USER GUIDE ENGLISH
TOPSTART
With control box
Ref. TSG & TSW
4-12 kW

The TopStart is a compact heating system with circulation pump which heats the coolant liquid of a motor. This system is particularly made for generating sets, on-road engines, marine engines and all types of vehicles located inside or outside (protected place only).

IMPORTANT REMARKS:

In order to warranty an optimal working and useful life to your product, than please respect the following remarks:

- While running, please check that the circuit is air free.
- Make sure that the liquid doesn't contain any particle that could block the pump or damage the heating element.
- Make sure that the apparel is located at the low position of the system under the minimum level.

PHILLIPS & TEMRO industries®

CARLOR ENGINEERING

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The present user's guide contains instructions to be fulfilled during the mounting and the starting stage. Please read carefully for a correct installation and a proper use of the heater. Keep these instructions after installation.

1. IMPORTANT SAFETY INSTRUCTIONS

Qualified personnel:
The mounting should be carried out by a qualified technician only.

Danger in case of non-compliance with the present guidelines:
The non-compliance of the present guidelines could have serious consequences for the safety of people and could damage the equipment, thus making the warranty non-existant. The strictest rigor is required for the electrical and mechanical aspects of the mounting.

Safety measures for the user:
Avoid any risks linked to the mains by strictly observing local safety instructions in force.
Check or have checked by an authorized technician that your electrical installation is protected by a differential current system and that the earthing is in compliance with the local safety prescriptions.

Modifications of the heater and use of unauthorized parts:
Any modification of the heater will be made only in agreement with the manufacturer. The use of official spare parts and accessories guarantees your safety. The manufacturer disclaims any liability in case of non-original parts are used.

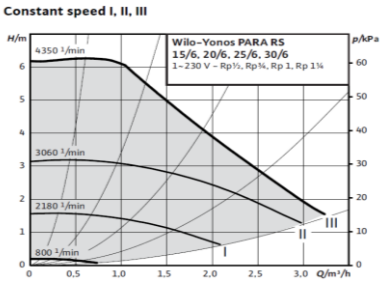
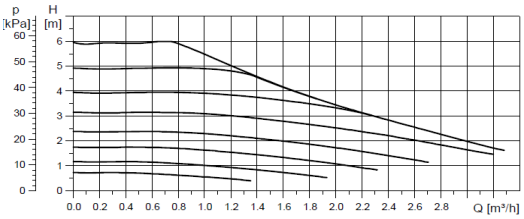
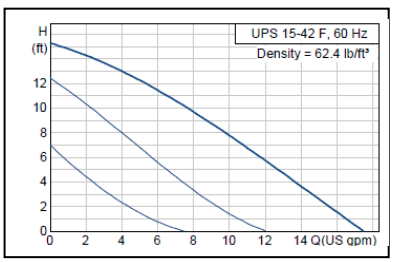
Instructions for use:
The equipment supplied with the present user guide is exclusively meant for the applications described in this user guide. The TopStart is a universal and compact electric coolant heater with circulating pump which heats the coolant liquid of a motor with a mixture of 50/50 water / glycol. It can be used to heat engines in generating sets, on-road engines, marine engines, industrial applications and all types of vehicles located inside or outside (protected area only). The Topstart is not made to be installed in an explosive environment.

2. SPECIFICATIONS

Technical Characteristics

The TopStart is a universal and compact electric coolant heater with circulating pump. It can be used to heat engines in generating sets, on-road vehicles, marine engines and all types of application on thermic motors. High-quality components and materials are used to guarantee the reliability of the heater. Its compactness makes it easy to install. This heater with forced circulation is made of a heating body, a heating element, an adjustable regulating thermostat, an overheat thermostat with manual reset and a circulating pump.

As soon as the heater is plugged in, the coolant of the engine is sucked into the heating body and then expelled by the pump back into the engine. The pump allows a progressive and uniform warming of the engine. Into the heating boby you can find the regulating thermostat of the water temperature which controls the heating element and the pump. The safety thermostat protects the heating element and the pump in case of overheating.

