VOTRONIC

MADE IN GERMANY

CATALOG 2023

VOTRONIC

INNOVATIVE ELECTRONIC MADE IN GERMANY

We are passionate about the development and production of electronic equipment for mobile use since over 30 years. Only truly innovative and, above all, high-quality product series can successfully stand their ground on the market for such a long time. Many years of experience and our profound technical know-how are continuously incorporated in our products. This is also appreciated by renowned national and international original equipment manufacturers, who preferably apply VOTRONIC products.

Satisfied long-standing customers and the proven long service life of the equipment apparently proof that excellent quality and the reliability „Made in Germany" are not merely promotional phrases for us, but rather the guiding maxim for all our activities. Thus, all VOTRONIC products correspond to the state of the art and satisfy highest quality requirements, although they are available at an economic price.

Our Efficiency

VOTRONIC provides development, production and service from a single source. Thus, we know our equipment very exactly, and we are able to provide competent information regarding technical questions. Due to the close contact to our customers and the continuous pursuit of the technical progress, we are always up-to-date for permanent further development of our products. In addition, we benefit from the commitment of a young developer team, a flexible administration and a short decision making process.

Our Production

Satisfaction of the high quality standards for „Products Made in Germany" on a permanent basis was only possible by inplementation of the quality assurance system DIN ISO 9001, already in the year 2000. As a result, the complex production processes become controllable, and a continuous control of the entire production process is always ensured. Each finished unit will be subject to an

additional complete test run before it leaves our house.

Our Service

Each unit is delivered with detailed mounting instructions and operating manual. In addition, our technical support provides assistance to our customers for any question of detail. Our in-house repair service would be also pleased to repair your defective equipment. After a thorough inspection of the equipment and a cost estinate, the customer decides, if the equipment shall be repaired, provided the problem cannot be resolved on the basis of guarantee or goodwill.

www.votronic.de

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CURRENT IS AN EXCITING MATTER

VOTRONIC-Charging Technology on Highest Level

Each vehicle has different, specific requirements concerning the charging of the starter or supply battery. Not least because of the 30 years of experience by now, VOTRONIC units are already used ex-factory by original equipment manufacturers of the most different vehicle categories. Of course, also existing (foreign) components can be replaced or supported, if the technical conception of the vehicle changes or the requirements regarding technology and quality.

CARAVANS AND CAMPERS

The comfort on journey in a caravan or camper depends in a great extent of the power supply. The size and possibly the type of the vehicle's (supply) battery, which shall ensure the power supply during driving, depends on the type of journey or the equipment of the vehicle when being en route. Since the capacity of batteries is only limited, they have to be recharged regularly.

The typical way is charging via country current connection at the campsite or parking lot via a 230 V mains supply charger of **series Pb** ensuring fully automatic and gentle charging due to microprocessor-controlled charging programs. The charging program can be adjusted individually to the corresponding battery type (lead-acid, gel, AGM 1 or 2 up to lithium-LiFePO4 batteries). A separate auxiliary charging port even supplies the vehicle's starter battery at the same time to maintain its starting capacity.

However, the most effective way is charging the supply battery via the vehicle's generator. Unfortunately, technical conditions regarding installation or engine, or battery management of modern vehicles with Euro6 standard, can lead to insufficient charging during driving or even discharging. The **charging converter (booster) of the series VCC** is an efficient solution. The charging converter is activated automatically with engine start and, like mains supply chargers, microprocessor-controlled charging programs ensure optimum charging of the supply battery during driving and that it is already fully charged after a short driving time. This is an outstanding solution - and not only for owners of campers, who are far away from parking lots or campsites.

The virtually easiest, but in any case the cheapest way is charging via the free power of the sun. Use of the sun's solar power for the own power supply is possible with simple means and can be retrofit at any time. The most important is the optimum exploitation of the solar power via high-quality solar modules and a solar charging controller, which uses the solar power in an optimum way. Especially the **solar charging controllers in advanced MPP technology** ensure short charging times and the best possible power yield of the solar system due to a special technology with high efficiency.

The clou of the charging technology are the unit combinations of the **series VBCS Triple or VAC Triple**. The units of both series combine high-quality charging technology of a mains supply charger of series Pb or VAC with the technology of a charging converter of series VCC in a common, compact housing. The units of series VBCS Triple are additionally equipped with an integrated solar charging controller in MPP technology. The series VAC Triple excels by integration of an intelligent charging current distributor into the unit, in lieu of the solar charging controller. The charging current distributor divides the main charging current and supplies full charging current to the starter battery, if required.

By the combination of the different individual components, the energy supply of the vehicle is always ensured - during standstill as well as during driving. And that worldwide. Moreover, the expenditure regarding installation and cab-

ling is reduced to a minimum and helps to save costs and valuable resources.

BOATS

Generally, all products can also be used for boats, however exclusively for installation in the inside area. If desired, the units can be delivered in special execution for boat application, equipped with a humidity-proof electronic system. For this purpose, the electronic system will get an additional protective painting against increased air humidity. However, please observe, that the original protective class according to EN 60529 DIN VDE 0470 part 1 (IP 21) is not changed.

OFFROAD- AND EXPEDITION VEHICLE

Outside of Germany or far away from paved roads different regulations and laws are applicable, also from a technical point of view. Apart from the changed supply voltage or a weakly protected country current connection, the charging technology is put to a very hard endurance test, particularly for off-road or expedition vehicles. For this reason, the Votronic mains chargers generally have a wide operating voltage range (AC), and they are able to limit the current capacity in case of weakly protected country current. Furthermore, special mains supply chargers (so-called wide-range chargers) are available with an extended input voltage range, which ensures the full charging capacity of the mains supply charger all over the world. High-quality components, a robust design and a special manufacturing technology ensure the reliability and faultless operation of the units, also far away from paved roads.

AMBULANCE AND INTERVENTION VEHICLES

In ambulance vehicles and intervention vehicles, very special requirements regarding the charging technology are demanded concerning functions and reliability. After all, the connected consumer loads and their constant availability and operativeness might possibly be decisive for life and limb.

The mains supply chargers of **series VAC** were developed particularly for this purpose. All units are equipped with special, microprocessor-controlled charging programs for vehicles with strongly varying charging cycles. In addition, the units are generally equipped with a humidity-proof electronic system, and they will be delivered with the corresponding temperature sensors for temperature equalization. An integrated charging current distributor allows distribution of the main charging current to two supply batteries, or one supply battery and one starter battery.

If vehicles have two different, completely independent battery circuits, the series VAC-Duo is recommended. The chargers of this series have two individual charging parts, working independently of each other, which are space-saving combined in one unit. Each charging part can be adjusted exactly to its battery regarding battery type, charging program and battery capacity. So, a fully-fledged and efficient charger is also available for the starter battery. A further particularity of this series is, that the units are available with an integrated battery bridging function allowing an emergency start of the engine. Remote control of this function is also possible by means of a simple push-button, which can be installed on the dashboard

FIRE-FIGHTING VEHICLES

The chargers of **series VAC-F** are also based on the robust technology of series VAC. Additionally, they comply with all regulations of the FNFW of the valid fire brigade standard DIN 14679 for charging of auxiliary batteries and starter batteries in intervention vehicles. The standardized FIRECAN connection according to DIN 14700 is available as option for these chargers **(series VAC-Fc)**. The units of **series VAC-F II** are equipped with a protective insulation according to protection class II and a 2-core mains cable. A protective conductor is not required.

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ADJUSTABLE CHARGING PROGRAMS/ CHARACTERISTIC LINES OF CHARGING

The charger uses all charging programs for gentle full charging and after that for trickle charging of the battery. If a temperature sensor 825 is used, a temperature compensation will be executed, which is adapted to the battery type. The simultaneous supply of the connected consumers during charging is dimensioned in such a way, that the supply to the consumers during phase I (initial charging) is up to 50 %. If the batteries are fully charged, almost the total charger current is available for the consumers without any discharge of the batteries. Consumed energy will be recharged immediately.

CHARGING PROGRAMS

1 Gel: Characteristic line IU1oU2 gel batteries

Adapted to closed, gas-tight gel/dryfit batteries with determined electrolyte, which are generally requiring a higher charging voltage level and longer dwell times U1 to achieve short charging times with particularly high capacity storage and to avoid total discharge of the battery.

2 AGM: AGM-/Vlies-/Lead Crystal batteries characteristic line IU1oU2oU3

Adapted to charging of closed, gas-tight AGM (absorbed glass mat) batteries in lead-fleece technology requiring a particularly high level U1 with adapted dwell times for full charging, and after that a moderate level U2 for trickle charging (plate and round cell technology).

3 DIN 0510: Characteristic line IU1oU2, Lead, Acid/Lead-Acid batteries

General characteristic line DIN for charging and trickle charging of open and closed lead storage batteries with removable cell plugs and possibility of acid level control and acid level correction (maintenance). Also suitable for recently developed, closed battery types, low-maintenance, maintenance-free, low-antinonous, with silver alloy, calcium etc., with low and very low water consumption. Allows short charging times with high level U1, high charging factor and high acid mixing, even during stationary application (acid accumulation) of „wet" drive, lighting, solar, heavy duty and standard batteries.

4 UNIVERSAL: Characteristic line IU1oU2oU3, Lead, Acid/Lead-Acid/AGM batteries

Universal program for charging and trickle charging of acid batteries in vehicles (mixed operation mobile/stationary). Still offers short charging times, good charging factor and good acid mixing with average level U1 for open and closed, low-maintenance, maintenance-free standard, drive, lighting, solar and heavy duty batteries, as well as AGM batteries with standard level U1.

5 MOTOR: Characteristic Line IU1oU2, Lead, Acid/Lead-Acid batteries

Characteristic line similar to dynamo/generator for mobile application (acid accumulation) with particularly low maintenance (battery gassing, water consumption). Charging and trickle charging of starter batteries in intervention vehicles, according to a customary suggestion of the Standard Committee Fire Protection (FNFW). For conventional, standard starter batteries, starter batteries being „absolutely maintenance-free", „maintenance-free according to EN", „maintenance-free according to DIN", „maintenance-free",„low-maintenance".

Li LiFePO4: Lithium batteries

Charging program adapted to lithium LiFePO4 batteries with own BMS and prescribed or built-in safety circuit. When the vehicle is stopped (seasonal operation), a special trickle charging of the LiFePO4 battery maintains a charging state of 50-80 %, which is advantageous for the battery lifetime with simultaneous floating of 12 V consumer loads and the vehicle's starter battery. Moreover, the battery cell balancing is activated regularly by an Auto Wake up function.

CHARGING PROGRAMS FOR FIRE-FIGHTING VEHICLES

for charging of starter and auxiliary batteries according to DIN 14679: 2008-03

6 L: Closed Acid/Lead-Acid batteries with water consumption L = Low according to DIN EN 50342-1, characteristic line IU1oU2

Characteristic line with average level U1 for acid batteries for chargers being installed in the vehicle or external chargers at a permanent location.

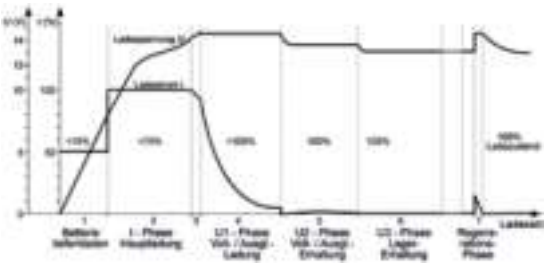
7 VL: Closed Acid/Lead-Acid batteries with water consumption VL = very low according to DIN EN 50342-1, characteristic line IU1oU

Characteristic line with average level U1 for acid batteries for chargers being installed in the vehicle or external chargers at a permanent location.

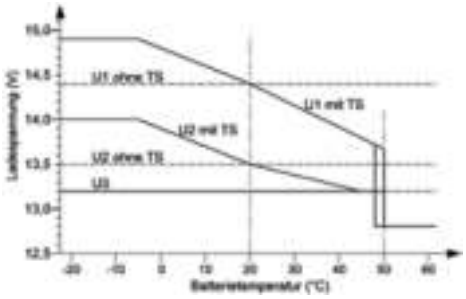
8 Fleece: Batteries (VRLA) with AGM/Fleece technology, characteristic line IU1oU2

Characteristic line for AGM batteries for chargers being installed in the vehicle or external chargers at a permanent location.

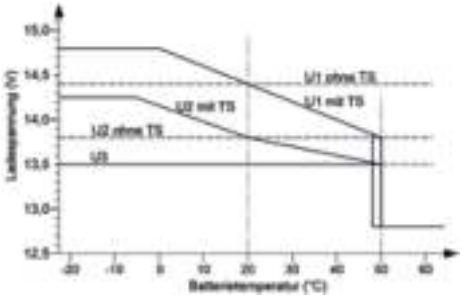
Examples characteristic line of charging (IU1oU2oU3) with Lead Temperature Equalization or LiFePO4 Protection



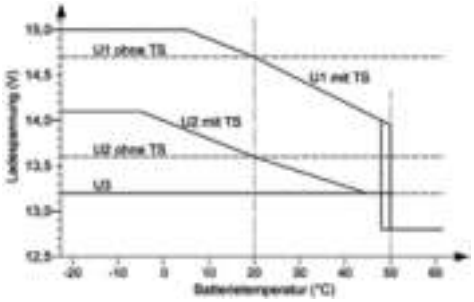
General Characteristic Line of Charging (IU1oU2oU3)



Charging Voltage Acid Batteries/AGM

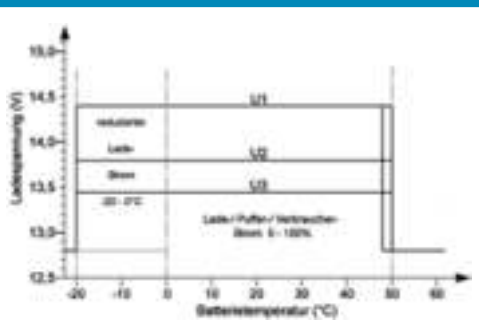


Charging Voltage Gel Batteries



Charging Voltage AGM Batteries

1. Prelininary charging totally discharged battery, gentle initial charging
2. Main charging constant, maximum charging current (I-Phase)
3. Measuring and orientation
4. Main/full charging constant charging voltage 1 (U1-Phase) cell balancing
5. Full/conservation charging constant continuous charging voltage 2 (U2-Phase)
6. Storage charging constant continuous charging voltage 3 (Phase U3)
7. Automatic battery regeneration twice a week
8. LiFePO4-Auto Wake up: regular, automatic activation of the battery cell equalization charging (balancing)



Example: Charging Voltage LiFePO4 Batteries

TS = Temperature sensor 825/625 installed at the battery

For temperature measurement, the temperature sensor (TS) is installed at the battery. The temperature sensor effects an adaptation of the charging voltage to the battery temperature. In case of low outside temperatures, full charging is improved, in case of high temperatures a protection against gassing is effected caring the battery as well as a temperature protection for LiFePO4.

9 Gel: Closed batteries (VRLA) with gel technology, characteristic line IU1oU2

Characteristic line for gel batteries for chargers being installed in the vehicle or external chargers at a permanent location.

10 External: Without allocation of the battery type, characteristic line IU1oU2

Charging of the vehicle's battery by external charger over vehicle plug in vehicle halls with allocated or free parking lots. Universal program for charging and trickle charging of acid/gel/AGM batteries.

AUTOMATIC CHARGERS

SERIES Pb


1s Silent Run /
4s Li Storage
LiFePO4
Gel AGM
Lead
Acid
Remote
Control
Battery Full
Main Charging
Current
Battery I
Battery II
Power
Temp. -
Sensor
omatic Charger
Pb 1230 SMT 2B

VOTRONIC

ALWAYS FULLY CHARGED ON-SITE

Built-in mains chargers for campers, for the marine field and for special purpose vehicles

The crucial point regarding the functionality of the electronic system on board is a sound board battery. If it fails, comfort ends and the journey must be interrupted. The charger series „Pb“ had been created for high-quality campers, for the marine field, as well as for special purpose vehicles, where it is successfully applied for years. The continuous further development of the battery technology had a formative influence on this equipment series. The units are technically mature, and they are always up-to-date with the charging technology. An intelligent microprocessor completed by robust power electronics ensures an unattended charging with careful treatment of the battery, also in continuous operation.

Advanced characteristic lines IUoU for lead-acid, gel and AGM batteries had been adapted and optimised to each particular application for optinum charging of the board battery. Connected consumers are supplied automatically and simultaneously. During extended stop periods, the integrated battery regeneration keeps the battery ready for operation, and the battery life is extremely extended. Unattended connection of the battery at the charger is allowed, overcharging is excluded. The integrated on-board mains suppression filter ensures a smooth cooperation with other charging sources.

Even if a nice parking lot has only a weakly protected power supply, charging with reduced capacity is still possible by means of the Silent Run func-tion or the AC Power Limit.

PRODUCT FEATURES

- High operating safety
- Quick, gentle charging for extended service life of the battery
- Small, lightweight and compact
- Full charging capacity, even in case of low supply voltage
- Optimised 6-stage characteristic line of charging for acid, gel and AGM batteries
- Temperature compensation
- Unattended charging
- Suitable for floating operation
- Automatic battery regeneration

SERIES Pb
Automatic chargers

INCLUSIVE LiFePO4-Programms

CHARGERS FOR SUPPLY AND STARTER BATTERIES

110-230 V/AC – 12 V/DC
Max. charging current: 15, 20, 25, 30, 80 A

110-230 V/AC – 24 V/DC
Max. charging current: 16, 40 A

CHARGERS WITH SELECTIVE CHARGING CURRENT DISTRIBUTOR FOR 2 BATTERIES AND STARTER BATTERY

110-230 V/AC – 12 V/DC
Max. charging current: 40, 50, 60 A

110-230 V/AC – 24 V/DC
Max. charging current: 25 A

✓ OUR TIP

Charging of lead batteries is strongly depending on the temperature. Therefore, a temperature sensor 825 or temperature sensor 625 should be used for full charging of gel and AGM batteries.

Charging of advanced lithium LiFePO4 batteries with conventional units, which are solely designed for batteries in conventional lead-acid technology (also Gel or AGM), possibly are limiting the use of the technical advantages of this new technology (capacity, number of cycles etc.).

» All units with technical data are listed on page 12/13.

! WE RECOMMEND

The service life of lead batteries is extended by 100 % full charging by means of a mains charger, once a month. Insufficient recharging results in capacity loss and premature ageing of the battery.

AUTOMATIC CHARGER PB 12 V

Unit Type	Pb 1215 SMT 2B	Pb 1220 SMT 2B	Pb 1225 SMT 2B	Pb 1230 SMT 2B	Pb 1240 SMT 3B	Pb 1250 SMT 3B
Order No.	**3100**	**3101**	**3102**	**3114**	**3124**	**3125**
Execution	A	A	A	A	B	B
Rated voltage / Current	**12 V;** 12.0-13.3 V / 15 A	**12 V;** 12.0-13.3 V / 20 A	**12 V;** 12.0-13.3 V / 25 A	**12 V;** 12.0-13.3 V / 30 A	**12 V;** 12.0-13.3 V / 40 A	**12 V;** 12.0-13.3 V / 50 A
Auxiliary Charging Port „S"	12 V / 2 A	12 V / 2 A	12 V / 2 A	12 V / 3 A	12 V / 4 A	12 V / 4 A
Battery Capacity	38-170 Ah	50-230 Ah	60-290 Ah	75-350 Ah	75-480 Ah	88-550 Ah
No. of Charging Ports	1+S	1+S	1+S	1+S	2+S	2+S
Charging current distributor, switchable Start	–	–	–	–	● [1]	● [1]
Mains Voltage	110 V to 230 V AC [2]	(110 V) 230 V AC [4]	(110 V) 230 V AC [4]	(110 V) 230 V AC [4]	(110 V) 230 V AC [3]	(110 V) 230 V AC [3]
Max. Power Consumption (AC)	240 W	330 W	400 W	490 W	680 W	840 W
Dimensions* (DxWxH)	228x139x74 mm	228x139x74 mm	228x139x74 mm	228x139x74 mm	330x139x74 mm	330x139x74 mm
Weight	1250 g	1280 g	1300 g	1350 g	2350 g	2400 g
No. of charging program adjustable (see p. 6)	1,2,4 Li	1,2,4 Li	1,2,4 Li	1,2,4 Li	1,2,4 Li	1,2,4 Li
Automatic Battery Regeneration/Li Auto Wake Up	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●
Power Pack Function (Battery Replacement)	●	●	●	●	●	●
Connection Remote Control/Remote Indicator	●	●	●	●	●	●
Battery Capacity (size) adjustable	–	–	–	–	●	●
AC Power Limit Function	–	–	–	–	●	●
Silent Run Function	●	●	●	●	●	●
Lead Temperature Compensation/LiFePO4 Protection	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●
Temperature Sensor 825 in Delivery Scope	–	–	–	–	–	–
Voltage Sensor	–	–	–	–	●	●

AUTOMATIC CHARGER PB 24 V

Unit Type	Pb 2416 SMT 2B	Pb 2425 SMT 3B	Pb 2440 SMT 2B
Order No.	**6232**	**6239**	**6250**
Execution	A	B	C
Rated voltage / Current	**24 V** / 16 A	**24 V** / 25 A	**24 V** / 40 A
Auxiliary Charging Port „S"	24 V / 2 A	24 V / 4 A	24 V / 2 A
Battery Capacity	40-200 Ah	46-290 Ah	75-440 Ah
No. of Charging Ports	1+S	2+S	1+S
Charging current distributor, switchable Start [1]	–	●	–
Mains Voltage	(110 V) 230 V AC [3]	(110 V) 230 V AC [3]	(110 V) 230 V AC [3]
Max. Power Consumption (AC)	510 W	830 W	1380 W
Dimensions* (DxWxH)	228x139x74 mm	330x139x74 mm	333x262x92 mm
Weight	1350 g	2400 g	3900 g
No. of charging program adjustable (see p. 6)	1,2,3,4	1,2,3,4	1,2,4
Automatic Battery Regeneration	●	●	●
Power Pack Function (Battery Replacement)	●	●	–
Connection Remote Control/Remote Indicator	●	●	●
Battery Capacity (size) adjustable	–	●	●
AC Power Limit Function	–	●	●
Silent Run Function	●	●	●
Lead Temperature Compensation	●	●	●
Temperature Sensor 825 in Delivery Scope	–	–	–
Voltage Sensor	–	●	●

	Pb 1260 SMT 3B	Pb 1280 SMT 2B	Pb 1280 SMT Li
	3126	**3131**	**3289**
	B	C	C
	12 V; 12,0-13,3 V / 60 A	**12 V** / 80 A	**12,0 V - 13,3 V** / 80 A
	12 V / 4 A	12 V / 2 A	12 V / 2 A
	110-660 Ah	150-880 Ah	100-600 Ah
	2+S	1+S	1+S
	●[1]	–	–
	(110 V) 230 V AC [3]	(110 V) 230 V AC [3]	(110 V) 230 V AC [3]
	1020 W	1400 W	1400 W
	330x139x74 mm	333x262x92 mm	333x262x92 mm
	2500 g	3900 g	3900 g
	1,2,4 Li	1,2,4	4 x Li
	● / ●	● / –	–
	●	–	–
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	● / ●	● / –	– / ●
	–	–	●
	●	●	●

[1] The 2nd output of the charging current distributor can also be adjusted to the vehicle starter battery with full charging current, with own starter program. It allows short charging times, high capacity storage and different battery types for board (acid / AGM / Gel / LiFePO4) and starter battery.

[2] 110 V to 230 V AC: Operating voltage range worldwide: 90 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC.

[3] (110 V) 230 V AC: Operating voltage range: 190 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC. Works from 90 V AC, at 110 V AC approx. 50 % charging capacity.

[4] (110 V) 230 V AC: Operating voltage range: 190 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC. Works from 90 V AC, at 110 V AC approx. 18 A charging current.

