fothermo

1,000 Watt Solar Heating Element

ROD-1000

Operating instructions

Manual via QR code. Manuel via QR code. Manuale tramite QR. Manual a través de QR. Handleiding via QR code.

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IMPORTANT!
Please read these operating instructions before installation and commissioning!

Note on the operating instructions:
The original version of this instruction manual is written in German. In case of questions, ambiguities or difficulties in understanding, it is recommended to consult the original German version of the operating instructions. Alternatively, you can contact the manufacturer directly for further assistance.

Datasheet

Specifications

Product	1,000 W fothermo solar heating element
Product Model	ROD-1000
Stepless heating capacity	0 W - 1,000 W
Max. Voltage	50 V (max. open-circuit voltage)
Recommended photovoltaic module voltage	38 V - 43 V (MPP voltage of the photovoltaic modules)
Max. input current	23 A, automatic current limit (DC)
Max. connected photovoltaic power	3,000 watts
Recommended connected photovoltaic power	1,500 W to 2,500 W
DC Inputs	1, MC4 compatible connector pair
Number of MPP trackers	1
Water temperature range	5 °C to 65 °C (max. 85 °C in lime-free water)

Surplus output

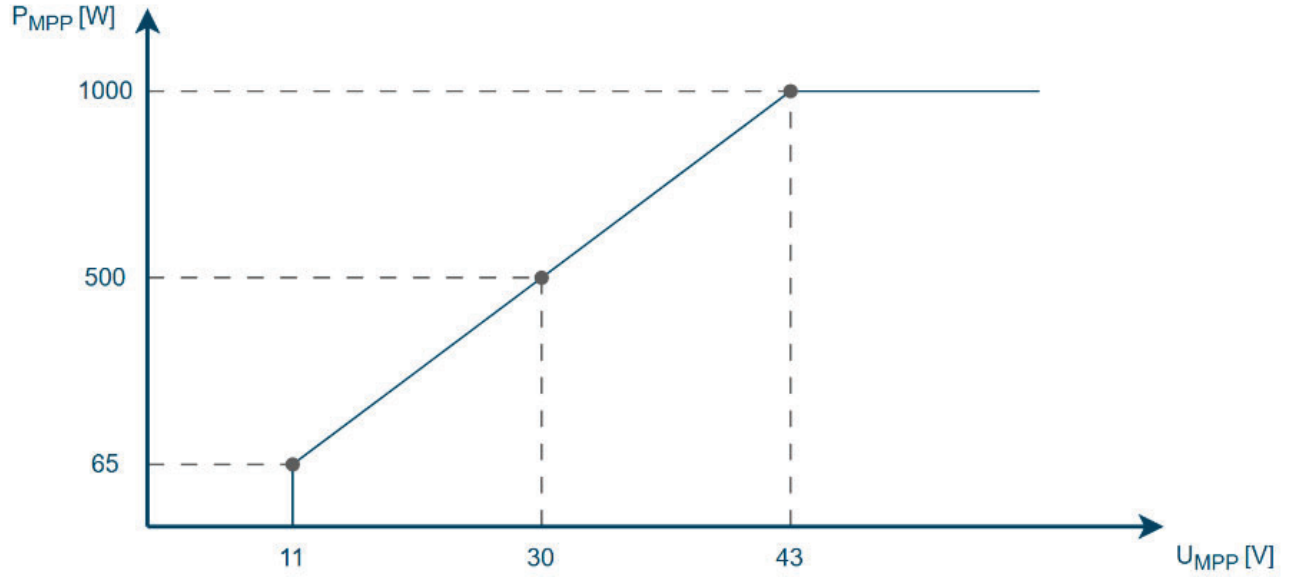
Max. Output Power	1,000 W
Max. Output Current	23 A, automatic shutdown of the output if exceeded
Output voltage range	0 - 50 V photovoltaic module voltage
DC Outputs	1, MC4 compatible connector pair