Model	TSG + CB or TSW + CB
Description	TopStart with control box
Picture	
Components characteristics	
Heating body	Aluminium
Heating element	INCOLOY 800 ® stainless steel protection sheath.
Wet rotor circulating pump **WILO Yonos Para MS/6**	Voltage: 230 VAC, single phase Frequency: 50 Hz or 60Hz Flowrate in the enclosed table (speed III) Power input : 45W 
Grundfos UPM 2 XX-60	Voltage: 230 VAC, single phase Frequency: 50 Hz or 60Hz Flowrate in the enclosed table Power input : 48W 
Grundfos UPS 15-42F (Certified for the North American market)	Voltage: 230 VAC, single phase Frequency: 50 Hz or 60Hz Flowrate in the enclosed table Power input : 92W 

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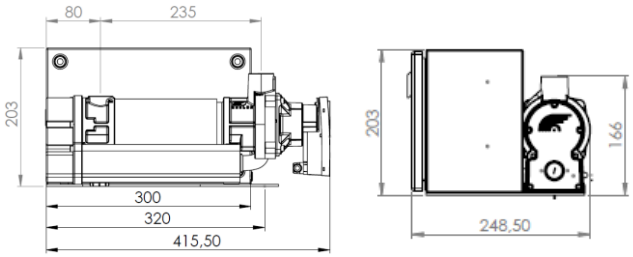
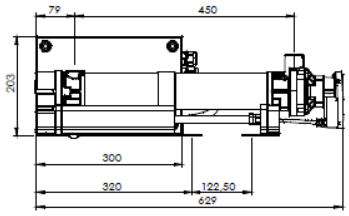
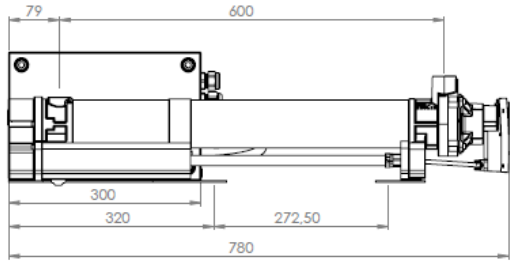
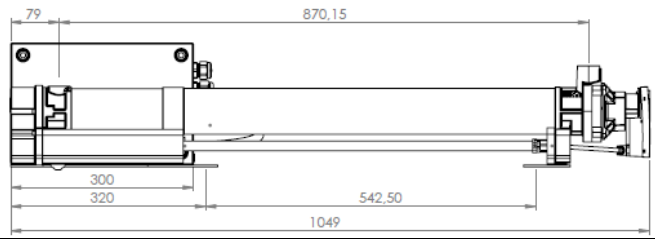
Temperature control	Adjustable capillary thermostat 0°-80°c (32°F to 176°F).
Safety thermostat	Capillary thermostat with a limit at 110°C (230°F) and manual reset
Electrical characteristics	
Power supply ➢ Heating element ➢ Pump ➢ Thermostatic plate	Single supply thanks to a transformer into the control box 230VAC, 400VAC, 400VAC+N, 440VAC, 480VAC, 600VAC, 690VAC 230VAC/50 or 60 Hz, 115V/60Hz /
Ingress protection level	IP44
Available power	4kW, 6kW, 9kW, 12kW
Amperage	From 6 to 40 amps depending of the model
Working specifications	
Maximum working pressure	6 bars (90psi)
Maximum working temperature with ambient temperature of 40°c (104°F)	95 °C
Coolant temperature range	-10°C to 100°C
Thermostat temperature range	Adjustable from 0 to 80°C
General characteristics	
Weight in kg	**230V or 400+N:** 4-6kW: 12 kg / 9kW: 13 kg / 12kW: 14kg **400V – 690V:** 4-6kW: 14 kg / 9kW: 15kg / 12kW: 16kg
Size in mm 4kW	
6kW	
9 kW	
12 kW	

