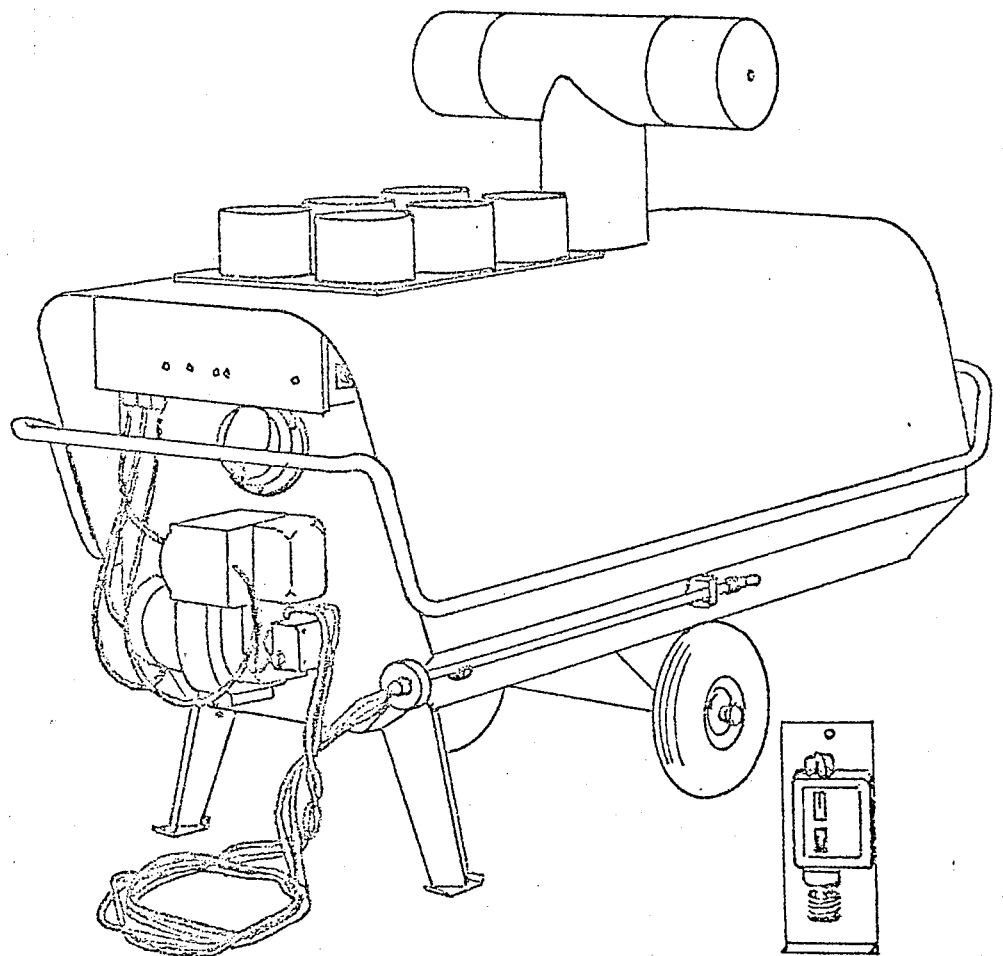


Dantherm

INSTRUCTION MANUAL

UTC



OPERATION

A Dantherm UTC warm air heater is built up of the following main components:

1. Oil Burner
2. Fan
3. Control Panel
4. Room Thermostat
5. Combustion Chamber/Heat Exchanger
6. Casing with air outlets.
7. Carriage
8. Flue Outlet
9. Combined Suction/Return Hose with Check-Valve
10. Lifting Hook.

The heater functions in the following way:

1. When the room thermostat (4) calls for heat, the oil burner comes into operation via the control box in the control panel (3). If a flame is established, the rest of the starting procedure will continue normally. If this is not the case, the control box will, after approx. 25 sec., cut off the oil burner and the red light on the control panel will come on.
2. When the temperature in the heater itself has reached a certain level (50°C), the fan (2) will come into operation via the combination thermostat of the control panel (3).
3. When the room temperature has reached the desired level, the room thermostat will cut off the oil burner, while the fan will go on running until the temperature inside the heater has reached approx. 30°C . Then the combination thermostat will cut off the fan.
4. If the temperature inside the heater for one reason or another rises to more than 80°C , the combination thermostat will cut off the oil burner, but leave the fan in operation. As soon as the temperature has dropped to less than 80°C , the oil burner will automatically start.
5. Should the temperature, even though the oil burner is switched off, still rise, then the electricity supply to the heater will be cut off altogether by the overheat thermostat, positioned in the control panel (3), when the temperature reaches 100°C .