General data

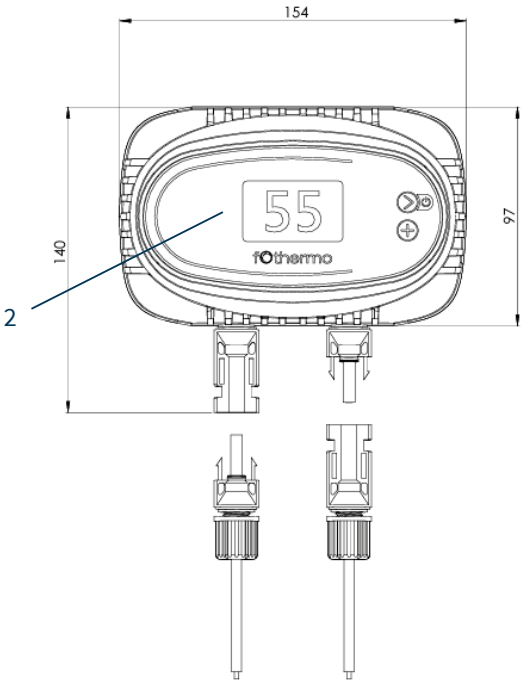
Dimensions (L x H x W)	468 mm x 140 mm x 154 mm
Heating rod length / immersion depth	315 mm / 295 mm
Unheated heating rod length	50 mm
Temperature range	-10 °C to 35 °C
Storage	-10 °C to 35 °C
Installation position	Horizontal
Warranty	2 years
Protection	IP 20
Weight	0.9 kg
Screw-in diameter	G 1 1/2 inch

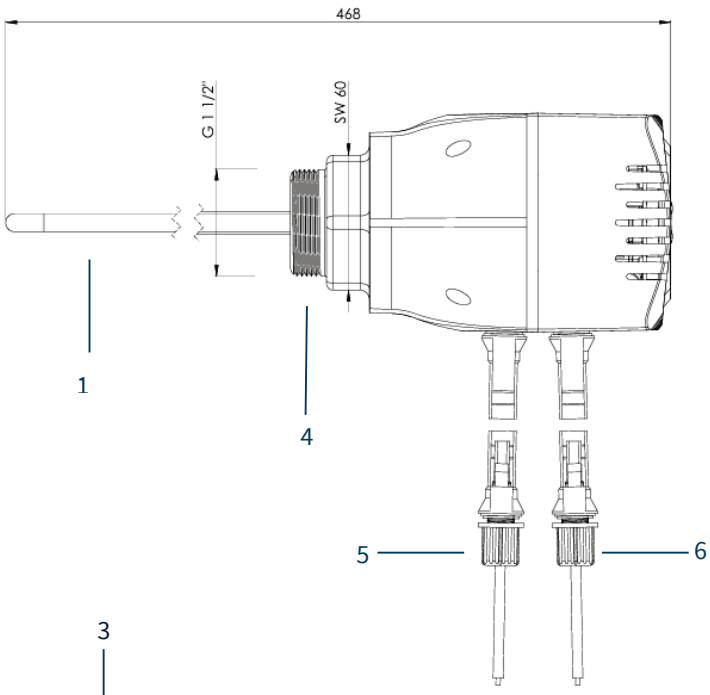
Heating capacity depending on the photovoltaic module voltage

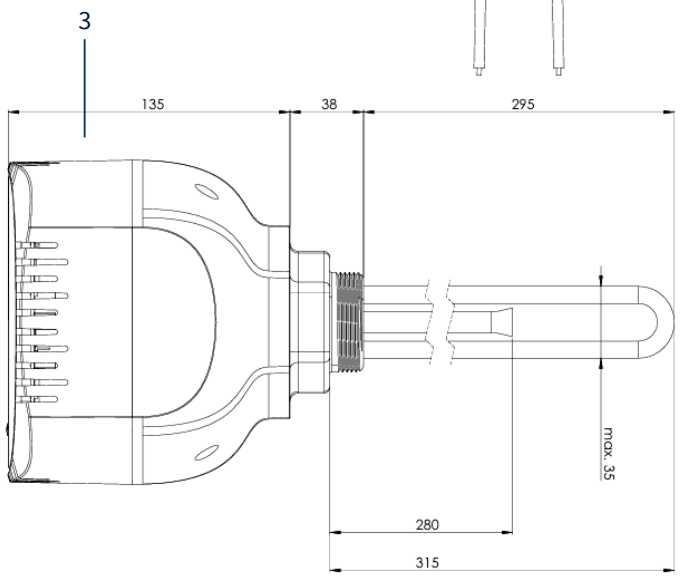
The maximum heating capacity of the solar heating element depends on the voltage of the photovoltaic modules. At low module voltages, only a reduced maximum heating capacity is available. As the module voltage increases, the maximum heating capacity increases.
For optimal results, it is recommended to use photovoltaic modules with an MPP voltage of 38 – 43 volts specified in the data sheet.