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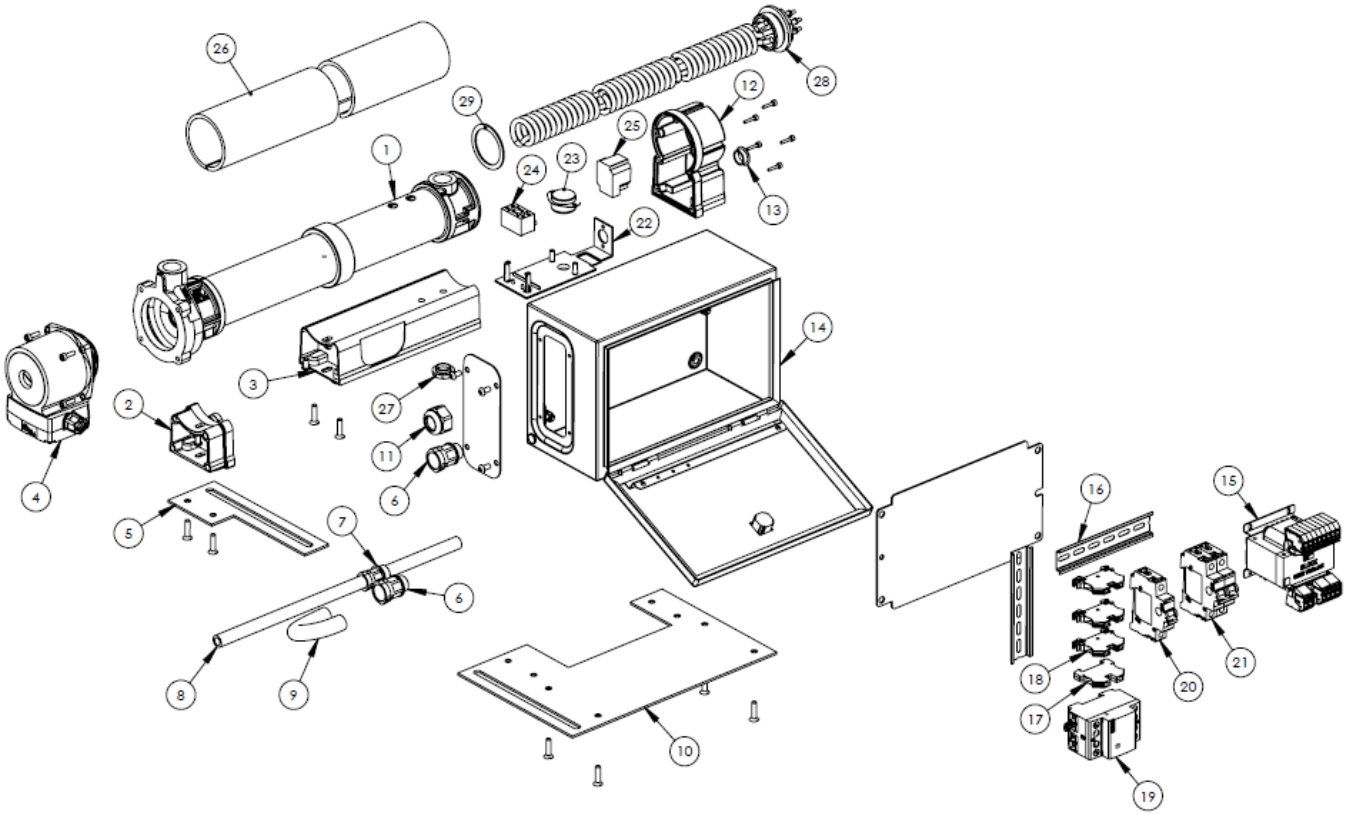
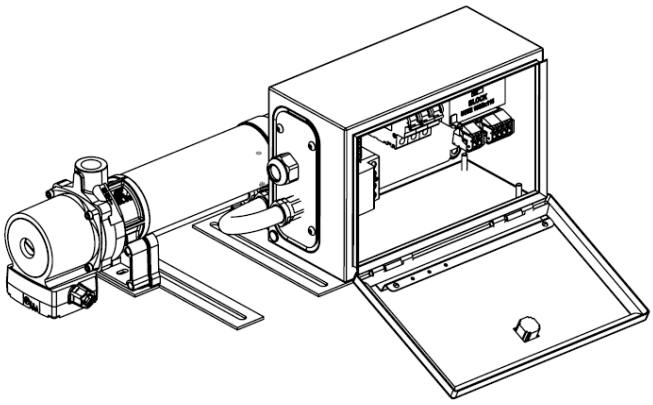
Exploded view of the TopStart



