All materials used for installing temperature sensors (sensor element, cables, conducting compound, sealing and insulating materials) must be suitably temperature resistant (up to 250° C).

Operating pressure

The maximum operating pressure is 60 psi, recommended operating pressure is 15 up to 50 psi with pre charge pressure of expansion vessel set at 35 psi bar, pressure will raise vaporization point of Solar Mate.

Pressure relief valve

80 psi maximum

Air vent

If a solar rated Air Vent is to be used on the system, the isolation valve must be switched off after commissioning to prevent any possible damage to the air vent.

Check heat transfer fluid

The heat transfer fluid must be checked every 12 months with regard to its antifreeze and pH value. We recommend to use Solar Mate fluid.

Maintenance of the collector

The collector or the collector array must be inspected visually, once a year, for any damage, leaks and contamination and also antifreeze level checked as the above recommendation.

5. Technical Specifications

	TZ15R	TZ20R	TZ30R
Gross Collector Area (m²)	1.39	1.86	2.79
Absorber Area (m²)	1.20	1.60	2.41
Height (mm)	2002	2002	2002
Width (mm)	1352	1742	2500
Depth (mm)	140	140	140
Weight (kg)	54	71	106
Water Content (litres)	1.2	1.6	2.3
Connections (mm)	22	22	22
Maximum collectors in series	13	10	6

Collector glazing Evacuated tubes (Borosilicate glass)

Absorber Copper heat pipe

Housing/Frame Aluminum manifold & frame section

Insulation 40mm

Max operating pressure 60 psi

Stagnation temperature 203°C

Flow rate recommendation 50-150 l/m²h (ms)

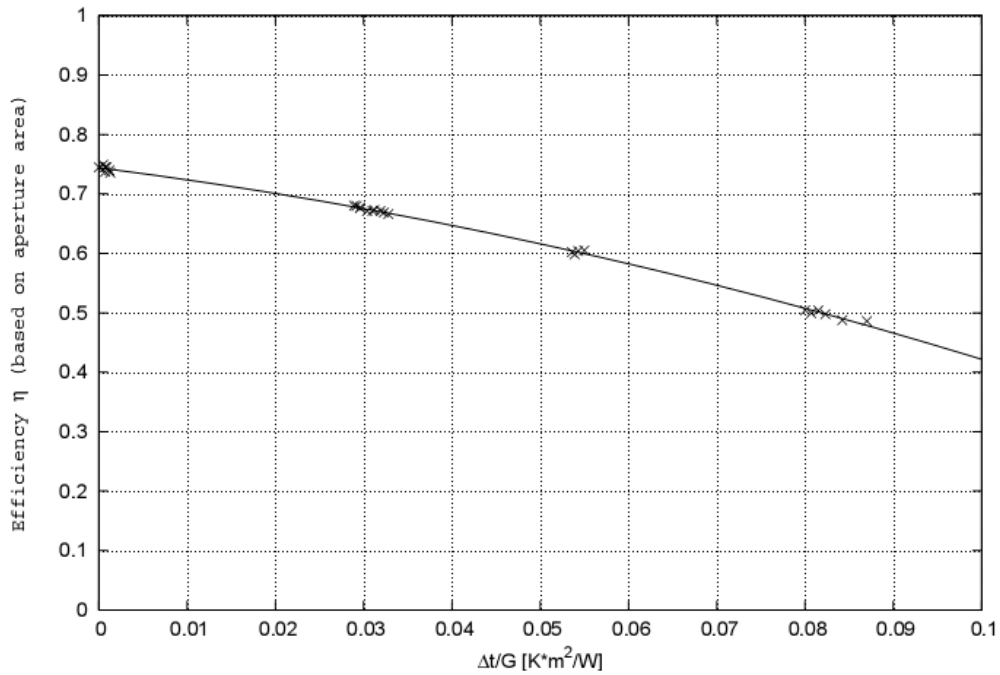
Min/max inclination angle 15-75°

Absorption 94%

Emission 7%



Efficiency Curve



The calculated parameters are based on following areas:

aperture area of 0.936 m

$$\eta_{0a} = 0.734$$

$$a_{1a} = 1.529 \text{ W/m}^2 \text{ K}$$

$$a_{2a} = 0.0166 \text{ W/m}^2 \text{ K}^2$$

absorber area of 0.808 m :

$$\eta_{0A} = 0.850$$

$$a_{1A} = 1.771 \text{ W/m}^2 \text{ K}$$

$$a_{2A} = 0.0192 \text{ W/m}^2 \text{ K}^2$$

6. Packing Details

TZ58/1800-20, 30R with flat roof stand (For example 20R)

