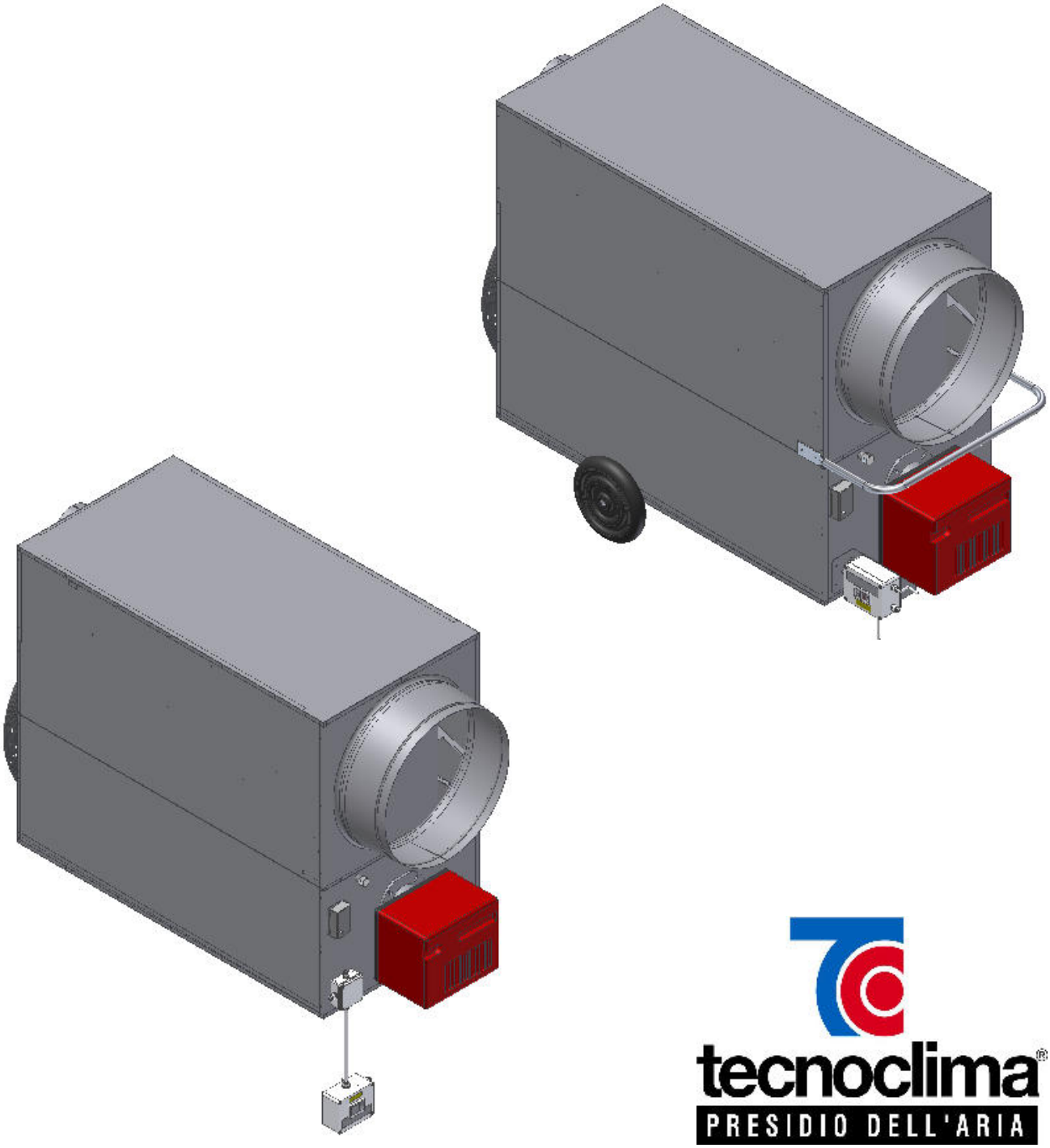
TECHNICAL INFORMATION INSTRUCTIONS FOR INSTALLATIONS, USE MAINTENANCE

Diesel oil Warm air heater

SERIES AGRI P – AGRI C – AGRI P/R – AGRI C/R
MODELS 60 – 85 – 120 – 175



tecnoclima®
PRESIDIO DELL'ARIA

***Dear** Customer,*
We thank you for the choice of a warm air heater of AGRI series, a modern and innovative product of high quality and efficiency. It will guarantee your wellbeing, total noiseless and security for a long period of time, especially if the heater is granted to one of the technical assistance service centres TECNOCLIMA that are particularly equipped and trained in order to guarantee the maximum level of efficiency and lower costs; furthermore they are provided with original spare parts in case of need.
The current direction sheet contains important indications and suggestions that should be followed for a simple installation and a better functioning of the of the warm air heater of the AGRI series.
Renewed thanks.

TECNOCLIMA S.p.A.

CONFORMITY

Warm air heaters series AGRI are in conformity with:
- Machines Directive 2006/42/CEE.
- Low Tension Directive 73/23/CEE.

RANGE

In these instructions we are referring to the Type. In the following table it is reported the correspondence of TYPE and the COMMERCIAL NAMING:

TYPE	MOD.	NOTE *	TYPE	MOD	NOTE *
1	AGRI P 60	P/E	**9**	AGRI C 60	C/E
2	AGRI P 85	P/E	**10**	AGRI C 85	C/E
3	AGRI P 120	P/E	**11**	AGRI C 120	C/E
4	AGRI P 175	P/E	**12**	AGRI C 175	C/E
5	AGRI P 60/R	P/R	**13**	AGRI C 60/R	C/R
6	AGRI P 85/R	P/R	**14**	AGRI C 85/R	C/R
7	AGRI P 120/R	P/R	**15**	AGRI C 120/R	C/R
8	AGRI P 175/R	P/R	**16**	AGRI C 175/R	C/R

P = device for suspended installation
E = axial fan model
C = mobile device for the ground installation
R = centrifugal fan model

WARRANTY

The device for the air treatment of AGRI series is covered by a SPECIFIC GUARANTEE that is valid from the date of purchase that should be attested by the consumer, if it is not possible to prove the acquisition, the guarantee term will come into effect from the date of manufacture of the device.
The guarantee conditions are expressly specified in the GUARANTEE CERTIFICATE, delivered with the device. We suggest you to read it attentively.

INDEX

In several parts of the booklet the following symbols are used:

⚠ **ATTENTION** = for the actions that require particolar caution and adequate training.

⛔ **FORBIDDEN** = for the actions that absolutely CAN NOT be performed

This booklet consists of 32 pages.

GENERAL CAUTIONS

This Instruction Manual is an integral part of the assemblage, thus should be preserved with cure and should always accompany the device also when the heater is transferred to an another owner or user. In case of damaging or loss of the booklet, ask a copy at the Technical Assistance Service of the area or to the Constructor.
After removing the packing, please make sure of the heater's integrity and completeness. In case of inconformity apply to the Agency where the device was bought.

The installation of the warm air heater should be completed by a qualified companies, that issue to the owner, at the end of the installation, the conformity assertion of the right installing , according to the current applicable Norms and according to the indications provided by the Manufacturer in this Instruction Manual.

The heaters have been manufactured for room heating and they must be used for this purpose, compatibly with their performance characteristics.

The Manufacturer takes no contractual or extra-contractual responsibility for damage caused to persons, animals or property, due to errors in installation, adjustment and maintenance or due to improper use.

Excess temperature is damaging to health and represents a waste of energy.
Avoid leaving rooms closed for long periods of time. Open the windows periodically to ensure adequate air change.

During the first start-up, there may be formation of smells and smoke due to evaporation of the liquid used to protect the heat exchanger during storage; this is a normal phenomenon that will disappear after a brief operation time. The rooms must be adequately aerated.

On leaving the heater unused for a long period, you should carry out at least the following operations:
- Turn off the main heater switch and the main plant switch;
- Close the main fuel supply valve.

- If the heater is not used for a long period of time, we suggest you contact the After Sales Service or other professionally qualified personnel for restarting.

All heaters must be fitted exclusively with original accessories. The Manufacturer is not responsible for any damage caused by improper use of the heater and by the use of accessories that are not original.

All references to Law, standards, directives and technical rules in this manual are to be considered as informative only and valid at the date of printing of the Manual. The enforcing of new dispositions or the alteration of current ones do not create any Manufacturer obligations towards third parties.

Repairs and maintenance must be carried out by the After Sales Service or by qualified personnel as specified in this Manual. Do not alter or tamper with the heater: this can create dangerous situations and the Manufacturer will not be responsible for any damage.

The systems that must be installed (gas or oil pipes, electrical supplies etc) must be suitably fastened and must not create obstacles that could cause tripping.

The Manufacturer is responsible for conformity of his product to laws, directives and construction standards current at the date of sale. Knowledge and observation of legislative instruments and of standards for the design of systems, and for installation, operation and maintenance are the exclusive responsibility of respectively the designer, the installation personnel and the user.

The Manufacturer is not responsible for failure to observe the instructions in this Manual, for the consequences of any operation carried out that is not specifically foreseen, or for any translations causing erroneous interpretations.

The heater is projected to function with the heating power capacity and the air throughput indicated in the chapter "Technical data". A too low capacity and/or an excessive air throughput can lead to the condensation of the combustion products and, as a consequence, a possible corrosion of the exchanger. A too high power capacity and/or an insufficient air throughput can lead to an anomalous overheating of the exchanger that activate the security alarms or can damage the exchanger.

BASIC SECURITY RULES

The use of devices that employ electrical energy and/or fuel oil requires the observance of some fundamental safety rules such as:

Children and unassisted disabled persons must not use the warm air heaters.

Do not operate electrical equipment such as switches, electric household equipment etc if you can smell gas, fuel or other combustibles.
In this case:

- Open the doors and windows to aerate the room
- Close the fuel supply valves
- Call in quickly the After Sales Service or other professionally qualified personnel

Do not touch the heater if you are barefoot or if parts of your body are wet.

Do not carry out any cleaning or maintenance operation without first deactivating the heater by setting the main system switch to "OFF" and without first closing the fuel supply.

Do not alter the safety and adjustment systems without prior authorisation and indications by the heater Manufacturer.

Do not pull, detach or twist the electric cables that exit the heater, even if the heater is not connected to the electrical supply.

Do not open any doors that access the inside of the heater without turning the main system switch to "OFF".

Do not abandon or leave available to children the heater packing materials (cartons, nails, plastic bags etc), as these are a potential source of danger.

Do not install the heater near flammable material, or in areas where there is a corrosive atmosphere.

Do not place any object on the heater or push anything through the grilles in the casing nor in the flue gas ducts.

Do not touch the flue gas ducts as during normal operation these can reach high temperatures and represent a hazard.

Do not use any adapters, multiple sockets and cable extensions for the electrical connection of the heater.

Do not install the heater in the open air nor where it could be subject to atmospheric events.

Do not install the heater directly in limited spaces without adequate ventilation, as the burner air suction can create a pressure drop in the room and consequently cause serious problems.

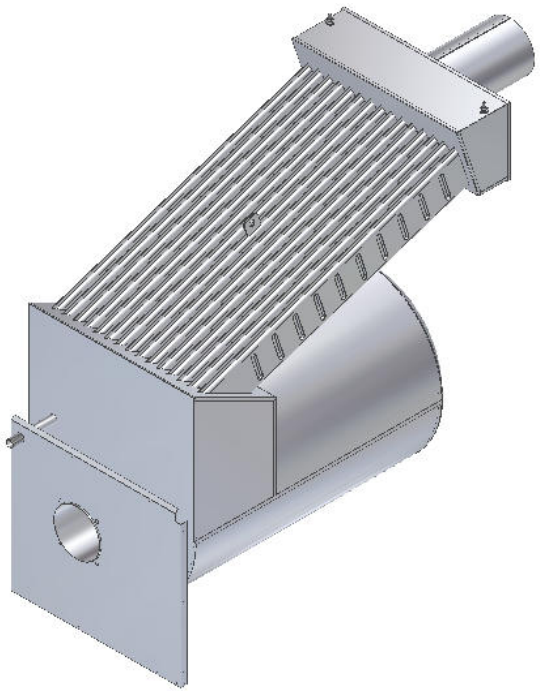
It is forbidden to install the warm air heater externally directly exposed to the weathering.

