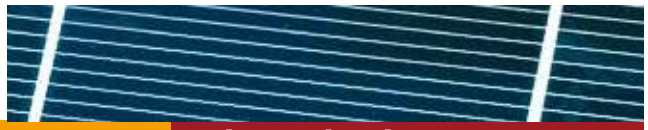
VOTRONIC Solar Current Technology



Free Energy | **Solar Technology**

The Specialists for Professional Solar Charging Technology

A correctly dimensioned solar system makes the camper, caravan or boat independent and consists of three components: Solar module, solar charging controller and battery. The VOTRONIC solar controllers are the link between solar module and battery, they work automatically, and they ensure optimum battery charging without overloading. If current is consumed during the day, immediate recharge is ensured, and a back discharge of the battery at night is avoided.

The units distinguish by high operating safety. High-quality charging technology in connection with intelligent microprocessor control ensures exact observation of charging voltage rates, charging current rates and charging time. The main charging port with characteristic line IU1oU2 can be set ideally to acid/lead-acid batteries, gel or AGM/fleece batteries. The battery temperature sensor (recommendable accessories, order no. 2001) for temperature compensation effects automatic increase of the charging voltage in case of low temperatures (winter operation) in order to improve and accelerate full charging of the weak battery. In case of summery temperatures, the charging voltage is reduced to minimize the load (gassing) of the battery and to extend the lifetime of gas-tight batteries (such as gel batteries). Voltage and current of the second charging port are reduced. It serves for support charging and trickle charge of the vehicle's starter battery in case of extended stop periods.

The charging controllers are suitable for any conventional solar module. More powerful systems can be created by application of several solar modules, also subsequently. The solar charging controller can then be chosen according to the capacity (Wp) of the solar module.

Two control methods are at disposal: Controllers of the VOTRONIC series SR are designed according to the proved shunt controller technology. This technology is a widespread, simple, reliable, and an economic control method.

The technology of the MPP controllers with maximum power point control is much more extensive. Firstly, the units automatically determine the optimum power yield (Peak) from the solar module. Secondly, the voltage surplus between solar module and battery will be transformed to a higher battery charging current. These processes will be measured, calculated and executed several times per second, thus ensuring an optimum adaptation of the solar module to the battery and the best possible power yield of the solar system. In contrast to conventional controllers, the charging current increase is approx. 10 - 30 %. This advantage shows particularly in cooler times of the year or in case of cold solar modules.

VOTRONIC Solar Computer

Energy and power measuring unit for the solar system

How much energy does my solar system really supply? Are the solar modules shaded or soiled or is something wrong? The VOTRONIC solar power measurement unit gives the answer to these questions. When being plugged into the VOTRONIC solar charging controllers of series SR and MPP, the desired information is given comprehensively and immediately.

The solar display can be connected to the controller at any time, also subsequently, since the VOTRONIC solar charging controller is ready for connection to produce the required signals. Thus, the connection is extremely simple.

The clear arrangement of the measuring values on the display and the easy operation with pushing the button allow improved control and use of the solar system. The instantaneous solar power is also displayed as bar graph allowing the control at a glance. The display is equipped with a background illumination (switchable). So, the legibility of the values is very well, even at a great distance and with all lighting conditions.

Matching to the VOTRONIC modular system, the digital display is executed as panel version. Appearance and mechanic (identical height 85 mm) are adapted to the other display modules. The small dimensions of the front panel and the particularly small mounting depth of only 18 mm allow an installation at almost any location. If flush mounting of the LCD display is not desired, a corresponding casing is available as accessory. The unit is ready for connection to the solar controllers. A suitable connection cable (length: 5 m) will be delivered with the unit.

A microprocessor control measures, calculates and displays the following values:

- Instantaneous solar power 0-999 W (Watts)
- Instantaneous solar current 0-32.0 A (Amperes)
  Any geographic or atmospheric influences will be displayed immediately and unmistakable. The same applies to the exposure of the sun, partial shading or soiling of the solar modules.
- Instantaneous voltage of the solar battery 7-32.0 V (Volts)
  Allows conclusions concerning the battery state; flashing warning signal in case of undervoltage and overvoltage of the battery.
- Charged solar capacity 0-9999 Ah (Ampere-hours)
- Charged solar energy 0-9999 kWh (kilowatt-hours)
  The power (Wh and kWh) being generated by the solar modules and the capacity (Ah) being charged into the battery will be measured, added up and displayed, even over a longer period (days, weeks). If it is required for purposes of statistics, each of the display units can be reset to "zero" at any time.

