



Floor standing hot air generators  
indoor/outdoor gas

## AS L - AS EX



mod. AS L



mod. AS EX

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## PURPOSE

### Machine we mean the warm air heater complete with its accessories

This manual is intended for operators and specialized personnel and provides important information and warnings on safety in the installation, commissioning, use and maintenance of the machine, to allow it to be used correctly.

Inside you will find the following descriptions and information:

- a functional description of the machine and of each of its parts
- machine safety information
- information for correct installation of the machine
- information for correct use of the machine
- information for correct routine and scheduled maintenance of the machine

### Symbols used in the manual

In some parts of the manual there are triangular DANGER signs.

Pay great attention to these, as they indicate a situation of potential danger.

#### **DANGER**

Maximum danger level!

This symbol indicates operations which, if not carried out correctly, cause serious injury, death or long-term health risks.



DANGER

#### **WARNING**

This symbol indicates operations which, if not carried out correctly, may cause serious injury, death or long-term health risks.



WARNING

#### **CAUTION**

This symbol indicates operations which, if not carried out correctly, may cause damage to the machine and/or injury to people.



CAUTION

#### **DANGER LIVE COMPONENTS**

This symbol indicates operations which, if not carried out correctly, lead to electric shocks with lethal consequences.



#### **DANGER FLAMMABLE MATERIAL**

This symbol indicates the presence of flammable materials.



#### **DANGER BURNING**

This symbol indicates the risks of burns due to high temperatures.



#### **DANGER CRUSHING OF LIMBS**

This symbol indicates the presence of moving parts: danger of crushing of limbs.



#### **WARNING MOVING PARTS**

This symbol indicates that you must keep limbs away from moving mechanical parts; danger of crushing.



#### **DANGER EXPLOSION**

This symbol signals places where an explosive atmosphere may be present. An explosive atmosphere is defined as a mixture - under atmospheric conditions - of air and flammable substances in the form of gases, vapours, mist or dust in which, after ignition has occurred, combustion spreads to the entire unburned mixture.



#### **PERSONAL PROTECTION EQUIPMENT**

These symbols indicate the equipment that must be worn and kept by the operator for protection against threats against safety and/or health while at work



#### **ENVIRONMENTAL PROTECTION**

This symbol gives indications for the use of the machine with respect for the environment.



#### **IMPORTANT INFORMATION**

This symbol indicates important information that you must bear in mind.





This manual is an essential and integral part of the machine, therefore it must be followed, even in the case of transfer of ownership or to another facility, and must be stored with care. In case of damage or loss, another copy must be requested from the manufacturer.



The operator and specialized personnel are required to read and understand the contents of this manual.

The manufacturer declines all responsibility for damage to people, animals and things caused by:

- incorrect use of the machine;
- improper intended use of the machine;
- use of the machine that does not comply with the instructions in this manual;
- use that does not comply with laws, regulations, decrees, prescriptions, European, national, regional and district ordinances.



The manufacturer also declines all responsibility if the machine is not installed or checked periodically or repaired by service centres authorized by the manufacturer or by personnel specialized. By specialized personnel we mean "maintenance technicians with specific knowledge of heating in rooms where people are present".

This machine cannot be used by people (including children) with reduced physical, sensory, mental or with little experience and knowledge of the machine in question unless the person is been instructed on its use by the person responsible for its safety or operates under supervision of the person responsible for safety.



**IT IS STRICTLY FORBIDDEN TO USE THIS MACHINE IN THE PRESENCE OF AN EXPLOSIVE ATMOSPHERE.**

The system design, installation, commissioning, periodic checks and repairs of this machine must only be carried out by qualified personnel.



In particular, attention is drawn to the obligations imposed by laws, decrees, rules, ordinances, Prescriptions European, national, regional and local in matters of design, authorizations, installation, controls periodicals, maintenance, combustion checks and atmospheric emissions, which the operator and

In the event of problems or malfunctioning of the machine, the operator must disconnect the power supply machine and avoid any attempt to repair in order to avoid damage to the machine and / or to third parties. See description in the TROUBLESHOOTING chapter of this manual.



**Before any maintenance or repair work, remove the power supply to the machine by selecting - O - on the electric control board**

At the end of each heating season, the operator must request the intervention of specialized personnel to clean the combustion chamber and the heat exchanger.

At the beginning of each heating season and, according to the deadlines set by law and regulations, the operator must have the efficiency of all functional and safety parts of the machine checked by specialized personnel and have the combustion checked.

The results of these interventions will be recorded in the "central log book".

The air filter, if provided, must be kept clean frequently to keep it clean.

It must be removed from its frame, blown with compressed air (see MAINTENANCE chapter) and put back in its frame.

When the air intake grille is dirty, it must be cleaned with a brush or vacuum cleaner without however removing it.

**Explanation of graphic symbols on controls and alarm devices**

Voltage

Heating

Only ventilation

Intervention of the thermal switch of the remote

Intervention of the safety limit with manual reset

Burner off





## GENERAL INFORMATION AND PRECAUTIONS

This machine is suitable for the following uses:

### **a) Direct heating of the blown air through its own fan unit.**

The heat exchange occurs by contact between the external walls of the combustion chamber / heat exchanger and the air that passes through it.

### **b) Ventilation only.**

In mode (a), the machine must be equipped with a burner, connected to the electric power supply line, to the gas pipe and to a suitable system for discharging the products of combustion and condensate.

In mode (b) it is sufficient to connect the machine to the power supply line.

**This machine must be used for heating the room air.**

**Attention is drawn to the fact that the machine is not suitable for use for other purposes; and in particular it is not suitable for use in normal operation at average air outlet temperatures above 80°C.**



**The manufacturer is solely responsible for the functional characteristics of the machine if it is used in the manner and within the limits described in this manual.**



WARNING

## **Liability and Warranty**

The manufacturer guarantees its new products from the date of installation in accordance with current regulations and / or in accordance with the sales contract.

Verify, upon initial start-up, that the machine is intact and complete.

Failure to comply with what is described in this manual, operational negligence, incorrect installation and the execution of unauthorized modifications, cause the manufacturer to void the machine warranty.

In particular, the warranty and liability rights expire in the event of damage to persons and / or things, if the damage itself is attributable to one or more of the following causes:

- incorrect installation, commissioning, use and maintenance of the machine;
- improper, erroneous and unreasonable use of the machine;
- intervention of unskilled personnel;
- execution of unauthorized modifications to the machine;
- use of the machine with defective safety devices, incorrectly applied and / or not working;
- installation of additional components not tested together with the machine;
- supplying the burner with unsuitable fuels;
- defects in the fuel supply system;
- use of the machine even following the occurrence of an error and / or an anomaly;
- repairs and / or overhauls performed incorrectly;
- modification of the combustion chamber by introducing inserts that prevent the regular development of the constructively established flame;
- insufficient and inappropriate supervision and care of the machine components most subject to wear;
- use of non-original components, whether they are spare parts, kits, accessories and options;
- causes of force majeure.

**Furthermore, the manufacturer furthermore declines any and every responsibility for the failure to observe the contents of this manual.**



## Information on safety and prevention

The machine has been designed and built-in compliance with the standards and directives in force, applying the known technical safety rules and providing for all potentially dangerous situations.

However, it is necessary to consider that careless and clumsy use of the machine can cause situations of danger of death for the user or third parties, as well as damage to the machine itself or to other assets.

Distraction, lightness and too much confidence are often the cause of injuries as can fatigue and drowsiness.

### **The following should be taken into consideration:**

- the machine must only be used for the use for which it was expressly intended.
- Any other use is to be considered improper and therefore dangerous.

### **In particular:**

the type and pressure of the fuel, the voltage and frequency of the supply voltage, the minimum and maximum flow rates at which the machine can be adjusted, the ambient temperature, must be within the values indicated in this manual.

- It is not allowed to modify the machine to alter its performance and intended use.
- The machine must be used in flawless technical safety conditions.  
Any disturbances that could compromise safety must be eliminated promptly.
- It is not allowed to open or tamper with the machine components, except only the parts required for maintenance.
- Only the parts specified by the manufacturer can be replaced.

The manufacturer guarantees safety and proper functioning only if all machine components are intact and positioned correctly.

## CONSTRUCTION EXAMINATION AND SAFETY REQUIREMENTS

The warm air heater consists of an aluminium frame and an external panelling in pre-painted sheet metal: the panels are internally insulated with a glass wool mat.

In the heating section we find a combustion chamber and a heat exchanger.

In this area, the insulating mat is protected against the danger of overheating by a galvanized sheet cover.

In the fan section, located in the lower part of the warm air heater, there are one or more double inlet centrifugal fans, individually driven by a three-phase electric motor / s with belt drive / s.

The fan unit is protected by an anti-finger grid that prevents accidental contact with parts of the body and the entry of leaves or external objects.

It is designed to prevent the entry of a ball with a diameter of 16 mm, with a force of 5N.

The grid can only be removed with the aid of a tool.

The combustion chamber, built in stainless steel for high temperatures, is fixed to the frame so that its thermal expansion does not compromise its duration over time.

The heat exchanger made with stainless steel tubes is solidly welded to the combustion chamber.

Suitable openings on both sides allow easy access for inspection and maintenance.

On the front side of the warm air heater we find:

- a plate to fit the automatic forced draught gas / fuel oil burner
- an electric control board complete with
  - switch
  - HEATING / VENTILATION / BURNER STOP switch
  - voltage indicator
  - remote switch thermal intervention light (only in 3F models)
  - Safety Limit intervention light;

a combination of 3 thermostats (TRITHERMOSTAT) ensure the following control and safety functions:

- **FAN (TR):** thermostat normally open for the automatic start and stop of the fan unit in "HEATING" phase;
- **LIMIT (TW):** burner maximum thermostat, normally closed with automatic reset.
  - o Automatically turns off the burner to prevent the air temperature at the warm air heater outlet exceeding the safety limit;
- **LIMIT2 (STB):** burner safety thermostat, normally closed with manual reset and a positive security.
  - o Automatically turns off the burner to prevent the air temperature at the warm air heater outlet from exceeding the safety limit set by the reference standard.  
Its calibration is imposed at 100°C by the manufacturer and must not be modified to avoid overheat of the warm air heater;  
(to reset the burner, read the instructions in the Chapter: **TRI-THERMOSTAT**).

## Other essential safety requirements

### Electrical equipment.

After the various assembly stages, all warm air heaters are subjected to the following electrical checks to verify compliance:

- visual check of the electrical circuit and tightening of the connections;
- continuity of the earth circuit;
- insulation resistance test;
- voltage test.

### Temperatures.

The temperatures of the accessible areas for normal use of the warm air heater comply with the European reference standard.

### Noise.

All the necessary measures have been taken to contain noise.

The values in dB (A) are shown in the tables Chapter: **TECHNICAL DATA.**

### Reports.

The signals on the controls and on the alarm devices are made with graphic symbols according to the ISO7000 standard.

For an explanation of the symbols used, refer to the Chapter Explanation of Graphic Symbols on page. 4.

At the beginning of each heating season and, according to the deadlines set by law and regulations, the operator must have the efficiency of all functional and safety parts of the machine checked by specialized personnel and have the combustion checked.

The results of these interventions will be recorded in the "central booklet".

The air filter, if provided, must be kept clean frequently to keep it clean.

It must be removed from its frame, blown with compressed air (see MAINTENANCE chapter) and put back in its frame.

When the air intake grille is dirty, it must be cleaned with a brush or vacuum cleaner without however removing it.



## REFERENCE STANDARDS, DIRECTIVES AND REGULATIONS

The manufacturer declares that the machine is built in a workmanlike manner based on UNI, UNI technical standards CIG, CEI; is according to:

- to GAR 2016/426 (EU),
- the Machinery Directive 2006/42 / EC,
- the Low Voltage Directive 2014/35 / EU,
- the Electromagnetic Compatibility Directive 2014/30 / EU,
- to ECODESIGN: Directive 2009/125 / EC,
- ErP REGULATION 2016/2281 / UE, STEP II °

SOME REFERENCE STANDARDS AND LAWS:



## PLATE OF THE CHARACTERISTICS OF THE WARM AIR HEATER

On the front of the warm air heater, the Technical Characteristics Plate is applied, made with ultra-destructible film which, if removed, cannot be reused.

A facsimile of this plate is shown below.



		A2B Accorroni E.G. s.r.l. Via d'Ancona, 37 - 60027 Osimo (An) - Tel. 071.723991 web site: www.accorroni.it - e-mail: a2b@accorroni.it	
GENERATORE D'ARIA CALDA A CONVEZIONE FORZATA ABBINABILE A BRUCIATORE AUTOMATICO AD ARIA SOFFIATA. - TIPO B23 FORCED CONVECTION WARM AIR HEATER COMPATIBLE WITH AUTOMATIC FORCED DRAUGHT BURNER. - TYPE B23			
MOD. /TYPE	LP 200	Serial N° Comm.	MESE/ANNO MONTH/YEAR
PORTATA TERMICA NOMINALE (Hi) NOMINAL HEAT INPUT (Hi)		238	kW
PORTATA TERMICA MINIMA (Hi) MINIMUM HEAT INPUT		100	kW
POTENZA TERMICA ALLA NOMINALE (Hi) THERMAL RATED POWER		229,2	kW
RESA TERMICA UTILE ALLA NOMINALE THERMAL YIELD		96,3	%
PERDITE DI CARICO DEL CIRC. DI COMB. COUNTERPRESSURE IN COM. CHAMBER		4	mbar
PORTATA ARIA AIR FLOW RATE		18.000	mc/h
PRESSIONE STATICA UTILE LATO ARIA USEFUL STATIC PRESSURE		250	Pa
POTENZA ELETTRICA ASSORBITA RATED POWER INPUT		400V - 3+N - 50 1	x 7,5kW
COMBUSTIBILE FUEL	G20	CATEGORIA CATEGORY	II2H3B/P
PAESE DI DESTINAZIONE DESTINATION COUNTRY		IT	
PREDISPOSTO PER GAS: G20 FOR GAS: G20 INLET GAS PRESSURE: 20mbar MADE IN ITALY - PIN 0476DL3913			
COMBUSTIBILE / FUEL /			
Questo apparecchio deve essere installato in conformità alle norme e leggi in vigore e usato solo in ambienti sufficientemente areati. Consultare le istruzioni prima dell'installazione e dell'uso di questo apparecchio.			
This appliance must be installed in compliance with the standards and laws in force and used only in sufficiently ventilated areas. Consult the instructions before installing and using this appliance.			

Fig. 1 Facsimile of the plate on the warm air heater

## PACKAGING

For the AS L - AS L EX versions, the warm air heater is delivered on a pallet and protected with bubble polyethylene and stretch film.

The other versions AS L delivered without pallet but with support feet and protected with polyethylene bubbles and stretch film.

The air delivery plenum, if supplied, is packaged with or separately from the warm air heater depending on the models. The packaging is accompanied by a packaging plate bearing the description of the machine, according to EN17082: 2019.

## TRANSPORT, LOADING AND UNLOADING



CAUTION

The transport, loading and unloading of the machine must be carried out with caution in order not to damage it and not to cause damage to people, animals or things.

A forklift with sufficient load capacity according to the safety factor can be used for loading and unloading the machine (see the gross weight of the machine in the tables contained in the WEIGHTS AND DIMENSIONS chapters).

During these operations, check the center of gravity of the machine in order to keep the load balanced, thus avoiding dangerous inclinations.

It is also possible, for the AS L versions, to load and unload the machine using bands for lifting through the rods welded to the combustion chamber pipes.

After removing the packaging, check the integrity of the machine.

If in doubt, contact the manufacturer or the local agent.



Packaging materials

The packaging materials (wood, cardboard, polystyrene, nails, etc.) must be collected and disposed of in accordance with the laws in force.



CAUTION

Before proceeding with the installation operations, carry out a thorough cleaning all around the area supervisor.



Keep out of reach of children these materials, they can be dangerous.