* Dimensions incl. mounting flanges/feeds without connections

Delivery Scope: Mains cable, manual. Pb 1280 SMT Li: Temperature sensor 825

! RECOMMENDABLE ACCESSORIES

Order No. 2075
Remote Control S

Order No. 2001/2088
Temperature Sensor 825/625

Order No. 2081
Remote Indicator IP67
(similar to figure)

» *More information you will find on pages* ***101-107.***

» More technical specifications and informations you will get at our website **www.votronic.de**

AUTOMATIC CHARGERS

SERIES VAC, VAC-DUO, VAC-F

VOTRONIC

RELIABILITY IN APPLICATION

Built-in mains chargers for intervention vehicles with strongly varying mission cycles

Particularly in ambulance cars and intervention vehicles, the reliability of the built-in batteries is quite decisive for the readiness for use of the vehicle. Most notably, in case of strong load of the batteries due to many consumers, the time for recharging is missing due to frequent interventions, or if the charger is inadequately adapted to the batteries. To satisfy the special requirements of intervention vehicles, the series VAC had been created in close cooperation with customers and leading battery manufacturers. Based on the series Pb, these units are equipped with additional characteristic lines of charging for intervention vehicles with strongly varying mission cycles. The electronic system of the equipment is protected against humidity and ensures safe operation in case of strong variations in temperature. The simultaneous supply of consumers being connected to the vehicle's board mains supply (wireless transmitting sets, charging trays etc.) is ensured without inpairment of the charging process. If required, the integrated charging current distributor effects an automatic supply of the starter battery with full charging current. Activation of the engine inmobilizer is possible by means of a signalling port, if the vehicle is connected to the mains supply. The units will be supplied including temperature sensor 825 to ensure optimised battery charging. The unit can be installed in any position. A second unit label is included in the standard delivery scope. Instead of a remote control, a waterproof LED display (see accessories) can be connected to the tip jack Remote Control, which indicates the unit's readiness for operation on the vehicle's exterior.

PRODUCT FEATURES

- All features identical with series Pb

Additionally:

- Particularly adapted to intervention vehicles
- Optimised 6-stage characteristic line of charging for acid, gel, AGM and Lithium LiFePO4 batteries
- 8 Charging programs adjustable
- Battery capacity adjustable
- Function charging current distributor can also be adjusted for the starter battery
- Equalization function adjustable
- Temperature sensor 825 is included in the standard delivery
- Signalling port for engine inmobilizer
- Electronic system humidity-proof
- Variable fitting position
- Optionally for 110 - 230 V AC

SERIE VAC

Automatic Chargers

INCLUSIVE LiFePO4-Programms

CHARGERS FOR SUPPLY AND STARTER BATTERIES

110-230 V/AC – 12 V/DC
Max. charging current: 80 A

110-230 V/AC – 24 V/DC
Max. charging current: 40 A

CHARGERS WITH SELECTIVE CHARGING CURRENT DISTRIBUTOR FOR 2 BATTERIES AND STARTER BATTERY

110-230 V/AC – 12 V/DC
Max. charging current: 15, 20, 25, 30, 40, 50, 60 A

110-230 V/AC – 24 V/DC
Max. charging current: 16, 25 A

» **All units with technical data are listed on page 18/19.**

Charging of lead batteries is strongly depending on the temperature. Therefore, the temperature sensor 825 should be used for full charging, particularly for gel and AGM batteries. The sensor is part of the delivery scope for chargers of series VAC.

! WE RECOMMEND

The service life of lead batteries is extended by 100 % full charging by means of a mains charger, once a month. Insufficient recharging results in capacity loss and premature ageing of the battery.

✓ OUR TIP

Charging of advanced lithium LiFePO4 batteries with conventional units, which are solely designed for batteries in conventional lead-acid technology (also Gel or AGM), possibly are limiting the use of the technical advantages of this new technology (capacity, number of cycles etc.).

AUTOMATIC CHARGER VAC 12 V

Unit Type	VAC 1215 M 3A	VAC 1220 M 3A	VAC 1225 M 3A	VAC 1230 M 3A	VAC 1240 M 3A	VAC 1250 M 3A
Order No.	**0404**	**0406**	**0408**	**0410**	**0413**	**0427**
Execution	A	A	A	A	B	B
Rated voltage / Current	**12 V;** 12.0-13.3 V / 15 A	**12 V;** 12.0-13.3 V / 20 A	**12 V;** 12.0-13.3 V / 25 A	**12 V;** 12.0-13.3 V / 30 A	**12 V;** 12.0-13.3 V / 40 A	**12 V;** 12.0-13.3 V / 50 A
Auxiliary Charging Port „S"	12 V / 2 A	12 V / 2 A	12 V / 2 A	12 V / 3 A	12 V / 4 A	12 V / 4 A
Battery Capacity	38-170 Ah	50-230 Ah	60-290 Ah	75-350 Ah	75-480 Ah	88-550 Ah
No. of Charging Ports	2+S	2+S	2+S	2+S	2+S	2+S
Charging Current Distributor, switchable	● [1]	● [1]	● [1]	● [1]	● [1]	● [1]
Mains Voltage	110 V to 230 V AC [2]	(110 V) 230 V AC [4]	(110 V) 230 V AC [4]	(110 V) 230 V AC [4]	(110 V) 230 V AC [3]	(110 V) 230 V AC [3]
Max. Power Consumption (AC)	240 W	330 W	400 W	490 W	680 W	840 W
Dimensions* (DxWxH)	228x139x74 mm	228x139x74 mm	228x139x74 mm	228x139x74 mm	330x139x74 mm	330x139x74 mm
Weight	1250 g	1280 g	1300 g	1350 g	2400 g	2450 g
No. of Charging Program adjustable (see p. 6)	1,2,4,5, 4x Li	1,2,4,5, 4x Li	1,2,4,5, 4x Li	1,2,4,5, 4x Li	1,2,4,5, 4x Li	1,2,4,5, 4x Li
Autom. Battery Regeneration/Li Auto Wake Up	●/●	●/●	●/●	●/●	●/●	●/●
Power Pack Function (Battery Replacement)	●	●	●	●	●	●
Manual Lead Equalization Function	●	●	●	●	●	●
Connection Remote Control/remote	●	●	●	●	●	●
Battery Capacity (size) adjustable	–	–	–	–	●	●
AC Power Limit Function	–	–	–	–	●	●
Silent Run Function	●	●	●	●	●	●
Switching Output for Motor Locking	●	●	●	●	●	●
Lead Temperature Compensation/LiFePO4 Protection	●/●	●/●	●/●	●/●	●/●	●/●
Temperature Sensor (s) 825 in Delivery Scope	1	1	1	1	2	2
Voltage Sensor	–	–	–	–	●	●
Electronic System humidity-proof	●	●	●	●	●	●

AUTOMATIC CHARGER VAC 24 V

Unit Type	VAC 2416 M 3A	VAC 2425 M 3A	VAC 2430 M 3A /110 V AC	VAC 2440 M 2A
Order No.	**0452**	**0459**	**0462**	**0467**
Execution	A	B	C	C
Rated voltage / Current	**24 V** / 16 A	**24 V** / 25 A	**24 V** / 30 A	**24 V** / 40 A
Auxiliary Charging Port „S"	24 V / 2 A	24 V / 4 A	24 V / 2 A	24 V / 2 A
Battery Capacity	40-200 Ah	46-290 Ah	62-350 Ah	75-480 Ah
No. of Charging Ports	2+S	2+S	2+S	1+S
Charging Current Distributor, switchable Start	● [1]	● [1]	●	–
Mains Voltage	(110 V) 230 V AC [3]	(110 V) 230 V AC [3]	110 bis 230 V AC [2]	(110 V) 230 V AC [3]
Max. Power Consumption (AC)	510 W	830 W	1040 W	1380 W
Dimensions* (DxWxH)	228x139x74 mm	330x139x74 mm	333x262x92 mm	333x262x92 mm
Weight	1400 g	2400 g	3900 g	3900 g
No. of Charging Program adjustable (see p. 6)	1,2,4,5	1,2,4,5	1,2,4,5	1,2,4,5
Automatic Battery Regeneration	●	●	●	●
Power Pack Function (Battery Replacement)	●	●	●	●
Manual Lead Equalization Function	●	●	●	●
Connection Remote Control/Remote Indicator	●	●	●	●
Battery Capacity (size) adjustable	–	●	●	●
AC Power Limit Function	–	●	●	●
Silent Run Function	●	●	●	●
Switching Output for Motor Locking	●	●	●	●
Lead Temperature Compensation	●	●	●	●
Temperature Sensor (s) 825 in Delivery Scope	1	2	2	1
Voltage Sensor	–	●	●	●
Electronic System humidity-proof	●	●	●	●

	VAC 1260 M 3A	VAC 1260 M 3A /110 V AC	VAC 1280 M 2A
	0430	**0432**	**0439**
	B	C	C
	12 V; 12,0-13,3 V / 60 A	**12 V** / 60 A	**12 V** / 80 A
	12 V / 4 A	12 V / 2 A	12 V / 2 A
	110-660 Ah	120-660 Ah	150-880 Ah
	2+S	2+S	1+S
	●[1]	●	–
	(110 V) 230 V AC[3]	110 V bis 230 V AC[2]	(110 V) 230 V AC[3]
	1020 W	1060 W	1400 W
	330x139x74 mm	333x262x92 mm	333x262x92 mm
	2500 g	3900 g	3900 g
	1,2,4,5, 4x Li	1,2,4,5	1,2,4,5
	● / ●	● / –	● / –
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	● / ●	● / –	● / –
	2	2	1
	●	●	●
	●	●	●

[1] The charging distributors 2nd port is also usable for engine-starter-battery by selecting the battery-type. So it provides high power as well as high speed charging for different types of batteries and for this also engine-starter-batteries.

[2] 110 V to 230 V AC: Operating voltage range worldwide: 90 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC.

[3] (110 V) 230 V AC: Operating voltage range: 190 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC. Works from 90 V AC, at 110 V AC approx. 50 % charging capacity.

[4] 110 V) 230 V AC: Operating voltage range: 190 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC. Works from 90 V AC, at 110 V AC approx. 18 A charging current.

* Dimensions incl. mounting flanges/feeds, without connections.

Delivery Scope:
Mains cable, manual, temperature sensor (s) 825 see table

! RECOMMENDABLE ACCESSORIES

Order No. 2081
Remote Indicator IP67

Order No. 2075
Remote Control S

» *More information you will find on pages* ***101-107.***

» More technical specifications and informations you will get at our website **www.votronic.de**

BETTER SAFE THAN SORRY - SIMPLY CLEVER

Dual charger for ambulance cars with 2 independent battery circuits

PRODUCT FEATURES

- All features identical with series VAC

Additionally:

- Built-in mains charger, special development for ambulance cars
- Two completely individual and independent charging parts
- Optimised 6-stage characteristic line of charging for acid, gel, and AGM batteries
- Battery type and capacity adjustable per battery
- 2 temperature sensors 825 included in the standard delivery
- Automatic battery regeneration
- Signalling port for engine inmobilizer
- Electronic system humidity-proof
- Optionally with emergency start function 200 A

Quite often, special mains chargers with different charging capacity rates are required for two independent battery circuits or two different battery types. Usually, this means, that apart from the "normal" charger for the starter battery, an additional unit for the special board battery must be installed - with all attending ills: additional costs for the unit, additional expenses for installation and double space requirements in the vehicle.

The remedy is the charger series VAC-Duo, in which two individual charging parts, working independently of each other, are combined space-savingly in one unit. Each charging part can be adjusted exactly to its battery regarding battery type, charging program and battery capacity. So, a fully-fledged charger is also available for the starter battery.

Such as for all chargers of series VAC, the electronic system is protected against humidity, and the temperature sensors 825 are included in the standard delivery. Also a signalling port+86 exists to avoid starting of the engine, when the vehicle is connected to the mains supply.

Further novelties are the units with integrated battery bridging 200 A allowing an emergency engine start. Remote control of this function is also possible by means of a simple push-button, which can be installed on the dashboard.

SERIES VAC-DUO

Automatic Chargers

2 Independent charging parts, battery types individually adjustable

DUAL CHARGERS, OPTIONALLY WITH OR WITHOUT START BRIDGE FUNCTION FOR SUPPLY AND STARTER BATTERIES

230 V AC – 12 V DC / 12 V DC

VAC 1215/15 Duo:	Max. charging current starter battery / board battery:	15 A / 15 A
VAC 1215/30 Duo:	Max. charging current starter battery / board battery:	15 A / 30 A
VAC 1215/40 Duo:	Max. charging current starter battery / board battery:	15 A / 40 A
VAC 1220/30 Duo:	Max. charging current starter battery / board battery:	20 A / 30 A
VAC 1220/40 Duo:	Max. charging current starter battery / board battery:	20 A / 40 A
VAC 1230/30 Duo:	Max. charging current starter battery / board battery:	30 A / 30 A
VAC 1230/40 Duo:	Max. charging current starter battery / board battery:	30 A / 40 A

Charging of lead batteries is strongly depending on the temperature. Therefore, the temperature sensors 825 should be used for full charging, particularly for gel and AGM batteries. The sensor is part of the delivery scope for chargers of series VAC-Duo (2 pieces).

! WE RECOMMEND

The service life of lead batteries is extended by 100 % full charging by means of a mains charger, once a month. Insufficient recharging results in capacity loss and premature ageing of the battery.

The battery is the central element of the vehicle's electric system. Utmost attention has to be paid to it concerning maintenance and care, and, above all: It has to be charged correctly. This is particularly true for fire-fighting vehicles and intervention vehicles, where the auxiliary battery supplies the electric appliances, systems and equipment on board. The charging state of this supply battery decides, which electric appliance can be switched-on and how long it can be switched-on, which might eventually be decisive for life and linb.

IN CASE OF EMERGENCY POWER IS REQUIRED

Built-in mains chargers for fire-fighting vehicles

The charger series VAC-F and VAC-F II are identical with the units of series VAC, and they are a special design for application in fire-fighting vehicles. They are designed for installation in the vehicle and comply with all regulations of the FNFW of the valid fire brigade standard DIN 14679 for charging of auxiliary batteries and starter batteries in intervention vehicles. Optionally, the units can be equipped with the standardized FIRECAN connection.

In addition, the units of series VAC-F II are equipped with a protective insulation according to protection class II and a 2-core mains cable. Connection of a protective conductor is not required. In case of a single installation in the vehicle according to DIN 14679, supplement C, the electric mains cable of the unit can simply be replaced by the heavy cable H07RN-F, 2x2.5 mm^2, being prescribed in this case.

PRODUCT FEATURES

- All features identical with series VAC
- Special design for fire-fighting vehicles
- Satisfies DIN 14679 of the FNFW
- Optimised 6-stage characteristic line of charging for acid, gel, and AGM batteries
- Function charging current distributor can also be adjusted for the starter battery
- Temperature sensor 825 is included in the standard delivery
- Unattended charging, also during continuous operation
- Manual charging start for totally discharged batteries
- Automatic battery regeneration
- Signalling port for engine inmobilizer
- Electronic system humidity-proof
- Replaceable mains cable for execution protection class II

SERIES VAC-F AND VAC-F II

Automatic Chargers according to DIN 14679

Optional with FIRECAN

Serie VAC-F

CHARGERS FOR SUPPLY AND STARTER BATTERIES

230 V/AC – 12 V/DC
Max. charging current: 80 A

230 V/AC – 24 V/DC
Max. charging current: 40 A

CHARGERS WITH SELECTIVE CHARGING CURRENT DISTRIBUTOR FOR 2 BATTERIES

230 V/AC – 12 V/DC
Max. charging current: 15, 30, 50 A

230 V/AC – 24 V/DC
Max. charging current: 16, 25 A

Serie VAC-F II

Built-in chargers in protection class II

CHARGERS WITH SELECTIVE CHARGING CURRENT DISTRIBUTOR FOR 2 BATTERIES

230 V/AC – 12 V/DC
Max. charging current: 15, 30 A

230 V/AC – 24 V/DC
Max. charging current: 16 A

» **All units with technical data are listed on page 24/25.**

! WE RECOMMEND

The service life of lead batteries is extended by 100 % full charging by means of a mains charger, once a month. Insufficient recharging results in capacity loss and premature ageing of the battery.

AUTOMATIC CHARGER VAC-DUO

Unit Type	VAC 1215/15 Duo	VAC 1215/30 Duo	VAC 1215/40 Duo	VAC 1220/30 Duo	VAC 1220/40 Duo	VAC 1230/30 Duo
Order No. **with** Start Bridge Function	**0625**	**0628**	–	**0632**	**0633**	–
Order No. **without** Start Bridge Function	**0626**	**0627**	**0636**	**0631**	**0634**	**0642**
Execution	A	A	A	A	A	A
Rated voltage / Current	**12 V** / 15 A + 15 A	**12 V** / 15 A + 30 A	**12 V** / 15 A + 40 A	**12 V** / 20 A + 30 A	**12 V** / 20 A + 40 A	**12 V** / 30 A + 30 A
Battery Capacity	36-170 Ah/ 36-170 Ah	36-170 Ah/ 75-350 Ah	36-170 Ah/ 90-480 Ah	50-230 Ah/ 75-350 Ah	50-230 Ah/ 90-480 Ah	75-350 Ah/ 75-350 Ah
Switching Output for Motor Locking	●	●	●	●	●	●
Mains Voltage	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]
Max. Power Consumption (AC)	480 W	720 W	890 W	810 W	980 W	980 W
Dimensions* (DxWxH)	353x262x92 mm	353x262x92 mm	353x262x92 mm	353x262x92 mm	353x262x92 mm	353x262x92 mm
Weight	3700 g	3700 g	3700 g	3750 g	3900 g	3950 g
No. of Charging Program adjustable (see p. 6)	1,2,3,5 / 1,2,3,5	1,2,3,5 / 1,2,3,5	1,2,3,5 / 1,2,3,5	1,2,3,5 / 1,2,3,5	1,2,3,5 / 1,2,3,5	1,2,3,5 / 1,2,3,5
Automatic Battery Regeneration	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●
Power Pack Function (Battery Replacement)	–	–	–	–	–	–
Connection Remote Control/Remote Indicator	●	●	●	●	●	●
Battery Capacity (size) adjustable	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●
AC Power Limit Function	–	–	–	–	–	–
Silent Run Function	–	–	–	–	–	–
Temperature Compensation	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●
Temperature Sensor (s) 825 in Delivery	2	2	2	2	2	2
Voltage Sensor with/without Start Bridge	– / ●	– / ●	●	– / ●	– / ●	●
Electronic System humidity-proof	●	●	●	●	●	●

» **Other capacity combinations upon request**

* Dimensions incl. mounting flanges, without connections

Delivery Scope: 2 temperature sensors 825, mains cable, manual

AUTOMATIC CHARGER VAC-F

Unit Type	VAC 1215 F3A	VAC 1230 F3A	VAC 1250 F3A	VAC 1280 F2A	VAC 2416 F3A	VAC 2425 F3A
Order No.	**0470**	**0476**	**0482**	**0487**	**0494**	**0496**
Execution	A	A	C	B	A	C
Rated voltage / Current	**12 V** / 15 A	**12 V** / 30 A	**12 V** / 50 A	**12 V** / 80 A	**24 V** / 16 A	**24 V** / 25 A
Battery Capacityen	30-75 (150 [4]) Ah	50-150 (300 [4]) Ah	85-250 (500 [4]) Ah	120-400 (800 [4]) Ah	30-80 (160 [4]) Ah	40-125 (250 [4]) Ah
No. of Charging Ports	2	2	2	1+S	2	2
Charging Current Distributor, switchable	● [3]	● [3]	● [3]	–	● [3]	● [3]
Switching Output for Motor Locking	●	●	●	●	●	●
Mains Voltage	110 V to 230 V AC [1]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]
Max. Power Consumption (AC)	240 W	490 W	840 W	1400 W	510 W	830 W
Dimensions* (DxWxH)	228x139x74 mm	228x139x74 mm	330x139x74 mm	333x262x92 mm	228x139x74 mm	330x139x74 mm
Weight	1250 g	1350 g	2450 g	4100 g	1400 g	2450 g
No. of Charging Program adjustable (see p. 6)	5,6,7,8,9	5,6,7,8,9	5,6,7,8,9	5,6,7,8,9	5,6,7,8,9	5,6,7,8,9
Automatic Battery Regeneration	●	●	●	●	●	●
Power Pack Function (Battery Replacement)	●	●	●	●	●	●
Connection Remote Control/Remote Indicator	●	●	●	●	●	●
Battery Capacity (size) adjustable	–	–	●	●	–	●
AC Power Limit Function	–	–	●	●	–	●
Manual Charging Start at Totally Discharged Battery	●	●	●	●	●	●
Temperature Compensation	●	●	●	●	●	●
Temperature Sensor (s) 825 in Delivery	1	1	2	1	1	2
Voltage Sensor	–	–	●	●	–	●
Electronic System humidity-proof	●	●	●	●	●	●
Protection Class II (DIN 14679)	–	–	–	–	–	–

* Dimensions incl. mounting flanges, without connections

Delivery Scope: Temperature sensor (s) 825, mains cable (protection class II, 2 core), manual, 2nd unit label self-adhesive

[1] 110 V to 230 V AC: Operating voltage range worldwide: 90 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC.

[2] (110 V) 230 V AC: Operating voltage range: 190 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC. Works from 90 V AC, at 110 V AC approx. 50 % charging capacity.

[3] The charging distributors 2nd port is also usable for engine-starter-battery by selecting the battery-type. So it provides high power as well as high speed charging for different types of batteries and for this also engine-starter-batteries.

