



HEATING SYSTEMS

THERMO plus

160/230/300/350

Operating and service instructions



NOTE: Subject to modification. In multilingual versions the German language is binding. The latest version of this document is provided for download on www.spheros.com.

Operating and service instructions

General Information

Dear Customer,

We assume that the operation and function of your new heater will have been explained to you properly and to your complete satisfaction by the installing workshop / service outlet. This owner's handbook is designed to give you a brief summary of how to use the Thermo plus 160/230/300/350 heaters.

The heater operation is unlimited without a change of the CO₂ adjustment up to an altitude of 1500 m above MSL and up to 2000 m above MSL if that is a short stay in such conditions (pass crossing, break).

In case of a permanent heater operation above 1500 m the CO₂ setting must be readjusted by Spheros trained personnel, due to a change of the exhaust gas values depending on environmental conditions.

Service and safety instructions

For the heater exist type approvals according to ECE Regulations R122 (Heater) and R10 (EMC).

The heaters must be installed as described in the attached installation instructions. The installation must be checked pursuant to the statutory regulations governing installation work. Further details are given in the installation instructions.

The year in which the heater is used for the first time must be permanently marked on the heater's model plate by removing the inapplicable year numbers.

Ensure that the existing shut-off devices in the fuel return line are open prior to starting the heater.

When the coolant used in the vehicle's engine is renewed, after bleeding the vehicle's cooling system, pay attention to bleeding the heater carefully. Top up the coolant as described in the instructions supplied by the vehicle manufacturer.

Check the openings of the combustion air intake and exhaust outlet and clean them if necessary.



WARNING!

Risk of fire, explosion, poisoning and asphyxiation!

The heater **must not be operated:**

- at filling stations and other refueling points.
- if the heater or its exhaust outlet is in locations where inflammable vapors or dust may form (e.g. close to fuel, plastic, coal, wood dust or cereal storage facilities).

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- if the heater or its exhaust outlet is located close to inflammable materials for example dry grass and leaves, cartons, paper etc.
- in enclosed areas (e.g. garages, hall without a suck off facility), not even if the pre-selection timer or a remote control is used.
- if the exhaust outlet of the heater is partial or fully obstructed (e.g. by soil or snow, as it may occur while move the vehicle backwards).

The heater **must**:

- be shut down and the fuse shall be removed in the event of extensive smoke development, unusual combustion noises or fuel odors. The heater must not be used again until personnel trained by Spheros have examined it.

ATTENTION:

The heater **must not**:

- be exposed to temperatures exceeding 110 °C (storage temperature). Exceeding this temperature may result in permanent damages.
- be operated without at least 30 % of a brand name anti-freeze in the heating system water. An up-to-date list of anti-freeze approved by Spheros can be found on the Spheros website.

The heater **must**:

- be operated with a fuel approved by Spheros in accordance with DIN EN 590 (see fuels under Service / Technical Updates on the Spheros website for more information) and the rated voltage shown on the model plate.
- be operated at least once per month for 10 minutes when the engine is cold. At the latest when the cold weather season starts the heater must be inspected by an expert.

Liability claims

Failure to follow the installation instructions and the notes contained therein will lead to all liability being refused by Spheros. The same applies if repairs are carried out incorrectly or with the use of parts other than genuine spare parts. This will result in the expiry of the ECE type approval of the heater and thus the general operating permit.

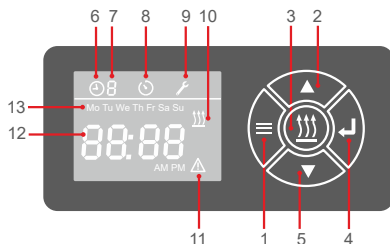
Liability claims can only be made if the claimant has verifiably considered all the servicing and safety instructions.

Operating and service instructions

Heater operation

The water heater can be switched on using either a switch or digital timer. Before you switch on the heater set the vehicle's heating system to "Warm".

Pre-selection timer



- 1 Menu button
- 2 Selection button UP
- 3 Instant heating button
- 4 Confirmation button
- 5 Selection button DOWN
- 6 Preselection time
- 7 Active preselection time
- 8 Operation duration
- 9 Settings
- 10 Heater is on
- 11 Error message
- 12 Time
- 13 Weekday





General

The preselection timer enables you to preset the start of the heater operation up to 7 days in advance. It is possible to program 7 different starting times, only one of which can be activated.



The activation of the preset time is only possible for the same and the following day. Activation for Sunday and Monday is already on Friday, activation for Monday is possible on Saturday.

With switched on ignition, the display shows the current time and day of the week.








Operation


To access a menu using the  button, the heating function must be disabled. Any selection and setting of values is made using the selection buttons  and , and confirmed by the  button.

If 10 seconds no action, the preselection timer returns to the standard display.