DESCRIPTION OF THE HEATER

The warm air heater is designed to heat the air especially in agricultural room, using heat energy produced by combustion. Essentially the equipment consists of heat exchanger assemblies exchanging heat from the combustion by-products by a high performance fan assembly.
The air to be heated is sucked in by the fans and flows against the heat exchanger where its temperature rises to then be distributed either immediately or via suitable channelling.
This system gives a notable reduction in the costs of the plant and also works economically, making itself particularly suitable where it is expected to be used intermittently or occasionally.
The equipment is designed so that it can also be used to provide ventilation only during the summer months.

GENERAL STRUCTURAL CHARACTERISTICS:

Heat exchanger:



Built with welded steel and seal-tested in accordance with the standards and is easy to inspect for the normal cleaning and maintenance operations. It consists of:

- **Combustion chamber** made in low thermal load stainless steel AISI 430 in a suitable shape and size.
- **Exchange elements** made in stainless steel AISI 430 steel modular sections with large surface area, with swirl impressions for optimal heat exchange complete with net turbolators.
- **Exhaust manifolds** made in stainless steel AISI 430.

External cabinet:
The closing panels are made of pre-painted plate steel; they are thermically insulated with special insulations and they are completed with counter-panels in galvanized metal steel. They are removable for the ordinary inspections

Fan assembly:
According to the version, the fan assembly consists of a high performance axial or centrifugal fan with low sound level emission. For the version with centrifugal fan, the fan has a electric motor connected by a transmission system with pulley and belts that confers a high adaptability to different types of installations.

Security thermostat "TR":
The warm air heater is equipped with a security thermostat with the sensible element positioned in the air outlet. This thermostat has the function to stop the functioning of the burner in case of overheating of the air. The reset is automatic when the normal functioning conditions are established.

Function "FAN":
The same thermostat TR (bi-thermostat Fan-Limit) turn on the fan after max 60 seconds from the burner starting and will turn the fan off after about 4 minutes after the burner stopping. This will avoid to blow cold air in the environment in the starting up of the warm air heater and to consume the thermal energy hoarded by the heat exchanger granting the complete use before the stopping of the warm air heater.

Exhaust smoke kit:
The warm air heater is equipped with a circular smoke outlet connection where to connect in a secure way the smoke exhaust kit supplied with the warm air heater.

IDENTIFICATION

The warm air heaters are identifiable by:

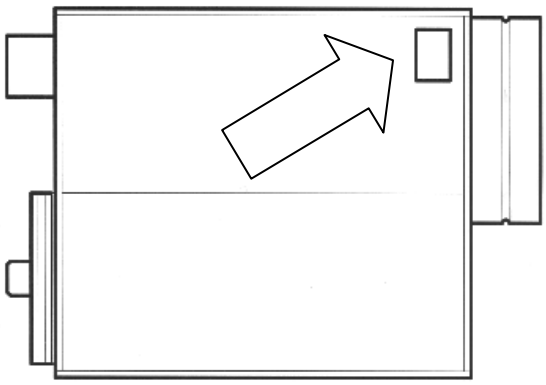
- The Technical Plate bearing their main technical and performance details. The plate is located on the front of the equipment.

IDENTIFICATION DATA OF THE SUPPLIER

CE

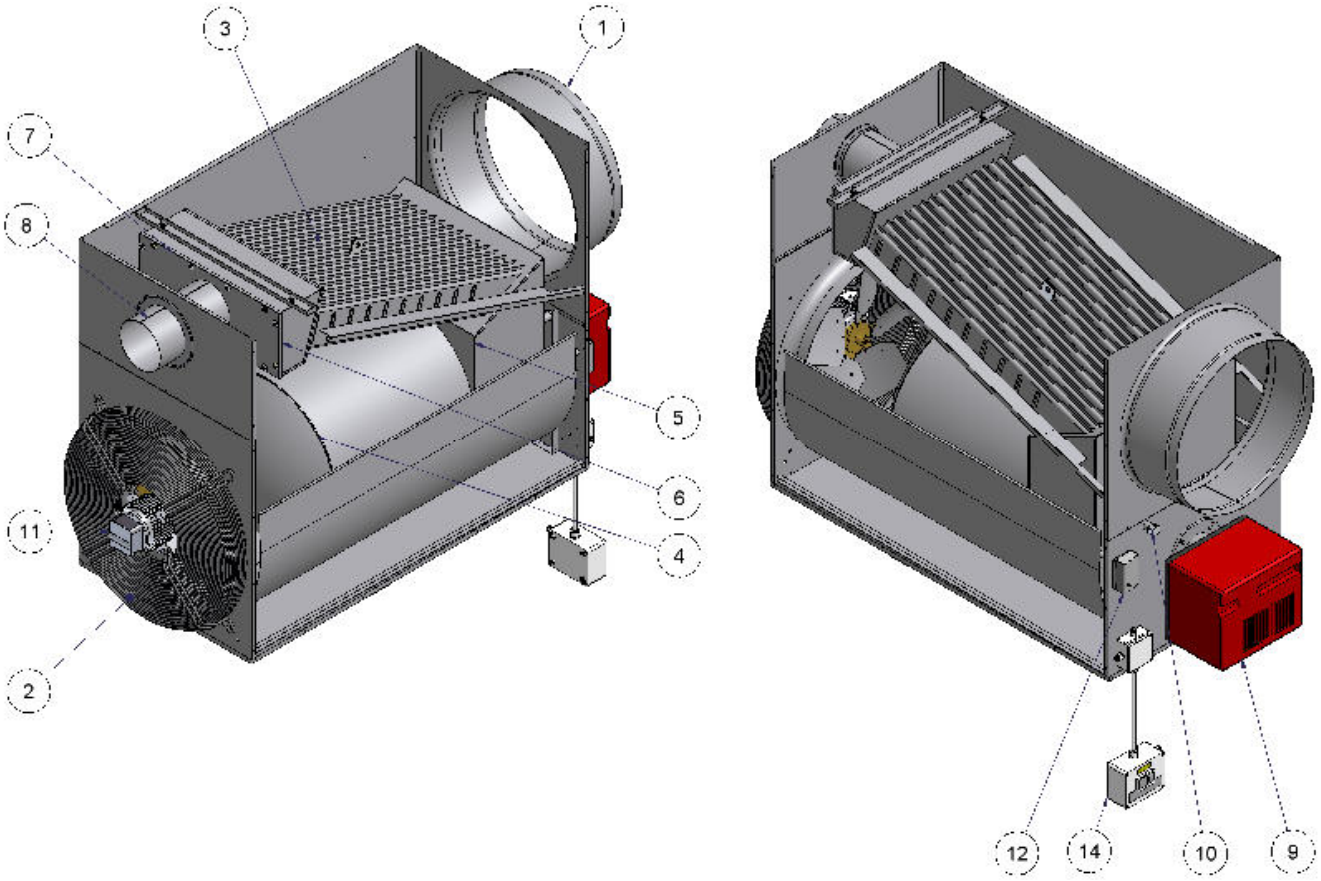
WARM AIR HEATER

Model			
Serial number			
Code		Year	
Heating capacity input max			kW
Heating capacity output max			kW
Air flow rate(+20°C)			m^3/h
Electric supply			
Three phase electrical supply			
Fan motor power			kW
Max fan current			A
Protection rating			IP



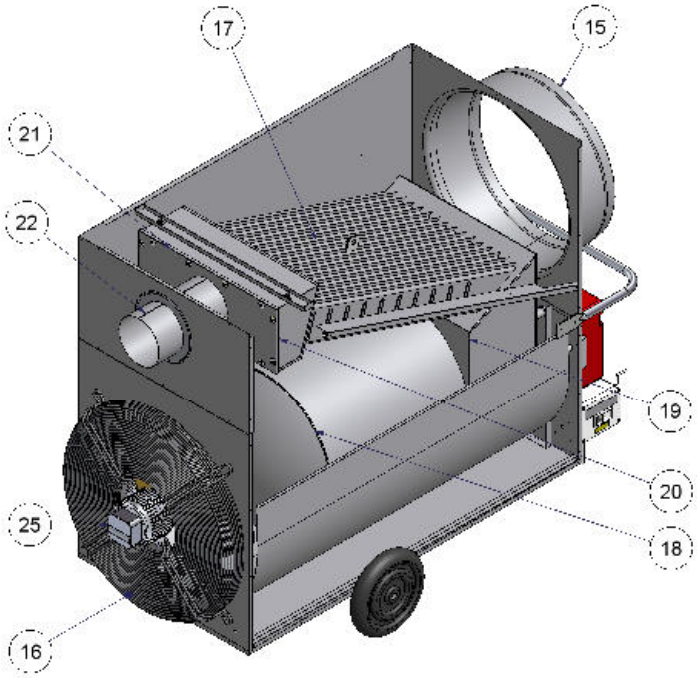
⚠ In case of the damaging or loosing of the technical plate, please ask a duplicate to the technical assistance service.

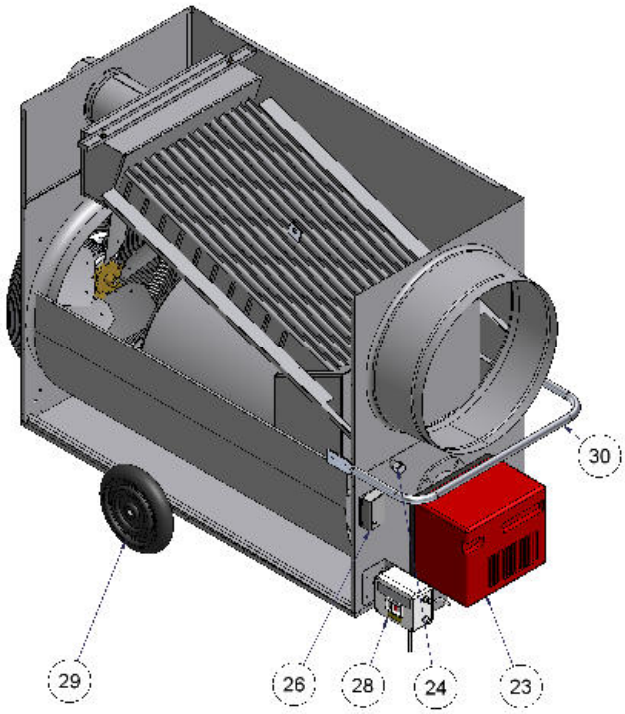
STRUTTURE OF AGRI P



1) Air circular outlet
2) Air inlet
3) Smoke pipe of the heat exchanger
4) Combustion chamber
5) Front fume manifold
6) Back fume manifold
7) Inspection doors of the heat exchanger
8) Smoke pipe of the heat exchanger
9) Burner
10) Combustion spy hole
11) Fan group (axial or centrifugal)
12) Double Thermostat Fan-Limit with automatic reset
13) Electrical board

