

➤ **AUTOMATIC BATTERY CHARGER INCL. SHORE POWER CONNECTION UNIT**

The charger AL 12/15 FI was designed especially for small installations. It is based on the technique of automatic charger series AL combined with a shore power connection unit. This reduces the installation procedure, as only this device and a shore power connector is needed to

get a safe AC system with an AC socket and proper charger on board. The RCBO device and the socket are at the front side. Another AC connection possibility at the rear side provides a the safe connection of further AC loads 230 V/50 Hz.

AC socket

AC Mains and on-board control LEDs

Operation indicator
Front side: 3 coloured LEDs indicate the charge condition or a failure condition.

ON/OFF switch and condition operation indicator

Double pole RCBO leakage protector 16A/30mA to protect the shore connection.

Temperature compensated charging curve
To prevent harmful battery gassing, the maximum charge current is reduced with every rise in temperature. Up to two temperature sensors can be connected to monitor two battery groups.

AL12/15 FI

Connection for batteries and temperature sensor on the rear side terminals with screws

Shore connection 230V/50Hz, and an extra AC connection at the rear side terminals.

Cut out 227 x 150 mm



Why investigate into a high-quality charger technology?

When a battery will be discharged and not immediately re-charged again, the plates begin to sulphate. If the battery won't be correctly charged the sulphating becomes sulphate crystals what results in a reduced battery capacity and also reduced life span of the battery. In case of a very strong sulphating great parts of the electrodes can be permanently damaged. This means, the capacity goes down and also the voltage is lower. In case of a deep discharge the battery got damaged irrevocable. The sulphating process will be equalised by a well controlled charging process with a 4 step charging characteristic.

| AL 12/15 FI | | Order-No.: 0 4312 1512 |
|--------------------------|---|------------------------|
| Charge current | 15 A | |
| Rated voltage | 12 V | |
| Charging characteristic | IUoUo-characteristic, Gel: 14,4V/13,8V/13,2V Open lead battery 14,2V/13,5V/13,2V | |
| Number of outlets | 2 | |
| Recom. battery capacity | 50 - 150 Ah | |
| Terminals for | FAL, LCM, Temp-AL | |
| Input voltage range | 180 - 264 V | |
| Frequency | 50-60 Hz | |
| Load consumption on 230V | 1 A | |
| Weight | 3 kg | |
| Dimensions | W 250 x H 174 x D 190 mm | |
| Cooling | Convection cooling without fan | |
| Return current | < 2 mA | |
| Temperature range | - 15°C - 50 °C, power derating from 40°C | |
| Protection | IP 20 | |
| Short circuit protection | yes | |

Automatic charger for small plants of up to 2 battery groups (service-starter and battery) and capacities of up to 150 Ah. The compact dimensions and plug connectors facilitate the rapid installation.

Noise free convection cooling. An optional temperature sensor can be connected to both versions. Proven devices since a long time!

AUTOMATIC CHARGER AL



AL 12/15

AL 24/08

Charging of the battery and power supply of the electrical system

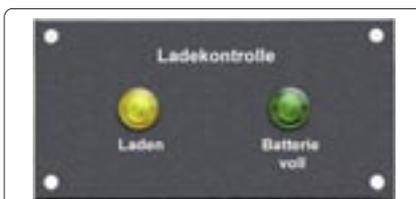
DIP-switch to select the type of battery and operation mode of the 2nd outlet (service/start)

Pluggable connections...
... for battery, temperature sensor and display connection facilitate the installation of all lines even at close / cramped installation places.

Charging without noise
No noise - no fan is needed due to convection cooling.

