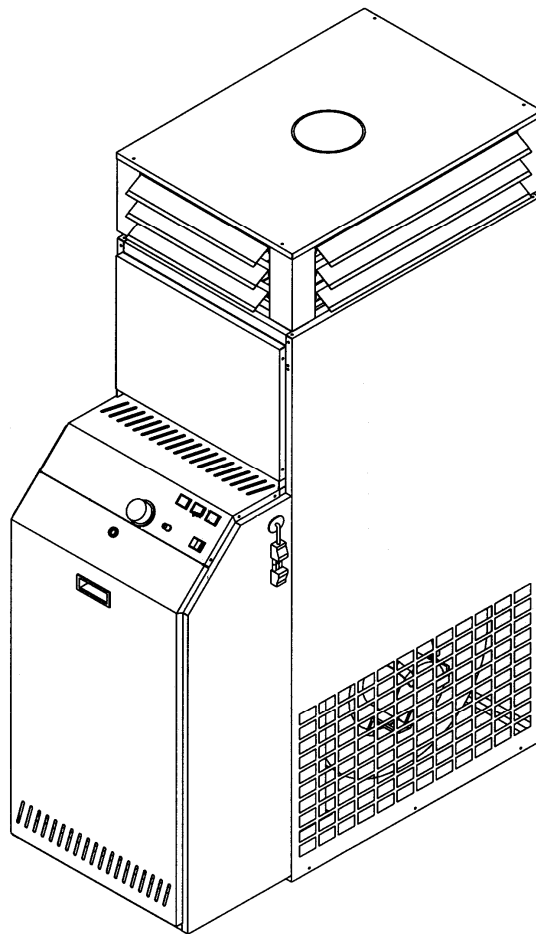


OIL-FIRED AIR HEATER

KOS

**TECHNICAL INFORMATION
ASSEMBLING INSTRUCTIONS
USE AND MAINTENANCE**



Munters

KOS heaters are produced according to :

- Directive 2006/42/CE – 2004/108/CE – 2006/95/CE

MODEL	CODE With oil burner
KOS 34 IE	120000 4331
KOS 47 IE	120000 4431
KOS 70 IE	120000 4531
KOS 93 IE	120000 4631
KOS 110 IE	120000 4731

Dear Customer,

Thank you for choosing our **KOS** air heater a new, modern and high quality product that guarantees efficiency at all times. The heater is very quiet and safe specially when maintenance is made by our MUNTERS ITALY Technical Service.

The instruction manual contains important information that must be followed to install and operate the **KOS** heater.

We thank you again for choosing our products.

MUNTERS ITALY S.p.A.

WARRANTY

The **KOS** heater is covered by a specific warranty that becomes effective from your customers purchase date, this must be proved by documentation, otherwise the production date will be used.

All warranty conditions are listed in the "WARRANTY CERTIFICATE" that is supplied together with the heater, therefore we suggest you read it very carefully.

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GENERAL NOTIONS

1) This manual must be considered an integral part of the machine even when transferred to another user. It must be carefully conserved and consulted before any operation. If damaged or lost your local MUTERS ITALY Technical Assistance Service can send you a copy.

2) After taking off the packaging, check that all parts are complete. Otherwise contact your local Technical Assistance Service.

3) The KOS heater must be installed by a qualified installer according to the laws in force in the Country where the heater is placed and after the installation a valid certificate must be issued declaring that the heater has been installed according to the regulations in force.

4) These heaters have been designed to heat environments and for no other use. MUTERS ITALY will not respond, if mentioned or excluded in any contract, to any responsibility regarding damage to people, animals or objects due to errors when installing, incorrect regulation or maintenance or improper use.

5) High temperature is not good for health reasons and is also a waste of electricity. Do not allow rooms to stay closed for long periods. Open windows regularly to ensure air ventilation.

6) When used for the first time, there could be smoke or bad smells that are caused by the evaporated liquid that protects the heat exchanger when stocked. This is considered a normal effect and stops after a short period. It is advisable to change the air in the room.

7) If you do not intend to use the machine for long periods, position the general electrical network switch on the "off" position.

8) When the heater has not been in use for a long period it is advisable to contact MUTERS ITALY Technical Assistance Service or personnel qualified to start the heater.

9) The heaters must exclusively be equipped with original MUTERS ITALY spare parts. MUTERS ITALY is not responsible for damage caused by incorrect use or not original spare parts.

10) All references to laws, norms, technical regulations mentioned in this manual are for information only and are to be considered valid at the date the publication is issued. All laws that become effective or are modified as from the date of publication will not constitute any

obligation from MUTERS ITALY towards any third party.

11) Repairs or maintenance operations must be carried out by MUTERS ITALY Technical Assistance Service or by qualified personnel as mentioned in this manual.

12) All installments (oil hoses, electrical parts, etc.) must be properly fixed so there is no risk for anyone to trip over parts.

13) MUTERS ITALY must be held responsible for producing equipment that is compliant with laws, regulations or directives concerning the construction of the product. The designer, the installer and the final user must all be aware of all laws in force and observe them.

14) MUTERS ITALY will not be held responsible for anyone disregarding instructions held in this manual, for operations not indicated or for any translation that may cause a wrong interpretation of the text.

SAFETY RULES

When using electrical or oil fired equipment there are some basic rules that must be observed:

Children and non assisted disabled people are not allowed to use the heater.

It is not allowed to use electrical devices such as switches, household appliances etc. When one can smell oil or smoke. In such circumstances it is important to:

- Open windows and doors to improve air circulation.
- Close the fuel supply.
- Call immediately MUNTERS ITALY Technical Assistance or qualified personnel.

It is not allowed to touch the heater with bare feet when parts of the body are wet.

It is not allowed to carry out maintenance or cleaning procedures before disconnecting the heater from the mains by positioning the general switch on "OFF" and stopping the fuel connection.

It is not allowed to modify the safety systems or regulation systems without the manufacturers authorization or indications from the manufacturer.

It is not allowed to pull, take off, twist or cut any electrical cable that comes out of the heater without the builders authorization.

It is not allowed to open any access door to internal parts before positioning the heater switch on "OFF".

It is not allowed to scatter, abandon or leave within childrens reach any packaging (such as carton boxes, staples, plastic bags, etc.) that could be potentially dangerous.

It is not allowed to install the heater near inflammable products or in rooms with chemical products.

It is not allowed to lay objects on the heater or insert any object inside the grid or in the combustion discharging duct.

It is not allowed to touch the fuel hose, because when the heater is functioning it can reach high temperatures and become dangerous.

It is not allowed to use adaptors, multiple jacks, or extentions for electrical connections.

It is not allowed to install the heater outdoors or in areas where the heater is exposed to weather conditions.

It is not allowed to install the heater in small environments without sufficient air ventilation, air intake can cause a heavy depression in the room that can arouse serious problems.

DESCRIPTION OF THE HEATER

The KOS heater functions by using the thermal energy produced through combustion.

The thermal exchange occurs when the air flow, generated by a centrifugal fan, passes on the surface of the heat exchanger without the aid of any intermedial fluid.

The combustion products, once completed the thermal exchange, are ejected outside.

This system allows a noticeable reduction of costs on installment and a reliable and economic use, particularly ideal for all final users that require intermittent or irregular heating.

This heater can also be used, in summer, as a ventilator.