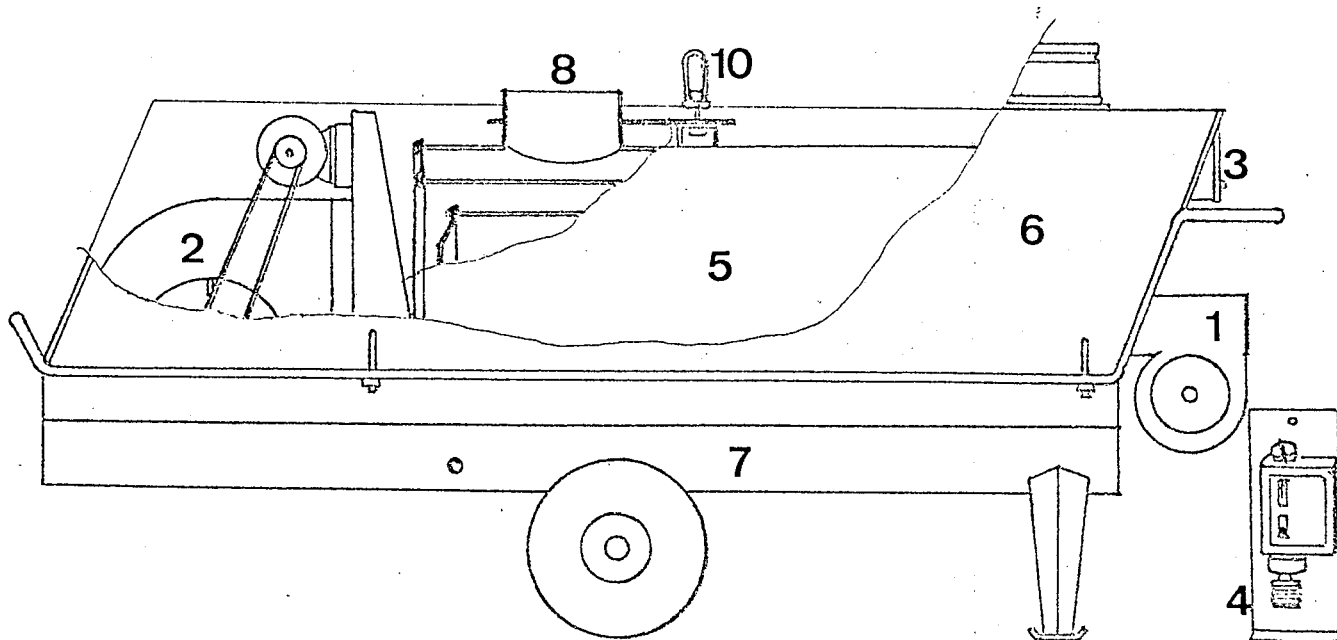


Fig. 1

CONNECTION TO ELECTRICITY

Dantherm type UTC are - when they leave the factory - fitted with all necessary electrical equipment, including an approx. 17 m (50 ft.) long cable which only has to be fitted with a suitable plug for 3 x 380 volt (3 x 420) + earth.

CONNECTION TO THERMOSTAT

The heater is supplied with a Danfoss RT4 room thermostat connected to the heater by an approx. 7 m (20 ft.) long cable, and no further connections are necessary. The thermostat is placed in the room in which the temperature should be controlled. It must be placed in such a way that it is not exposed to direct sunlight, air flow from the heater or other special direct influence. Furthermore, it is recommended not to place it near a door, as opening and closing of the door might mean false temperature fluctuations which again will influence the thermostat.

The thermostat is adjusted by turning the button (1) until the desired temperature can be seen on the scale (2). When the temperature drops below this level, the heater will start. The differential cylinder (3) is graduated from 1-10, with 1 as the smallest and 10 as the largest temperature differential. In order to adjust the differential cylinder, the lid must be dismantled by means of the four screws (4). Normally the cylinder should be set at approx. 2.