STRUTTURE OF AGRI C

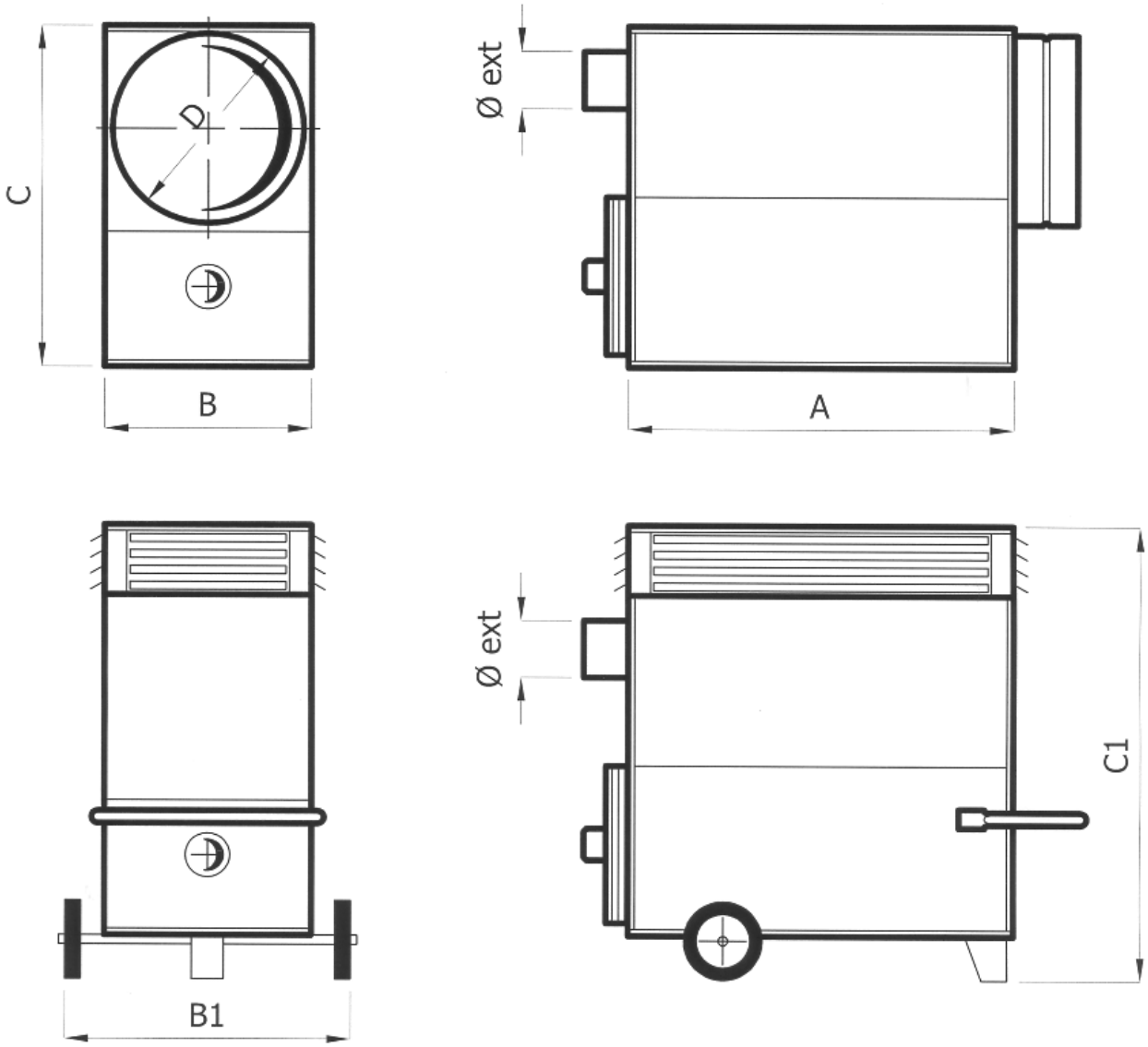




14) Air circular outlet
15) Air inlet
16) Smoke pipe
17) Combustion chamber
18) Front fume manifold
19) Back fume manifold
20) Inspection doors of the heat exchanger
21) Smoke pipe of the heat exchanger
22) Burner
23) Combustion spy hole
24) Fan group (axial or centrifugal)
25) Double Thermostat Fan-Limit with automatic reset
26) Electrical board
27) Transportation wheels
28) Handhold for the transportation

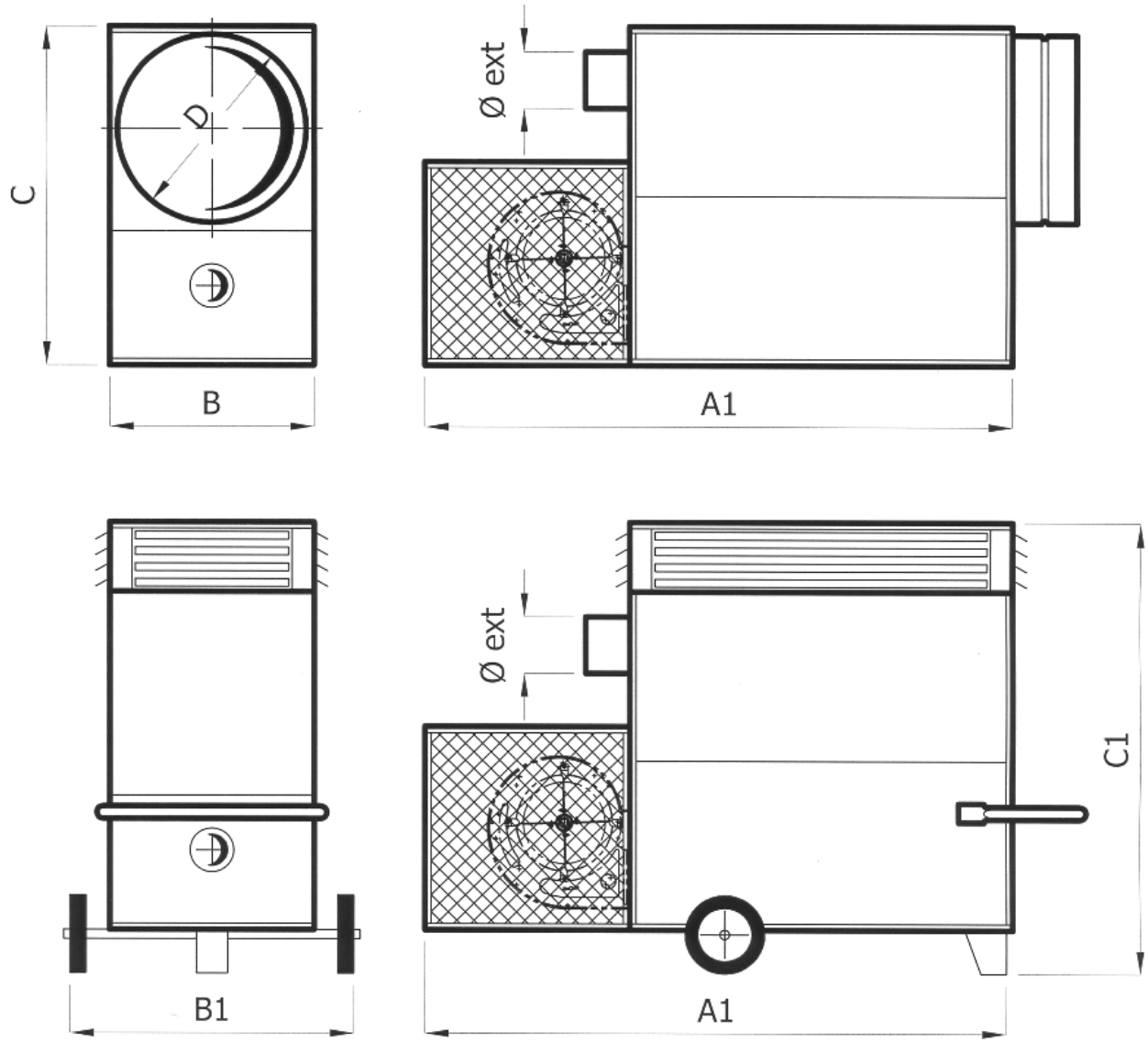
DIMENSIONS AND WEIGHT

Types 1-2-3-4-9-10-11-12:



Type		1	2	3	4	9	10	11	12
A	mm	950	950	1.210	1.470	950	950	1.210	1.470
B	mm	500	550	650	750	500	550	650	750
B1	mm	-	-	-	-	650	700	800	900
C	mm	860	925	1080	1230	-	-	-	-
C1	mm	-	-	-	-	1.230	1.295	1.450	1.635
D	mm	400	500	600	600	-	-	-	-
Ø ext	mm	130	130	180	180	130	130	180	180
Weight	kg	92	107	160	220	96	114	168	230

Types 5-6-7-8-13-14-15-16:



Type		5	6	7	8	13	14	15	16
A1	mm	1.570	1.665	1.995	2.365	1.570	1.665	1.995	2.365
B	mm	500	550	650	750	500	550	650	750
B1	mm	-	-	-	-	650	700	800	900
C	mm	860	925	1.080	1.230	-	-	-	-
C1	mm	-	-	-	-	1.230	1.295	1.450	1.635
D	mm	400	500	600	600	-	-	-	-
Ø ext	mm	130	130	180	180	130	130	180	180
Weight	kg	116	135	195	280	120	142	203	290

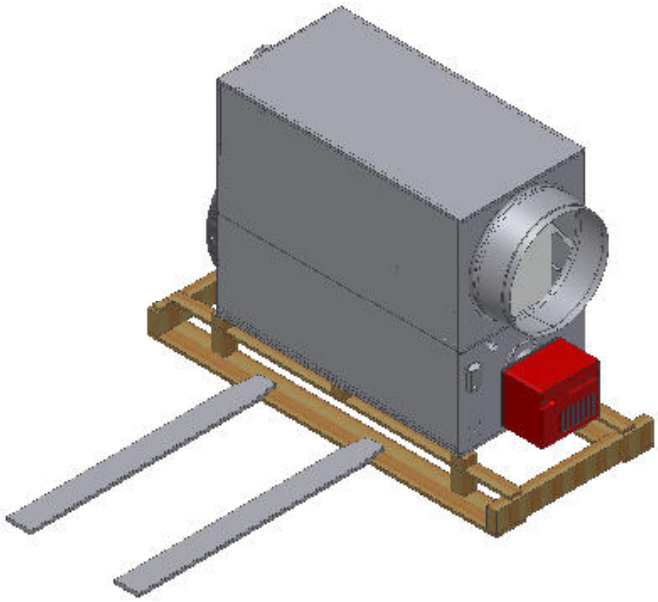
TECHNICAL DATA

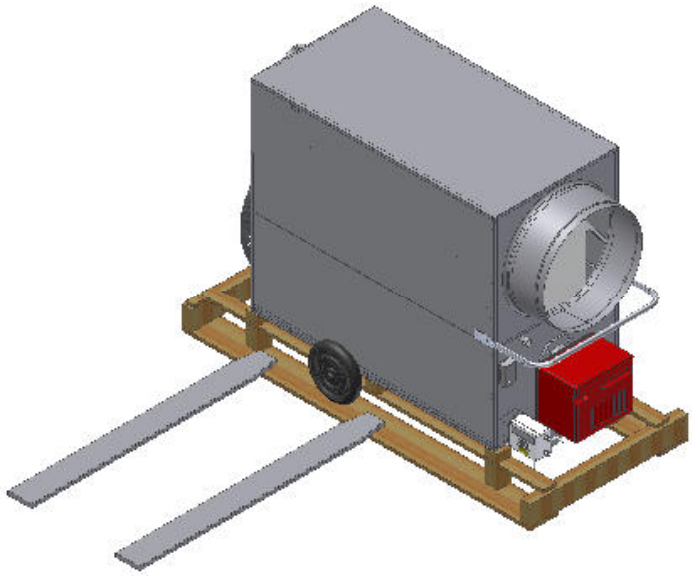
TYPE		1 9	2 10	3 11	4 12	5 13	6 14	7 15	8 16
HEATING CAPACITY INPUT	kW	60,0	85,0	115,9	175,0	60,0	85,0	116,2	175,0
(BURNED)	Kcal/h	51.600	73.100	99.700	150.500	51.600	73.100	99.900	150.500
HEATING CAP. OUTPUT	kW	52,2	73,9	100,8	152,3	52,2	73,9	101,1	152,3
(USEFUL)	Kcal/h	44.890	63.590	86.680	130.930	44.890	63.590	86.910	130.930
EFFICIENCY	%	87	87	87	87	87	87	87	87
PRESSURE IN THE COMBUSTION CHAMBER	mbar	0,6	0,6	0,6	0,7	0,6	0,6	0,6	0,7
NET SMOKE TEMPERATURE	°C	~260	~260	~260	~260	~260	~260	~260	~260
AIR FLOW RATE	m³/h	4.100	5.700	8.300	12.500	4.100	5.700	8.300	12.500
STATIC PRESSURE	Pa	50	50	50	50	50	50	50	50
TEMPERATURE DEVIATION	°K	37	38	36	36	37	38	36	36
SET-POINT									
Thermostat FAN	°C	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35
Thermostat TR	°C	80	80	80	80	80	80	80	80
CONSUMO MAX (1)									
Diesel oil	Kg/h	5,0	7,1	9,8	14,7	5,0	7,1	9,8	14,7
ELECTRICAL SUPPLY									
Single-phase	V/50Hz	230	230	230	-	230	230	-	-
Three-phase	V/50Hz	-	400~3N	400~3N	400~3N	-	400~3N	400~3N	400~3N
FAN MOTOR		-							
Poles	N°	4	4	4	4	4	4	4	4
Single-phase power	kW	0,40	0,54	1,00	-	0,75	0,75	-	?
Max absorbed current single-phase	A	2,2	2,7	4,9	-	6,0	6,0	-	?
Three-phase power	kW	-	0,53	1,00	1,30	-	0,75	1,50	2,00
Max absorbed current three-phase	A	-	1,40	2,83	2,2	-	1,7	3,6	5,0
PROTECTION	IP	20	20	20	20	20	20	20	20
ASPIRATE AIR									
Min TEMPERATURE	°C	-15	-15	-15	-15	-15	-15	-15	-15
Max TEMPERATURE	°C	+28	+28	+28	+28	+28	+28	+28	+28

1) Diesel oil: Hi = 10.200 kcal/kg

MOVEMENT AND TRANSPORT

Movement with fork lift with the warm air heater positioned on wood pallet:





GENERAL ADVISE FOR THE TRANSPORT AND THE MOVEMENT

⚠ **WARNING!**

The movement has to be done from equipped persons with the right equipment for the weight of the warm air heater.

