

↔ DOMETIC

# ENERGY & LIGHTING SINEPOWER



MSI912, MSI1812T

EN

## Sine wave inverter

Installation and Operating Manual



**Please read this instruction manual carefully before installation and first use, and store it in a safe place. If you pass on the product to another person, hand over this instruction manual along with it.**

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# 1 Explanation of symbols

**WARNING!**

**Safety instruction:** Failure to observe this instruction can cause fatal or serious injury.

**NOTICE!**

Failure to observe this instruction can cause material damage and impair the function of the product.

**NOTE**

Supplementary information for operating the product.

## 2 General safety instructions

### 2.1 General safety

The manufacturer accepts no liability for damage in the following cases:

- Faulty assembly or connection
- Damage to the product resulting from mechanical influences and excess voltage
- Alterations to the product without express permission from the manufacturer
- Use for purposes other than those described in the operating manual

**WARNING!**

- Only use the device as intended.
- Do **not** operate the device in a damp or wet environment.
- Do **not** operate the device near any flammable materials.
- Do **not** operate the device in areas that are potentially explosive.
- Maintenance and repair work may only be carried out by qualified personnel who are familiar with the risks involved and the relevant regulations.
- People (including children) whose physical, sensory or mental capacities or whose lack of experience or knowledge prevent them from using this product safely should not use it without the supervision or instruction of a responsible person.

- **Electrical devices are not toys**  
Always keep and use the device out of the reach of children.

## 2.2 Safety when installing the device



### **WARNING!**

- Installing the device may only be performed by qualified personnel who are familiar with the guidelines and safety precautions to be applied.
- If electrical devices are incorrectly installed on boats, corrosion damage might occur. The device should be installed by a specialist (marine) electrician.
- All the wiring must comply to AS3000 and AS3001.



### **NOTICE!**

- Ensure that the device is standing firmly.  
The device must be set up and fastened in such a way that it cannot tip over or fall down.
- Do not expose the device to a heat source (such as direct sunlight or heating). Avoid additional heating of the device in this way.
- If cables have to be fed through metal walls or other walls with sharp edges, use ducts or tubes to prevent damage.
- Do not lay cables which are loose or bent next to electrically conductive material (metal).
- Do not pull on the cables.
- Do not lay the 230 V mains cable and the 12/24 V DC cable in the same duct.
- Fasten the cables securely.
- Lay the cables so that they cannot be tripped over or damaged.

## 2.3 Operating the device safely



### WARNING!

- Operate the device only if you are certain that the housing and the cables are undamaged.
- Even after the fuse triggers, parts of the inverter remain live.
- Always disconnect the power supply when working on the device.

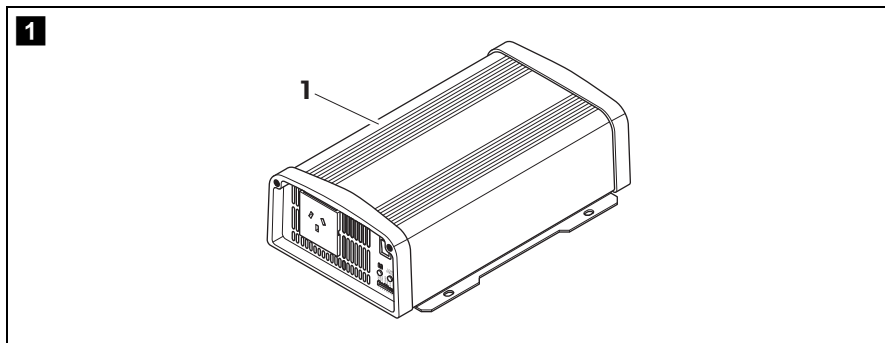


### NOTICE!

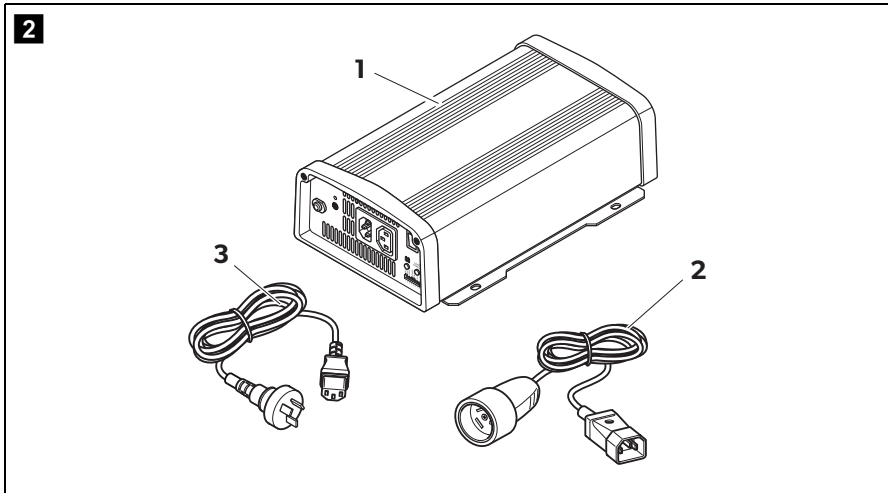
- Make sure the air inlets and outlets of the device are not covered.
- Ensure good ventilation. The inverter produces dissipated heat which has to be diverted.
- Do not connect the 230 V output of the inverter (fig. **4** 5, page 11 and fig. **5** 5, page 12) to a different 230 V source.

