

Frequently asked questions about **Combis**

What battery capacity do I need to fit a Mass Combi 12/2000 or 24/2000?

A simple rule of thumb states that a 12 Volt system needs a minimum battery capacity of around 20% of the inverter capacity, while the corresponding figure for 24 Volt inverters is 10%. The battery capacity required for a 12 Volt Mass Combi 2000 is therefore 400 Ah, and that needed for a 24 Volt Mass Combi 2000 is 200 Ah.

How much power does a Combi use up?

The output efficiency of Mastervolt equipment is very high due to the application of high frequency (HF) technology, which allows greater energy to be drawn from the same battery. If the Mass Combi needs to power a Senseo coffee machine (1450 Watt), for instance, power consumption will be 1450 Watt divided by the onboard voltage of 12 Volt = 120 amps. Making a cup of coffee takes less than a minute, so consumption in Ah can be considered fairly small at $120 \times 1 \text{ min} = 2 \text{ Ah}$. The power used by the inverter itself is negligible.

Does the Combi need a lot of ventilation?

The Combi needs very little ventilation - two approx. 80 cm² (9 x 9 cm) ventilation openings are usually sufficient. Inverters that are used in high ambient temperatures, or are expected to be operating at full capacity for a long period, require openings that are at least four times as large.

How thick should the battery cables be?

To calculate the right cable size, determine the highest possible current which will flow through the cable. For the Combi this is the inverter current. When running at full capacity, the inverter draws around 200 amps from the batteries (100 amps for a 24 Volt system).

The rule is simple: For every 3 amps you need 1 mm² in cable thickness. The advice for a Combi 12/2000 would thus be 70 mm² cable thickness and 35 mm² for a 24 Volt version.



Is the Mass Combi noisy?

HF technology has rendered large low frequency transformers obsolete, so you no longer have the irritating humming sound generated by equipment with a large transformer. An ultra quiet and temperature-regulated ventilator takes care of cooling, ensuring that noise levels are kept very low. The only remaining sound is the soft hum of the cooling air. A Mass Combi can therefore be installed virtually anywhere on your boat.



Do I need a transfer system?

A transfer system is not needed when there is only one 230 Volt connection. The Mass Combi comes with a transfer system between the incoming current and the inverter current. Incoming 230 Volt power current is automatically directed to the outlet and the batteries are charged. The inverter will immediately take over should the 230 Volt input drop or be switched off, resulting in virtually no interruption. Once a 230 Volt input is available again, it will be plugged back in immediately after synchronisation. If you have a second 230 Volt power source (such as a generator) you will need a manual switch or Masterswitch transfer system.

Can I power a computer with a Combi?

Yes, the Mass Combi can easily and safely supply a computer without the slightest problem or risk. The Combi can even function as an emergency power system. If, for instance, the 230 Volt grid drops, the Combi will automatically switch over to inverter operation. As the switching time is very short and the inverter was already keeping up with the incoming current in standby-mode, the computer will usually continue to work normally. Once the mains is restored, the system switches back to charger operation and the incoming current from the shore or generator again powers the computer. The Mass Combi MasterAdjust software allows you to set the minimum level of shore or generator power at which the inverter is switched on.

Does the Mass Combi work with washing machines?

The Mass Combi can easily power a washing machine. One whole washing cycle will, on average, take 80-100 Ah (with a 12 Volt system), and 40-50 Ah (with a 24 Volt system). Most of the energy is used to heat up the water, so consumption is properly correlated to the water temperature. Washing your laundry will put considerable strain on your battery for a short period of time, so it is important that battery capacity be sufficient: 600 Ah should be enough for a 12 Volt system and 300 Ah for a 24 Volt one.

Can I reduce the shore power intake in situations where shore power is limited?

Yes. The Mass Combi comes with Power Sharing and the Power Support function. Power Sharing ensures that the battery charger in the Combi automatically switches to a lower capacity as soon as a given preset value is reached. This value usually corresponds to the available shore power fuse or generator capacity. The current required by the battery charger and the current required to power connected equipment are added up. Should the total exceed the pre-set critical value, the battery charger current will be automatically reduced to the extent where shore or generator power intake is equal to the pre-set value. The battery charger can even be set to operate at zero-amps charge current. If the output load of the Combi exceeds the preset value of, for instance, the shore power fuse, the system will quickly switch back to the inverter: This prevents the shore power fuse from blowing or the generator from becoming overloaded. Once the current required to power the connected equipment becomes lower - when a number of appliances have been turned off, for example - then the system will switch back to incoming current and the batteries will be recharged again. The value for maximum power intake can be adjusted via the optional remote control panels or by dialswitches in the equipment.

Can a Combi power a microwave?

Yes, all microwave models can be connected to a Mastervolt Combi. Bear in mind that an 800 Watt microwave consumes 1200 to 1300 Watt from the 230 Volts system, and that the capacity of the inverter must be able to handle this. Apart from this, the total consumption of the microwave is modest: Five minutes of microwave use will consume around 8 Ah on a 12 Volt system and 4 Ah on a 24 Volt system. A combination microwave with oven and grill can also be connected to the Mass Combi. As power consumption will be high when the oven and the microwave are used simultaneously, you will need a robust battery of at least 400 Ah for 12 Volt and 200 Ah for 24 Volt.

Can I parallel connect Mass Combis?