GENERAL MANUFACTURING NOTES:

The heater is composed of the following parts:

- The combustion chamber, of the "flame reversal" type, is made of AISI 430 stainless steel, resistant to high temperatures, with a low thermal charge with different shapes or volumes depending on the model.
- Tube nest heat exchanger that guarantees a maximum thermal efficiency.
- Back smoke manifold with inspection door for an easy access when cleaning pipes.
- Four way head air diffuser with revolving flaps that can be completely shut for excluding air on one side.
- External steel epossidic painted panels that can be dismantled.
- Thermal anti radiant insulation of the surfaces exposed to heat radiation of the exchanger.
- Hole set to be connected to a ducting system.
- Casing with an inspection door to protect the burner and the tank.

- Centrifugal fan with two suction inlets, noiseproof, high performance, single voltage electrical motor directly connected to a centrifugal fan.
- Large capacity oil tank equipped with filling hose, filter and connection fittings to the burner.
- Oil suction burner equipped with electrical control for fully automatic use.

ELECTRIC PARTS:

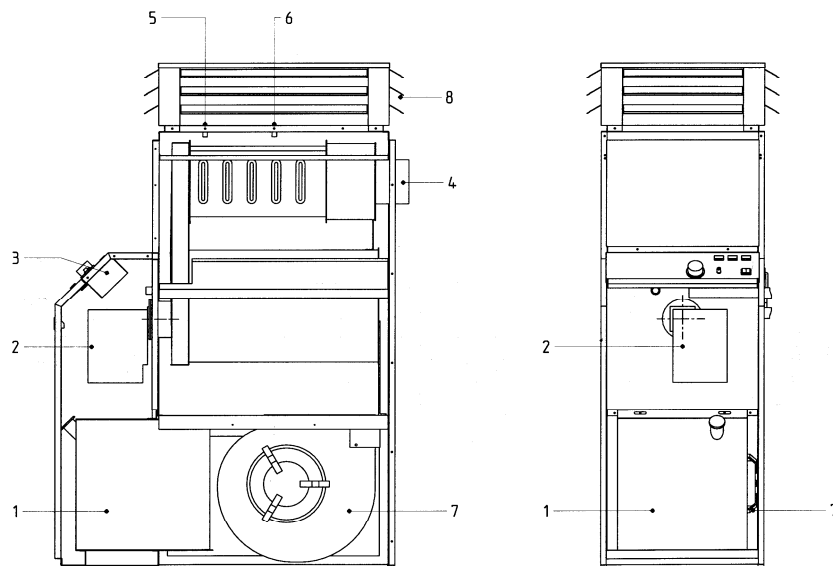
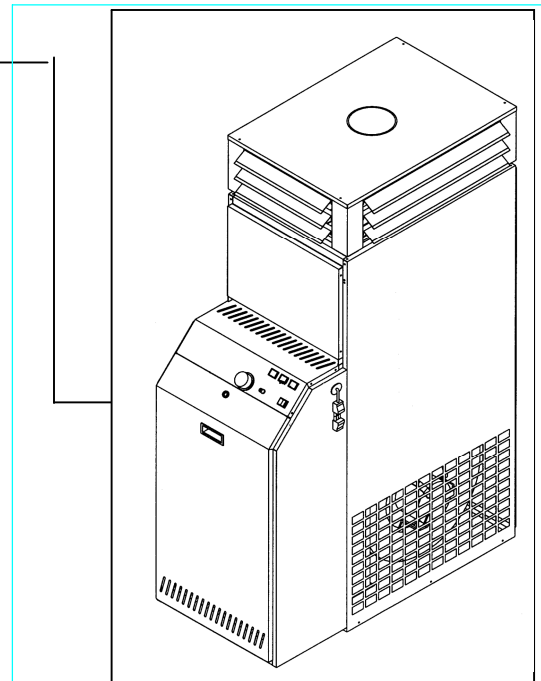
- **Liquid expansion FAN" thermostat (35°C)** which starts the fan 60 seconds after ignition of the burner and stops it 4 minutes after the burner stops. This avoids the cold air exiting when switched on and expels the heat accumulated in the heat exchanger once the unit has been turned off.
- **"LIMIT" thermostat (100°C)**, with a reset manual switch, that stops the burner when the air is overheated. When the "LIMIT" switch is activated, reset only after checking and eliminating the causes for which it was activated.
- **Room thermostat (0-40°C)** for automatic regulation of the room temperature through a sensor positioned on the air inlet and an adjusting knob positioned on the central panel.
- **Green light** indicating electrical voltage.
- **Yellow light** indicating the "LIMIT" thermostat is working.
- **Red light** indicating that the burners electronic device has stopped.
- 3 position switch to set heating, ventilation or to stop.

IDENTIFICATION

The KOS heater can be identified through a Technical Data plate where all technical specifications are marked, it is positioned directly inside the burner cabinet.

If the data plate is damaged or lost it is necessary to request a duplicate from the MUTERS ITALY Technical Service.

® Corso Inghilterra, 15 12084 Mondovi – ITALY AIR HEATER	
Code	
Model	
Serial plate number	
Country	
Thermal input	
Thermal output	
Air flow (+20°C)	
Electrical feeding	
Motor power	
Maximum current of motor	
IP degree	



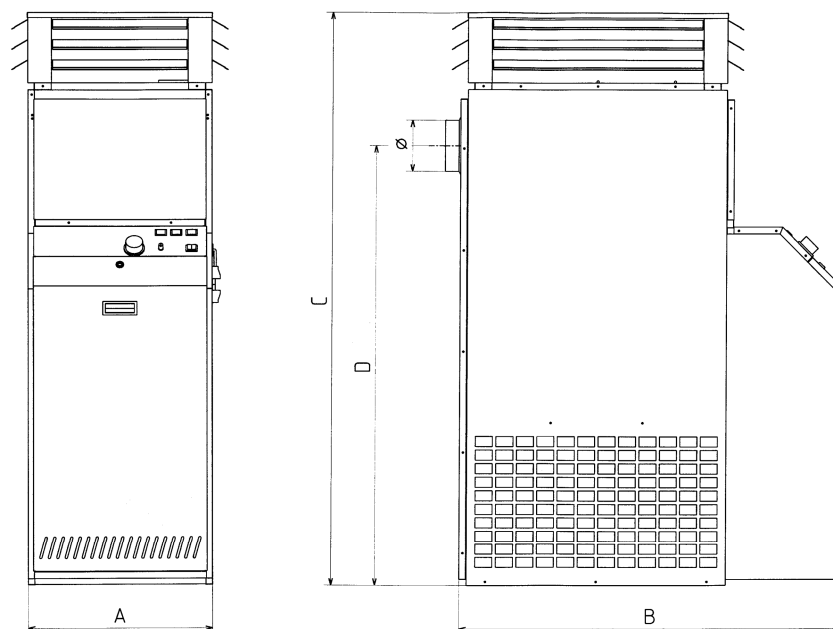
- 1. Tank
- 2. Oil burner

- 3. Electrical board
- 4. Chimney fitting

- 5. FAN thermostat
- 6. LIMIT thermostat

- 7. Electroventilator
- 8. Air outlet

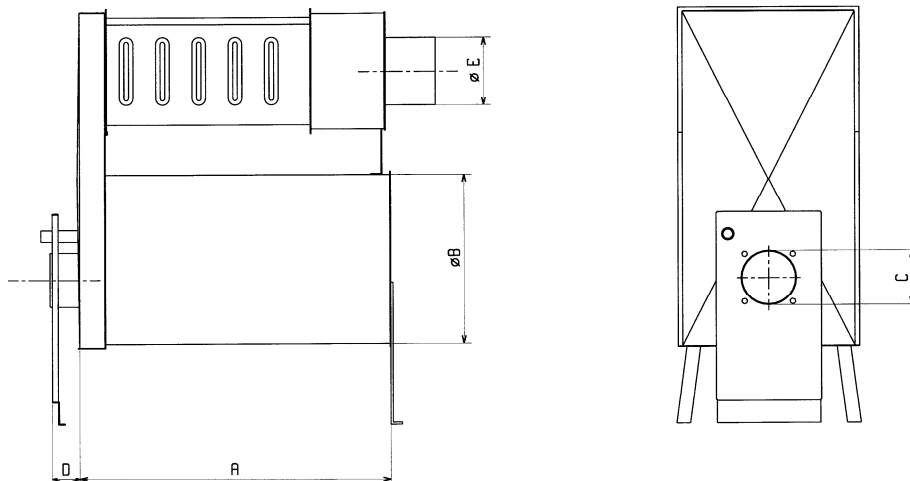
SIZE



Size (mm)	KOS 34	KOS 47	KOS 70	KOS 93	KOS 110
A	460	460	540	680	760
B	1.050	1.050	1.120	1.220	1.400
C	1.600	1.600	1.700	1.885	2.000
D	1.175	1.175	1.305	1.430	1.570
Ø Chimney	120	120	150	180	200