Fig. 2 Packed warm air heater

### Positioning

Once the packaging has been removed, the machine must be positioned as described in Chapter **Location of the warm air heater**



CAUTION

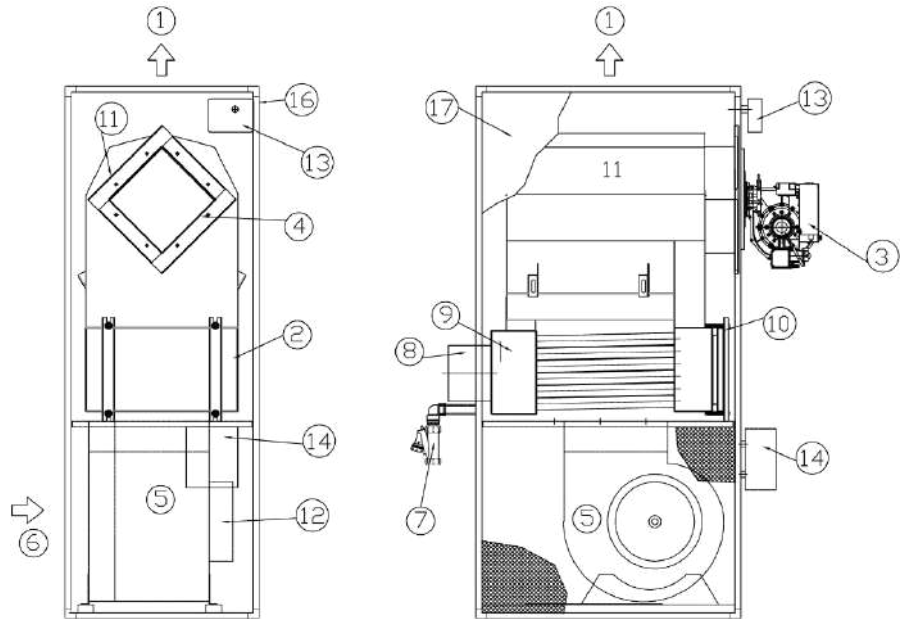
**DO NOT overturn the machine for any need.**

## CONSTRUCTION CHARACTERISTICS

COMPOSITION OF WARM AIR HEATER series "AS L" version

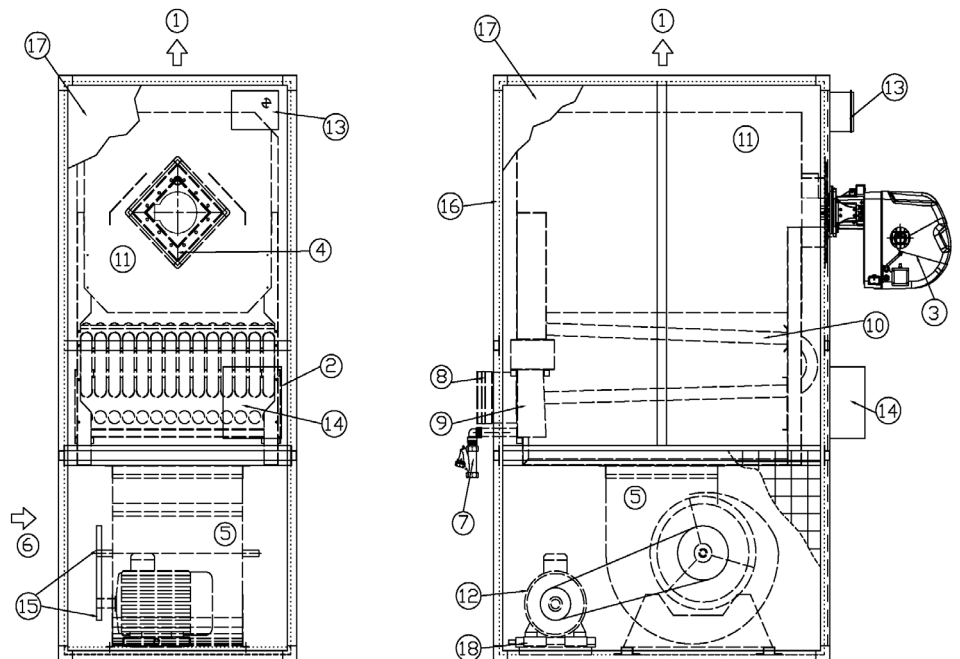
**Models "30" and "60" with single-phase motor and direct driven fan**

- 1) Air outlet
- 2) Rear smoke box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain with siphon
- 8) Smoke exhaust connection
- 9) Rear smoke box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Tri-thermostat
- 14) Electrical board
- 16) Frame made of aluminium sections
- 17) External insulated panels



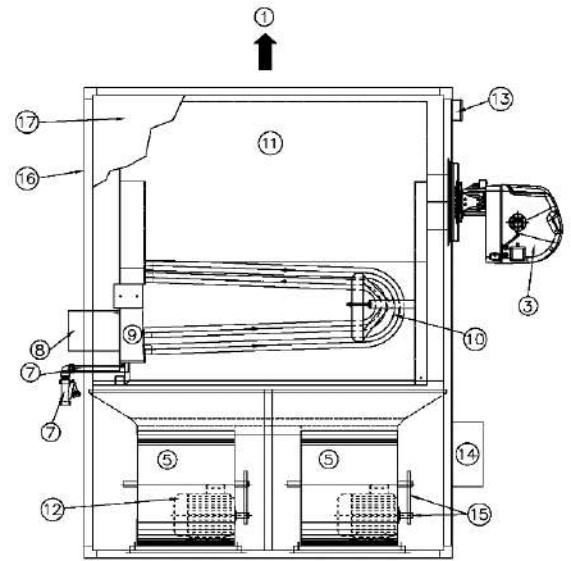
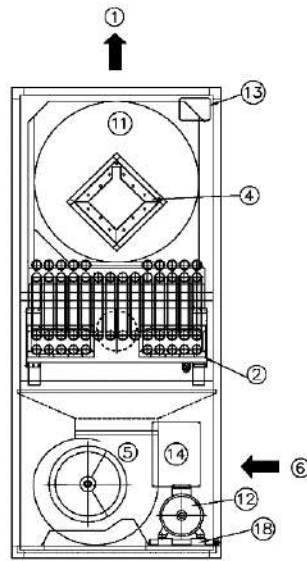
**Models from "80" to "200" with three-phase motor and transmission driven fan**

- 1) Air outlet
- 2) Rear smoke box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain with siphon
- 8) Smoke exhaust connection
- 9) Rear smoke box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Tri-thermostat
- 14) Electrical board
- 15) Pulleys and drive belts
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Motor's belt tightening slide



**Models from "250" to "600" with three-phase motor, and transmission driven fan**

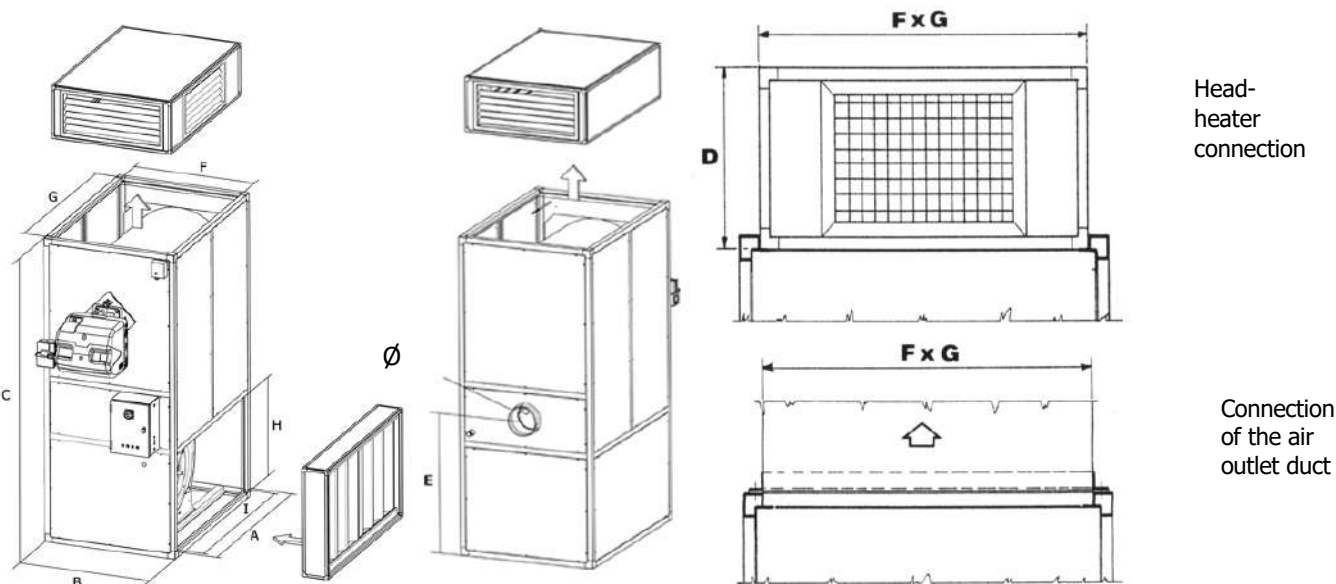
- 1) Air outlet
- 2) Rear smoke box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain with siphon
- 8) Smoke exhaust connection
- 9) Rear smoke box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) 2 Fan motors
- 13) Tri-thermostat
- 14) Electrical board
- 15) Pulleys and drive belts
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Motor's belt tightening slide



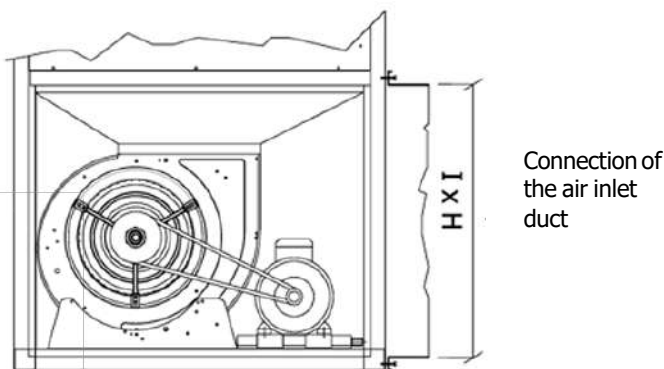
**Fig. 3 Left: Warm air heater 1Ph with air inlet filter and head for direct air distribution. Right: Warm air heater 3Ph with head for direct air distribution.**

# WEIGHTS and DIMENSIONS "AS L" SERIES

Weight in [kg] and dimensions in [mm].



The air inlet grille is on the LEFT up to model L200 and on the RIGHT from model L250 up to model L600. RIGHT and LEFT are in relation to the burner side. In the drawing the grille is RIGHT. The grille position can be reversed.



HEATER				Head height	Flue height	Air Outlet connection		Air Inlet connection		Frame profile	Frame system	Weight		Net head weight
MOD.	Length	Width	Height			F	G	H	I			Net	Packed	
	A	B	C	D	E	F	G	H	I	L	Ø	Kg	Kg	Kg
<b>AS L30</b>	660	530	1430	305	705	490	620	480	620	20	150	110	115	10
<b>AS L60</b>	870	636	1750	305	860	596	830	630	830	20	150	176	183	12
<b>AS L80</b>	1020	750	1950	405	935	670	940	690	940	40	130	225	235	37
<b>AS L100</b>	1020	750	1950	405	935	670	940	690	940	40	130	240	250	37
<b>AS L150</b>	1440	1020	2340	405	1070	940	1360	760	1360	40	150	390	400	40
<b>AS L175</b>	1440	1020	2340	405	1070	940	1360	760	1360	40	150	400	410	40
<b>AS L200</b>	1440	1020	2340	405	1070	940	1360	760	1360	40	150	415	425	40
<b>AS L250</b>	1790	1020	2340	405	1130	940	1710	760	1710	40	200	520	535	46
<b>AS L300</b>	1790	1020	2340	405	1130	940	1710	760	1710	40	200	550	565	46
<b>AS L425</b>	2300	1340	2660	405	1220	1260	2220	930	2220	40	250	850	870	67
<b>AS L500</b>	2300	1340	2660	405	1220	1260	2220	930	2220	40	250	870	890	67
<b>AS L600(1)</b>	2300	1500	2840	445	1400	1420	2220	1070	2220	40	250	965	985	70

NOTE 1: The L 600 model is made in 2 sections with the height of the fan section of 1150 mm and the heating section of 1690 mm.

## UNION OF THE FAN SECTION WITH THE HEATING SECTION OF WARM AIR HEATERS AS L 600 and variants

The warm air heaters L 600 and variants are produced and delivered in 2 sections (fan and heating).

Proceed as follows:

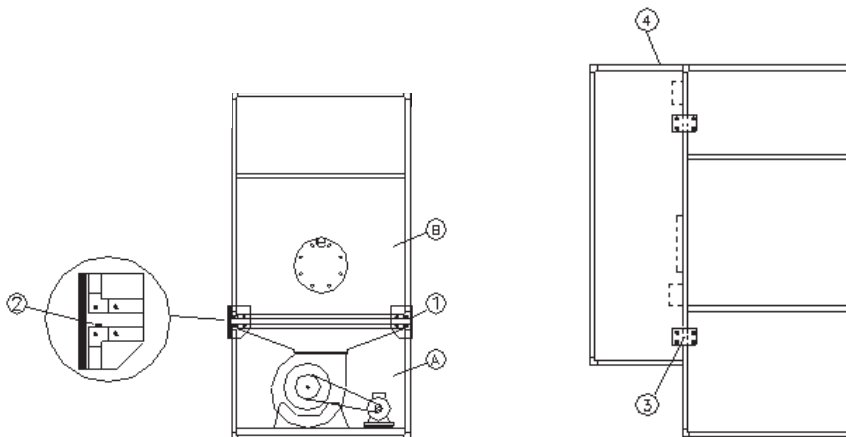
- remove the packaging of the 2 sections;
- remove the pallet by lifting the ventilating section (A) by means of the 4 lifting eyebolts located on the upper profile of the section itself;
- place the ventilating section (A) on a level floor;
- remove the 4 lifting eyebolts
- position the self-adhesive gasket (2) supplied along the side of the aluminum profile so that it adheres to the aluminum profile of the heating section (B);
- place the heating section (B) on the ventilating section (A) using the 4 lifting eyebolts located in the upper profile of the section itself;
- remove the 4 lifting eyebolts
- for mod. LO and LEO join the 2 sections horizontally;
- fix the 2 sections with the supplied screws through the brackets (1) located in the fan section (A);
- connect the tri-thermostat to the electrical panel with the supplied cable.



## ASSEMBLY OF THE BURNER PROTECTION CABIN FOR "LE 600" WARM AIR HEATERS

Proceed as follows:

- place the edge (4) of the cabin on the upper profile of the warm air heater, on the burner side;
- drill the side profiles in correspondence with the brackets (3) of the cabin (holes  $\varnothing$  5 mm);
- screw the brackets with the supplied screws.



## FIXING THE HEAD FOR DIRECT AIR DISTRIBUTION TO WARM AIR HEATERS

### L 300-425-500- 600 series

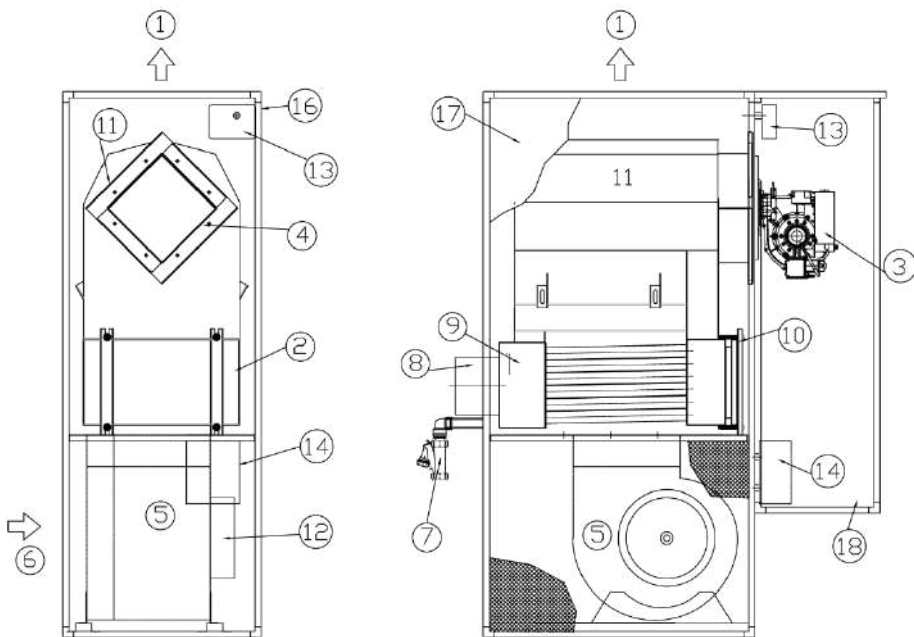
- Place the head for direct air distribution on the warm air heater
- Position the 4 brackets supplied (as shown in the photo).
- Screw the 16 self-drilling screws 6.3x16 supplied both on the profile of the warm air heater and on the profile of the head for direct air distribution.