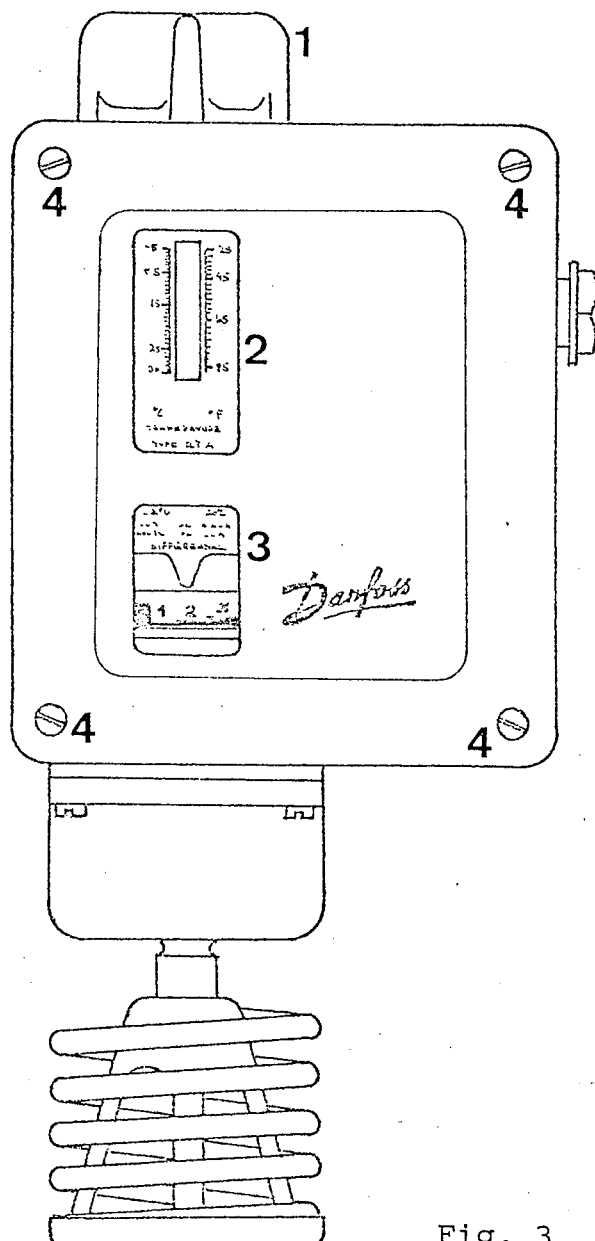
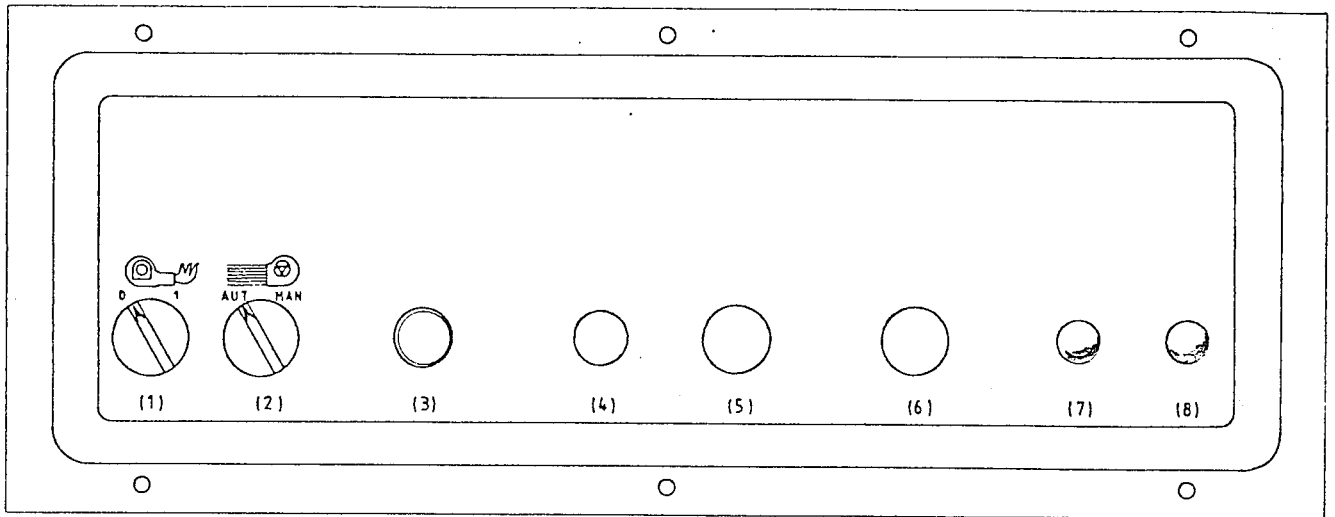


Fig. 3

OPERATION

All the operating buttons and control lamps of the heater are placed on the control panel above the oil burner at the front of the heater.



Operation

1. Switch for oil burner
2. Switch for fan AUT - MAN
(AUT: Delayed fan start/stop)
(MAN: Constant fan operation - ventilation)
3. Reset button for High Limit thermostat OT
4. Reset button for fan
5. Reset button for burner motor
6. Reset button for oil burner control box
7. Red control lamp for burner failure
8. Green control lamp for power supply

STARTING OF THE HEATER

PREPARATION

When the heater has been installed and is ready for operation, the procedure described below should be followed:

1. Check that the heater is connected to electricity in the correct way and that the current is switched off.
2. Check that there is oil in the drum (or if connected to an oil tank - in the tank) and that it is the correct type of oil.
3. Check that the room thermostat is set at a temperature higher than ambient.
4. Check that the window of the photo cell is clean and facing the flame.
5. Check that all return air openings are free and that the inlet and outlet grilles are open - in ductwork, too.
6. Check that the fan switch is in AUT position.
7. Press all reset buttons.
8. Check that the joints of the oil line are tight, that there are no open ends, and that the oil lines are correctly connected to the pump (when using the combined suction/return hose, the suction line must be connected at the top of this).
9. Check that the small screw is fitted in the pump when using two-pipe system.
10. Check that the oil burner switch is in OFF position.