[4] In case of stop periods of the vehicles .. 24 hours, acc. to DIN 14679

* Dimensions incl. mounting flanges/feeds, without connections

RECOMMENDABLE ACCESSORIES

Order No. 2081
Remote Indicator IP67
(similar to figure)

Order No. 2075
Remote Control S

Order No. 2078
Remote Control S
only for Automatic Charger Duo

» *More information you will find on pages 101-107.*

VAC 1230/40 Duo	
–	
0644	
A	
12 V / 30 A + 40 A	
75-350 Ah/ 90-480 Ah	
●	
(110 V) 230 V AC [2]	
1100 W	
353x262x92 mm	
4000 g	
1,2,3,5 / 1,2,3,5	
● / ●	
–	
●	
● / ●	
–	
–	
● / ●	
2	
●	
●	

VAC 2440 F2A	
0498	
B	
24 V / 40 A	
66-200 (400 [4]) Ah	
1+S	
–	
●	
(110 V) 230 V AC [2]	
1380 W	
333x262x92 mm	
4100 g	
5,6,7,8,9	
●	
●	
●	
●	
●	
●	
●	
1	
●	
●	
–	

Optional with FIRECAN

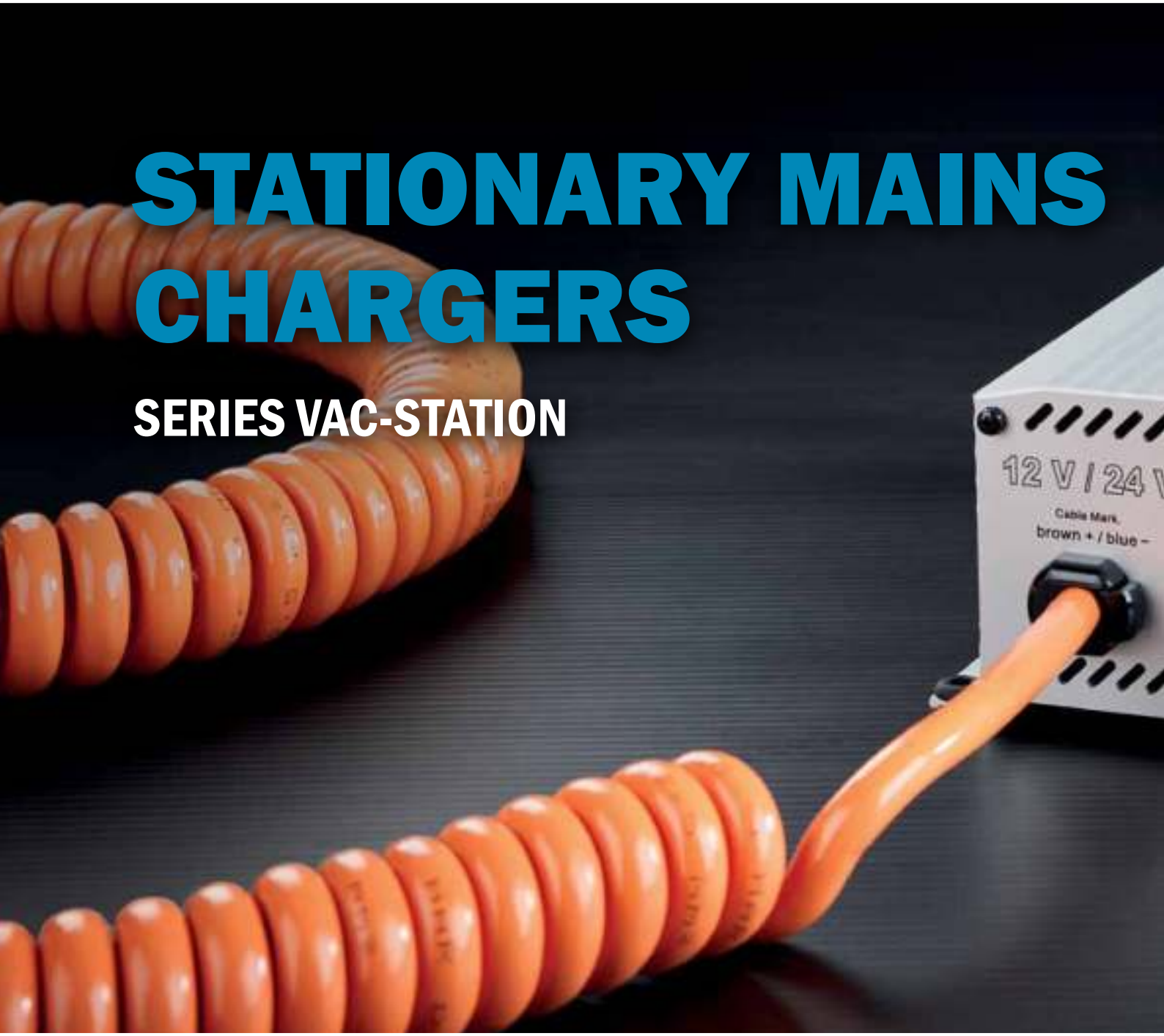
AUTOMATIC CHARGER - PROTECTION CLASS II VAC-F II

Unit Type	VAC 1215 F3A II	VAC 1230 F3A II	VAC 2416 F3A II
Order No.	**0471**	**0477**	**0495**
Execution	A	A	A
Rated voltage / Current	**12 V** / 15 A	**12 V** / 30 A	**24 V** / 16 A
Battery Capacityen	30-75 (150 [4]) Ah	50-150 (300 [4]) Ah	30-80 (160 [4]) Ah
No. of Charging Ports	2	2	2
Charging Current Distributor, switchable	● [3]	● [3]	● [3]
Switching Output for Motor Locking	●	●	●
Mains Voltage	110 V to 230 V AC [1]	(110 V) 230 V AC [2]	(110 V) 230 V AC [2]
Max. Power Consumption (AC)	240 W	490 W	510 W
Dimensions* (DxWxH)	259x139x72 mm	259x139x72 mm	259x139x72 mm
Weight	1250 g	1350 g	1400 g
No. of Charging Program adjustable (see p. 6)	5,6,7,8,9	5,6,7,8,9	5,6,7,8,9
Automatic Battery Regeneration	●	●	●
Power Pack Function (Battery Replacement)	●	●	●
Connection Remote Control/Remote Indicator	●	●	●
Battery Capacity (size) adjustable	–	–	–
AC Power Limit Function	–	–	–
Man. charging start for discharged battery	●	●	●
Temperature Compensation	●	●	●
Temperature Sensor (s) 825 in Delivery	1	1	1
Voltage Sensor	–	–	–
Electronic System humidity-proof	●	●	●
Protection Class II (DIN 14679)	●	●	●

» More technical specifications and informations you will get at our website **www.votronic.de**

STATIONARY MAINS CHARGERS

SERIES VAC-STATION




Quitt.
1 2 3 4
Battery Type
Remote Control
24 V
12 V
Stand By
On
VOTRONIC

VOTRONIC

READY FOR THE NEXT MISSION

Stationary mains chargers for external charging of intervention vehicles in vehicle halls with permanent or variable parking lots

PRODUCT FEATURES

- All features identical with series VAC
- Special design for external battery charging and and trickle charging in vehicle halls
- Satisfies DIN 14679 of the FNFW
- Optimised 6-stage characteristic line of charging for acid, gel, and AGM batteries
- 6 Charging programs adjustable
- Automatic battery regeneration
- Variable fitting position
- Automatic activation of the charging plug
- Delivery without charging plug

The chargers of series VAC-Station are largely identical with the units of series VAC, and they are specifically adapted to the external charging of intervention vehicles in vehicle halls. They comply with all regulations of the FNFW of the valid fire brigade standard DIN 14679, with the exception of the protection against splash water.

During extended stop periods, an automatic battery regeneration keeps the batteries ready for the next mission. Simultaneous, failure-free supply of consumers being continuously connected to the vehicle's board mains supply (wireless transmitting sets, charging trays, lamps etc.) and their readiness for operation are also ensured. Automatic separation from mains of the charging connector in case of missing battery.

All units are either available with fixed helix cable or cable „Ölflex®". The high-quality helix cable is suitable for direct connection of a cable connector, the cable „Ölflex®" serves for connection to a connection box for further cable extension or an automatic cable rewinder.

In vehicle halls with variable parking lots the Automatic Charger VAC 1224-16 Station is recommended, which recognizes the vehicle's board supply voltage 12 V or 24 V automatically.

AUTOMATIC CHARGER VAC-STATION			
Unit Type	VAC 1215 Station	VAC 1224-16 Station	VAC 2416 Station
Order No. with **4 m cable "Ölflex"**	**0538**	**0533**	**0548**
Order No. with **5 m Helix Cable**	**0528**	**0523**	**0544**
Auto Detection 12/24 V	–	●	–
Rated voltage / Current	**12 V** / 15 A	**12 V / 24 V** / 16 A	**24 V** / 16 A
Battery Capacity (according to DIN 14679)	45-160 Ah	50-160 Ah	50-160 Ah
Mains/max. Power Consumption	110 V to 230 V AC [1] / 270 W	(110 V) 230 V AC [2] / 530 W	(110 V) 230 V AC [2] / 530 W
Dimensions* (DxWxH)	228x139x74 mm	228x139x74 mm	228x139x74 mm
Weight without Cable	1300 g	1400 g	1400 g
No. of Charging Program adjustable (see p. 6)	5,6,7,8,9,10	5,6,7,8,9,10	5,6,7,8,9,10
Automatic Battery Regeneration	●	●	●
Connection Remote Control/Remote Indicator	●	●	●

[1] 110 V to 230 V AC: Operating voltage range worldwide: 90 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC.

[2] (110 V) 230 V AC: Operating voltage range: 190 V - 270 V AC / 45-65 Hz with full charging capacity, short-time (5 s) 305 V AC. Works from 90 V AC, at 110 V AC approx. 50 % charging capacity.

* Dimensions incl. mounting flanges, without connections

Delivery Scope: Mains cable, second unit label, manual, cable „Ölflex" or helix cable

! WE RECOMMEND

The service life of lead batteries is extended by 100 % full charging by means of a mains charger, once a month. Insufficient recharging results in capacity loss and premature ageing of the battery.

SERIES VAC-STATION

Stationary mains chargers

EXECUTION WITH 5 M HELIX CABLE:

- Prepared for direct connection of the charging plug at the cable end (such as charging connector 12 V/24 V, order no. 2331, or C-connector, order no. 2323).
- Cable length approx. 1.2 m, extractible to approx. 5 m
- Oil-proofed and acid-proofed cable for high mechanic stress, suitable for humid rooms

EXECUTION WITH CABLE „ÖLFLEX ®“, 4 M:

Prepared for further cable extension, optionally with:

- Automatic cable rewinder, 5 m (max. 16 A charging current), order no. 2315 or
- Helix charging cable, 5 m, complete with charging connector, order no. 2319 or
- Helix charging cable, 5 m, order no. 2318, with C-connector, order no. 2323, or charging connector, order no. 2331

! RECOMMENDABLE ACCESSORIES

Order No. 2315
Automatic
Cable Rewinder

Order No. 2075
Remote Control S

Order No. 2331
Charging Connector
12 V / 24 V

Order No. 2323
Charging Connector for fire-fighting vehicles according to DIN 14690 (C-connector)

» *More information you will find on pages 101-109.*

UNIT COMBI-NATIONS

SERIES VBCS TRIPLE, VAC TRIPLE


VOTRONIC
Battery Charger Triple
VBCS 60\40\30 CI
AC Power Lost
AC Power Off 4s
Display
BUS
Com.
Made in Germany

VOTRONIC

ALL GOOD THINGS COME IN THREES

PRODUCT FEATURES

- Continuous, all-automatic battery charging
- High operating safety
- Quick, gentle charging
- Integrated battery care
- Full charging capacity worldwide
- 110 V / 230 V
- 8 characteristic lines of charging for acid, gel, AGM and LiFePO4 batteries
- Temperature sensor 825 is included in the standard delivery
- Robust technology and compact design
- Easy installation, short cable paths
- Options: Plug-and-play Display and Control Panel LCD-Charge Control S

The creation of the Battery Charger VBCS Triple is a completely new unit combination consisting of a Mains Charger PB, a Charging Converter VCC and a Solar Controller MPP, which ensures the energy supply in the camper. The batteries will always be charged automatically, regardless if during driving or at the parking lot. Particularly the amply dimensioned charging capacity of the integrated charging converter of 30, 45 or 60 A ensures battery charging with full charging current, even at short distances, and that it is fully charged at the destination.

Regarding quality, equipment and functions, the series VBCS Triple is identical to the VOTRONIC individual units, and it distinguishes itself by the particularly compact and lightweight design. The units extremely contribute to cost saving and help to gain valuable space in the camper. Acquisition, installation, cabling and connection wiring are reduced to a minimum in order to conserve valuable resources.

Designed for well-established battery sizes, three different unit combinations are available. All units are equipped with 8 characteristic lines of charging for lead-acid, gel and AGM batteries, as well as - future-proof - for Lithium LiFePO4 batteries. The integrated battery trainer keeps the board batteries ready for operation during extended stop periods.

A LCD display and control panel, which had been developed specifically for this charging unit, indicates all important unit information. Furthermore, the charger can be adapted to the energy supply of the parking lot.

SERIES VBCS TRIPLE

Unit Combination of Mains Charger, Charging Converter and MPP Solar Controller and Battery Trainer

INCLUSIVE
Temperature Sensor

SUITABLE FOR EURO 6

MOBILE CHARGER WITH CHARGING OPTIONS FOR BOARD AND STARTER BATTERY

VBCS 30/20/250 Triple:
VCC Charging Converter with 30 A
Pb Mobile Charger with 20 A
MPP Solar Charging Controller
for max. 250 Wp

VBCS 45/30/350 Triple:
VCC Charging Converter with 45 A
Pb Mobile Charger with 30 A
MPP Solar Charging Controller
for max. 350 Wp

VBCS 60/40/430 Triple:
VCC Charging Converter with 60 A
Pb Mobile Charger with 40 A
MPP Solar Charging Controller for
max. 430 Wp

Charging of lead batteries is strongly depending on the temperature. Therefore, a temperature sensor should be used for full charging of gel and AGM batteries, which is included in the delivery scope of all units

» **All units with technical data are listed on page 35.**

✓ OUR TIP

The combination chargers of series Triple distinguish depending on application:

The series VBCS Triple is a special development with integrated MPP solar charging controller with focus on board battery charging in campers, whereas the series VAC Triple with integrated charging current distributor also supplies high charging current to the starter battery, thus being particularly suitable for intervention vehicles.

SERIES VAC TRIPLE

Unit combinations of mains charger, charging converter and battery trainer with charging current distributor function for the starter battery

SUITABLE FOR EURO 6

PRODUCT FEATURES

- As series VBCS Triple, however without solar charging controller MPP
- In lieu thereof with intelligent charging current distributor for high charging current 12 V/10-15 A for quick charging of the starter battery and supply of the connected consumer loads 12 V during mains charging
- Including trickle charging in case of extended standstill periods and battery maintenance
- Electronic system humidity-proof

MOBILE CHARGER WITH CHARGING OPTIONS FOR BOARD AND STARTER BATTERY

VAC 45-10/25 Triple:
VCC Charging Converter with 45 A
VAC Main Charger with 35 A and
Charging Current Distributor 10 A

VAC 60-15/30 Triple:
VCC Charging Converter with 60 A
VAC Main Charger with 45 A and
Charging Current Distributor 15 A

The units of series VAC Triple consist of a VAC, mains supply charger and a VCC charging converter including battery trainer. Instead of the integrated MPP solar controller of series VBCS Triple, the units are equipped with an intelligent charging current distributor, which distributes the charging current of the mains supply charger and supplies a higher charging current of 10 A or 15 A to the starter battery. That way, higher loads can be floated at the starter battery (entertainment, blue light, siren etc.) to ensure that the vehicle can be started at any time. If the starter battery does not need the high charging current any more, the charging current distributor supplies the excess charging current to the board battery.

BATTERY CHARGER VBCS TRIPLE/VAC TRIPLE

Unit Type	VBCS 30/20/250 Triple	VBCS 45/30/350 Triple	VBCS 60/40/430 Triple	VAC 45-10/25 Triple	VAC 60-15/30 Triple
Order No.	**3241**	**3243**	**3245**	**0663**	**0665**
Mains Operation					
Nominal Operating Voltage (AC)	110 V - 230 V / 45 - 65 Hz worldwide110 V to 230 V / 45 - 65 Hz				
Operating Voltage Range (AC)	90 V - 270 V, Short-timing (5 s) 305 V				
Max. Power Consumption (AC)	360 W	520 W	700 W	610 W	780 W
Charging Capacity Board-Battery max.	20 A	30 A	40 A	35 A	45 A
Charging Capacity Starter-Battery via Charging Current	4 A	4 A	5 A	10 A	15 A
Mains Detection/Switching Output for Motor locking	●	●	●	●	●
AC Power Limit Function	●	●	●	●	●
12 V/12 V B2B Charging Converter Operation					
Charging Capacity Board Battery max.	30 A	45 A	60 A	45 A	60 A
Automatic Activation D+, Ignition	●	●	●	●	●
Starter Battery/Alternator Voltage Range (Euro 6) / max. Current	10.5-16.5 V / 42 A	10.5-16.5 V / 63 A	10.5-16.5 V / 82 A	10.5-16.5 V / 63 A	10.5-16.5 V / 82 A
Max. Current Limit II (adjusable)	25 A	48 A	65 A	48 A	65 A
MPP Solar Charging Controller Operation					
Capacity Solar Module (Pmax)	50 - 250 Wp	50 -350 Wp	60 - 430 Wp	–	–
Current Solar Module max.	15.0 A	21.0 A	26.0 A	–	–
Voltage Solar Module (Voc) max.	36 V	36 V	36 V	–	–
Charging Current Board/Starter Battery max.	18.0 / 4.0 A	25.5 / 5.0 A	31.5 / 5.0 A	–	–
Terminal AES Refrigerator	●	●	●	–	–
Starter-Battery					
Nominal Voltage / Capacity min. recommendable	12 V / >60 Ah	12 V / >/80 Ah	12 V / >100 Ah	12 V / >80 Ah	12 V / >100 Ah
Bord-Battery, IU1oU2oU3					
Nominal Voltage Lead-Acid/ LiFePO4	12 V / 12.0-13.3 V	12 V / 12.0-13.3 V	12 V / 12.0-13.3 V	12 V / 12.0-13.3 V	12 V / 12.0-13.3 V
Battery Capacity, adjustable	45 - 280 Ah	68 - 420 Ah	90 - 560 Ah	68 - 420 Ah	90 - 560 Ah
No. of charging program adjustable Lead-Acid/-Gel/-AGM (see p. 6)	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4
4 different charging programs for some of the latest LiFePO4 Battery-Systems with BMS	4x Li	4x Li	4x Li	4x Li	4x Li
Voltage Sensor Lines Start-/Bord-Battery	●/●	●/●	●/●	●/●	●/●
Lead Temperature Compensation/LiFePO4 Protection	●/●	●/●	●/●	●/●	●/●
Temperature Sensor 825 in Delivery Scope	●	●	●	●	●
Automatic Battery Regeneration/Li Auto Wake Up	●/●	●/●	●/●	●/●	●/●
Lead Board Battery Trainer (Pulser), optionally activatable	●	●	●	●	●
Control Input for LiFePO4 - BMS for Charging Stop	●	●	●	●	●
Plug-in Connection Display LCD-Charge Control S	●	●	●	●	●
Plug-in Connection VBS2	●	●	●	●	●
Dimensions * (WxDxH)	256x219x85 mm	256x219x85 mm	256x219x85 mm	256x219x85 mm	256x219x85 mm
Weight	2700 g	2850 g	2900 g	2850 g	2900 g

* Dimensions incl. mounting flanges, without connections

Delivery Scope: Manual, Mains cable, temperature sensor 825 **Mark of Conformity:** CE, E Test (EMV/automotive regulations)

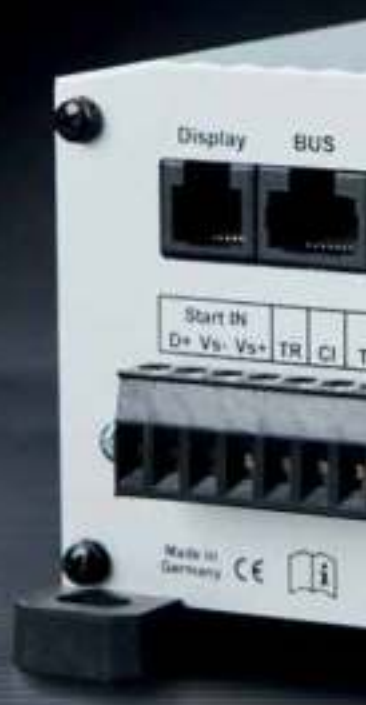
! RECOMMENDABLE ACCESSORIES

Order No. 1247
LCD-Charge Control S

» *More Information see page 71.*

CHARGING CONVERTER

SERIES VCC




VOTRONIC
Bord OUT
T Vb- Vb+
Battery Full
Main Charge
Current
Bord OUT
Start IN
Power
Pb
Gel
Acid/AGM1
AGM2
OUT Limit
A
IN Limit
D+
Low
LiFePo
13.8 V
14.2 V
14.4 V
max
B
max
Vs
High
Charging Converter
VCC 1212-70

VOTRONIC

REACHING THE DESTINATION WITH FULL BOARD BATTERY

Optimum battery charging with characteristic line during driving

PRODUCT FEATURES

- Replaces conventional Cutoff Relay
- Suitable for any type of dynamo
- High charging capacity, already within short distances
- Full charging when driving longer distances
- Optimised characteristic lines of charging for acid, gel and AGM batteries adjustable as Lithium LiFePO4-Batteries
- The energy balance of conventional generators is considerably improved
- Automatic power control
- Parallel operation for power increase possible
- Particularly suitable for vehicles with **standard Euro 6**
- Simple installation, no intervention into the starter circuit
- Small, lightweight and compact
- Inclusive Temperature Sensor 825

The problem is long-known, but even so annoying again and again: Despite powerful dynamo, the board battery is not charged fully, even when driving longer distances. This is caused by long cable paths, small cable cross-sections and strongly varying charging conditions of starter battery and board battery. Besides, supply of these consumers during driving is required.

This is resolvable by the VOTRONIC Charging Converters, charging the board battery quickly and gently according to the specifications of the battery manufacturers. Even at short distances, the battery will be charged with full charging current. Losses due to long charging cables in big vehicles, as well as voltage fluctuations at the dynamo (Euro 6) are compensated.

With the appropriate unit, optimum supply of vehicles with 12 V and 24 V board voltage is ensured. Of course, with galvanic isolation. This avoids voltage puncture in case of failure, undesirable back discharges and suppresses interferences of the board mains. The compact units are in no way inferior to the mains chargers of the same construction. Also here, an intelligent microprocessor controls the robust power electronics and ensures optimum charging and safe operation. The six phased charging current curve can be used on not only the more classical lead-acid, gel, and AGM batteries, but also on the more modern lithium (LiFePO4) batteries. The simultaneous supply of the connected consumers is effected automatically, even in case of strongly loaded board mains. The automatic power control gives the required safety and ensures the vehicle's starting ability.

SERIES VCC

B2B charging converter (battery to battery) for lead and LiFePO4 batteries

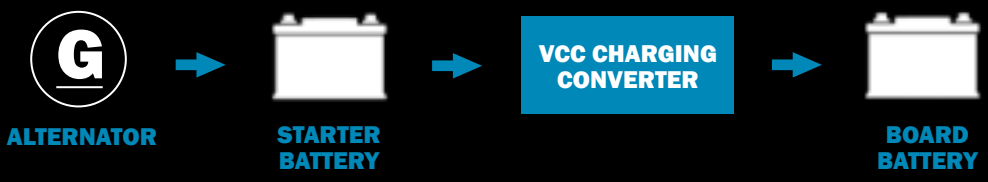
12 V → 12 V

AVAILABLE VERSIONS

VCC 1212-30 Input Voltage 12 V (Starter Battery) Output 12 V / max. 30 A
VCC 1212-20 C Input 12 V / max. 20 A (Towing Vehicle) Output 12 V / max. 24 A

SUITABLE FOR EURO 6

FUNCTIONALITY CHARGING CONVERTER SERIES VCC



FUNCTIONALITY CHARGING CONVERTER SERIES VCC-C

» Alle technical data are listed on page 42.

! WE RECOMMEND

The VCC charging converters are an optimum substitute for the existing cutoff relay and ensure a considerable improvement of the energy balance, even with conventional generators.

In contrast to conventional boosters, the charging converters VCC work with optimised characteristic lines of charging, automatically and unattended. Overcharging of the battery is excluded.

✓ OUR TIP

Particularly suitable for electroblock „EBL", „EVS" of the customer with further use of the customer's cabling.

SERIES VCC (50 - 90 A)

Charging Converter B2B (Battery to Battery) without Galvanic Isolation

12 V → 12 V

SUITABLE FOR EURO 6

AVAILABLE VERSIONS

Starter battery 12 V / bord battery 12 V:

VCC 1212-50	charging current 50 A
VCC 1212-70	charging current 70 A
VCC 1212-90	charging current 90 A

Charging of lead batteries is strongly depending on the temperature. Therefore, a temperature sensor should be used for full charging of gel and AGM batteries, which is included in the delivery scope of all units.

» **All units with technical data are listed on page 42.**

! WE RECOMMEND

The VCC charging converters are an optimum substitute for the existing cutoff relay and ensure a considerable improvement of the energy balance, even with conventional generators.

In contrast to conventional boosters, the charging converters VCC work with optimised characteristic lines of charging, automatically and unattended. Overcharging of the battery is excluded.

✓ OUR TIP

If the capacity of the electroblock „EBL", „EVS" is limited or in case of weak generator, the current draw of the unit can be adapted dynamically.