## COMPOSITION OF WARM AIR HEATER series "AS L EX" version

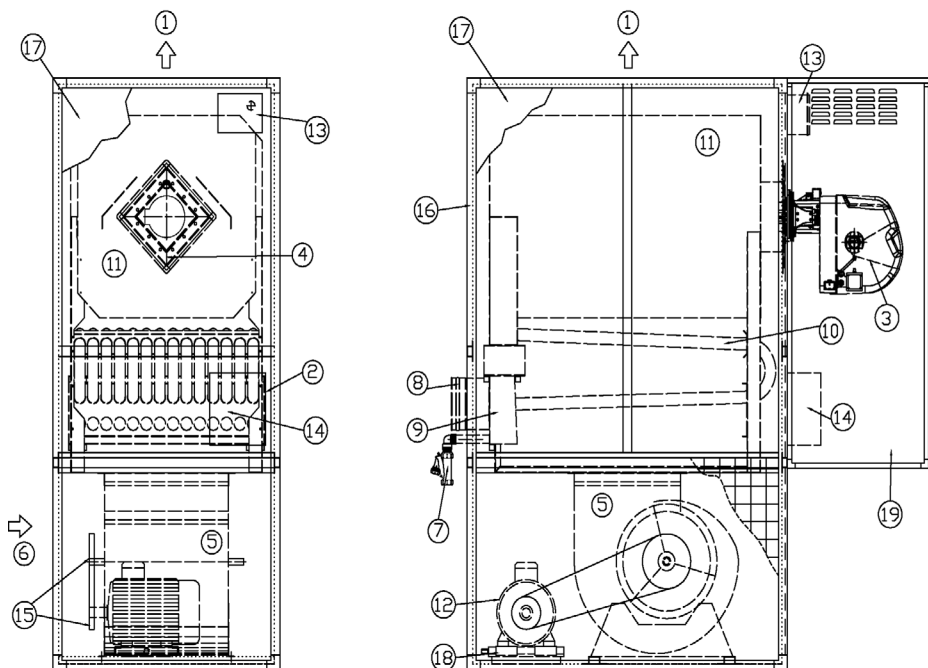
Models "30" and "60" with single-phase motor, and direct driven fan

- 1) Air outlet
- 2) Rear smoke box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain with siphon
- 8) Smoke exhaust connection
- 9) Rear smoke box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Tri-thermostat
- 14) Electrical board
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Burner cabin for protecting burner and electric components



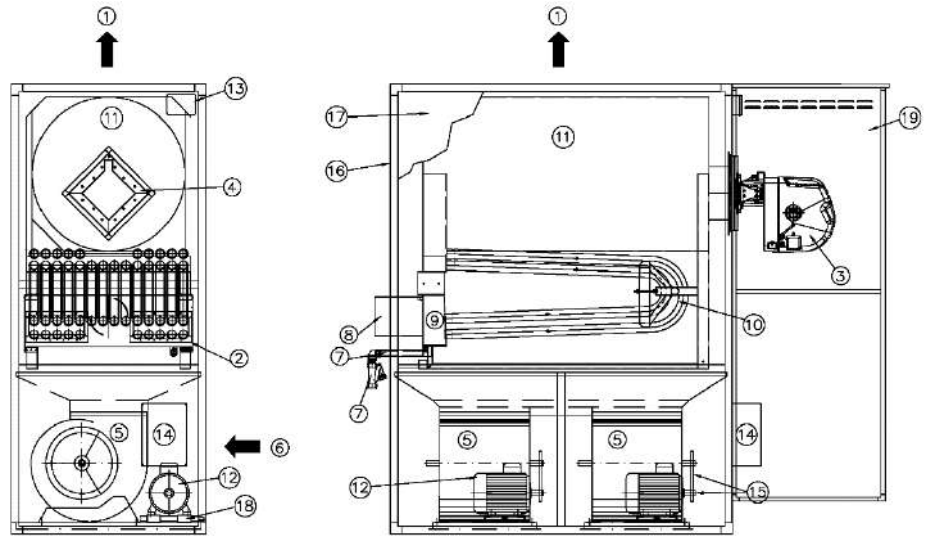
## Models from "AS L EX 80" to "AS L EX 200" with three-phase motor and transmission driven fan

- 1) Air outlet
- 2) Rear smoke box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain with siphon
- 8) Smoke exhaust connection
- 9) Rear smoke box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Tri-thermostat
- 14) Electrical board
- 15) Pulleys and drive belts
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Motor's belt tightening slide
- 19) Burner cabin protecting burner and electric components



**Models from "250" to "600" with 2 three-phase motors and transmission driven fans**

- 1) Air outlet
- 2) Rear smoke box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain with siphon
- 8) Smoke exhaust connection
- 9) Rear smoke box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Tri-thermostat
- 14) Electrical board
- 15) Pulleys and drive belts
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Motor's belt tightening slide
- 19) Burner cabin protecting burner and electric components

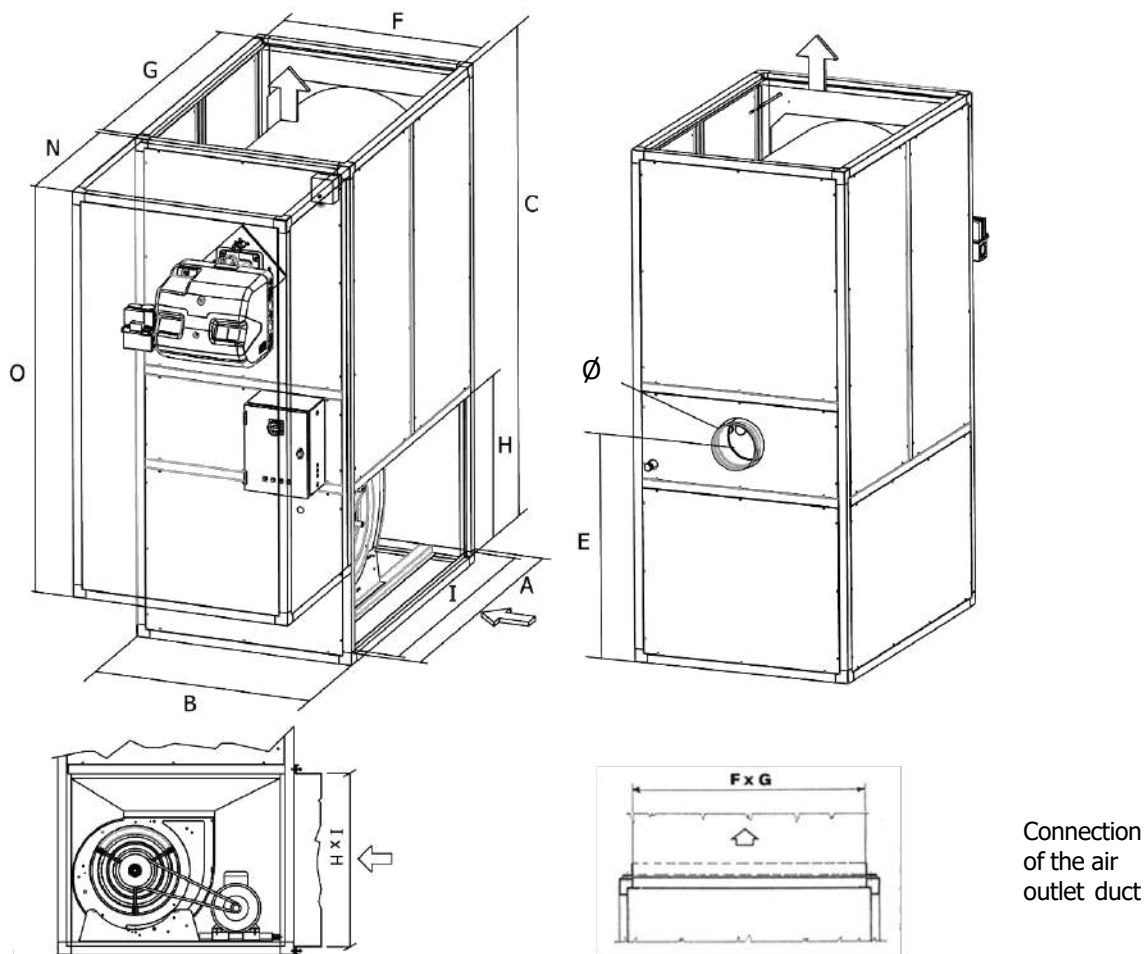


**Fig. AS L EX warm air heater for outdoor installation in vertical configuration.**



## WEIGHTS and DIMENSIONS "AS L EX"

**SERIES** Weight on [kg] and dimensions on [mm].



Connection  
of the air  
inlet duct

Connection  
of the air  
outlet duct

The air inlet grille is on the LEFT till model AS L EX 200 and on the RIGHT from model AS L EX 250 up to model AS L EX 600. RIGHT and LEFT are in relation to the burner side.

In the drawing the grille is RIGHT

The grille position can be reversed.

MOD.	HEATER			Flue height	Air Outlet connection		Air Inlet connection		Burner cabin		Flue system	Weight	
	Length	Width	Height						Depth	Height		Net	Packed
	A	B	C		E	F	G	H	I	N			
AS L EX 30	660	530	1430	705	490	620	490	620	400	1280	150	125	130
AS L EX 60	870	636	1750	860	596	830	630	830	400	1540	150	200	207
AS L EX 80	1020	750	1950	935	670	940	690	940	400	1320	130	265	275
AS L EX 100	1020	750	1950	935	670	940	690	940	400	1320	130	280	290
AS L EX 150	1440	1020	2340	1070	940	1360	760	1360	600	1700	150	432	442
AS L EX 175	1440	1020	2340	1070	940	1360	760	1360	600	1700	150	442	452
AS L EX 200	1440	1020	2340	1070	940	1360	760	1360	600	1700	150	457	467
AS L EX250	1790	1020	2340	1120	940	1710	760	1710	800	2170	200	580	595
AS L EX 300	1790	1020	2340	1120	940	1710	760	1710	800	2170	200	610	625
AS L EX4 25	2300	1340	2660	1220	1260	2220	930	2220	900	2500	250	935	950
AS L EX 500	2300	1340	2660	1220	1260	2220	930	2220	900	2500	250	955	970
AS L EX 600(1)	2300	1500	2840	1400	1420	2220	1070	2220	900	2680	250	1070	1090

NOTE 1: The AS L EX 600 model is made in 2 sections with the height of the fan section of 1150 mm and the heating section of 1690 mm.

# HEAD FOR DIRECT AIR DISTRIBUTION

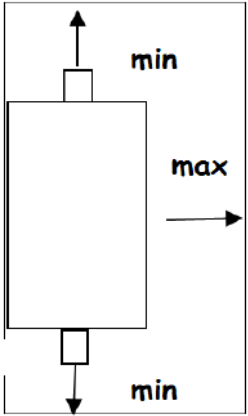
## WARM AIR HEATERS OF THE "AS L" SERIES

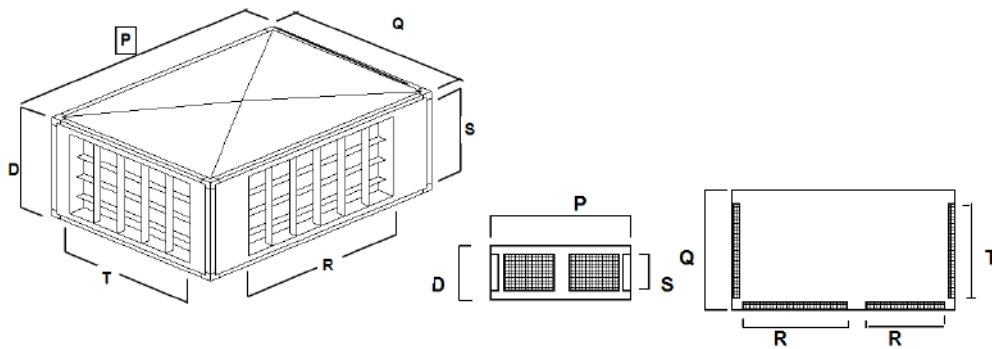
Air blown and dimensions in mm with fin vents on three sides of the nozzles.

MOD.	P	Q	D	R	T	S	n° of nozzles 1)	Air blown in m.	
								max 2)	min
AS L30	615	485	305	300	300	200	1+1+1	16	16
AS L60	825	591	305	300	300	200	1+1+1	16	16
AS L80	935	665	405	550	550	300	1+1+1	34	34
AS L100	935	665	405	550	550	300	1+1+1	38	38
AS L150	1355	935	405	750	750	300	1+1+1	55	55
AS L175	1355	935	405	750	750	300	1+1+1	60	60
AS L200	1355	935	405	750	750	300	1+1+1	63	63
AS L250	1705	935	405	750	750	300	1+2+1	74	60
AS L300	1705	935	405	750	750	300	1+2+1	80	62
AS L425	2215	1255	405	650	750	300	1+3+1	90	69
AS L500	2215	1255	405	650	750	300	1+3+1	94	72
AS L600	2215	1415	405	650	750	300	1+3+1	102	84

1) Short side (Q) + long side (P) + short side (Q).

2) The final speed of the blown air is 0.15 m/sec, and the nozzle fins' deflection is 0°. If deflection = 30°, multiply the blown air value by 0.65.



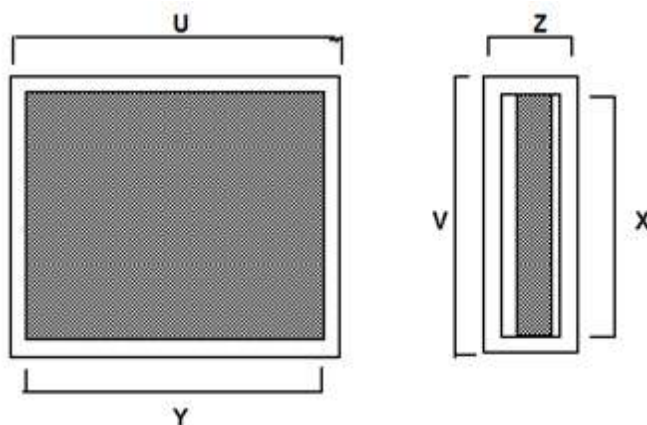


## FILTER BOXES ON AIR INLET DELIVERY WARM AIR HEATERS OF THE "AS L" and "AS L EX" SERIES

MOD.	U mm	V mm	Z mm	Y mm	X mm	Filters (1) [mm]	Pressure drop (2) [Pa]
AS L 30	660	490	60	620	445	1x490x600x48	65
AS L EX 30	660	490	60	620	445	1x490x600x48	65
AS L 60	870	640	60	820	595	1x640x810x48	70
AS L EX 60	870	640	60	820	595	1x640x810x48	70
AS L 80	980	700	60	940	630	1x910x695x48	88
AS L EX 80	980	700	60	940	630	1x625x500x48      1x625x400x48	88
AS L 100	980	700	60	940	630	1x910x695x48	110
AS L EX 100	980	700	60	980	630	1x625x500x48      1x625x400x48	110
AS L 150	1440	840	200	1400	800	4x625x400x98	68
AS L EX 150	1440	840	200	1400	800	2X625X500X98 1X625X400X98	77
AS L 175	1440	840	200	1400	800	4x625x400x98	85
AS L EX 175	1440	840	200	1400	800	2x625x500x98 1X625X400X98	105
AS L 200	1440	840	200	1400	800	4x625x400x98	105
AS L EX 200	1440	840	200	1400	800	2x625x500x98 1X625X400X98	115
AS L 250	1790	840	200	1750	800	2x625x400x98      4x500x400x98	85
AS L EX 250	1790	840	200	1750	800	3x625x400x98      1x625x500x98	85
AS L 300	1790	840	200	1750	800	2x625x400x98      4x500x400x98	105
AS L EX 300	1790	840	200	1750	800	3x625x400x98      1x625x500x98	105
AS L 425	2300	1010	200	2260	970	8x500x500x98	90
AS L EX 425	2300	1010	200	2260	970	4x625x400x98      4x500x400x98	105
AS L 500	2300	1010	200	2260	970	8x500x500x98	110
AS L EX 500	2300	1010	200	2260	970	4x625x400x98 4x500x400x98	128
AS L 600	2300	1150	200	2260	1110	8x500x500x98	123
AS L EX 600	2300	1150	200	2260	1110	4x625x400x98 4x500x400x98	140

- 1- Efficiency ASHRAE52/76 DUST WEIGHT: 87%
- 2 - Pressure drop of a new filter.