NAME	DESCRIPTION
All-Glass Evacuated Solar Collector Tube (with heat pipe)	20 PCS/CTN
Solar Collector with heat pipe (with stand)	1 SET/CTN 1 Manifold header, 20 tail stocks, 1 tail stock track, 3 back support bars, 3 joints
Solar Collector Frame (with stand)	1 SET/CTN 3 front tracks, 3 rear tracks, 3 up bars, 3 bottom assistant bars, 4 cross bars

TZ58/1800-20, 30R without flat roof stand (For example 20R)

NAME	DESCRIPTION
All-Glass Evacuated Solar Collector Tube (with heat pipe)	20 PCS/CTN
Solar Collector with heat pipe	1 SET/CTN 1 Manifold header, 20 tail stocks, 1 tail stock track, 3 back support bars, 3 joints

TZ58/1800- 15R with flat roof stand (For example 15R)

NAME	DESCRIPTION
All-Glass Evacuated Solar Collector Tube (with heat pipe)	15 PCS/CTN
Solar Collector with heat pipe (with stand)	1 SET/CTN 1 Manifold header, 15 tail stocks, 1 tail stock track, 3 back support bars, 2 joints
Solar Collector Frame (with stand)	1 SET/CTN 2 front tracks, 2 rear tracks, 2 up bars, 2 bottom assistant bars, 2 cross bars

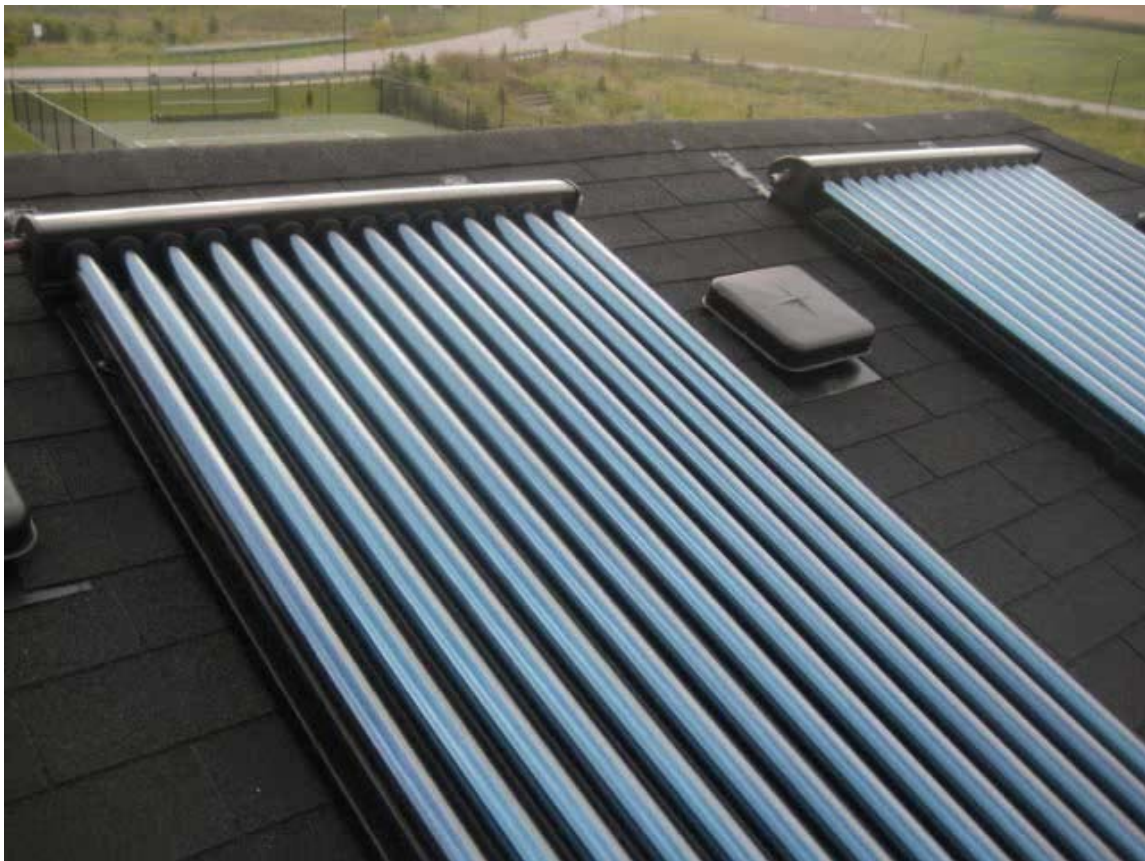
TZ58/1800-10, 15R without flat roof stand (For example 15R)

