

The 3 LED module SUSE 4.20

LED module for Primary Schools and lower Secondary School levels with 3 individually switchable LEDs with series resistance
IR (Infrared), red, blue. For the connection to SUSE PV solar modules in series connection or for the use as mini solar cells

The LED module SUSE 4.20 on a plexiglass angle 310 x 80 mm (75° angle) can be applied in 2 functions:

1. Indicator lamp for a connection to solar modules

4 – 8 solar cells in series connection can be connected to the module, the glowing LED shows the generation of electric energy with the solar module. LEDs (glowing semiconductor diodes) do not glow until a certain minimum voltage is reached, in the **IR LED this is 1.1 V**, it is suited for 2 solar cells in series connection. Infrared light cannot be seen with the human eye, digital cameras or cell phone cameras can show the IR light (see photo to the right). For the **red LED the minimum voltage is 1.6 V**, it is suited for the operation display of 3 solar cells in series, the **blue LED needs 2.4 V**, it is suited for 5-6 solar cells in series connection. A single solar cell cannot make any LED glow, because the voltage (0.6 V) is too low.

The 3 LEDs can also be connected in parallel by lab wires, so that the 3 LEDs glow simultaneously: Connect all black jacks with each other and also connect the blue, red and yellow jack with each other.

Maximum operating voltage: 5.0 V DC
can also be delivered optionally for 12 V or 24 V

2. LED as a mini solar cell

If light irradiates an LED (sunlight or light of artificial light sources), the LED acts as a solar cell, because it is similar to a solar cell in its principal composition. The voltage, that can be measured at the ends of an illuminated LED, is much higher as in common silicon solar cells, because LEDs consist of other semiconductor materials and the solar voltage is dependent on the semiconductor material.

Because of the tiny semiconductor crystal, the usable currents are very low, they are in the range of μA . The light has to hit the semiconductor crystal directly through the lens of the LED.

The IR LED shows a voltage of 1.1 V under irradiation, the red LED shows 1.5 V, the blue LED over 2.0 V. The module can be used free-standing or on the basic device SUSE 4.0.



Top:

The 3 LED module SUSE 4.20. The 3 LEDs with 1 series resistance each are arranged on top of each other, jack pair and LED are in one row. The upper black-blue jack pair is for the blue LED, the middle red-black jack pair for the red LED, and the bottom black-yellow jack pair for the IR LED.

Bottom:

The photo shows the glowing IR LED, observed through a digital camera, with the naked eye the glowing is not visible.