CAUTION! For plant calculations, this pressure drop for rather dirty (but not clogged) filters must be increased by at least 50%, and must be subtracted from the useful pressure of the heater (see chap. DATA SHEET)



## Technical data table for floor standing generators AS L - AS EX 30÷175

Description	U.M.	AS 30	AS 60	AS 80	AS 100	AS 150	AS 175
Nominal heat input Q nom	kW	32,6	58,0	98,5	115,8	179,0	203,0
Nominal thermal power Pn	kW	30,6	56,0	94,7	110,2	172,4	198,3
Efficiency at nominal heat input Pn	%	94,0	96,1	95,2	95,2	96,3	97,7
Thermal input at 50% of the nominal thermal input	kW	18,4	25,0	48,0	55,0	82,0	85,0
Thermal power at 50% of the nominal thermal input	kW	18,4	26,0	47,7	54,5	82,3	86,5
Thermal efficiency at 50% of the nominal heat input	%	99,8	103,8	99,3	97,9	100,4	101,8
Back pressure in the combustion chamber with G20 at Q nom	mbar	0,5	0,3	2,3	3,5	2,5	3,4
Back pressure in the combustion chamber with G30 at Q nom	mbar	0,4	0,2	2,1	3,3	1,8	2,2
G20: NOx (Erp 2istep ≤70Mg/kWh) with GCV (1)	mg/kWh	≤70	≤70	≤70	≤70	≤70	≤70
<b>AERAILIC PERFORMANCE</b>							
Air flow at 18 °C	m³/h	2.750	5.100	7.560	9.200	13.000	15.800
Useful static pressure	Pa	50	90	150	150	200	200
ΔT air at Q nom	°C	31,9	31,5	35,9	34,3	38,0	36,0
<b>MAX GAS CONSUMPTION AT 15 °C-1013 mbar</b>							
Natural gas G20 at 20 mbar	m³/h	3,45	6,14	10,42	12,25	18,94	21,48
Natural gas G25 at 25 mbar	m³/h	4,00	7,10	12,10	14,22	22,00	25,00
Propane G31 at 37 mbar	kg/h	2,53	4,50	7,65	8,99	13,91	15,77
Butane G30 at 28 mbar	kg/h	2,57	4,57	7,77	9,13	14,12	16,1
Average temperature of the fumes with combustion air 20 °C at Qnom	°C ± 15%	140	130	115	130	115	95
CO2 content in% in the fumes at Qnom	%	8,9	9,6	9,3	9,5	9,8	9,6
Weight of fumes in kg at Qnom	kg/h	56,7	100,9	171,4	201,5	311,5	352,2
Flue gas pressures at Qnom	Pa	50	50	50	50	50	50
Average temperature of the fumes with combustion air 20 °C at Qmin	°C ± 15%	70	65	55	75	50	50
CO2 content in% in the fumes at Qmin	%	7,7	8,2	7,7	7,9	8,5	8,0
Smoke weight in kg at Qmin	kg/h	32,0	43,5	83,5	95,7	142,7	147,9
<b>ELECTRICAL DATA</b>							
Fan motor electric power	kW x n.	0,2	0,736	1,5	2,2	3,0	4,0
Fan motor supply voltage		230V/1/50Hz		400V/3+N/50Hz			
Absorption of the fan motor	A	3,1	6,7	3,5	4,9	6,3	8,3
Voltage fan motor absorption 3F 230V 50Hz	A	-	-	6,2	8,5	11,1	14,4
Sound pressure (at 5m)	dB(A)	62	72	72	73	71	73
Degree of protection version L		IP X5D					
<b>ELECTRICAL DATA WITH USEFUL PRESSURE 300 Pa</b>							
Electric power of the fan motor	kW	0,5	1,5	2,2	3,0	4,0	5,5
Fan motor supply voltage		230V/1/50Hz		400V/3+N/50Hz			
Voltage fan motor absorption 3F 400V 50Hz	A	-	3,5	4,9	6,3	8,3	11,3
Voltage fan motor absorption 3F 230V 50Hz	A	3,9	6,2	8,5	11,1	14,4	19,6
Smoke outlet connection	Ø mm	150	150	130	130	150	150
Burners	mod.	Abbinabile a bruciatore gas soffiato 2016/426					
Gas category		È la categoria gas del bruciatore a gas soffiato GAR abbinato					
Appliance type based on flue gas outlet		B23					

NOTES: (1) Nox values, calculated according to EN 17082:2019, par. 6.8, obtained with 2-stage or modulating diesel burners with low NOx emissions  
Class 3 Nox ≤ 120 mg/kWh or even Class 2 Nox ≤ 180 mg/kWh (ERP 2° STEP)

## Technical data table for floor standing generators AS L - AS EX 200÷600

Description	U.M.	AS 200	AS 250	AS 300	AS 425	AS 500	AS 600
Nominal heat input Q nom	kW	238,0	270,0	313,0	425,0	500,0	600,0
Nominal thermal power Pn	kW	229,2	260,8	300,8	420,7	487,5	585,0
Efficiency at nominal heat input Pn	%	96,3	96,6	96,1	98,6	97,5	97,5
Thermal input at 50% of the nominal thermal input	kW	100,0	135,0	156,5	212,5	212,5	212,5
Thermal power at 50% of the nominal thermal input	kW	100,3	137,2	157,3	213,8	217,0	217,0
Thermal efficiency at 50% of the nominal heat input	%	100,3	101,6	100,5	101,4	102,1	102,1
Back pressure in the combustion chamber with G20 at Q nom	mbar	4,0	2,6	3,3	3,0	3,6	5,2
Back pressure in the combustion chamber with G30 at Q nom	mbar	3,1	2,5	3,2	2,8	3,4	4,9
G20: NOx (Erp 2istep ≤70Mg/kWh) with GCV (1)	mg/kWh	≤70	≤70	≤70	≤70	≤70	≤70
<b>AERUALIC PERFORMANCE</b>							
Air flow at 18 °C	m³/h	18.000	20.800	24.000	32.500	38.300	41.000
Useful static pressure	Pa	200	200	200	200	200	160
ΔT air at Q nom	°C	36,5	35,9	35,9	37,2	36,7	41,0
<b>MAX GAS CONSUMPTION AT 15 °C-1013 mbar</b>							
Natural gas G20 at 20 mbar	m³/h	25,19	28,57	33,12	44,97	52,9	63,5
Natural gas G25 at 25 mbar	m³/h	29,30	33,24	38,53	52,30	61,50	73,80
Propane G31 at 37 mbar	kg/h	18,49	20,98	24,32	32,80	38,60	46,30
Butane G30 at 28 mbar	kg/h	18,77	21,29	24,68	33,50	39,40	47,30
Average temperature of the fumes with combustion air 20 °C at Qnom	°C ± 15%	110	110	125	88	93	94
CO2 content in% in the fumes at Qnom	%	9,2	8,2	9,4	9,3	8,7	8,8
Weight of fumes in kg at Qnom	kg/h	414,1	469,8	554,6	739,5	870,0	1044,0
Flue gas pressures at Qnom	Pa	50	50	50	50	50	50
Average temperature of the fumes with combustion air 20 °C at Qmin	°C ± 15%	60	60	60	60	50	50
CO2 content in% in the fumes at Qmin	%	8,1	8,4	8,3	9,4	8,6	8,7
Smoke weight in kg at Qmin	kg/h	174,0	234,9	272,3	369,8	369,8	369,8
<b>ELECTRICAL DATA</b>							
Fan motor electric power	kW x n.	5,5	3x2	4x2	4x2	5,5x2	5,5x2
Fan motor supply voltage		400V/3+N/50Hz					
Absorption of the fan motor	A	11,3	6,3x2	8,3x2	8,3x2	11,3x2	11,3x2
Voltage fan motor absorption 3F 230V 50Hz	A	19,6	11,1x2	14,4x2	14,4x2	19,6x2	19,6x2
Sound pressure (at 5m)	dB(A)	74	74	75	74	75	75
Degree of protection version L		IP X5D					
<b>ELECTRICAL DATA WITH USEFUL PRESSURE 300 Pa</b>							
Electric power of the fan motor	kW	7,5	3x2	5,5x2	5,5x2	7,5x2	7,5x2
Fan motor supply voltage		400V/3+N/50Hz					
Voltage fan motor absorption 3F 400V 50Hz	A	15,0	6,3x2	11,3x2	11,3x2	15x2	15x2
Voltage fan motor absorption 3F 230V 50Hz	A	26,3	11,1x2	19,6x2	19,6x2	26,3x2	26,3x2
Smoke outlet connection	Ø mm	150	200	200	250	250	250
Burners	mod.	Abbinabile a bruciatore gas soffiato 2016/426					
Gas category		È la categoria gas del bruciatore a gas soffiato GAR abbinato					
Appliance type based on flue gas outlet		B23					

NOTES: (1) Nox values, calculated according to EN 17082:2019, par. 6.8, obtained with 2-stage or modulating diesel burners with low NOx emissions  
Class 3 Nox ≤ 120 mg/kWh or even Class 2 Nox ≤ 180 mg/kWh (ERP 2° STEP)

**DATA SHEET WARM AIR HEATER series "AS L" and "AS L EX" with 2 stages automatic forced draught gas**

<b>THERMAL PERFORMANCE</b>												
Mod.	30	60	80	100	150	175	200	250	300	425	500	600
Rated heat input, Qnom	32,6	58,0	98,5	115,8	179,0	203,0	238,0	270,0	313,0	425,0	500,0	600,0
Rated heat output, Pn	30,6	56,0	94,7	110,2	172,4	198,3	229,2	260,8	300,8	420,7	487,5	585,0
Thermal efficiency at rated heat input, Pn	94,0	96,5	96,1	95,2	96,3	97,7	96,3	96,6	96,1	98,6	97,5	97,5
Heat input at 50% of the rated heat input	18,4	25,0	48,0	55,0	82,0	85,0	100,0	135,0	156,5	212,5	212,5	212,5
Heat rating at 50% of the rated heat input	18,4	26,0	47,7	54,5	82,3	86,5	100,3	137,2	157,3	213,8	217,0	217,0
Thermal efficiency at 50% of the rated heat input	99,8	103,8	99,3	97,9	100,4	101,8	100,3	101,6	100,5	101,4	102,1	102,1
Backpressure in the combustion chamber, with G20 at Qn	0,5	0,3	2,3	3,5	2,5	3,4	4,0	2,6	3,3	3,0	3,6	5,2
Backpressure in the combustion chamber, with G30 at Qn	0,4	0,2	2,1	3,3	1,8	2,2	3,1	2,5	3,2	2,8	3,4	4,9
G20: NOx (Eip 2°-step ≤70Mg/kWh) con GCV (a)	≤70	≤70	≤70	≤70	≤70	≤70	≤70	≤70	≤70	≤70	≤70	≤70
<b>AERULIC PERFORMANCE</b>												
Air flow rate at 18 °C	2,750	5,100	7,560	9,200	13,000	15,800	18,000	20,800	24,000	32,500	38,300	41,000
Useful static pressure	50	90	150	150	200	200	200	200	200	200	200	160
DELTA T AIR at PN nom	31,9	31,5	35,9	34,3	38,0	36,0	36,5	35,9	35,9	37,2	36,7	41,0
<b>MAX GAS CONSUMPTION at 15°C-1013 mbar for each of the burners</b>												
METHANE G20 at 20 mbar	3,45	6,14	10,42	12,25	18,94	21,48	25,19	28,57	33,12	44,97	52,9	63,5
NAT.GAS G25 at 25 mbar	4,00	7,10	12,10	14,22	22,00	25,00	29,30	33,24	38,53	52,30	61,50	73,80
PROPANE G31 at 37 mbar	2,53	4,50	7,65	8,99	13,91	15,77	18,49	20,98	24,32	32,80	38,60	46,30
BUTANE G30 at 28 mbar	2,57	4,57	7,77	9,13	14,12	16,01	18,77	21,29	24,68	33,50	39,40	47,30
Average flue gas temperature with combustion air 20 ° C at Qnom	140	130	115	130	115	95	110	110	125	88	93	94
CO2 content in% in the furnes at Qnom	8,9	9,6	9,3	9,5	9,8	9,6	9,2	8,2	9,4	9,3	8,7	8,8
Weight of the furnes in kg at Qnom	56,7	100,9	171,4	201,5	311,5	353,2	414,1	469,8	544,6	739,5	870,0	1044,0
Smoke outlet pressure at Qnom	50	50	50	50	50	50	50	50	50	50	50	50
Average flue gas temperature with combustion air 20 ° C at Qmin	70	65	55	75	50	50	60	60	60	60	50	50
CO2 content in% in the flue gas at Qmin	7,7	8,2	7,7	7,9	8,5	8,0	8,1	8,4	8,3	9,4	8,6	8,7
Weight of the furnes in kg at Qmin	32,0	43,5	83,5	95,7	142,7	147,9	174,0	234,9	272,3	369,8	369,8	369,8
<b>ELECTRICAL DATA</b>												
Fan motor capacity	0,2	0,736	1,5	2,2	3	4	5,5	3x2	4 x 2	4x2	5,5x2	5,5x2
Fan motor supply voltage	230/1/50 400/3/50+N											
Fan motor absorption	3,1	6,7	3,5	4,9	6,3	8,3	11,3	6,3 x 2	8,3 x 2	8,3 x 2	11,3 x 2	11,3 x 2
Fan motor absorption/voltage 3F 230V 50Hz	A	A	6,2	8,5	11,1	14,4	19,6	11,1 x 2	14,4 x 2	14,4 x 2	19,6 x 2	19,6 x 2
Sound pressure (at 5 m)	62	72	72	73	71	73	74	74	75	74	75	75
Protection degree of "LE" "LEO" "LR" versions	IP	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D
<b>ELECTRICAL DATA, WITH USEFUL PRESSURE = 300 Pa</b>												
Fan motor capacity	0,5	1,5	2,2	3	4	5,5	7,5	3 x 2	5,5 x 2	5,5x2	7,5x2	7,5x2
Fan motor supply voltage	230/1/50 400/3/50+N											
Fan motor absorption	3,9	3,5	4,9	6,3	8,3	11,3	15,0	6,3 x 2	11,3 x 2	11,3x2	15x2	15x2
Fan motor absorption/voltage 3F 230V 50Hz	A	6,2	8,5	11,1	14,4	19,6	26,3	11,1x2	19,6 x 2	19,6x2	26,3x2	26,3x2
Flue connection/combustion air intake	Ø mm	150	150	130	150	150	150	200	200	250	250	250
Burners	Can be combined with blown gas burner GAR 2016/426 (EU) (see combination table)											
GAS CATEGORY	It is the gas category of the GAR blown gas burner combined											
Type of appliance, based on exhaust devices/combustion air intake	B23											

**ECODESIGN Directive 2009/125/EC ErP Regulation 2016/2281/EC  
Information requirements for floor standing hot air heaters AS L - AS EX 30÷175**