## 3 Scope of delivery

### MSI912



No.	Designation
1	Sine wave inverter
-	Operating manual

**MSI1812T**

No.	Designation
1	Sine wave inverter
2	Connection cable with safety coupling (for 230 V~ output)
3	Connection cable with safety plug (for 230 V~ supply)
-	Operating manual

## 4 Accessories

Designation	Ref. no.
Remote control	MCR-7 (on/off sleep mode)
Remote control	MCR-9 (LED power monitoring)

## 5 Target group for this manual

The electrical installation (chapter “Connecting the inverter” on page 15) is intended for professionals who are familiar with the applicable regulations of the country in which the equipment is to be installed and/or used.

All other chapters are intended for the users.

## 6 Intended use



### WARNING!

Never use the inverter on vehicles where the positive terminal of the battery is connected to the chassis.

The wave inverter converts direct current of **12 V $\overline{=}$**  into a 200 – 240 V AC supply of 50 Hz or 60 Hz.

## 7 Technical description

The inverters can be operated wherever a 12 V $\overline{=}$  connection (MSI912, MSI1812T) is available. The light-weight and compact construction of this device allows for easy installation in mobile homes, commercial vehicles or motor and sailing yachts.

The output voltage corresponds to the household voltage from the socket (pure sine wave, THD < 3 %).

Please observe the values for constant output power and peak output power as indicated in chapter "Technical data" on page 29. Never connect devices that have a higher power requirement.



### NOTE

Note when connecting devices with an electrical drive (such as power drills and refrigerators), that they often require more power than is indicated on the type plate.

The inverter has various protective mechanisms.

- **Overvoltage shutdown:** The inverter shuts itself off when the voltage exceeds the cut-off value. It restarts when the voltage returns to the restart value.
- **Undervoltage shutdown:** The inverter shuts itself off when the voltage sinks below the cut-off value. It restarts when the voltage rises to the restart value.
- **Excess temperature shutdown:** The inverter switches off when the temperature inside the device or the temperature on the cooling element exceeds a cut-off value. It restarts when the voltage rises to the restart value.
- **Overload shutdown:** The LED on the inverter indicates an operating fault (constant red light) when an excess load is connected or a short circuit has occurred. The fuse in the device must be pressed in again by hand after it is triggered by excess current.
- **Incorrect polarity protection:** The incorrect polarity protection prevents the wrong polarity when connecting the inverter.



- **Fuses (MSI1812T only):** The LED on the inverter indicates an operating fault (constant red light). The fuse in the device must be pressed in again by hand after it is triggered.

**NOTE**

The individual values are found in the chapter “Technical data” on page 29.

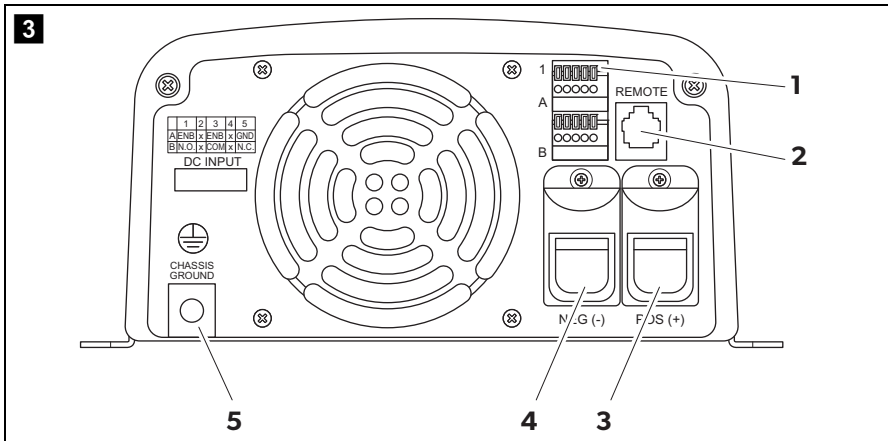
The inverter can be switched to an energy-saving mode to prevent the connected battery from discharging too quickly.

The inverter can be easily controlled using the remote control (accessory).

The SinePower MSI1812T inverters are fitted with a 230 V~ priority circuit. If an external 230 V~ voltage is available, this will have priority. If no external 230 V~ voltage is connected, then the connected battery will be used as the power supply.

