

Manual
Mounting & Connection
of
SOLAR TRACKER
TP4-ST1

Introduction	page 2
Mounting of Solar Tracker Unit	page 3
Mounting of Solar PV Sensors	page 4
Electrical Connections	page 5
Start-Up and Test Run	page 6
Problems and Solutions	page 7

A cooperation of companies

TKM Hellas

TP4-Enersol

Electronic Repairs

ThermicSol

The solar tracker controllers ST follows the movement of the sun and are available in three basic types.



A) Single Mode ST1
Thermodynamic systems TD or photovoltaic systems PV. Makes one sided solar panels to follow the sun or turn to the max. incident insolation. Including manual operation of tilting mechanism for easy cleaning of panel surfaces. Maximum inclinations +/- 60'

B) Single Mode ST1Dt
Thermodynamic systems TD as type (A) with incorporated differential thermostat (Dt) and predefined temperature settings through dip switch. Presetting a) Dt = 4 'C
Presetting b) Dt = 8 'C
Presetting c) Dt = 12 'C
Maximum inclination +/- 60'

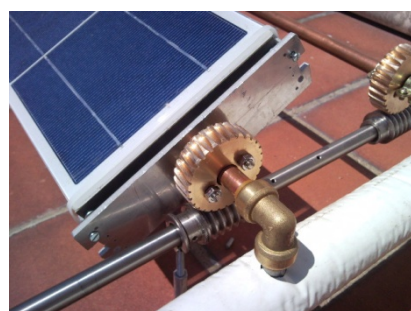
C) Double Mode ST2
Thermodynamic system and photovoltaic system PV for double faced and functioning solar panels type TP4-enersol exchanging the energy mode. Space heating in wintertime PV-Electricity in summertime Several extra functions tec. and Full rotation ability +/- 180 '

The Solar Tracker controllers ST are specially designed for application based on 1-axis tilting mechanisms (Horizontal or Vertical) and initially developed for the new solar panel system TP4-enersol.

The Solar Tracker controllers ST can be connected to various types of solar sensors LDR, LED or PV-cell depending on the specific requirements and on other local circumstances.



Axial tilting mechanism +/- 60'



Rotating tilting mechanism 360'



TP4-enersol Solar Pergola type TD

Mounting instructions Solar Tracker TP4-ST1

pg. 3

The Solar Tracker Controller ST1 is incorporated into a plastic box (ABS) with 10 cable inlets, classification IP-54.

The plastic box must be installed in a weather protected closed space.

Preferably all cable connection should be performed, on the bottom or on the sides of the box.

The box has three additional classified switches for the management of manual movement control.

The circuit board has three multi cable connectors for the connection of the peripheral equipment.

A) Up on Left side: a 2-pole connector for the electrical supply of current 12 VDC - > 6 Amp

B) Middle on Left side: a 4-pole connector for the connection of the solar sensors

C) Opposite on Right side: a 2-pole connector for the connection of the linear actuator

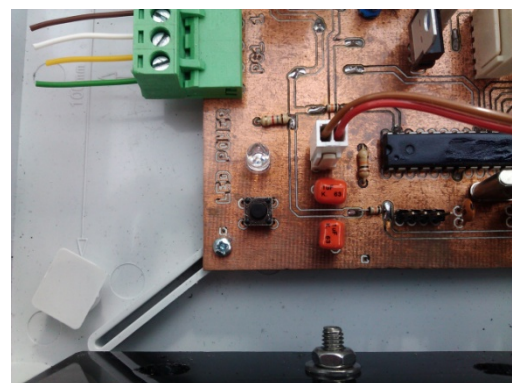
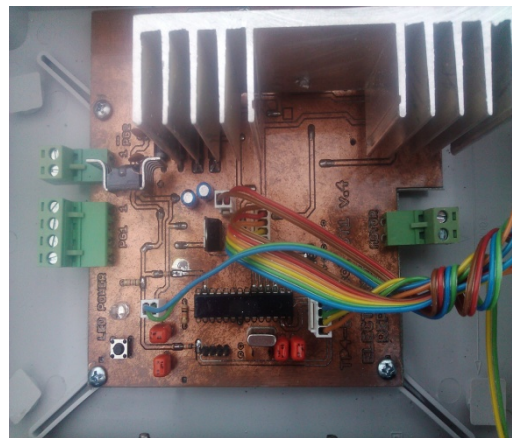
D) Down on Left side: a blue LED indicating the supply of current to the unit.