Type of hot air generator series AS	symbols	U.M.	30		60		80		100		150		175	
Thermal power load range			100-50%	100-30%	100-50%	100-30%	100-50%	100-30%	100-50%	100-30%	100-50%	100-30%	100-50%	100-30%
Thermal power control			2 ph.	modul.	2 ph.	modul.	2 ph.	modul.	2 ph.	modul.	2 fasi	modul.	2 ph.	modul.
B1 hot air generator	Yes/No		no	no	no	no	no	no	no	no	no	no	no	no
C2 hot air generator	Yes/No		no	no	no	no	no	no	no	no	no	no	no	no
C4 hot air generator	Yes/No		no	no	no	no	no	no	no	no	no	no	no	no
Fuel type	gas/liquid		gas	gas	gas	gas	gas	gas	gas	gas	gas	gas	gas	gas
Nominal heating capacity	P nom.h	kW	30,6	30,6	56,0	56,0	94,7	94,7	110,2	110,2	172,4	172,4	198,3	198,3
Minimum capacity	P min.	kW	18,4	10,2	26,7	19,6	47,7	33,4	53,8	33,4	82,3	54,8	86,4	54,8
Rated electricity consumption heating capacity	Elett./max	kW	0,280	0,280	0,280	0,280	0,430	0,430	0,430	0,430	0,460	0,460	0,460	0,460
Minimum electricity consumption heating capacity	Elett./min	kW	0,252	0,252	0,252	0,252	0,387	0,387	0,387	0,387	0,414	0,414	0,414	0,414
Electricity consumption in standby mode	Elett./st.by	kW	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010
Useful efficiency at nominal heat output	η nom	%	84,6	84,6	86,9	86,9	86,5	86,5	85,7	85,7	86,7	86,7	87,9	87,9
Useful efficiency at the minimum flow rate of Hs	η pl	%	89,8	91,8	93,4	95,2	89,4	97,0	88,1	97,0	90,4	93,1	91,5	93,1
Loss factor for W.A.H.(1) not installed	Fenv	%	1	1	1	1	1	1	1	1	1	1	1	1
Loss factor for W.A.H.(1) installed in heated area	Fenv	%	0	0	0	0	0	0	0	0	0	0	0	0
Energy consumption of the burner in the ignition phase	Pign	kW	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nitric Oxide Emission from Hs (GCV) with G20(2)</b>	<b>NOx</b>	<b>mg/kWh</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>
Emission efficiency	ηs, flow	%	0,930	0,953	0,943	0,954	0,931	0,946	0,935	0,953	0,930	0,946	0,938	0,954
<b>Seasonal energy for space heating efficiency for W.A.H. not installed in heated area</b>	<b>ηs, h</b>	<b>%</b>	<b>78,8</b>	<b>85,3</b>	<b>85,8</b>	<b>90,3</b>	<b>79,3</b>	<b>88,9</b>	<b>78,7</b>	<b>89,8</b>	<b>80,2</b>	<b>86,1</b>	<b>82,2</b>	<b>87,0</b>
<b>Seasonal energy for space heating efficiency for W.A.H. installed in heated area</b>	<b>ηs, h</b>	<b>%</b>	<b>79,8</b>	<b>86,2</b>	<b>86,8</b>	<b>91,2</b>	<b>80,3</b>	<b>89,8</b>	<b>79,6</b>	<b>90,8</b>	<b>81,1</b>	<b>87,0</b>	<b>83,1</b>	<b>88,0</b>

NOTES: (1) W.A.H. = hot air generators.

(2) The NOx values are calculated according to standard EN17082:2019 par 6.8 and are valid with forced draft gas burners certified Low Nox ERP 2nd STEP ≤ 70 mg/kWh or compliant with Low Nox emissions ≤ 70 mg/kWh .

**ECODESIGN Directive 2009/125/EC ErP Regulation 2016/2281/EC  
Information requirements for floor standing hot air heaters AS L - AS EX 200÷600**

Type of hot air generator series AS	symbols	U.M.	200		250		300		425		500		600	
Thermal power load range			100-50%	100-30%	100-50%	100-30%	100-50%	100-30%	100-50%	100-30%	100-50%	100-30%	100-50%	100-30%
Thermal power control			2 ph.	modul.	2 ph.	modul.	2 ph.	modul.	2 ph.	modul.	2 ph.	modul.	2 ph.	modul.
B1 hot air generator	Yes/No		no	no	no	no	no	no	no	no	no	no	no	no
C2 hot air generator	Yes/No		no	no	no	no	no	no	no	no	no	no	no	no
C4 hot air generator	Yes/No		no	no	no	no	no	no	no	no	no	no	no	no
Fuel type	gas/liquid		gas	gas	gas	gas	gas	gas	gas	gas	gas	gas	gas	gas
Nominal heating capacity	P nom.h	kW	229,2	229,2	260,8	260,8	300,8	300,8	491,1	491,1	487,5	487,5	585,0	585,0
Minimum capacity	P min.	kW	100,3	54,8	137,2	83,8	157,3	83,8	215,5	132,4	217,0	155,1	217,0	186,1
Rated electricity consumption heating capacity	Elett./max	kW	0,620	0,620	0,620	0,620	0,620	0,620	1,050	1,050	1,050	1,050	1,050	1,050
Minimum electricity consumption heating capacity	Elett./min	kW	0,558	0,558	0,558	0,558	0,558	0,558	0,945	0,945	0,945	0,945	0,945	0,945
Electricity consumption in standby mode	Elett./st.by	kW	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010
Useful efficiency at nominal heat output	η nom	%	86,7	86,7	86,9	86,9	86,5	86,5	91,3	93,1	87,8	87,8	87,8	87,8
Useful efficiency at the minimum flow rate of Hs	η pl	%	90,3	93,1	91,4	93,1	90,5	93,1	88,1	97,0	91,9	93,1	91,9	93,1
Loss factor for W.A.H.(1) not installed	Fenv	%	1	1	1	1	1	1	1	1	1	1	1	1
Loss factor for W.A.H.(1) installed in heated area	Fenv	%	0	0	0	0	0	0	0	0	0	0	0	0
Energy consumption of the burner in the ignition phase	Pign	kW	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nitric Oxide Emission from Hs (GCV) with G20(2)</b>	<b>NOx</b>	<b>mg/kWh</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>	<b>≤70</b>
Emission efficiency	ηs, flow	%	0,937	0,957	0,929	0,949	0,931	0,953	0,928	0,948	0,930	0,948	0,938	0,945
<b>Seasonal energy for space heating efficiency for W.A.H. not installed in heated area</b>	<b>ηs, h</b>	<b>%</b>	<b>80,9</b>	<b>87,2</b>	<b>80,7</b>	<b>86,3</b>	<b>79,9</b>	<b>86,8</b>	<b>80,8</b>	<b>86,7</b>	<b>82,3</b>	<b>86,6</b>	<b>83,0</b>	<b>86,2</b>
<b>Seasonal energy for space heating efficiency for W.A.H. installed in heated area</b>	<b>ηs, h</b>	<b>%</b>	<b>81,9</b>	<b>88,1</b>	<b>81,7</b>	<b>87,3</b>	<b>80,9</b>	<b>87,8</b>	<b>81,7</b>	<b>87,6</b>	<b>83,2</b>	<b>87,5</b>	<b>83,9</b>	<b>87,2</b>

NOTES: (1) W.A.H. = hot air generators.

(2) The NOx values are calculated according to standard EN17082:2019 par 6.8 and are valid with forced draft gas burners certified Low Nox ERP 2nd STEP ≤ 70 mg/kWh or compliant with Low Nox emissions ≤ 70 mg/kWh .

# INSTRUCTIONS FOR THE USER

## INSPECTIONS BEFORE START-UP

The warm air heater is equipped with an electrical board, which comprises:

- A master switch
- A HEATING – BURNER STOP – VENTILATION switch
- A terminal board
- Three signal lamps on the board's door indicate
  1. VOLTAGE: the board is powered.
  2. THERMAL RELAYS ON: the remote switch's thermal relays have de-energized the fan. From mod. "80" to mod. 600" only.
  3. LIMIT2 ENABLED: the safety Limit has de-energized the burner.

Check that:

- The electrical panel is correctly connected to the single-phase electrical line for mod. "30" and "60" and three-phase from mod. "80" to mod. "600".
- The general power supply cable is of a suitable section for the Ampere absorption of the machine.
- The direction of rotation of the fan(s) is as indicated on the auger or on the characteristics label.
- From mod. "80" to mod. "600" that the thermal setting of the contactor is adequate: the values in Amperes indicated in the TECHNICAL DATA chapter.
- There are no obstructions to the free exit of air from the air inlet and intake.
- The blades of the air supply air vents of the plenum, if present, are not too inclined to avoid reducing the air throw.
- Filters on the air inlet (if present) are clean to avoid reducing the airflow of the supply fan.

## OTHER INSPECTIONS IN THE HEATING MODE

Check that:

1. the fuel supply piping to the burner is in compliance with standards.  
Have the installer issue a declaration of conformity for the fuel supply system and a test certificate;
2. the fuel that feeds the burner complies with what was specified when the machine was ordered and manufactured;
3. the settings of the FAN, LIMIT and LIMIT2 thermostats are correct (see Chapter – **TRI-THERMOSTAT**).
4. the external flue gas outlet is in compliance with standards (see legislative provisions and regulations for chimneys), as is the combustion air piping where present;
5. the room is sufficiently ventilated as required by current regulations, also in relation to combustion air for the burner;
6. the condensate drainage pipe is installed in accordance with the regulations in force (see Chapter **CONNECTION OF THE CONDENSATE DISCHARGE**).



**Carefully read the burner instruction manual provided by the manufacturer**



## FUNCTION DESCRIPTION

### Heating mode operation

#### Heating mode

On the electrical panel the main switch must be in position -1- and the commutator in position -HEATING-.

At each request for heat from the room thermostat, the burner starts its self-test and pre-cleaning cycle at the end of which combustion begins.

Approximately 5 minutes after combustion begins, the FAN thermostat automatically starts the fan unit.

When the burner is turned off by the room thermostat, the fan assembly continues to operate to cool the heat exchanger and is automatically stopped by the FAN (fan thermostat) to avoid sending cold air.

Burner shutdown can also be caused by the intervention of the automatic reset LIMIT, the burner's maximum thermostat (set at 70°C), if the temperature of the air leaving the warm air heater exceeds the operating limit.

The LIMIT automatically resets the burner after the outlet air has cooled.

Burner shutdown may also be due to the tripping of the LIMIT2 burner safety thermostat (set at 95°C) if the temperature of the air leaving the warm air heater exceeds the safety limit set by the relevant standard.



CAUTION

Before resetting the burner, after the LIMIT2 has tripped, you must let the outlet air cool and then proceed as described in the **TRI-THERMOSTAT** chapter of this manual.

**LIMIT2 intervention denotes a malfunction, contact an authorized service center or qualified service personnel.**

#### Stop

By moving the switch to the -BURNER STOP- position the burner stops while the fan unit continues to operate until it is turned off by the FAN thermostat (at the end of the combustion chamber/tube bundle cooling phase).

To de-energize the whole heater, move the main switch (IG) to -O-.



**Before disconnecting the power from the main switch, make sure that the warm air heater is well cooled down (the fan has turned off automatically), otherwise, it may reduce the life of the warm air heater.**

**Otherwise, the life of the warm air heater may be reduced.**

### OPERATION IN VENTILATION MODE BY POSITIONING

By positioning the switch on -VENTILATION- the warm air heater will work only in ventilation mode, excluding the burner.



CAUTION

**Never turn off the warm air heater at the main power switch, but always by its switch, the room thermostat or the clock (if installed).**

**Otherwise, the heat remains inside the heat exchanger with serious risk of deformation.**

# INSTALLATION INSTRUCTIONS



**This part of the manual is reserved for the legally required installer.**



CAUTION

## Warm Air Heater Location – Distances

The warm air heater shall be installed on a solid horizontal foundation in accordance with the requirements of Ministerial Decree 08-11-2019 and other applicable legislative provisions, rules and regulations that the installer is required to be familiar with.

For the ventilation of the room where the warm air heater is installed, follow the legislative provisions, rules and regulations mentioned above.

- try to cover the entire heated area with air throws;
- in the presence of large infiltrations of external air (doors), counteract them with an air curtain;
- avoid directing air flows against obstacles such as pillars, deposited material or other;
- if the room is equipped with air extractors, install the warm air heater from the opposite wall and provide an external air intake to make up for the expelled air.



WARNING

## Location of the warm air heater

An area free of combustible material must be left around the warm air heater for a distance calculated according to M.D. 08-11-2019.

## Distance of the warm air heater from walls

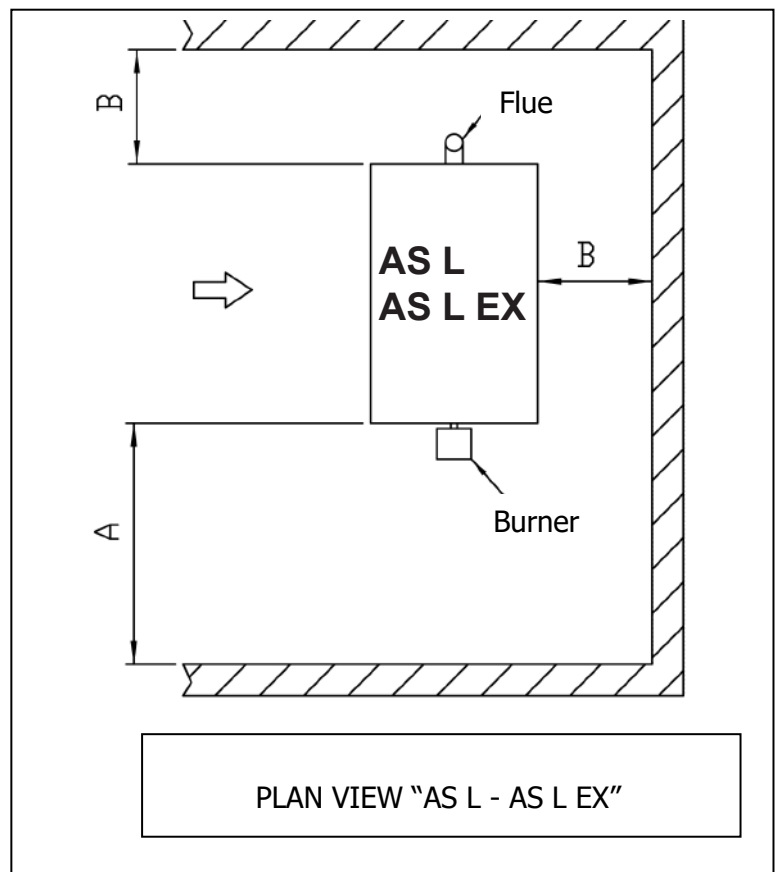
In order to calculate the minimum distances of the warm air heater from the walls and ceilings, you must refer to the Ministerial Decree 08-11-2019 and other legislative provisions in force.

Below we indicate the minimum distances that the manufacturer requires for performing maintenance on the warm air heater, burner and any accessories provided.

MOD.	A	B
AS L 30	600	600
AS L 60	800	600
AS L 80-100	1000	600
AS L 150-175-200	1300	600
AS L 250-300	1300	600
AS L 425-500	1700	600
AS L 600	1700	600
AS L EX 30	600	600
AS L EX 60	800	600
AS L EX 80-100	1400	600
AS L EX 150-175-200	1300	600
AS L EX 250-300	1300	600
AS L EX 425-500	1700	600
AS L EX 600	1700	600

Check dimension **A** in relation to the dimensions and prescriptions of the chosen burner.

Check dimension **B** also according to the removability and maintenance of the smoke outlet.



## INSTALLATION



The installation of the machine must be carried out by qualified personnel with the requirements of the law and in accordance with the standards, laws and regulations in force.

### Temperature

The operating temperatures of burner and electric parts are:

- minimum 0°C;
- maximum 40°C.

For "LE", "LEO" and "LP" versions for external installation, when operational temperature are below -10°C, the manufacturer recommends an anti-frost kit, **on demand**, mounted in the burner protective cabin.

The anti-frost kit maintains the temperature inside the burner cabin to 0°C when the outdoor temperature drops below this limit.

### Choosing burner

**Gas burner:** The burner must be compatible with the warm air heater and certified CE in accordance with GAR 2016/426 UE.

The burner must be compatible, with a penetration of the tube in the chamber(A) of 115mm or higher, but this length must be the shortest possible.

Selected burners must guarantee combustion results comparable to the ones in the chapter **TECHNICAL DATA**.