Temperature sensor (optional) available
A temperature sensor can be connected, to allow a thermally optimal battery charging characteristic.

| Type | AL 12/15 | AL 24/08 |
|---------------------------------|--|-------------|
| Order-No.: | 0 4212 1512 | 0 4224 0822 |
| Charge current | 15 A | 8 A |
| Rated voltage | 12 V | 24 V |
| Number of outlets | 2 | 2 |
| Recom. battery capacity | 50 - 150 Ah | 20 - 80 Ah |
| Charging curves | IUoUoU, 2nd output adjustable | |
| Charging voltage | Gel/AGM: 14,4V/13,8V/13,2V Open-lead-battery: 14,2V/13,5V/13,2V | |
| Optional connection | FAL, Temp-AL | |
| Input voltage range | 180 - 264 V / 50-60 Hz | |
| Load consumption on 230V | 1 A | |
| Short circuit protection | all models | |
| Cooling | Convection cooling | |
| Return current | < 2 mA | |
| Temperature range | - 15°C - 50 °C, power will be derated from 40 °C | |
| Protection | IP 20 | |
| Weight | 1,2 kg | |
| Dimensions | W 250 x D 142 x H 84 mm | |



FAL Order-No.: 0 4900 2002
LED remote control panel for monitoring the operational condition of the charger (charging/full)
Connecting cable length 5m
Dimensions W 105 x H 52,5 x D 40 mm



KS 2-15 Order-No.: 0 4922 0015
Ready made cables for battery charger, length 2 m.



Temp-AL Order-No.: 0 5900 3001
Temperature sensor to measure the battery's temperature. Cable length 2,8m. Cable can be longered to any length you need.

The new charger series ACE is the start of a completely new designed charger range. The new models represent up-to-date switch mode technology in terms of efficiency and system effectiveness.

Thereby the self-heating and the need of cooling has been minimized. All chargers up to an output current of 40 A at 12 V and 20 A at 24 V have no fan built in and so without noise! This fact provides a great advantage in comfort espe-

cially at night when you want to sleep. Another advantage thereby is the opportunity of full charging current until an environment temperature of 55°C. So you get even in the Mediterrean area the complete power you need. .

The chargers are optimised for wall mounting regarding humidity protection and cooling, which is the preferred mounting position on board. All connections are pluggable and easy to fit even in difficult accessible places.

AUTOMATIC CHARGER ACE

World wide operational due to input voltage range AC 110-230 V and also in connection with AC generators

Even when the available AC source has a reduced voltage the charger works with full power due to the most up-to-date design of the switch mode electronic. So you are able to charge your batteries with the same power even at piers with very long feed cables or while using the onboard generator. The built-in power factor-correction provides an optimal utilisation of the input energy. Therefore you got a low power consumption from the AC shore power and nevertheless a high output power for your batteries.

The integrated soft start electronic avoids high peak input currents, which would end in a switch-off of the pier AC-source protection. If there's a very weak AC source you can reduce the input power by programming the charger via the digital charge monitor CLM or the system monitor PSM.

Simultaneous charging of the batteries and power supply of the connected loads

If the charger is connected to an AC-source, all connected loads will be supplied by the charger and at the same time the batteries will be charged with the available part of the charging current.

Convection cooling

The models ACE 12/25, 12/40 and 24/20 are working without a fan and so without any annoying fan noise. The medium-power models ACE 12/60 and 24/30 have a fan which works only if really necessary. Via the remote control a silent mode can be activated (than the device works with reduced power for 8h timer controlled, so no fan will be needed).

Charging of several battery banks

The automatic charger ACE all have 3 separate charging outlets and have thereby the opportunity to charge e.g. a starter-, a house- and a bow-thruster- battery at the same time. Or you can charge different battery banks as 2 starter- and one house- battery. The available charge current will be split, so that every battery gets the current it needs.



ACE 12/60

ACE 24/30

Intuitive touch screen for control and individual setup of different battery systems

The charger models ACE 12/60 and ACE 24/30 have an integrated touch screen monitor for the easy control of each function. You can read the charging current, the individual charging voltages, the AC - input voltage and more. Also you can easily activate a silent mode and a power reduction for weak AC sources via push buttons.

The charging curves can be chosen by internal DIP switches, via the remote charging control BLS/BTM, the system monitor PSM or by the integrated touch screen. You have the choice of 7 different curves. In addition there's a free adjustable curve, a winter storage mode as well as a power supply mode. Also you can activate a refresh function for the extension of the battery's lifetime.



Pluggable connections / add-ons

At the device all connections for the AC-power supply, the temperature sensor and the charging outlets are pluggable for the ease of installation and maintenance. You can plug in different interface modules (touchscreen monitor, P-Bus, CLM). A shore power cable, temperature sensor and DC- connector are included.