E) Below on Left side: a Reset button for the calibration of the solar sensor balance and sensitivity.

For the usage of this Reset button please confirm to the instructions of calibration on pg. 5 Start-Up & Test Run

On the bottom of the box you will find a cable fixture for the securing of cable connections to the circuit board.

Lightly tighten the 3 mm Allen screw to fixate the cables.



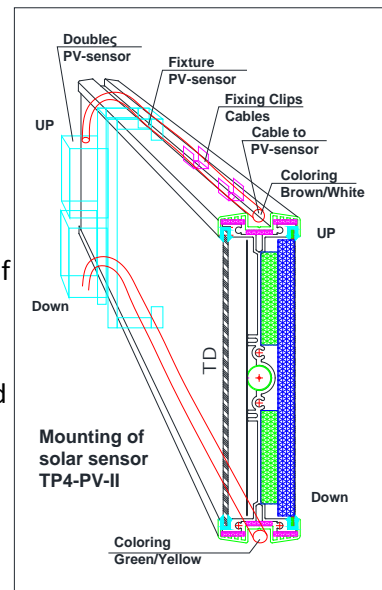
Mounting instructions of Solar Sensors TP4-PV-II

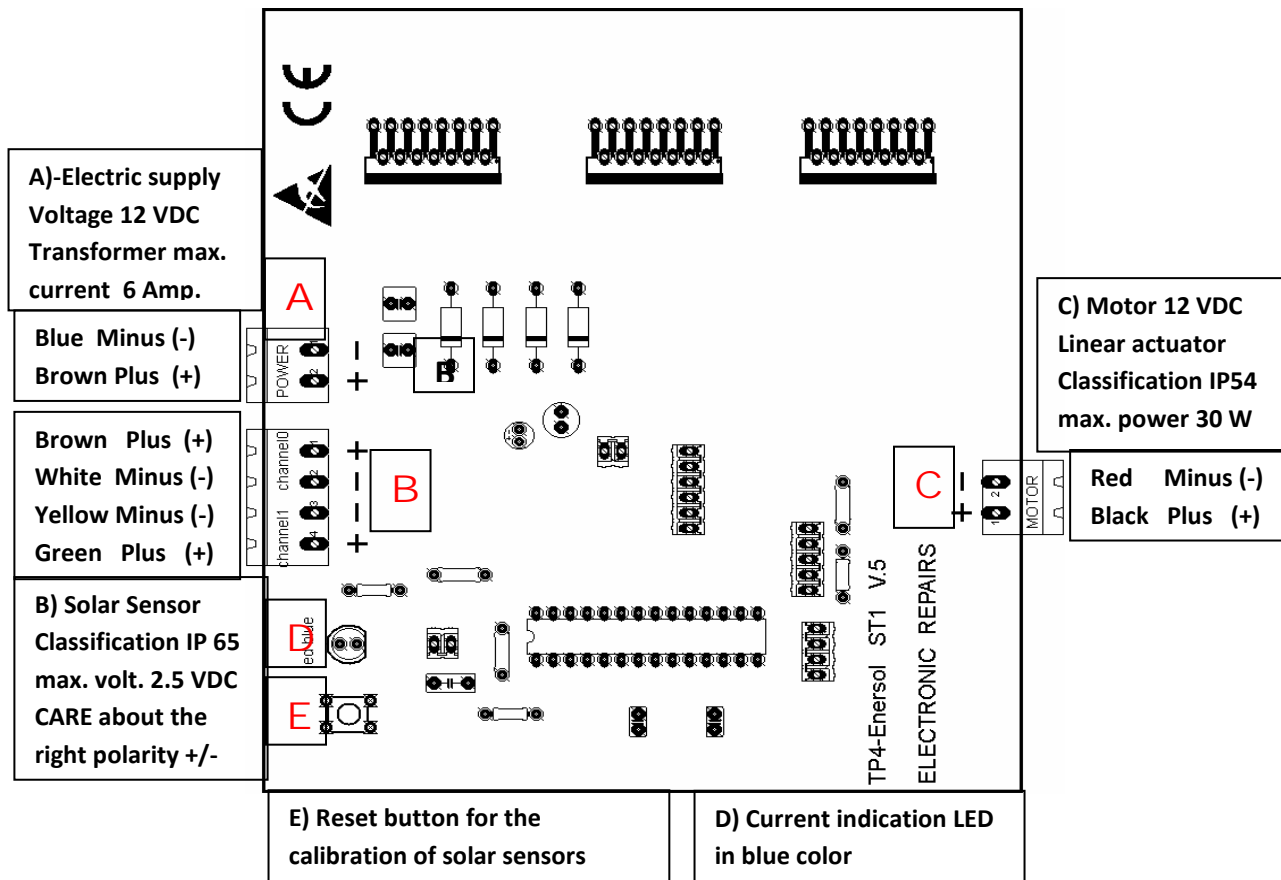
The linear actuator is delivered and mounted in its closed position.
Solar Panels are mounted and turned away from the motor location.

