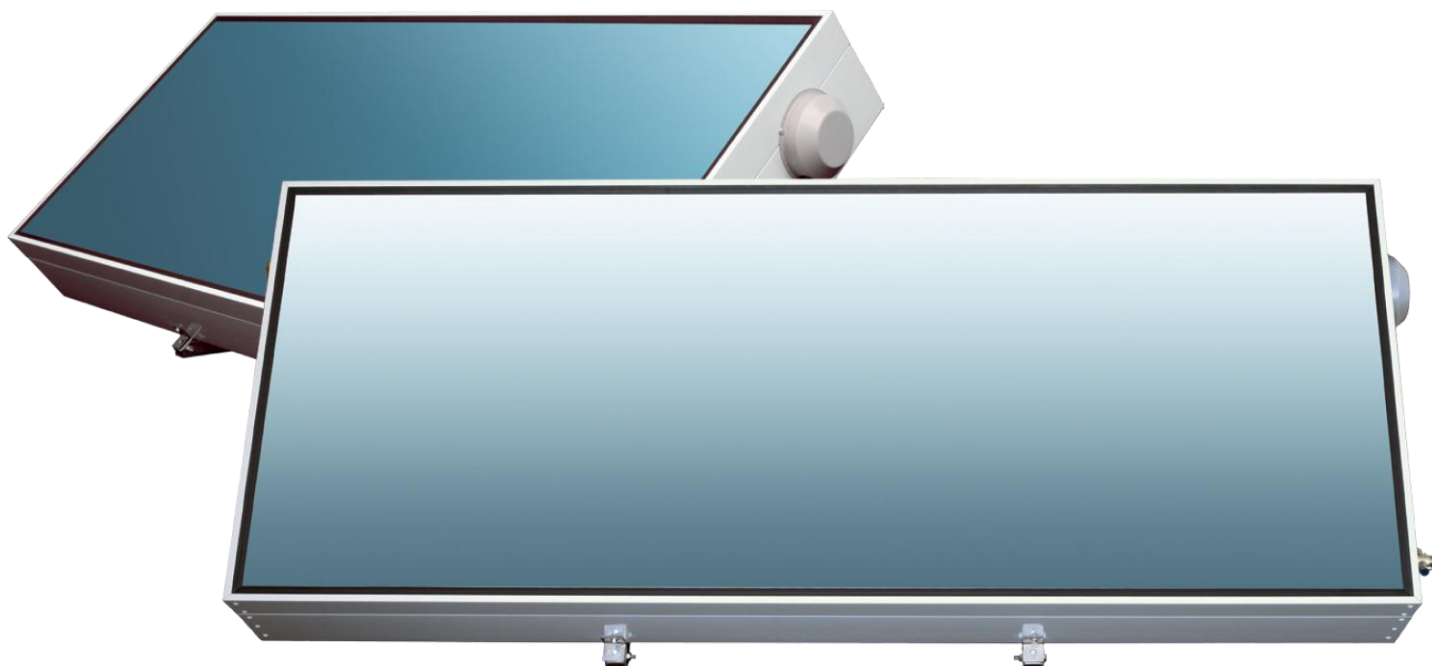


**Installation and Operation Manual**

**Diresol**



## **Contents**

- Safety Symbol Explanation
- Introduction
- Safety Precautions
- Technical Features
- Overview of Materials
- Measurements
- Installation
- Flat Roof
- Inclined Roof
- Hydraulic Connection
- Connection and Piping
- Electrical Connection
- Operating Instructions
- Anti-frost Protection
- Maintenance
- Installer's Comments
- Limited Warranty

## Safety symbol Explanation

### **DANGER**

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

### **WARNING**

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **CAUTION**

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### **CAUTION**

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage

### **NOTICE**

NOTICE indicates special instructions on installation, operation, or maintenance that are important but not related to personal injury or property damage.

## Introduction

This general manual provides important safety information relating to the installation, maintenance and handling of Diresol solar water heater. The instructions below apply for all models of Diresol. System users and professional installers should read this manual carefully and strictly follow the instructions in the manual. Failure to follow these instructions may result in death, injury or property damage. The Limited Warranty of the product will not cover damages, malfunctions, or failures resulting from improper installation or failure to operate and maintain Diresol in accordance with the manufacturer's instructions provided. The installation of solar water heaters requires specialized skills and should only be performed by licensed professionals.