The transport and the movement has to be done very carefully in order to avoid to damage the warm air heater and danger for the people who are making them.

While the transport operations is forbidden to stay near the warm air heater.

Use forks with min length of the warm air heater.

It is forbidden to put one warm air heater on another.

In the case that the warm air heater has to be moved by hand, please be sure to have enough human force proportionally to the weight indicated in the paragraph "TECHNICAL DATA".

We suggest to use protection glove to make the above mentioned operations.

LOCATION

The place of installation must be established by the plant project engineer or competent person and must take account of the technical requirements and current legislation and regulations which demand the obtaining of authorisation (e.g. building, architectural and fire regulations, environmental legislation and so on). Before installing the equipment it is therefore advisable to apply for obtaining all necessary authorisations.

For a correct installation please follow the following rules:

- Be placed on a level surface which is able to support its weight.
- Observe the distances indicated in this manual so that there is a proper air flow and the normal cleaning and maintenance operations can be properly carried out.
- Maintain the safety distances for inflammable materials
- Be easily connected up to the fuel tank
- Be near to an electrical socket.
- Be near the exhaust smoke channel
- Allow easy carrying out of maintenance and monitoring operations.
- Have the openings and ventilation required by the law in force.

It is not advisable the installation:

- In places where there are aggressive atmosphere;
- In places where the sound level of the warm air heater could be increased;
- In places where could be groups of leaves or something which can close the passing of the air reducing the efficiency of the warm air heater;
- In places where there is pressure;
- In places where there is depression.

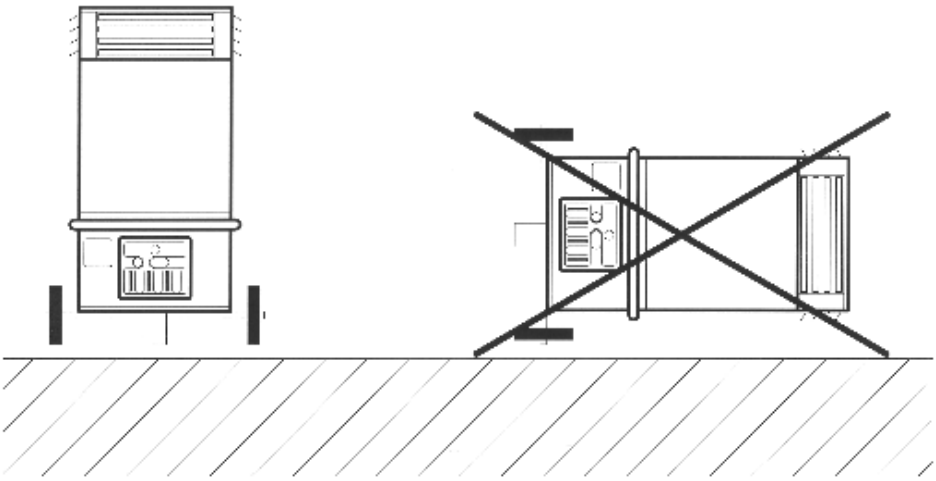
ATTENTION!

If there are specific Norms, for example Fire prevention regulation ,these rules should be respected, otherwise consult the constructor.

INSTALLATION POSITION

The heaters of ground installing version or with centrifugal fan can be installed **only in vertical position:**

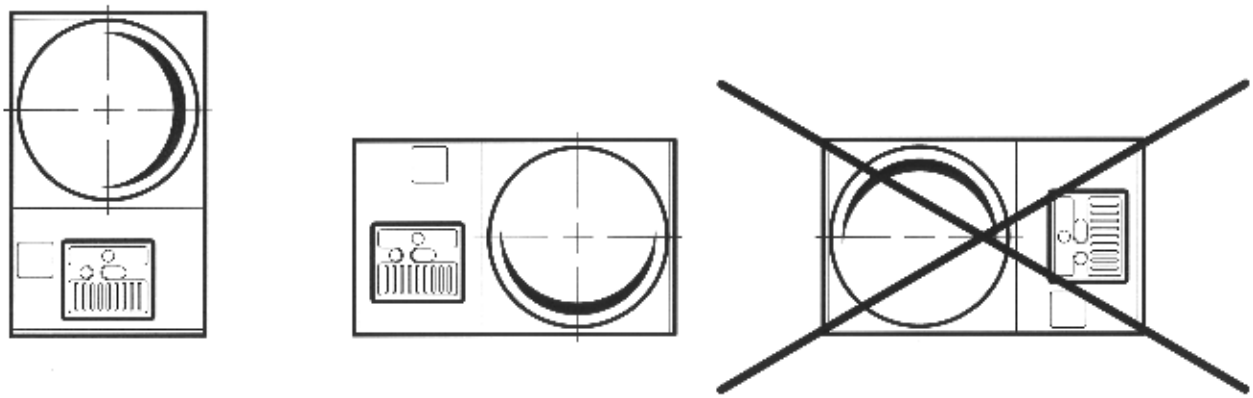
Installation scheme of warm air heaters of **5-6-7-8-13-14-15-16** types:



The heaters with axial fan and of suspended installing version are assembled in vertical position in manufacture, as well they can be installed in horizontal position, completing the following operations:

- Lean the heater exclusively on the right side(looking at it from the burner side);
- Disassemble the burner, if it is present;
- Disassemble the anchorage flange of the burner, if it is present, and rotate counter clockwise at 90°.
- Reassemble the burner **(rotate of 90° counter clockwise according to the initial position**).

Installation scheme of warm air heaters of **1-2-3-4-9-10-11-12** types:



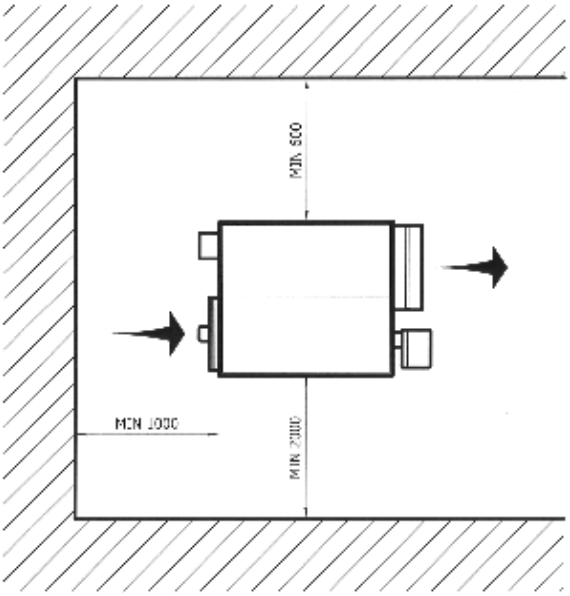
FIXED PROTECTIONS

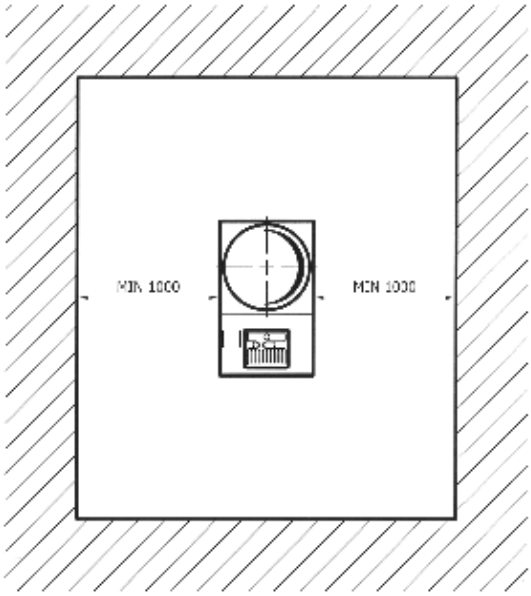
In order to avoid the accidental contact with the mobile parts of the heater, do not remove the fixed protections(grate for treated area, burner's carter, external casing panels, etc.).

If the device is provided with a circular air supply inlet and it is installed without being connected to the air delivery system, a hand protection net should be set on the inlet in order to avoid the risk of an accidental contact with sharp and/or hot surfaces of heat exchanger.
If the exhaust manifolds are in a accessible position they must be isolated or protected in order to avoid the contact with hot surfaces.

RESPECTING AREA

The warm air heater must be reached easily. Around the warm air heater it is also necessary to respect the minimum distances to let the normal checking or maintenance operations and not to create any obstacle to the air flow.





COMBUSTION CONNECTION

For the connection to the fuel net, which has to be done by trained and professional personnel please follows carefully to what written in the burner manual and the local norms.

SMOKE EXHAUST

The smoke pipe and the connection to the chimney itself has to be done in conformity of the local law, with metal channels, stiff, resistant to the mechanical movement and to the chemical products of the combustion.

We advice to:

- Avoid or limit the horizontal sections, which anyway must be ascending.
- Use pipes provided with plain inside surface and made of materials able to resist the chemical or thermal effects due to the flue gas, provided with equal or larger diameter that the joint on the heater.
- Avoid short curves and section reductions.
- Have a proper place where is possible to take a sample and to analyze the combustion products.
- Fix adequately the smoke exhaust pipe.
- Provide on the low part a collector for the condensation.
- Provide an adequate terminal cover to avoid that the rainy water seep inside the device and, at the same time to prevent the pressure drop.
- Provide an adequate thermal isolation of the conducts that pass through the walls of the building.
- Provide a easy removal of smoke conducts necessary for the exchanger's internal cleaning.

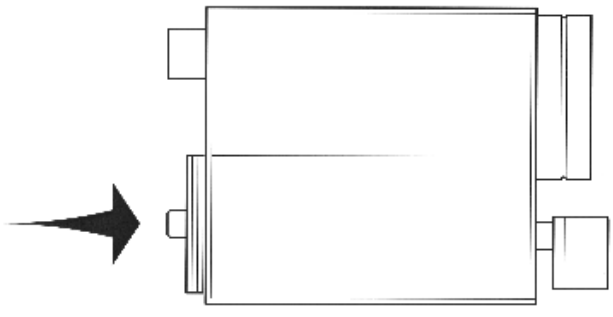
All the components of the smoke exhaust should be standardized according to CEE standards.
The chimney pipe should guarantee the minimum depression provided by the Technical Norms in force, considering pressure "zero" at the chimney connection.

The exhaust pipes non insulated can cause potential danger.
The inadequate o non insulated chimney pipe or exhaust channels can amplify the burning noisiness and influence negatively combustion parameters.

The junction holdings are made of resistant materials that can stand a 350°C temperature(for example fillers, rubber solutions, silicone products, etc.).