**A list of compatible burners can be found at the chapter "BURNER COUPLING".**

**The holes dimensions on the burner plate of the generator for fixing compatible burners are showed on p.40.**

### Burner installation



**For all of the operations described below, the installer must follow the instruction in the burner installation manual, supplied by the burner manufacturer.**

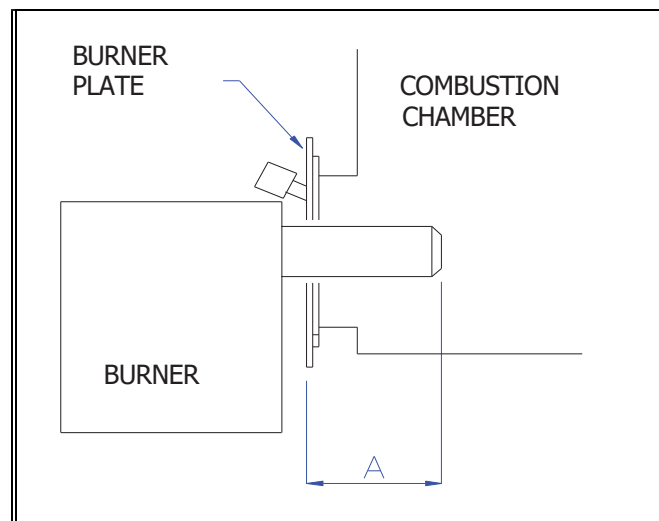
Drill the burner plate (4), firmly fix the burner to the plate using the bolts indicated in the burner manual

- Make the electrical connections between the burner and the warm air heater electric board, following the schemes at chapter **ELECTRIC DIAGRAMS**
- Make the electrical connections of LIMIT and LIMIT2: maximum temperature and safety thermostats (see chapter **TRI-THERMOSTAT**)
- Make the electrical connections of ambient thermostat and clock (if any) to the warm air heater electric board
- Follow all the installations, regulations and controls activity described in the burner manual;

**The G20 gas pressure at burner inlet must be 20mbar (on operation)**



**To get the most from the length of the combustion chamber and avoid the flame to hit the bottom and cause overheating, the length of the tube of the burner must be "A", the shortest possible, but at least 115mm (Standard warm air heater)**



## GAS PIPING

Gas piping must be realized in accordance with regulation in force.

The piping diameters must be calculated from:

- the heat output of the installed air heater
- distance from gas meter

The piping must be realized in a way that the total pressure drop from the gas meter and every warm air heater won't be superior then:

- 1 mbar for methane gas
- 2 mbar for LPG (Liquified Petroleum Gas)

The reference UNI-CIG standards contain tables of the diameters to be used according to the flow rates and lengths.

Install a tap and a gas filter near the heater.

For methane (G20) be sure that the gas feed system is sufficient to deliver the volume of gas needed.

For LPG adopt a pressure reduction system of two stages, installing a first stage reductor (set at 1,5 mbar) near the reservoir, and a second stage reductor before internal piping.

## Gas interception device and alarm



The system where the warm air heater is installed must have a gas interception and alarm device in case of gas leak as required by laws and regulations in force.

## Electrical connections

(see chapter ELECTRICAL DIAGRAMS)

The electrical installation must be carried in accordance with laws and regulation in force, as well as IEEE standards.

Electrical insulation of cables must be compliant with IEC 60227 or IEC 60245.

The warm air heater is delivered with all internal wirings already done with the exception of general power supply and components not supplied, which must be performed by the installer following the instructions of the components themselves.



**Never cut off the power supply to the warm air heater using general power switch, use the switch on the heater electrical board.**

- Install the electrical switch near the warm air heater, with adequate power and voltage.
- Connect the power switch to the terminal strip of warm air heater as described in the **chapter Electrical Diagrams**
- Connect the closing fire damper, if present, to the electric board.
- The power supply cables must have an adequate section in regard of the absorption and must be and have **T** mark.
- Grounding cable must be longer than the others of about 2cm.
- The warm air heater must be connected with a grounding system in accordance with laws and regulations in force.

It is necessary to provide, in order to allow the maintenance of the warm air heater, a complete insulation of the heater itself from the general power line by installing, upstream of heater, an omnipolar switch according to current regulations. The switch must be of adequate section in regard of the overall electrical load of the warm air heater and burner.

The warm air heater must be powered with the following voltage(V)/phases/frequency (Hz):

- 230/1/50 for models **30 - 60**;
- 400/3/50 for models from **80 to 600**.

For installing the ambient thermostat:

- Place the thermostat in the environment heated by warm air heater
- Avoid placing the ambient thermostat near heat sources or sunny areas.
- Preferably do not place it on perimetral walls but rather on internal walls
- Prevent the thermostat being directly hit by air flow exiting the warm air heater



**If a watch will be installed NEVER connect it in series to the general power line to avoid the watch intervenes on the heater.  
Install the clock ALWAYS on ambient thermostat line!**

## BURNER FIXING PLATE

The warm air heaters are supplied with a standard plate, equipped with burner fixing holes, whose standard drilling dimensions are shown in the table below. For all other burner models the plates are supplied without holes. For a correct choice of the plate, when ordering the warm air heaters, notify the manufacturer of the brand and model of the burner to be matched, in addition to the mounting dimensions of the burner.

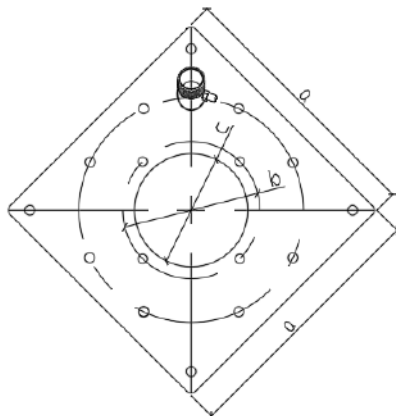
WARM AIR HEATER	Drilling dimensions on burner plate			Brand and model of the matching burner					
	a mm	b mm	c mm	RIELLO MOD.	ECOFLAM MOD.	CUENOD MOD.	ELCO MOD.	CIB UNIGAS MOD.	BALTUR MOD.
MODEL L/LO/LE/LEO/LP/LR									
30	325	170	140	(1)	(1)	(1)	(1)	(1)	(1)
60	325	170	140	(1)	(1)	(1)	(1)	(1)	(1)
80	325	170	140	(1)	(1)	(1)	(1)	(1)	(1)
100	325	170	140	(1)	(1)	(1)	(1)	(1)	(1)
150	325	170	140	(1)	(1)	(1)	(1)	(1)	(1)
175	325 325	170 185	140 165	(1)	(1)	(1)	(2) VG 290	(1)	(1)
200	325	185	165	(2) RS25/MBLU (3)	MAX GAS 350(3)	(1)	(1)	(1)	TBG 35 (3)
250	342	224	170	(2) RS 5D (3)	MAX GAS 350(3)	NC 36 GXE(3)	VG 3.290(3) VG 3.350(3)	(1)	TBG 35 (3)
300	342	224	170	(1)	MAX GAS 350(3)	NC 36 GXE(3)	VG 4.400 (3) VG 3.350 (3)	(1)	TBG 35 (3)
425	431,6	224	165	(1)	BLU 700.1 LN (3) MAX GAS 500 (3)	NC61GX (3)	VG 3.350(3) VG 4.610(3)	NGX550 (3)	(1)
500 500	431,6 431,6	300 224	195 165	(2) RS 50	BLU 700.1 LN (3)	NC61GX (3)	VG 4.610 (3)	C83X (3)	(1)
600	431,6	300	195	(1)	BLU 700.1 LN (3)	NC95GX (3)	VG 4.610 (3) VG 5.950 (3)	C83X (3)	(1)

1) On these models, the plate drilling is suitable for all the models of matching gas burners, listed on page 41 and 42 of this manual.

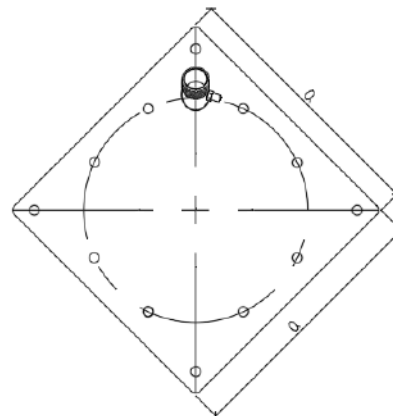
2) On these models, the plate drilling is suitable for all the models of matching gas burners, listed on page 41 and 42 of this manual, except for those listed in this table, for which the plate will be the one indicated in correspondence.

3) On these models, matched with these burners, the plate is supplied without burner fixing holes. On request, this can be drilled by the manufacturer at an extra cost.

BURNER PLATE WITH DRILLING



BLIND BURNER PLATE (WITHOUT DRILLING)



# BURNER COUPLING

Warm air heater L series: coupling with burner certified according to GAR 2016/426 (UE)

MOD. HEATER L/LO/LE/LEO /LP/LR	Heater rated heat input		Counter pressure in combustion chamber mbar	RIELLO		ECOFLAM		CUENOD	
	Q nom kWh	Q min kWh		Gas burner Model	Gas Valve Model	Gas burner Model	Gas Valve Model	Gas burner Model	Gas Valve Model
30	32,6	18,4	0,4	915T1 (BS1D) 915/M (BS1/M)	MB405				
60	58,0	25,0	0,2	915T1 (BS1D) 915/M (BS1/M)	MB405				
80	98,5	49,3	2,3	917T1 (BS3D)	MB 407	MAX GAS 120E PAB	MB-ZRDLE 405	NC10 GXE 207/8	MB-ZRDLE 407
				917M (BS3/M)	MB 410	MAX GAS 170E PAB	MB-ZRDLE 405/MB-ZRDLE 407/MB-ZRDLE 410	NC12 GXE 507/8	MB-VEF 407
100	115,9	61,0	3,5		MB 412			NC12 GXE 907/8	MBC-300
				917T1 (BS3D)	MB 407	MAX GAS 170E PAB	MB-ZRDLE 405/MB-ZRDLE 407/MB-ZRDLE 410	NC16 GXE 207/8	MB-ZRDLE 407
				917M (BS3/M)	MB 410			NC16 GXE 507/8	MB-VEF 407
150	179,0	89,5	1,8		MB 412			NC16 GXE 907/8	MBC-300
				917T1 (BS3D)	MB 407	MAX GAS 250E PAB	MB-ZRDLE 405/MB-ZRDLE 407	NC21 GXE 207/8	MB-ZRDLE 412/MB-ZRDLE 407
				917M (BS3/M)	MB 410		MB-ZRDLE 410	NC21 GXE 507/8	MB-VEF 412/MB-VEF 407
				918T1 (BS4D)	MB 412		MB-ZRDLE 412	NC21 GXE 807/8	MB-VEF 412/MB-VEF 407
175	203,0	101,5	2,2	918M (BS4/M)				NC21 GXE 907/8	MBC-300
				918T1 (BS4D)	MB 407	MAX GAS 250E PAB	MB-ZRDLE 405/MB-ZRDLE 407	NC29 GXE 207/8	MB-ZRDLE 412/MB-ZRDLE 407
				918M (BS4/M)	MB 410		MB-ZRDLE 410/MB-ZRDLE 412	NC29 GXE 507/8	MB-VEF 412/MB-VEF 407
					MB 412			NC29 GXE 807/8	MB-VEF 412/MB-VEF 407
200	238,0	119,0	3,1					NC29 GXE 907/8	MBC-300/MBC-700
				918T1 (BS4D)	MB 407	MAX GAS 250E PAB	MB-ZRDLE 405/MB-ZRDLE 407	NC29 GXE 207/8	MB-ZRDLE 412/MB-ZRDLE 407
				918M (BS4/M)	MB 410	MAX GAS 350E PR	MB-DLE 415/MB-DLE 412/MB-DLE 410/MB-DLE 407	NC29 GXE 507/8	MB-VEF 412/MB-VEF 407
				922 T1 (RS5D)*	MB 412			NC29 GXE 807/8	MB-VEF 412/MB-VEF 407
250	270,0	162,0	2,6	876 T (RS25/M BLU)	MB 415			NC29 GXE 907/8	MBC-300/MBC-700
				922 T1 (RS5D)*	MB 405	MAX GAS 350E PAB	MB-DLE 415/MB-DLE 412/MB-DLE 410/MB-DLE 407	NC36 GXE 207/8	MB-ZRDLE 412/MB-ZRDLE 407
				876 T (RS25/M BLU)	MB 407	MAX GAS 350E PR	MB-DLE 415/MB-DLE 412/MB-DLE 410/MB-DLE 407	NC36 GXE 507/8	MB-VEF 412/MB-VEF 407
				877 T (RS35/M BLU) RS34/MMZ*	MB 410/ MB 412			NC36 GXE 807/8	MB-VEF 412/MB-VEF 407
300	313,0	156,5	3,3		MB 415/MB 420			NC36 GXE 907/8	MBC-300/MBC-700
				876 T (RS25/M BLU)	MB 405	MAX GAS 350E PAB	MB-DLE 415/MB-DLE 412/MB-DLE 410/MB-DLE 407	NC36 GXE 207/8	MB-ZRDLE 412/MB-ZRDLE 407
				877 T (RS35/M BLU)	MB 407	MAX GAS 350E PR	MB-DLE 415/MB-DLE 412/MB-DLE 410/MB-DLE 407	NC36 GXE 507/8	MB-VEF 412/MB-VEF 407
				827 T2 (RS45/M BLU)	MB 410		MB-DLE 412	NC36 GXE 807/8	MB-VEF 412/MB-VEF 407
425	425,0	212,5	3,0	883T (RS34MZ)*	MB 412		MB-DLE 415	NC36 GXE 907/8	MBC-300/MBC-700
				RS45/M BLU	MB 405	BLU700.1 LN PAB	MB-DLE 420/MB-DLE 415/MB-DLE 412/MB-DLE 410	NC61 GX 507/8	MB-VEF 420/MB-VEF 412/MB-VEF 407
				RS 44 MZ*	MB 407	BLU700.1 LN PR	MB-DLE 420/MB-DLE 415/MB-DLE 412/MB-DLE 410	NC61 GX 807/8	MB-VEF 420/MB-VEF 412/MB-VEF 407
						MAX GAS 500E PAB	MB-DLE 415/MB-DLE 412/MB-DLE 410/MB-DLE 407	NC61 GX 907/8	MBC-300/MBC-700
500	500,0	212,5	3,6	RS55/M BLU	MB 405	BLU700.1 LN PAB	MB-DLE-420/MB-DLE 415/MB-DLE 410	NC61 GX 507/8	MB-VEF 420/MB-VEF 412/MB-VEF 407
				RS 50*	MB 407	BLU700.1 LN PR		NC61 GX 807/8	MB-VEF 420/MB-VEF 412/MB-VEF 407
				RS 50 M*	MB 410			NC61 GX 907/8	MBC-300/MBC-700
600	600,0	212,5	5,2	RS68/M BLU RS 64 MZ*	MB 410 MB 412	BLU700.1 LN PAB	MB-DLE-420/MB-DLE 415/MB-DLE 410	NC95 GX 507/8	VDG 40-065/VDG20-5011/MB-VEF 420/MB-VEF 412/MB-VEF 407/
				RS 70*	MB 415	BLU700.1 LN PR	MB-DLE-420/MB-DLE 415/MB-DLE 410	NC95 GX 907/8	MBC-1900/MBC-1200/MBC-700/MBC-300

\* burner that are not compliant with NOx emission according to ERP 2° STEP ( $\leq 70$  mg/kWh)

Warm air heater L series: coupling with burner certified according to GAR 2016/426 (UE)

