

The solar storage module SUSE 4.12

Storage module with 2 GoldCap capacitors 3.3 F in series connection for the storage of electrical energy from solar cells or solar modules

Maximum voltage $U = 5.0 \text{ V DC}$

Maximum storage capacity 20,6 J

The **Solar storage module SUSE 4.12** serves the purpose of **direct storage of electrical energy**, that is obtained from the sunlight through solar cells or solar modules. The storage module **SUSE 4.12** may be connected to and charged by 1 to 8 solar cells (in series connection). Two **GoldCap capacitors 3.3 F** in series connection store the electrical energy. The module may also be charged by batteries or power supply units. The **maximum charging voltage is 5.0 V**, in doing so the **maximum stored energy is 20.6 J** (according to the equation for the stored energy inside a capacitor $W = \frac{1}{2} CV^2$)

No higher voltage than 5.0 V may be applied, otherwise the GoldCap capacitors are destroyed.

For an operation under higher voltages however, several storage modules can be connected in series, 2 modules = 10 V max., 3 modules = 15 V max. and so on.

If the charged storage module **SUSE 4.12** is connected to a solar motor with air-screw (e.g. SUSE 4.16), the **motor runs for several minutes** with the stored energy, also LED modules (e.g. SUSE 4.15) may be connected to the charged storage module SUSE 4.12 and glow several minutes.

The charging process with solar cells may take several minutes, depending on the intensity of the solar radiation, it can be supervised with an amperemeter in the charging circuit or with a voltmeter at the sockets. With bright sunshine the charging process takes about 1 minute.

The binding posts can be connected to lab wires, but bellwire can also be connected by slightly unscrewing the bolt head, clamping the bared wire in between and firmly tightening the bolt head again.

Between the binding posts there is a **red key switch**, if it is pushed for 3 seconds, the GoldCaps are discharged completely, the module should always be discharged before conducting charging experiments.

If a voltmeter (measurement range 20 V DC) is connected to the binding posts during the charging process, the charging can be monitored, the voltage increases slowly from 0 to the value of the charging voltage.

This way one can gain electrical energy outside with solar cells, charge the module **SUSE 4.12** with them, take this energy inside into a badly lit room and use it there on a solar motor SUSE 4.16 or LED module SUSE 4.15. The students learn from it, that the electrical energy from solar cells can be stored and transported.



Top: The storage module SUSE 4.12

On the left the binding post +, on the right the binding post - for a connection to a solar module. The key switch T in the middle serves to discharge the module.

Bottom: Connection to the solar module SUSE 4.49 with 5V- output