CONNECTION INLET AND OUTLET AIR

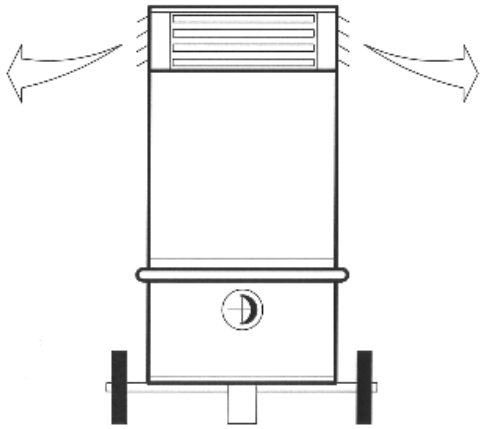
The air inlet comes on to the lateral side where the fan is placed. A possible channelling of the inlet is not foreseen.

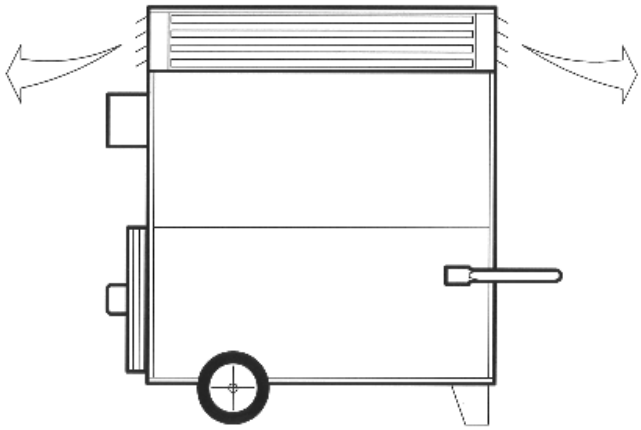


AIR OUTLET CONNECTION

Versions for the ground installation(of 9-10-11-12-13-14-15-16 types):

The mobile versions for the ground installation are provided with a supply plenum with adjustable wings placed on all the four sides of the device. .



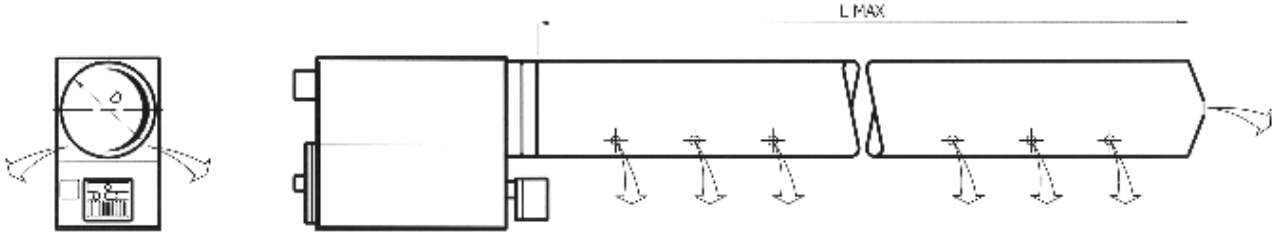


⚠

In order to avoid the significant air reduction the wings should be opened at least on three sides.

Versions with suspended installation(of 1-2-3-4-5-6-7-8types):

The device is provided with an outlet panel with a circular outlet at which eventually can be connected a polyethelenic sleeve. This sleeve can be blocked by the use of a specific groove on the outlet.
As an indicative notice in the following table you can find the maximal length of the sleeve.



Type	Polyethylene sleeve	
	D (mm)	L MAX (metri)
1-5	400	40
2-6	500	60
3-7	600	80
4-8	600	90

The polyethylene sleeve is supplied as an accessory and is provided already with holes of 50 mm diameter and a pitch of 500 mm. During the installation more holes can be made in the first section of the sleeve in order to uniform the temperature inside the green house.

⚠

WARNING!

A too short sleeve or a sleeve with an insufficient hole can activate the security thermostat and may cause dangerous overheating of the warm exchanger. Do not close completely the opening of the sleeve.
The ratio of versions with centrifugal fan is considered for a channelized air distribution. If the heater is used with the open mouthing, in order to avoid an overload of the fan motor, it is necessary to change the transmission.

Verify with the project manager if it is necessary to install a fire damper.

THE DIMENSIONING OF THE AIR SUPPLY CHANNELS SHOULD BE PERFORMED BY A COMPETENT, SPECIALLY TRAINED PERSON, FOLLOWING THE INDICATIONS PRESENTED IN THE "TECHNICAL DATA" PARAGRAPH.

DIESEL OIL BURNER

Pre-setting table of the oil burner coupling:

TYPE		1-9-5-13	2-10-6-14	3-11-7-15	4-12-8-19
DIESEL OIL					
Brand		RIELLO	RIELLO	RIELLO	RIELLO
Model	Mod	R40G5	R40G10	R40G10	R40G20
Working range	kW	28÷60	54÷120	54÷120	95÷213
Nozzel Delava 60°W	GPH	1,10	1,50	2,25	3,50
Oil pomp pressure	bar	11,5	12	12	10
Air damper	tacca	7,0	3,3	5,6	5,8
Head	tacca	6,0	5,0	6,0	3,5
Materassino su carter		SI	SI	NO	NO

For different coupling please contact the Constructor.
Usually the burner is furnished in a separate package, electrically and hydraulically disconnected and unpledged.

Installation, electric connection and burner's regulation is on technician's care.
These operations can be carried out by qualified staff only, meticulously following the information of the burner instructions manual .

AN EVENTUAL PRE-SETTING IN MANUFACTURE IS NOT COMPULSORY. IN THE FIRST STARTING PHASE, AN INITIAL CHECK UP AND REGULATION OF THE BURNER IS OBLIGATORY.

FAN – LIMIT DUAL THERMOSTAT

This thermostat has its sensitive element located on air supply outlet and command the starting and the stop of the fan assembly(function FAN), but also the security blocking of the device in case of overheating(function LIMIT).

FUNCTION FAN

When air temperature near to the sensible element reaches the value preset on the graduated dial of the dual thermostat (35°C and abt. One minute after the start up of the burner), an electric contact of the thermostat closes and the fan stops.

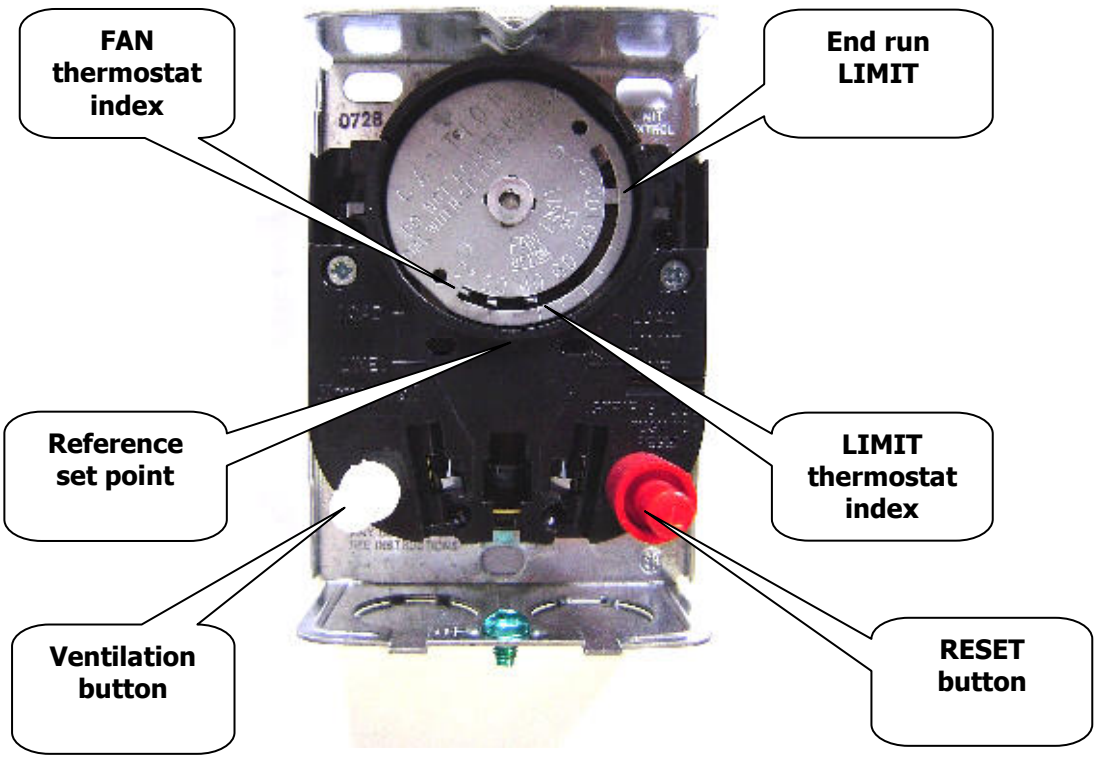
When air temperature near to the sensible element decreases lower than the value preset on the graduated dial of the dual thermostat (25°C and abt. 2-3 minutes after the turning off of the burner), an electric contact of the thermostat opens and the fan stops.

FUNCTION LIMIT

When, due to a function fault, the air near to the sensible element overheats, and the temperature reaches the value preset on the graduated dial of the dual thermostat (80°C), an electric contact of the thermostat opens and only the burner turns off. The restoration is manual and it has to be done after the removal of the reason of its intervention.

REGULATING MODE

The warm air heater is supplied with electrical connections and dual thermostat regulation already done. In case that it is necessary to proceed with these operations (for maintenance, control or replacement of some parts), here below some suitable information.



ELECTRICAL CONNECTION

The equipment is tested by our premises and delivered with the electric panel already installed.

The connections to be carried out by the installation company are the following:

- The main electrical connection;
- The connection to the burner;
- The connection to any other accessory for the installation(fire damper, humidifier, etc.)(*);
- Connections to the different external security systems and commands(*)

(*) Components that are not part of the supply.

WARNING!

- Install a magneto thermal switch before the equipment, of suitable size in accordance with the law in force.
- The qualified personnel should verify that the cable sections and the electric system are adequate to the maximum power indicated in the target data.
- Always earth of the equipment. Leave the earth cable a little longer than the line wires so that if they are accidentally pulled it is the last to get detached.
- Respect the polarities when making the electrical connections (phase – neutral). Always verify that the rotation direction of the fans is that one indicated by the flag on the fan shroud.

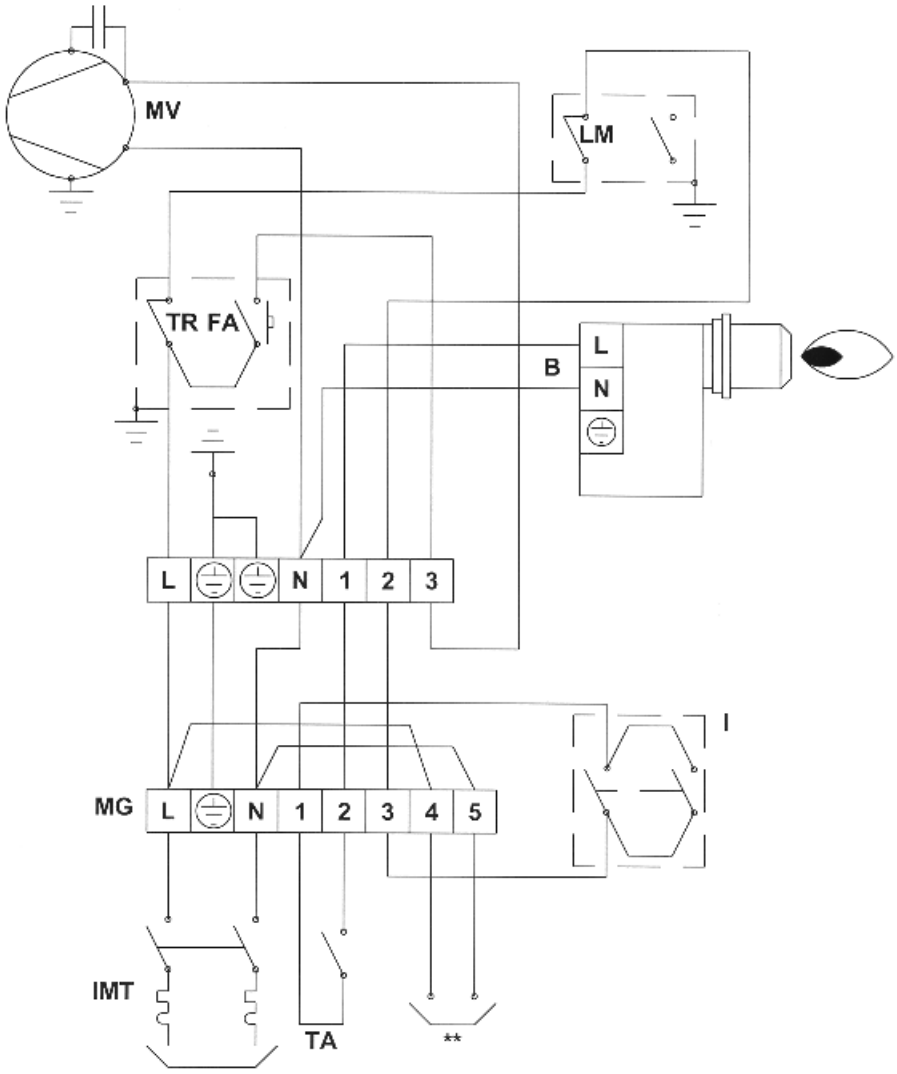
WARNING!