Art	Description	Qte
1	Heating body in aluminum	1
2	Support base in polyamide	1
3	Support base in polyamide	1
4	Glandless Circulating pump	1
5	Fixation plate	1
6	Conduit fitting	1
7	Conduit fitting	1
8	Cable conduit	1
9	Cable conduit	1
10	Fixation plate	1
11	Cable gland	1
12	Protection cap in polyamide	1
13	M20 screw plug (regulation thermostat access)	1
14	Control box	1
15	Transformator	1
16	DIN rail	2
17	Earthing terminal	1
18	Terminal screw connection	3
19	Contactor	1
20	Circuit breaker	1
21	Circuit breaker	1
22	Thermostatic plate (support)	1
23	Safety thermostat, 25A cutting capacity, 110°C with manual reset	1
24	Terminal block	1
25	Regulation thermostat, 25A cutting capacity (100000 cycles)	1
26	Insulation (polyethylene foam)	1
27	M20 screw plug (safety thermostat access)	1
28	Heating element in Incoloy 800® with low wattage density	1
29	Heating element gasket	1



3. Mounting instructions

Unpacking and installation preparation

Make sure that you have the following components and accessories before disposing of the packaging material:
For a correct installation use the spare parts and accessories delivered with the TopStart.

- Topstart heater with control box
- Fixation kit

Precautions

The installation has to be made by an authorized technician in strict compliance with the instructions of the manufacturer. Do not connect to the mains before having followed the present instructions. Do not connect the heater to the mains if you are not sure that it is filled with coolant.

Installation Instructions

- ✓ The TopStart should be mounted in horizontal position. In no circumstances the axis of the pump should be placed in a vertical position.
- ✓ Fix the heater as low as possible. The heater should be below the lowest level of the water jacket and the coolant inlet must be below the point of removal of the coolant from the engine.
- ✓ Fix the TopStart to the chassis or any other suitable place with the fixation kit supplied with the heater. If you don't use the fixation kit supplied, the support for the fixing of the heater should be rigid enough. If the heater is mounted on the engine chassis, it is necessary to use the supplied silent-blocks in order to reduce vibrations to the heater.
- ✓ Be careful not to mount the heater, the hoses or the power cord close to the engine exhaust.

Connecting the cooland circuit

Drain off completely the coolant circuit.
Before placing the heater, it is imperative to drain the coolant circuit. Unscrew the drain plug or disconnect the lower hose in order to completely drain off the coolant circuit.

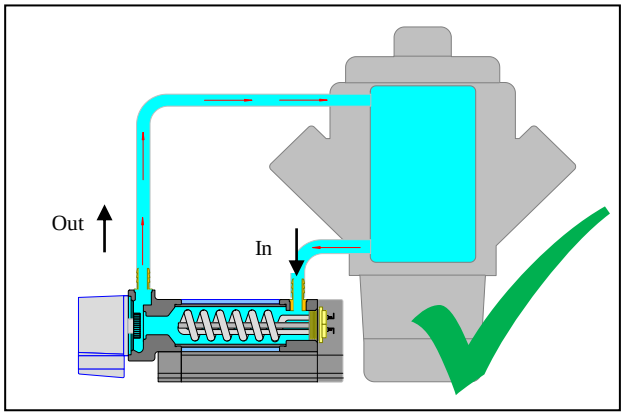
Connecting the heater inlet.
The heater inlet and outlet are meant for hoses (not supplied) with an internal diameter of 11/16" (17 mm). For engines equipped with a drain plug, replace the plug by a hose connector with an internal diameter of 18 mm in order to make the connection to the heater inlet. If the heater is connected to a rigid pipe, use a piece of flexible radiator hose that is long enough to prevent engine vibrations being transmitted to the heater.

Connecting the heater outlet.
In order to guarantee an optimum heating of the engine the coolant return hose from the heater to the engine should be placed at the highest possible point on the engine and as far as possible from the suction port to enhance heat distribution throughout the engine. Use any available coolant jacket opening and install a connector for the outlet hose.

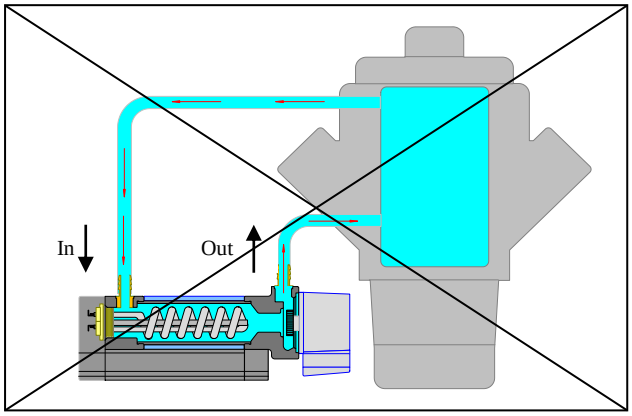
Checking and re-filling the coolant circuit
Make sure that the hose clamp collars are properly tightened. Fill the coolant circuit with a high quality and clean mixture glycol/water without impurities and without exceeding the recommended proportion 50% glycol / 50% water. It is necessary to check its quality frequently to ensure that the heater is not dirty, has no grimes and does not suffer from deterioration. The life and the proper functioning of the heater depend on it. In order to eliminate air pockets and