## 7.1 Control elements

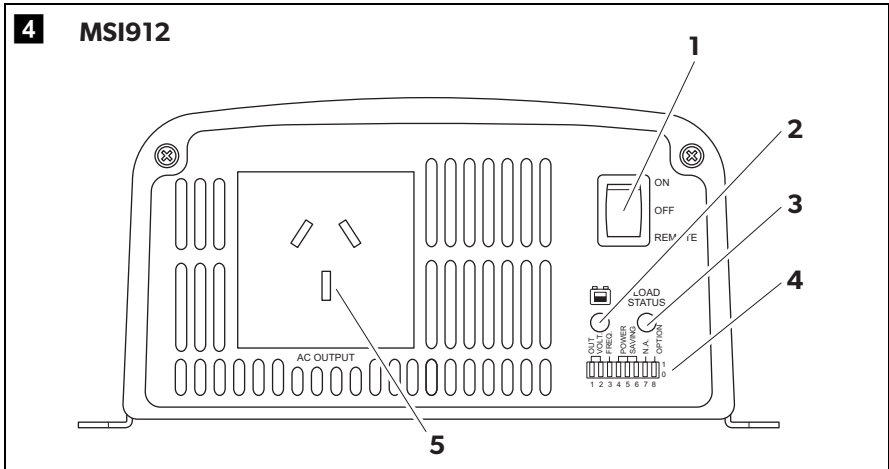
The inverter has the following connections, displays and control elements on the back:



No.	Designation	Description
1	Terminal	Setup operation via remote control
2	REMOTE port	Connection of a PC using a serial RS-232 interface or connection of the MCR-7 or MCR-9 remote control
3	POS+	Positive terminal
4	NEG-	Negative terminal
5	Earth terminal	Earthing on the vehicle bodywork

**MSI912**

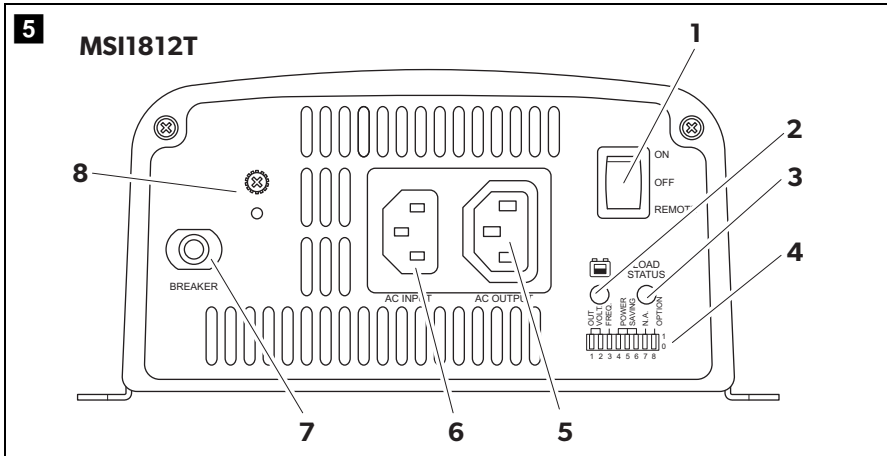
The inverter has the following connections, displays and control elements on the front:



No.	Designation	Description
1	Main switch "ON/OFF/REMOTE" switch:	Switches the device on, off or to operation via the remote control (accessory)
2	"Input Level" LED	Displays the input voltage range
3	"Load Level" LED	Displays the power being supplied
4	Dip switch	Makes settings on the inverter (such as mains voltage, mains frequency, energy-saving mode).
5	Safety socket	230 V output

### MSI1812T

The inverter has the following connections, displays and control elements on the front:



No.	Designation	Description
1	Main switch "ON/OFF/REMOTE"	Switches the device on, off or to operation via the remote control (accessory)
2	"Input Level" LED	Displays the input voltage range
3	"Load Level" LED	Displays the power being supplied
4	Dip switch	Makes settings on the inverter (such as mains voltage, mains frequency, energy-saving mode).
5	AC output	230 V output
6	AC input	230 V input
7	Fuse	Protects the inverter from overload. The fuse can be pressed in again once it has triggered.
8	Grounding screw	Sets or removes the grounding bridge

## 8 Fitting the inverter

### 8.1 Tools required

For the **electrical connection** you will need the following tools:

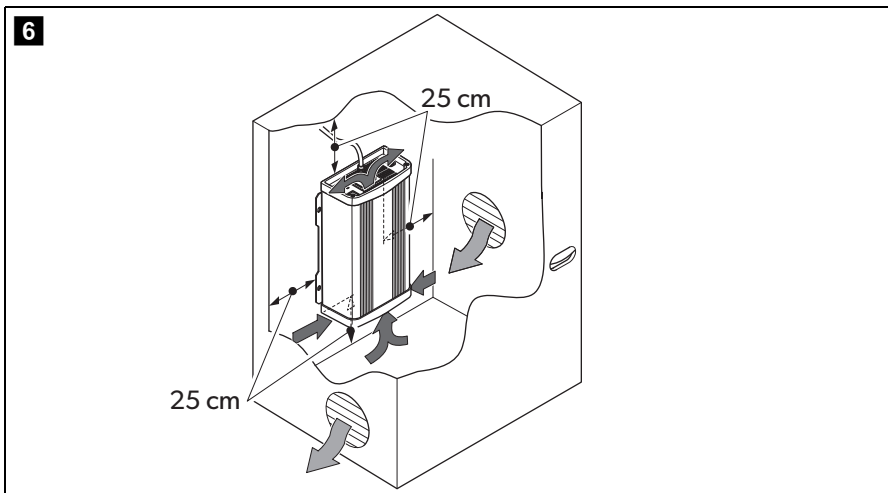
- Crimping tool
- 3 multi-coloured, flexible connection cables. Determine the necessary thickness from the table in chapter "Connecting the inverter" on page 15.
- Cable lugs and conductor sleeves

For fastening you will require the following tools:

- Machine bolts (M4) with washers and self-locking nuts or
- self-tapping screws or wood screws.