For fan motor consider a starting current that is five-six times more that the nominal working current.

Foresee a device for the disconnection from the net with an opening distance contact which ensure the complete disconnection in over tension III conditions in accordance with the Electrical Installation Laws (Law EN 60335-1).

ELECTRICAL SCHEME

Electrical scheme for the suspended version with single-phase supply 230V ~ 50Hz:
Cod. 10002265-TC



ELECTRICAL SUPPLY
230V ~ 50 Hz

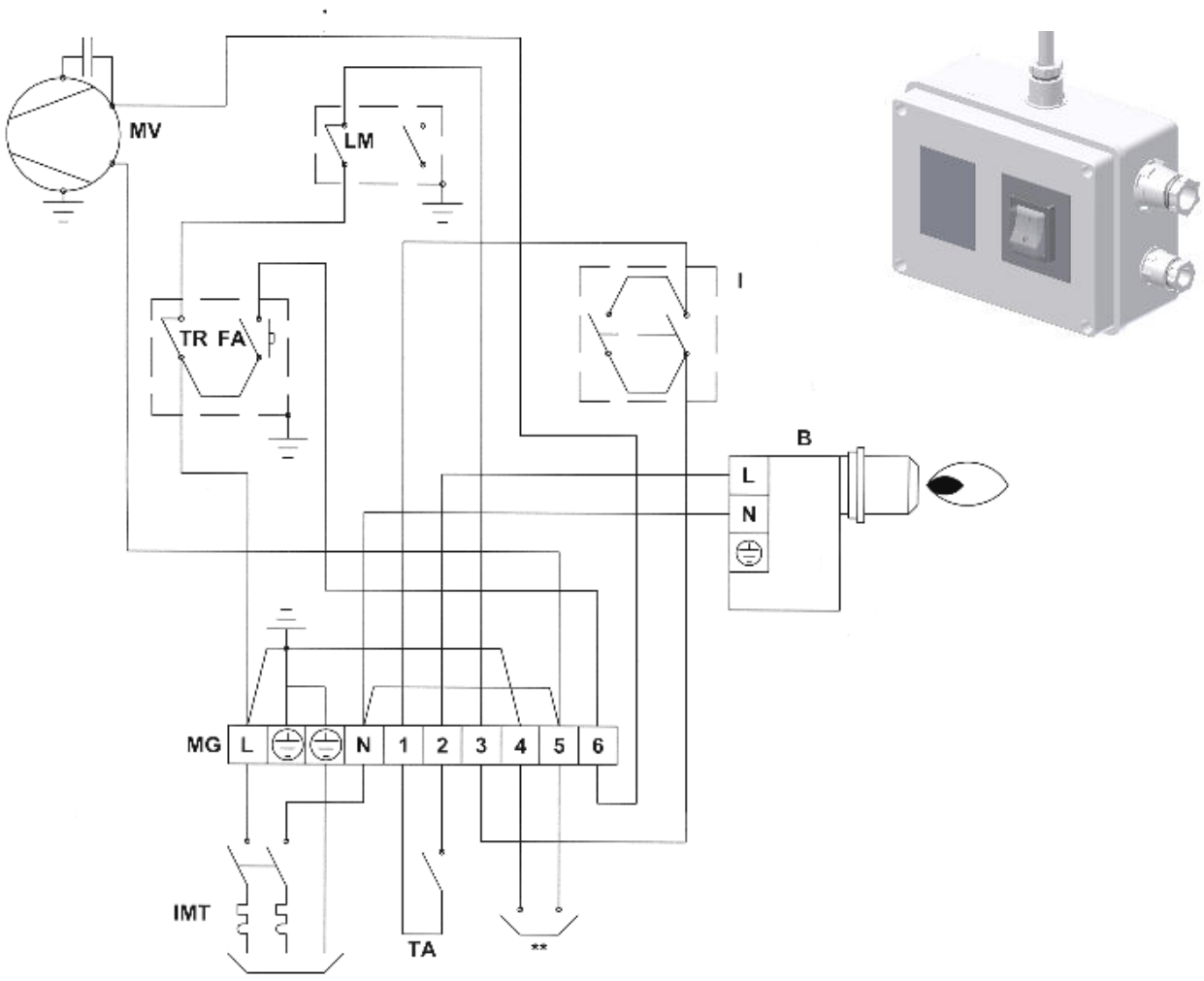
Index:

I	Turn-off switch
MV	Fan terminal board
FA	FAN thermostat
TR	Contactor Automatic security thermostat contact TR
LM	Contactor Manual security thermostat contact LM(optional)
B	Burner
MG	Terminal board
IMT*	Differential magneto-thermic switch
TA*	Room thermostat contact

*	Not included in the supply, to be fixed by the installer.
**	Electric supply mono-phase 230V ~ 50HZ for a possible room thermostat.

A copy of the electrical scheme can be found inside the electrical board supplied with the device.

Electrical scheme for the mobile version, with single-phase electric supply 230V ~ 50Hz:
Cod. 10002266-TC



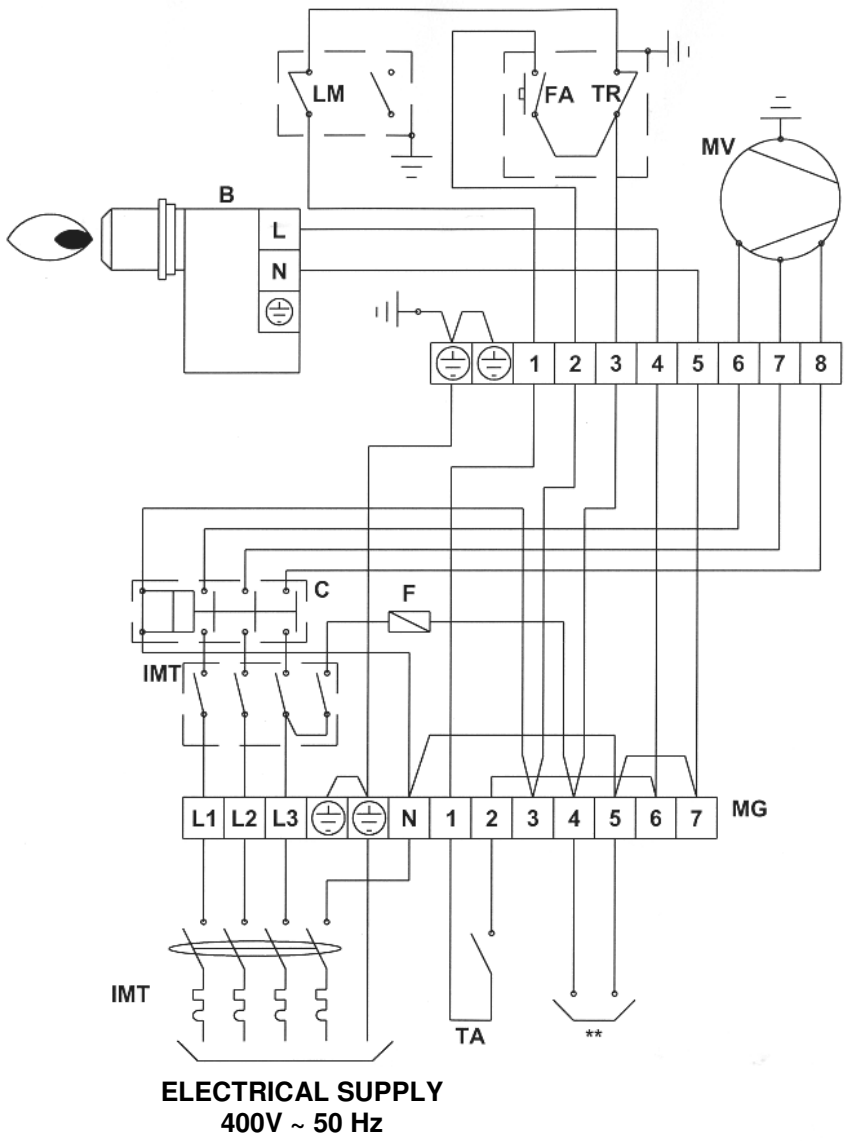
INDEX:

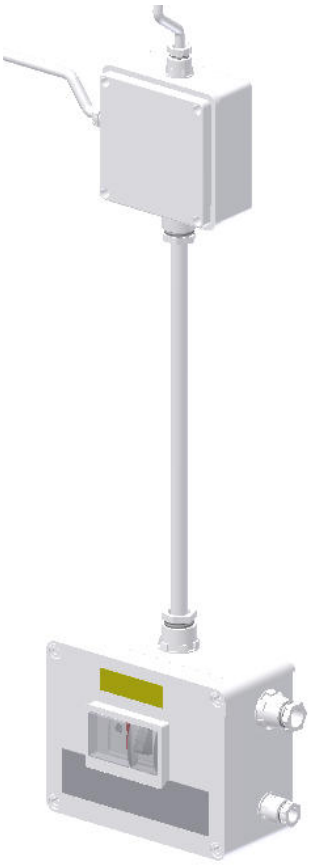
I	Turn-off switch
MV	Fan terminal board
FA	FAN thermostat
TR	Contactor Automatic security thermostat contact TR
LM	Contactor Manual security thermostat contact LM(optional)
B	Burner
MG	Terminal board
IMT*	Differential magneto-thermic switch
TA*	Room thermostat contact

*	Not included in the supply, to be fixed by the installer.
**	Electric supply mono-phase 230V ~ 50HZ for a possible room thermostat.

A copy of the electrical scheme can be found inside the electrical board supplied with the device.