On the picture you can see the cavity on top of the solar panel profile and the fixing screws within the cavity

The Solar Sensors TP4-PV-II consists of small 'mini' photovoltaic cells firmly enclosed into containers of transparent Plexiglas, an additional mounting fixture of aluminum alloy and a 2-lead solar resistant cable for the connection of solar sensors to the circuit board TP4-ST1.

1. The solar sensor cables are + / - polarity sensitive and has to be connected rightly. The sensor on the top of the panel must have the Brown/White coloring and the bottom sensor should have the Green/Yellow coloring.
2. The sensors should preferably be mounted onto a solar panel with sufficient insolation without to much shadowing and located closely to the solar tracker unit ST1 (cable 5 meter).
3. On the sensor fixture, disconnect the two allen screws (4 mm) of one side and remove the leg completely.
4. Pass the other leg into the cavity of the solar panel.
5. Replace the other leg into the panel cavity on the other side and lightly tighten the two screws.
6. Center the sensors into the selected position and fix it to the panel by tightening all screws.
7. Remove some of the screws in the cavity of the solar panel for the mounting of the cable fixing clips.
8. Replace the screws together with the cable fixation clips
9. Apply the Sensor cable along the cavity and within the cable fixation clips.
10. Bend the top of the fixation clips around the cable in order to hold the cable in place along the solar panel
11. Repeat the cable fixation work on the other cable on the other side of the solar panel.
12. For the connection of the sensor cables to the solar tracker controller TP4-ST1 please follow the instructions of electrical connections on pg 5



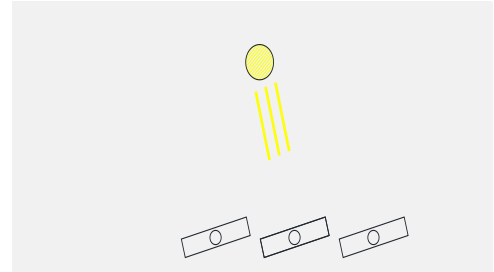
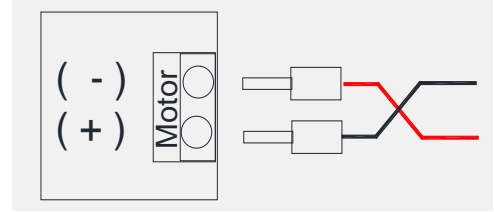


- 1) The device is supplied (A) through a transformer 220 VAC - 12VDC / 6 A accordingly to the on the drawing specified polarity +/- . (The transformer is not included).
- 2) A first perform all the electrical connections before you connect to the electricity supply
- 3) The sensors are sensitive to the right polarity +/- and the color indications on cables and on drawing must be corresponding. CAREFUL Do not connect Wrongly)
- 4) The motor carries a 1 meter long 2-wire cable (Black / Red) which has to be extended by a cable of at least 1.5 mm² area for the connection of the motor to the Solar Tracker Unit. The polarity of the motor +/- is continuously changing by the function and the motor is not polarity sensitive.
- 5) The connection of +/- to the motor should be as drawing shows but is also depending on local circumstances like orientation and positioning of the motor. In case that the motor goes in the wrong direction you will have to switch over the two wires to change movement direction.
- 6) If you encounter problems with the positioning of the sensors onto the solar panel then you can run the tilting mechanism by connecting only the electrical supply and the linear actuator.
- 7) Push the switch into manual function, move the panels up and down to desired position, enabling the sensor positioning easier.
- 8) Finally connect the sensor cables to the 4-pole connector and disable the manual switch

