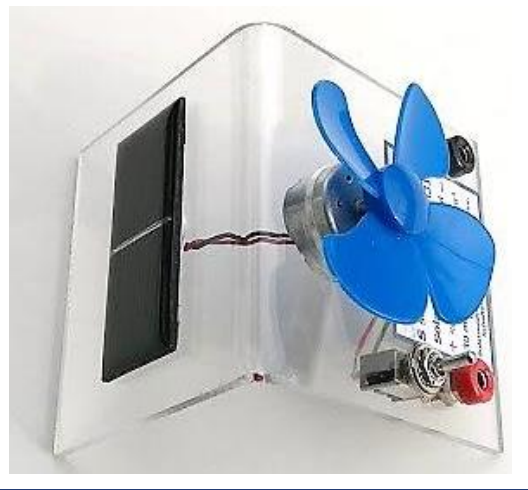


Construction manual for the solar module SUSE CM315 inexpensive and powerful beginner's solar module

Learning station E2

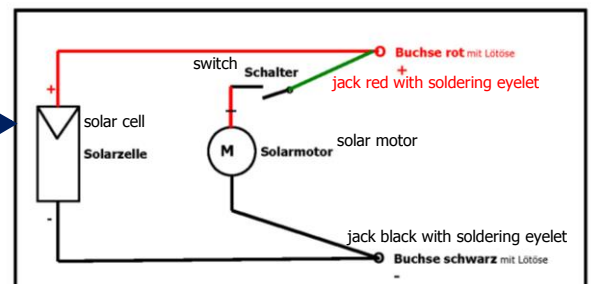


On the module base plate made of plexiglass and bent roof-shaped (total dimensions 160 x 80 mm) the solar electric motor with the propeller is visible on the front side, as well as 1 switch and 2 jacks. On the back side the high-class silicon solar cell (module dimensions 60 x 30 mm, solar cell 52 x 26 mm) is glued on. The jacks and the solar cell are firmly connected electrically, at the jacks lab wires can be plugged in to conduct experiments with a multimeter. Here voltages and short-circuit currents can be measured, to these measurement points additional devices can be connected or series or parallel connections of several modules can be established.

With the switch S the electric motor can be switched on or off.

With the switch the motor can be switched off for certain experiments to operate the solar cell in idle.

The electric circuit of the solar module



The colours of the wiring correspond to the colours of the hookup wires in the construction kit

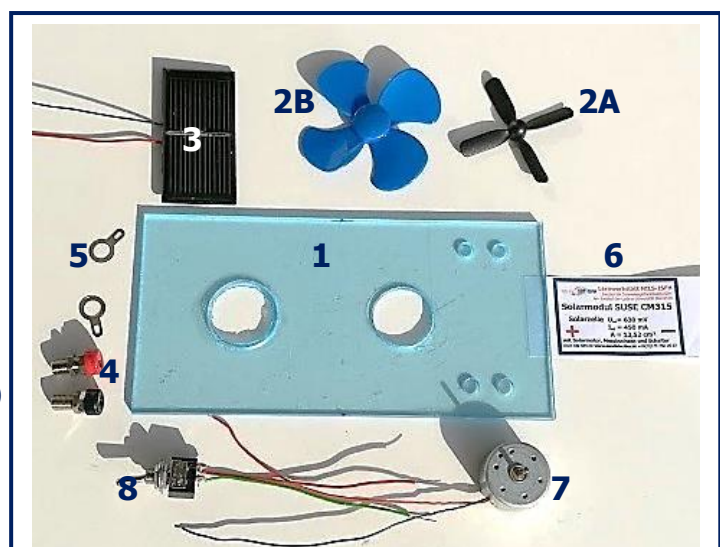
The self-construction requires bending the plexiglass base plate as well as the installation of the electronic parts and soldering work. The self-construction by students takes about 45 minutes. With the attached detailed experimentation manual extensive experiments on photovoltaics can be conducted.

The component parts for the solar module SUSE CM315

- 1 Plexiglass base plate 160mm x 80mm, pre punched with 5 or 6 holes
- 2 Propeller A or fan blade B
- 3 Solar module SUSEmod5 with 2 connective wires red/black and 2x double-faced adhesive tape on the back side
- 4 2 jacks, 1x red + 1x black
- 5 2 soldering eyelets M6
- 6 Adhesive labels (type plate with technical data)
- 7 Solar electric motor RF300-10
- 8 1 switch with 2 connective wires red/green

+ construction manual +experimentation manual

The construction manual



The component parts for SUSE CM315

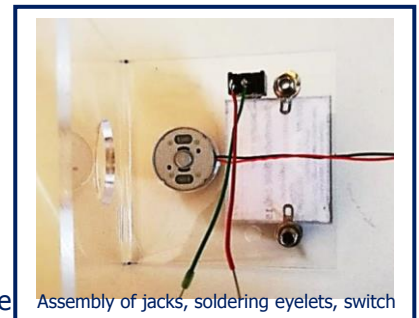
Under the guidance of the NILS-ISFH teachers the following 8 work steps have to be conducted. The finished sample module and the photos can be used exemplarily.