Electrical scheme for the suspended version with three-phase electric supply 400V ~ 50Hz 3N:
Cod. 10002272-TC





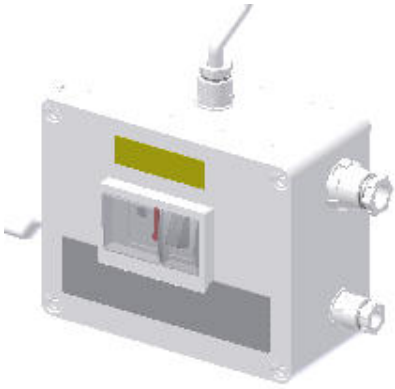
INDEX:

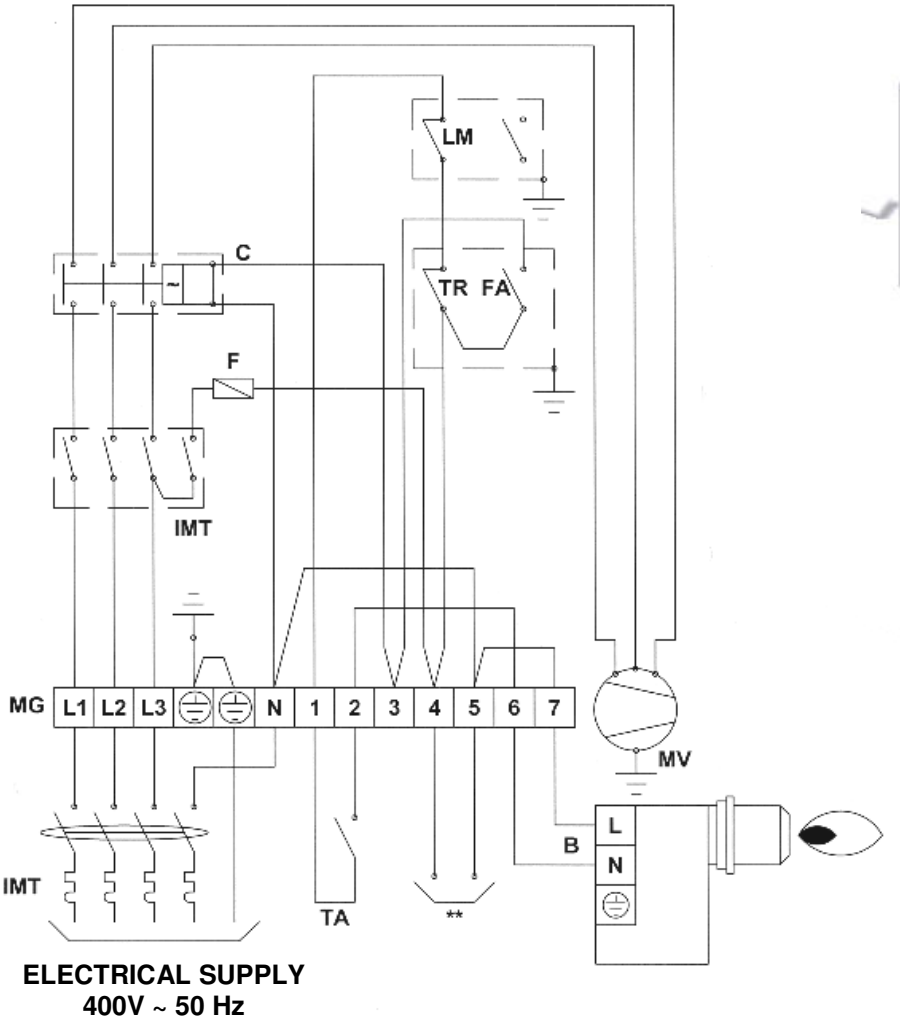
I	Turn-off switch
MV	Fan terminal board
FA	FAN thermostat
TR	Contactor Automatic security thermostat contact TR
LM	Contactor Manual security thermostat contact LM(optional)
B	Burner
MG	Terminal board
IMT*	Differential magneto-thermic switch
TA*	Room thermostat contact

*	Not included in the supply, to be fixed by the installer.
**	Electric supply mono-phase 230V ~ 50HZ for a possible room thermostat.

A copy of the electrical scheme can be found inside the electrical board supplied with the device.

Electrical scheme for the mobile version with a three-phase electric supply 400V ~ 50Hz 3N:
Cod. 10002275-TC





INDEX:

I	Turn-off switch
MV	Fan terminal board
FA	FAN thermostat
TR	Contactor Automatic security thermostat contact TR
LM	Contactor Manual security thermostat contact LM(optional)
B	Burner
MG	Terminal board
IMT*	Differential magneto-thermic switch
TA*	Room thermostat contact

*	Not included in the supply, to be fixed by the installer.
**	Electric supply mono-phase 230V ~ 50HZ for a possible room thermostat.

A copy of the electrical scheme can be found inside the electrical board supplied with the device.

ADJUSTMENT OF FAN SPEED

Chapter concerning only the versions with centrifugal fans.

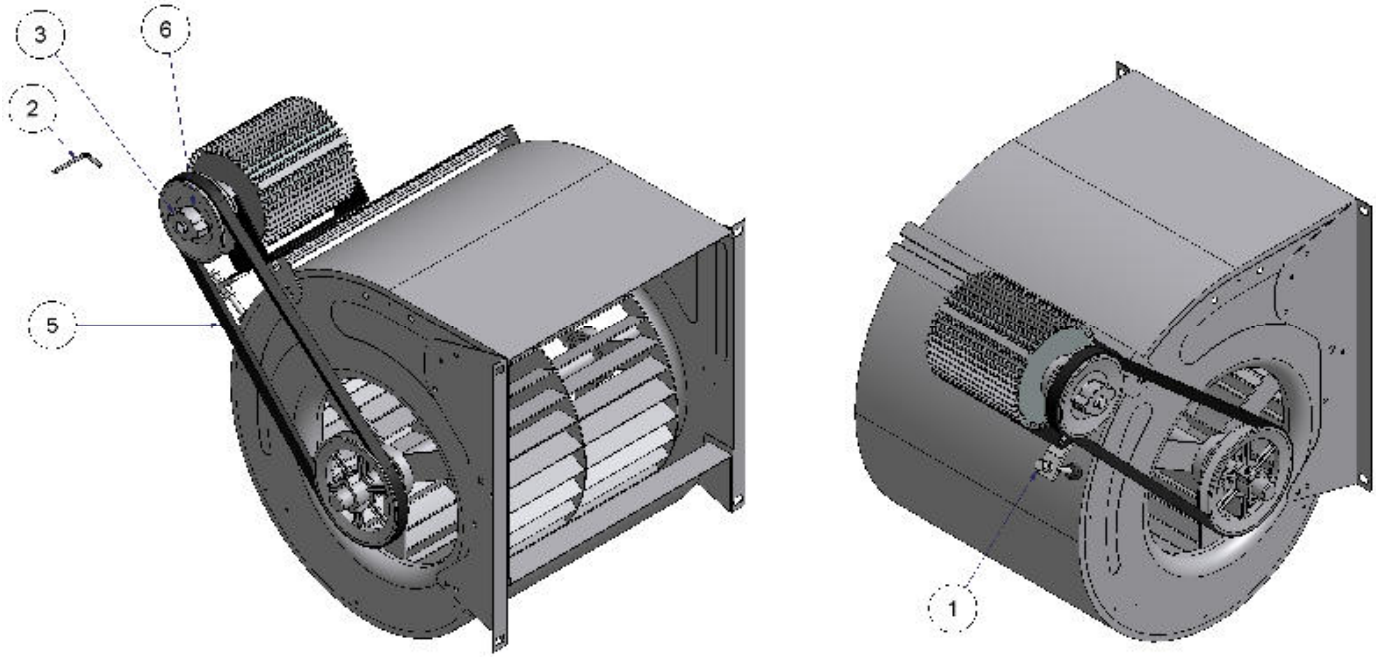
The pulley installed on fan motor is of variable diameter. The devices are supplied with a series with a transmission ratio which is regulated.

In the installing – first start phase it is compulsory to check out and regulate the transmission ratio in order to guarantee a normal air throughput.

The measuring of the air flow can be done exactly by using special instruments or by approximation, checking with the adjusted burner to the normal heating capacity input, the temperature deviation between the outlet air temperature and the inlet air temperature, comparing with the data stated into the paragraph "DATI TECNICI".

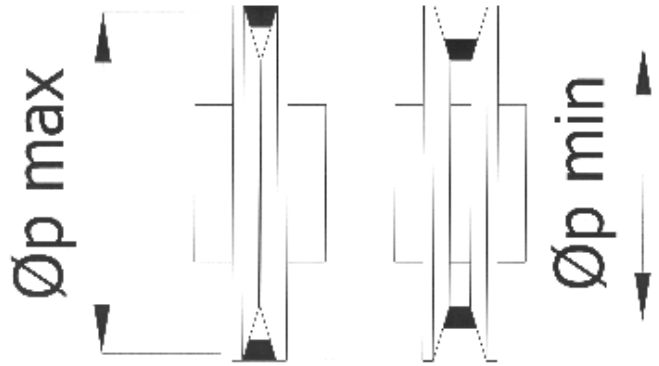
In any case, it is necessary to ensure that the rotation direction of the fans is that one indicated by the arrow on the fan case. In case of three phase electrical motor, to modify the rotation direction, it is enough to invert a phase of the electrical supply line without touching the electrical board cabling. It is furthermore necessary that the motor absorption will be near, but not over the one indicated on the motor plate. In order to obtain this result, you have to reduce the fan rpm.

In order to modify the rpm of the fan plese procedee as follows:



- Dismount the lateral grid of the aspiration carter;
- Unfasten the belts unscrewing the screw **1**
- Take out the belts **5**
- With 6 angle key **2**, unscrew the screw **3** on the mobile part of the sheave **6**
- Rotate the mobile part of the sheave in order to obtain the primitive diameter desired.
- Block strongly the screw **3** in corrispondance in the side of the shaft.
- Mount and fasten the belt **5**

⚠ **ATTENTION!**
Not fasten to much the belts, because the can be the case of the fan shaft breaking. Pushing with the hands on the belts the belts must go down of 20-30 mm.



⚠ Increasing the primitive diameter of the traction sheave the fan rpm will increase and the current absorption of the electrical motor will increase. Decreasing the primitive diameter of the traction sheave the fan rpm will decrease and the current absorption of the electrical motor will decrease.

FONCTIONNING CYCLE

Summer vent functioning cycle

The functioning cycle follows these steps::
- Supply power to heater
- Press the white vent button placed on the bi-thermostat FAN-LIMIT installed near the burner.
- Now only the fan group is working and the air spread in the room has the same temperature as the inlet air.

Heating functioning cycle.

The functioning cycle follows these phases:

- Supply power to the heater.
- Set the switch on the heating position.
- Set the thermostat on desired temperature.
- Now the burner is electrically supplied and, after the change of air in the combustion chamber, the flame lights.
- After about a minute from the lighting of the flame, the fan group starts to work and the hot air is spread in the room you want to heat.
- When the air temperature is the same as the thermostat temperature, the burner stops and, after 3 minutes, the fan group stops as well.

- **STOP**

- To stop the heater do as follows.:
- Open the contact of the room thermostat
- Wait until the fan stops and then , if necessary, cut off tension on general switch.

⚠ **WARNING!**

Do not stop the device by disconnecting it from the electric supply system as the thermal energy cumulated in the exchanger can cause dangerous overheating of the exchanger with possible damages of the heater. Besides, the LIMIT thermostat can action, thus requiring a manual restart.

CONTROLS

In order to verify the correct function of the equipment, it is necessary to control some essential parameters. Start the equipment and:

- Verify that the fan group starts after abt. max 60 sec from burner starting and in the correct rotation direction.

With the warm air heater completely running and the room in a standard condition, following operations have to be carried out:

- Verify that there are no combustible losses.
- Verify the correct combustible consumption.
- Verify that the smokes temperature correspond to the value on the chapter "TECHNICAL DATAS" with a +/-10°C tolerance
- Verify that the setting of the dual thermostat FAN-LIMIT with automatic reset is correct.
- Verify that there is not any unusual intervention of the thermal protection relays.
- Verify that the setting of the dual thermostat FAN-LIMIT with manual reset is correct and that the scale disk position itself to a max temp of about +50-60°C.
- Verify that the temperature deviation corresponds to the value on the chapter "TECHNICAL DATAS" with a +/-5K tolerance.
- Rotate by hand and separately the scale disks of the security thermostat LM and TR (simulating the intervention), verifying that the burner turns off.
- Open the contact of the room thermostat and verify that it is working only on the diesel oil burner and that there is not the turn off of the fan motor.
- Verify that the electrical absorption of the electrical motor is near, but not get over the value indicated in the plate.
- Verify that the thermal protection relays of the motor is set on the value of the motor plate.
- Verify that the fan still works for a 3 minutes period before the complete cooling down of the heat exchanger.

COMMANDS

HEATING MAIN SWITCH(ONLY FOR THE VERSION WITH SINGLE-PHASE ELECTRIC SUPPLY 230V~50HZ):
Positioned on the electrical board of the warm air heater, has the function to start and to turn off the heating.