SIZE OF COMBUSTION CHAMBER

The heat exchanger has 3 smoke rings and the combustion chamber has the following size:



Model	A	BØ	C	D	EØ
KOS 34	623	316	120	60	120
KOS 47	623	316	120	60	120
KOS 70	683	380	120	60	150
KOS 93	728	476	170	80	180
KOS 110	906	567	170	85	200

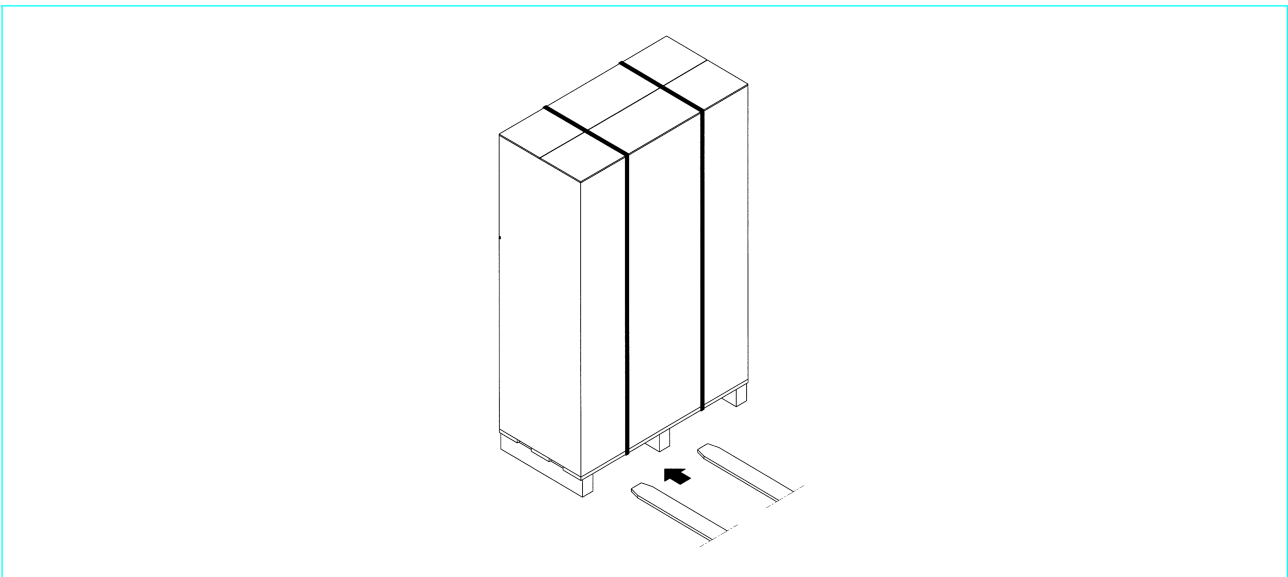
**KOS
TECHNICAL DATA**

		KOS 34	KOS 47	KOS 70	KOS 93	KOS 110
Thermal input	kW	33,7	46,8	71,1	93,0	104,6
	kcal/h	29000	40300	61200	80000	90000
	Btu/hr	115000	160000	245000	320000	360000
Thermal output	kW	30,4	42,2	64,4	83,91	94,2
	kcal/h	26130	36300	55400	72100	81090
	Btu/hr	104000	145000	220000	290000	320000
Efficiency	%	90,1	90,1	90,5	90,1	90,1
Combustion chamber volume	dm ³	48,8	48,8	77,4	129,5	228,5
Oil consumption	kg/h	2,84	3,95	6,00	7,84	8,82
	ltr/hr	3,34	4,65	7,06	9,22	10,38
	gal/hr	0,88	1,23	1,87	2,44	2,74
Air +20°C	m ³ /h	1900	2800	4500	5300	6300
	cfm					
ΔT	K	45	43	41	45	45
	F	81	77	74	81	81
Thermostat setting	°C	35 (95)				
	(F)	100 (212)				
• FAN	°C	100 (212)				
• LIMIT	(F)	100 (212)				
Electrical feed		230V 50Hz~				
Motor power	kW	0,245	0,245	0,590	0,736	0,736
Electrical degree	IP	20				
Net weight (excluding burner)	kg	132	137	173	197	264
	lbs	290	300	381	433	581
Tank capacity	l	20	55	75	105	135
	gal	5,5	14	20	28	36

HANDLING AND TRANSPORT

The heaters must only be handled by personnel properly equipped with machinery capable of handling the weight of the heater.

If using a fork lift make sure that the fork is inserted correctly in the slots between the side supports.



BEWARE!

When handling or moving the heater it is important to be very careful not to damage the heater or harm people.

When handling or moving the heater it is not allowed to stay near the unit.

It is not allowed to stack the heaters in layers, it is also important to line them up correctly not to create instability.

When moving the heater manually, make sure there is a sufficient number of people to lift the weight of the heater for the distance to be covered. The weight of the machine is indicated at the paragraph "TECHNICAL DATA".

We advise the use of gloves when handling the heater.

LOCATION

The heater must be installed in a specific location decided by the engineer or by qualified personnel according to technical requirements and Laws or norms in force. It is advisable to obtain authorizations such as: fire certificates, anti-pollution certificates, town-planning charts, etc. It is therefore advisable to obtain all documentation before installing the heater.

When installing the KOS heater it is important to keep in mind that :

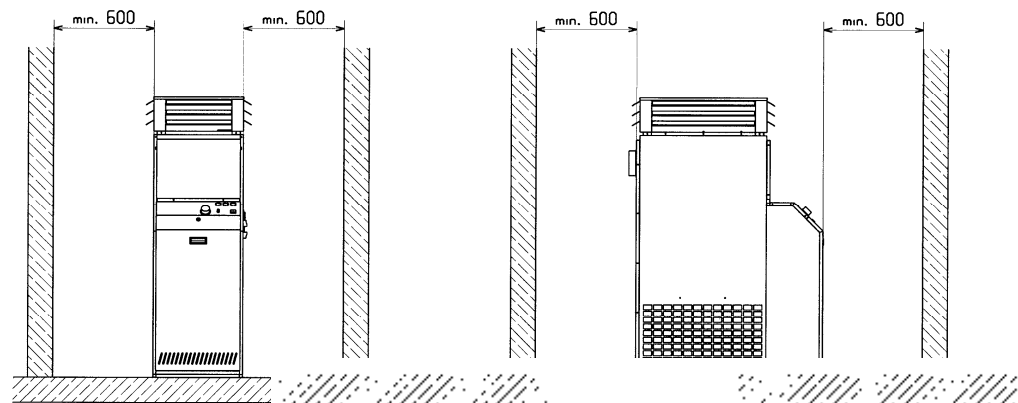
- the heater must be positioned on well levelled and dry ground capable of sustaining the weight of the machine;
- when finding the correct installment location for the heater one must consider the distance that allows a correct air flow and allows maintenance and cleaning procedures to be carried out;
- that there must be a safety distance between the unit and inflammable materials;

- that it must be positioned near a chimney;
- that it must be positioned near the electrical supply;
- that it must be positioned so there is easy access for maintenance or cleaning operations;
- that it must be positioned in a room with air ventilation according to the Laws in force.