Necessary tools: long-nosed pliers, side cutters, scissors, tweezers, spanner socket 8 or wrench 8, soldering station with tin-solder, NILS plexiglass bending device and power supply 14 V / 6.5 A



Top: Bending on the glow wire bending device

Bottom: Application of the type plate

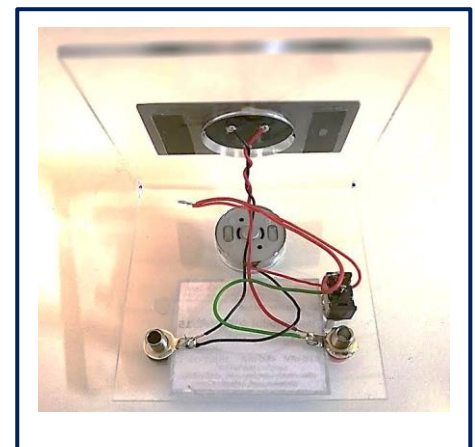


Assembly of jacks, soldering eyelets, switch



Assembly of the solar module

1. **Filing:** The hole for the electric motor (24.0 mm) has to be filed slightly bigger with a half-round file (to 24.2 mm) until the motor fits tightly. Caution! Always insert the motor with the axle first, otherwise the connective wires rip off. Caution! **Do not file the hole too big!**
2. **Bending:** Remove the protective layers on both sides and bend the plexiglass base plate roof-shaped to 75° at the marked positions (marked on the lateral edges!) with the NILS-ISFH bending device, hold the plexiglass base plate onto the 75° angle template until the bending site is cooled down.
3. **Assembly of the type plate (sticker):** The type plate can be covered with wide adhesive tape before cutting it out. Afterwards it is cut exactly at the outer edge of the blue frame, the back side protective layer is removed and it is placed exactly below the motor between the jack holes.
4. **Installation of the two jacks:** Completely unscrew a nut from the jack, tighten the 2nd nut firmly by hand to the colored head, then insert the jacks from the front, red on the left and black on the right, attach the soldering eyelet on the inside and tighten it with the 2nd nut, first by hand, then with a spanner socket 8 or a wrench 8. The eyelet should point sideways beneath the type plate.
5. **Assembly of the switch:** For the assembly of the switch 1 nut + 1 washer + 1 tooth washer are removed from the switch. The remaining nut is screwed tightly to the head of the switch. Then the switch is inserted from back to front, on the front side the tooth washer is placed and the 2nd nut is tightened with a spanner socket 8 or a wrench 8, the red wire points upwards towards the "rooftop". The washer is not required.
6. **Installation of the solar module:** Both of the red protective layers of the adhesive tape are removed. Impress the solar module from the outside. The wires red/black fit through the big hole! The solar module should exactly cover the hole and be mounted parallel to the lateral edges. The tape is sticking very firmly, it cannot be corrected after being impressed.
7. **Circuitry, soldering work, propeller:**
 1. Solder the red positive wire of the solar module to the eyelet of the red positive jack, black negative wire of the solar module to the eyelet of the black negative jack. Bend the soldering eyelets up a bit before soldering!
 2. Solder the red motor wire to the red switch wire and black motor wire to eyelet of the black jack.
 3. Solder the green switch wire to the eyelet of the red jack. Switch on = down towards the red jack, after that attach the propeller!
8. **Function test:** Hold the solar module into the daylight or into the light of a lamp (no LED light!) and switch on the motor: The propeller has to rotate fast! With the switch the motor can be switched off and on! Connect a multimeter in the measurement range 20V DC via 2 lab wires to the red-black jack pair in the right polarity, in bright sunshine a voltage of about 0.62 V should be displayed, with clouded sky about 0.52 - 0.60 V.
9. **Experiments:** With the extensive experimentation manual suxcm312/315 many photovoltaic experiments on different difficulty levels can be conducted with the self-constructed solar module. Have fun and success with the experiments!



The wiring on the inside



Short experimentation manual