### 8.2 Mounting instructions

When selecting the installation location, observe the following instructions:



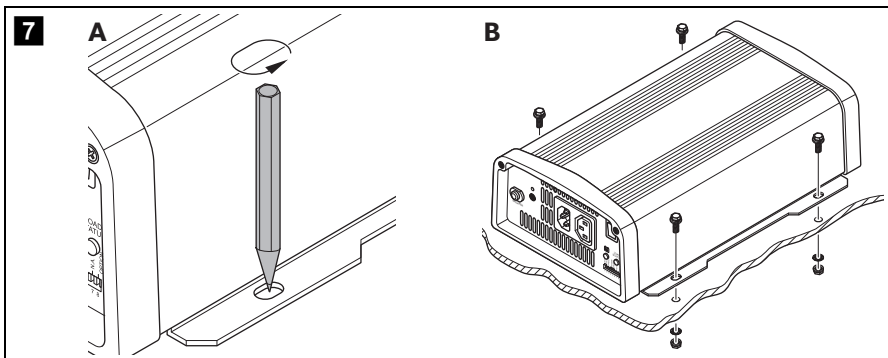
- The inverter can be mounted horizontally or vertically.
- The inverter must be installed in a place that is protected from moisture.
- The inverter may not be installed in the presence of flammable materials.
- The inverter may not be installed in a dusty environment.

- The place of installation must be well ventilated. A ventilation system must be available for installations in small, enclosed spaces. The minimum clearance around the inverter must be at least 25 cm (fig. **6**, page 13).
- The air intake on the underside or the air outlet on the back of the inverter must remain clear.
- For ambient temperatures higher than 40 °C (such as in engine or heating compartments, or direct sunlight), the heat from the inverter under load can lead to automatic shutdown.
- The device must be installed on a level and sufficiently sturdy surface.

**NOTICE!**

Before drilling any holes, make sure that no electrical cables or other parts of the vehicle can be damaged by drilling, sawing and filing.

### 8.3 Mounting the inverter



- ▶ Hold the inverter against the installation location and mark the fastening points (fig. **7** A).
- ▶ Attach the inverter using your chosen fastening method (fig. **7** B).

## 9 Connecting the inverter

### 9.1 General instructions



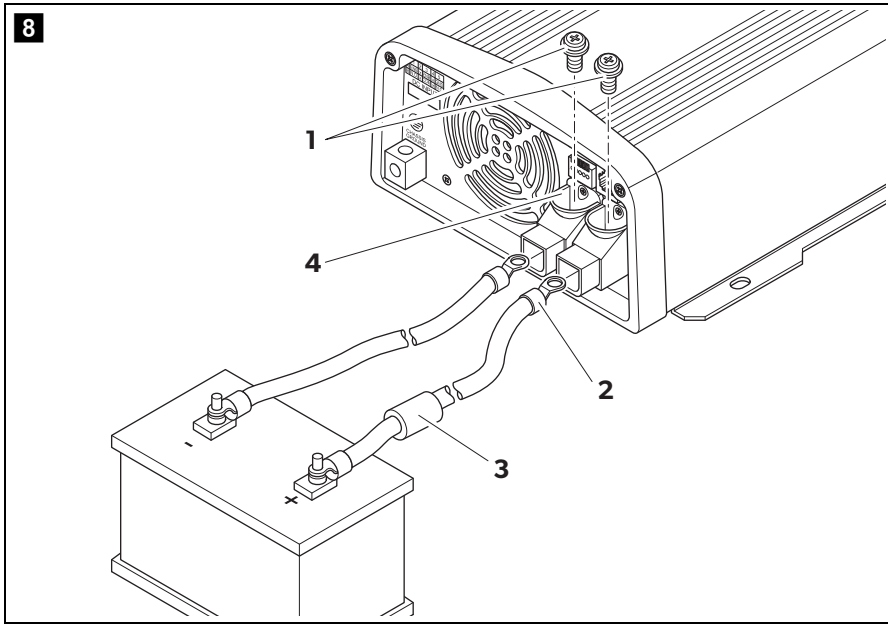
#### WARNING!

- The inverter may only be connected by a qualified workshop. The following information is intended for technicians who are familiar with the guidelines and safety precautions to be applied.
- **Never** use the inverter on vehicles where the positive terminal of the battery is connected to the chassis.
- If you do not fit a fuse to the **positive cable**, the cables can overload, which might result in a fire.
- Reversed polarity can damage the inverter.
- **MSI912 only**: The inverter should not be used to connect to a ring main, it must only be used to power individual appliances that are plugged into the inverter outlet either directly or using a purpose-made, moulded extension lead

- When installed in vehicles or boats, the inverter must be connected to the chassis or earth.
- When setting up a socket distribution circuit (mains setup), comply with the applicable regulations.
- Only use copper cables.
- Keep the cables as short as possible (< 1.8 m).
- Keep to the specified cable cross section and fit a cable fuse (fig. **8** 3, page 16) as close to the battery as possible on the positive cable (see the table).