NAME	DESCRIPTION
All-Glass Evacuated Solar Collector Tube (with heat pipe)	15 PCS/CTN
Solar Collector with heat pipe	1 SET/CTN 1 Manifold header, 15 tail stocks, 1 tail stock track, 3 back support bars, 2 joints

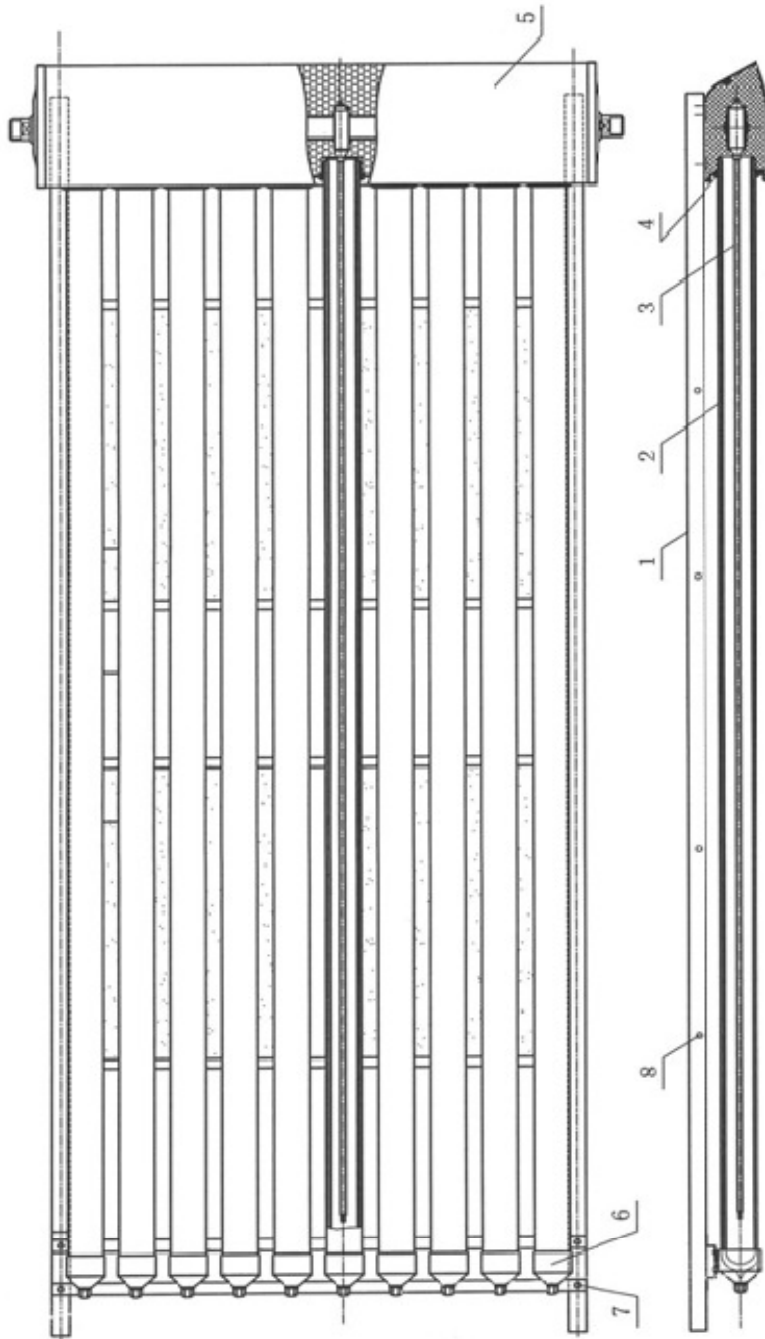
7. Installation

Various methods are used for collector mounting, suitable weather resistant unistrut should be fixed to the roof with hanger bolts and then the collector should then be fixed to the unistrut using stainless nuts and bolts.

Once the collector is in place it is advisable to connect & fill the solar loop and connect the wiring ready for commissioning before tube insertion, once the tubes are exposed to light very high temperatures can be generated in high irradiation conditions, if the tubes are inserted before filling the system, cover them with a suitable cover / sheet before filling of the system to avoid any vaporisation of the heat transfer fluid.