Unit Type	Order No.	For Votronic Solar Controller SR and MPP with Battery Voltage V	Current Consumption mA	Current Consumption Illumination max. mA	Dimensions (WxHxD) mm	Assembly Dimensions (WxHxD) mm	Weight g
LCD Solar Computer S	**1250**	12 and 24	3	30	80x85x21	65x71x18	60

Mark of conformity: CE, E Test (EMV/Automotive Regulations)
Delivery Scope: Connection Cable of 5 m length, fastening screws, manual, drilling jig
Recommendable Accessories: Casing S, order no. 2014; Connection Cable of 5 m length, order no. 2005

Further Display Examples

Instantaneous Solar Current

Operating Voltage

Charged Solar Capacity

Charged Solar Energy

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General Technical Data Solar Charging Controller Series SR and MPP

Unit execution	12 V and 24 V
Overcharge protection:	Yes
Characteristic line of charging:	IU1oU2
Reverse current protection (night operation):	Yes
Integrated on-board mains suppression filter, unproblematic parallel operation of chargers, dynamos, generators at the same battery:	Yes
Protection against overload, overheating, short-circuit, reverse battery:	Yes
Automatic battery temperature compensation, designed separately for acid, gel and AGM batteries, temperature sensor, order no. 2001, required:	Yes
Automatic compensation of voltage loss on the charging cables:	Yes
Overvoltage limitation for protection of sensitive consumers:	Yes
Charging Timer:	2-fold
Ambient temperature range:	-20 to +45 °C
Ambient Conditions, Humidity of Air:	max. 95 % RH
Mark of conformity:	CE, E Test (EMV/Automotive Regulations)

VOTRONIC Solar Charging Controller in Shunt Controller Technology

Effective battery charging for camper, caravan, boat and self-contained solar systems etc.

- Main charging port I: Automatic charging and conservation of charge of the (main) board supply battery.
- Auxiliary charging port II: Current and voltage reduced for recharging as well as trickle charge of the vehicle's starter battery, thus ensuring continuous starting capacity (execution B and C).
- Continuous control, full batteries by immediate recharging in case of current consumption
- Automatic charging programs adjustable for gel, acid/lead-acid and AGM/fleece batteries (not SR 100 universal charging program)
- Indicators for operating state "Charging" and "Full", execution C with "AES" and "Low Voltage"
- Least own electricity consumption
- Connection for battery temperature sensor (execution B and C), integrated temperature sensor (execution A)
- Control output EBL, prepared for "Elektroblock" with solar current display, cable set, order no. 2007, required
- Terminal "AES" with LED display: Automatic commutation of Dometic/ELECTROLUX refrigerators from gas operation to 12 V-operation in case of sufficient solar power by means of "AES" (Automatic Energy Selector).

Recommendation

Battery Temperature Compensation with VOTRONIC Temperature Sensor, order no. 2001

Unit Type	Order No.	Battery Voltage V	Capacity Solar Module Wp	Current Solar Module A max.	Voltage Solar Module V max.	Charg. Current Batt. I / Batt. II A max.	Terminal AES	Connection Solar Computer	Output for EBL -Solar Current Display	Dimensions* (WxDxH) mm	Weight g	Execution
12 V												
SR 100 Dig.	**3028**	12	12-100	6.5	26	6.5/ –	–	–	–	90x60x29	60	A
SR 130 Duo Dig.	**3050**	12	30-130	8.0	28	8/0.8	–	Yes	Yes	115x71x34	105	B
SR 200 Duo Dig.	**3052**	12	30-200	13	28	13/0.8	–	Yes	Yes	115x71x34	110	B
SR 300 Duo Dig.	**3054**	12	30-300	19	28	19/1.5	Yes	Yes	Yes	115x71x34	120	C
SR 400 Duo Dig.	**3056**	12	30-400	25	28	25/1.5	Yes	Yes	Yes	115x71x34	125	C
SR 500 Duo Dig.	**3058**	12	30-500	30	28	30/1.5	Yes	Yes	Yes	115x71x34	130	C
24 V												
SR 324 Duo Dig.	**6131**	24	50-300	10	50	10/0.8	–	Yes	–	115x71x34	140	B

* Dimensions incl. mounting flanges, without connections

Delivery Scope: Manual

Recommendable Accessories: VOTRONIC Solar Computer (see page 19), VOTRONIC Temperature Sensor, order no. 2001, Cable set for connection of the solar controller to EBL, order no. 2007

Execution A

Execution B

Execution C