START UP

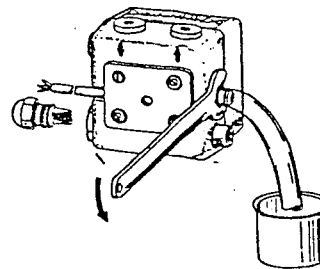
3

When all these tests have been made, switch on the electricity to the heater and start the fan by turning the fan switch to the MAN position. The air should now be blown out of the openings at the top of the heater. If this is not the case, switch off the electricity to the heater and swap over two phases on the mains connection into the control panel - not the connections to the fan motor. Switch on the electricity again and check that the fan now is running the right way.

After this the oil pipework must be vented. This is done by loosening the small screw as shown on the below figure for MSLB pumps.

The screw should only be loosened a few turns - not be taken right out. Then remove the photo cell from its bracket at the side of the burner, cover the window of the photo cell with one hand, and switch on the burner by turning the burner switch to ON. As soon as the burner motor starts running, take the hand away from the window of the photo cell, so that light is coming on to the window. Let the burner run, until a clear stream of oil is coming out of the hole in the side of the bolt at the underside of the pump. Have a bucket ready for the oil. Then stop the burner by turning the burner switch to OFF, tighten the small screw and replace the photo cell, making sure the window is turned towards the flame. After this the burner can be started again, and after a few seconds a flame will be established.

After 2-3 minutes running, the fan motor will start automatically. Check that the fan thermostat is functioning correctly by switching off the burner to allow the fan to stop automatically.



MSLB oil pumps

TESTING

Now the testing of the heater can take place. To carry out the test, the following equipment is required: flue thermometer, CO₂-tester, soot spot tester, flue manometer and oil pressure gauge.

1. Switch off the burner and fit the oil pressure gauge under the pump, in place of the bolt with the vent screw.
2. Start the burner and allow it to run for approx. 15 min. before starting the test.
3. Adjust the oil pressure to 9-10 kg/cm² (130-140 psi) and adjust the air volume until a bright clean flame has been achieved.
4. Make a soot spot test, the soot spot should be 1-2. If more than 2, increase the air volume.
5. Make a CO₂-test and measure the temperature in the flue. The CO₂-percentage should be as high as possible and preferably 11% or more. The flue temperature and the CO₂-%, together gives the combustion efficiency, which should be at least 85% and preferably 88-90%.
6. If the heater is connected to ductwork, check that the amp. consumption does not exceed the nominal amperage of the motor.