Technical Drawing







NUMBER	COMPONENT
1	Heating element
2	Electronics & Display
3	Case
4	Screw-in thread G11/2 inch
5	Input – Input Photovoltaic Modules
6	Output – Output Surplus Utilization

Further information

Dear customers, thank you very much for choosing a device from fothermo System AG!

Please read this operating manual carefully before installing and commissioning the solar heating element!

General warnings

The information provided here is intended to familiarize you with the heating element, the rules for its proper and safe use, the minimum requirements for its maintenance and servicing. In addition, you are obliged to make this manual available to the competent persons who will install and possibly repair the device. The installation of the heating element and the testing of its functionality are not covered by the warranty obligation of the dealer and/or the manufacturer. These instructions should always be kept near the device for future reference. Compliance with the rules described here is one of the measures for the safe use of the product and is considered part of the warranty conditions.

Safety

WARNING! When using the device, there is a risk of burns or scalding!

WARNING! This device may only be used by persons (including children aged 3 years and older) with reduced physical or mental abilities if such persons are under the supervision of or have been instructed by such person in the use of the device. Children must be supervised so that they do not play with the device under any circumstances. It is forbidden for children to clean the device or operate it independently. Children aged 3 to 8 years are only allowed to operate the tap connected to the water heater.

WARNING! Calcareous water (service and drinking water) may be heated up to a maximum temperature of 65 degrees in order to eliminate the risk of scalding and to maximize the operating time of the product due to possible calcification of the heating element.

IMPORTANT! Only competent persons may install the solar heating element in accordance with the specifications in this manual and the relevant local regulations. Necessary protective devices and other assemblies must be installed!

IMPORTANT! Before connecting the photovoltaic modules to the heating element, the tank must be filled with water! In addition, professional grounding of the tank is mandatory. Failure to comply with the requirements for electrical connection will compromise the safety of the device, so the heating element must not be used.

Other things to note

This device contains a support battery, which is not replaceable. This is necessary for the display to function at night. A defect in the battery does not limit the basic functionality of the heating element.

The water used for heating must comply with the requirements in the normative documents for domestic water, in particular:

Chloride content up to 250 mg/l; electrical conductivity more than 100 µS/cm, pH value 6.5 - 8 for hot water tanks with enamelled water tank.

Description

The fothermo solar heating element is a 1,000 watt direct current heating element for water heating. An integrated surplus function allows surplus electricity to be forwarded to a second solar heating element or fed into one's own electrical home grid with the help of a micro PV inverter. This can reduce hot water and electricity costs. The solar heating element uses infinitely variable power control from 0 W to 1,000 W.

Scope of delivery

- 1x 1,000 Watt Solar Heating Rod (ROD-1000)
- 1x Instruction manual
- 2x solar plug pair

Installation

The device must be installed in a dry and frost-free place. The device may be operated up to an altitude of 2,000 meters above sea level. During installation, sufficient distance to adjacent walls and sufficient distance under the device must be provided for photovoltaic connections and surplus connections.

The installation is done via the following four steps:

Step 1:
Drain the water from your water tank so that the water level falls below the installation height of the heating element.

Step 2:
Screw the solar heating rod into the G 11/2 inch thread of your hot water tank. Use a suitable sealing material. Make sure that the thread grips correctly and does not tilt. Then use a wrench to carefully and evenly tighten the solar heating rod to ensure a secure connection.

IMPORTANT! Do not use the housing to tighten the heating rod with the wrench!

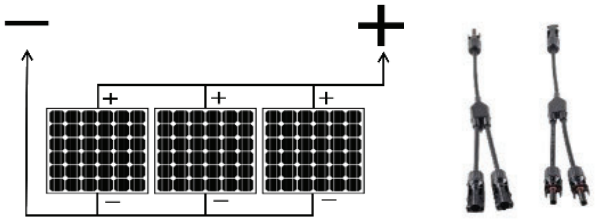
Step 4:
If the display is in an awkward position, gently pull the case toward the viewer (away from the memory). Then turn the heating rod to the desired alignment position. If the heating rod does not rotate any further, repeat the process and try to turn the heating rod in the opposite direction until the desired position is reached. Be careful not to use excessive force to avoid damage.