MEDIUM POWER AUTOMATIC BATTERY CHARGER ACE

NEW



| Type | ACE 12/25 | ACE 12/40 | ACE 12/60 | ACE 24/20 | ACE 24/30 |
|--------------------------|---|-----------------------|---------------------------|-----------------------|---------------------------|
| Order-No.: | 0 4512 2513 | 0 4512 4013 | 0 4512 6013 | 0 4524 2023 | 0 4524 3023 |
| Charge current | 25 A | 40 A | 60 A | 20 A | 30 A |
| Nominal voltage | 12 V | 12 V | 12 V | 24 V | 24 V |
| Charging curves | 4-steps, adjustable - factory setting: 14,4 V / 13,8 V, hibernation mode, power supply mode, refresh-function | | | | |
| Battery types | 7 different charging programs for Open-lead, lead-calcium, GEL-, AGM - batteries, Lithium-battery-systems | | | | |
| Number of outlets | 3 | 3 | 3 | 3 | 3 |
| Recom. battery capacity | 120 - 250 Ah | 200 - 400 Ah | 300 - 600 Ah | 100 - 200 Ah | 150 - 300 Ah |
| Input voltage range | 90 - 265 VAC | 90 - 265 VAC | 90 - 265 VAC | 90 - 265 VAC | 90 - 265 VAC |
| Frequency | 47 - 65 Hz | 47 - 65 Hz | 47 - 65 Hz | 47 - 65 Hz | 47 - 65 Hz |
| Power efficiency | 90% typical | 90% typical | 90% typical | 90% typical | 90% typical |
| Consumption 230 / 115 V | 1,7 / 3,4 A | 2,7 / 5,6 A | 4,4 / 8,7 A | 2,9 / 5,9 A | 4,5 / 8,8 A |
| Weight | 2,1 kg | 3,5 kg | 3,5 kg | 3,5 kg | 3,5 kg |
| Dimensions L x W x H | 236 x 180 x 96 mm | 289 x 195 x 106 mm | 289 x 195 x 106 mm | 289 x 195 x 106 mm | 289 x 195 x 106 mm |
| Cooling | Convection cooling | Convection cooling | Controlled fan (<50 dBA) | Convection cooling | Controlled fan (<50 dBA) |
| Temperature range | - 20°C - 60°C, derating from 55°C | | | | |
| Protection | IP 22 | IP 22 | IP 22 | IP 22 | IP 22 |
| Short circuit protection | Against short and overvoltage (fuse): all devices | | | | |
| Option: LED-Remote panel | F-ACE incl. Interface | F-ACE incl. Interface | FAL | F-ACE incl. Interface | FAL |
| Option: P-BUS-Interface | Interface ACE P-BUS | ACE P-BUS / ACE-TFT | ACE-T-Kabel only | ACE P-BUS / ACE-TFT | ACE-T-Kabel only |
| Option: TFT-Monitor | CLM (incl. Interface) | CLM (incl. Interface) | CLM-I (without Interface) | CLM (incl. Interface) | CLM-I (without Interface) |



F-ACE Order-No.: 0 8000 4002

LED-Remote control panel incl. interface printed board for inserting into the ACE. Incl. 5 m connection cable.
Dim. W 105 x H 52,5 x D 40 mm



ACE-TFT No.: 0 8000 4971

Touchscreen module with P-BUS interface for retrofitting of models ACE 12/40 and ACE 24/20.

Delivery incl. ACE-T-cable.



ACE-PBUS No.: 0 8000 4970

Interface module P-BUS for inserting into the charger ACE 12/25, ACE 12/40 and ACE 24/20.

Delivery incl. M12 T-cable



ACE-T-Kabel No.: 5 0411 1161

M12-T-cable for P-BUS connection, length 0,2 m. Only for the retrofitting of models ACE 12/60 + 80 and ACE 24/30 - 100

REMOTE CONTROL BLS

The combined digital battery/charging monitor BLS informs about the operating status of the charger ACE and enables the setting of all charging parameters.

The main display shows the current charging current, the charging voltage, the current charging phase, the battery temperature and the mains voltage.

The power reduction can be set via the touch screen and the silent mode activated.

A battery management shunt SHE 300 can also be added.