Device	Required cable cross section	Cable fuse (fig. <b>8</b> 3, page 16)
MSI912	25 mm <sup>2</sup>	115 A
MSI1812T	35 mm <sup>2</sup>	228 A

## 9.2 Connecting the inverter to the battery



### NOTE

Tighten the nuts and bolts to a maximum torque of 12 – 13 Nm. Loose connections may cause overheating.

- ▶ Set the main switch (fig. **4** 1, page 11 and fig. **5** 1, page 12) to “OFF”.
- ▶ Loosen the screw (fig. **8** 1) from the red positive terminal (fig. **8** 2).
- ▶ Push the cable lug (fig. **8** 2) of the positive cable into the red positive terminal and fasten it with the screw.
- ▶ Connect the negative cable to the black negative terminal (fig. **8** 4).
- ▶ Lay the positive cable from the inverter to the positive terminal of the vehicle battery and connect it.
- ▶ Lay the negative cable from the inverter to the negative terminal of the vehicle battery and connect it.
- ▶ Connect the earth terminal to the vehicle chassis.



### 9.3 Connecting the 230 V power cable (MSI1812T only)

- ▶ Connect the 230 V~ connection cable with safety plug to the 230 V~ input jack (fig. **5** 6, page 12).
- ▶ Connect the safety plug to the 230 V AC mains.

### 9.4 Connecting the 230 V output cable (MSI1812T only)

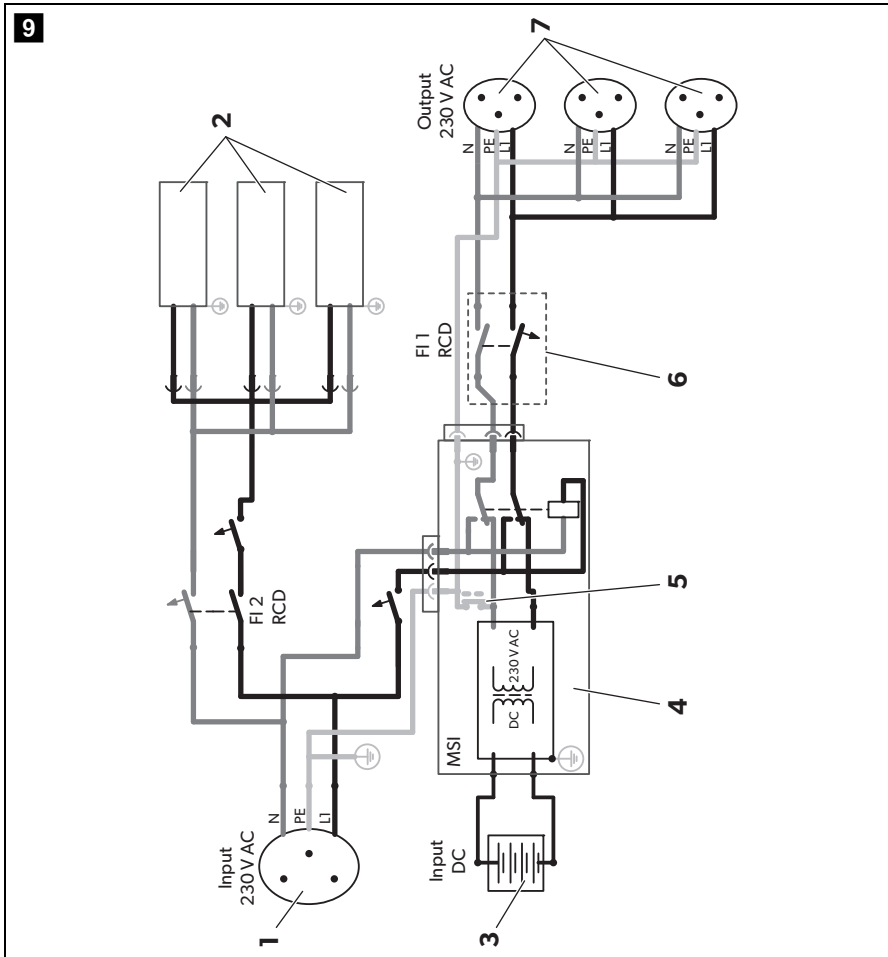
**WARNING!**

Before connecting the 230V output cable, make sure the inverter is switched off at the main switch.

- ▶ Connect the 230 V~ connection cable with safety plug to the 230 V~ output jack (fig. **5** 5, page 12).

## 9.5 Connect multiple appliances (MSI1812T only)

The device is equipped at delivery with galvanic isolation. For the safe operation of multiple appliances, it is essential that a circuit breaker (residual current circuit breaker) is built into the socket distribution circuit, see sample circuit diagram in fig. 9.



No. in fig. 9, page 18	Explanation
1	230 V~ power source
2	Additional devices, e.g. battery charger, refrigerator
3	DC power source (battery)
4	Inverter
5	Set grounding bridge (At delivery: not set, shown by dotted line)
6	Circuit breaker (residual current circuit breaker)
7	Socket distribution circuit for appliances



### **WARNING! Danger of electrocution!**

If you wish to connect more than one appliance to the inverter and install a socket distribution circuit, you must arrange a circuit breaker (residual current circuit breaker) and set a grounding bridge in the inverter.