## Safety Precautions

### **⚠ WARNING**

- All instructions should be read and understood before attempting to install.
- The installation of solar water heaters requires specialized skills and should only be performed by licensed professionals.

### **⚠ CAUTION**

All installations must be performed in compliance with all applicable regional and local codes or other national or international standards.

### **NOTICE**

Before installation, check the unit and the accessories for any visible defects, cracks, or other damages sustained in transport. If you see any damage, do not use the product.

### **⚠ CAUTION**

- The load bearing capacity of the roofing and the frame shall be specially checked or analyzed by a structural engineer before installation.
- Never lift the unit by any water connections or bolts.
- The collectors must be linked with a lightning arrester system and/or the building's ground system by a licensed electrician.

### **CAUTION**

- Roof penetrations for solar piping must be adequately sealed against water ingress.
- All piping should be properly insulated to avoid freezing and/or burn potential.
- Use only the original mounting components.
- No liability can be accepted for damage resulting from failure to observe the installation instructions.

### **⚠ CAUTION**

The collector becomes very hot in the sunlight. There is a risk of burn.

### **⚠ WARNING**

Only use safety harness equipment (harnesses or belts, ropes and straps, fall arresters, rope shorteners) that has been approved by authorized testing authorities.

### **⚠ DANGER**

Contact with live overhead electrical cables and wiring can lead to mortal injuries.

## Technical Features

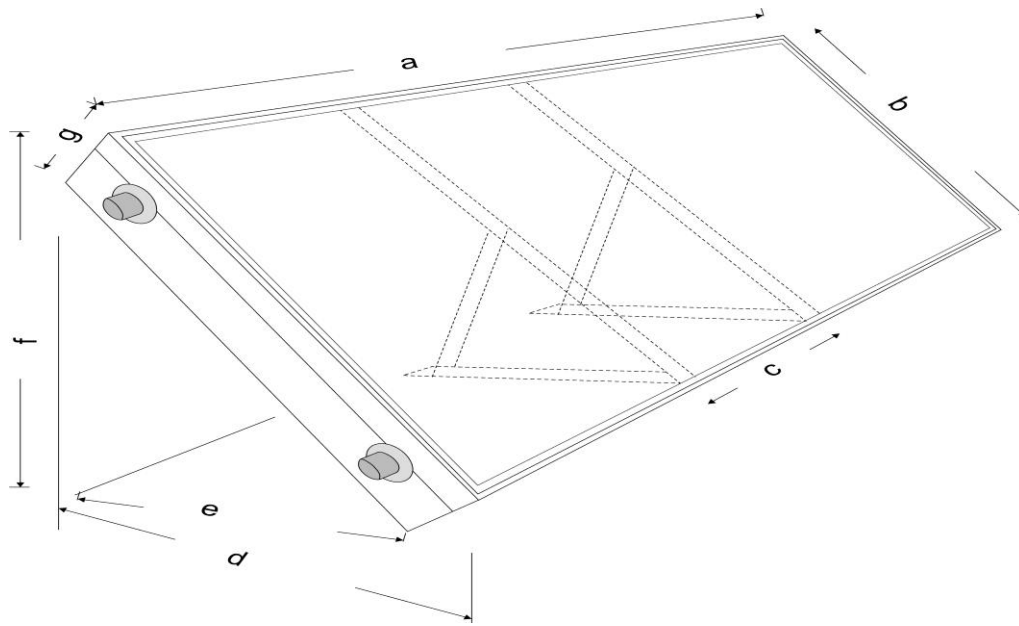
Type	Diresol 100	Diresol 150	Diresol 200
Total collector area	0,99 m <sup>2</sup>	1,96 m <sup>2</sup>	2,38 m <sup>2</sup>
Window area	0,92 m <sup>2</sup>	1,78 m <sup>2</sup>	2,13 m <sup>2</sup>
Dimensions	1,98 x 0,50 x 0,22 m	1,98 x 0,98 x 0,22 m	1,98 x 1,18 x 0,22 m
Boiler Volume	94	147	184
Max pressure	8 bar	8 bar	8 bar
Anti frost protection	Heating element 200w (optional)	Heating element 200w (optional)	Heating element 200w (optional)
Electric Back Up	2000 w (optional)	2000 w (optional)	2000 w (optional)
Cover	Prismatic solar safety glass	Prismatic solar safety glass	Prismatic solar safety glass
Weight	70 kg	98,5 kg	118,00 kg