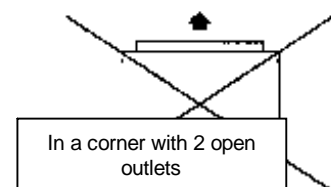
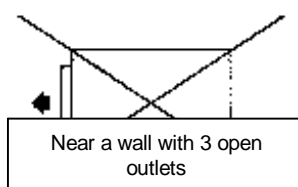
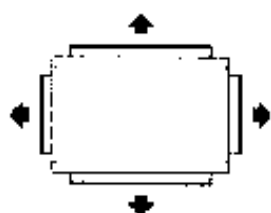
It is not allowed to install the heater :

- when the air is polluted with chemical agents or aggressive agents;
- when the room is narrow or restricted and the noise caused by the unit can reverberate or cause acoustic resonance;
 - in dusty environments or where there are leaves or other particles that could reduce the efficiency and obstruct the air flow;
 - Outdoors

Free zone



Examples for installment



HEAD

The heater is equipped with a 4 way head with movable flaps.

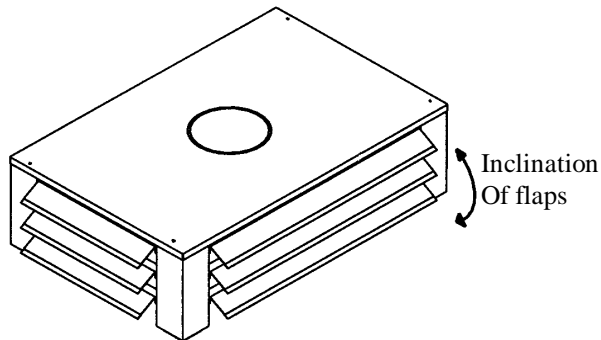
The regulation of the flaps must allow:

- a regular distribution of air
- a low air drag
- no interference with people



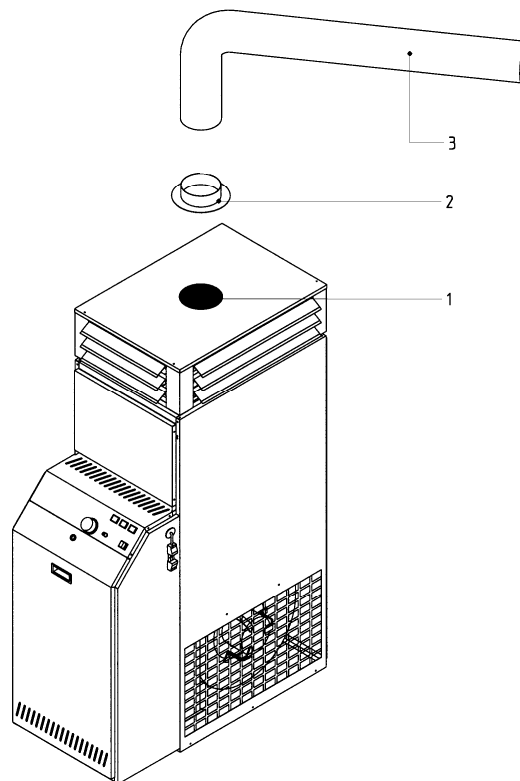
IMPORTANT!

It is not allowed to let the air exit only on one side.



DUCTING

It is possible, by ducting, to send some of the hot air to other rooms through a hole (\varnothing 150 for the models **KOS 34/47/70** and \varnothing 300 for the models **KOS 93/110**) situated on the superior panel on of the head.



1. Set hole
2. Fitting (not supplied)
3. Duct (not supplied)

FIXED PROTECTIONS

To avoid accidental contact with any moving part of the heater it is absolutely forbidden to switch on the heater when it is not provided with its fixed protection which are:

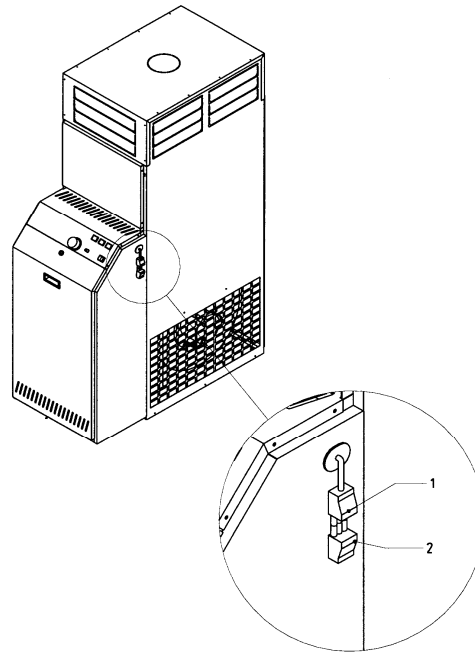
- Burner inspection panel
- Back panel

ELECTRICAL CONNECTIONS

The heater is equipped with an electrical board, a fan motor, thermostats and a burner already connected:

For the connections use the socket positioned externally according to the specific electrical diagram.

Therefore all connections concern the general electrical feeding system.



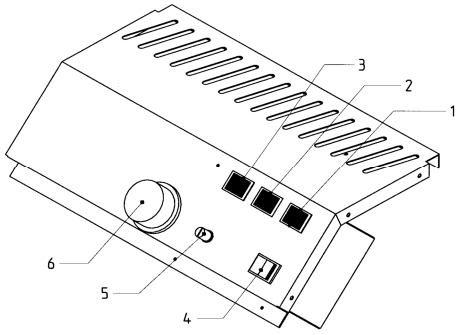
1. 3 pin plug
2. 3 pin socket

WARNING!!

