

fothermo



PHOTOVOLTAIC SURPLUS MANAGEMENT SYSTEM

SWITCHING DEVICE

**TECHNICAL DESCRIPTION INSTALLATION, OPERATION AND MAINTENANCE
INSTRUCTIONS WARRANTY
CONDITIONS**

Table of contents

Specifications	3
GENERAL WARNINGS	4
SAFETY	4
SPECIFICATIONS	4
APPLICATION	4
PREPARATION	5
INSTALLATION	5
OPERATION	6
MAINTENANCE AND SERVICING	7
DISTURBANCES	7
ENVIRONMENTAL PROTECTION	7
WARRANTY	7

Contact:

fothermo System AG
 Im Starkfeld 45b
 89231 Neu-Ulm
 Germany

Phone: +49 (0) 7346 9649960
 Email: contact@fothermo.com
 Ulm Registry Court: HRB 739609
 VAT: DE329022123

IMPORTANT!

Please read this instruction manual before installation and commissioning!

EN - Specifications	Unit	
Switching device		
IP protection class	-	20
Built-in reverse polarity protection	-	Yes
Digital display	-	Yes
Dimensions (length, width, height)	Cm	17.9 x 7.6 x 4.1
Weight	g	400

Photovoltaic connection

Number of photovoltaic modules that can be connected	-	1-4
Recommended photovoltaic output per photovoltaic module	Wp	300-450
Maximum photovoltaic output per photovoltaic module	Wp	450
Max. open-circuit voltage of a photovoltaic module	VOC	50

Important: The connected photovoltaic modules must match the electrical properties (max. current, max. voltage) of the connected consumers. The switchover device switches individual (whole) photovoltaic modules. There is no regulation of power or voltage in the Switching device. If the connected load is not compatible with the photovoltaic modules, the electrical consumers can be destroyed.

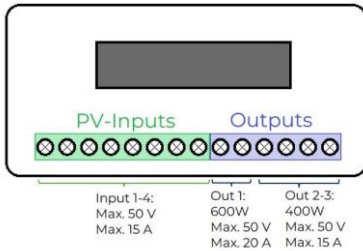
Connectable Electrical Loads

Number of outputs for fothermo photovoltaic boiler	-	1
Max. Power - Output 1	W	600
Number of outputs for Micro PV inverters	-	2
Maximum power of the connected Micro PV inverter	W	800
Maximum Power – Output 2 – and – Output 3 –	W	400

Important: The connected photovoltaic modules must match the electrical properties (max. current, max. voltage) of the connected consumers. The switchover device switches individual (whole) photovoltaic modules. There is no regulation of power or voltage in the Switching device. If the connected load is not compatible with the photovoltaic modules, the electrical consumers can be destroyed.

GENERAL WARNINGS

Carefully read the instructions and warnings in this manual before installing and commissioning the switchgear. The information provided here is intended to familiarize you with the installation and operation of the device. In addition, you are obliged to make this manual available to the competent persons who will install and possibly repair the device. This guide should always be kept close to 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! This device can be used by children aged 8 years and over, as well as by persons with reduced physical, sensory or mental abilities or lack of experience and knowledge, if they have been supervised or instructed in the safe use of the appliance and understand the resulting hazards. Children are not allowed to play with the device. Cleaning and Maintenance must not be used by children carried out without supervision.

OTHER THINGS TO NOTE

- Observe the maximum permissible voltage of the photovoltaic modules and the electrical loads to be connected.
- The connected loads must be compatible with the connected photovoltaic panels.
- The device must be installed in a dry place.
- Accordingly, only a single module may be connected per input, with the limits specified in the specifications.
- The inputs of the system must not be connected to photovoltaic modules in parallel or in series.
- The fastening base must be fireproof.
- The use of a PV fuse plug is recommended

SPECIFICATIONS

The switchover distributes the power of several photovoltaic modules to different electrical consumers. The product is primarily used as an energy management system. The energy generated by the photovoltaic panels can be distributed efficiently and with different priorities to the connected loads by the switching device.

Up to four photovoltaic modules can be connected to the switching device. The photovoltaic inputs - PV1 to PV4 - are used for this purpose. The energy generated by the photovoltaic modules is distributed to up to three electrical consumers. These are connected to the load outputs - output 1 to output 3. (See graphic)

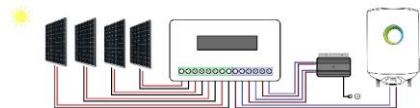
Prioritization:

The switching device prioritizes the connected loads differently. The output - output 1 - has first priority. This is followed by - Output 2 - and then - Output 3 -. Loads connected to - Output 1 - are prioritized with energy. If the photovoltaic modules generate more power than the consumer connected under - output 1 - can use, individual / entire photovoltaic modules are switched to the second load output - output 2. If there is also surplus energy available, the output 3 output is also supplied with energy. If a consumer does not (or no longer) consume power (e.g. fothermo photovoltaic boiler has reached its maximum temperature), the available power (photovoltaic modules) is switched over to the other connected consumers with lower priority if possible. If more power is available from the photovoltaic modules than the maximum power specified by the outputs (600W or 400W), individual photovoltaic modules are temporarily switched off.