obtain a good circulation, run the engine a few minutes. Then shut off the engine and check that the water circuit is properly flushed. Check that all connections are watertight and that hose clamps are properly tightened. When the engine has cooled down, check the level of coolant in the circuit and adjust if necessary

Examples of Correct / Incorrect Mounting



Example of correct mounting
Suction from low point. Heater installed horizontally



Example of incorrect mounting
Suction from high point

Electrical connections

Fixing the power supply cord.
Fix the cord with clamp collars in order to avoid any contact with hot or moving parts. It is recommended to use a protection sheath for the cord.

Checking the installation before connecting the heater to electricity.
Check the information regarding voltage and power on the heater label before connecting the heater to electricity.
An improper connection to the mains could irremediably damage your heater. Make sure that the voltage is correct and the earthing is in compliance with local rules.

Electrical diagram 1X230 V (max 6kW)

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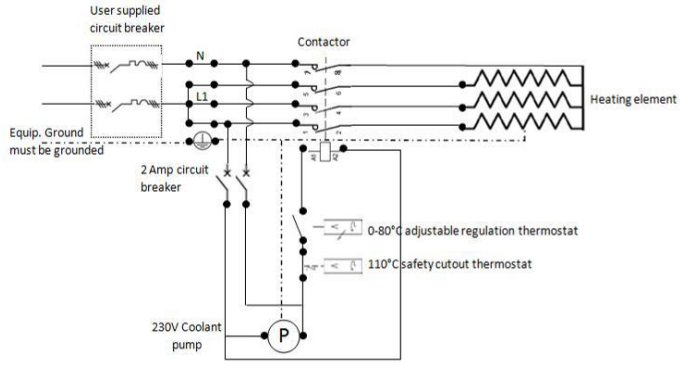
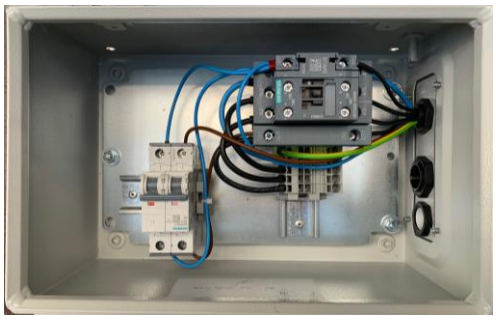
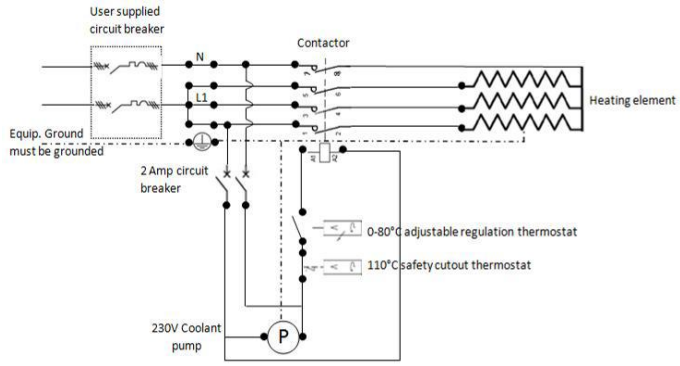
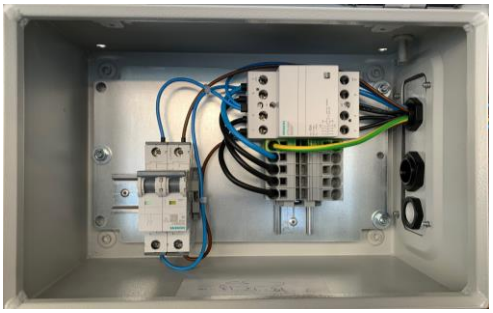