Connection of the photovoltaic modules:

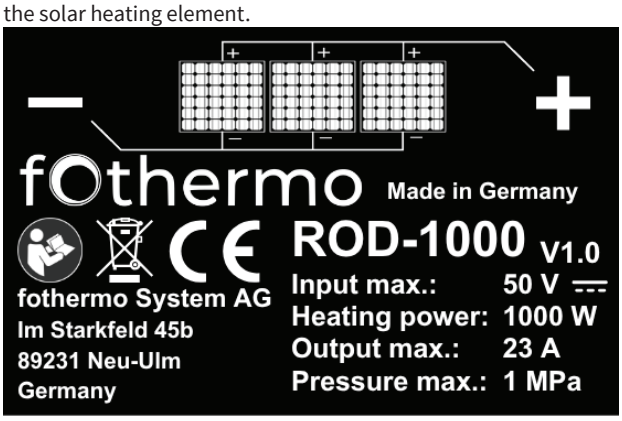
IMPORTANT! The solar heating element is operated with direct current. Only photovoltaic modules with an open-circuit voltage of no more than 50 V may be connected. The maximum power is 3,000 W. A faulty or unsuitable power source poses a high risk and can cause injury.

The photovoltaic modules are installed in parallel. Use suitable parallel connectors for this purpose (see figure). A series

connection of the photovoltaic modules leads to a defect in the device.



The photovoltaic modules are connected to the solar heating element to the solar input (see technical drawing: No. 5 Input – Input photovoltaic modules). The correct polarity of the photovoltaic modules to be connected can be found in the sticker on the solar heating element.



After the electrical connection has been made, it is essential to check the functionality of the device.

Solar cable for extension:

IMPORTANT! Only use the solar plugs or MC4 compatible solar plugs included in the scope of delivery for connecting solar cables to the solar heating element.

When extending the solar cables, the solar plugs must be properly fastened to ensure function and safety.

Cables with a cross-section of at least 6 mm² must be used. The maximum distance between the photovoltaic panels and the solar heating element is 25 meters.

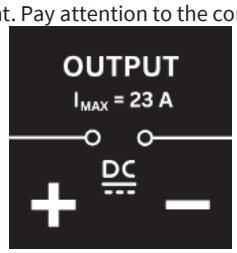
Always lay cables in such a way that no one can trip over them or get caught on them. There is a risk of injury. The cables must be fastened in such a way that no tensile load acts on the connectors on the solar heating element. Furthermore, it must be ruled out that the cables and connectors rub over surfaces and edges (e.g. in wind) or lie in water.

Surplus output

An innovative switching system enables the optional use of excess energy. The changeover takes place as soon as the freely selectable maximum temperature of the hot water in the storage tank has been reached. The surplus use can be used both for a cascade connection of several solar heating elements and for the surplus feed-in into one's own electrical home grid via a micro PV inverter or a battery.

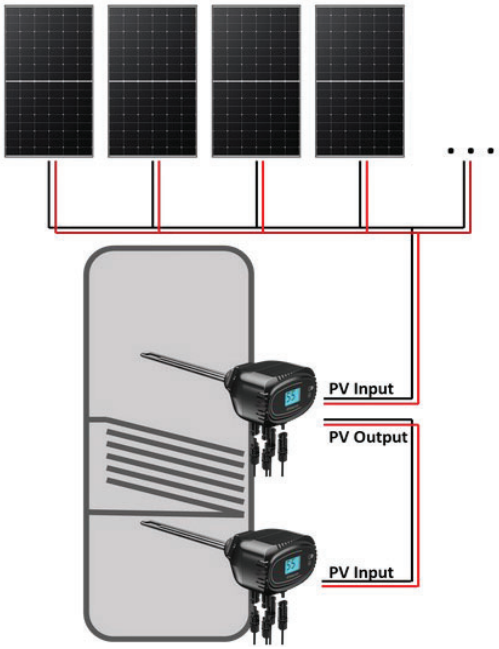
IMPORTANT! Make sure that the connected consumers (e.g. micro PV inverter, battery, etc.) are compatible with the photovoltaic modules connected to the solar heating element.

IMPORTANT! To connect another device to the solar heating element, use the included solar plugs or a solar cable with MC4 compatible solar plugs. The cable cross-section should be 6 mm². The connection is made to the marked OUTPUT of the solar heating element. Pay attention to the correct polarity.



IMPORTANT! Do not connect any energy source to the output of the solar heating element! A return current into the solar heating element must be excluded. Always make sure that the polarity of the connected solar devices is correct. Failure to do so can lead to a defect in the solar heating element.