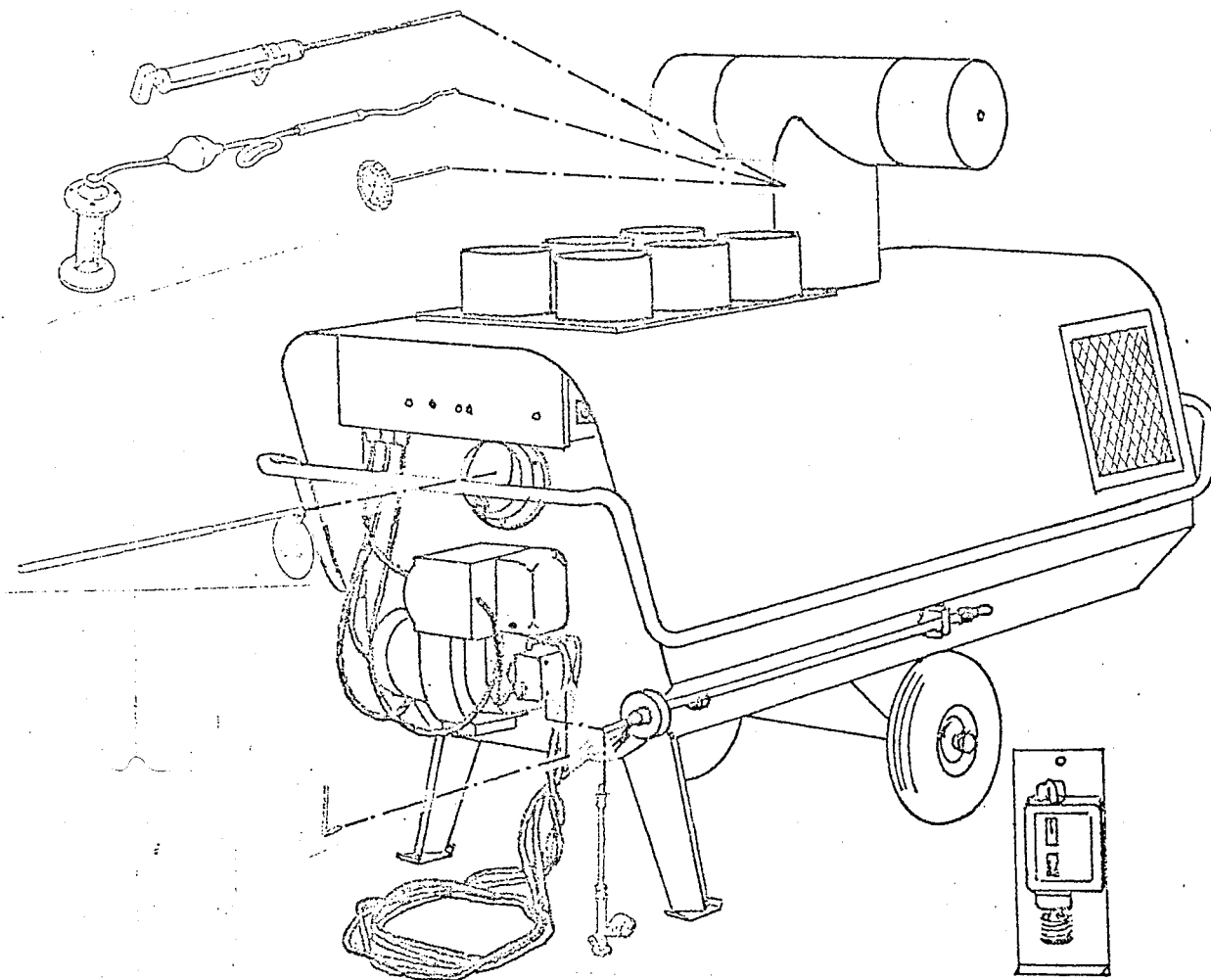


Fig. 5

SERVICE AND MAINTENANCE

Dantherm type UTC is designed in such a way that only a minimum of maintenance is required. The user maintenance is limited to keeping the outside of the heater clean.

Once a year, however, the heater should be checked through by an engineer to ensure that the heater also in the coming year will function satisfactorily with economic running. This annual check should comprise the following:

1. After start up of the heater, check of combustion chamber and heat exchanger for damage.
2. Cleaning of combustion chamber and heat exchanger (see page 6).
3. Cleaning and adjusting of swirler plate, electrodes and nozzle, replacing nozzle if required.
4. Cleaning of the burner fan wheel.
5. Check setting of control thermostats. (30 - 50 - 80° C).
6. Cleaning of filter in pump and in oil line (if fitted).
7. Cleaning of main fan. Tightening of belt, replacing belt if required.
8. After every 10.000 hours running, replacing grease in the fan motor bearings.
9. After start-up of the heater, check of thermal relays and measuring of amp.-consumption
10. Check of overheat thermostat, by disconnecting fan motor, with burner running.
11. Check of the photo cell. Measuring the amperage.
12. Check of the flame sequence control box - check of safety cut-off time.
13. Testing as described on page 4.
14. Cleaning of the surfaces of the heater.

FAULT FINDING

In case of breakdowns, first go through the following points:

1. Check that there is oil in the tank and that all valves are open.
2. Check that there is power to the heater (Main isolator).
3. Check if the window of the photo cell is dirty - clean it if necessary. Replace the photo cell with the window facing the flame.
4. Check that the room thermostat is set at a temperature higher than ambient.
5. Press the reset buttons for overheat thermostat, motor relays and control box.
6. If electrodes, swirler plate or nozzle are dirty, clean these and adjust according to drawings at the back of the book.