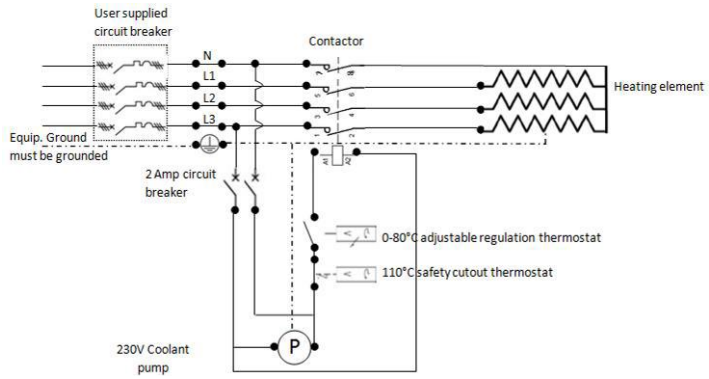


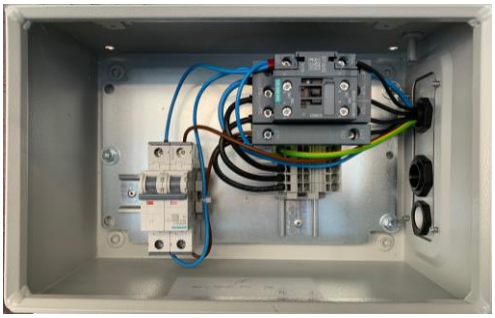
Electrical diagram 1X230 V (9-12kW)





Electrical diagram 3X400V+N





Electrical diagram 3X230V

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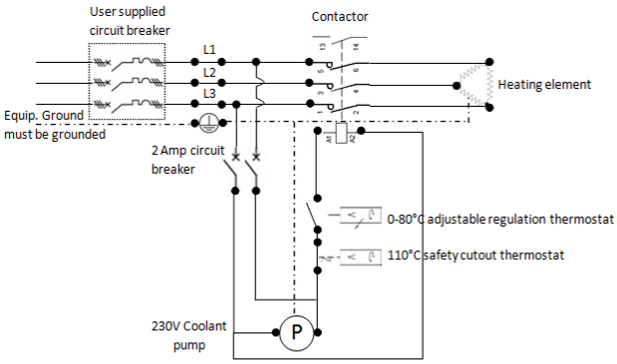
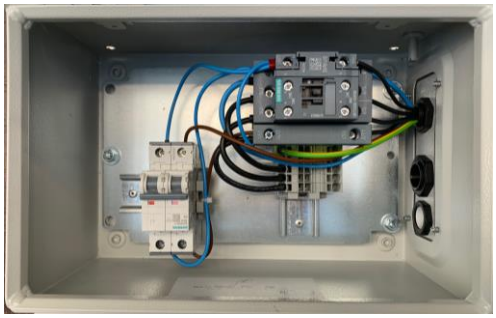
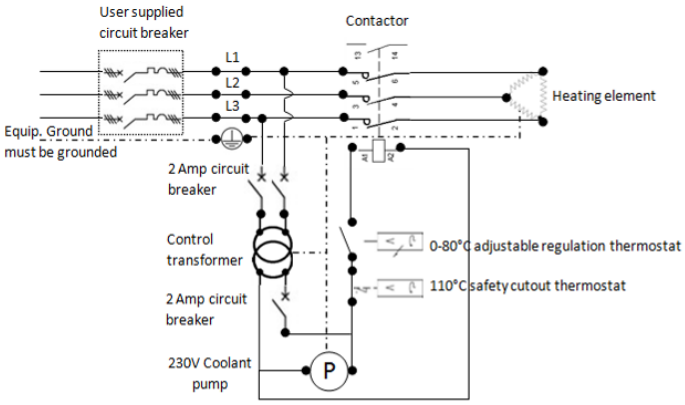




Electrical diagram 3 X 400V, 3 X 480V, 3 X 690V



Caution:

- ✓ **All wire must be rated to the highest voltage in the box.**
- ✓ **Use supply conductors suitable for 105°C.**
- ✓ **All connections in the control box should be checked during installation. Due to the vibration during shipment the screws can be loose. Then control the connections at regular intervals.**

4. Directions for use

Putting the heater into service

BEWARE: DON'T START THE HEATER IF NOT FILLED WITH COOLANT AND NEVER RUN THE PUMP WITHOUT LIQUID

Follow the procedure described hereafter:

- ✓ Connect the plug. The regulating thermostat is adjusted on 50°C (122°F) at the factory.
- ✓ Touch the heater inlet and outlet hoses at regular intervals during one hour. If the heater works correctly, the outlet hose should be warm and the inlet hose relatively cold. If the inlet hose becomes very hot before the outlet hose, the circulation is not good.
- ✓ After checking of the correct circulation through the heating body and the engine and that the air has been properly purged, adjust the regulating thermostat on the required temperature.