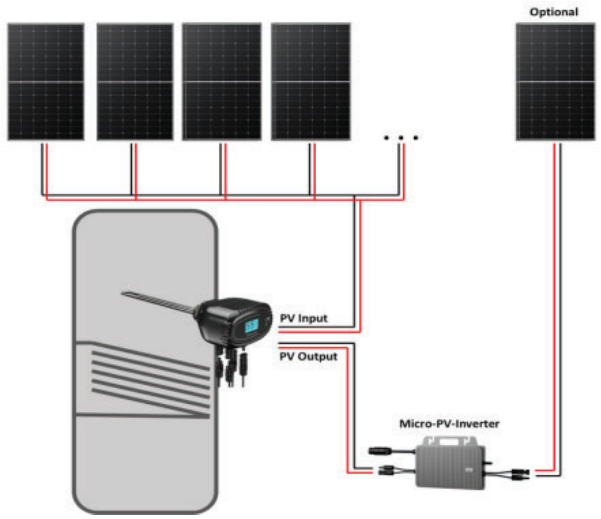
Option 1: Cascade



Two solar heating elements can be connected in series. This enables energy-efficient stratification of the hot water in the storage tank. As soon as the upper heating element has reached the maximum temperature, the switch to the second heating element takes place, which is located further down in the storage tank.

The two solar heating rods are connected with the help of a solar cable via the PV output of one heating element to the PV input of the other heating element.

Option 2: Grid feed-in



When the maximum temperature of the water in the hot water tank is reached, the switch can also be made to a micro PV inverter. This enables the efficient and bureaucracy-free surplus use of the generated solar power. In addition to hot water costs, electricity costs can also be reduced.

To connect an inverter, the use of a 400 W / 800 W micro PV inverter or a balcony power plant battery is provided. The output of the solar heating element is connected to the photovoltaic input of the connected device.

On the website of fothermo System AG you will find a list of approved products for connection to the surplus outlet of the solar heating element.
Link: https://fothermo.com/pages/whitelist-rod-1000

IMPORTANT! You can also connect other solar devices from other brands and manufacturers. However, pay attention to the compatibility of the connected solar device with the photovoltaic modules connected to the solar heating element. Connecting other devices is at your own risk. A defective and/or unsuitable product poses a high risk and can lead to a defect.

The connected device must meet the following characteristics:

- The device must be designed for operation with photovoltaic modules connected in parallel. Check whether the current limits and voltage limits are observed.
- If the current flow through the surplus output of the solar heating element exceeds 23 A, the surplus output is deactivated.

If a connected device does not meet the above characteristics, the warranty is void and the manufacturer assumes no liability for damage to the solar heating element, photovoltaic panels, connected device or any other damage caused.

Operation

Standby: To turn off the solar heating element, press and hold the ⏻ - button for about three seconds.

Menu navigation: Navigation through the menu is done with the ⊙ - button. By pressing the button again, you jump to the next page in the menu.

Display of the home screen: The first page of the menu shows the current water temperature.

Display of performance data:

VOLTAGE: Input voltage of photovoltaic modules

POWER IN: Input power of photovoltaic modules

POWER OUT: Output power that is delivered to the connected device via the surplus output.

HEATING ENERGY: Photovoltaic energy used during operating hours for water heating.

OUTPUT ENERGY: Total energy delivered to the output of the solar heating element.

Maximum temperature display: The maximum temperature set by the user to which the water is heated is displayed.

Press the ⊕ - button to set the maximum temperature. This can be adjusted between 5 °C and 85 °C.

HINT! Higher water temperatures lead to greater calcification of the heating rod and to a potentially shorter operating time. Furthermore, the risk of burns and scalding increases!

Restricted operating modes
The following table describes the meaning of the limited operating states shown on the display.

INFO	DESCRIPTION
CURENT LIMIT	The solar heating element limits the power of the photovoltaic modules to protect against overcurrent.
HEAT REDUCTION	The solar heating element heats with limited power to avoid overheating. It will return to normal operation once the system has cooled down.
ERROR OVERHEAT	The solar heating element has stopped heating due to overheating and risk of damage. It will return to normal operation once the solar heating element has cooled down.
ERROR ELEMENT	The heating element is disconnected or defective. The solar heating element is not in operation.
ERROR SENSOR	The temperature sensor is not connected or defective. The solar heating element is not in operation.
OVERLOAD PROTECT	The solar heating element detects a voltage that is too high. No heating operation possible to avoid overheating and damage to the solar heating element.
SHORT CIRCIUT	A short circuit was detected. The system switches off and remains in this state for safety. **To resolve the issue:** Connect the output with the correct polarity and disconnect the power supply of the photovoltaic modules to the system. Wait 5 minutes and reconnect the photovoltaic modules, making sure that the connectors are correctly polarized.