SERIES VCC (12 V / 24 V to 45 A)

Charging Converter B2B (Battery to Battery) with Galvanic Isolation

12 V → 24 V

24 V → 12 V

24 V → 24 V

INCLUSIVE
Temperature Sensor

SUITABLE FOR EURO 6

AVAILABLE VERSIONS

max. charging current 25 A:

VCC 1212-25 IUoU-Li	Starter Battery 12 V / Board Battery 12 V
VCC 1224-25 IUoU	Starter Battery 12 V / Board Battery 24 V
VCC 2412-25 IUoU-Li	Starter Battery 24 V / Board Battery 12 V
VCC 2424-25 IUoU	Starter Battery 24 V / Board Battery 24 V

max. charging current 45 A:

VCC 1212-45 IUoU-Li	Starter Battery 12 V / Board Battery 12 V
VCC 2412-45 IUoU-Li	Starter Battery 24 V / Board Battery 12 V
VCC 1212-45 Li	Starter Battery 12 V / Board Battery 12 V
VCC 2412-45 Li	Starter Battery 24 V / Board Battery 12 V

Charging of lead batteries is strongly depending on the temperature. Therefore, a temperature sensor should be used for full charging of gel and AGM batteries, which is included in the delivery scope of all units.

! GALVANIC ISOLATION

The galvanic isolation between input and output ensures absolute separation of the battery circuits for outstanding suppression of failures, neat ground ratio on both sides (also with long supply cables), safety in case of failure (puncture 12 V/ 24 V or 24 V/12 V is not possible) and reliable prevention of undesirable back discharge.

» **All units with technical data are listed on page 43.**

CHARGING CONVERTERS VCC 12 V without galvanic Isolation

Unit Type	VCC 1212-20 C	VCC 1212-30	VCC 1212-50	VCC 1212-70	VCC 1212-90
Order No.	**3321**	**3324**	**3326**	**3328**	**3329**
Excetution	A	A	B	B	B
Output: Nominal Voltage Lead-Acid/-Gel/-AGM / LiFePO4	**12 V** / 12.0-13.3 V	**12 V** / 12.0-13.3 V	**12 V** / 12.0-13.3 V	**12 V** / 12.0-13.3 V	**12 V** / 12.0-13.3 V
Charging Current adjustable Limit, max.	15 A [2] / 24 A	20 A [2] / 30 A	39 A / 50 A	50 A / 70 A	75 A / 90 A
Battery Capacity (recommendable) / up to	50-160 / 200 Ah	60-200 / 260 Ah	75-320 / 440 Ah	100-460 / 620 Ah	150-600 / 800 Ah
No. of charging program adjustable Lead-Acid/-Gel/-AGM	1, 2, 4	1, 2, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4
Charging profiles for the latest LiFePO4 batteries with BMS	Li	Li	4x Li	4x Li	4x Li
Lead Temperature Compensation / LiFePO4 Protection	●/●	●/●	●/●	●/●	●/●
Input: Starter Battery/ LiMa Voltage Range (Euro 6)	**12 V** (10.5-16.5 V)	**12 V** (10.5-16.5 V)	**12 V** (10.5-16.5 V)	**12 V** (10.5-16.5 V)	**12 V** (10.5-16.5 V)
Current max. / 3 Limits adjustable	20 A / –	39 A / –	68 A / 49 A / 42 A / 33 A	95 A / 77 A / 63 A / 50 A	125 A / 100 A / 82 A / 64 A
Automatic Activation D+, Ignition / Voltage controlled	●/●	●/●	●/●	●/●	●/●
Connections Sense Cable for Input / Output	–/–	–/–	●/●	●/●	●/●
Conservation of Charge for Starter Battery [1]	0 - 1 A	0 - 1 A	0 - 3 A	0 - 5 A	0 - 5 A
Connections Display / VBS2 / CI-Bus	●/–/–	●/–/–	●/●/●	●/●/●	●/●/●
Temperature Sensor 825 in Delivery Scope	●	●	●	●	●
Terminals, Control Front / power rear	0.5-2.5 / 4-10 mm²	0.5-2.5 / 4-10 mm²	0.5-2.5 / 4-25 mm²	0.5-2.5 / 4-25 mm²	0.5-2.5 / 4-25 mm²
Dimensions* (WxDxH)	73x146x40 mm	73x146x40 mm	165x139x73 mm	235x139x74 mm	235x139x74 mm
Weight	280 g	280 g	950 g	1300 g	1480 g

Delivery Scope: Manual, 1 temperature sensor 825

Mark of Conformity: CE, E Test (EMV/automotive regulations)

[1] On mains or solar charge of the board battery

[2] When connecting the remote control Order No. 2076 or Order No. 1248

* Dimensions incl. mounting flanges/feets, without connections

! RECOMMENDABLE ACCESSORIES

for current Charging Converter without Galvanic Isolation

Order No. 1248
LCD Charge Control S-VCC

Order No. 2076
LED Remote Control S

» *More information you will find on pages 71/106.*

CHARGING CONVERTERS VCC 12 V / 24 V with galvanic Isolation

Unit Type	VCC 1224-25 IUoU	VCC 2412-25 IUoU-Li	VCC 2424-25 IUoU	VCC 2412-45 IUoU-Li	VCC 2412-45 Li
Order No.	**3311**	**3314**	**3313**	**3315**	**3309**
Output: Rated voltage / Current	C	C	C	C	C
Ausgang: Nennspannung / Ladestrom	**24 V** / 25 A	**12 V - 13.3 V** / 25 A	**24 V** / 25 A	**12 V - 13.3 V** / 45 A	**12 V - 13.3 V** / 45 A
Battery Capacity (recommendable) / up to	50-170 / 220 Ah	50-170 / 220 Ah	50-170 / 220 Ah	90-300/ 400 Ah	90-300 / 400 Ah
No. of Charging Program adjustable (see p. 6)	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	–
Charging profiles for the latest LiFePO4 batteries with BMS	–	Li	–	Li	4x Li
Connections Sense Cable a. Remote Control	●	●	●	●	●
Lead Temperature Compensation	●	●	●	●	–
LiFePO4 Temperature Control, Protection	–	●	–	●	●
Temperature Sensor 825 in Delivery Scope	●	●	●	●	●
Input: Voltage V Euro 6/max. Current A	**12 V** (11-16)/68 A	**24 V** (22-32)/18 A	**24 V** (22-32)/33 A	**24 V** (22-32)/30 A	**24 V** (22-32)/33 A
Automatic Activation D+, Ignition	●	●	●	●	●
Voltage Sensor Starter Battery	●	●	●	●	●
Terminals Front/Rear	4-16/4-16 mm²	4-16/4-16 mm²	4-16/4-16 mm²	4-16/4-16 mm²	4-16/4-16 mm²
Dimensions* (WxDxH)	270x139x74 mm	270x139x74 mm	270x139x74 mm	270x139x74 mm	270x139x74 mm
Weight	1700 g	1350 g	1700 g	1700 g	1700 g

Delivery Scope: Manual, temperature sensor 825 **Mark of Conformity:** CE, E Test (EMV/automotive regulations) * Dimensions incl. mounting flanges, without connections

CHARGING CONVERTERS VCC 12 V with galvanic Isolation

Unit Type	VCC 1212-25 IUoU-Li	VCC 1212-45 IUoU-Li	VCC 1212-45 Li
Order No.	**3306**	**3308**	**3307**
Excetution	C	C	C
Output: Rated voltage / Current	**12 V - 13.3 V** / 25 A	**12 V - 13.3 V** / 45 A	**12 V - 13.3 V** / 45 A
Battery Capacity (recommendable) / up to	50-170 / 220 Ah	90-300 / 400 Ah	90-300 / 400 Ah
No. of Charging Program adjustable (see p. 6)	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4
Charging profiles for the latest LiFePO4 batteries with BMS	Li	Li	4x Li
Connections Sense Cable a. Remote Control	●	●	●
Lead Temperature Compensation	●	●	●
LiFePO4 Temperature Control, Protection	–	–	–
Temperature Sensor 825 in Delivery Scope	●	●	●
Input: Voltage V Euro 6/max. Current A	**12 V** (11-16)/37 A	**12 V** (11-16)/63 A	**12 V** (11-16)/63 A
Automatic Activation D+, Ignition	●	●	●
Voltage Sensor Starter Battery	●	●	●
Terminals Front/Rear	4-16/4-16 mm²	4-16/4-16 mm²	4-16/4-16 mm²
Dimensions* (WxDxH)	270x139x74 mm	270x139x74 mm	270x139x74 mm
Weight	1350 g	1700 g	1700 g

! RECOMMENDABLE ACCESSORIES

for Charging Converter with Galvanic Isolation

Order No. 2075
Remote Control S

» *More Information see page 106.*

PRODUCT FEATURES

- Six-stage charging characteristic lines for acid, gel and AGM batteries, as well as Lithium LiFePO4 batteries
- Fully automatic, unattended charging while driving or for mains connection
- Suitable for strongly varying mission cycles
- No “drying up“ of the battery
- Battery capacity 6 Ah - 100 Ah
- Input 12 V or 24 V
- Galvanic isolation
- Fulfills DIN 14679 of the FNFW

TS BATTERY CHARGER PFPN 1204

Fully automatic DC charger according to DIN 14679 for trickle charging and recharging from the 12 V or 24 V board mains of the vehicle (adjustable) for the 12 V starter battery of portable fire pumps (TS/PFPN), mobile power generators and units. The adjustable charging current from 1 A to 4 A is designed for battery capacity rates of 6 to 100 Ah. Charging starts automatically, as soon as the board battery of the vehicle is charged during driving or when connected to mains. Four adjustable, 6-stage charging characteristic lines IU1oU2oU3 for acid, gel and AGM1/AGM2 type starter batteries, as well as advanced Lithium LiFePO4 batteries ensure adequate and unattended main and trickle charging, or careful storage charging.

In case of extended standstill periods, lead batteries are kept ready for operation by the automatic battery regeneration and activation of the battery trainer. Input and output are separated from each other by galvanic isolation. Thus, corrosion of the unit rack (creepage) and disruptive discharge of the 24 V/12 V board mains are avoided, the charging voltage rates are observed and neat ground ratio is ensured. After withdrawal, the charging connector will be automatically de-energised to avoid corrosion and short circuits.

The unit is equipped with a clearly arranged display of the battery condition, as well as with an audible and visual alarm. A potential-free signal contact allows connection of an additional pilot lamp for „Charge OK“. The robust housing protects from water and dust (system of protection IP 65).

ON BOARD CHARGING CONVERTER B2B

fully automatic charger (IP 65 for charging, trickle charging and maintenance of unit batteries

ON BOARD CHARGING CONVERTER B2B (Battery to Battery)	Fully Automatic Charger
Unit Type	TS-Battery Charger PFPN 1204
Order No.	**0694**
Output: Voltage Aggregat Battery Lead / LiFePO4	12 V / 12.0 - 13.3 V
Charging Current adjustable / Battery Capacity (recommendable)	1, 2, 3, 4 A / 6 - 100 Ah
Charging Programs Lead-Acid, Gel, AGM / LiFePO4	4 / 4
Charging plug disconnection Charging Connector / Protection Reverse	● / ●
Connection for Battery Temperature Compensation	●
Input: Vehicles board voltage switchable with discharge protection	12 V / 24 V
Automatic Charging Control during	Driving Mode, Mains Supply
Automatic compensation of cable length Input / Output	● / ●
Dimensions (without connections, WxDxH), System of Protection	102x120x58 mm, IP65
Weight	270 g

Delivery Scope: Manual **Mark of Conformity:** CE, E Test (EMV/automotive regulations)

! RECOMMENDABLE ACCESSORIES

Order No. 2317
Helix Cable
2 pin. 0.8 m-2 m

Order No. 2326
MagCode Power-System-Set

Order No. 2001/2088
Temperature Sensor 825/625

» *More Information see page on 101-110.*

DC-POWERSUPPLY

SERIES DC/DC


Service
Output
Voltage
< 50%
< 100%
Overload
IN
OUT
Power
Vin x2
27,0 V
26,0 V
25,0 V
DC - DC Converter
DCDC 1224-25
Made in Germany

VOTRONIC

PERFECT DC-POWERSUPPLY

DC/DC-Converters for powering electrical consumers from the battery

PRODUCT FEATURES

- Protected voltage supply of consumers in the vehicle
- Short-time overload admissible
- Output voltage stabilized
- Ideal for sensitive consumers
- Outstanding interference suppression
- Automatic activation
- 24 V/12 V flashover-proof by galvanic isolation
- Versatile applicability
- Quick and easy installation
- Not suitable for charging batteries

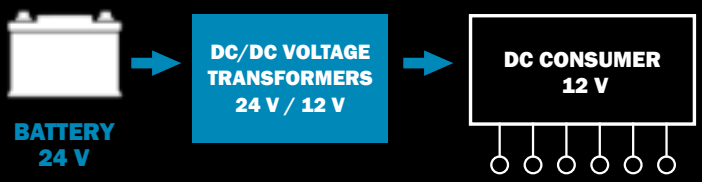
The board mains supply, which is installed in the vehicle, ensures the supply of the electrical appliances in the vehicle. If the appliance does not match to the voltage of the board mains supply, a special solution is required. More often, retrofitting to 2 board supply voltages (12 V and 24 V) is too elaborate and too expensive or even not feasible. Moreover, the desired appliance is note available with the required operating voltage.

The VOTRONIC Direct Voltage Transformers are available in any 12 V/24 V combination and allow an operation of the appropriate consumers with a continuous rating of up to 25 A or 45 A without own battery. Moreover, they supply a stabilized and smoothened direct voltage, even if the board mains supply is disturbed or if it is subject to strong variations. That way, even operation of sensitive consumers is possible, which had not been designed for automotive use. They are separated by galvanic isolation between input and output, thus ensuring absolute safety against 24 V/12 V punctures. They dispose of an outstanding interference suppression and ensure neat ground ratio in case of long connection cables.

The activation is effected manually or automatically by means of the D+ signal of the dynamo. A further possibility is the automatic control by the operating voltage. LED pilot lamps always inform of the operating state and of the load of the unit.

VOLTAGE SUPPLY OF CONSUMERS IN THE VEHICLE

FUNCTIONALITY DC/DC VOLTAGE TRANSFORMERS (EXAMPLE 24 V / 12 V)



DC/DC TRANSFORMERS Voltage Transformers

Unit Type	DCDC 1212-20	DCDC 1212-45	DCDC 1224-25	DCDC 2412-25	DCDC 2412-45	DCDC 2424-25
Order No.	**3335**	**3337**	**3331**	**3332**	**3339**	**3333**
Output Voltage, adjustable	A	B	B	B	B	B
Output Voltage, adjustable	12.0 V;12.5 V;13.0 V;13.8 V	12.5 V; 13.0 V; 13.5 V; =Vin	25.0 V; 26.0 V; 27.0 V; Vin•2	12.5 V; 13.0 V; 13.5 V; Vin:2	12.5 V; 13.0 V; 13.5 V; Vin:2	25.0 V; 26.0 V; 27.0 V=Vin
Output Constant Current/Short-time Peak Current	20 A/25 A	45 A/58 A	25 A/33 A	25 A/33 A	45 A/58 A	25 A/33 A
Input Voltage/Nominal Current	**12 V** (10-16)/24 A	**12 V** (9-16)/50 A	**12 V** (9-16)/50 A	**24 V** (18-32)/15 A	**24 V** (20-32)/35 A	**24 V** (18-32)/30 A
Galvanic Insulation	–	●	●	●	●	●
Control Input D+, Ignition or alike	●	●	●	●	●	●
Voltage Sensor Starter Battery	●	●	●	●	●	●
Terminals Front/Rear	4-10/4-10 mm²	4-16/4-16 mm²	4-16/4-16 mm²	4-16/4-16 mm²	4-16/4-16 mm²	4-16/4-16 mm²
Dimensions* (WxDxH)	73x146x40 mm	270x139x74 mm	270x139x74 mm	270x139x74 mm	270x139x74 mm	270x139x74 mm
Wight	250 g	1800 g	1750 g	1450 g	1800 g	1750 g

* Dimensions incl. mounting flanges/feets, without connections **Delivery Scope:** Manual **Mark of Conformity:** CE, E Test (EMV/automotive regulations)

SINE INVERTERS

PERFECT SUPPLY VOLTAGE WITHOUT MAINS


ER Inverter
Sinus Inverter
Overload
OUT 230V AC max. 10A
Made in Germany

VOTRONIC

MAINS SUPPLY VOLTAGE WITHOUT MAINS

Sine Inverters - 230 Volts alternating voltage like out of the socket

When being on the road with a vehicle, nobody wants to renounce comforts. Electric appliances not only inprove the comfort in the leisure vehicle, but are also decisive for the equipment of ambulance cars or fire-fighting vehicles. These electric appliances might be sensitive medical equipment, notebooks, electrical tools or the preferred espresso machine. All these units require 230 V supply voltage, which is placed at disposal by a an inverter out of the board battery. The size of the inverter is determined by the case of application. So, a coffee machine requires a more powerful unit than a razor. Consequently, the current requirement is not determined by the size of the inverter, but by the size of the connected consumer. More powerful inverters require more current and consequently larger batteries. Usually, this fact is not considered when purchasing an inverter.

The VOTRONIC Inverters supply a steady, pure sinusoidal alternating voltage of 230 V/50 Hz. They are suitable for all commercial 230 V consumers, regardless if sensitive medical appliances or robust electrical tools. Many electrical appliances in the household, in the workshop or of the multimedia field are equipped with a sensitive electronic system. Thus, they need a pure sinusoidal alternating voltage. Simple and cheap inverters with square-wave alternating voltage or modified sinusoidal voltage are not suitable for such units.

As special feature, all VOTRONIC inverters are also available with integrated mains priority control. The automatic mains priority control (NVS) of the unit ensures the availability of 230 V supply voltage and 230 V alternating voltage of the inverter at all 230 V sockets in the vehicle. An integrated safety relay avoids collision of the two operating modes. As soon as the country current is connected to the vehicle, the country current will be supplied automatically the internal 230 V sockets and the inverter will be switched off. If the vehicle is separated from the country current, the inverter will be again connected automatically to the 230 V board mains supply. The high quality of the VOTRONIC Inverters becomes remarkable by an unproblematic operation of sensitive consumers, as well as by the amply dimensioned power electronics providing high peak power for appliances with high starting current rates. To avoid unnecessary load of the board battery, all VOTRONIC inverters are equipped with an intelligent low-energy function with automatic reduction of the current consumption or timely disconnection of the inverter.

The user-friendly control panel of the unit informs of the instantaneous capacity and of the operating mode of the unit. Depending on the fitting position, it can be rotated or it can be installed at any desired position in the vehicle to act as remote control. With a suitable mounting frame, the control panel can be added to the VOTRONIC modular system.

PRODUCT FEATURES

- Output voltage in quality of mains voltage (pure sine)
- Trouble-free operation of all mains operated appliances
- The control panel can be rotated by 360 °, and it can be used as remote control
- Switch mode technology
- Compact and lightweight, but robust and reliable
- Short-time excess current is admissible
- Low current consumption and high efficiency
- Automatic disconnection in case of overvoltage/low voltage of the battery, overload, overheating etc.
- Comfort cooling fan with power control, temperature control and continuous speed control
- Integrated mains priority control with overload protection (series NVS)
- Outstanding radio interference suppression
- High peak power for demanding consumers

MOBILPOWER INVERTER 300 W AND 600 W

Sine Inverters with fixed battery connection cable

The MobilPOWER Inverters SMI 300 and 600 convert the battery voltage into pure sinusoidal alternating voltage 230 V and are equipped with battery connection cables of the corresponding cross-section. They are designed in advanced switch mode technology for continuous operation and they excel by their light weight and very high efficiency.

The capacity of these units is sufficiently dimensioned for TV and satellite receivers, multimedia equipment, computers and office equipment, battery chargers, radio systems and medical equipment. They are also ideally suitable for small consumers, such as chargers for mobile phones, notebooks etc.

» All units with technical data are listed on page 56/57.

The units offer all features of all other VOTRONIC inverters. Even the small Sine Inverter 300 W is available with mains priority control, which is unique in this class.

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Optional:
Mounting Frame S

MOBILPOWER INVERTER 1200 W AND 1700 W

Sine Inverter with battery terminals

CONTINIUS POWER

Also the efficient MobilPOWER Inverters SMI 1200 and 1700 convert the battery voltage into pure sinusoidal alternating voltage 230 V. Owing to very high peak power rates, they are also applicable for demanding consumers with high starting current rates, such as air-conditioning systems or vacuum cleaners.

Due to their efficiency, they are equipped with solid battery terminals for the corresponding high-current cables with a cross-section of up to 50 mm^2. Of course, they are also designed in advanced switch mode technology for continuous operation. Since their efficiency exceeds 93 %, the inverters' operation is very efficient with very low own consumption at the same time.

Numerous integrated protective circuits, robust power electronics and an intelligent microprocessor control ensure a very high operating safety in the long run, even in case of unfavourable operating conditions.

An intelligent power saving control with automatic disconnection allows uninterrupted operation of powerful 230 V consumers, as well as of small, sensitive appliances with minimum battery consumption.

Also the „big“ units offer all product features of all other VOTRONIC inverters. They have a compact design and a very low weight. Thanks to the removable remote control, an installation near the board batteries is possible. Plug-in battery cables, as well as the required high-current fuse are available as accessories.

» **All units with technical data are listed on page 56/57.**

! OUR RECOMMENDATION: SUITABLE INVERTERS FOR AIR-CONDITIONERS

For air-conditioners mostly the generated cooling capacity is indicated, whereas the required electrical capacity is lower. The choice of a suitable inverter must be based on the increased starting current. We recommend the following inverter for operation of air-conditioners:

- **Air-conditioners till 1700 W cooling capacity:** MobilPOWER Inverter SMI 1200 ST (-NVS) Sinus
- **Air-conditioners till 2300 W cooling capacity:** MobilPOWER Inverter SMI 1700 ST (-NVS) Sinus

MOBILPOWER INVERTER 300 - 600 W Sinus Inverter			
Unit Type	SMI 300-NVS	SMI 600	SMI 600-NVS
Order No.	**3156**	**3157**	**3158**
Nominal Voltage	12 V	12 V	12 V
Output Capacity Continuous/Short-time/Peak	300/420/600 W	600/840/1200 W	600/840/1200 W
Own Consumption Off/Stand-By/Mains approx	0 / 3 / 0 W	0 /5 / - W	0 / 5 / 0 W
Connection Cable Battery ** Length/Cross Section/Cable Lug	2x1,2 m 4 mm²/ M8	2x1,2 m 10 mm²/ M6	2x1,2 m 10 mm²/ M6
Dimensions* (WxDxH)	332x139x74 mm	332x139x74 mm	332x139x74 mm
Weight	1800 g	2000 g	2300 g

* Dimensions incl. mounting flanges, without connections

** Cable included in the delivery, already installed at the unit

Mark of Conformity: CE, E Test (EMV/automotive regulations)

Delivery Scope: Battery connection cable of suitable cross-section, 5 m connection cable for removable control panel/ remote control, mains cable (only „-NVS"), manual

GENERAL TECHNICAL SPECIFICATIONS SINE INVERTER

Input Voltage (DC)	**12 V (10,5 V - 15 V)**
Output Voltage (AC)	**230 V pure Sine**
Output Frequency	**50 Hz crystal stabilized**
Efficiency	**> 93 %**
CosPhi of the Consumers	**≤ 1, no restriction**
Overvoltage Battery max.	**16.0 V**
Low Voltage Battery min.	**10.5 V (load-dependent, dynam.)**
Overtemperature Protection	●
Overload Protection	●
Fan with Contincuous Temp. Control	●
Power Saving Mode	●
Remote Control	●
Autom. Commutation to Mains (only „-NVS")	**Rating max. 2300 W**
Input Country Current 230 V/AC (only „-NVS")	**Socket for Cold Appliances**
System of Protection/Protection Classes	**IP21 / I, II**
Temperature Range	**- 20 to + 45 °C**
Ambient Conditions, Humidity of Air	**max. 95 % RH, no condensationsierend**
Safety Regulations	**EN 60950**

For current consumption 12 V DC, the following rough formula is applied:

The current consumption of the inverter is almost exclusively depending on the used consumer 230 V and can be determined roughly.