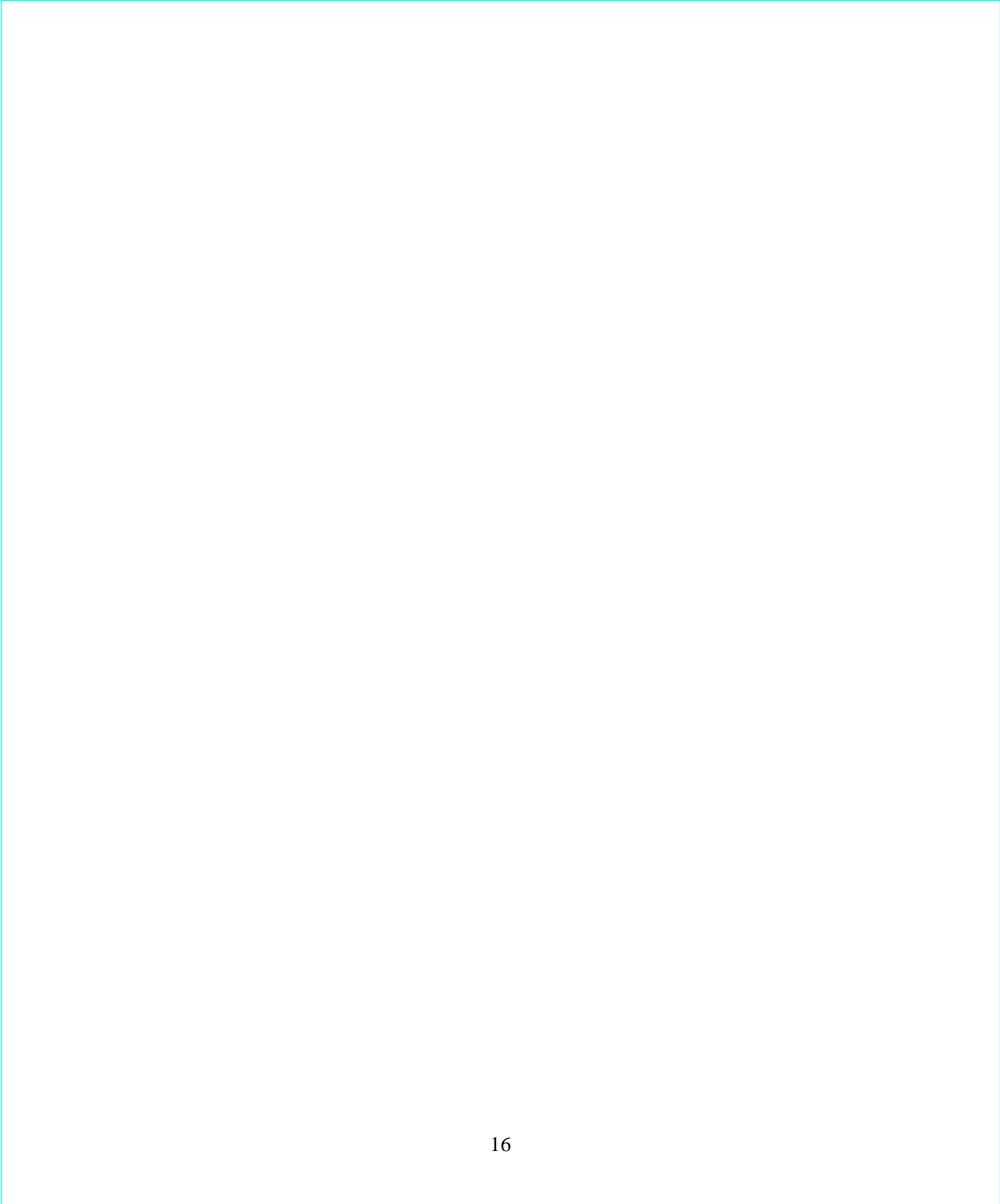
- The heater must be protected by a magnetic switch of the right size according to the “technical data” chart and according to the laws in force.
- Make sure that trained personnel checks that the cross section of the electric cables and the electric system are adequate to the maximum absorbed power of the heater that is indicated on the the serial plate.
- Always earth the heater, make sure that the earth cable is longer than the mains, so if accidentally pulled it is the last one to cut off.
- Always make sure that the polarity is correct on all connections.

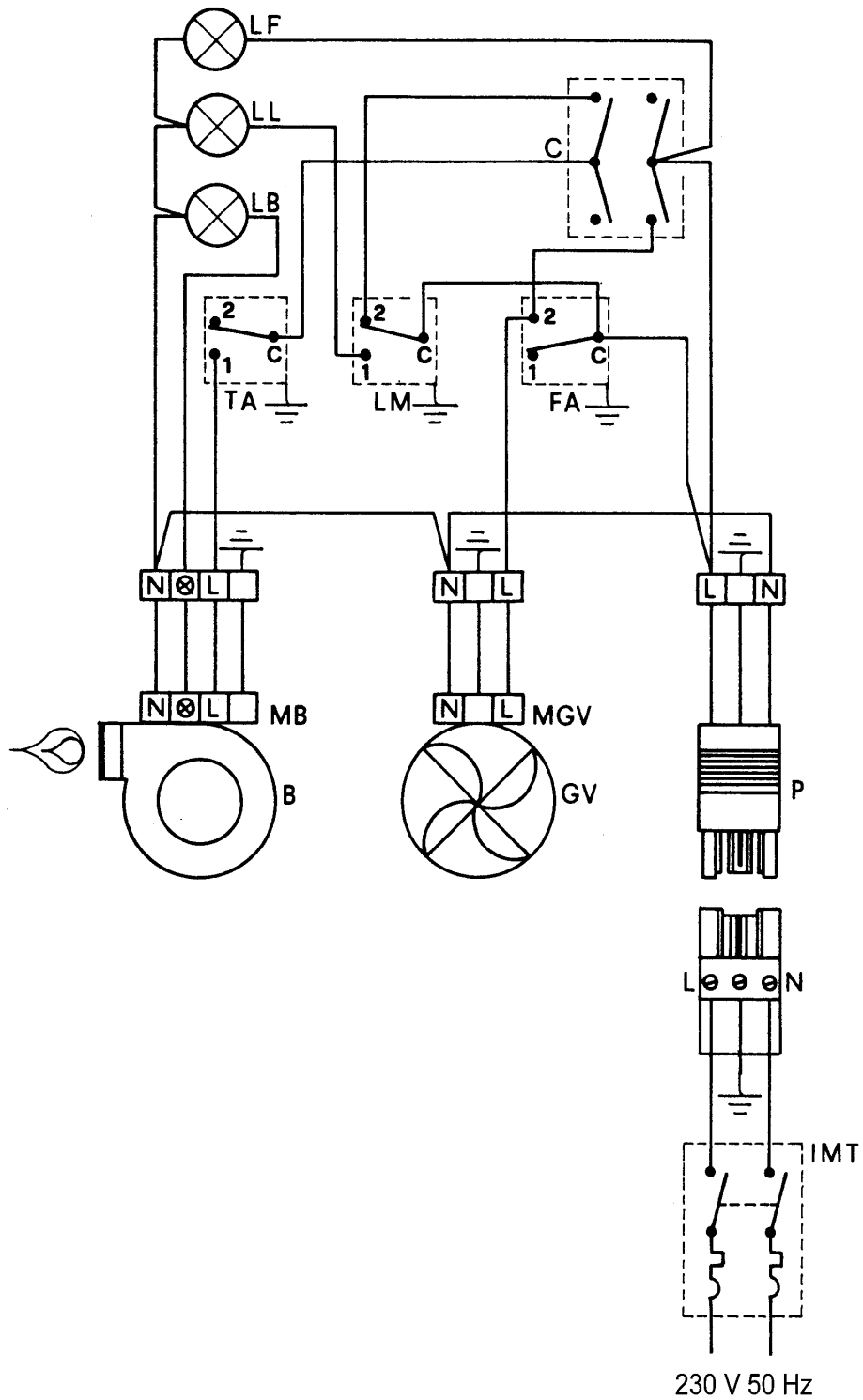
CONTROL BOARD

1. Voltage indicator (green)
2. LIMIT thermostat indicator (orange)
3. Burner block indicator (red)
- 4. Switch**
5. RESET LIMIT switch
6. Room thermostat