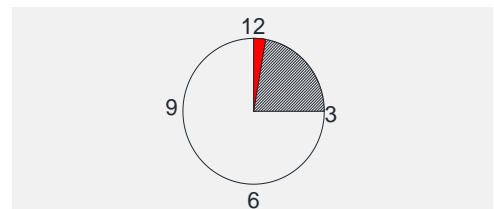
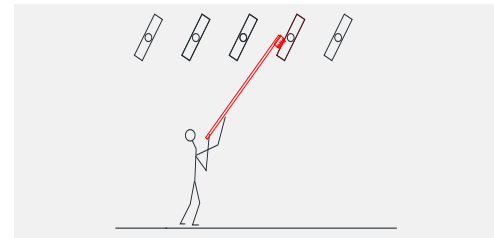
Start-Up and Test Run

pg. 6

- 1) If during the first test run the solar panels goes in the wrong direction and terminates away from the sun then you must alter the polarity of the 2-wire motor cable as shown on the picture in order to make the motor work in opposite direction.
- 2) It is necessary to execute the sensor calibration in order to balance the two sensors in between them. This procedure must be carried out with sufficient sunshine and preferable around noon. Switch to Manual mode and move panels Up and Down to center surfaces 90° against the insolation. Open the ST1 box cover and push the RESET button to save calibration into memory and then disable Manual
- 3) Periodically examine the proper function of the tilting device as far as concerns following details ... A) B) C)
- 4) For the easiness of regular cleaning of panel surfaces Use the Manual switch and turn panels by Up & Down switches to terminal position. Clean the panels and disable the manual function returning to auto mode.
- 5) CAREFUL: Do Not Use the Manual function without reason because continuous movement of the panels can cause overheating problems to the motor. Maximum manual run time is 2 minutes continuously after that a rest period of at least 15 minutes is required before running the motor again.
- 6) The system is automatic and should work all year around for self-maintenance purposes.
- 7) For any technical assistance required please contact us on phone 00306932231959.



- A) the precision of 90° angle towards sun
B) the terminal position (60°) towards East
C) the terminal position (60°) towards West



- The tilting mechanism does not work at all !

Open the box cover and check that power supply LED is lightning

- If NOT then replace the transformer 12 VDC
- If YES then push the Manual Switch into manual operation

Check that the piston of the actuator is moving out and in

- If NOT then replace the linear actuator with a new
- If YES then check the connector piece between motor and flap mechanism

Is the connector 'not straight' but significantly angled to the flap mechanism

- If YES then the motor has slipped from its original position and need repositioning

- 1) Remove the connector from the motor or the flap mechanism
- 2) Turn all the panels into front position, away from the motor position
- 3) Remove the metallic pipe fixing brackets from the stainless steel 22 mm pipe
- 4) Pull back the motor into position where it connects to the flap mechanism
- 5) Reconnect the connector piece to the motor and flap mechanism.
- 6) Tighten as hard as possible the two metallic fixing brackets to the 22 mm pipe
- 7) For the tightening work use always hexagonal wrench key and not screwdriver.
- 8) Mark the selected 'right' position in order to recognize any unwanted movement
- 9) After a few days check that motor has been firmly stabilized.

- The flap mechanism is working but panels are not centered 90' towards the sun.
 - Notice that at low sunshine intensity sensors have less accuracy.
 - Try to check the function at midday with full sunshine.
 - If then panels are not sufficiently centered then calibration must be repeated
 - Push switch into Manual function and move panels Up and down to be centered
 - Open box cover and press the reset button, then close box and disable manual
 - Check that the panels are centering towards the direct solar radiation
- At terminal positions panels are not obtaining the expected angle 60' on both sides.
 - When terminal angle differs from one side to the other (e.g. 60' West & 40' East) then the motor has lost its original positioning.
 - Follow the instruction 1 – 9 for motor positioning corrections.

For further technical advises please contact us on emergency phone 00306932231959 for direct help.