BUTTON TO RESET THE BURNER
Positioned on the same burner, has the function to reset the protection after the block

BUTTON TO RESET THE FAN THERMOSTAT LIMIT(IF IT IS PRESENT)
Positioned inside the electrical panel on the body of the thermostat LIMIT, has the function to reset the functioning of the fan assembly after a lock out for bad functioning or excessive electric absorption of the fan motor.

SUMMER FAN SWITCH:
Placed on the body of the bi-thermostat FAN-LIMIT with an automatic restart, of white colour, has the function to start and to turn off the fan assembly. If pushed it lead to forced starting of the fan, if pulled determine the automatic functioning according to the temperature.

ROOM THERMOSTAT (ACCESSORY):
It is installed inside the building to be heated on a 1,5 meter position over the ground, away from hot/cold current. Has as function the regulation of the device functioning according to the defined temperature.

⚠ **WARNING!**

Before unblocking, find out and remove the inconvenient that caused the security protection intervention. If you have doubts or perplexities apply to the local Authorized Assistance Centre.

MISTAKES AND RESETS

INTERVENTION OF THE SECURITY THERMOSTAT "TR":

- In case of overheating of the out-going air, the security thermostat TR intervenes immediately (for its setting look in the "Technical Data" paragraph).
- The intervention causes an immediate shutting off of the burner. The fan assembly does not stop immediately, but in several minutes after the burner stopped.
- **Remove the fault that caused the intervention**, the re-start is automatic.
-

BLOCKING INTERVENTION OF DIESEL OIL BURNER:

- In case of loosed starting of the burner, it is blocked automatically.
- The intervention shuts off the burner instantly. The fan assembly does not stop immediately, but in several minutes after the burner stopped.
- **After remove the fault that caused the intervention**, for re-starting the re-starting button should be pusher.

ELECTRIC ABSORBTION OF THE MOTOR

THE MEASURING OF THE ELECTRIC ABSORBTION OF THE FAN MOTOR

For checking out the electric absorption the following actions should be done:
- Insert the metric tongs on one phase of the main tension;
- Start the warm air heater in only summer ventilation, in order to avoid any other electrical charge (burner, auxiliaries, etc.);
- Read the absorption value on the metric tongs and compare with the data on the motor plate;
- Repeat the measurement on all three phases of the electrical supply.

START AND STOP

START
Follow the instructions in the "Functioning cycle" chapter.

STOP
For interrupting the device functioning, action by following steps:
- Open the contact of the room thermostat.
- Wait until the fan stops, after that disconnect the device from the electric system.
-

⚠ **WARNING!**

Do not stop the device by disconnecting it from the electric supply system as the thermal energy cumulated in the exchanger can cause dangerous overheating of the exchanger with possible damages of the heater. Besides, the LIMIT thermostat can action, thus requiring a manual restart.

MAINTENANCE

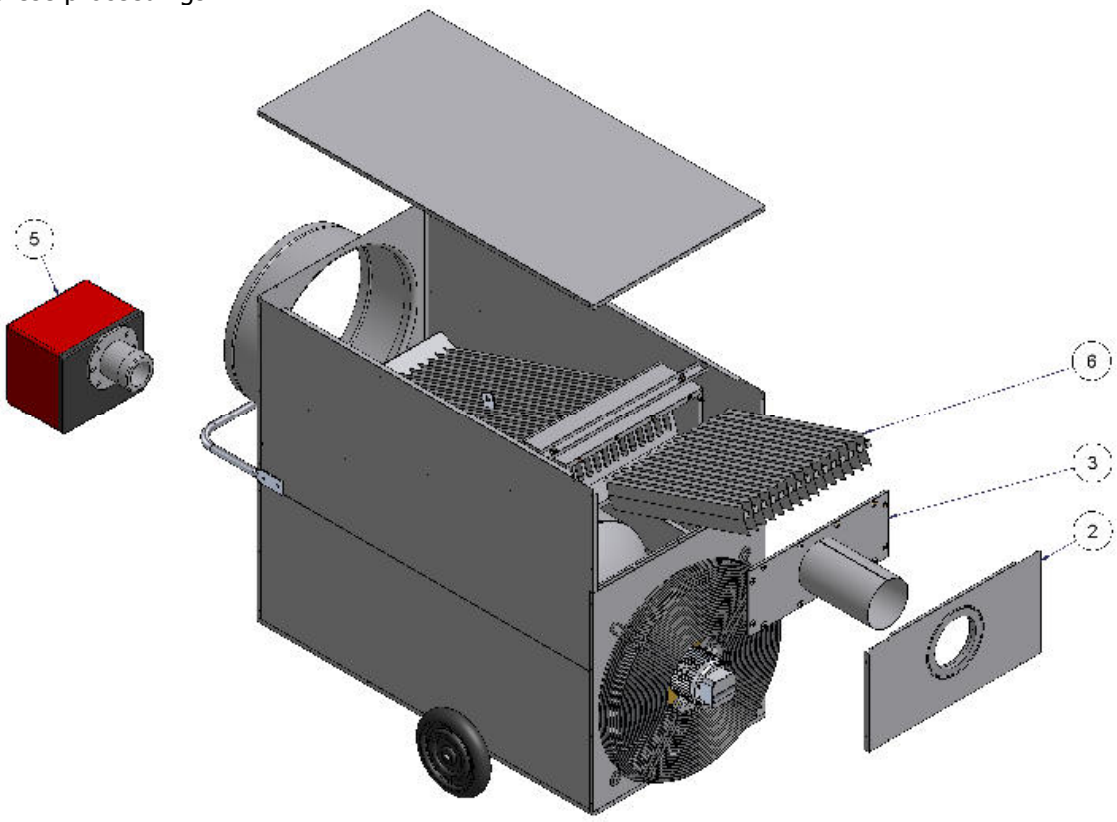
For a good functioning and preservation of the warm air heater, it is recommendable to make the periodical cleaning and maintenance operations.
All the intervention in this sense it must be done by professional people with not working equipment and cutting off the electrical and fuel supply.
All the maintenance and cleaning operations of the warm air heater in which it is necessary to us stairs or another access way, have to be carried out with suitable systems and in safety.
Periodically control the correct fixing of screws used for equipment assembling.

OIL BURNER CLEANING

Burner cleaning has to be done by qualified personnel, accurately following the instructions of the burner.

HEAT EXCHANGER CLEANING

The exchanger cleaning has to be done by qualified personnel and should follow the referring specific rules. We advice to do the cleaning at least one time a year at the beginning of the winter season. To do this follow these proceedings:

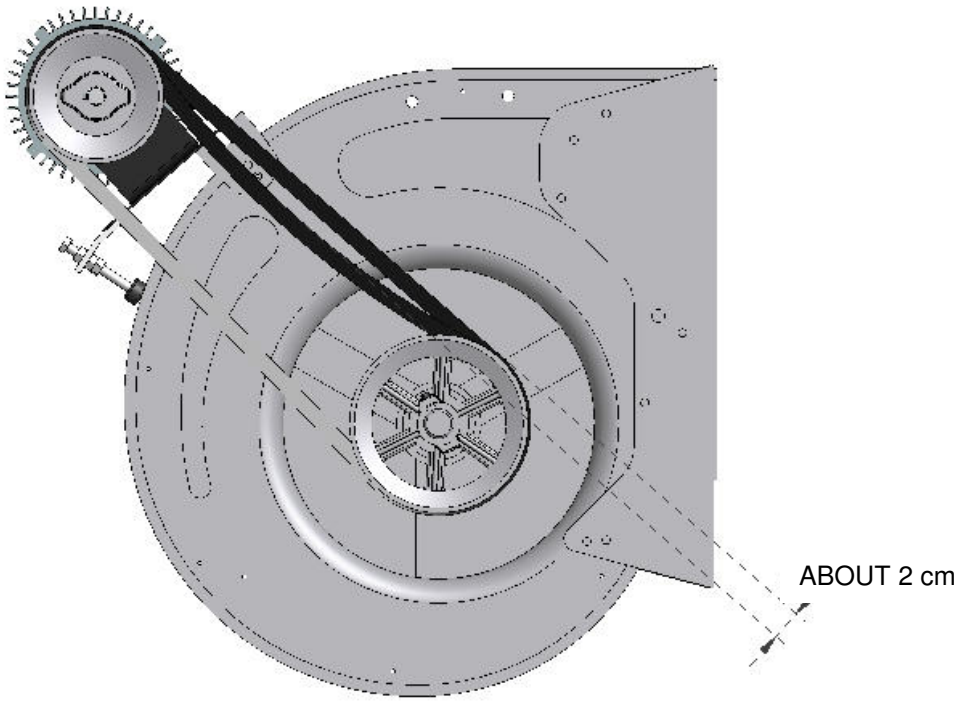


- Dismount smokes kit **1;**
- Dismount the inspection panels **2**;
- Dismount the inspection doors **3**;
- Dismount the burner**5;**
- Take out the vortex plates **6;**
- Check the cleaning of the inside of the combustion chamber and of the heat exchanger ;
- Clean with the flue brush the pipes o f the heat exchanger and remove the dirty with a vacuum cleaner
- Remove the dirty in the back manifold through the inspection door using a vacuum cleaner.
- Remount everything putting attention to the seal of the inspection doors of the heat exchanger, and if it is necessary change them.

FAN ASSEMBLY MAINTENANCE

Chapter concerning only versions with centrifugal fan.

Periodically check the tension of drive belts and the alignment between engine pulley and fan pulley. Belts must not be tighter than necessary, so that they can't slip. If you press the belt sides with your hands, it should give of at least 2 or 3 cm. To set the tension use the special bolts to stretch the belt.



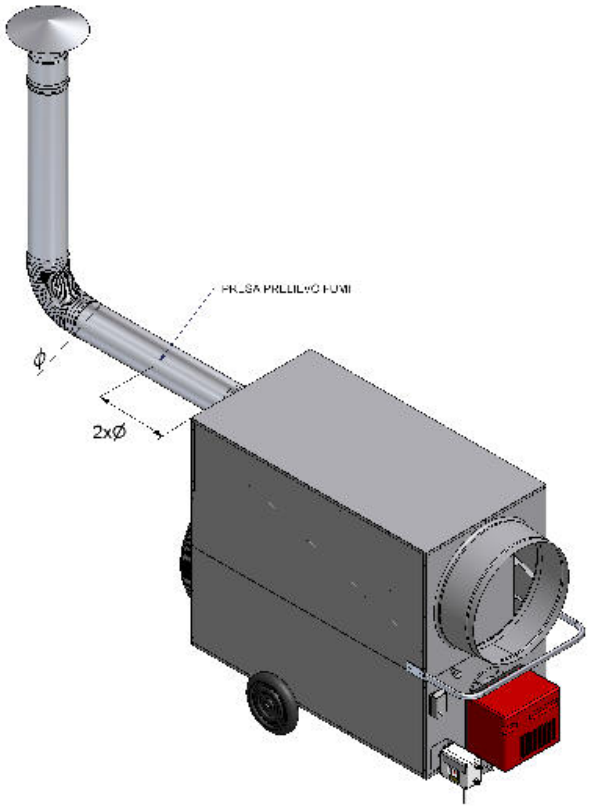
Engine bearings are hermetical and greased; the grease supply allows the heater to work even without maintenance.

SECURITY THERMOSTAT MAINTENANCE

Verify any semester the functionality of the security thermostat. Manually rotating the graduated dial, it is possible to simulate its intervention and verify that the burner switches off.
Verify than that the reset will take place regularly by the reset button.

LOCATION OF SMOKES COLLECTION HOLE

To make an analysis of flue gas of the heater, you must take a sample following the dimensions indicated here below:
:



The supply does not include the collector for the smoke tests.

ASSISTANCE

Installation, working and maintenance of hot air heaters must be carried out only by qualified staff.

To find out the local Authorized Assistance Centre apply to the Agency where the device was bought.

38057 PERGINE VALSUGANA (TRENTO) ITALY
Viale dell'Industria, 19
tel. (0461) 53 16 76 fax (0461) 51 24 32
www.tecnoclimaspa.com tecnoclima@tecnoclimaspa.com

Since the company is constantly engaged in making improvements to its production, the appearance and dimensions, technical data and equipment and accessories may be subject to alterations.