Technical data:

Type	PC200
Battery connectors -B +B	
Voltage $_{nom}$	12V
Input voltage range	10…15V
Max. power consumption	30A
Typical standby consumption without inverter	0,3 W
Typical standby consumption with inverter	1,8 W
Module connection / charge controller -M +M	
Max. input voltage	22V
Max. module current	8 A
End of charging after reaching overcharging limit	14,3V
End of charging without reaching overcharging limit	14,3V
Overcharging limit	<12,4V
Battery Ah $_{min}$	40Ah
12V Output -L +L	
Nominal voltage	12V
Max. load current	8A
Max. power consumption	96W
230V output (grounded socket)	
Output voltage	230V ± 5%
Output frequency	50Hz ± 1%
Output current cont. / max.	0,9 / 2,7A
Max. cont. consumption at cos φ >0,8	200VA
Max. peak consumption at cos φ >0,8	600VA
Efficiency ($U_{in} = U_{nom}$)	87%
Deep discharge protection	
Advance warning indication	<12V
Switch-off threshold of DDP	10,4V
Reset threshold	12,3V
Other data	
Operating temperature	0…+40°C
Dimensions (mm)	190×190×80
Weight	1.6 kg

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INSTRUCTION MANUAL

PC200 COMBI INVERTER

CE

- solar charge controller 12V / 8A
- DC loads 12V / 8A
- Sinewave inverter 230VAC / 200VA continuous (600VA peak power)

Dear Customer,

Thank you for buying our product. You have bought one of the most powerful, most compact and most reliable sinewave inverter of its class. Please make sure to read this manual carefully before putting the unit into operation.

WARNING!!! Important security advice!

- This unit produces 230V alternating current on the output side, which is dangerous for human life and health if touched!
- This unit must be kept away from children! Should a supervised operation in a household with children not be possible, all corresponding security measures related to a conventional mains socket are to be taken!
- The operation of an alternating current load of protection class I (unit with protection plug containing PE connection) is dependent on the earthing of the PE connection at the sinewave inverter output or the earthing of the battery minus connector. Please note that according to the regulations the cover and the PE connector are internally connected to the minus connector of the battery. Under no circumstances should the output neutral-connector be earthed!
- Please note that even when the inverter is switched off, there could be dangerous voltage on the output stored in the capacitors!
- Operation under extreme conditions must be avoided, such as: in temperatures above 40ºC, inflammable gas, solvents, vapour, dust, humidity over 80% non cond., etc.)
- The unit must be kept and operated in closed, dry area.
- As soon as you assume that safe operation of the unit is no longer possible, unplug it immediately and make sure that it cannot be switched back by somebody else. Operation has become unsafe when the unit does not show any signs of working or has been visibly damaged under transportation of after storing the unit in unfavourable conditions. Under adverse circumstances (e.g. lack of charge regulation, extremely high temperature) lead acid batteries can produce hydrogen – danger of explosion! Batteries must be stored and installed in well-ventilated areas only!
- Due to the power consumption of the unit, it is only allowed to use lead acid batteries with the minimum Ah capacity, as stated in the technical specifications.
- When connecting the unit, please make sure to keep the connection order! When disconnecting, please do it in a reversed order! (See later)
- The unit contains an internal fuse for the positive battery connection and another one for the AC output connection. In order to avoid high current if short-circuit occurs in the battery cables, the battery cable must also be fused (e.g. built-in fuse in the battery connection cable).
- Batteries are able to deliver high currents, which can, despite the corresponding protecting measures taken, damage equipment and cause injuries to persons. In adverse conditions short-circuit could result in heat development and consequent fire. Please carefully observe technical specification on voltages and polarity!

Servicing and repair
can be conducted by authorised personnel only. Only fuses with the same rating and characteristics can be used as replacement. It is forbidden to mend the burned fuse or short-circuit the fuse-holder. Before service or fuse replacement, all equipment must be disconnected from the inverter and the inverter itself from the batteries. It is necessary to wait for an additional 3 minutes in order to avoid dangerous voltage shock from the internal capacitors.

Operation description / appropriate usage
The PC200 combi inverter joins an integrated solar load regulator and a 230 V AC sinewave inverter in one unit. The unit provides the DC loads with a nominal voltage of 12V and a max. power of 96W as well as AC

loads (230V AC @ 50 Hz, cos φ > 0,8) up to a max. power of 200VA. The 12V lead acid battery which is used as power supply will be protected against hazardous deep discharge / overcharging. The unit is designed for usage in dry room and should be installed wall-mounted. When the necessary conditions for usage are not present, it is the responsibility of the user to provide them. Generally lead-acid batteries are used in photovoltaic systems for storing energy. They must be protected against deep discharging and overcharging. This solar charge controller complies with both requirements.

Deep discharge protection – AC and DC load disconnection
Lead acid batteries must be protected against deep discharging; otherwise the cells will be irreversibly damaged. All loads (both AC and DC) will be switched off automatically when battery discharge voltage is reached. A new automatic load re-connection is possible only after charging the battery to an appropriate level. This is to make sure that the battery leaves the discharged status as soon as possible.