APPLICATION

IMPORTANT: Make sure that the connected loads are compatible with the permissible system specifications of the photovoltaic modules.

fothermo Boiler + Micro PV Inverter*



The changeover device allows the use of surplus energy, which can no longer be stored as heat in the fothermo photovoltaic boiler.

* For the connection of an inverter, the use of "Mirco PV inverters" or "balcony power plant inverters" is provided. Which are limited to an output of 400W per photovoltaic module input. It should be noted that the inverter has a separate input for each photovoltaic module. If several photovoltaic modules can be connected to one input of the inverter, it is not possible to use them in combination with the switching device.

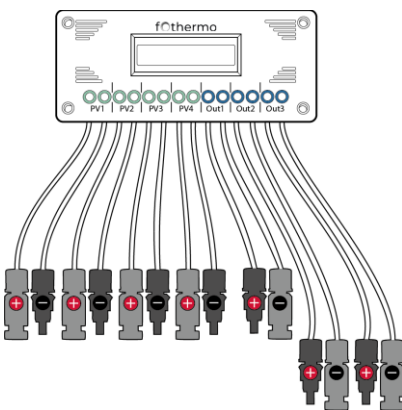
PREPARATION

Make sure you have the necessary tools and mounting materials handy. We recommend four dowels and four screws with at least M4x70, depending on the mounting surface. Make sure that you have a suitable drill bit with the appropriate attachment for the screws.

INSTALLATION

1. Assembly: Mount the switching device in a dry room. During installation, sufficient distance to adjacent walls and sufficient distance under the device for the photovoltaic connections must be provided.

2. Connecting the connection cables: The connection of the supplied connection cables follows the figure below. Pay attention to the polarity!



3. Connection of the photovoltaic modules:

IMPORTANT! It is operated with direct current.

IMPORTANT! Only photovoltaic modules of the same type may be connected individually to the inputs of the switchboard.

IMPORTANT! A series or parallel connection of the photovoltaic modules at one input leads to a defect of the device.

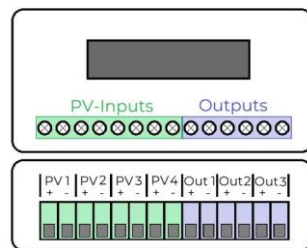
IMPORTANT! The connected photovoltaic modules must comply with the electrical limitations of the connected loads.

IMPORTANT! The installation of PV modules may only be carried out by a competent person and must exclude any risk to third parties. When installing the photovoltaic modules, the local rules and laws must be complied with.

IMPORTANT! Only photovoltaic modules with a maximum open-circuit voltage of 50 V specified in the data sheet may be connected. Up to four photovoltaic modules, each with 450Wp, may be connected to the designated connections of the system.

The photovoltaic modules and the loads are connected via the screw terminals of the switchover device. The connections for the photovoltaic modules on the switchover unit are marked in green. Make sure that the photovoltaic panels are connected with the correct polarity. (A common reason for incorrect polarity is the reversal of cables during laying, as a result of which the polarity is not correctly maintained)

Start by connecting the photovoltaic modules on the left side of the terminal block to the



first terminal (PV1+) for the positive (+) and (PV1-) for the negative connection (-) of a photovoltaic module. Assemble further modules from left to right in ascending number order according to the principle described above.

Check whether the display of the switchover device lights up after connecting the first photovoltaic module.

After connecting the first photovoltaic module, a timer of 5:00 minutes starts counting. You should connect all photovoltaic panels within this allotted time. This ensures that the switching device detects all photovoltaic modules and ensures proper operation.

If you were not able to connect all the photovoltaic panels to the switching device within the 5:00 minutes, you should disconnect all photovoltaic panels from the switching device and let the timer start again.

The device is completely disconnected from the power supply system when all supply plugs/photovoltaic panels are disconnected.

4. Connection of electrical loads: The loads are mounted on the blue terminals. At the first load output – output 1 – the fothermo photovoltaic boiler is connected. To do this, the terminal labeled Out + is connected to the connection for the positive photovoltaic module voltage (+). The Out terminal – is connected to the negative terminal (-) of the device.

The Mirco PV inverter is connected to the load outputs – output 2 – and/or output 3. The respective connection terminal Out + is connected to the connection for the positive photovoltaic voltage (+). The Out terminal – connects to the negative terminal (-) of the Micro PV inverter.

You can use the supplied 6x MC4 contact plugs to connect the electrical loads. Take the MC4 plugs with the red wires for connecting the positive + photovoltaic voltage and the MC4 plugs with the blue wires for the negative – photovoltaic voltage.