## Overview of Materials

The package of the Diresol System contains:

Description	Pieces
Collector legs	2
Mounting Brackets	2
Hexagon bolt M10	6
Safety valve	1
Brass elbow	1
Electric resistance	1
Anti frost resistance	1 (optional)

## Measurements



TYPE	a	b	c	d	e	f	g
DIRESOL 100	1.98	0.50	1.00	0.53	0.40	0.52	0.22
DIRESOL 150	1.98	0.98	1.00	0.88	0.61	0.87	0.22
DIRESOL 200	1.98	1.18	1.00	1.01	0.67	1.02	0.22

## Installation

### **⚠ WARNING**

- Before installation load bearing capacity of the roof shall be ensured by a structural engineer. The maximum loads shall not be exceeded by snowfall or wind forces.
- The installation must be performed by professional staff of two or more people.
- Local instructions, laws and standards are to be kept.
- Never lift the module by any water connections or bolts.

### **CAUTION**

Always secure roof against water penetration.

### **NOTICE**

- For best performance, it is recommended that the collector faces true south.
- Collector incline should be at least 15° and no more than 70° for best performance.
- Choose the right location with respect to maximum sunlight exposure. Avoid installation in shaded areas.

### **NOTICE**

Follow the instructions step by step to install the Diresol system.

1. Unpack the unit.
2. Turn the system window down, after you have ensured that the surface to be put is clear. Avoid any physical damage on the module.

### **⚠ CAUTION**

Use the wrapping of the unit underneath the collector to protect the glass surface and the aluminum profile.

## Flat Roof

1. Attach the collector legs on the back wall of the collector and the mounting brackets at the bottom profile and tighten all bolts with a torque M10.

### **NOTICE**

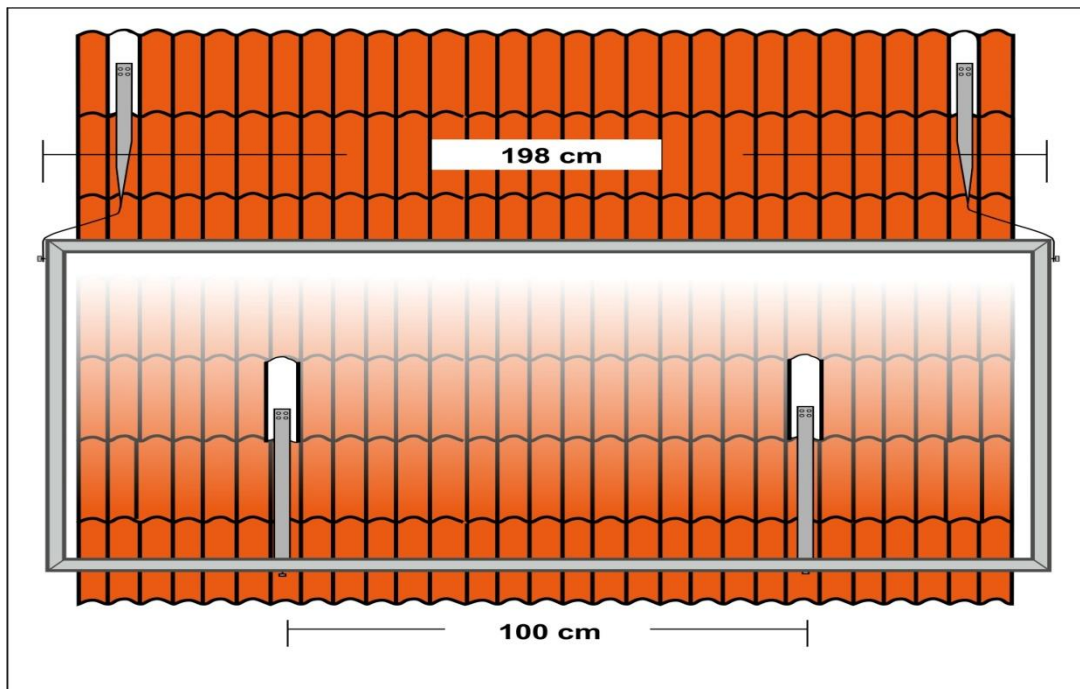
- Adjust the inclination by moving the vertical leg bolt to another position. Use the marked holes for the standard or low inclination.
- For maximum efficiency the inclination must be between 20° and 60°.

