



SPHEROS



# Thermo

## 230/300/350

Operating and  
service instructions

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# Operating and service instructions

## General Information

Dear SPHEROS 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 230 / Thermo 300 / Thermo 350 heaters.

## Service and safety instructions

For the Thermo 230 / Thermo 300 / Thermo 350 water heaters exist type approvals according to UNECE Regulations R10 (EMC) and R122 (heating systems).

For heater models Thermo 230 / 300 /350 designed for installation in rail vehicles, a design certification acc. to § 33 EBO (= Federal Railway Authority) has been issued with the following approval number: EBA32AZ3/0174/08.

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 line return are open before the heater is used for the first time.

When the coolant used in the vehicle's engine is renewed, after bleeding the vehicle's cooling system, give careful attention to bleeding the heater.

Top up the coolant as described in the instructions supplied by the vehicle manufacturer.

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

When the heater is operated in rail vehicles, maintenance chart / test certificate item no. 90 08722 is to be used.

**Switch off the auxiliary heating system before refuelling.**

The heater must **not be operated:**



Risk of fire,  
explosion  
and asphyxiation

- 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).

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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 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 **not**:



- be exposed to temperatures exceeding 110°C (storage temperature). If this temperature is exceeded the electronics system may suffer permanent damage.
- be operated without at least 20% of a brand name anti-freeze in the heating system water.

## The heater **must**:



- be operated using the fuel type shown on the model plate and the rated voltage shown on the model plate.
- be shut down by removing the fuse 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.
- be operated at least once per month for 10 minutes when the engine is cold and with the blower at its lowest setting. At the latest when the cold weather season starts the heater must be inspected by an expert.

## Liability claims:



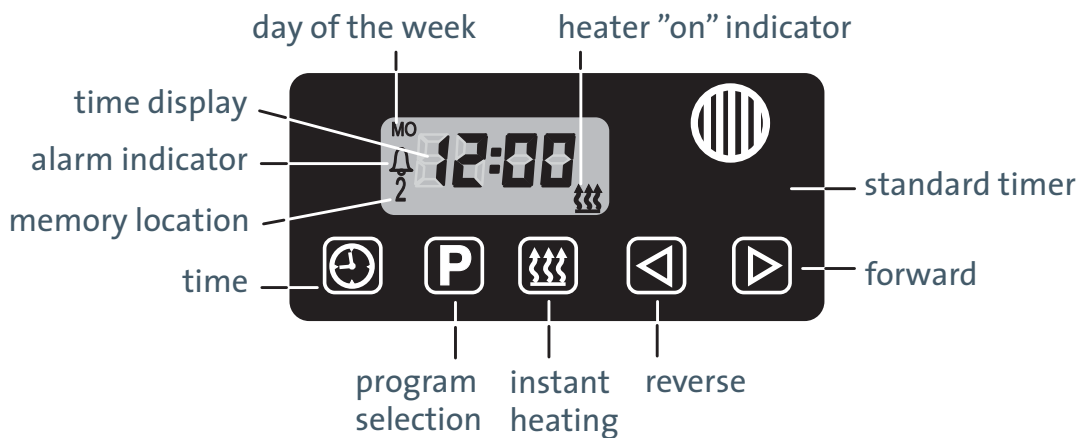
- Failure to follow the installation instructions and the notes contained therein will lead to all liability being refused by SPHEROS. The same applies if repairs are carried out incorrectly or with the use of parts other than genuine spare parts. This results to the invalidation of the general operating license / ECE Type approval of the heater.
- Liability claims can only be made if the claimant has verifiably considered all the servicing and safety instructions.

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## 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

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## 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 **P** 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 **P** button, memory locations 2 and 3 can be programmed or the time display mode can be reached.



## Recalling/erasing preset times

Repeatedly press the **P** button until the desired memory location is displayed. To erase the preset time, press the **P** 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 **P** 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 **P** button until the bell symbol  appears on the display - read off wake-up time. To erase the wake-up time: press the **P** button until the bell symbol  is no longer visible on the display.

## Remote control

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

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## Troubleshooting

In the event of a malfunction, fuses and electrical connections should be checked for condition and security.

If this action fails to correct the malfunction, please consult your authorised SPHEROS dealer.

Following a fault lock-out situation, coded flashing signals will be emitted - via the operation indicator light - during the after-run period of the heater, on all heaters equipped with control unit 1572D. These coded flashing signals allow your authorised SPHEROS dealer to identify the malfunction that has occurred.

## Heater turns itself off automatically (=fault lock-out)

### Cause

Combustion was not established during start-up

Flame extinguishes during operation

Heater is shut down due to overheating, e.g. owing to lack/loss of coolant

Vehicle voltage insufficient

Combustion air and/or exhaust gas ducts obstructed

### Remedy

Switch heater briefly off and on again **one time**

Switch heater briefly off and on again **one time**

Top up coolant and press the push-button on the temperature limiter

#### **NOTE:**

Some heater applications are equipped with an automatic reset.

Charge battery

Switch heater briefly off and on again **one time**

Check combustion air and exhaust gas ducts for unobstructed passage

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## Fault code display

On heaters equipped with control unit 1572D and standard digital timer, a fault code appears on the display of the digital timer whenever a malfunction has occurred.

## Fault codes on the display of the combination or standard digital timer

### NOTE:

In the case of heaters operated by a switch, the particular type of malfunction that has occurred is indicated by coded flashing signals via the operation indicator light during the after-run period of the heater. After every fast pulse sequence comprising 5 signals, the long flashing signal pulses can then be counted: The coded flashing signals correspond to the numbers in the table below:

F 01	No start
F 02	Flame failure
F 03	Undervoltage or overvoltage
F 04	Stray light detection during the prestart or after-run period
F 05	Defective flame detector
F 06	Defective temperature sensor
F 07	Defective solenoid valve
F 08	Defective fan motor
F 09	Defective circulation pump
F 10	Defective temperature limiter/overheating
F 11	Defective ignition spark transmitter
F 12	Fault lock-out condition due to recurring malfunctions or repeated flame failure (8x no start-up or 5x flame failure)

### Deactivating the heater lock-out mode:

Deactivation of the heater lock-out mode is effected by switching the heater on and then disrupting the power supply during the start-up procedure.