More detailed information on page 46



Setup



Charger active



BLS Order-No.: 0 8000 3200
ACE-LIN Interface Order-No.: 0 8000 4975

2.4" TFT touch remote display panel for ACE series chargers. The ACE 12/60 and 24/30 chargers do not require an ACE-LIN interface. For the ACE 12/25, 12/40 and 24/20 chargers, the ACE-LIN interface must be ordered for insertion into the ACE charger.

Dimensions W 105 x H 75 x D 40 mm

Automatic battery charger for medium and large arrangements of up to 3 groups of batteries (starter, house and bow battery) and capacities of up to 1000 Ah.

The large models of the ACE series are also equipped with the latest state-of-the-art switching power supply technology and deliver full charging power up to an ambient temperature of 50°C. This means that the full performance is also available in the mediterranean environment. Automatic detection of the AC input voltage, combined with the wide AC input voltage range of 90 - 265 V / 47 - 65 Hz, ensures that the device can be used worldwide without sacrificing performance. So full charging power is always supplied regardless of the AC current source or genset.

The lightweight, rugged aluminum casing can be installed quickly and safely using the external wall bracket. The electrical connection compartment is covered by a front-side flap and allows safe and secured installation.

The smart color synoptic for charger status informs about charger status, an optionally a 2.4 "color touch-screen control panel can be integrated. The cooling of the device is made by an automatic controlled fan. A 5-stage charging profile for fast and complete charging for all battery types: flooded, Lead-sealed, Calcium-Lead, AGM, Gel, Lithium, user-defined profile, power supply mode. The included temperature probe adjusts charging profile to the battery temperature.

A system monitor for remote monitoring of the charge can be connected to the integrated P-BUS interface.



| Type | ACE 12/90 | ACE 24/45 | ACE 24/60 | ACE 24/80 | ACE 24/100 |
|------------------------------|---|---|--------------------|--------------------|--------------------|
| Order-No.: | 0 4512 9013 | 0 4524 4523 | 0 4524 6023 | 0 4524 8023 | 0 4525 0023 |
| Nominal current | 90 A | 45 A | 60 A | 80 A | 100 A |
| Nominal voltage | 12 V | 24 V | 24 V | 24 V | 24 V |
| Recom battery bank | 300-900 Ah | 200-450 Ah | 250-600 Ah | 300-800 Ah | 400-1000 Ah |
| Input voltage /frequency | 90 - 265 VAC (47 - 65 Hz), single-phase automatic, efficiency 87% typical | | | | |
| Max. consumption 230/115 VAC | 6,0 A/12,0 A | 6,8 A/13,6 A | 9,0 A/18,1 A | 12,0 A/24,0 A | 15,1 A / 30,2 A |
| Outputs | 3, each bank can be used individually and deliver the rated current | | | | |
| Connection on threaded rods | M6 | M6 | M6 | M6 | M8 |
| Dimensions L x W x H | 270 x 360 x 130 mm | 270 x 360 x 130 mm | 270 x 360 x 130 mm | 270 x 360 x 130 mm | 270 x 410 x 130 mm |
| Weight | 6,8 kg | 6,8 kg | 6,8 kg | 6,8 kg | 9,0 kg |
| Charging profile | IU or IUoU through internal dip switches | | | | |
| Batterie type | Lead-sealed as factory setting - Wet, Gel, AGM, Calcium Lead, LiFePO4, DC power-supply mode, custom characteristic | | | | |
| Boost /Floating voltage | 14,4 V /13,8 V DC | 28,8 V / 27,6 V DC as factory setting for Lead-sealed | | | |
| Cooling | Electric fan controlled in temperature and current < 50 dBA at 1m | | | | |
| Operating temperature | Rated charge from -20°C to +50°C, derating above 50°C. Automatic switch off above 60°C; automatic restart | | | | |
| Storage temperature | From -20°C to +70°C, relative humidity up to 96% without condensation | | | | |
| Casing | Coated aluminium, protection factor IP23, fixing screw (wall) 4 x M6 round screws, mounting kit + securing screws | | | | |
| Protection against | leaking input surge by VDR - Not covered by warranty / output polarity reversal by fuse rupture / short-circuit and surge / abnormal overheating by cutting off the charger | | | | |

- KS 2-30 (up to 30 A) Order-No.: 0 4922 0030
- KS 2-40 (up to 40 A) Order-No.: 0 4922 0045
- KS 2-60 (up to 60 A) Order-No.: 0 4922 0060

Ready made cables for battery charger, length 2 m.