## ⚠ WARNING

Diresol shall only be installed on its original collector legs.

2. Lift the system upright.
3. Mark the attachment points.
4. Move the product to drill holes and put the product back to attach on the roof surface.
5. Securely tighten all bolts.
6. Continue with the hydraulic connection.

### Inclined roof



1. Affix the top and bottom collector straps to the beams under the roofing material.

## NOTICE

- The top collector straps have to be affixed with a distance of 1,98 m to each other for all models of Diresol.
  - The bottom collector straps have to be affixed with a distance of 0,98 m to each other for all models of Diresol.
2. Find the bolts at the top of the side casing of the collector. Affix the top collector straps on the collector and tighten all bolts with a torque M10.
  3. Find the bolts at the bottom of the side casing of the collector. Affix the bottom collector straps on the collector and tighten all bolts with a torque M10.
  4. Continue with the hydraulic connection.



## Hydraulic Connection



1. Connect the safety valve at the cold water inlet.

### **CAUTION**

- The safety valve is used to release the pressure of the system. It also works as a non-return valve to avoid contamination of the tap water from the water in the tank.
  - Ensure that the water entering the system does not exceed maximum pressure 4 bar.
  - Always connect the safety valve directly at the cold water inlet to protect the storage tank from high pressure. Do not cover the safety valve with insulation.
2. Ensure that there is a cold water supply isolation valve on the cold water supply tubing at an easily accessible site.
  3. Connect the cold water inlet at the lower tube (male thread 3/4 ")
  4. Connect the brass elbow to the hot water outlet at the indicated tube and connect the hot water supply tubing.
  5. Ensure that the hydraulic connections are correct and there is no leak.

## Connection and Piping

### **NOTICE**

- The water connections are external thread screws 3/4".
- Before tightening the connections make sure that seals are positioned properly.
- To prevent dielectric corrosion make sure that there is no connection between stainless steel and copper pipes.
- Use flexible pipes suited for sanitary facilities that withstand temperatures of at least 100 °C.
- Cold water supply and hot water return lines shall be well insulated with high quality flexible closed cell insulation to minimize heat loss of at least 3/4" wall thickness.
- Slide the insulation material over the pipe without cutting or taping. Seal all butt joints with contact adhesive.

## CAUTION

Appropriate insulation should be able to prevent pipes from freezing.

## Electrical Connection

There are two heating elements on Diresol Solar Water Heater. The heating element at the lower position is 200W and operates as antifreeze protection. The heating element at the upper position is the electric backup of the system (2000 W).

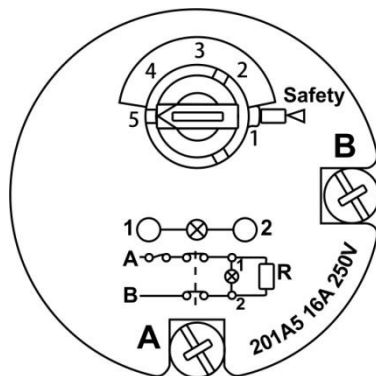
## DANGER

The electrical connection of the system must be performed by licensed professional following the national and international standards.

## NOTICE

- Use different electrical supply for each heating element to be able to operate it when necessary.
- To connect the heating elements connect the separate electrical supply cables to the electrical connector terminal block connected on the heating element.
- Manufacturer has taken under consideration throughout the design of Diresol the international standards as well as the instructions to installers for protection of structures against lightning IEC 61024-1.
- Both heating elements have been tested under EN 60335-1 and EN60335-2-21 standards for Safety of household electrical appliances.

Follow the instructions on the image to connect the heating elements with the electrical supply:



## DANGER

Connect the ground cable to the socket on the electric resistance.

## Operating instruction

### Anti-frost protection

#### **⚠ CAUTION**

- **Operate the antifreeze protection heating element when the air temperature is below zero (0 °C) to protect the water tank from freezing.**
- During extremely low temperatures you shall drain the module.