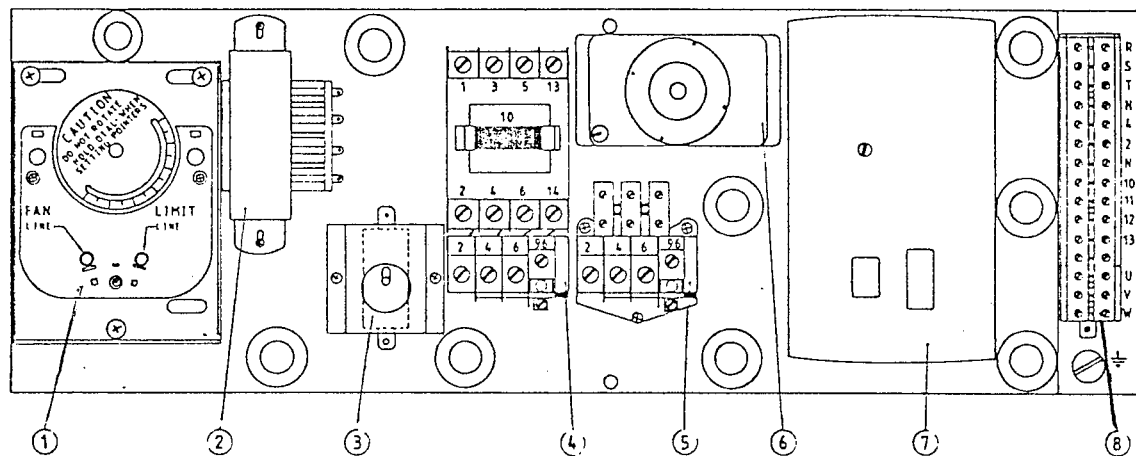
If the heater, after carrying out these tests, does still not function, call your service engineer.

CONTROL PANEL

All the functions of the heater are controlled by the control panel at the front of the heater.

The control panel contains the following main components:

(see wiring diagram page 8)



1. Combination thermostat
2. Autotransformer (not in UTC 150)
3. High Limit thermostat
4. Motor contactor for fan motor
5. Thermal overload for burner motor (contactor in UTC 150)
6. Fuse 6 A
7. Control box for oil burner (not in UTC 150)
8. Terminals for electric connection

CLEANING

Should there, by checking through the inspection and cleaning cover and the flue outlet, be found soot deposits, the heater must be cleaned thoroughly. Try at first an ordinary soot remover for oil burners. If this is not sufficient, the heater must be disassembled.

This is done by removing the four brackets (1) and the lifting hook (2). Then the outer casing (3) can be removed. The oil burner and the inspection cover are dismantled and the two bolts (4) for the supporting legs of the heat exchanger are removed. The heat exchanger can now be lifted from the under part of the heater.

The domed cover (5) and the rear assembly ring (6) must be dismounted. Cleaning can now easily be carried out with a brush.

Before assembling, the domed cover and the assembly ring must be thoroughly cleaned and the groove in the domed cover and the assembly ring should be packed with an asbestos rope and fire cement.