The capacity of the consumer 230 V divided by 10 results in the approxinate current value being taken from the battery, for instance z.B. 300 W bis zu 30 A oder
bei 1700 W bis zu 170 A.

Battery dinensioning 12 V:

For your guidance regarding the battery size, we recommend the following battery capacity rates:
300 W > 60 (40) Ah,
600 W >120 (80) Ah,
1200 W > 240 (100) Ah,
1700 W > 340 (150) Ah.
The values in () are valid for short-time operation.

The power consumption (Watts) can be drawn from the technical data or the nameplate of th 230 V consumer. Here some examples at a glance:

Razor	10 W	TV	80 W	Hairdryer	1000-1500 W	Storage Battery Charger	50 W
Coffee Maker	1200 W	DVD Player	30 W	Drill	400-800 W	Mobile Phone Charger	12 W
Power Pack Laptop	75-140 W	Sat Receiver	20 W	Coffee Dispenser	1500 W	Vacuum Cleaner	1000-1500 W
Microwave	1000-1500 W	E-Bike-Charger	250 W	Energy-saving Lamp	10-20 W	Fluorescent Lamp	40-100 W

Please observe that the indicated values are always nominal values. The momentary power consumption might be three or five times higher than the indicated value due toe. g. starting current.

MOBILPOWER INVERTER 1200 - 1700 W Sinus Inverter				
Unit Type	SMI 1200 ST	SMI 1200 ST-NVS	SMI 1700 ST	SMI 1700 ST-NVS
Order No.	**3177**	**3178**	**3183**	**3184**
Excetution	A	B	A	B
Nominal Voltage	12 V	12 V	12 V	12 V
Output Capacity Continuous/Short-time/Peak	1200/1400/2000 W	1200/1400/2000 W	1700/2100/3000 W	1700/2100/3000 W
Own Consumption Off/ Stand-by/Mains approx.	0 / 8 / - W	0 / 8 / 0 W	0 / 10 / - W	0 / 10 / 0 W
Battery Connection Cross Section	Jam 2x 50 mm²	Jam 2x 50 mm²	Jam 2x 50 mm²	Jam 2x 50 mm²
Dimensions* (WxDxH)	366x262x91 mm	366x262x91 mm	482x262x92 mm	482x262x92 mm
Weight	3800 g	4000 g	4900 g	5200 g

* Dimensions incl. mounting flanges, without connections

Mark of Conformity: CE, E Test (EMV/automotive regulations)

Delivery Scope: Unit connection terminals for battery connection cable of suitable cross-section, 5 m connection cable for removable control panel/remote control, mains cable (only „-NVS"), manual

REQUIRED ACCESSORIES

BATTERY CONNECTION CABLE

» *More Information you will find on page 105.*

For SMI 1200 ST (-NVS):
Order No. 2268 High-current cable set red/black 25 mm² of 1 m length
Order No. 2272 High-current cable set red/black 25 mm² of 2 m length
Order No. 2262 High-current cable red 25 mm² , 40 cm length

For SMI 1700 ST (-NVS):
Order No. 2269 High-current cable set red/black 35 mm² of 1 m length
Order No. 2273 High-current cable set red/black 35 mm² of 2 m length
Order No. 2263 High-current cable red, 35 mm² , 40 cm length

ACCESSOIRES Sine Inverter







Unit Type	Mounting Frame S (for Remote Control)	Additional Remote Control (Extension set with 2nd Remote Control)	Control Unit (autom. On/Off control unit)	Fuse Holder (for Strip Fuses)	Strip Fuse	Power Fuse Holder with Lid	Power Fuse
Order No.	**2016**	**2067**	**2065**	**2242**	see list	**2251**	see list
Suitable for							
SMI 300-NVS	●	●	●	●	**2244** (40 A)	–	–
SMI 600 (-NVS)	●	●	●	●	**2247** (80 A)	–	–
SMI 1200 ST	●	●	●	–	–	●	**2256** (175 A)
SMI 1700 ST	●	●	●	–	–	●	**2259** (250 A)

More information you will find on pages 101-105.

» More technical specifications and informations you will get at our website **www.votronic.de**


VOTRONIC
275
W
Solar Power
Reset 3s
Made in Germany

SOLAR CURRENT TECHNOLOGY

VOTRONIC

ENERGY – ALMOST FREE

VOTRONIC – The specialists for professional solar charging technology

PRODUCT FEATURES

- 2 different control methods available, SR and MPP
- High operating safety by micro-controller
- Charging programs adjustable for lead-acid, gel and AGM, as well as LiFePO4 batteries
- Temperature compensation
- Recharging or trickle charging of the vehicle's starter battery
- Control refrigerator AES
- Continuous control, inmediate recharging
- 5 LED pilot lamps at the unit
- Suitable for any conventional solar module
- Option: Plug-and-Play Power Measurement Unit LCD-Solar-Computer S
- Option: Display on a mobile terminal device via Bluetooth-Connector with free app

When travelling with a camper, caravan or boat, everyone prefers to be free and independent from country current connections. To satisfy this demand, only a correctly dimensioned solar system is required, which is adapted to the user and its current consumption. Moving autonomously and independent of country current connections is possible with a solar system. The solar charging controller is the link between solar module and board battery ensuring automatic and correct charging of the battery.

The appliance range is completed by an energy and power measurement unit for the solar system. On the one hand, the VOTRONIC LCD Solar Computer S serves for measurement and display of the instantaneous capacity of the solar system, and, on the other hand, for storage of the measuring values for determination of the yield of a defined period. The unit is adapted to the VOTRONIC modular system (height 85 mm) and can simply be connected to the solar charging controller due to the plug-and-play design. We also recommend the multi panel systems of the series VPC (Votronic Power Control) giving information about the solar charging controller and - depending on the execution - further measuring values, such as the levels of fresh water tanks or sewage water tanks.

Even the display of the information of the solar charging controller ona mobile phone or tablet is possible. For this purpose, an additional communication module (Bluetooth Connector S-BC) will be installed in the connection between Solar Charging Controller and LCD Solar Computer S, which communicates the data to the mobile terminal device via Bluetooth. Of course, the corresponding app for the Energy Monitor is free of charge.

SOLAR CHARGING CONTROLLER SR TECHNOLOGY					
Unit Type	SR 140 Duo Dig.	SR 220 Duo Dig.	SR 330 Duo Dig.	SR 530 Duo Dig.	SR 300-24 Duo Dig.
Order No.	**1610**	**1615**	**1620**	**1625**	**6615**
Battery Voltage	**12 V**	**12 V**	**12 V**	**12 V**	**24 V**
Capacity Solar Module (Pmax)	30-140 Wp	40-220 Wp	50-330 Wp	50-530 Wp	50-300 Wp
Current Solar Module max.	9 A	14 A	21 A	33 A	10 A
Voltage Solar Module (Voc) max.	28 V	28 V	28 V	28 V	50 V
Charging Current Bord-/Starter Battery max.	9.0/0.8 A	14.0/0.8 A	21.0/1.5 A	33.0/1.5 A	10.0/0.8 A
Temperature Compensation	●	●	●	●	●
Switching Output AES Refrigerator	–	–	12 V/0.2 A	12 V/0.2 A	–
Connection Solar Computer S, ready to plug in	●	●	●	●	●
Output for EBL Solar Power Display	●	●	●	●	–
Dimensions* (WxDxH)	77x131x40 mm	77x131x40 mm	77x131x40 mm	77x131x40 mm	77x131x40 mm
Weight	150 g	155 g	165 g	170 g	155 g
Charging Programs for Acid/Gel/AGM	3	3	3	3	4
Charging programs for current LiFePO4 complete batteries with BMS	5	5	5	5	–

SOLAR CHARGING CONTROLLER IN SR TECHNOLOGY

Effective, cost-efficient battery charging for camper, caravan and boat

Available executionen for charging

12 V batteries:
Max. charging current: 9, 14, 21, 33 A

24 V batteries:
Max. charging current: 10 A

The VOTRONIC Solar Controllers of series SR are working automatically and ensure optimum charging of the board batteries without overcharging. An intelligent microprocessor control ensures exact observation of the charging voltage rates and of the charging current rates according to the specifications of the battery manufacturers. Furthermore, it supervises the battery and recharges the battery immediately in case of power consumption. Temperature-compensated charging of lead-acid, gel and AGM batteries is possible by means of an optional temperature sensor 825 via the main charging port. The second charging port is provided for support charging and trickle charging of the vehicle's starter battery. The decisive factor for the choice of the suitable charging controller is the maximum capacity (Wp) of the solar module. If subsequent retrofitting of a solar module is planned, the size of solar controller is already to be chosen correspondingly larger.

✓ OUR TIP

With the Bluetooth Connector S-BC (see page 68/69) and the free Energy Monitor App all values can also be displayed on a mobile phone or tablet.

PRODUCT FEATURES

- Maximum solar-energy-usage done by MPP technology
- Small, lightweight and compact
- High operating safety by microcontroller
- Charging programs adjustable for lead-acid, gel and AGM, as well as LiFePO4 batteries
- Temperature compensation
- Recharging or trickle charging of the vehicle's starter battery
- Control refrigerator AES
- Stepless control, instant recharging
- 5 LED pilot lamps at the unit
- Suitable for any conventional solar modules
- Optional: Plug and Play remote-display LCD-Solar-Computer S
- Optional: Display on a mobile terminal device via Bluetooth-Connector with free app

The VOTRONIC Solar Controllers in MPP technology are the royal class of solar charging controllers. A microprocessor uses the maximum power point (MPP) of the solar module and determines the maximum power yield of the solar system several times a second. The voltage surplus will be transformed into a higher charging current for the battery. This surplus of charging current ensures short charging times and the best possible power yield of the solar system. The design of the MPP controllers is more complex due to the high-frequency switching controller technology. Particularly high-quality components are reducing the losses to a minimum. In contrast to conventional controllers, the charging current of VOTRONIC MPP Solar Controllers is increased by approx. 10-30 %. This advantage shows particularly in cooler times of the year, in cooler holiday regions, or in case of solar modules with increased number of cells. Solar modules with a permanently higher solar module voltage combined with a MPP controller generate maximum capacity on a small surface. The VOTRONIC Solar Controllers of series MPP are working automatically and ensure optimum charging of the board batteries without overcharging. An intelligent microprocessor control ensures exact observation of the charging voltage rates and of the charging current rates according to the specifications of the battery manufacturers. Furthermore, it supervises the battery and recharges the battery immediately in case of power consumption.

With the main charging port, charging of the following batteries is possible:

- Lead-acid, gel- and AGM batteries and
- advanced lithium-LiFePO4-batteries. The second charging port is provided for support charging and trickle charging of the vehicle's lead starter battery.

✓ OUR TIP

With the Bluetooth Connector S-BC (see page 68/69) and the free Energy Monitor App all values can also be displayed on a mobile phone or tablet.

SOLAR CHARGING CONTROLLER MPP TECHNOLOGY

Unit Type	MPP 165 Duo Dig.	MPP 250 Duo Dig	MPP 350 Duo Dig.	MPP 430 Duo Dig.
Order No.	**1710**	**1715**	**1720**	**1725**
Battery Voltage Blei / LiFePO4	**12 V** / 12.0-13.3 V	**12 V** / 12.0-13.3 V	**12 V** / 12.0-13.3 V	**12 V** / 12.0-13.3 V
Capacity Solar Module (Pmax)	40-165 Wp	40-250 Wp	50-350 Wp	50-430 Wp
Current Solar Module max.	10 A	15 A	21 A	26 A
Voltage Solar Module (Voc) max.	50 V	50 V	50 V	50 V
Charging Current Bord-/Starter Battery max.	12.0/1.0 A	18.0/1.0 A	25.5/1.0 A	31.5/1.0 A
Lead Temperature Compensation/LiFePO4 Protection	●/●	●/●	●/●	●/●
Switching Output AES Refrigerator	–	12 V/0.2 A	12 V/0.2 A	12 V/0.2 A
Connection Solar Computer S, ready to plug in	●	●	●	●
Output for EBL Solar Power Display	●	●	●	●
Dimensions* (WxDxH)	77x131x40 mm	77x131x40 mm	77x131x40 mm	77x131x40 mm
Weight	225 g	235 g	285 g	285 g
Charging programs for Acid, Gel and AGM	3	3	3	3
Chargers with temperature protection for current LiFePO4 complete batteries with BMS	5	5	5	5

* Dimensions incl. mounting flanges, without connections **Delivery Scope:** Manual

SOLAR CHARGING CONTROLLER IN MPP-TECHNOLOGY

Optimum solar-energy-usage due to 10% to 30% higher charging current

ADJUSTABLE LIFEPO4-BATTERIES

Available executionen for charging

12 V batteries:
Max. charging current: 12, 18, 25.5, 31.5 A

! RECOMMENDED ACCESSORIES SR AND MPP

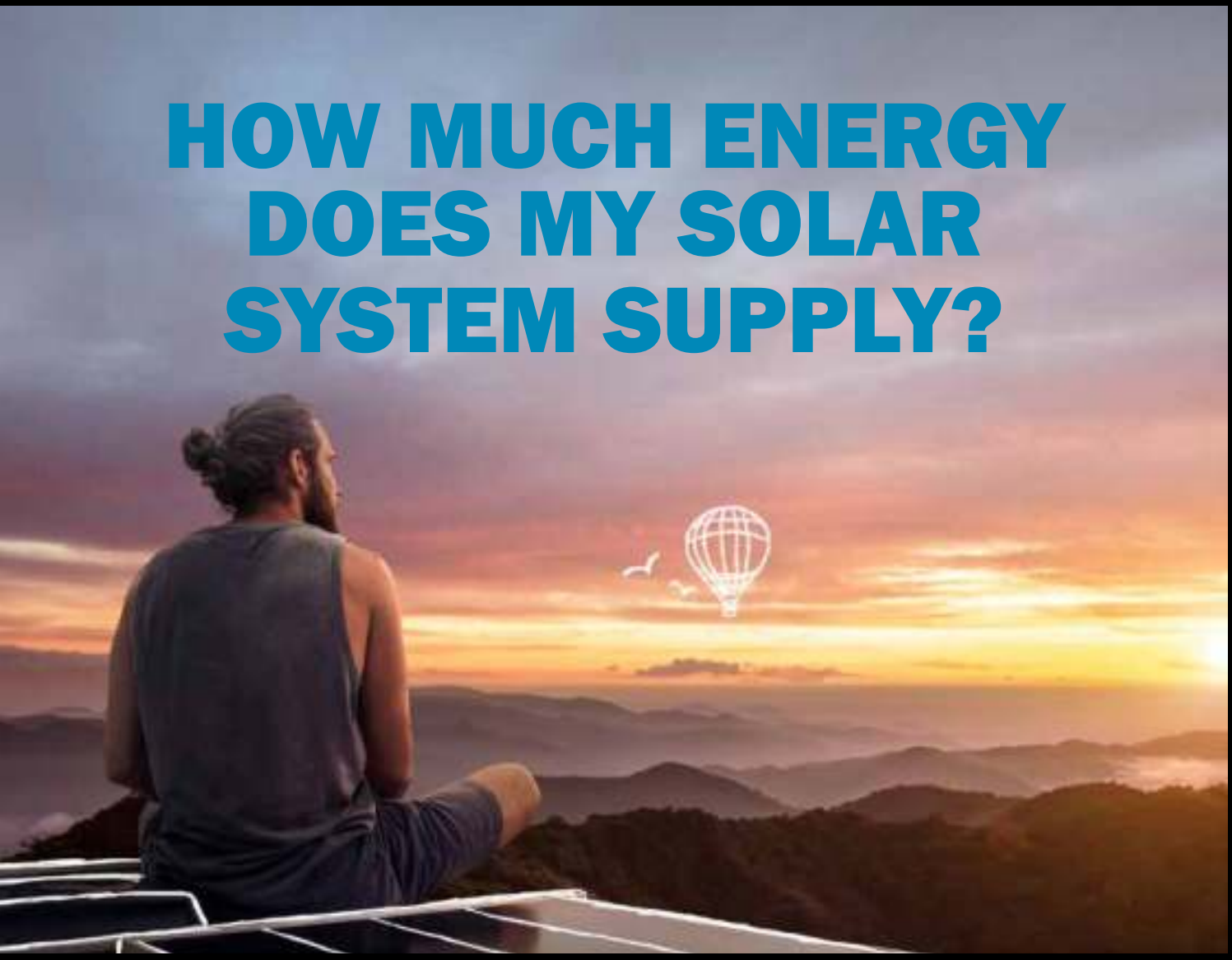
Order No. 1250
LCD Solar Computer S

Order No. 2001/2088
Temperature Sensor 825/625

Order No. 2007
Cable-Set for connecting the solar-chargers to an EBL with Solar-Current-Indicator
(See Accessories on page 106)

GENERAL TECHNICAL DETAILS OF THE SOLAR CHARGING CONTROLLERS SERIES SR AND MPP

Overcharge Protection	●
Characteristic Line of Charging	IU1oU2
Reverse Current Protection (Night Operation)	●
Integrated On-Board Mains Suppression Filter, unproblematic parallel Operation of Chargers, Dynamos, Generators at the same Battery	●
Protection against Overload, Overheating, Short-Circuit, Reverse Battery	●
Automatic Battery Temperature Compensation, designed separately for Acid, Gel and AGM batteries, Temperature Sensor 825/625, Order No. 2001/2088, required	●
Automatic Compensation of Voltage loss on the Charging Cables	●
Overvoltage Limitation for Protection of sensitive Consumers	●
Ambient Temperature Range	-20 to +45 °C
Mark of Conformity	CE, E Test (EMV/automotive Regulations)



HOW MUCH ENERGY DOES MY SOLAR SYSTEM SUPPLY?

PRODUCT FEATURES

- Compatible with the VOTRONIC Solar Controllers (SR and MPP), as well as VBCS Triple
- Large, clearly arranged display
- Very easy operation
- Illuminated, excellently readable display
- Small mounting depth 22 mm
- Retrofit at any time
- Option: Casing S
- Optional: Bluetooth Connector S-BC

How much energy does my solar system really supply? Is the board battery fully charged? Are the solar modules shaded or soiled or is something wrong? Is the capacity of the solar modules consistent with the specifications of the manufacturer, or does the system deliver completely different values? All these questions can be answered directly and conveniently with the LCD-Solar-Computer S.

Connection of the LCD-Solar-Computer S to the VOTRONIC Solar Charging Controllers, series SR and MPP, is very easy by means of the supplied plug-and-play control cable of 5 m length. After that, th

SOLAR DATA EXTENDER 3N1

With the 3N1 Solar Data Extender, the data from up to three VOTRONIC solar controllers can be combined so that they can be shown on a single display.

(See Accessories on Page 107)

LCD SOLAR COMPUTER S

Energy and power measuring unit for the solar system

PLUG AND PLAY

The measuring values are displayed at the push of a button. The display is illuminated (switchable). So, the legibility of the values is very well, even at a great distance and with all lighting conditions. The display informs of the instantaneous solar power (W), of the instantaneous battery voltage (V) and the instantaneous solar current (A). Thus, influences of the weather, partial shading or exposure to the sun can be realized quickly. A separate sun symbol informs of the operating state of the solar charging controller. It is flashing, if the solar current is limited due to a full battery. The generated solar power (Wh) and the charge (Ah) are calculated and can be displayed at the push of a button. The values can be used for own statistical purposes even over days and weeks. Both displayed values can be reset separately to „zero" at any time.

LCD SOLAR COMPUTER S	Measuring Devices and Displays
Unit Type	LCD Solar Computer S
Order No.	**1250**
Battery Voltage	**12 and 24 V**
Current Consumption (Illumination abswitchable)	3-30 mA
Measuring Range	–
Dimensions (HxWxD)	80x85x24 mm
Assembly Dimensions (HxWxD)	66x72x22 mm
Weight	55 g

Mark of Conformity: CE, E Test (EMV/automotive regulations)

Delivery Scope: fastening screws, manual, drilling jig, control cable of 5 m length

Recommended Accessories: Casing S Order No. 2024, Control Cable 5 m extension Order No. 2005

The following values are measured by microprocessor control, calculated and displayed:

Instantaneous Solar Power	0-999 W (Watt)
Instantaneous Solar Current	0-60 A (Ampere)
Instantaneous Voltage of the Solar Battery	7-32.0 V (Volts)
Charged Solar Capacity	0-9999 Ah (Ampere-hours)
Charged Solar Energy	0-9999 kWh (kilowatt-hours)

✓ OUR TIP

With the Bluetooth Connector S-BC (see page 68/69) and the free Energy Monitor App all values can also be displayed on a mobile phone or tablet.


VOTRONIC
On
Charge
367
Ah
Start
Bord
Battery Power
OFF 3s
ON 3s
Set 3s
Made in Germany
VOTRONIC
100 %
90
80
70
60
50
40
30
20
10
Made in Germany

MEASURING AND TANK DISPLAYS

VIEW OF EVERYTHING, CONTROL OF EVERYTHING

VOTRONIC

ENERGY MONITOR VIA BLUETOOTH

PRODUCT FEATURES

- Compatible with LCD Battery Computer S and VPC Jupiter
- Compatible with Votronic Solar Charging Controller (SR and MPP) from 2013 with LCD Solar Computer S
- Solar and battery information via a common communication module (dual mode)
- Easy installation (plug & play)
- Retrofittable at any time
- Compact design and minimum current consumption
- Connection via Bluetooth 4.0 (2.4 GHz)
- Open-air range up to 50 m
- Free App (Android and iOS)
- Export as CSV file for purposes of analysis

The Votronic Energy Monitor is a special communication module (Bluetooth connector S-BC). Combined with a Votronic Solar Charging Converter (from 2013) with LCD Solar Computer S and/or the LCD Battery Computer S or VPC Jupiter with Smart Shunt, the values, which are indicated on a corresponding display, are communicated to a mobile terminal device via Bluetooth. The required app for Android or iOS can be downloaded free of charge from Google Play Store or IOS App Store.

Connection of the Bluetooth Connector S-BC is simple as can be. Connect the delivered modular cable to the Votronic Solar Charging Controller and the LCD Solar Computer S or to the Smart Shunt and the LCD Battery Computer S or the VPC Jupiter. The unit is equipped with 2 inputs and 2 outputs allowing the connection of 1 solar controller with LCD Solar Computer and 1 Smart Shunt with LCD Battery Computer or VPC Jupiter at a time.

In this way, all information of the board battery, such as voltage, charging current, discharging current, the residual capacity and all data of the solar system can be read conveniently via mobile phone or tablet. In addition, the most important data are recorded and graphically represented, and they are stored for a longer period. Also, an export as CSV file for purposes of analysis is possible. Later installation of the Bluetooth Connector S-BC is possible at any time.

GET IT ON Google Play

for Android from 5.0

Download on the App Store

in Apple App Store from iOS 10, iPhone (from 5) or iPad (from 3rd generation)

http://energymonitor.votronic.de

LCD SOLAR-
COMPUTER S

LCD BATTERY
COMPUTER S

BLUETOOTH
CONNECTOR S-BC

SOLAR CHARGER
(SR- or MPP-Series)

SMART SHUNT
(in Delivery Scope Battery Computer S)

ENERGY MONITOR APP

Indication
of solar values

Indication
of battery values

ENERGY MONITOR	Measuring Devices and Displays
Unit Type	Bluetooth Connector S-BC
Order No.	**1430**
Dimensions (WxDxH)	47x75x26 mm
Weight	37 g

Mark of Conformity: CE

Delivery Scope: manual, 2x control Cable 6-pin 1 m

VIEW OF EVERYTHING, CONTROL OF EVERYTHING

VOTRONIC Modular System - Digital measuring units

PRODUCT FEATURES

- Extensive product range
- Possibility of integration due to matching appearance and mechanics
- Uniform height 85 mm
- Mounting depth approx. 22 mm
- Display in LED or LCD
- Large, illuminated LC Display
- Protected against overload and reverse battery
- Protection against reverse battery
- Connection by means of terminal screws or by plug-and-play
- Easy installation and operation
- Extremely low current consumption

No matter, if in the camper, boat or intervention vehicle: For the various supervision and control tasks regarding the electricity on board, exact measuring and display systems for display of the desired information are indispensable to the user. The VOTRONIC modular system consists of digital measuring units in LED or LCD execution, which can be combined according to the individual requirements of the user. They provide important display possibilities around power supply and inform of the tank levels as well as of time and temperature. Switch panels and fuse panels complete the system.