Adjusting the regulating thermostat

The regulating thermostat temperature is set on 50°C (122°F) at the factory. It is possible to modify this temperature between 0 and 80°C (32°F and 176°F). To do this, unscrew the threaded cap on the side of the heater. Use a screwdriver to set the thermostat on the desired temperature. It is imperative to fix the protection cap again after adjustment of the thermostat.

Resetting of the overheat thermostat

In case of overheating (due for example to a lack of water in the circuit), the overheat thermostat cuts the electric supply to the pump and the heating element. After checking of the heater, the thermostat has to be reset manually. To do this, unscrew the threaded cap under the support base of the heater and push the manual reset button.

5. Troubleshooting

Before contacting the technical service, please check the following table for causes and solutions:

- Contaminated cooling circuit
- Air pocket caused by a curve in the hoses
- Engine temperature higher than the thermostat set temperature.

Type of problem	Possible causes	Control and remedies
The pump doesn't work. The heating body of the heater and the engine remain cold	The heater is not connected to the mains.	1. Check that the supplying cable is connected to the mains. 2. Check that the supply to the mains is correct. 3. Check the fuses in the mains distribution box.
The pump works properly but the heating body of the heater and the engine remain cold	The overheat thermostat has been switched on. 1.Lack of water into the heater	1. Disconnect the supplying cable from the mains. 2. Reset the overheat thermostat (see above) 3. Check the level of water in the circuit. 4. Adjust the level if necessary. 5. Turn the engine on for 10 minutes. 6. Reconnect the supplying cable to the mains
The pump works properly but the heating body of the heater and the engine remain cold	1.Failure of the heating element. 2.Failure of the regulating thermostat.	1. Put the heater out of service and call the technical service.
The connection to the mains is correct and the circuit is correctly purged. The heating body of the heater is hot but the engine remains cold.	1.Bad circulation. 2.Pump blocked with impurities. 3.The pump is not working.	1. Unblock the pump. (Unscrew the threaded cap and turn the pump axle with a screwdriver). 2. If unsuccessful, put the heater out of service and call the technical service.
The fuse or the circuit breaker in the distribution box is engaged.	Electrical breakdown.	1. Put the heater out of service and call the technical service.

6. Instructions for the protection of the environment

Recuperation of raw materials rather that elimination of waste. Machines, as well as their accessories and packaging, should be recycled in an appropriate way. Our spare parts can be recycled selectively depending on the type of material. Phillips & Temro Industries Europe SPRL commits itself to recycle the different components of the TopStart. Each TopStart will be either reconditioned or recycled selectively at the Customer's request.

7. Quality tests

Each TopStart assembled by Phillips & Temro Industries Europe SPRL is controlled and tested before leaving the factory. For this reason, it is possible to find residual water in the heating body.

Phillips & Temro Industries Europe SPRL runs the following test on each TopStart:

- ➔ Test of electrical insulation
- ➔ Test of heating capacity.
- ➔ Test of the circulating pump
- ➔ Water tightness pressure test of the heating body
- ➔ Test of the regulating thermostat

You will find in the packaging a check list of all the tests undergone on your TopStart. Keep this list carefully.

8. Warranty

All our TopStart devices are guaranteed against all manufacturing errors over a 2 years period, starting at the invoice date and following general sales conditions. This warranty is voided in each of the following situations:

- ➔ The device was transformed or modified without permission of Phillips & Temro Industries Europe SPRL
- ➔ Installation und use are against the guidelines of TopStart
- ➔ The heater is damaged by impurities or grimes.

You have a 2 years warranty on the parts and labour except if there is an installation or using defect according to our general sales conditions. Our warranty covers exclusively the standard change of the heater or the replacement of the damaged parts. The shipment and the installation costs are not taken under the warranty of Phillips and Temro Industries.

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