HEATING SYSTEMS

THERMO G

Operating and Service Instructions

NOTE:
Subject to modification. The latest version of this document you will find in the download center on www.spheros.com.

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SPHEROS

Operating and Maintenance 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 G heater.

The heater is adjusted in the factory for use with natural gas (CNG) class H.

An unlimited use of the heater is possible up to an altitude of 1500 m above MSL and for a short time, up to one hour, up to 2000 m above MSL (e.g. for pass crossing).

Service and safety instructions

For the heater exists a type approval according to the ECE Regulations R122 (Heater) and R10 (EMC).

The heater and the gas pressure regulator must be installed as described in the attached installation instructions.

Prior to operating the heater, check the openings for the combustion air intake and exhaust outlet and clean them if necessary.

WARNING!	Risk of fire, explosion 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, coal, wood dust or cereal storage facilities).
- 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 digital timer or Tele Start 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 100°C (storage temperature). Exceeding this temperature may result in permanent damages.
- be operated without at least 20% of a brand name anti-freeze in the heating system water.

The heater must:

- be operated using natural gas (CNG) of class H (methane content at least 95%) and rated voltage of 24 VDC. If the methane content is lower than 95% (natural gas of class L) the CO_2 content of the exhaust gas is to be readjusted by Spheros-trained personnel. The oil content of the gas must not exceed 10 mg/m^3.
- 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 in the context of the annual maintenance by an expert.

The gas pressure regulator must:

- be replaced after 4 years for safety reasons. If you fail to do this, it may leak and gas may escape.
- be drained of oil through the oil drain screw every three months.

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 lead to the invalidation of the type approval for the heater and therefore of its homologation / EC type licence.

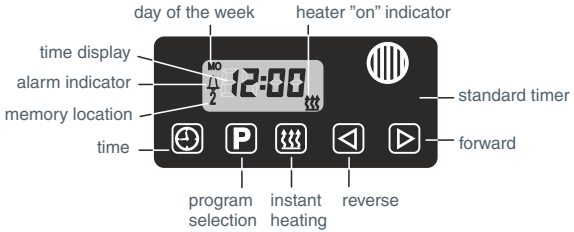
Liability claims can only be made if the claimant has verifiably considered all the servicing and safety instructions.

Operating and Maintenance Instructions

Heater operation

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

Standard timer



General

The standard digital timer enables you to preset the start of the heater operation up to 7 days in advance.

It is possible to program 3 different starting times, only one of which can be activated.

The standard digital timer features a wake-up alarm function.

When the ignition is switched on, the timer displays the current time and the day of the week. When the heater is switched on, the display and the buttons are illuminated.

After the power supply has been connected, all symbols on the display will flash. The current time and weekday must be set.

Operation

The timer can be operated in that all flashing symbols can be adjusted by means of the ◁ and ▷ buttons. If the buttons are not pressed within 5 seconds, the time displayed will be stored. If the ◁ and ▷ buttons are pressed for more than 2 seconds, the fast time-setting mode is activated.

If the ignition is switched off while the heater is operating in the continuous mode, the remaining operating time of 15 minutes is displayed and the heater continues to operate for this period of time.

Switching the heater on

Manually: by pressing the button (continuous heating mode)
Automatically: by programming the heater starting time

Switching the heater off

Manually: by pressing the button
Automatically: by programming the operating time
With the heater running: by programming the remaining operating time

Setting time/day of the week

Press the button for more than 2 seconds - time of the day is flashing - and set the clock using the and buttons. Day of the week is flashing - adjust the day of the week.

Viewing the time

With the ignition switched off: press the button

Programming heater starting time

Press the button - the memory location is flashing - using the and buttons, set the heater starting time. Day of the week is flashing - set the day of the week. By repeatedly pressing the button, memory locations 2 and 3 can be programmed or the time display mode can be reached.

Recalling/erasing preset times

Repeatedly press the button until the desired memory location is displayed. To erase the preset time, press the button several times until the time of the day is displayed instead of the memory location.

Programming duration of operating time

The heater must be switched off. Press the button for 3 seconds - operating time is flashing - and set the desired operating time (10 to 120 minutes) using the and buttons.

Setting the remaining operating time

Set the desired remaining operating time (1 to 120 minutes) using the and buttons. The remaining operating time refers to the time the heater still continues to remain in operation. It can only be changed while the heater is in operation and the ignition switched off.

Setting the wake-up time

A wake-up time can only be programmed on the standard digital timer. The wake-up time is not bound to a specific day of the week. Repeatedly press the button until the bell symbol appears on the display. Set the desired wake-up time using the and buttons. The alarm clock turns off after 5 minutes or when one of the buttons is pressed.

Recalling/erasing the wake-up time

Repeatedly press the button until the bell symbol appears on the display - read off wake-up time. To erase the wake-up time: press the button until the bell symbol is no longer visible on the display.

Remote control

Possible by means of an optional external "instant heating" button.

Malfunction

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

- undervoltage or overvoltage during a defined period
- if combustion was not established during start-up
- if the flame extinguishes during operation
- unexpected light detection
- 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.

Additional to the fault lock-out a heater lock-out occurs if safety related components are affected.

The heater lock-out occurs:

- overheat protection has been activated, is disconnected or defective
- water temperature sensor is defective
- solenoid valve is defective
- flame guard is defective
- repeated malfunctions (error counter has reached the locking threshold)
- repeated flame interruptions (flame interruption counter has reached the locking threshold)
- control device malfunction or program error

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, and if a standard timer is used, on the display (operating indication) respectively. The flash code is immediately generated after detection of the malfunction and will be kept while the heater is powered on 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 pulses	Description of malfunction
0	Control Device malfunction (on standard timer 1531 not displayed)
1	No start within the safety time
2	Flame interruption during operation, repeated start unsuccessfully
3	Undervoltage / overvoltage
4	Unexpected light detection before starting or within the purge cycle
5	not assigned
6	Temperature sensor / overheat protection defective
7	Solenoid valve 1 or 2 defective (short circuit/disconnected/does not close)
8	Combustion air fan motor defective
9	Circulating pump defective
10	Overheat protection has been activated
11	Electronic ignition module defective (short circuit/disconnected)
12	Heater fault lock-out (caused by several malfunctions or flame interruptions)
13	Electrical gas regulator heating defective

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