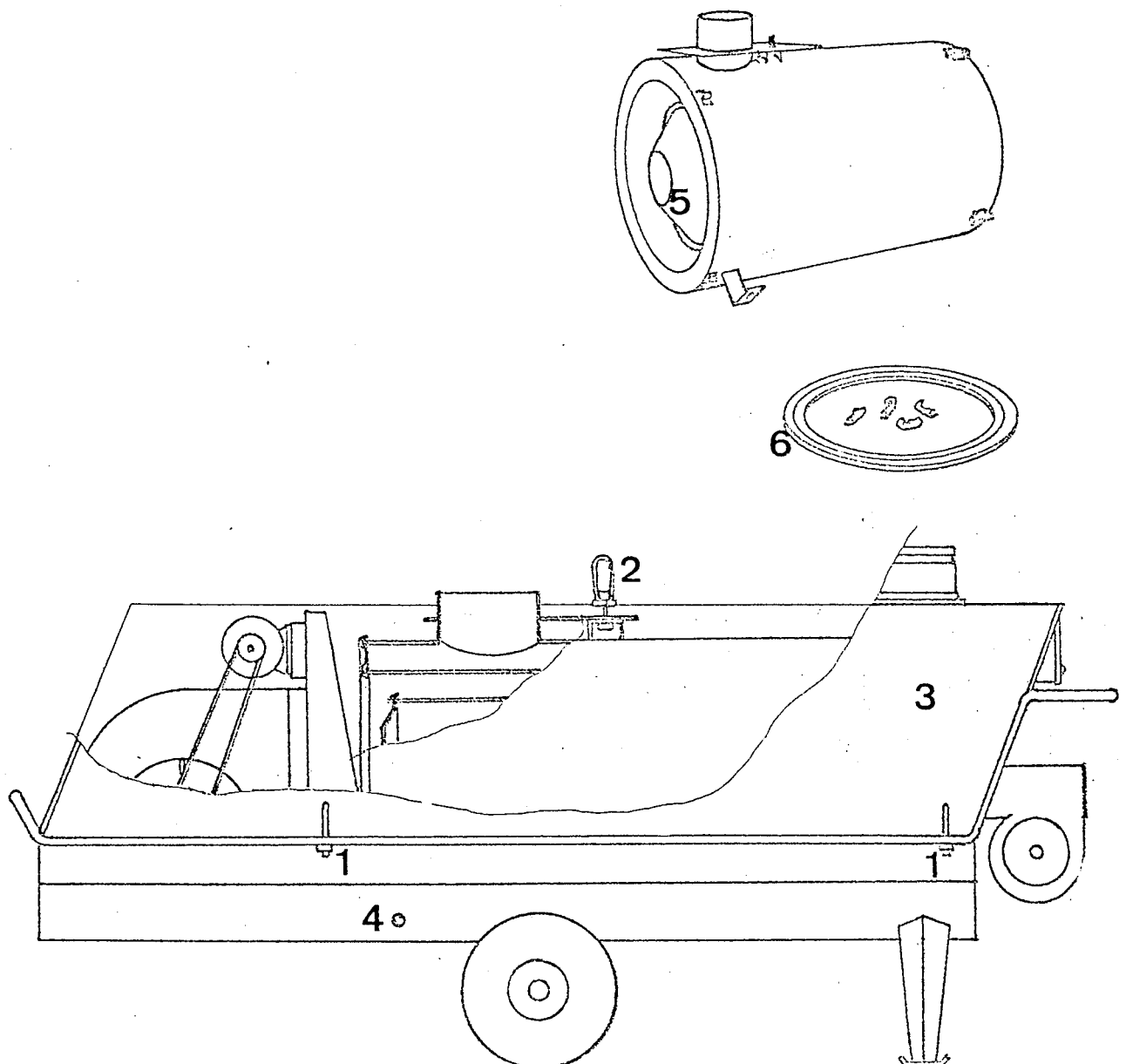


Fig. 6

INSTALLATION INSTRUCTIONS

Dantherm type UTC can be installed everywhere where it can be connected to 3 phased electricity. All that is needed apart from that is an oil drum and - if wanted - provision for leading the flue gases outside.

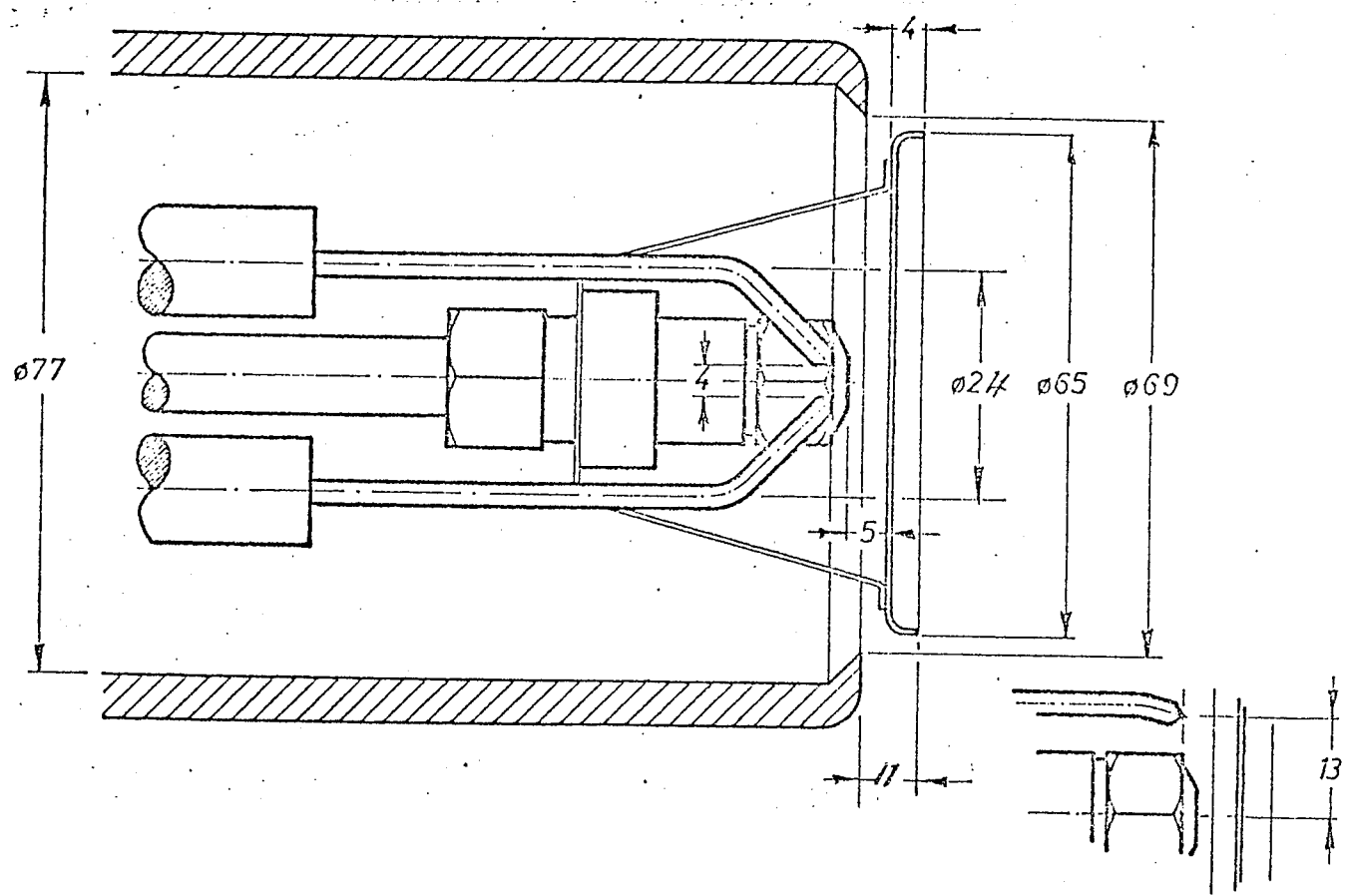
If the heater is placed outdoors, paraffin wax may be formed in the oil on very cold days, resulting in breakdowns. In order to avoid this, up to 20% kerosene can be added to the oil. It is necessary to stir slightly to make the kerosene mix properly with oil. Please note that this is only a preventive measure. If paraffin wax has already been formed, it cannot be dissolved by kerosene, as paraffin wax can only be dissolved at a fairly high temperature.