It is the owner's responsibility to protect Diresol from extreme weather conditions in accordance to the manufacturer's instructions. Warranty is void if you fail to protect Diresol according to the instructions above.

## Maintenance

Conduct an inspection of Diresol at least annually for any damage, leakage or soiling. The manufacturer recommends maintenance by a qualified specialist every year.

During the maintenance the following steps have to be checked:

Description	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year
Inspection for any damage, leakage or soiling					
Inspection of the electric resistance, replacement if necessary					
Inspection of the thermostat, replacement if necessary					
Inspection of the mounting system, securely tighten all bolts					
Inspection of the insulation of the piping, repair if necessary					
Replacement of the safety valve					



## Limited Warranty

This Limited Warranty is made and effective from the original date of purchase and for five (5) years (Warranty Period). AST Solar Industry warrants this product and each of its component parts, to be free from defects in materials and workmanship, under normal use and service, for the applicable Warranty Period.

THIS WARRANTY IS APPLICABLE TO THE ORIGINAL OWNER ONLY in accordance with the Warranty terms and conditions specified below.

This Limited Warranty will **NOT** cover:

1. Consumables or wearing parts that may come with the product.
2. Damages, malfunctions, or failures of the electric back up after the period of one year from the original date of purchase.
3. Products installed with attempted or actual modification or alteration of the product's original design in any way.
4. Damages, malfunctions, or failures resulting from failure to install the Solar Water Heating System in accordance with applicable building codes/ordinances or good plumbing and electrical trade practices
5. Damages, malfunctions, or failures resulting from improper installation or failure to operate and maintain the Solar Water Heating System in accordance with the manufacturer's instructions provided.
6. Damages, malfunctions, or failures caused by failure to protect the product and the piping from temperatures below freezing.

The warranty is void if the water values fail to meet the parameters described below:

<b>Water Substance</b>	<b>Units of Measurement</b>	<b>Parameter</b>
<b>pH value</b>	<b>-</b>	<b>7 - 9</b>
<b>Total hardness</b>	<b>gpg</b>	<b>6 - 15</b>
<b>Chlorides</b>	<b>ppm</b>	<b>&lt; 250</b>
<b>Free chlorine</b>	<b>ppm</b>	<b>&lt; 0,2</b>
<b>Sulfate</b>	<b>ppm</b>	<b>&lt; 100</b>
<b>Iron</b>	<b>ppm</b>	<b>&lt; 0,5</b>

### Customer Remedies

AST Solar Industry's and its distributors' entire liability and Customer's exclusive remedy shall be, at the Company's option, either repair of the product that does not meet this Limited Warranty or replacement of it with a direct replacement or with a similar product deemed by the company to perform substantially the same function as the original product. The defective product must be returned to the Company with a copy of customer's receipt. If this product is returned to the Company or the authorized dealer from which it was purchased or any other party authorized to repair AST Solar Industry products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. The company will not be responsible for any costs related to the removal or re-

installation of this product from or into any installation. The limited warranty is void if failure of product has resulted from misuse, abuse, accident, vandalism, fire, flood, freeze, hail, storms, wind, lightning, acts of God and the like, or any extraordinary event beyond the manufacturer's control. Any replacement product will be warranted for the remainder of the original warranty period.

## **Disclaimer**

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THE COMPANY AND ITS DISTRIBUTORS DISCLAIM ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH REGARD TO THE PRODUCT AND ANY RELATED WRITTEN MATERIALS. THIS LIMITED WARRANTY GIVES CUSTOMER SPECIFIC LEGAL RIGHTS. CUSTOMER MAY HAVE OTHER RIGHTS DEPENDING ON THE JURISDICTION.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL THE COMPANY OR ITS DISTRIBUTORS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR INDIRECT DAMAGES FOR PERSONAL INJURY, DEATH, PROPERTY DAMAGE, LOSS OF BUSINESS PROFITS OR ANY OTHER LOSS ARISING OUT OF THE USE OF OR INABILITY TO USE THIS PRODUCT. IN ANY CASE, THE COMPANY'S AND ITS DISTRIBUTORS' ENTIRE LIABILITY UNDER ANY PROVISION OF THIS AGREEMENT SHALL BE LIMITED TO THE AMOUNT ACTUALLY PAID BY YOU FOR THE PRODUCT.