The LCD modules excel by the excellent legibility of the large, bright LCD display, as well as very easy handling. The illumination of the LCD display can be adjusted individually or it can be switched-off completely to reduce the already low current consumption additionally. The legibility is very well, even at a great distance or with views from different angles and with all lighting conditions.

The VOTRONIC modular system is build as a panel version and adapt in appearance and mechanics (identical height 85 mm) to the other display modules. The small dimensions of the front panel and the particularly small mounting depth of only 22 mm allow an installation at almost any location. The storage place behind can stii be used completely.

LCD CHARGE CONTROL S

Control and operating unit for Unit Combinations and Charging Converter

PLUG AND PLAY

PRODUCT FEATURES

- Compatible with VOTRONIC Charger VBCS Triple and Automatic Charger VCC
- Large, clearly arranged display
- Bright display with white illumination
- Display of the active charging source mains/charging converter/solar
- Control of the mains charging function, AC Power Limit
- Display of the battery charging phases
- Voltage and charging current display
- Solar computer function (only VBCS Triple)

Mark of Conformity: CE, E Test (EMV/automotive regulations)

Delivery Scope: fastening screws, manual, drilling jig, control cable of 5 m length

Recommended Accessories: Casing S Order No. 2024, control Cable 5 m extension Order No. 2005

The LCD Charge Control S is a control and operating unit, which displays the status of the individual charging sources, the instantaneous charging phase, the voltage of board and starter battery and the instantaneous charging current. During solar operation, the instantaneous solar power (W) and the energy values (Wh and Ah) are displayed. Depending on the execution, the mains charging mode can be switched-on or -off manually or the capacity can be reduced (AC Power Limit), such as in case of weakly protected country current. A special protective function ensures that mains charging is reactivated, if the board battery runs the risk to become totally discharged. The clearly arranged display is illuminated and offers excellent legibility with very low current consumption. Retrofit of the unit, also subsequently, is easily possible by means of the plug-and-play connection, and due to the compact design, it can be installed at almost any location.

LCD-CHARGE CONTROL S **Measuring Devices and Displays**

Unit Type	LCD Charge Control S for all Triple-Charger	LCD Charge Control S-VCC for current 12 V charge converter
Order No.	**1247**	**1248**
Charging phase/current, Voltage Board-/Starter Battery	●	●
AC-Mode (ON/OFF/Limit)	●	–
Solar-Computer (only VBCS Triple)	●	–
Current Consumption (Illumination abswitchable)	3-30 mA	3-30 mA
Dimensions (HxWxD)	80x85x24 mm	80x85x24 mm
Assembly Dimensions (HxWxD)	66x72x22 mm	66x72x22 mm
Weight	55 g	55 g

FULLY CHARGED OR ONLY HALF-FULLY?

How much residual charge does my board battery still have?

PRODUCT FEATURES

- Fuel gauge for the battery
- Bright display with white illumination
- Indication of the battery's charging state adjustable for lead-acid, gel, AGM, as well as LiFePO4 batteries
- Residual capacity in Ah and %
- Charging/discharging current in A
- Voltage for 2nd battery in V
- Programmable terminal with main switch function up to 100 A
- Including precision measuring resistor
- For all 12 V and 24 V batteries
- Optional: Bluetooth Connector S-BC

The crucial point for comfort on journey is the battery. It is really annoying, when the battery signalises suddenly and unexpectedly total discharge and the comfort ends. But how much power is still in the battery? Is the battery really "Full"? Why is energy still taken from the battery, although the consumers have been switched-off? The LCD-Battery-Computer S gives the answer to these and other questions.

It informs of all current data of the battery. All charging and discharging currents are recorded accurately. Battery size, self-discharge, battery load etc. are considered by means of programmed characteristic diagrams. Battery voltage or current, as well as the charging state are displayed as residual capacity in ampere-hours or as percentage and as level bar. Additionally, the voltage of the starter battery can be displayed.

The freely programmable terminal can also be used for purposes of control, supervision and warning, for instance as remote-controllable main switch with undervoltage protection. Then, the consumers are switched-off via a connected switch unit (such as Switch Unit 40 or 100), which can be effected manually at any time or automatically, as soon as the adjusted lower value is attained. They can be reconnected manually by pressing a key and by activation of the function EMERGENCY-ON. Installation is conceivably simple: The supplied precision measuring resistor (shunt) will be connected directly to the negative pole of the board battery and to the display using the plug-and-go cable. The small mounting depth of only 22 mm allows an installation of the display at almost any location.

LCD BATTERY COMPUTER S Measuring Devices and Displays			
Unit Type	LCD Battery Computer 100 S	LCD Battery Computer 200 S	LCD Battery Computer 400 S
Order No.	**1263**	**1266**	**1269**
Nominal battery voltage Lead-acid / Gel / AGM	**12 and 24 V**	**12 and 24 V**	**12 and 24 V**
Battery Voltage LiFePO4	12.8-13.2 V / 25.6-26.4 V	12.8-13.2 V / 25.6-26.4 V	12.8-13.2 V / 25.6-26.4 V
Measuring Shunt in the Delivery Scope	100 A	200 A	400 A
Current Consumption (Illumination abswitchable)	8-60 mA	8-60 mA	8-60 mA
Nominal Capacity of Battery adjustable	50-2000 Ah	50-2000 Ah	100-2000 Ah
Current Carrying Capacity Duration/15 Min/Short-time	+/- 100/150/450 A	+/- 200/300/900 A	+/- 400/600/1800 A
Dimensions Display (HxWxD)	80x85x24 mm	80x85x24 mm	80x85x24 mm
Assembly Dimensions (HxWxD)	66x72x22 mm	66x72x22 mm	66x72x22 mm
Dimensions Shunt (HxWxD)	32x135x44 mm	32x135x44 mm	32x135x44 mm
Weight Display/Smart-Shunt	55 g/240 g	55 g/240 g	55 g/245 g

Mark of Conformity: CE, E Test (EMV/automotive regulations)
Delivery Scope: Display unit, Smart-Shunt 100 A, 200 A or 400 A, control cable of 5 m length, ground strap, fastening screws, manual, drilling jig
Recommended Accessories: Casing S Order No. 2024, control cable of 5 m length Order No. 2005, Switch Unit 40 A Order No. 2071, Switch Unit 100 A Order No. 2072

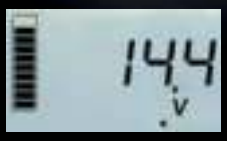
» More technical specifications and informations you will get at our website **www.votronic.de**

LCD BATTERY COMPUTER

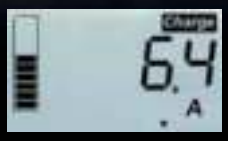
The fuel gauge for the battery

85

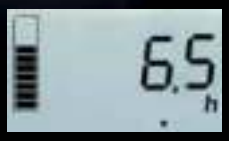
Available Capacity in %



Voltage Board Battery



Battery Current during Charging



Display of remaining time

Remaining capacity in Ah

IMPORTANT INFORMATION SMART-SHUNT

The choice of the suitable smart shunt (100 S, 200 S or 400 S) is exclusively depending on the maximum permanent load by consumers. It does not depend on the battery capacity (size).

Smart-Shunt 100 A, 200 A or 400 A (Precision Measuring Resistor), included in the items delivered

- **Battery voltage board battery**, 7 to 32 V (Volts), internal measuring scale 0.1 V. Allows drawing conclusions from the battery behaviour in case of variations in load and serves as operational check, for instance, of the charger, the solar system, the dynamo etc.
- **Battery current** (**+** = charge/**–** = discharge) +/- 0 to max. +/- 1800 A (Amperes, depending on type), internal measuring scale 0.1 A. control of the discharge current rates (load) by the consumers, indicated by the sign „**–**“. Control of the discharge current rates identified by a “Charge“ sign.
- **Battery capacity „Ah“** (residual charge in ampere-hours) from 0 Ah (empty) to nominal capacity (full), max. 2000 Ah.
- **Battery capacity „%“** (percentage residual charge) from 0 % (empty) to nominal capacity (full), 100 %.
- **Battery voltage starter battery**, 2nd battery, 7 to 32 V (Volts), internal measuring scale 0.1 V.
- **Terminal,** freely programmable and tactile (PNP, plus potential 12 V / 24 V, max. 0.3 A).
- **Display of remaining time „h“,** as calculational reference point for the calculation, how long the residual capacity is sufficient until the adjusted switching off threshold is reached, in case of constant current consumption.

✓ OUR TIP

With the Bluetooth Connector S-BC (see page 68/69) and the free Energy Monitor App all values can also be displayed on a mobile phone or tablet.

LCD VOLTMETER S

Digital measuring unit for measurement of the voltage of board and starter battery

The LCD-Voltmeter S displays the exact voltage values of board and starter battery at the push of a button. The additional bar graph shows the interesting range of the battery from 10.5 V to 15 V at a glance.

LCD VOLTMETER S	Measuring Devices and Displays
Unit Type	LCD Voltmeter S
Order No.	**1256**
Battery Voltage	**12 and 24 V**
Voltage Measurement Range	8-32 V
Measuring Range	0.1 V
Power Consumption (Illumination abswitchable)	1-30 mA
Dimensions (HxWxD)	80x85x24 mm
Assembly Dimensions (HxWxD)	66x72x22 mm
Weight	55 g

85

Delivery Scope: Fastening screws, Manual, drilling jig
Mark of Conformity: CE, E Test (EMV/Automotive regulations)

» More technical specifications and informations you will get at our website **www.votronic.de**

DUO STORAGE BATTERY TESTER S

Voltmeter for board battery and starter battery

Exact measurement of the board voltage ensures safety, and it's hard to imagine a modern camper without it. The convenient 10-stage LED display of the Duo Storage Battery Tester S clearly indicates the voltage range of board and starter battery from total discharge up to maximum charging voltage. Even intermediate values are clearly legible due to the different brightness of the adjacent light-emitting diodes. At the push of a button, the board or starter battery is displayed, or the display is switched-off. In case of low battery voltage, red LEDs indicate that inmediate battery recharging is required.

DUO STORAGE BATTERY TESTER S	Measuring Devices and Displays
Unit Type	Duo Storage Battery Tester S
Order No.	**1245**
Display Type	LED
Battery Voltage	**12 V**
Voltage Measurement Range	10.5-15.0 V
Measuring Scale	0.1 V
Current Consumption	1-15 mA
Dimensions (HxWxD	47x85x17 mm
Assembly Dimensions (HxWxD)	30x63x16 mm
Weight	28 g

Mark of Conformity: CE, E Test (EMV/automotive regulations)
Delivery Scope: Fastening screws, manual, drilling jig

85

Matching to the VOTRONIC modular system, panels with identical height of 85 mm are offered, which can be applied as individual units or in combination.

LCD THERMOMETER / CLOCK S

Unit combination of triple thermometer and crystal clock

The LCD-Thermometer / Clock S is a unit combination consisting of a triple thermometer for display of the inside and outside temperature, as well as of a third temperature range in °C and of a crystal clock in 24 hours format.

The inside temperature is measured by a temperature sensor, which is integrated in the unit, while the outside Temperature is measured by the temperature sensor 825 (order No. 2001) being included in the standard delivery. The additional measuring input is suitable for tasks, such as the supervision of a refrigerator box or heat box. For this, we recommend the inside temperature sensor (order No. 2085) with restrained appearance, which can be installed at the desired location.

The crystal clock is equipped with a digital display showing the time in 24 hours format, as well as the weekday. The high-accuracy clock is equipped with an own power reserve against voltage loss. A separate segment of the display indicates, if the clock is in DCF mode (optional DCF module required).

The LCD-Thermometer / Clock S disposes of a plug-and-go connection for the DCF module. Without DCF module or in case of bad reception, the clock continues working with its usual accuracy and crystal control. If reception conditions are better, it synchronises again.

LCD-THERMOMETER/CLOCK S	Measuring Devices and Displays
Unit Type	LCD-Thermometer/Clock S
Order No.	**1253**
Battery Voltage	**12 and 24 V**
Current Consumption (Illumination abswitchable)	1-30 mA
Measuring Range	-30 to +70 °C
Dimensions (HxWxD)	80x85x24 mm
Assembly Dimensions (HxWxD)	66x72x22 mm
Weight	60 g

Mark of Conformity: CE, E Test (EMV/automotive regulations)

Delivery Scope: fastening screws, manual, drilling jig, 1 piece outdoor sensor and plug-in type terminal

Recommended Accessories: Casing S Order No. 2014, Control Cable 5 m extension Order No. 2005, Temperature Sensor 825/625 Order No. 2001/2088, Inside Temperature Sensor Order No. 2085, DCF Module Order No. 2062

LCD CONTROL BOARDS

For comprehensive board information and convenient operation

PRODUCT FEATURES

- All information and all functions in one unit
- Easy, intuitive operation
- Information in form of numerical values and as bar graph
- Large graphics display with white illumination
- Compact design, easy installation
- Small mounting depth, low current consumption
- For 12 V batteries, execution Terra also for 24 V batteries.
- Extensive accessories available

The VOTRONIC Power Control (in short: VPC) is an innovative multi panel system for campers combining the most important functions and information in one unit in a user-friendly manner. The information is displayed on a bright graphics display with white illumination. The values are displayed in large size and can be recognized excellently, even at a great distance and with all lighting conditions. Coloured light-emitting diodes signalize the selected function at any time.

The individual executions are distinguished by their range of functions, which is adapted to the specific requirements of the different vehicle types. While the version Jupiter leaves nothing to be desired regarding energy supply and levels, the execution Merkur is particularly recommended for more compact vehicles, which very often are not equipped with fixed tanks.

All units are equipped with at least one voltage display for the board and starter battery and with a terminal for an external relay as main switch. An audible alarm (beeper) at the panel, which can be switched off, as well as a visual indication on the display inform, if a value dropped below an adjustable energy threshold, and the main switch will be switched-off automatically in a few seconds to avoid deep discharge of the battery.

» **All units with technical data are listed on page 79.**

VOTRONIC POWER CONTROL

VPC – Innovative Multi Panel System for Campers

EXECUTION VPC JUPITER

- Battery computer (data see page 72) for the board battery
  - Battery voltage in V
  - Battery current in A (+ = charging/– = discharging)
  - Battery capacity in Ah and %
  - Remaining time in h until the programmed switching off threshold
- Solar computer (data see page 65) is reached for all VOTRONIC solar charging controllers (from 2014) and VBCS Triple
  - Instantaneous solar power in W
  - Instantaneous solar current in A
  - Charged solar capacity in Ah
  - Charged solar power in kWh
- Voltage display for the starter battery
- Level indicator for fresh water and sewage water tank
- Terminal for external relay with freely programmable switching thresholds (% Residual capacity) as protection against deep discharge and as main switch
- Switch for fresh water pump max. 16 A
- Inside and outside thermometer, including 1 internal sensor and 1 external sensor
- Clock in 24 hours format
- Dual USB charging socket (5 V/2.5 A)

Smart-Shunt 100 A, 200 A or 400 A (Precision Measuring Resistor), included in the items delivered

✓ OUR TIP

With the Bluetooth Connector S-BC (see page 68/69) and the free Energy Monitor App all values can also be displayed on a mobile phone or tablet.

EXECUTION VPC MERKUR

- Voltage display for the starter and board battery
- Voltage-controlled protection against deep discharge for the board battery
- Terminal for external relay as main switch
- Solar computer (data see page 65) is reached for all VOTRONIC solar charging controllers (from 2014) and VBCS Triple
- Inside and outside thermometer, including 1 internal sensor and 1 external sensor
- Clock in 24 hours format (Option: Operation with radio clock via separate DCF module)

EXECUTION VPC TERRA

- Voltage display for the starter and board battery
- Voltage-controlled protection against deep discharge for the board battery
- Terminal for external relay as main switch
- Solar computer (data see page 65) is reached for all VOTRONIC solar charging controllers (from 2014) and VBCS Triple
- Level indicator for fresh water and sewage water tank
- Switch for fresh water pump max. 16 A

✓ OUR TIP

With the Bluetooth Connector S-BC (see page 68/69) and the free Energy Monitor App all values can also be displayed on a mobile phone or tablet.

LED CONTROLLBOARD

Info Panel Pro – Combined control of tank and battery

Board and starter batteries are controlled by voltage display. The luminous bars allow a very precise representation of the battery voltage, since also the intermediate values can be read excellently by means of adjacent LEDs in different luminance. At the push of a button, either the board battery or the starter battery is displayed, or the display is switched-off. In switched-off condition, the VOTRONIC Info Panel Pro and the connected tank transmitters are completely dead. The tank levels are represented in form of clearly arranged luminous bars with 10 light-emitting diodes in three colours allowing that the tank con-tents can be read conveniently at a glance. The displays work continuously with variable brightness allowing a significantly more exact reading of the levels than conventional displays with often only 5 stages. If the corresponding tank display remains switched-on continuously, the continuously raising or dropping display shows a direct image of the instantaneous tank contents. This is very helpful for dosed filling of the fresh water tank. The selection between sewage water and feces tank is effected at the push of a button..

CONTROLLBOARDS **Measuring Devices and Displays**

Unit Type	VPC Jupiter 100	VPC Jupiter 200	VPC Jupiter 400	VPC Merkur	VPC Terra	Info Panel Pro
Order No.	**5747**	**5748**	**5749**	**5744**	**5741**	**5330**
Smart-Shunt (continuous current) included	100 A	200 A	400 A	–	–	–
Battery Voltage Board / Start	**12 / 12 and 24 V**			**12 / 12 and 24 V**	**12 and 24 V / 12 and 24 V**	**12 V / 12 V**
Power Consumption / with USB active	13-60 mA / max. 2 A			6-60 mA / max. 2 A	6-60 mA / –	0-50 mA / –
Switching Current Main max.	0.3 A			0.3 A	1 A	16 A
Switching Current Pump max.	16 A			–	16 A	10 A
Dimensions Display (WxHxD)	200x65x30 mm			200x65x30 mm	200x65x28 mm	200x55x18 mm
Assembly Dimensions (HxWxD)	185x57x24 mm			185x57x24 mm	185x57x22 mm	175x43x12 mm
Weight Display	200 g			200 g	175 g	90 g

Mark of Conformity: CE, E Test (EMV/automotive regulations)
Delivery Scope VPC Terra: Connection cable 5 m, fastening screws
Delivery Scope VPC Jupiter: Smart-Shunt, Masseband, 2x Connection cable 5 m, 2x temperature sensor, fastening screws
Delivery Scope VPC Merkur: Connection cable 5 m, 2x temperature sensor, fastening screws
Delivery Scope Info Panel Pro: Flat connector, fastening screws, manual, drilling jig

IMPORTANT INFORMATION

Required tank transmitters (1 piece per tank), choice according to tank volume, tank height and installation possibility at the tank, see page 87.

SWITCH AND FUSE PANELS

for the electricity on board

85

USB Charger Panel S

- Dual USB Charger 5 V / 2.5 A

Blind S for Front Panel

- Blind cover for planned panels or for installation of own components.

Fuse Panel 4 S

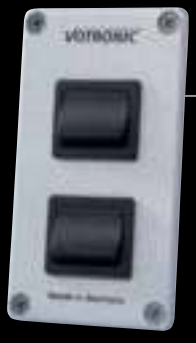
- Safety cutouts 6 A, 8 A, 10 A, prewired as group
- 1 Safety cutout 12 A, can be wired separately
- Suitable for 12 V and 24 V
- Connection by means of flat connectors
- Visual control of release
- Other insertions upon request

Switch Panel 4 S

- 4 Switches ON/OFF, rating 8 A, each, with LED pilot lamps
- Connection by means of terminal screws
- Execution 12 V or 24 V

Switch Panel 16 A S

- Single switch 2xUM with push-on connection
- Rating: max. 2x8 A or 1x16 A
- Suitable for 12 V and 24 V



Switch Panel 2x16 A S

- 2 Single switches 2xUM with push-on connection
- Rating: each, max. 2x8 A or 1x16 A
- Suitable for 12 V and 24 V

Socket Panel S

- For 12 V consumers with DIN-connector (ISO 4165), rating 8 A
- Connection by means of flat connectors

Main Switch Panel 20 A S

- Robust main switch with 20 A overcurrent cutout (safety cutout)
- Thermal release, short-time high over-load is admissible
- Release in case of more than 20 A constant current with return movement of the rocker
- Suitable for 12 V and 24 V

SWITCH PANELS AND FUSE PANELS	Switching and Protecting				
Unit Type	USB Charger Panel S	Fuse Panel 4 S	Switch Panel 4 S	Switch Panel 4 / 24 V S	Switch Panel 16 A S
Order No.	**1297**	**1285**	**1287**	**6287**	**1289**
Battery Voltage	**12 and 24 V**	**12 and 24 V**	**12 V**	**24 V**	**12 und 24 V**
Dimensions (HxWxD)	47x85x42 mm	47x85x52 mm	47x85x24 mm	47x85x24 mm	47x85x23 mm
Installation Depth approx.	36x36x36 mm	32x63x40 mm	42x67x17 mm	42x67x17 mm	23x21x17 mm

SWITCH PANELS AND FUSE PANELS	Switching and Protecting			
Unit Type	Switch Panel 2x16 A S	Socket Panel S	Main Switch Panel 20 A S	Blind S for Front Panel
Order No.	**1291**	**1293**	**1295**	**2019**
Battery Voltage	**12 and 24 V**	**12 and 24 V**	**12 and 24 V**	–
Dimensions (HxWxD)	47x85x23 mm	47x85x43 mm	47x85x51 mm	47x85x3 mm
Installation Depth	23x59x17 mm	18x17x32 mm	23x61x41 mm	–

Delivery Scope: Flat connector, fastening screws, drilling jig

PICTOGRAPH FILM, BLACK	Accessoires
Order No.	**2112**
Dimensions Pictographs approx.	12x10 mm

For proper marking switches and fuses a self-explanatory sheet of pictograms is available. These self-adhesive pictogram stickers are transparent with black printed abrasion-proof symbols.

PRECISE LEVEL MEASUREMENT TECHNOLOGY

Equipped at best with the VORONIC tank transmitters

PRODUCT FEATURES

- Robust fully-electronic, capacitive measuring method
- Insensitive to soiling and deposits in the water
- Easy adaptation to the existing height
- No mechanically moved parts
- Suitable for plastic tanks and metal tanks
- Linear, continuous signal of the level
- Various installation possibilities
- Suitable for 12 V and 24 V continuous operation

The tank transmitters measure the tank level, and the measured value will be led to the display unit by means of only 2 cables. The 12 V or 24 V power supply of the tank transmitters is effected from the display. In quiescent condition, they are completely dead. The electronic system (IP 67) is sealed and frost-proof, thus being also suitable for problematic locations, such as at underfloor tanks. All VOTRONIC Tank Transmitters are working independently of pressure. Therefore, a falsification of the measured values in case of overpressure in the tank, pressure filling etc. is avoided. The standard delivery includes a protection against reverse battery, overvoltage, short-circuit and overload. All VOTRONIC tank transmitters are working according to the capacitive measuring method. The insulated measuring electrode and the surrounding medium are forming an electric capacitor, the capacity of which is changing with rising or falling level. The electronic system evaluates this effect and transmits an electrical signal to the display unit, which is equivalent to the level.