- ACE-T-Kabel HP Order-No.: 5 0411 1162

M12-T cable for connection to the P-BUS, length 0.2 m.



➤ CHARGE BOOSTER

The sufficient and complete charging of the supply batteries of a yacht or a vehicle is usually not guaranteed with a conventional system. Especially in vehicles with intelligent alternators, the charging voltage is reduced after a short time and produces voltage peaks during braking. This is where the charging boosters come in: they are DC battery chargers with a 12 V or 24 V input and have the following advantages:

- Correct charging with a three-stage characteristic curve, better utilisation of the alternator power, thus fast and optimum charging of the supply batteries
- Effective even on short journeys
- Adjustable characteristic curves - suitable for lead/acid batteries, gel, AGM and lithium-ion batteries
- Stabilisation of a 12 V or 24 V vehicle electrical system for supplying sensitive devices
- Charge of a 24 V bow battery from a 12 V on-board system
- Charge of a 12 V battery from a 24 V on-board system
- Current limitation of the charging current, so that the maximum current can be adapted to existing cable cross-sections.
- Fanless operation for maximum comfort.
- Power supply mode - operation also possible without battery.
- Soft start to relieve the load on the V-belt during starting.
- P-BUS connection for system integration with a philippi system monitor.



| Type | Order-No.: | Input-/Output Voltage | Charge Current |
|--------------|-------------|-----------------------|----------------|
| DCE 12/12-60 | 0 4612 1260 | 12 V / 12 V | 60 A |
| DCE 24/12-60 | 0 4624 1260 | 24 V / 12 V | 60 A |
| DCE 12/24-30 | 0 4612 2430 | 12 V / 24 V | 30 A |
| DCE 24/24-30 | 0 4624 2430 | 24 V / 12 V | 30 A |

Technical Data:

| | |
|-----------------------|--------------------|
| Degree of protection | IP 22 |
| Dimensions | 236 x 180 x 96 mm |
| weight | 2,2 kg |
| Connection | M 8 |
| Input voltage | 10 - 32 V DC |
| Efficiency | > 96% |
| Operating temperature | -20° to +60°C |
| Interface | P-BUS |
| Temperature sensor | Temp-AL (optional) |

➤ SOLAR CHARGE CONTROLLER

The solar charge controllers with Maximum Power Point Tracking, MPPT for short, increase the efficiency of the solar panels. The operating point varies constantly depending on the external conditions (solar radiation and temperature) to which it must adapt (tracking).

They ensure optimal utilization:

Tracking efficiency and efficiency up to 99%.

4 stage charging curve for longer battery life.

8 predefined battery charging curves, suitable for all common battery systems. Fully configurable system.

| Type | SCE 12/60 | SCE 24/30 | VT 65 | VT 80 |
|-----------------------------|-------------------|-------------------|--|----------------------|
| Order-No.: | 0 4600 1260 | 0 4600 2430 | 7 0006 8065 | 7 0006 8080 |
| Max. charge current | 60 A | 30 A | 65 A | 80 A |
| Nominal voltage battery | 12 V | 24 V | 12 / 24 / 48 V | 12 / 24 / 48 V |
| Solar panel voltage max. | 45 V | 45 V | 150 V (75 V @ 12 V) | 150 V (75 V @ 12 V) |
| max. power of the PV Module | 800 W | 800 W | 1000 / 2000 / 4000 W | 1250 / 2500 / 5000 W |
| Weight | 2,2 kg | 2,2 kg | 5,2 kg | 5,5 kg |
| Dimensions L x W x H | 236 x 180 x 96 mm | 236 x 180 x 96 mm | 120 x 220 x 310 mm | 120 x 220 x 350 mm |
| Return current | | | < 1 W in night mode | |
| Protection | IP 22 | IP 22 | IP 54 | IP 54 |
| Interface | P-BUS Interface | P-BUS Interface | Studer CAN-Bus Interface for remote panel RCC-02/-03 | |