- Install a residual current circuit breaker in the socket distribution circuit.

## **9.6 Setting the earthing bridge (fig. 5 8, page 12) (MSI1812T only)**

- Remove the earthing screw from the top hole.
- Screw the screw into the bottom hole.

## **9.7 Connecting the MCR-7 or MCR-9 remote control (accessory)**

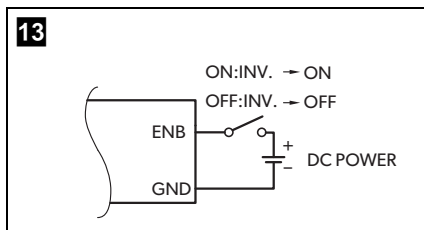
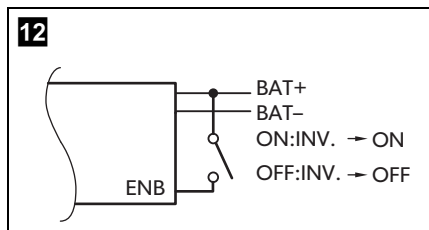
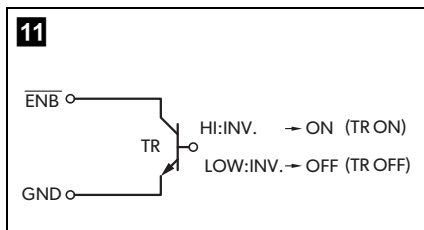
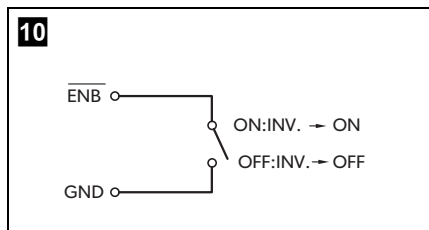


### **NOTICE!**

- Only plug in the connection to the remote control in the remote port. The device can be damaged by connecting it incorrectly.
- Ensure that the remote control and inverter are supplied with the same input voltage.
- Follow the instruction manual of the remote control.

- Connect the remote control (accessory) to the remote port (fig. 3 2, page 10).

## 9.8 Connecting the external switch for turning on and off



### NOTE

Use cables with a cable cross section of 0.25 – 0.75 mm<sup>2</sup>.

You can use the following as an external switch:

- external switch, voltage supply from the inverter: fig. **10**
  - Control unit with relay or transistor circuit (TR): fig. **11**
  - external switch with voltage supply from the battery (BAT) of the vehicle: fig. **12**
  - external switch with its own voltage supply (DC POWER) e.g. from the ignition: fig. **13**
- Set the main switch (fig. **4** 1, page 12 and fig. **5** 1, page 12) to “OFF” and make sure that the connection for the remote control (fig. **3** 2, page 10) is not assigned.
- Set the main switch (fig. **4** 1, page 12 and fig. **5** 1, page 12) to “REMOTE”.
- Connect the external on/off switch with the connection cable to the terminal (fig. **3** 1, page 10).

## 9.9 Pin assignment



### NOTE

Keep the cable lengths as short as possible (< 10 m), so there is no loss in the signal transmission.

The pins of the RS-232 ports are assigned as follows:

Inverter		Computer	
Pin	Description	Description	Pin
1	Not assigned	Not assigned	1
2	GND	RXD	2
3	RXD	TXD	3
4	TXD	DTR	4
5	Not assigned	GND	5
6	Not assigned	DSR	6
		RTS	7
		CTS	8
		Not assigned	9

The pins of the RJ11 remote control connection are assigned as follows:

Inverter	
Pin	Description
1	–
2	GND
3	RS-232 RXD
4	RS-232 TXD
5	RMT remote control
6	Not assigned

## 10 Using the inverter

### 10.1 Switching on the inverter

- Set the main switch (fig. **4** 1, page 11 and fig. **5** 1, page 12) of the inverter to the "ON" position.  
Set the On/Off switch to "OFF" to switch off.
- The inverter performs a self-test.  
During the self-test, the built-in speaker emits tones and the LEDs flash.
- ✓ After the self-test is completed successfully, the "Input Level" (fig. **4** 2, page 11 and fig. **5** 2, page 12) and "Load Status" (fig. **4** 3, page 11 and fig. **5** 3, page 12) LEDs light up green.

Observe the following when using the device (see also chapter "Troubleshooting" on page 26)

The inverter switches off if:

- the battery voltage drops below 10.5 V (12 V $\Rightarrow$  connection),
  - the battery voltage exceeds 16 V (12 V $\Rightarrow$  connection),
  - the inverter overheats.
- If this happens, shut down the inverter with the main switch (fig. **4** 1, page 11 and fig. **5** 1, page 12).
  - Check that the inverter is sufficiently ventilated and that the ventilation grilles are unimpeded.
  - Wait 5 – 10 minutes and switch the inverter on again without any electric consumers.