ELECTRICAL CHART





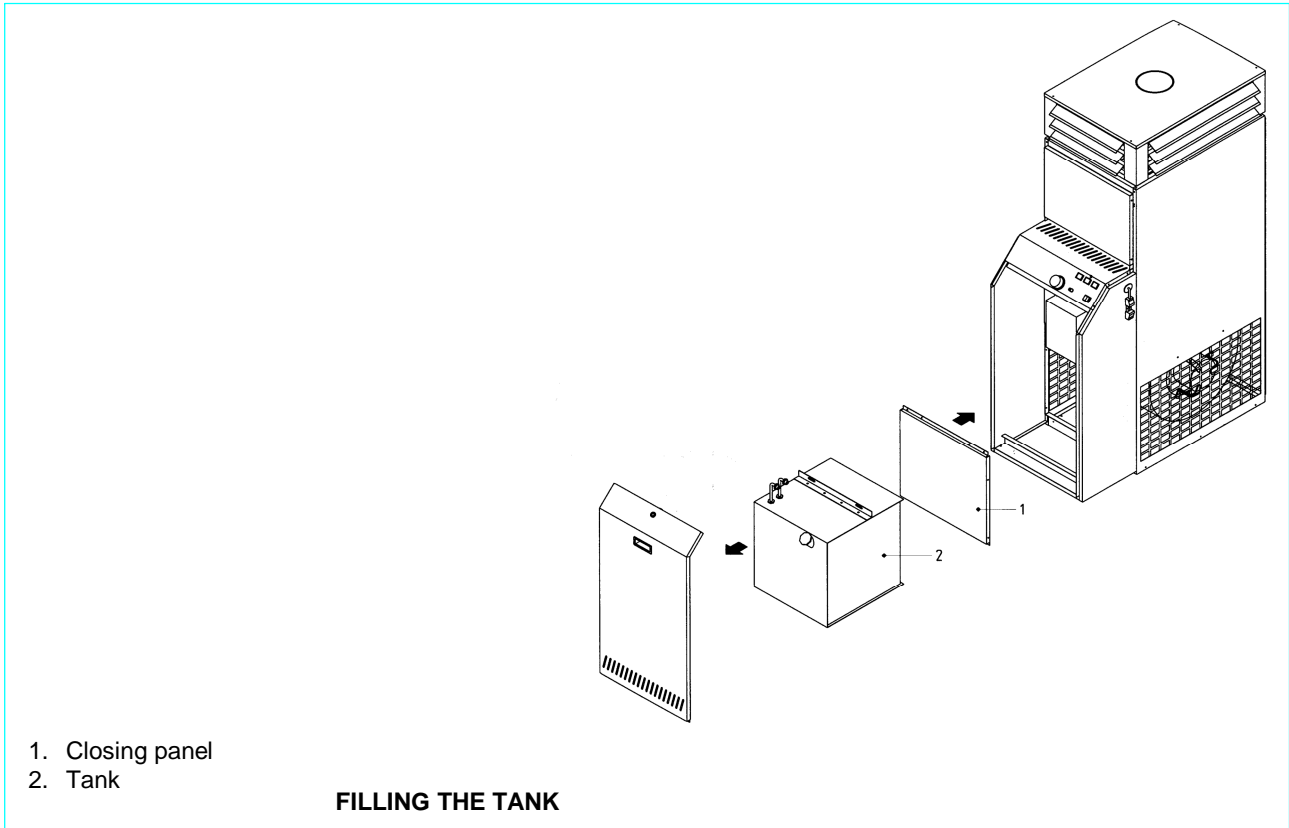
CAPTION

- LF** Voltage indicator
- LL** Limit indicator
- LB** Burner lock-out indicator
- C** Heating / stop / fan switch
- TA** Room thermostat
- LM** Limit thermostat
- FA** Fan thermostat
- MB** Burner terminal board
- B** Burner
- MGV** Fan terminal board

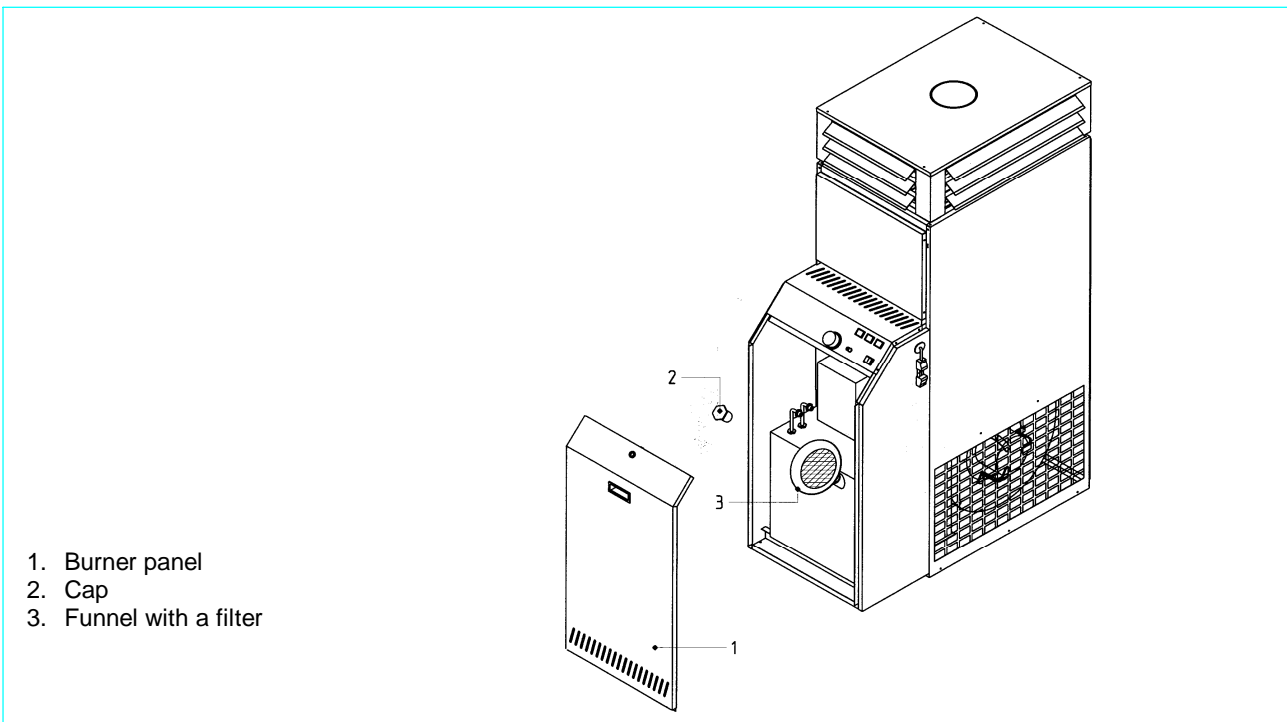
- GV** Fan group
- P** Outside socket
- IMT*** Magnetic switch

*External part of the heater – to be installed by the customer

The KOS heater is equipped with a tank that not necessarily must be installed inside the heater (if the tank is positioned far away we can supply a closing panel)



- Take off the burner panel
- Take off the tank cap
- Fill the tank with a funnel with a filter



REGULATING THE OIL BURNER

Only qualified personnel can assemble and regulate the oil burner, following strictly the instruction manual of the burner.

BEWARE:
Regulation chart
RIELLO oil burner

All data indicated here is by way of example.
The regulation of the combustion air changes according to the chimney characteristics, and this occurs by adjusting the air lock according to the instructions on the manual.

	Burner model	Electrical feed	Burner head regulation	Air regulation	Pump pressure (bar)	Delavan Nozzle (G.P.H)
KOS 34	REG 3	230V 50Hz ~	2.0	5.0	12	0.65 60°W
KOS 47	REG 5	230V 50Hz ~	2.0	4.7	11	1.00 60°W
KOS 70	R40G10S	230V 50Hz ~	2.5	4.5	12	1.50 60°W
KOS 93	R40G10S	230V 50Hz ~	5.0	3.2	12	1.75 60°W
KOS 110	R40G10S	230V 50Hz ~	6.0	3.8	12	2.00 60°W

COMMANDS

ROOM THERMOSTAT

It is installed on the unit, its function is to automatically switch on and switch off the heater in order to maintain the temperature that has been selected.