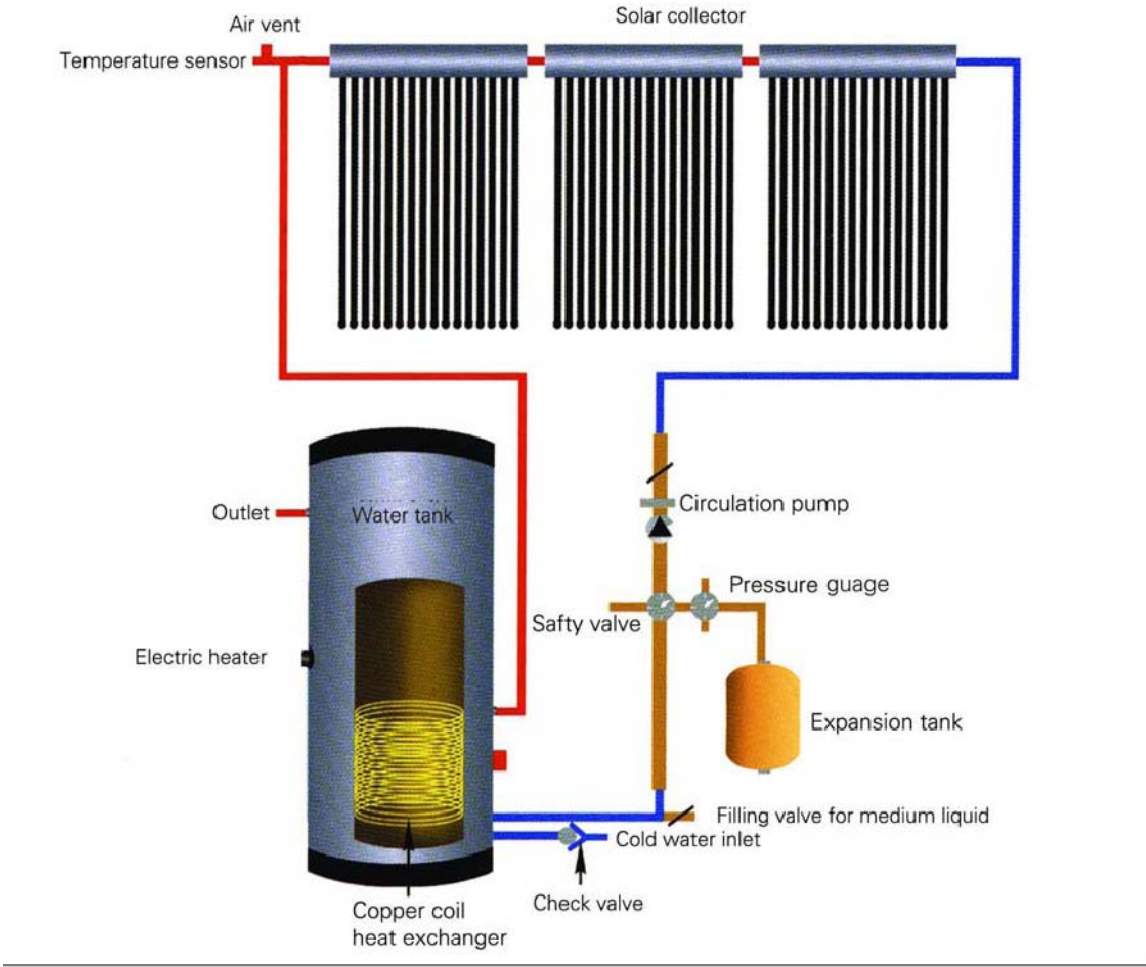


8. Collector Dimensions



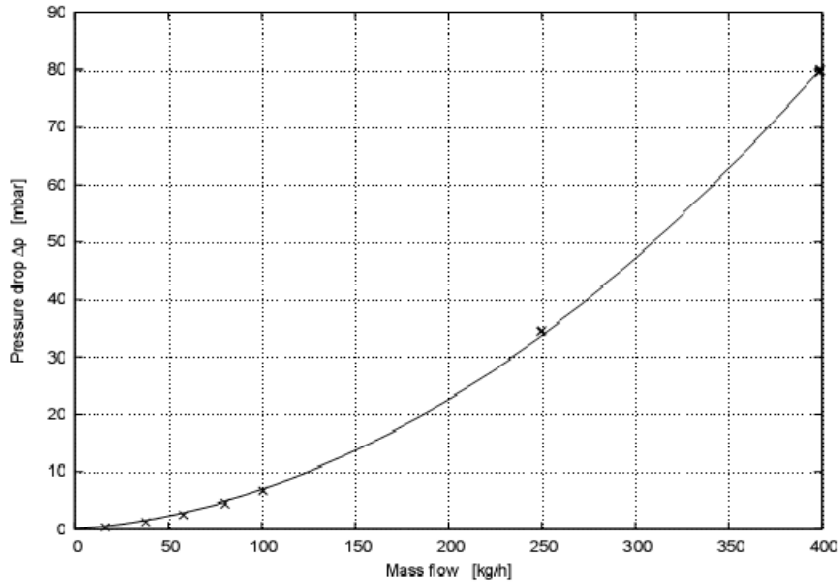
15R 2002*1352*140 mm
20R 2002*1742*140 mm
30R 2002*2500*140 mm

Collector In System

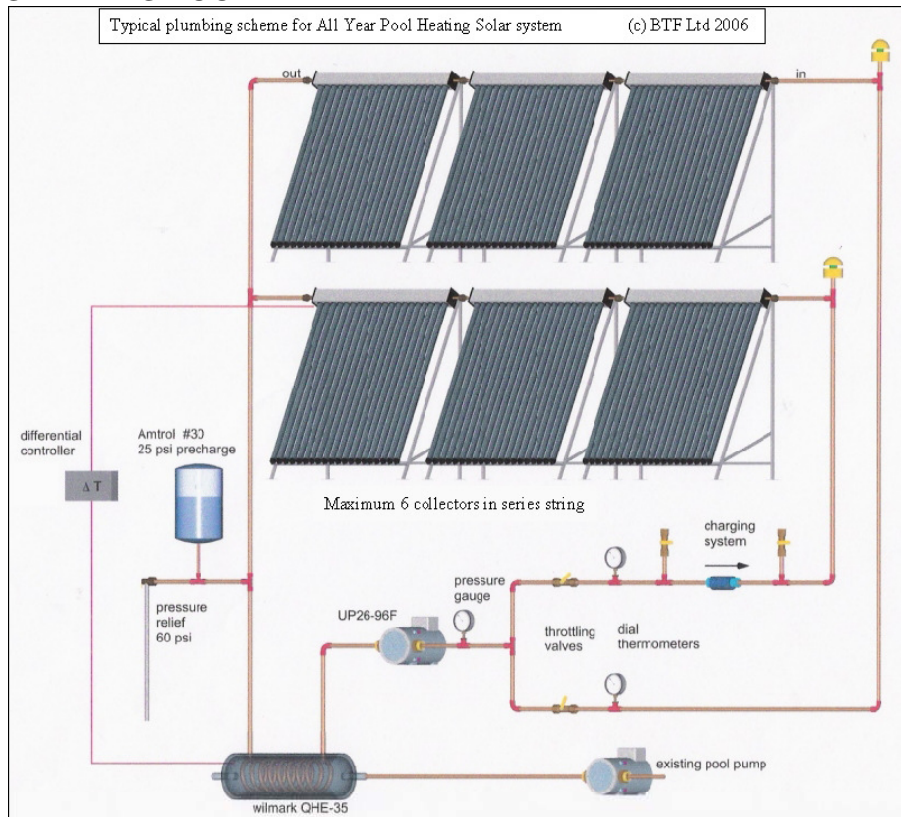


9. INDOOR POOL EXAMPLE

Pressure Drop



SWIMMING POOL



10. Warranty

No liability is accepted for incorrect use, unauthorized changes to the assembly components, or the resulting consequences. The warranty for the collector lasts for 10 years from the date of purchase provided the system has been installed by an approved AAA EcoEnergy solar technician and periodically inspected according to these instructions. Please always use the respective assembly instructions supplied with the collectors. Due to the possibility of setting and printing errors, and to the need for continuous technical change, please understand that we cannot accept liability for the correctness of the data. All photographs used are for illustrative purposes only. These assembly instructions contain proprietary information protected by copyright laws. All rights and changes to these assembly instructions are reserved.

TUBE VACUUM NOT COVERED UNDER THE WARRANTY.
HEAT PIPE EFFICIENCY WILL DECREASE OVER THE LIFE OF THE
COLLECTOR AND IS NOT COVERED IN THE WARRANTY.