MOD. WARM AIR HEATER L/LO/LE/LEO /LP/LR	Heater rated heat input		Counter pressure in combustion chamber  mbar	ELCO		CIB/UNIGAS		BALTUR	
	Q nom kWh	Q min kWh		Gas burner Model	Gas Valve Model	Gas burner Model	Gas Valve Model	Gas burner Model	Gas Valve Model
30	32,6	18,4	0,4						
60	58,0	25,0	0,2						
80	98,5	49,3	2,3	VG1.105 DE	MB-ZRDLE 407				
				VG1.105 DE	MB-ZRDLE 407	NGX120-AB	20-3/4" (MBDLE405)		
				VG2.120 DPE	MB-VEF 407	NGX120-MD	20/3/4" (MBDLE...)		
100	115,9	61,0	3,5	VG2.120 ME	MBC-300				
				VG2.160 DE	MB-ZRDLE 407	NGX200-AB	20/3/4" (MBDLE...)	BTG 20 LX	BM407A20C
				VG2.160 DPE	MB-VEF 407	NGX200-MD	20/3/4" (MBDLE...)	BTG 20 P*	BM407A20C
150	179,0	89,5	1,8	VG2.160 ME	MBC-300				
				VG2.205 DE	MB-VEF 412/MB-VEF 407	NGX280-AB	25-1" (MBDLE...)	BTG 20 LX	BM410A20C
				VG2.205 DPE	MB-VEF 412/MB-VEF 407	NGX280-MD	25-1" (MBDLE...)	BTG 20 P*	BM410A20C
				VG2.205 VE	MB-VEF 412/MB-VEF 407	NGX350-PR	25-1" (MBDLE...)		
175	203,0	101,5	2,2	VG2.205 ME	MBC-300			TBG 35 P*	MM407A20C
				VG3.290 DE	MB-ZRDLE 412/MB-ZRDLE 407	NGX350-PR	25-1" (MBDLE...)	TBG 35 PN*	MM407A20C
				VG3.290 DPE	MB-VEF 412/MB-VEF 407	NGX350-MD	25-1" (MBDLE...)		
				VG3.290 VE	MB-VEF 412/MB-VEF 407				
200	238,0	119,0	3,1	VG3.290 ME	MBC-300/MBC-700			TBG 35 P*	MM407A20C
				VG3.290 DE	MB-ZRDLE 412/MB-ZRDLE 407	NGX400-PR	25-1" (MBDLE...)	TBG 35 PN*	MM407A20C
				VG3.290 DPE	MB-VEF 412/MB-VEF 407	NGX400-MD	25-1" (MBDLE...)		
				VG3.290 VE	MB-VEF 412/MB-VEF 407				
250	270,0	162,0	2,6	VG3.290 ME	MBC-300/MBC-700			TBG 35 P*	MM407A20C
				VG3.350 DE	MB-ZRDLE 407/MB-ZRDLE 412	NGX400-PR	25-1" (MBDLE...)	TBG 35 PN*	MM407A20C
				VG3.350 DPE	MB-VEF 412/MB-VEF 407	NGX400-MD	25-1" (MBDLE...)		
				VG3.350 VE	MB-VEF 412/MB-VEF 407				
300	313,0	156,5	3,3	VG3.350 ME	MBC-300/MBC-700			TBG 35 P*	MM407A20C
				VG3.350 DE e VG4 440 DE	MB-ZRDLE 407/MB-ZRDLE 412	NGX400-PR	32-1"1/4(MBDLE...)	TBG 35 PN*	MM407A20C
				VG3.350 DPE e VG4 440DE	MB-VEF 412/MB-VEF 407	NGX400-MD	32-1"1/4(MBDLE...)		
				VG3.350 VE	MB-VEF 412/MB-VEF 407				
425	425,0	212,5	3,0	VG3.350 ME	MBC-300/MBC-700			TBG 45 P*	MBZRDLE 412
				VG4.610 DP	MB-VEF 420/MB-VEF 412/MB-VEF 407	NGX550AB NGX550PR	40-1"1/2(MBDLE...) 40-1"1/2(MBDLE...)	TBG 45 PN*	MBZRDLE 415
				VG4.610 V	MB-VEF 420/MB-VEF 412/MB-VEF 407				
500	500,0	212,5	3,6	VG4.610 M	MBC-300/MBC-700	NGX550MD	40-1"1/2(MBDLE...)	TBG 60 PN*	MBZRDLE 415
				VG4.610 DP	MB-VEF 420/MB-VEF 412/MB-VEF 407	C83X AB C83X PR	40-1"1/2(MBDLE...) 40-1"1/2(MBDLE...)	TBG 60 PN*	MBZRDLE 415
				VG4.610 V	MB-VEF 420/MB-VEF 412/MB-VEF 407	C83X MD	40-1"1/2(MBDLE...)		
600	600,0	212,5	5,2	VG4.610 M	MBC-300/MBC-700				
				VG5.950 DP	VDG 40-065/VDG20-5011/MB-VEF 420/MB-VEF 412/MB-VEF 407	C83X AB C83X PR	50-2" (MBDLE...) 50-2" (MBDLE...)	TBG 80 LX P	VDG20.503
				VG5.950 M	MBC-1900/MBC-1200/MBC-700/MBC-300	C83X MD	50-2" (MBDLE415)	TBG 80 LX PN	VDG20.503

\*burners that are not compliant with NOx emission according to ENEC 2016/426 (UE)

## CONNECTION OF THE FLUE TO THE CHIMNEY



If requested by local regulations, or when other options are selected, the warm air heater must be connected to a chimney of proper sized, made of suitable materials and installed according to national and local environmental regulations and standards, and respecting the environment.

The diameter of the pipe connecting the heater to the chimney must be equal to or larger than the flue of the warm air heater; all joints must be sealed to be airtight.

When dimensioning the ducts/chimney system, please remember that the maximum pressure drop must not exceed 50 Pa.

## Flues



The warm air heater of L series are suitable for the following configuration of flues:

➤ **B23;**

We invite you to inform about international, national and local laws and rules regulating flue systems to be sure that the flue system installed is in accordance with them.

You must respect the installation schemes in this manual.

The maximum pressure loss of flue must be under 50 Pa.

For other information about junction of flue contact the manufacturer or the supplier.

Hereafter there is a table of the pressure loss of the element supplied, **on demand**, from CMT that compose the flue.

This pipes and elements are made of INOX AISI 316 and are single wall and smooth, suitable for outdoor installation, certified by EN 1856-1:2009.

It can be possible to supply double wall elements **on demand**.

The tightening between elements is provided by silicone gaskets and hose clamps.

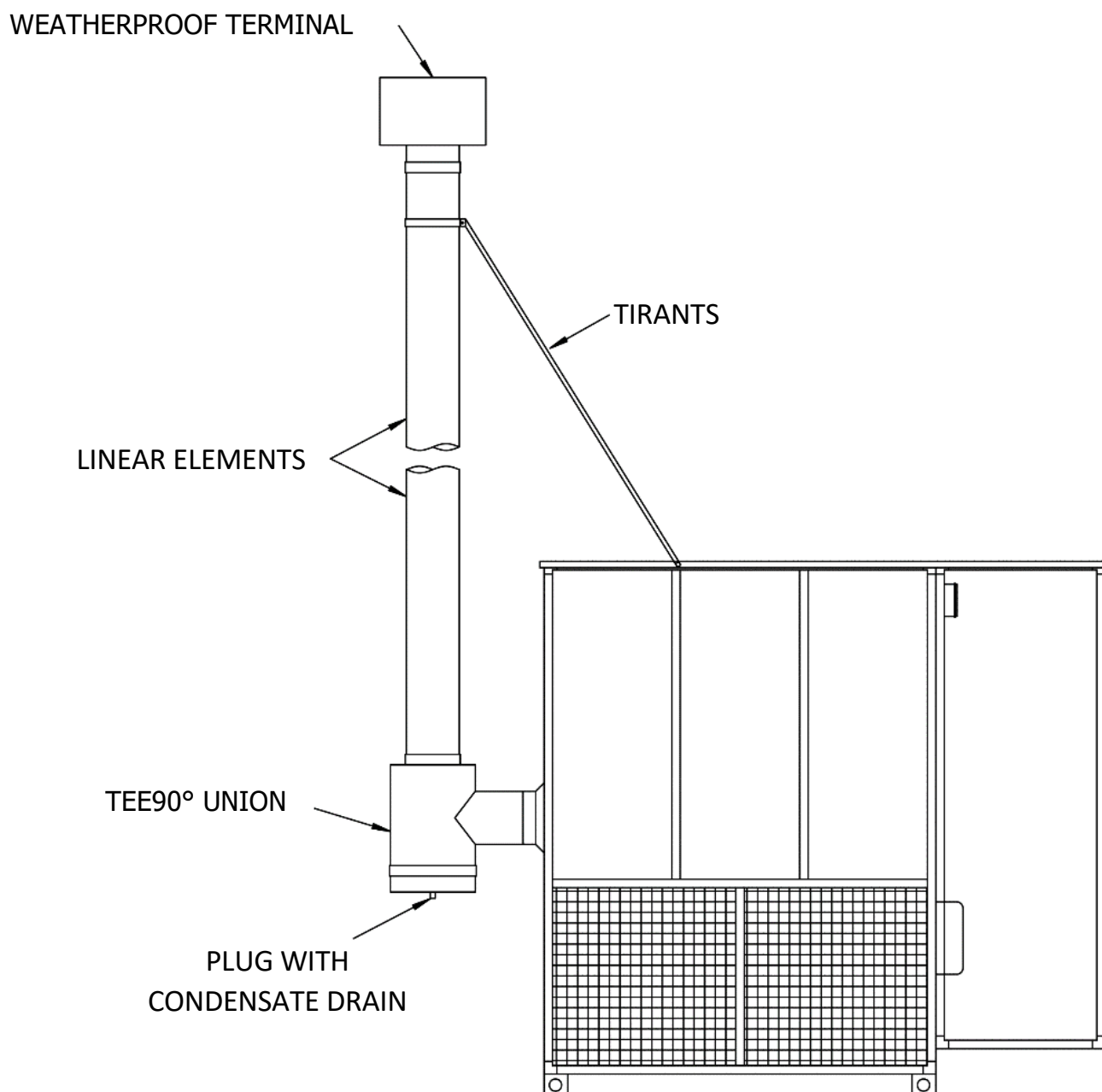
For warm air heaters for outdoor installation (series LE, LEO, LP), the vertical terminal must be type weatherproof, for protection against rain, snow, leaves.

Flue discharge tubes must be within 2 and 8 mt.

See here after an installation example



## Generatori d'aria calda AS L - AS L EX



The manufacturer guarantees the machine performance if are used pipes and elements that are supplied by it, that can be find in the table at chapter **TABLE OF CMT PIPES AND ELEMENTS FOR FLUE**.

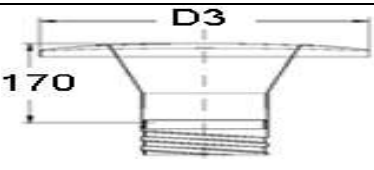
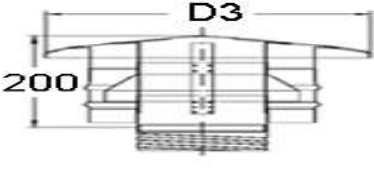
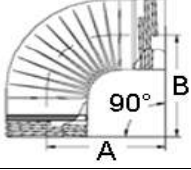
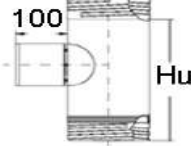
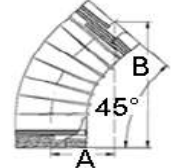
The installer can use other elements but they must be homologated and the pressure losses can't be superior then the ones in the table.

When the flue pipe cross a combustibile wall or ceiling or is distant less than 25 mm, this pipe must be protected with another bigger pipe in order that the outside temperature of the protection will be not more than 50°C of ambient temperature.

**TABLE CMT PIPES AND ELEMENTS FOR FLUE AND PRESSURE DROPS**

MODEL		L30	L60	L80	L100	L150	L175	L200
<b>Available pressure in Pa for exhaust fumes</b>		<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>
<b>PIPES DESCRIPTION</b>		Pressure drop in CMT pipe for length unit Pa/m (a)						
Rigid pipe Ø 100 mm -Length 1 m	Flue	2,7	4,0			-	-	-
Rigid pipe Ø 130 mm -Length 1 m	Flue	0,8	1,1	1,8	2,7	-	-	-
Rigid pipe Ø 150 mm -Length 1 m	Flue	0,4	0,6	1,0	1,5	2,9	3,0	4,9
<b>ELEMENTS DESCRIPTION</b>		Pressure loss Pa/element						
90° Moulded bend 90° R/D=1,5-Diam.100mm	Flue	5,4	8,0			-	-	-
90° Moulded bend 90° R/D=1,5-Diam.130mm	Flue	1,5	2,2	3,6	5,4			
90° Moulded bend R/D=1,5 - Diam. 150 mm	Flue	0,9	1,2	2,0	3,0	5,8	6,0	9,8
45° Moulded bend R/D=1,5 - Diam. 100mm	Flue	2,7	4,0					
45° Moulded bend R/D=1,5 - Diam. 130 mm	Flue	0,8	1,1	1,8	2,7			
45° Moulded bend R/D=1,5 - Diam. 150mm	Flue	0,5	0,6	1,0	1,5	2,9	3,0	4,9
"Chinese hat" terminal Ø 100 mm	Flue	3,8	5,6			-	-	-
"Chinese hat" terminal Ø 130 mm	Flue	1,1	1,6	2,5	3,8			
"Chinese hat" terminal Ø 150 mm	Flue	0,6	0,9	1,4	2,1	4,1	4,2	6,9
Weatherproof terminal Ø 100 mm	Flue	4,7	7,0			-	-	-
Weatherproof terminal Ø 130 mm	Flue	1,3	2,0	3,2	4,7			
Weatherproof terminal Ø 150 mm	Flue	0,7	1,1	1,8	2,6	5,1	5,3	8,6
TEE90° union - Ø 100	Flue	8,1	12,0			-	-	-
TEE90° union - Ø 130	Flue	2,3	3,4	5,4	8,1			
TEE90° union - Ø 150	Flue	1,26	1,83	3,0	4,5	8,7	9	14,7
<b>MODEL</b>		<b>L250</b>	<b>L300</b>	<b>L425</b>	<b>L500</b>	<b>L600</b>		
<b>Available pressure in Pa for exhaust fumes</b>		<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>		
<b>PIPES DESCRIPTION</b>		Pressure drop in CMT pipe for length unit Pa/m (a)						
Rigid pipe Ø 200 mm -Length 1 m	Flue	2,5	3,4					
Rigid pipe Ø 250 mm -Length 1 m	Flue	-	-	2,6	3,4	5,3		
Rigid pipe Ø 300 mm -Length 1 m	Flue	0,5	0,7	1,4	1,8	2,8		
<b>ELEMENTS DESCRIPTION</b>		Pressure loss Pa/element						
90° Moulded bend 90° R/D=1,5-Diam.200mm	Flue	5,0	6,8					
90° Moulded bend 90° R/D=1,5-Diam.250mm	Flue	-	-	5,2	6,8	10,4		
90° Moulded bend R/D=1,5 - Diam. 300 mm	Flue	1,0	0,7	2,8	3,6	5,6		
45° Moulded bend R/D=1,5 - Diam. 200mm	Flue	2,5	3,4					
45° Moulded bend R/D=1,5 - Diam. 250 mm	Flue			2,6	3,4	5,3		
45° Moulded bend R/D=1,5 - Diam. 300mm	Flue	0,5	0,7	1,4	1,8	2,8		
"Chinese hat" terminal Ø 200 mm	Flue	3,5	4,8					
"Chinese hat" terminal Ø 250 mm	Flue			3,7	4,8	7,5		
"Chinese hat" terminal Ø 300 mm	Flue	0,7	0,9	2,0	2,6	4,1		
Weatherproof terminal Ø 200 mm	Flue	2,9	3,9					
Weatherproof terminal Ø 250 mm	Flue			3,0	3,9	6,1		
Weatherproof terminal Ø 300 mm	Flue	0,6	0,8	1,6	2,1	3,3		
TEE90° union - Ø 200	Flue	3,8	5,1					
TEE90° union - Ø 250	Flue			3,9	5,1	8,0		
TEE90° union - Ø 300	Flue	0,8	1,0	2,1	2,7	4,2		

## FLUE AND COMBUSTION AIR INTAKE POCED ELEMENTS

	DECIPTION	ELEMENTS DIMENSIONS [mm]						
		D1	100	130	150	200	250	300
	"T6" CHINESE HAT	D3	160	190	210	300	350	400
	"T20" WATERPROOF TERMINAL	D3	230	230	290	380	470	520
	90° MOULDED BEND	A	164	186	195	214	240	266
		B	173	191	201	208	240	266
	90° T UNION	HU	200	245	265	340	390	440
	45° MOULDED BEND	A	75	75	85	82	140	101
		B	185	202	205	216	310	253

### SAFETY PRESSURE SWITCH AND HYGIENE CONTROL OF COMBUSTION IN CASE OF FLUE OBSTRUCTION.

The warm air heater has installed a safety pressure switch (1), with 2 inlet. The one with symbol + is connected to the silicon tube inserted in the pressure connection with venturi, at the start of flue duct (2) that detect the exhaust fume pressure.

The pressure switch (normally closed) is electrically connected to the electric board.

When it receive a high pressure signal, due to a flue obstruction, that can compromise the hygiene of fumes and the safe operation (with CO production higher than 1000 ppm at start, or 2000 ppm during normal operation), the pressure switch turn off the burner.