Overcharge protection
The unit protects the battery against hazardous overcharging. It is suitable for all types of lead batteries with a min. capacity of 40 Ah (C5), if the permissible overcharging limits given by the manufacturer are kept. As soon as the overcharging limit is reached, the charging current of the solar modules will be reduced according to the shunt principle. This charging mode is called "IU-charging" which charges the battery extremely careful and fast. The charging limit is dependent of the prior discharge status.

Sinewave inverter
The unit produces real sinewave at its output from which all alternating current loads (230V AC 50 Hz cos φ>0,8) within the corresponding power range can be operated. Nevertheless please note that some load devices require more power at start-up than their nominal power. Light bulbs can require 5 times more current at start-up than their nominal value. Drills and refrigerators take a much higher current at start-up than their rated power given in their manuals. There are also 230V appliances, which require a 16A fusing to get them started. Starting drills, refrigerators (with compressor), PC monitors or TVs (demagnetising coil) also requires 10 times more power than their nominal power consumption. Should disconnection due to overload repeatedly occur, please use a more powerful model with the corresponding power reserve for difficult start-ups.

Main switch
The inverter can be started by the main switch, which is located near the socket. If there is no load connected to the unit, it is recommended to switch the unit off. This will save the batteries from discharging since the standby loss of the inverter is approximately 1,8 W.

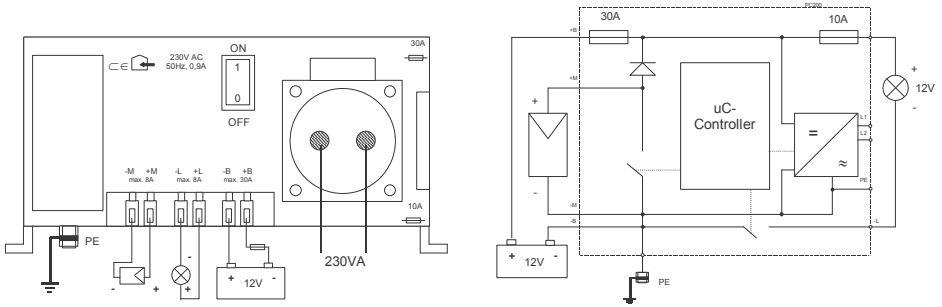
LED indicators
The unit has two LEDs to indicate the actual status.

LED green	LED red	Status
ON	OFF	Unit in operation. Everything is O.K.
ON	Flashing	The unit is temporarily overloaded. This operating status is limited in time.
OFF	Flashing	The unit has switched off due to impermissible overload. The unit will automatically switch back to ready status after a certain waiting time.
ON	ON	Advance warning to deep discharging. The battery voltage has dropped below the deep discharge threshold but the discharge end voltage not yet reached.
OFF	ON	The battery voltage has dropped below the discharge end voltage. The unit will switch back only after the battery voltage reaches the switch-back threshold.
OFF	OFF	The unit is off. If the main switch is in ON position, either there is no voltage connected of the fuse is blown.

Installation
Corresponding to its protection class, the unit must be mounted not far from the battery. Battery area must be ventilated according to the regulations. The unit must not be mounted directly above any heat source or on inflammable material. The free space must be > 100 mm above and below the unit.

In order to get the best performance out of the unit, please mount it on a vertical area with the output socket facing downwards or upwards. This position will allow the best ventilation for your inverter and it should be mounted this way whenever it is possible. Otherwise the unit might not be run at full load for too long, the internal overheating sensor switches the unit off temporarily.

Wiring



Attention: Make sure of the right polarity! Follow the security advice!

Wiring and installation must follow the corresponding regulations! Check the voltage / power rating and polarity of each equipment which is to be connected to the inverter, **before** you start with the actual connection! If you have any doubts – ask your local dealer. Please follow this order during installation:

1. Check whether the connected battery is already earthed. In that case the minus connector must be earthed since the solar-station is internally connected to earth. If that is not the case, connect the earth of the unit to the earthing point of your house. If you have no suitable earth connection available, the earthing must be done according to the corresponding regulations (e.g. earthing spear). **Under no circumstances can the unit be operated without earthing because faulty units of Protection Class I may represent serious hazard to human health and life (life danger).** Earthing of the neutral connection is not allowed and will destroy your unit!
2. Switch your unit off before connecting it (AUS position). Connect the battery with the appropriate cables – B +B while making sure of the right polarity to avoid short circuit. A cable diameter of 6,0 mm^2 flexible is recommended to hold the voltage losses modest and the combined cablewarming low. Always install a fuse directly at the plus connector of the battery, according to the corresponding regulations. The cables between battery and the combi inverter should be no longer than 3 m. After connecting the cables switch the inverter ON. The green LED lights. If not, please check all fuses and the presence of the incoming voltage.
3. If the combi inverter is working properly so far, connect the solar modules to the screw terminals –M +M with the right polarity.
4. Connect the DC loads to the screw terminals –L +L with the right polarity. Use cables with the minimum cross section of 2,5 mm^2. You should use a bigger cable cross section if the distance between the combi inverter and the loads is bigger than 4 m. This helps to reduce voltage drops on the line. Reverse polarity at the output connections can destroy your devices despite of protection.