Never leave the oil drum out in the rain or snow without cover, and with the suction/return hose inserted. The water will run into the drum and cause breakdowns.

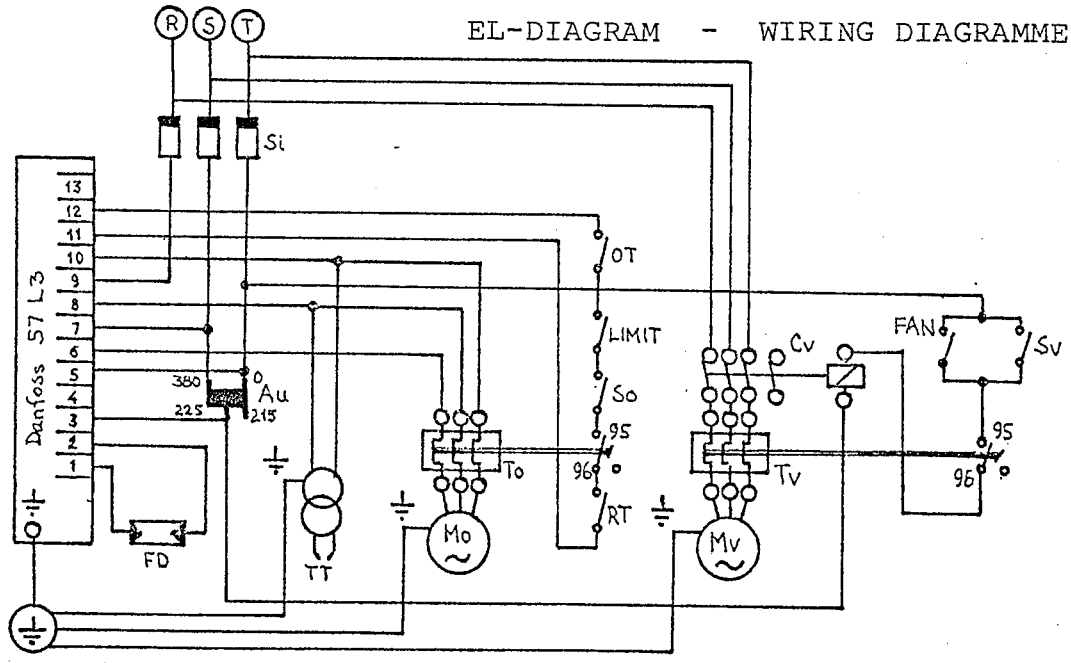
Dantherm type UTC is supplied with the following flue pipe parts: T-connection with spark arrester, 2 off 90° bends. The flue pipe must be very carefully assembled, as good draught conditions are necessary to ensure economic running.

The heater is standard supplied with 6 off 155 mm (6 1/8") outlet spigots designed for fitting of flexible tubes. If all the air is to be led through one duct, one single, large outlet spigot for mounting on the heater can be supplied as an option.

ADJUSTMENT OF BURNER HEAD



EL-DIAGRAM - WIRING DIAGRAMME



- | | | | |
|-------|---------------------|----|--------------------------------|
| Au | Auto Transformer | RT | Room Thermostat |
| Cv | Fan Contactor | Si | Fuse |
| FAN | Fan Thermostat | So | Burner Switch |
| FD | Photo Cell | Sv | Fan Switch |
| LIMIT | Limit Thermostat | To | Thermal Relay for Burner Motor |
| Mo | Burner Motor | Tv | Thermal Relay for Fan Motor |
| Mv | Fan Motor | TT | Ignition Transformer |
| OT | Overheat Thermostat | | |