OPERATION

Operation:

When the device is put into operation, a 5:00 minute timer runs until start-up, presented by the following figure.



After the timer has elapsed, the switchover device determines the number of connected photovoltaic modules, and the detected module voltages are displayed as shown in the following figure.



After proper installation, the switching device "checks" the availability of each output according to its prioritization (see section above, Prioritization), as shown in the figure below.



If, for example, the indicator – Check Output 1 – is displayed on the display, the switching device waits for the power consumption of the load at output 1. If no power is consumed by the connected consumer, the switchover device switches the photovoltaic modules to the second output. Switching is fully automatic and can take up to 5 minutes per output.



Once the switching device has detected an available output, it automatically switches the connected photovoltaic modules to available outputs depending on the incoming photovoltaic power. It is not possible for the user to operate it. The display is used to read the current system status during operation. The display is structured as follows:



In this figure, the active output is in the upper left corner, and the voltage at the output is on the right. At the bottom left, the number of connected PV modules

is displayed, and at the bottom right, the output output is indicated.

If several outputs are active, they are displayed one after the other. If only one output is active, the display is not switched. If one output consumes little power, the modules connected to it are switched to another output after a short time. This ensures that the prioritization (see section above, prioritization) of the outputs is maintained and that the best possible use of the photovoltaic modules is ensured. This scenario is indicated by the following image of the device, where an arrow indicates in which direction the module(s) will be transmitted after the output is switched off. In the example shown, the module connected to output 2 is switched to the left, i.e. to the first output.



If higher priority outputs have been switched off during operation (e.g. due to the boiler reaching its maximum temperature), their availability is cyclically checked, as shown in the figure below. For this purpose, a connected photovoltaic module is connected to the output and the power consumption is checked. If the tested output is able to absorb energy again, modules are switched on, but if this is not the case, the switchover device returns to its previous operating state.



MAINTENANCE AND SERVICING


To clean the switching device, remove all electrical connections beforehand. The outer shell and the plastic parts of the device can only be cleaned with a slightly damp cotton cloth, without aggressive and/or abrasive agents. The device can only be put back into operation once the moisture has been completely removed.

DISTURBANCES

If a malfunction occurs during the use of the system, please disconnect all live lines from the device and contact the person or company from whom you purchased this product.

Check Output X: The switchover device searches for a suitable load. This can happen especially in very low light conditions (e.g. sunrise and sunset). In this case, less power is available from the photovoltaic modules than the consumer needs to switch on / operate.

ENVIRONMENTAL PROTECTION

This equipment is labelled in accordance with the Waste Electrical and Electronic Equipment (WEEE) Directive. By ensuring that the device 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 hot water tank 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 to a disposal centre with special facilities for electrical or electronic equipment. The end user must comply with the local disposal regulations when disposing of it. For more information on the treatment, recovery and recycling process, please contact your municipality, your local waste disposal centre or the specialist retailer where you purchased the product.

WARRANTY

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

- The device is installed in accordance with the assembly and use instructions.
- The appliance should only be used for its intended purpose and in accordance with the installation and use instructions.

The warranty covers the elimination of all manufacturing defects that may occur during the warranty period. Only the professionals authorised by the seller are allowed to carry out the repairs. The warranty does not cover damages:

- improper transport,
- improper storage,

- improper use,
- improper electrical voltage that deviates from the nominal voltage,
- exceptional risks, accidents or other force majeure,
- Failure to comply with the assembly and use-instructions, and
- in all cases where an unauthorised person attempts 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, including parts that are dismantled during normal use, to luminaires and signal lamps, etc., to discoloration of external surfaces, to changes in shape, dimensions and arrangement of parts and components that have been exposed to an effect that does not correspond to the normal conditions of use of the device. Loss of use, material and non-material damage resulting from the temporary impossibility of using the device during its repair and maintenance period is not covered by the warranty of the device.

COMPLIANCE WITH THE REQUIREMENTS SPECIFIED IN THE MANUAL IS A PREREQUISITE FOR THE SAFE OPERATION OF THE PURCHASED PRODUCT AND IS ONE OF THE WARRANTY CONDITIONS. ANY MODIFICATIONS OR MODIFICATIONS TO THE CONSTRUCTION OF THE PRODUCT MADE BY THE USER OR BY PERSONS AUTHORISED BY HIM ARE STRICTLY PROHIBITED. IF SUCH ACTIONS OR EXPERIMENTS ARE DETECTED, THE MANUFACTURER'S OR DEALER'S WARRANTY OBLIGATIONS 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 ARE MISUNDERSTANDINGS IN CONNECTION WITH THE TRANSLATION AND WITH THE TERMS USED IN THIS LANGUAGE VERSION OF THE ASSEMBLY AND USE INSTRUCTIONS, PLEASE USE THE ENGLISH VERSION AS THE ORIGINAL AND AS THE PRIMARY VERSION.