When operating the inverter at high load for lengthy periods, it is advisable to start the engine in order to recharge the vehicle battery.

## 10.2 Status indications

### “Input Level” LED (fig. 4 2, page 11 and fig. 5 2, page 12)

The “Input Level” LED shows the present range of the input voltage.

Display	Input voltage	
	MSI912, MSI1812T	
Red, slow flash	<10.6 V	
Red	10.6 – 11.0 V	
Orange	11.0 – 12.0 V	
Green	12.0 – 14.2 V	
Orange, flash	14.2 – 15.0 V	
Red, quick flash	>15.0	

### “Load Level” (fig. 4 3, page 11 and fig. 5 3, page 12)

The “Load Level” LED shows the power being supplied by the inverter.

Display	Input voltage	
	MSI912	MSI1812T
Off	0 – 80 W	0 – 160 W
Green	80 – 320 W	160 – 640 W
Orange	320 – 720 W	640 – 1440 W
Red, slow flash	720 – 800 W	1440 – 1600 W
Red, quick flash	>800 W	>1600 W

## 10.3 Configuring the inverter



### NOTE

Settings can only be made using the dip switch if the S8 dip switch is "On".

You can adjust the device using the dip switch (fig. 4 4, page 11 and fig. 5 4, page 12).

### Setting the mains voltage

You can set the mains voltage using the S1 and S2 dip switches.

Mains voltage	Dip switch	
	S1	S2
200 V	Off	Off
220 V	On	Off
230 V	Off	On
240 V	On	On

### Setting the mains frequency



### WARNING! Danger of electrocution

Only adjust the S3 DIP switch when the respective frequency for the output voltage should be used.

You can set the mains frequency using the S3 dip switch.

Net frequency	Dip switch
	S3
50 Hz	Off
60 Hz	On



## Switching to energy-saving mode

You can set the energy-saving mode using the S4, S5 and S6 dip switches. In this way, the battery you connect to the inverter is not discharged as quickly.

The inverter operates in energy-saving mode as long as the required power is below the set level. If the required power exceeds the set level, the inverter works in normal mode.

The values to be set on your inverter can be found in the following table:

Energy-saving mode		Dip switch		
MSI912	MSI1812T	S4	S5	S6
Off	Off	Off	Off	Off
–	110 – 190 W	On	Off	Off
70 – 110 W	190 – 240 W	On	On	Off
180 – 240 W	240 – 300 W	On	On	On

## Defining settings

Using the S8 dip switch you can define whether the default settings or the settings of dip switches S1 – S7 are used.

Parameter	Dip switch S8
Default settings	On
Use dip switch S1 – S7	Off

## Default settings

Mains voltage	Net frequency	Energy-saving mode
230 V	50 Hz	Off

## 11 Cleaning and caring for the inverter

**NOTICE!**

Do not use sharp or hard objects or cleaning agents for cleaning as these may damage the product.

- Occasionally clean the product with a damp cloth.

## 12 Troubleshooting

**WARNING!**

Do not open the device. You risk sustaining an electric shock by doing this.

**NOTE**

If you have detailed questions on the **specifications of the inverter** please contact the manufacturer (addresses on the back of the instruction manual).

The “Load Status” LED (fig. **4** 3, page 11 and fig. **5** 3, page 12) lights up red to indicate the fault:

<b>LED display</b>	<b>Cause</b>	<b>Remedy</b>
Quick flash	Input voltage is too high	Check the input voltage and reduce it.
Slow flash	Input voltage too low	The battery needs recharging. Check the cables and connections.
Occasional flash	Overheating	Switch off the inverter and the consumer. Wait 5 to 10 minutes and switch the inverter on again without any electric consumers. Reduce the load and make sure the inverter has better ventilation. Then switch the consumer back on.
Constantly lit	Short circuit or reversed polarity Excessive load	Switch off the inverter and remove the consumer. Then switch the inverter back on without the consumer. If no excessive load is now shown, then there is a short circuit in the consumer or the total load was higher than the power specified on the data sheet. MSI1812T: The fuse in the device must be pressed in again by hand after it is triggered. Check the cables and connections.

## 13 Warranty

The statutory warranty period applies. If the product is defective, please contact the manufacturer's branch in your country (see the back of the instruction manual for the addresses) or your retailer.

For repair and guarantee processing, please include the following documents when you send in the device:

- A copy of the receipt with purchasing date
- A reason for the claim or description of the fault

## 14 Disposal

- Place the packaging material in the appropriate recycling waste bins wherever possible.



If you wish to finally dispose of the product, ask your local recycling centre or specialist dealer for details about how to do this in accordance with the applicable disposal regulations.