Noise:
It is possible that noise can be generated inside the solar heating element during the heating of water. This can be attributed

to the CURRENT LIMIT MODE and calcareous deposits on the heating element. Increased limescale formation can be observed from water temperatures of over 60°C. In regular operation, the heating element can "beep" or "whistle", this is due to the operating frequency of the system.

Maintenance and repair

IMPORTANT! Before maintenance and servicing, disconnect the heating element from all energy sources. The housing may only be opened by competent persons.

Repair instructions

All electronic repair measures may only be carried out by an electronic specialist. There is a risk of injury. Modifying the cables and electronics voids the warranties.

Cleaning:

The outer shell and the plastic parts of the heating rod can only be cleaned with a slightly damp cotton cloth, without aggressive and/or abrasive agents. It is forbidden to clean the device with a steamer.

Disturbances

If a fault occurs during the use of the heating element, please disconnect all live cables from the device, take the device out of operation and contactthe manufacturer or your dealer.

Environmental protection

This equipment is labelled in accordance with the Waste Electrical and Electronic Equipment (WEEE) Directive. By ensuring that the appliance is returned to a suitable disposal centre at the end of its life, you are helping to protect the environment and avoid negative impacts on the environment and human health. The symbol on the heating rod indicates that the appliance must not be disposed of in normal household waste at the end of its service life. It must be handed in at a disposalcentre with special facilities for electrical or electronic equipment.

The end user must comply with local disposal regulations when disposing of the goods.

For more information on the treatment, recoveryand recycling process, please contact your municipality, your local disposalcentre or the specialist retailer from whom you purchased the product.

Warranties

The warranty for the device is only valid under the following conditions:

The device is installed according to the assembly and use instructions.

The device is only used for its intended purpose and in accordance with the assembly and use instructions. The warranty includes the correction of all manufacturing defects that may occur during the warranty period. Only the professionals authorized by the seller are allowed to carry out the repairs. The warranty does not cover damages:

- improper transport
- improper storage
- improper use
- unsuitablewater parameters
- improper electrical voltage that deviates from the rated voltage
- the freezing of the water
- extraordinary risks, accidents or other force majeure
- Failure to follow the assembly and use instructions
- in all cases when an unauthorized persontries to repair the device.

In the aforementioned cases, the damage will be repaired against payment. The warranty of the device does not apply to parts and components of the device that are worn out during its normal use, nor to parts that are degraded during normal use, to lights and signal lamps, etc., to discoloration of external surfaces, to changes in the shape, dimensions and arrangement of parts and components that have been subjected to an effect that does not correspond to the normal conditions of use of the device. Lost benefits, material and immaterial damage resulting from the temporary impossibilityof using the equipment during its repair and maintenance are not covered by the warranty of the device.

COMPLIANCE WITH THE REQUIREMENTS SPECIFIEDIN THE MANUAL IS A PREREQUISITE FOR THE SAFE OPERATION OF THE PURCHASED PRODUCT AND IS ONE OF THE WARRANTYCONDITIONS. ANYMODIFICATIONS OR MODIFICATIONS MADE TO THE STRUCTURE OF THE PRODUCT BY THE USER OR BY PERSONS AUTHORIZED BY HIM ARE STRICTLY PROHIBITED. IF SUCH ACTS OR ATTEMPTS ARE DETECTED, THEN THE WARRANTYOBLIGATIONS OF THE MANUFACTURER OR THE DEALER ARE INVALID. THE MANUFACTURER RESERVES THE RIGHT TO MAKE STRUCTURAL CHANGES WITHOUT NOTICE, PROVIDED THAT THE SAFETY OF THE PRODUCT IS NOT COMPROMISED. IF NECESSARY, OR IF THERE IS ANY MISUNDERSTANDING IN CONNECTION WITH THE TRANSLATION AND THE TERMS USED IN THIS LANGUAGEVERSION OF THE ASSEMBLY AND USE MANUAL, PLEASE USE THE GERMAN VERSION AS THE ORIGINAL AND AS THE PRIMARY VERSION.

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