It is positioned on the electrical control board and it selects the different cycles:

- When set on "heating" the unit automatically switches on both fan and burner according to the heat required.
- When set on "fan" the unit automatically switches off the burner and the fan can be used to cool in summer.
- When set on "stop" the unit automatically stops. The fan continues to function for a while to expel the hot air that is inside the heat exchanger.

HEATING / STOP / FAN SWITCH

FUNCTIONING CYCLES

WORKING THE FAN

Follow these instructions to activate the fan:

- Connect the electricity to the unit
- Position the switch on the "fan" position

In this condition only the fan works so the air exiting the heat is the same temperature of the air entering.

The whole cycle starts automatically every time that the room's temperature is under the temperature set on the thermostat.

WORKING THE HEATER

Follow these instructions to activate the heater:

- Connect the electricity to the unit
- Set the thermostat at the temperature required
- Position the switch on "heating"
- The burner is electrically fed and once the pre-purge has taken place the flame ignites
- One minute after the flame ignites the fan starts working and hot air exits the unit
- Once the set temperature has been reached according to the room thermostat the burner stops working and 4 minutes later also the fan stops.

START AND STOP

STARTING

The heater must be started for the first time by qualified personnel, who must check that the heater has been correctly installed, the regulation works and that the safety norms have been observed.

Starting the heater for the first time:

- Close the room thermostat contact: the burner starts its cycle and following the pre-purge the flame ignites
- Check that the fan starts one minute after ignition
- Check combustion
- Wait for the heater to reach its steady-state condition (~20 min.) and check that the LIMIT thermostat is not functioning
- Open the room thermostat contact and check that the burner has stopped
- Close the room thermostat and start a new ignition cycle on the burner
- Close the fuel valve and check the burner is blocked

- Check the fan stops automatically



ATTENTION

When starting for the first time it is possible that the burner stops because fuel does not immediately flow to the burner. If this occurs wait for at least 30 seconds, push the switch and start the same operation again. When ignited, during the first few hours, there could be smoke due to paint or joints being heated. This is normal and will stop after a few hours. Always make sure air ventilation is regular.

STOPPING

Stop the heater **EXCLUSIVELY BY ACTING DIRECTLY ON THE ROOM THERMOSTAT**

CONTROLS

To control the heater is working correctly it is necessary to carry out some basic tests:

- Check that the fan is working about 1 minute from ignition of the burner.

When the heater is running regularly (after running for about 20 seconds non-stop):

- Check there is no fuel leakage.
- Check the correct fuel flow with a fuel-meter (if possible).
- Check the setting corresponds to the indication in the "TECHNICAL DATA" section.

- Check the temperature rise corresponds to information contained in the "TECHNICAL DATA" section.
- Open the contact on the room thermostat and check it works only on the burner and does not simultaneously stop the fan.
- Check that the current intake value of the motor/s is not higher than the value indicated on the data plate.
- Check that the fan rotates for about 4 minutes from when the burner stops working.

MAINTENANCE

We recommend, to work and conserve the heater correctly, to clean regularly and carry out maintenance.

Any maintenance operation must be made only by trained personnel.

Maintenance must only be done when the unit is cold with the electrical and fuel connections switched off.

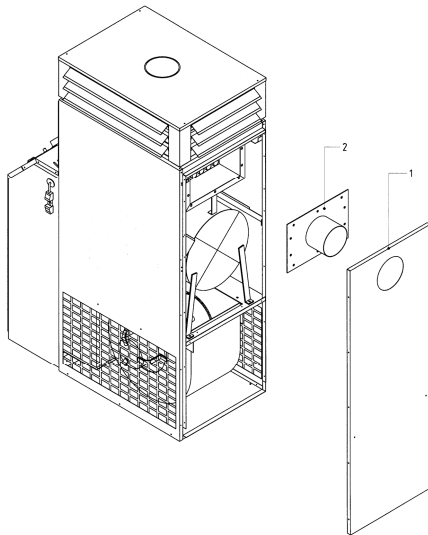
It is advisable to use protective gloves, and if any equipment such as ladders etc. are used it is important to work in safe conditions.

CLEANING THE HEAT EXCHANGER

The heat exchanger should only be cleaned by qualified personnel following the relevant regulations. We suggest to clean the heat exchanger at least once a year. Please follow the instructions below:

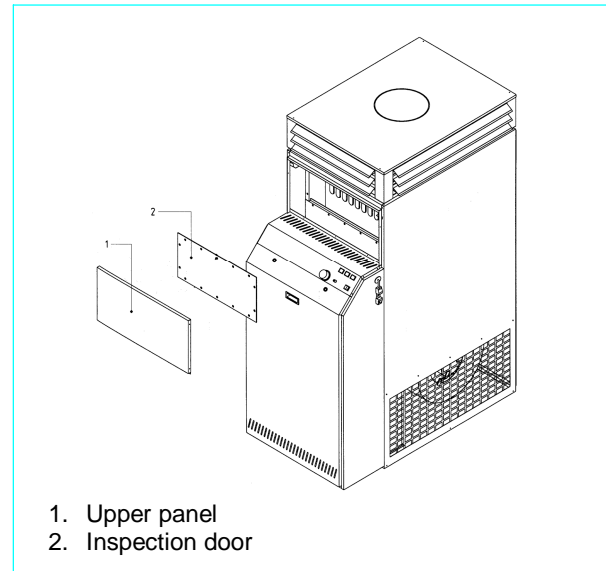
KOS 34/47/70

- Remove the rear panel.
- Remove the fixing screws of the inspection panels.
- Extract the baffle plate.
- Clean the smoke pipes using a steel brush. Clean the exhaust gas manifold and carefully remove residual soot.
- If required replace the inspection door gasket to ensure a good air-tightness.
- Reassemble all the components taking care not to forget the baffle plate.
- To clean the combustion chamber extract the burner from the fixing flange, set it on a flat surface and remove dirt and soot with a vacuum or by hand.



1. Rear panel
2. Inspection door

- Clean the exchanger elements using a steel brush.
- To clean the combustion chamber extract the burner from the fixing flange, set it on a flat surface and remove dirt and soot with a vacuum or by hand.
- If required replace the inspection door gasket to ensure it is air-tight
- Reassemble all the components taking special care they are air-tight.



1. Upper panel
2. Inspection door

CLEANING THE OIL BURNER

The oil burner cleaning operations should be carried out by qualified technicians who follow the instructions contained in the instruction manual of the burner itself.

FAN MAINTENANCE

When cleaning the heat exchanger, also check and clean the fan rotor.