## 15 Technical data

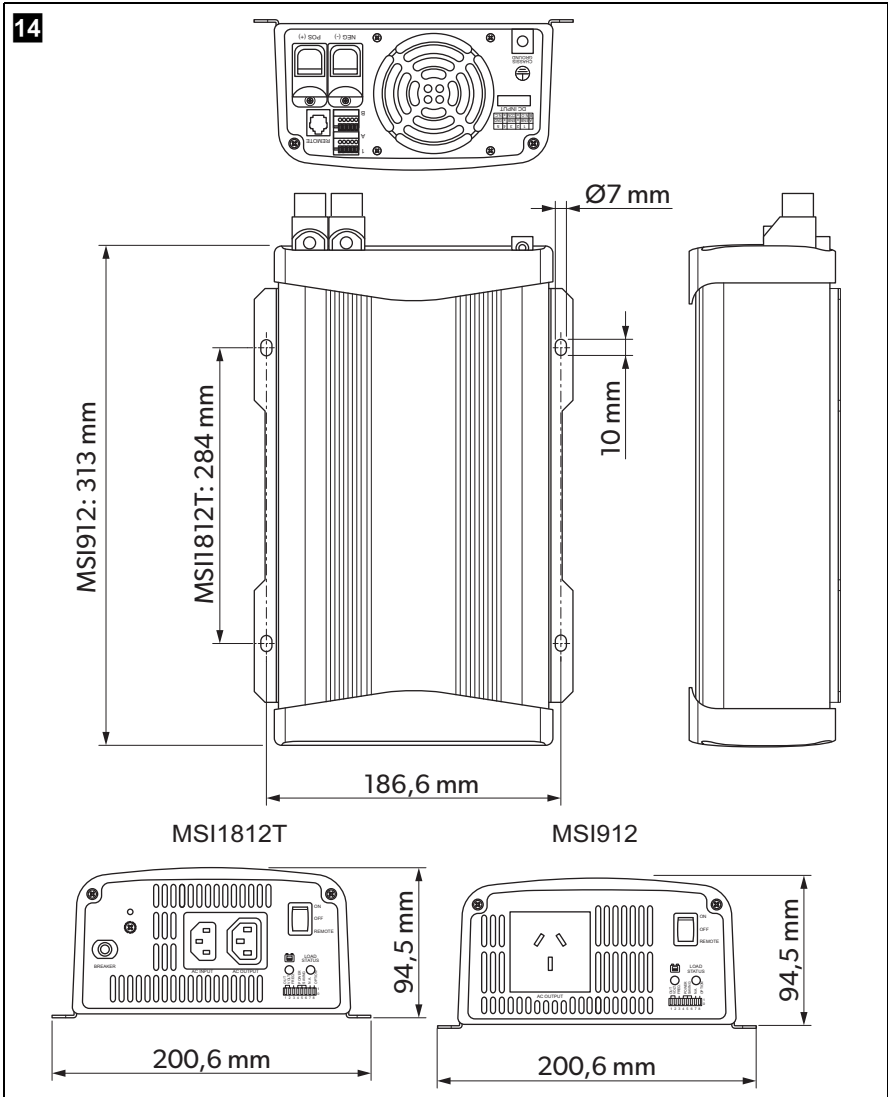


### NOTE

In the event of thermal overloading, the inverter reacts by reducing the power for temperatures of 40 °C and above.  
If the temperature exceeds 60 °C, the inverter switches off.

	<b>MSI912</b>	<b>MSI1812T</b>
Rated input voltage:	12 V $\overline{\text{---}}$	
Output power at 25 °C for 10 min:	900 W	1800 W
Continuous output power at 25 C:	800 W	1600 W
Peak output power:	1600 W	3200 W
Output voltage:	200 – 240 V $\sim$ pure sine wave (THD < 3 %)	
Output frequency:	50 or 60 Hz	
Idle current consumption:	1.8 A	2.1 A
Standby current consumption:	0.5 A	
Input voltage range:	10.5 V – 16 V	
Efficiency up to:	89 %	90 %
Bypass relay:	–	25 A/277 V $\sim$
Ambient temperature for operation:	–20 °C to 40 °C 40 °C to 60 °C (reduced power)	
Ambient temperature for storage:	–30 °C to +70 °C	
Priority circuit:	–	230 V input protection: 10 A Switchover time of bypass relay: < 30 m sec
Dimensions W x D x H:	197.5 x 94.3 x 291 mm, see fig. 14, page 30	197.5 x 94.3 x 406 mm see fig. 14, page 30
Weight:	4 kg	6 kg

### Dimensions



### Overvoltage shutdown

Device	Overvoltage	
	Shutdown	Restart
MSI912, MSI1812T	16 V	14.5 V

### Undervoltage shutdown

Device	Undervoltage warning	Undervoltage	
		Shutdown	Restart
MSI912, MSI1812T	11 V	10.5 V	12.5 V

### Excess temperature shutdown

Internal temperature		Temperature on cooling element	
Shutdown	Restart	Shutdown	Restart
60 °C	40 °C	95 °C	<80 °C

### Approvals

The device complies with Australian standard (AS/NZS 4763:2011) and IEC 60068.2.6:2007.

The device has E13 certification.



In compliance with the EMC directive 2004/108/EC including 2009/19/EC and the Low-voltage Directive 2006/95/EC

- EN55012: Class B
- EN55014: Class B
- EN61000-6-1/6-3: Class B
- EN61000-6-2/6-4: Class A
- EN61204-3

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A complete list of Dometic companies, which comprise the Dometic Group, can be found in the public filings of:  
**DOMETIC GROUP AB** Hemvärnsgatan 15 SE-17154 Solna Sweden