Yes, the Mastervolt Mass Combi 2000 or 2500 Watts can be parallel connected without any problem. Such a set-up means that you both double the inverter capacity as well as the charger capacity. With more batteries or a need to power more equipment, parallel connect a second Combi to the existing one. This doubles the available inverter capacity to 4 kWatts and increases the charge capacity to 200 amps (for the 12 Volt version) or 120 amps (for the 24 Volt version). No additional equipment is required, apart from the connection of a few signal cables. It will, however, be necessary to adapt wire and cable diameters in the system to cope with the increased capacity. All Mass Combi models can also be parallel connected to a generator or shore power.

What is the power support function?

Mastervolt Mass Combis are equipped with an extremely advanced system to prevent the shore power fuse from becoming overloaded. The output current of the battery charger is reduced as soon as there is a risk of this happening. If this proves insufficient, the system rapidly switches to inverter operation so that the battery temporarily powers a part of the connected load. Since the inverter will already have been synchronised and the switching is so fast, computers will continue functioning, as will clocks and timers on, for instance, microwave ovens. Once the load decreases, the system switches back to shore power and the battery charger returns to charging the batteries. Your Combi can also therefore function as an efficient emergency power system.

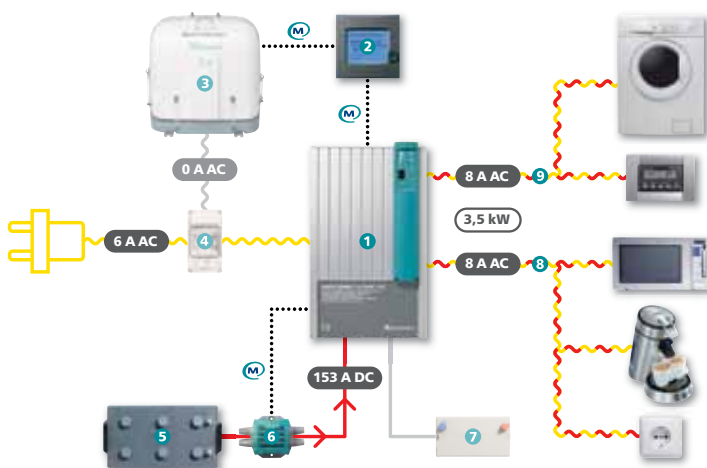
Although Mastervolt Mass Combi 4 kW models are constructed from two 2 kW units, their highly compact structure means they take up little space. Each of them is connected to a remote control panel that allows the Combi to be remotely monitored and switched on and off. If you require an even larger inverter capacity, a system of battery chargers and inverters can be used. Mastervolt inverters are available up to a capacity of 15 kW, which is sufficient to supply even the largest system.



The Mass Combi 2 kW and 4 kW models come with an ICC remote control panel.



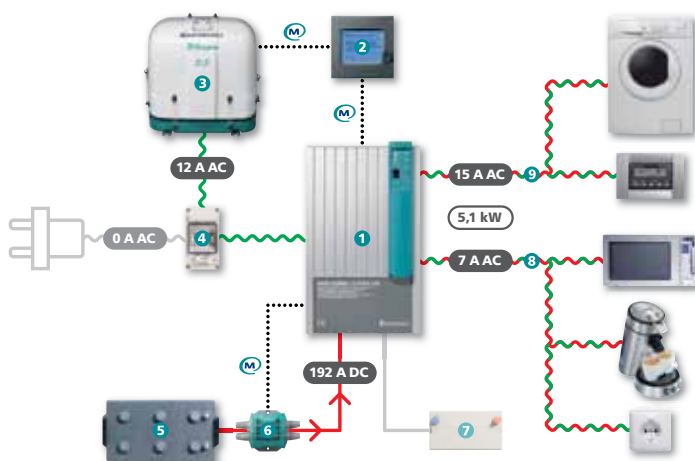
Example 1: Higher consumption than is available from the shore.



- 1 Mass Combi inverter/charger combination.
- 2 MasterView Easy, control panel for all devices in a MasterBus network.
- 3 Generator.
- 4 Masterswitch transfer system.
- 5 Service battery, gel.
- 6 MasterShunt.
- 7 Starter battery, AGM.
- 8 Inverter output.
- 9 High Power output.

Same shore power fuse as above diagram: 230 V/6 A. Several 230 V appliances are switched on, consuming 3.5 kW. A total of 16 amps is required. The additional 230 V (6 A) is supplied via the service battery and the Mass Combi. Automatic switching off prevents excessive discharge of the batteries. You can program the setting via Power Sharing in the Mass Combi, or remotely using the MasterView Easy panel.

Example 2: No shore power - only generator and battery power.



- 1 Mass Combi inverter/charger combination.
- 2 MasterView Easy, control panel for all devices in a MasterBus network.
- 3 Generator.
- 4 Masterswitch transfer system.
- 5 Service battery, gel.
- 6 MasterShunt.
- 7 Starter battery, AGM.
- 8 Inverter output.
- 9 High Power output.

In this case the generator is the source of power and makes the system entirely independent. The generator can both charge the batteries and provide power to the connected consumers. The Mass Combi regulates supply and demand and the MasterShunt can automatically start the generator. In case of a large power demand - in the diagram 5.1 kW - the Mass Combi provides an additional 230 V power from the service battery in parallel with the generator. This is how this configuration is able to supply 5.1 kW with a 3.5 kW generator.