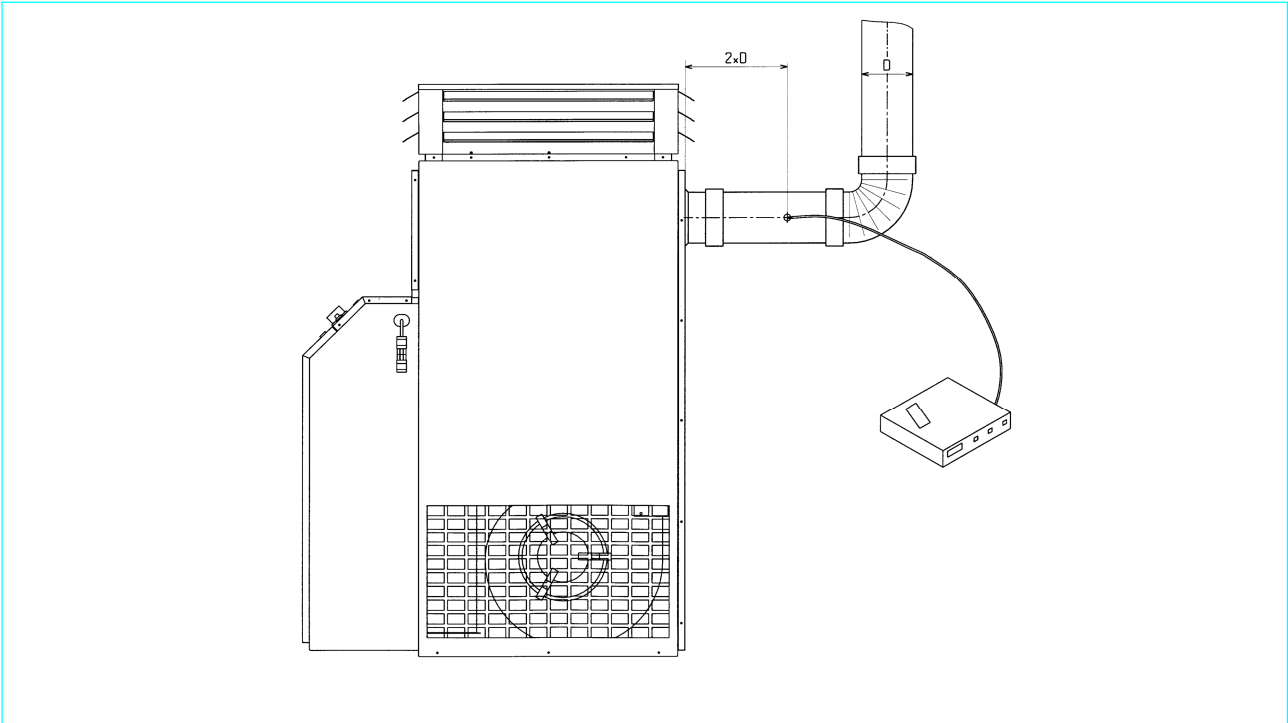
By disassembling the same panel you can also collect objects that could have fallen into the lower vane.

KOS 93/110

- Remove the upper panel.
- Remove the fixing screws of the inspection panel

LOCATION OF FLUE GAS PROBE

In the illustration we have indicated the correct position for drawing a sample of the exhaust gases to analyze the quality of combustion:

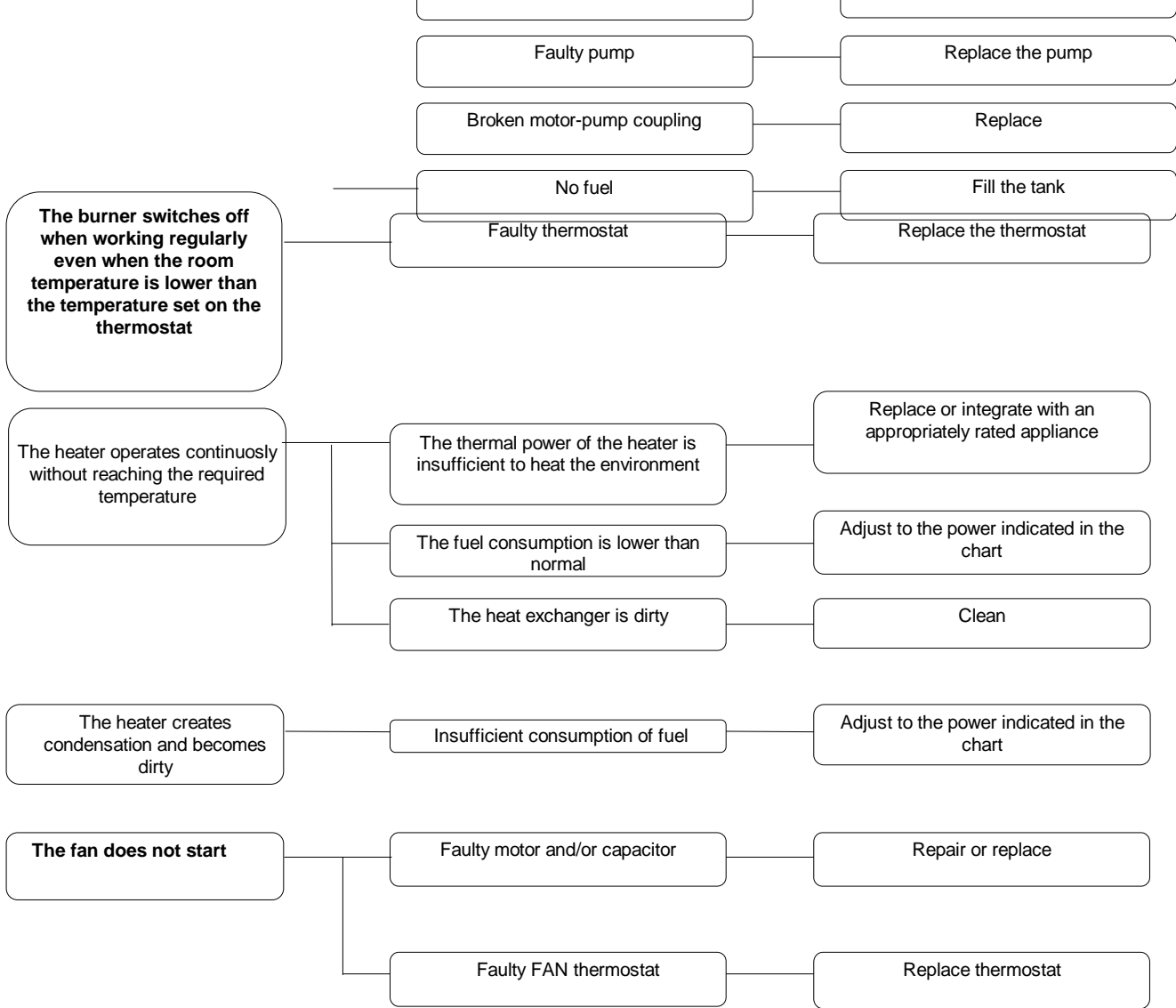


SERVICING

Installation, starting and maintenance operations for the MUNTERS ITALY air heaters shall be carried out by qualified technicians.
If you need help for maintenance or repairs please directly contact MUNTERS ITALY Technical Service, who will address you to the nearest Servicing Agency.

MALFUNCTIONS, CAUSES AND REMEDIES

MALFUNCTION	PROBABLE CAUSE	RECOMMENDED REMEDIES
The burner does not start	No power	<ul style="list-style-type: none"> Check position of general power switch Check the line Check connections
	Switch incorrectly positioned	Check and turn to the heating position
The burner does not start: The yellow light switch indicates that the LIMIT thermostat has been activated	Excessive delivery of fuel	Set to rating data
	Failure of the air ventilator	Check connection or repair if faulty
	Accidental obstruction of the intake grids	Remove the obstruction
	Faulty LIMIT thermostat	Replace the thermostat
	Faulty fan thermostat	Replace the thermostat
	Closed flaps on the outlets or too low	Open the flaps
The burner does not start: the red light switch indicates that the electronic flame control unit is blocked. By pressing the switch the equipment remains blocked.	Power supply voltage higher than 220 V + 10%	The voltage must not exceed 242 V
	Faulty flame control unit	Replace
The burner does not start: the red light switch indicates that the electronic flame control unit is blocked. Pressing the switch the equipment, after a safety time, is blocked after the burner stops		





Munters

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Please note that all details and specifications contained herein are correct at the time of going to print. However, due to constant technical improvement, MUNTERS ITALY S.p.A. reserves the right to change specifications at any time without prior notice. Always refer to the data plate on the heater.

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