If the buttons  and  are pressed longer than 0.5 seconds, the fast scroll is activated.

Menu selection

Get the menu bar (6 - 9) by pressing the  button. Use the buttons  and  to select the menu  / "Active preselection time" (7) /  or  and confirm by pressing the button .

Note: Using the button  allows to return from all menus to the standard display (unsaved settings will be lost).

Switch the preselection timer on

- switch on ignition,
- if ignition is off - press button  (instant heating), or
- automatically if preselection time is activated








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Switch the preselection timer off


- switch off ignition (the preselection timer goes into the sleep mode)
- the timer turns off after the expiry of remaining time or the programmed operation duration.

Setting time/day of the week




Select menu . Use the buttons  and  to select the 12h or 24h mode - confirm by pressing . Use the buttons  and  to select the day of the week, the hours and the minutes. Confirm each respectively using .

Note: In the 12h mode, after setting of the minutes, further choose AM or PM by the selection buttons - confirm using .

Programming operation duration








Select menu  - the operation duration flashes. Using  and  adjust the operation duration - confirm with .

Setting the remaining operation time


The remaining operating time refers to the time the heater is still in operation after the ignition is turned off. On the display appears the preselected time, which can be changed using the buttons  and . Confirm changes with .

If within 10 seconds no confirmation of the remaining operation time has been done, the heater is switched off.




Programming heater starting time

Select the menu  - the memory location  is flashing. Use the buttons  and  to select the memory location - confirm using . By pressing the buttons  and  select the day of





the week, the hours and the minutes. Confirm each respectively using .

Note: In the 12h mode, after setting of the minutes, further choose AM or PM by the selection buttons - confirm using .



Activate preselection time






Select menu "Active preselection time" (7). By using the buttons  and  choose the memory place with the preselected time - confirm with .

Deactivate preselection time




Select menu "Active preselection time" (7). Press  or  repeatedly until symbol  appears - confirm using .

Instant heating

Press  for continuous operation, with activated ignition -  flashes on the display and appears permanently after a positive feedback of the heater.

If button  is pressed with deactivated ignition, the display shows the default value of the programmed operation time. By pressing the buttons  and  the operation duration can be adjusted and with  confirmed. On the display appears  and the heater is operated for the time as programmed.

Read out heater errors

During heater malfunctions the symbol  flashes. Error code display by simultaneously pressing the buttons  and .

Remote control

Equivalent of the function instant heat.

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Malfuction

During all active operating phases of the heater, all electric components, the operating voltage and functional irregularities are monitored and recorded.

In the event of faults always first check the following:

- Is the fuel supply ok?
- Is a sufficient amount of fuel in the tank?
- Are the fuses ok?
- Are the electrical connections and cables in order?
- Are the combustion- and exhaust air ways free of obstructions?

A malfunction causes the heater to terminate its operation by a fault shut-off and to go into the fault lock-out mode to prevent the heater from an automatic combustion restart. At the same time the operation indicator begins to flash with a specific code (see below).

The fault lock-out occurs:

- low voltage during a defined period
- if combustion was not established during start-up
- if the flame extinguishes during operation
- extrinsic light
- if the control device itself has failed or peripheral components are defective

Variants to reset the heater after a fault lock-out:

1. Switch off the heater and then turn it on again
2. Reset the control device, e.g. through disconnecting it from the power supply
3. „Off“ and „On“ switching“ via the S-Bus diagnostic interface
4. Erase the data in the fault memory by means of the diagnostic tool.

Additional to the fault lock-out a heater lock-out occurs if safety related components are affected. The fault code 12 will be displayed (see para. "Flash code").

If a heater lock-out has occurred, the heater must be maintained and released by Spheros trained personnel.

Flash code

The kind of malfunction is indicated from the operating indication light through a flash code or if the pre-selection timer is used in the display (operation display). The flash code is immediately generated after detection of the malfunction and will be kept until the heater is freed.

The flash code comprises of a burst (sequence) of 5 short flashes depicting the break and a defined number of long pulses corresponding to the malfunction number, which are to be counted. After that the cycle starts with 5 short flashes again and so on.

The meaning of the number of long pulses is shown in the table below.

Table: Flash codes

No. of Long pulses	Description of malfunction
0	not used
1	No start within the safety time
2	Flame interruption, restart failed
3	Low voltage / overvoltage
4	Extrinsic light before starting or within the purge cycle
5	not used
6	Temperature sensor / overheat protection defective
7	Solenoid valve defective
8	Combustion air fan motor / control device defective
9	Circulating pump defective
10	Overheat protection has been activated
11	Electronic ignition unit defective
12	Heater fault lock-out activated
13	not used
14	not used
15	Revolution signal faulty



Spheros Germany GmbH

Friedrichshafener Str. 7 | 82205 Gilching | Germany | www.spheros.com