The display shows the level by means of 10 light-emitting diodes in three colours. Apart from the continuous measurement, the further advantage of this measuring method is its deep action and thus the insensitiveness to soiling, deposits and solids in the tank. Depending on the type of transmitter, the insulated measuring electrode is executed as stick probe or flexible cable probe for various installation possibilities, tank heights and mounting situations at the tank.

TANK DISPLAYS

for fresh water tanks, sewage water tanks and feces tanks

Fresh Water
Tank Display S

The VOTRONIC Tank Displays allow a significantly more exact reading of the level than conventional displays with often only 5 stages. Thus they ensure a much more convenient control of the levels.

A luminous bar with 10 light-emitting diodes shows the level in three colours. Also intermediate values are displayed. In this way, tendencies can be recognized immediately, and supply as well as disposal are much more safe. During continuous operation, the continuously raising or dropping display shows a direct image of the tank contents. So, the fresh water tank can be filled in doses.

Sewage Water
Tank Display S

Feces
Tank Display S

NOTE

Being specially adapted, the measuring system does not allow measuring sensors/display units of other brands or an operation with the VOTRONIC tank displays for intervention vehicles and fire fighting vehicles (page 88-91).

TANK DISPLAYS Level Measurement Technology			
Unit Type	Fresh Water Tank Display S	Sewage Water Tank Display S	Feces Tank Display S
Order No.	**5311**	**5313**	**5315**
Battery Voltage	**12 and 24 V**	**12 and 24 V**	**12 and 24 V**
Power Consumption	1-30 mA	1-30 mA	1-30 mA
Dimensions (HxWxD)	47x85x19 mm	47x85x19 mm	47x85x19 mm
Assembly Dimensions	30x63x15 mm	30x63x15 mm	30x63x15 mm
Weight	28 g	28 g	28 g

INFORMATION

See page 87 for required level sensors (different types are available).

Mark of Conformity: CE, E Test (EMV/automotive regulations)
Delivery Scope: Fastening screws, manual, drilling jig

TANK ELECTRODE 20 K-WC

Stick electrode, special design for cassette toilets

PRODUCT FEATURES

- Tank transmitter, special design for cassette toilets and movable tanks
- Compact, robust, water-tight (IP67)
- Easy installation, revision opening is not required
- With 3-pole circular connector for separation of the tank
- Complete mounting material included in the standard delivery
- Ideal for retrofitting

» All technical data, see page 87 or visit our website www.votronic.de

Nowadays, cassette toilets are an absolute standard in campers. They have a compact design and dispose of a display. Unfortunately, this display only shows the full level. If the full level is reached, the toilet cannot be used further in the vehicle. Foresight planning of the disposal is not possible, and the „smallest room" can only be used with restrictions.

The Tank Electrode 20 K-WC is a further development on the basis of the tank electrode, which has been well-proven for years. It is a fully-fledged level display, which has been designed particularly for application in cassette toilets. Due to the compact design, the tank transmitter can be easily screwed from above into the toilet cassette using the delivered assembly ring. The required mounting hole of 38 mm diameter can be easily produced by means of a hole saw. The electronic system is completely sealed and water-tight (IP67), and it is suitable for heavy-duty operation of flushing the toilet cassette.

For replacement of the cassette, the Tank Electrode 20 K-WC is separated from the vehicle via a solid 3-pole circular connector. The connector is then fastened at the cassette. Apart from the 3-pole circular connector, the standard delivery includes an assembly ring, as well as the complete mounting material.

ACCORDING TO DIN 2001-2

TANK ELECTRODE 12-24 K AND 15-50 K

Tank transmitter for water and hydrous media

These tank transmitters had been designed particularly for level measuring of fresh water, sewage water (grey water and industrial water), as well as feces, in metal or plastic tanks. Thus, they are universally applicable. Due to the use of corresponding material, these tank transmitters are complying with the Drinking Water Ordinance DIN 2001-2.

A further particularity is the possibility to install the tank electrodes from inside as well as from outside on the tank top. In case of fresh water tanks, the installation is also possible at the tank bottom..

» **All units with technical data are listed on page 87.**

INFORMATION

The measuring electrodes can be shortened easily to the height of the tank. The exact „full" adjustment is effected by an adjusting device at the top of the transmitter by means of an inprinted dial, if required also „dry".

OUR TIPP

Instead of the mounting hole of 38 mm diameter, also a PG29 thread can be produced in order to screw the tank electrode directly from outside without coupling ring. But this is only possible for plastic tanks with sufficient wall thickness of max. 8 mm. This is enormous helpful in case of lacking revision opening.

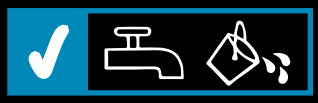
TANK ELECDRODE 30-110 K-FL

Tank transmitter, special design for high tanks

The Tank Electrode 30-110 K is the follow-up product of the Tank Electrode FL, which has been well-proven for years. It is a special design for high tanks with access from the top.

Such as all VOTRONIC Tank Transmitters, also the Tank Electrode 30-110 K-FL works according to the capacitive measuring method, it is suitable for plastic and metal tanks, and it is universally applicable. The flexible cable probe can be easily shortened to the corresponding tank height between 30 and 110 cm. Such as for the Tank-Sensor FL, the conductor is installed at the tank from outside.

The Tank electrode can be installed on the tank top via a bore hole 38 mm, from outside as well as from inside. The complete mounting material is included in the standard delivery.



TANK SENSOR FL

Tank transmitter, special design for high tanks

Due to its extremely compact design, the Tank-Sensor FL is applied mainly for high tanks, where only a lateral installation at the tank is possible. The tank must be equipped with a revision opening, and the wall thickness of plastic tanks should not exceed 8 mm. The flexible cable probe of the Tank-Sensor FL is simply shortened to the desired tank height, and the „Full“ adjustment is effected at the electronic module. Connection is realized by means of solid terminal screws.

Like all tank transmitters, also the Tank-Sensor FL works according to the capacitive measuring method, and it is universally suitable for water and hydrous media in metal or plastic

MEASURING SENSOR
Level Measurement Technology





Unit Type	Tank Electrode 12-24 K	Tank Electrode 15-50 K	Tank Electrode 20 K-WC	Tank Sensor FL	Tank Electrode 30-110 K-FL
Order No.	**5543**	**5545**	**5555**	**5530**	**5551**
Battery Voltage	**12 and 24 V**	**12 and 24 V**	**12 and 24 V**	**12 and 24 V**	**12 and 24 V**
Installation at the Tank	Top/Bottom	Top/Bottom	Top	Top/Side Wall	Top/Side Wall
Tank Material Ku = Plastic Me = Metal	Ku / Me	Ku / Me	Ku / Me	Ku / Me	Ku / Me
Tank Hight, adjustable (min.- max.)	12-24 cm	15-50 cm	12-24 cm	30-100 cm	30-110 cm
Suitable for Fresh Water	●	●	–	●	●
Suitable for Sewage Water	●	●	●	●	●
Suitable for Feces	●	●	●	–	–
Suitable for Tank Display:					
Fresh Water Tank Display S	●	●	–	●	●
Sewage Water Tank Display S	●	●	●	●	●
Feces Tank Display S	●	●	●	–	–
Info Panel Pro	●	●	●	●	●
Info Panel Pro 24 V	●	●	●	●	●
VPC Terra	●	●	●	●	●
VPC Luna	●	●	●	●	●
VPC Mars	●	●	●	●	●
VPC Jupiter	●	●	●	●	●
Previous Votronic Tank Displays since1987	●	●	●	●	●

Delivery Scope Tank Electrode 12-24 K and 15-50 K: Tank electrode, packing ring, nut PG 29, connection cable 75 cm, manual

Delivery Scope Tank-Sensor FL: Flexible cord probe, tank wall bushing, stainless steel conductor, fastening screws, manual

Mark of Conformity: CE, E Test (EMV/automotive regulations)

Delivery Scope Tank Electrode 20 K-WC: Tank electrode, packing ring, connection cable 75 cm, manual, bolts, mounting-ring, connecting jack and socket, holding-clip

Delivery Scope Tank Electrode 30-110 K-FL: Flexible cord probe, packing ring, nut PG 29, manual, stainless steel conductor

» More technical specifications and informations you will get at our website **www.votronic.de**

CHARGE THE HOSE LINE!

Tank display system for fire-fighting vehicles

PRODUCT FEATURES

- Fully-electronic, capacitive measuring method
- Industrial standard signal
- Compatible with other systems with standard voltage signal
- Protection against reverse battery and excess voltage
- Robust, sealed waterproof and vibration-proof
- For battery voltage 12 V / 24 V

The VOTRONIC tank display system had been designed for precise level measuring in fire-fighting vehicles. It consists of a tank transmitter, a display unit.

Due to the application of the standard signal 0-10 V, the tank level can also be displayed by several display units. So, it is for instance possible to have a display in the area of the pump control, as well as a second display in the driver's cabin at the same time.

All components are of robust design, vibration-proof and sealed watertightly (IP 67). They are designed for 12 V and 24 V board voltage. Supervision and control is realized by a microprocessor.

! NOTE

Being adapted to the industrial standard signals (0-10 V or 4-20 mA), these components allow an operation with other brands. But an operation with the VOTRONIC tank display system (pages 82-83) for camper, caravan, boat, is not possible.

LED TANK DISPLAY HE

Tank display with super-bright continuous light-emitting diode band

The LED Tank Display HE is a special development for heavy-duty use in fire-fighting vehicles, and it serves for exact indication of the tank level in the vehicle. As panel version, it can be installed in display panels. It is available with two standardized measuring signals: 0-10 V or 4-20 mA. Thus, the unit is suitable for the VOTRONIC Tank-Sensor FW, as well as for transmitters of other manufacturers with identical standard signals.

The tank level is represented by means of 10 super-bright light-emitting diodes in form of a continuous tricolour luminous bar allowing convenient reading of the tank level. A photocell controls the brightness of the display in such a way, that dazzling at night is avoided and that the readability is excellent, even in case of direct sunlight during the day or view from an unfavourable angle. A particular advantage is the compact design and the small mounting depth. Simple parallel connection of up to 4 LED Tank Displays HE 010 allow a control of the tank level at almost any location of the vehicle. The display unit is sealed water-tightly, it is vibration-proof and it is protected against reverse battery and overvoltage. The LED Tank Display HE 420 can also be operated with sensors 4-20 mA, and it is connected to the negative pole at the input side.

LED TANK DISPLAY HE	Tank Control for fire-fighting vehicles	
Unit Type	LED Tank Display HE 010	LED Tank Display HE 420
Order No.	**0242**	**0244**
Battery Voltage	**12 V and 24 V**	**12 V and 24 V**
Power Consumption at max. brightness	3-60 mA	3-60 mA
Input Signal	0-10 V	4-20 mA
Input Resistance	180 kOhm	150 Ohm
Dimensions (WxDxH)	47x85x27 mm	47x85x27 mm
Assembly Dimensions (WxHxD)	41x69x23 mm	41x69x23 mm
System of Protection	IP 67	IP 67
Weight	80 g	80 g

Mark of Conformity: CE, E Test (EMV/automotive Regulations)

Delivery Scope: Fastening Screws, connection cable 3-core of 1 m length, manual

PRODUCT FEATURES

- Luminous bars with 10 super-bright LEDs
- Brightness controlled LEDs
- With standard signal 0-10 V or 4-20 mA
- Compact design, small mounting depth
- Protection against reverse battery and overvoltage
- Connection cable firmly connected
- For battery voltage 12 V and 24 V

TANK SENSOR FW

Tank transmitter for water tanks in fire-fighting vehicles

The Tank-Sensor FW is a special development for level measurement in water tanks of fire-fighting vehicles. It is of robust design, it is not equipped with any mechanically moving parts, and it is suitable for any tank material. A further advantage is, that it can be mounted at the tank top or near the tank, depending on the mounting situation. The measurement is effected by a flexible measuring probe hanging in the tank. The measurement is realized completely independent of pressure to avoid a falsification of the measured values during pressure filling or in case of overpressure.

Linearly to the level, the sensor supplies continuous standard signals 0-10 V or 4-20 mA (switchable) for display and evaluation units, which are compatible for connection. The delivered measuring probe is simply shortened to the desired tank height and calibrated exactly to „Empty“ and „Full“ by means of separate adjusters. Minimum and maximum level are freely adjustable. The electronic system is sealed absolutely water-tightly, it is vibration-proof and it is protected against reverse battery, overvoltage, short-circuit and overload. The connections are made by means of high-strength cable glands.

IP 67
ROBUST
WATER-TIGHT
VIBRATION-PROOF

TANK SENSOR FW	Tank Control for fire-fighting vehicles	
Unit Type	Tank Sensor FW 120	Tank Sensor FW 240
Order No.	**0256**	**0258**
Battery Voltage	**12 V and 24 V**	**12 V and 24 V**
Current Consumption max.	30 mA	30 mA
Signal Output 0-10 V	●	●
Signal Output 4-20 mA	●	●
Tank Height (min.-max.)	40-120 cm	80-240 cm
System of Protection	IP 67	IP 67
Dimensions* (WxDxH)	98x64x38 mm	98x64x38 mm
Weight	180 g	180 g

* Dimensions without connections

Mark of Conformity: CE, E Test (EMV/automotive regulations)

Delivery Scope: Manual, cord measuring probe, complete with holding eyelet

» More technical specifications and informations you will get at our website www.votronic.de

PRODUCT FEATURES

- Fully-electronic, capacitive measuring method, no mechanically moved parts
- Easy installation and adaptation to the tank height
- Standard signal 0-10 V or 4-20 mA (switchable)
- Compatible with other systems with standard signal
- Protection against reverse battery, short-circuit and excess voltage
- Connection cable via high-strength cable glands
- For battery voltage 12 V and 24 V

PERIPHERAL UNITS

INDISPENSABLE AIDS IN THE BACKGROUND

VOTRONIC

BATTERY PROTECTOR 40

Undervoltage protection for the board battery and starter battery

The Battery Protector 40 protects the board battery against dangerous total discharge and consumers and equipment against overvoltage. It is connected between board battery and consumers, it is suitable for all types of lead batteries and it works fully automatically with fixed switching-on and switching-off thresholds. Apart from that, it can also be used as remote-controlled battery main switch by means of an external switch. The Battery Protector 40 is equipped with an EMERGENCY-ON function, by means of which the unit can be switched-on at any time. Also a remote control by means of a switch is possible. It is suitable for switching current rates up to 40 A, short-time overload up to 60 A is admissible, and it is available for 12 V battery systems, as well as for 24 V battery systems. A side-stable power relay ensures extremely low own consumption of less than 3 mA (according to DIN EN13976). Solid terminal screws up to a cross-section of 10 mm² complete the profile. The higher switching thresholds of the version „Motor" are keeping the starting ability of intervention vehicles with only one battery circuit according to DIN EN 1789.

BATTERY CONTROLLER **Peripheral Units**

Unit Type	Battery Protector 40 [1]	Battery Protector 40 Motor [1]	Battery Protector 40 / 24 [1]	Battery Protector 40 / 24 Motor [1]	Battery Protector 100 [2]
Order No.	**3075**	**3073**	**6075**	**6073**	**3078**
Battery Voltage	**12 V**	**12 V**	**24 V**	**24 V**	**12 und 24 V**
Switching current duration / short	40/60 A	40/60 A	40/60 A	40/60 A	100/180 A
Switching Threshold Undervoltage	10.7 V	11.8 V	21.4 V	23.6 V	10.6/11.5/11.8 V** 9.5-12.2 V *** **
Reset Point Undervoltage	12.5 V	12.8 V	25.0 V	25.6 V	2.4/12.5/12.8 V ** 12.5 V *** **
Overvoltage OFF/ON	15.5/15.0 V	15.5/15.0 V	31.0/30.0 V	31.0/30.0 V	15.5/15.0 V **
Acoustic Signal	–	–	–	–	●
Precaution-Alarm Signal-output	–	–	–	–	12 V/24 V/ 0,2 A
Bistabiles Leistungs-Relais	●	●	●	●	●
Own Consumption	2 mA	2 mA	2 mA	2 mA	3 mA
DIN EN 1789	–	●	–	●	●
Temperature Range	-20/+50 °C	-20/+50 °C	-20/+50 °C	-20/+50 °C	-20/+50 °C
Dimensions* (WxDxH)	90x60x41 mm	90x60x41 mm	90x60x41 mm	90x60x41 mm	105x75x38 mm
Weight	97 g	97 g	97 g	97 g	180 g

** In case of 24 V operation values x 2 *** Automatic switching threshold * Dimensions incl. mounting flanges, without connections

Mark of Conformity: CE, E Test (EMV/automotive regulations) **Delivery Scope[1]:** Manual **Delivery Scope[2]:** Manual, 2 pcs. protection caps

BATTERY PROTECTOR 100

Undervoltage protection for the board battery

EMERGENCY ON FUNCTION BY EXTERNAL SWITCH

The Battery Protector 100 protects the board battery against dangerous total discharge and consumers and equipment against overvoltage. It is connected between board battery and consumer, and it is suitable for all types of lead batteries. The side-stable power relay is rated for switching current rates of 100 A. Short-time overload of up to 180 A is admissible. In addition, it ensures an extremely low own consumption. It can also be used as remote-controlled battery main switch by means of an external switch.

The Battery Protector 100 is equipped with an EMERGENCY-ON function, by means of which the unit can be switched-on at any time. Also a remote control by means of a switch is possible. The unit is suitable for 12 V and 24 V board mains and it works fully automatically. A special feature is the intelligent switching threshold automatism. It recognizes the varying battery load and ensures optimum utilization of the battery capacity.

Operation of the unit is also possible with 3 defined selectable disconnection thresholds. The higher switching thresholds are keeping the starting ability of intervention vehicles with only one battery circuit according to DIN EN 1789.

The Battery Protector 100 is equipped with a visual and audible prelininary alarm, a separate warning terminal and solid screwed connections for the battery. The contact cover is included in the delivery. 2 LEDs indicate the operating state of the unit.

PRODUCT FEATURES

- High switching current rates, extremely low consumption
- Automatic reset function
- EMERGENCY-ON function, also remote-controllable
- Applicable as remote-controllable main switch
- Optimum battery yield due to intelligent switching threshold automatism
- Also for starter batteries according to DIN EN 1789
- For battery voltage 12 V or 24 V

ALSO AS SWITCH UNIT 300 USED

BATTERY PROTECTOR 300

Undervoltage protection and switch module for the board battery and starter battery

The Battery Protector 300 is a fully automatic battery protection for campers, boats, fire-fighting, ambulance and intervention vehicles, which can also be used as efficient switch module. It consists of a high-current relay, which is designed for switching current rates up to 300 A (permanently, 600 A for 20 seconds) and of a separate control unit. As battery protection, it protects the battery from dangerous deep discharge and the consumer loads from low voltage as well as from overvoltage. It is connected between board battery and consumer load, and it is suitable for all types of typical lead batteries and advanced lithium LiFePO4 batteries. Thanks to its extremely low current draw of less than 3 mA, it complies with the strict requirements of DIN 13976.

It can also be used as remote-controlled battery main switch (Switch Unit 300) by means of an external 1-pole switch.

The Battery Protector 300 is equipped with an EMERGENCY-ON function, by means of which the unit can be switched-on at any time in case of emergency. Also this function can be remote-controlled by means of a switch. The unit is suitable for 12 V, as well as 24 V battery systems, and it is equipped with the same intelligent automatic switching threshold or defined, selectable switching thresholds, as the Battery Protector 100. It is also equipped with a visual and audible preliminary alarm, a separate warning terminal and two LEDs at the housing, which are indicating the operating state of the unit. Optionally, it can be used as remote-controlled power relay („Switch Unit“), for instance at the LCD Battery Computer S or VPC.

BATTERY CONTROLLER	Peripheral Units
Unit Type	Battery Protector 300
Order No.	**3084**
Battery Voltage	**12 V and 24 V**
Switching Current Continuous/Short-Time	300/600 A
Switching Threshold Undervoltage	10.6/11.5/11.8 V** 9.5-12.2 V *** **
Reset Point Undervoltage	12.4/12.5/12.8 V ** 12.5 V *** **
Overvoltage OFF/ON	15.5/15.0 V **
Acoustic Signal	●
Precaution-Alarm Signal-output	12 V / 24 V / 0.3 A
Latching Power-Relay	●
Own Consumption	3 mA
DIN EN 1789	●
Temperature Range	-20/+50 °C
Dimensions* (WxDxH)	105x62x57 mm / 90x60x33 mm
Weight	680 g / 90 g

** In case of 24 V operation values x 2 *** Automatic switching threshold

* Dimensions incl. mounting flanges, without connections

Mark of Conformity: CE, E Test (EMV/automotive regulations)
Delivery Scope: Manual, Relais, Connection cable for relay, 1x plug-in type terminal 3-pol., 1x plug-in type terminal 4-pol.

START ALARM 124

Undervoltage protection for the starter battery

TO DIN EN 1789

The VOTRONIC Start Alarm 124 is an alerter with audible alarm (beeper) and visual alarm (LED) for the starter battery of intervention vehicles with only one battery circuit (according to DIN EN 1789, paragraph 4.3.2). The alarm shall warn the driver early of a battery, which is not capable to start. An additional horn, consumer relay or similar can be connected to a terminal (PNP, plus output, max. 0.5 A). The own consumption is below 3 mA (according to EN 13976). Connection via plug-in type terminal.

Mark of Conformity: CE, E Test (EMV/automotive regulations)

Delivery Scope: Manual

START ALARM Peripheral Units	
Unit Type	Start Alarm 124
Order No.	**0161**
Battery Voltage	**12 V and 24 V**
Switching Current	0.5 A
Switching Threshold Undervoltage	11.5 V **
Reset Point Undervoltage	12.5 V **
Temperature Range	-20/+50 °C
Dimensions* (WxDxH)	70x36x17 mm
Weight	30 g

* Dimensions without connections ** In case of 24 V operation values x 2

SWITCH UNIT 40 AND 100

Switching module for high current rates

The Switch Units are extremely robust switching modules with efficient side-stable relay for high switching capacities and very low own consumption. They are designed as pure power switches, and they are controlled via the integrated control input. In connection with the VOTRONIC LCD-Battery-Computer S they are particularly suitable as battery main switch and total discharge protection with 40 A or 100 A switching capacity. Suitable for 12 V and 24 V board mains.

SWITCH UNIT Peripheral Units		
Unit Type	Switch Unit 40	Switch Unit 100 [1]
Order No.	**2071**	**2072**
Battery Voltage	**12 V and 24 V**	**12 V and 24 V**
Switching Current Continuous/Short-time	40 / 60 A	100 / 180 A
Own Consumption Idle/On	0 / 2 mA	0 / 3 mA
Cable Connections	2.5 - 10 mm²	M6
Dimensions * (WxDxH)	90x60x38 mm	105x70x38 mm
Weight	97 g	180 g

* Dimensions incl. mounting flanges, without connections

Mark of Conformity: CE, E Test (EMV/automotive regulations)
Delivery Scope: Manual, [1] Cover for battery connections

CIRCUIT DISTRIBUTORS

... because of the safety

Appropriate cable laying in the vehicle is not only a question of orderliness, but rather an inperative to ensure the safety in the vehicle. Cable tangle, no labelling of the cables and no protection? In case of failure, trouble-shooting will be difficult and quite often, this represents a serious danger in vehicles.

PLUS DISTRIBUTOR 6

for 6 protected circuits

The compact Plus Distributor for 6 separate electric circuits allows professional distribution and protection of small to average consumers on the plus side of the battery. Two large collective terminals for cable cross-sections up to 16 mm² and a maximum admissible current rate of 50 A serve for power supply and distribution. The maximum rating of the fuse holders is 20 A, just as of the 6 terminals for the consumers. They allow the connection of cable cross-sections up to 4 mm². The standard delivery comprises the following conventional car fuses: 4 x 7.5 A, 10 A, 15 A

MINUS DISTRIBUTOR 12

for 12 electric circuits

The compact Minus Distributor for 12 separate electric circuits allows professional distribution of small to average consumers on the minus side of the battery. Two large collective terminals for cable cross-sections up to 16 mm² and a maximum admissible current rating of 50 A serve for power supply and distribution.

The distribution terminals on the consumer's side allow the connection of cable cross-sections up to 4 mm² at a maximum admissible current rate of 20 A. Also recommendable for ground junction in case of insulating vehicle bodies or insufficient ground ratio.

PLUS DISTRIBUTOR 8

for 6 protected circuits

Identical to Plus Distributor 6, however with six protected outputs for larger consumers. The total maximum admissible current rate is 96 A. The plus feed line of the battery is connected to a strip fuse of up to max. 60 A via cable lugs for cables of max. 16 mm². The output is designed for connection of powerful consumers or chargers via cable lugs for cables of max. 16 mm². For average consumers or chargers, the 2-pole terminal screw (cable up to 6 mm²) in connection with the delivered car fuse 30 A can be used. Smaller consumers must be protected by means of the four additional terminals for cables up to max. 4 mm² and fuse holders for conventional car fuses up to max. 20 A (2x10 A and 2x15 A included in the standard delivery).

MINUS DISTRIBUTOR 14

for 12 electric circuits

Efficient distributor at the minus side of the battery for 12 individual, different electric circuits. The total maximum admissible current rate is 96 A.

Particularly recommendable for ground distribution in case of insulating vehicle bodies or insufficient ground ratio. The minus feed line is connected to a solid terminal block with cable lug for cable cross-sections up to 16 mm². The second terminal block serves for minus distribution. For the consumers, 4 terminals for cables of max. 6 mm² with max. 32 A and 8 terminals for cables of max. 4 mm² with max. 20 A are at disposal.

CIRCUIT DISTRIBUTORS Peripheral Units				
Unit Type	Plus Distributor 6 [1]	Minus Distributor 12 [2]	Plus Distributor 8 [3]	Minus Distributor 14 [4]
Order No.	**3203**	**3208**	**3215**	**3218**
Battery Voltage	**12 V / 24 V max. 50 A**	**12 V / 24 V max. 50 A**	**12 V / 24 V max. 96 A**	**12 V / 24 V max. 96 A**
Dimensions* (WxDxH)	90x60x38 mm	90x60x38 mm	105x71x42 mm	105x71x42 mm
Weight	95 g	80 g	135 g	125 g

* Dimensions incl. mounting flanges

Delivery Scope[1]: Flat plug fuses 1x 15 A, 1x 10 A and 4x 7.5 A, manual **Delivery Scope[2]:** Manual
Delivery Scope[3]: 2 Pcs. cable lugs 16 mm², strip fuse 40 A, 50 A, 60 A, flat plug fuses 1x 30 A, 2x 15 A and 2x 10 A, manual
Delivery Scope[4]: 2 Pcs. cable lugs 16 mm², manual

D+ SIMULATOR PRO

Intelligent detection of a running engine – now also for Euro 6 vehicles

If additional consumers are only supposed to be switched on when the engine is running or the vehicle battery is supposed to be optimally charged by a charging converter whilst driving, then the alternator's D+ contact is used for control purposes. This contact is often inaccessible or even no longer present. This is where a D+ simulator helps, which generates a corresponding signal normally controlled by voltage (see Page 107). On newer vehicles (Euro 6), a voltage-controlled simulation of the D+ signal is often no longer possible due to the energy-optimised alternator controls. The VOTRONIC D+ Simulator PRO works independently of the alternator's charging mode, as it generates the signal by detecting the vibrations of the running engine. It is therefore suitable for all vehicles types made in any year. In order to bridge start/stop phases (e.g. at traffic lights) or stop-and-go traffic (e.g. in traffic jams), the device features an adjustable switch-off delay. In addition, a built-in charging voltage monitor prevents unwanted activation in the event of external sources of vibration, e.g. during ferry crossings.

D+ Simulator Pro Peripheral Units	
Unit Type	D+ Simulator Pro
Order No.	**3067**
Battery Voltage	**12 V / 24 V**
Own power consumption quiet	< 3 mA
Switching Current	+ switching, max. 300 mA
Switching delay on	4 s
Switching delay off (adjustable)	10 s ... 5 min
Working temperature range	-40 ... 105° C
System of Protection	IP64
Dimensions (cylinder)	43x25 mm
Connecting cable	2 m
Weight	100 g

Certification mark: CE, E-test (EMC/vehicle directive)
Scope of delivery: Instructions
Registered at the German Patent and Trade Mark Office (DPMA)

STANDBY CHARGER

Battery recharging and trickle charging

The VOTRONIC StandBy-Charger serves for automatic recharging and trickle charging of the starter battery, if the mains charger or the solar charging controller is equipped with only one charging port. Retrofit of the unit is very easy by just interconnecting it between board battery and starter battery. Depending on the charging state of the board battery, the starter battery will be recharged with max. 3 A.

StandBy Charger Peripheral Units		
Unit Type	StandBy Charger 12 V	StandBy Charger 24 V
Order No.	**3065**	**6065**
Battery Voltage	**12 V**	**24 V**
Current Consumption	-	-
Charging Current during Standstill Mode for Starter Battery	0-3 A	0-2 A
Dimensions* (WxDxH)	90x60x38 mm	90x60x38 mm
Weight	52 g	52 g

Note: Only for lead batteries (Acid, Gel, AGM)

Mark of Conformity: CE **Delivery Scope:** Manual

* Dimensions incl. mounting flanges, without connections

ACCESSORIES

Campers, Offroad, Boats

INDIVIDUAL SENSOR

(for Tank-Sensor FL and Tank Electrode 30-110 K-FL)
Tank-Sensor, consisting of rubber dowel, screw V2A with washer and cable lug

Order No. 2000

TEMPERATURE SENSOR 825

Temperature sensor 825 with connection cable of 3 m length, sealed for protection against environmental pollution, for all VOTRONIC units. Suitable for bolt M8

Order No. 2001

TEMPERATURE SENSOR 625

not illustrated

As before, but suitable for bolt M6

Order No. 2088

INSIDE TEMPERATURE SENSOR

Inside temperature sensor with connection cable of 3 m length with transparent cap for installation in the vehicle. (Mounting hole 7.5 mm)
Suitable for VOTRONIC VPC Series and LCD-Thermometer/Clock

Order No. 2085

CONTROL CABLE

Plug-and-go extension cable of 5 m length for VOTRONIC units, such as: LCD-Battery-Computer S, LCD-Volt/Ammeter S, LCD Solar-Computer S, LCD-Charge Control S, Remote Controls for Automatic Charger, MobilPOWER Inverter etc.

Order No. 2005

Control Cable like above, but without adapter.
Only for VPC Controlboards

Order No. 2008

CASING S FOR LCD UNIT SERIES

Plastic Housing, silver, for LCD display units with silver front panels, dimensions: 87x83x27 mm

Order No. 2024

MOUNTING FRAME S FOR DISPLAY PART INVERTER

For external mounting of the control panel of the VOTRONIC Inverter MobilPOWER, page 40. Appearance and mechanics (identical height 85 mm) are adapted to the VOTRONIC modular system.

Order No. 2016

CUTOFF RELAY 12 V / 70 A

Disconnects the starter battery from the board battery, as soon as the motor is stopped, and reconnects both batteries in parallel when the motor is restarted for charging by the dynamo. Including female connectors and manual. Dimensions incl. mounting flange, without connections 26x26x42 mm
Not suitable for vehicles according to Euro 6 standard

Order No. 2200

HIGH-CAPACITY CUTOFF RELAY 12 V / 200 A

Execution as above, but more powerful and equipped with spark extinction diode. Power Supply Connections: Threaded bolts M6; control connections: Flat connector 6.3 mm. Delivery including all required female connectors and manual. Dimensions incl. mounting flange, without connections: 45x45x63 mm

Order No. 2201

CHANGEOVER RELAY 12 V / 60 A

Switching relay with NC (normally closed contact) for connection of a battery charger VBCS Triple at an existing EBL – including female connectors 9.5 mm or 6.3 mm. Dimensions incl. mounting flange, without connections: 33 x 29 x 41 mm

Order No. 2202

RESIDUAL CURRENT OPERATED CIRCUIT-BREAKER RCBO 16-30

The FI/LS combination switch integrate people, fire-, and cable protection in one module for the 230 V circuit of the vehicle. The unit features a 2-pole automatic circuit-breaker and a 2-pole current-fault circuit breaker in an industrial casing with transparent door, terminal for protective conductor and equipotential bonding as well as space for a further 2-pole fault current breaker or 2 safety automatic circuit-breaker. 230 V/16 A, release current 30 mA, TÜV (MOT) / GS-certified. Dimensions 110x180x95 mm

Order No. 2152

RESIDUAL CURRENT OPERATED CIRCUIT-BREAKER RCBO 16-30 MINI

Performs like 2152, however, does not have room for an additional circuit breaker, Dimensions 100x140x100 mm

Order No. 2151

POWER FUSE HOLDER 5-FOLD WITH HOUSING

Safety for large consumer loads and charging sources in fully insulated housing with cover and protection of the connections by overhangs. Cover with snap quick fastener.

- 1x Power fuse (100 A – 250 A) with threaded bolt M8 for large consumer loads, such as inverters, lifting supports etc.
- 4x Car screw-in fuses, (30 A – 150 A) with threaded bolt M5 for powerful individual consumer loads, charging sources and as preliminary fuse for further plus distributors.

Depending on the installation situation or space requirements, the common battery connection can be on the left side or on the right side. Delivery excluding fuses.

Order No. 2216

POWER FUSE HOLDER WITH LID

for bolt-down fuses

Fully insulated fuse holder for power fuse for protection of large consumers loads or power circuits. The fuse holder can be added, and both sides are equipped with a threaded bolt M8. Delivery excluding Bolt-down fuses.

Order No. 2218

BOLT-DOWN FUSES

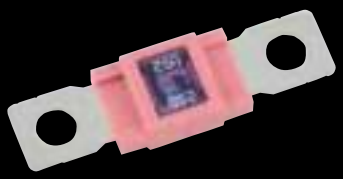
Bolt-down fuses to be inserted in power fuse holder No. 2218 and 2216. For 12 V and 24 V installation, bore holes M5, with inspection window and colour coding

Power Strengths and Order No. see price list

POWER FUSE HOLDER WITH HOUSING
for power fuses

Fully insulated fuse holder for power fuse for protection of large consumers loads or power circuits. The fuse holder can be added, and both sides are equipped with a threaded bolt M8. Delivery excluding power fuse.

Order No. 2251



POWER FUSE

Power fuse to be inserted in power fuse holder No. 2251 and 2216. For 12 V and 24 V installation, bore holes M8, with inspection window and colour coding.

Power Strengths and Order No. see price list

FUSE HOLDER
for strip fuses

Fuse holder for strip fuse for protection of larger consumers. Both sides of the fuse holder are equipped with a thread M5. Delivery excluding fuse

Order No. 2242

STRIP FUSE (packaging quantity 3 pieces)

Strip fuse for insertion into fuse holder, fig. 13, as well as for Plus Distributor 8 for protection of 12 V and 24 V installations: 30 A, 40 A, 50 A, 60 A, 80 A **Order No., see price-list**

CABLE FUSE HOLDER IP 56
for automotive flat fuses

Fully insulated fuse holder (IP 56) for automotive flat fuses. Strand 2.5 mm^2, red, length of both sides approx. 235 mm. Delivery excluding fuse

Order No. 2213

HIGH-CURRENT CABLE

High-current cable, red, highly flexible, both sides are equipped with cable lugs for bolts M8, for connection of power fuse holder and battery

High-current cable, 25 mm², Length: 40 cm **Order No. 2262**
High-current cable, 35 mm², Length: 40 cm **Order No. 2263**

CONNECTION CABLE FOR SMI INVERTER

Cable sets for plus (red) and minus (black) battery connection of the SMI Inverters "ST", highly flexible high-current cables, ready-made, including pipe cable lug for bolt M8
order no. 2268 and 2272 25 mm² for SMI 1200 ST(-NVS)
order no. 2269 and 2273 35 mm² for SMI 1700 ST(-NVS)

Cable set red/black 25 mm², 1 m Length Order No. 2268
Cable set red/black 35 mm², 1 m Length Order No. 2269
Cable set red/black 25 mm², 2 m Length Order No. 2272
Cable set red/black 35 mm², 2 m Length Order No. 2273

CONTROL UNIT

On/off control unit for VOTRONIC Sine Inverter SMI (-NVS) of all capacity classes. The control is effected by a +12 V signal (ON), e. g. of D+ (inverter works automatically during motor operation for light pole, air-conditioner, refrigerating and heat boxes, large consumers etc.) or centrally from a general main switch (all units including the power packs are switched-on/off when entering or leaving the vehicle).

Delivery Scope: Control Unit, connection cable 30 cm length, operating manual

Order No. 2065

ADDITIONAL REMOTE CONTROL FOR SINE INVERTER

Extension set with 2nd remote control for VOTRONIC Sine Inverter SMI (-NVS) of all capacity classes. In addition to the remote control, which is included in the standard delivery of the inverter, it allows complete control and further operation of the inverter from a second location (right / left, driver's cabin / body).
Delivery Scope: Remote Control, Y distributor, connection cable 5 m, connection cable 30 cm length

Order No. 2067

REMOTE CONTROL S FOR AUTOMATIC CHARGER

Suitable for automatic charges of series Pb and VAC, as well as for charging converters of series VCC, 12 V and 24 V. If the unit has been installed at a difficultly accessible location, unit status and charging progress are indicated by the pilot lamps (LED). One of the corresponding main functions of the unit can be remote-controlled by means of the switch, such as silent run (night operation) of the chargers of series Pb and VAC, standby of the chargers of series VAC-F-, VAC-F II- and VAC-Station for intervention vehicles, as well as for the charging converters of series VCC. The remote control is executed as panel version. Appearance and mechanics (identical height 85 mm) are adapted to the other displays of the VOTRONIC modular system.

Delivery Scope: connection cable 5m length, fastening screws, drilling jig

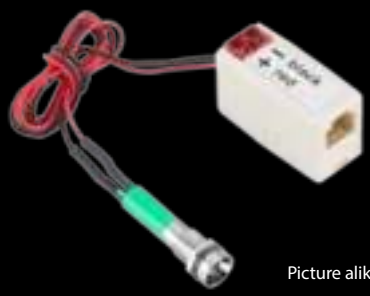
Order No. 2075

LED REMOTE CONTROL S FOR CHARGING CONVERTER

Suitable for the current charging converters of the series VCC 1212. The LED pilot lamps indicate the unit status and the charging progress, and the unit switch is used for specific functions of the units. The remote control is executed as panel version with plane surface. Appearance and mechanics (identical height 85 mm) are adapted to the other displays of the VOTRONIC modular system.
Dimensions: (WxHxD): 47x85x18 mm.

Delivery Scope: Connection Cable, 5 m Length, Fastening Screws, Drilling Jig

Order No. 2076



Picture alike

REMOTE INDICATOR IP67

The green light-emitting diode indicates the readiness for operation of the charger and the (inserted) mains power supply of the vehicle. Suitable for automatic chargers of the Votronic series „Pb...", „VAC..." and „VAC...DUO" with 6-pole plug-type connection „Remote Control" (except of VAC Station and VAC FIRE-CAN). The remote display can be installed at any desired location via a bore hole, 8 mm. It can be installed at any well visible location in the inside area (for instance in the dashboard), as well as outside with high tightness IP 67, such as near the driver's door.

Delivery Scope: Connection strands red/black of 2 m length, connection adapter, connection cable of 5 m length, plug-and-go on both sides, packing washer, coupling ring.

Order No. 2081

CABLE SET FOR CONNECTION SOLAR CHARGING CONTROLLER AT EBL

Readily assembled Cable Set for the connection of a VOTRONIC Solar Charging Controller at the suitable output of an existing Schaudt „Elektroblock (EBL) with connected Controll and Display Panel (DT.../LT...).

Before, please imperatively check the compatibility of your Schaudt Electroblock (EBL) and the corresponding control and display panel. For further information, see our website, menu item „Solar Controller Technology".

Delivery Scope: Cable Set 1 m length, manual

Order No. 2007

BLUETOOTH CONNECTOR S-BC

Communication module for VOTRONIC Energy Monitor App for display of the values of a VOTRONIC Solar Charging Controller (from 2013) and/or the LCD Battery Computer S or VPC Jupiter with Smart Shunt on a mobile terminal device via Bluetooth.

Delivery Scope: 2x Control Cable, 6-pole,1 m length

Order No. 1430

SOLAR DATA EXTENDER 3N1

Combines the data from up to three VOTRONIC solar controllers (or VBCS-Triple) so that these can be shown on a single display, e.g. LC D-Solar Computer S, LCC-Charge-Control S, VPC with solar function or Bluetooth connector S-BC.

Scope of delivery: 3x control lead 6-pin 0.5 m long

Order No. 1440

D+ SIMULATOR

Purely voltage-controlled generation of a control signal for (cut-off) relay or charging converter. With intelligent voltage analysis to prevent faulty activation in case of voltage drops and dynamic threshold identification. The switch output has a 12V / 0.5A rating, is resistant to short circuits and overloading and of type PNP, plus output, load on earth side.

Note: The simple D+ Simulator is not suitable for many Euro 6 vehicles. Suitable for these: D+ Simulator Pro (see Page 100)

Order No. 3066

ACCESSORIES
Intervention Vehicles

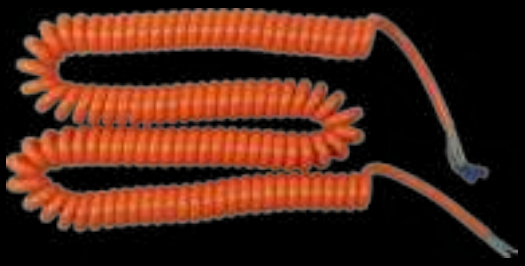
CONNECTION CABLES AND CHARGING CABLES

AUTOMATIC CABLE REWINDER, EXECUTION 5 M

Robust, longevous industrial execution, optionally for wall mounting (see fig.) or vertically for ceiling mounting, including cable stopper for adjustment of the optimum grip height and releasable cable locking. Cable H05VV-F 5 x 1.5 mm^2, excluding charging connector. Rating:

- For charging current supply 12 V or 24 V DC up to max. 16 A charging current
- For mains voltage supply 230 V/400 V AC up to max. 2200 Watts

Order No. 2315



HELIX CHARGING CABLE, 5 M, HIGHLY FLEXIBLE

Helix charging cable, approx. 1.2 m length, extractible to approx. 5 m, oil-proof and acidproof cable for high mechanic stress and application in humid rooms 3-core execution, 2+PE, excluding charging connector. Rating:

- For charging current supply 12 V or 24 V DC, 2-core up to max. 16 A charging current
- For mains voltage supply 230 V AC, 3-core up to max. 2200 Watts

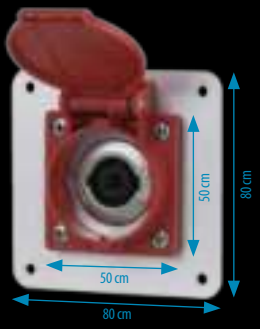
Order No. 2318

HELIX CHARGING CABLE 12 V / 24 V

Helix cable for on-board charging converter (B2B)
Length: approx. 80 cm, extractible to approx. 2 m, 2x 0.5 mm 2, max. 4 A

Order No. 2317

12 V / 24 V CHARGING CURRENT SUPPLY



CHARGING SOCKET 12 V / 24 V WITH HINGED LID

Pre-finished charging connection unit for vehicle installation, with hinged lid IP54 and mounting plate, flange dimensions 80 x 80 mm, mounting assembly dimensions 50 x 50 mm Connection female connector 6.3 mm, max. 20 A (regulation according to DIN 14679 max. 16 A)

Order No. 2333

HELIX CHARGING CABLE 12 V / 24 V WITH CHARGING CONNECTOR

Helix cable, approx. 1.2 m length, extractible to approx. 5 m, suitable for high mechanic stress, with mounted charging connector, stable execution, resistant to extension, with quick-release twist-locking connector, 12 V / 24 V, max. 16 A, Cable 3x2,5 mm²

Order No. 2319

CHARGING CONNECTOR 12 V / 24 V

Stable execution with quick-release twist-locking connector, soldered connection, 4-pole, max. 20 A, matching with 2333

Order No. 2331

CHARGING CONNECTOR FOR FIRE-FIGHTING VEHICLES

(according to DIN 14690)

2-pole cable connectors with antikink device according to DIN 14690, suitable for automatic cable rewinder or helix cable

Order No. 2323

CHARGING SOCKET FOR FIRE-FIGHTING VEHICLES

(according to DIN 14690)

2-pole socket according to DIN 14690 with protection cap and seal for vehicle installation

Order No. 2325

MAGCODE POWER-SYSTEM-SET 12 V

Magnetic connecting system with connector and socket, with automatic latching and automatic release in case of strong tension. Socket: Built-in - Ø 28 mm with coupling ring, Connection 6.3 mm flat connector; connector: Lead-in cable Ø max. 7 mm, connection terminal screws. Rating max. 15 A

Order No. 2326

MAGCODE POWER-SYSTEM-SET PRO 12 V

Execution as above, but with magnetic and mechanic latching (bayonet). Rating max. 25 A

Order No. 2328

COMPACT 230 V VEHICLE MAINS SUPPLY

MOUNTING CABLE 230 V
Complete for Vehicle Installation [1]

Male socket (Calix) with hinged lid IP44 and mounting cable, 2 m, for vehicle installation Simple and safe installation at the vehicle by means of mounting plate (flange diameter 63 mm, mounting hole 29 mm), incl. mounting material, optionally also for concealed installation, such as in the radiator grille. Cable with free cable ends, 230 V / 16 A, 2-pole +E. Cable 3x1.5 mm²

Order No. 2303

HELIX CONNECTION CABLE 230 V
with Plug-in Coupling [1]

Wear-resistant connection cable, orange, ideal for freely suspended (ceiling) mounting and high mechanic stress, 2 m length, with additional helix cable, approx. 45 cm (extractible to approx. 5 m length), with cast plug-in coupling (Calix) and free cable ends, 230 V AC / 16 A, 2-pole+E, Cable 3x1.5 mm², **matching with 2303**

Order No. 2305

SCHUKO CONNECTION CABLE 230 V
with Plug-in Coupling [1]

Solid rubber cable, 5 m length, black, for high mechanic stress, with cast plug-in coupling (Calix) and cast Schuko plug, 230 V AC / 16 A, 2-pole+E, Cable 3x1.5 mm², **matching with 2303**

Order No. 2307

[1] not DEFA compatible

VOTRONIC INFOLINE

Exchange
Phone: +49 (0) 6641 91173-0
E-Mail: info@votronic.de

Trader Contact
Phone: +49 (0) 6641 91173-73
E-Mail: vertrieb@votronic.de

Repair Service
E-Mail: service@votronic.de

» As a developer and manufacturer of innovative electronics for mobile use we give our products exclusively to commercial customers. According to our General Terms and Conditions, our products are not approved for sales in USA and Canada.

We are official CI-BUS partner of the Caravaning Industrie-Verband e.V. (CICID).
After consultation with us, manufacturers or original equipment manufacturers can integrate CI-BUS compatible units of our program into their systems.

MARINEAPPLICATION

The VOTRONIC price-list comprises all units, which are also available as option in a special boat version with humidity-proof electronic system. They are specially marked. The extra charge is marked with the corresponding sign (x or o). Furthermore a „1“ is to be added in front of the order number.

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Member of
CIVD Caravaning Industrie Verband e.V.

VOTRONIC
Elektronik-Systeme GmbH
Johann-Friedrich-Diehm-Str. 2
D-36341 Lauterbach/Hessen

Phone: +49 (0) 66 41 91173-0
E-Mail: info@votronic.de
Internet: www.votronic.de

VOTRONIC

MADE IN GERMANY

www.votronic.de