The set point of the pressure switch is set by the constructor (1,25mbar) taking in account a pressure loss of the flues of 0,5 mbar.

#### BEFORE START THE BURNER CHECK:

- The silicon tube is well connected at + of the pressure switch (1) and at pressure tap (2) with venturi tube (3) at the flue.
- The venturi tube (3) is fixed inside the flue in horizontal position.
- The silicon tube have a slope from pressure switch (1) to the pressure tap (2) to avoid condensation formation and return of condensation to the pressure switch (1).

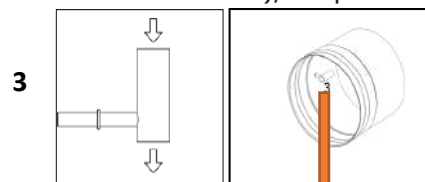


Fig. 7 pressure switch on flue

## Connecting the condensate drain

The warm air heater is provided with a condensate drain pipe, positioned in the bottom part of gas box, which drains the condensate produced in the heat exchanger.

A trap is also supplied, and the installer shall connect it to the heater's condensate drain pipe and to the condensate disposal system (see **Fig. 8**).

Unions must be watertight.

The disposal system piping must be calculated based on the condensate litres/hour (see the table on Chapter DATA SHEET or table below), and its internal diameter must not be less than 20 mm.

The condensate disposal pipes must be made of synthetic material (such as PVC or corrosion-proof stainless steel).



### Do not use galvanized steel pipes.

The trap provided must be installed always. It is complete with a float valve, to prevent fume leaks, and must be filled with water before the first start-up.

The condensate disposal piping can be provided with trap and closed disposal pipe. Use this system for warm air heaters installed in the heated ambient or inside a room.

Due to frost hazard, install an open piping with trap (see the drawing below) for outdoor disposal systems.

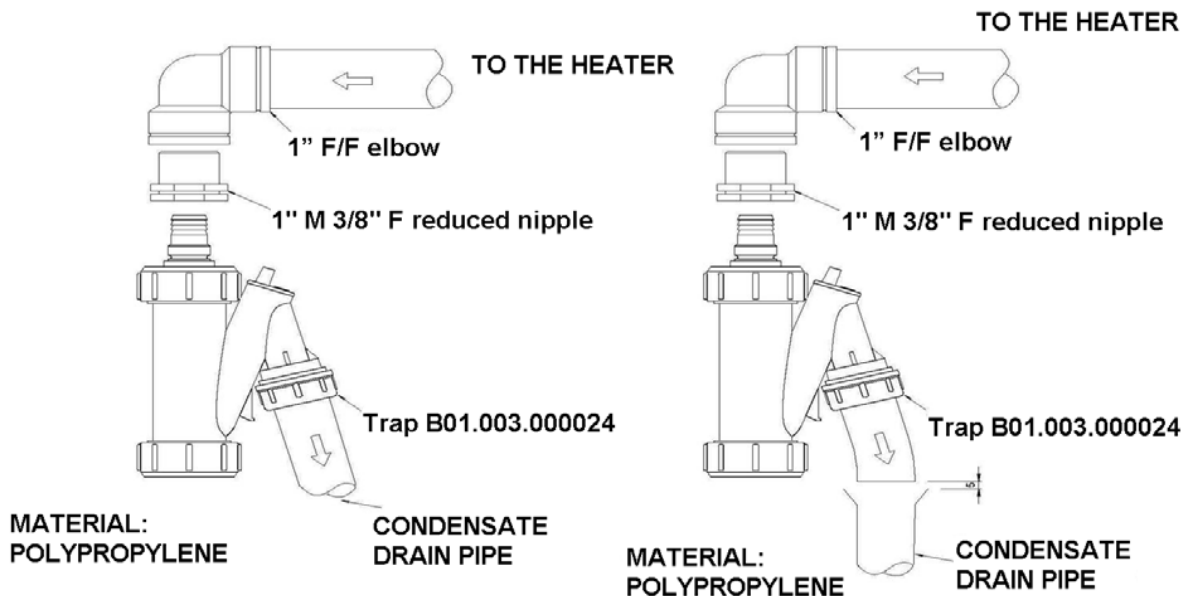


**To let the condensate out, make sure the warm air heater has been installed on a flat surface condensate disposal piping must be installed at a level lower than the trap.**



**To let the condensate out, make sure the warm air heater has been installed on a flat surface**

**The pH of the condensate produced during combustion can be neutralised by a condensate neutralisation kit.**



**Fig.8 Trap with closed piping and trap with open piping**

Condensing water produced by "L" Series warm air heater

Mod.	30	60	80	100	150	175	200	250	300	425	500	600
Condensing water lt/h	0,5	1,85	0,5	0,5	2	3,5	3	6	5	8,5	9	9

## Assembly of direct air delivery plenum

The plenum, if any, must be assembled as described on chapter **PLENUM** below; it is recommended to apply silicone sealant on contact surfaces.

In the standard version, the plenum is provided with grilles on three sides and adjustable horizontal/vertical fins. It can be supplied, on demand, a kit (4<sup>th</sup> side) with a grille that have double row of vertical and horizontal fins individually adjustable.



**Make sure the air delivery fins are not too inclined, for their capacity and delivery would be reduced.**

### INSPECTIONS ON FIRST START-UP

Check:

- The safety pressure switch is correctly connected to the flue (see figure 7 pag. 44).
- The performance of burner LR and make sure that the emissions of CO<sub>2</sub>, CO and NO<sub>x</sub> do not exceed the pre-determined tolerances, as shown in the table on Chapter DATA SHEET.  
Consult also the manual of the burner.
- Visually check that the burner flame is regular and does not hit the bottom of the combustion chamber.
- Check that the direction of rotation of the fan(s) is the one indicated by the arrow on the impeller (see fig.8)
- Check motor absorption by means of ammeter and make sure it does not exceed the values specified on Chapter **DATA SHEET**.
- The thermostats FAN, LIMIT and LIMIT2 are functioning correctly (See **chapter TRI-THERMOSTAT**).

### Perform a combustion analysis.

- 1) In the combustion analysis of the warm air heater, combined with a two-stage or modulating burner, the combustion analysis must be done both at Q nom (nominal heat input), and at Q min (minimum heat output).  
The combustion, efficiency and hygiene values obtained, including those of NO<sub>x</sub>, must be recorded at these two thermal flows.
- 2) To calculate NO<sub>x</sub> in mg / kWh, according to EN 17082: 2019 point 6.8.2.2.2, proceed as follows:
  - Take the values of NO<sub>x</sub> in mg / kWh at Q nom (nominal heat input) and of NO<sub>x</sub> at Qmin (minimum heat input) measured as in point 1).
  - Insert them in the following formula:  $NO_x = 0.15 NO_x \text{ nom} + 0.85 NO_x \text{ min}$  (to obtain NO<sub>x</sub> calculated).  
For the ErP Regulation 2016/2281 / EU, STEP II ° the calculated NO<sub>x</sub> value must be ≤ 70 mg / kWh, considered on the basis of the PCS (higher calorific value) which numerically is about 10% lower than that calculated on the basis of the PCI (lower calorific value).
  - Any tolerances and measurement uncertainties allowed by local authorities must be added to this value.  
Local authorities can establish their own minimum energy performance and NO<sub>x</sub> values other than those indicated in point 2.

**Prepare a power station or plant handbook and record the information required to be disclosed pursuant to the laws, rules, regulations and standards in force.**

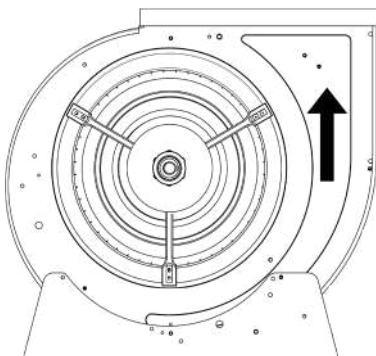
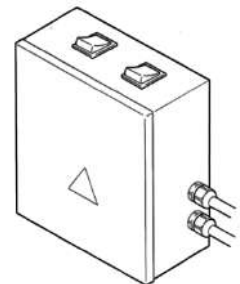


Fig. 9 Direction of rotation of the fan(s)



Fig. 10 Electrical board for 3Ph and 1Ph.



## TRI-THERMOSTAT

Tri-thermostat is composed of a FAN, LIMIT2 and LIMIT

**FAN (TR)**- fan thermostat, normally open.

Automatically start and stop the fan when the average air outlet temperature reaches a pre-set value.

The set point is fixed by moving the setpoint marker (2) on a brass screw.

This adjustment must be set to 40°C for models 30 and 60 and to 30°C for models 80 to 600.



Setting this value over, a delay on fan starting may be caused, so increasing fuel consumption and can cause damages to the machine.

On the cooling phase, the thermostat stops the fan at about 14°C, lower his starting point.

- For **all LP models, EXCEPT** for installations such as **PRESSURE STATIC** structure, the fan is operated as described in paragraph FAN (TR).
- For installation of **LP in PRESSURE STATIC STRUCTURE** the FAN must operate continuously to guarantee the structure support. The electrical connections of the thermostat are performed in order to keep the fan always on (**see ELECTRICAL DIAGRAMS below**).

**LIMIT2 (STB)** Security limit thermostat for the burner, normally closed with manual reset e a with positive safety.

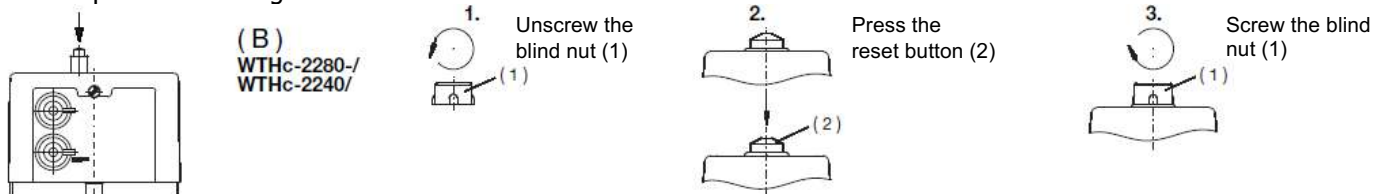
automatic stop the burner in case the average air outlet temperature overheat above the pre- set value imposed by the regulation.

The set point at 100°C, is fixed by the manufacturer. **This set point must not be changed** to avoid the overheating of the warm air heater.

Its intervention stops the burner, while the fan keeps turning to cool the heat exchanger.

### Reset thermostat LIMIT2 (STB)

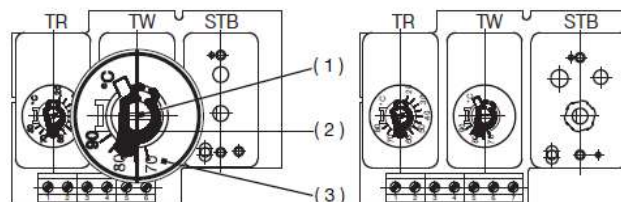
- wait the air outlet temperature drops down until the fan stops
- push the reset green button



**LIMIT (TW)** Temperature limit thermostat for the burner, normally closed, to automatic stop the burner when the average air outlet temperature exceeds the pre-set value.

Its calibration is set at a value of 70 ° C up to mod. 300 and 75 ° C from model 425 to model 600.; and can be increased maximum at 80°C.

The LIMIT reset is automatic, when air outlet temperature drops below his set point.



- (1) Setpoint spindle ■ Remove housing cover and adjust setpoint spindle using a screwdriver.  
 (2) Setpoint marker ■ Put housing cover back on and tighten up the screws.  
 (3) Internal scale

- (1) Potentiomètre ■ Retirer le couvercle du boîtier et régler le potentiomètre à l'aide du tournevis.  
 (2) Repère de consigne ■ Replacer et visser le couvercle du boîtier.  
 (3) Echelle interne

Make sure that the manual-reset LIMIT2 is not activated due to:

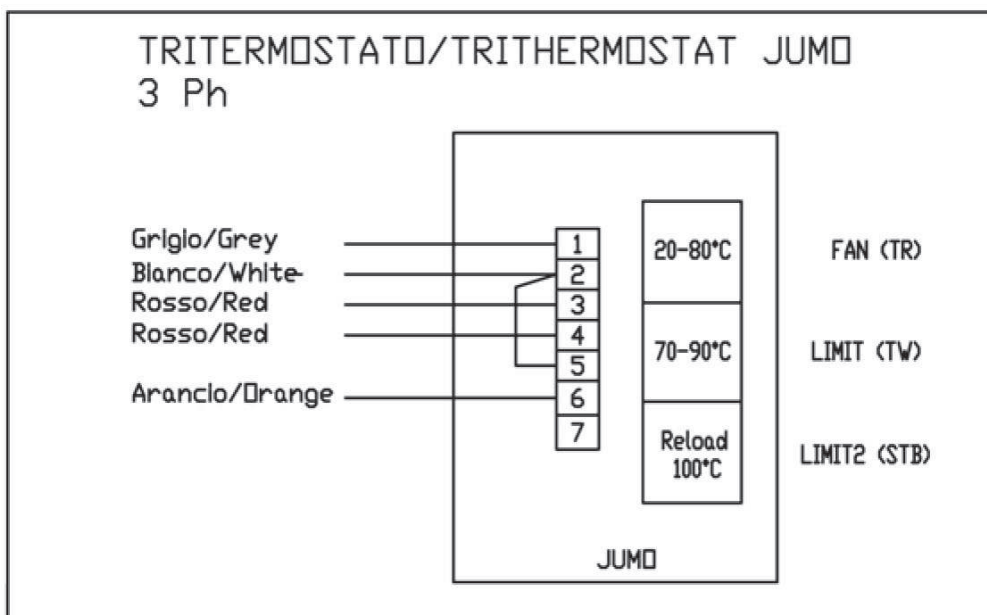
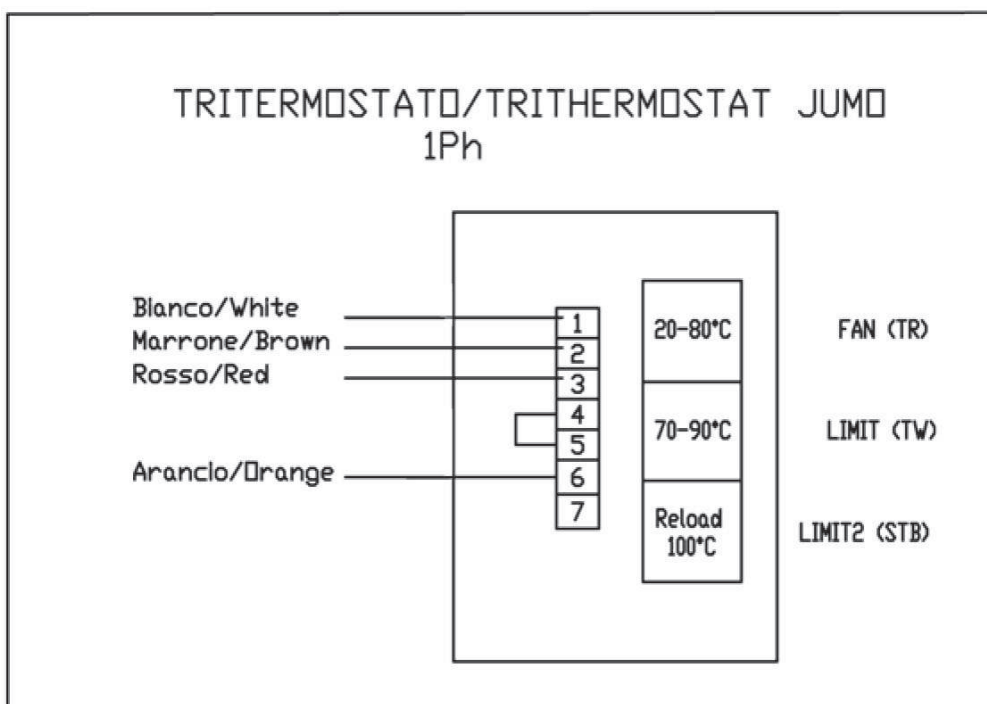


- Low air flow rate, caused by obstructions and obstacles in the air exhaust/distribution system
- Clogged air filters (if installed)
- Heater stopped using the master switch or owing to a power failure during operation
- Closing fire dumper intervention
- Tri-thermostat sensors' sloping and/or too close to the heat exchanger that anticipate the intervention due to the radiating heat

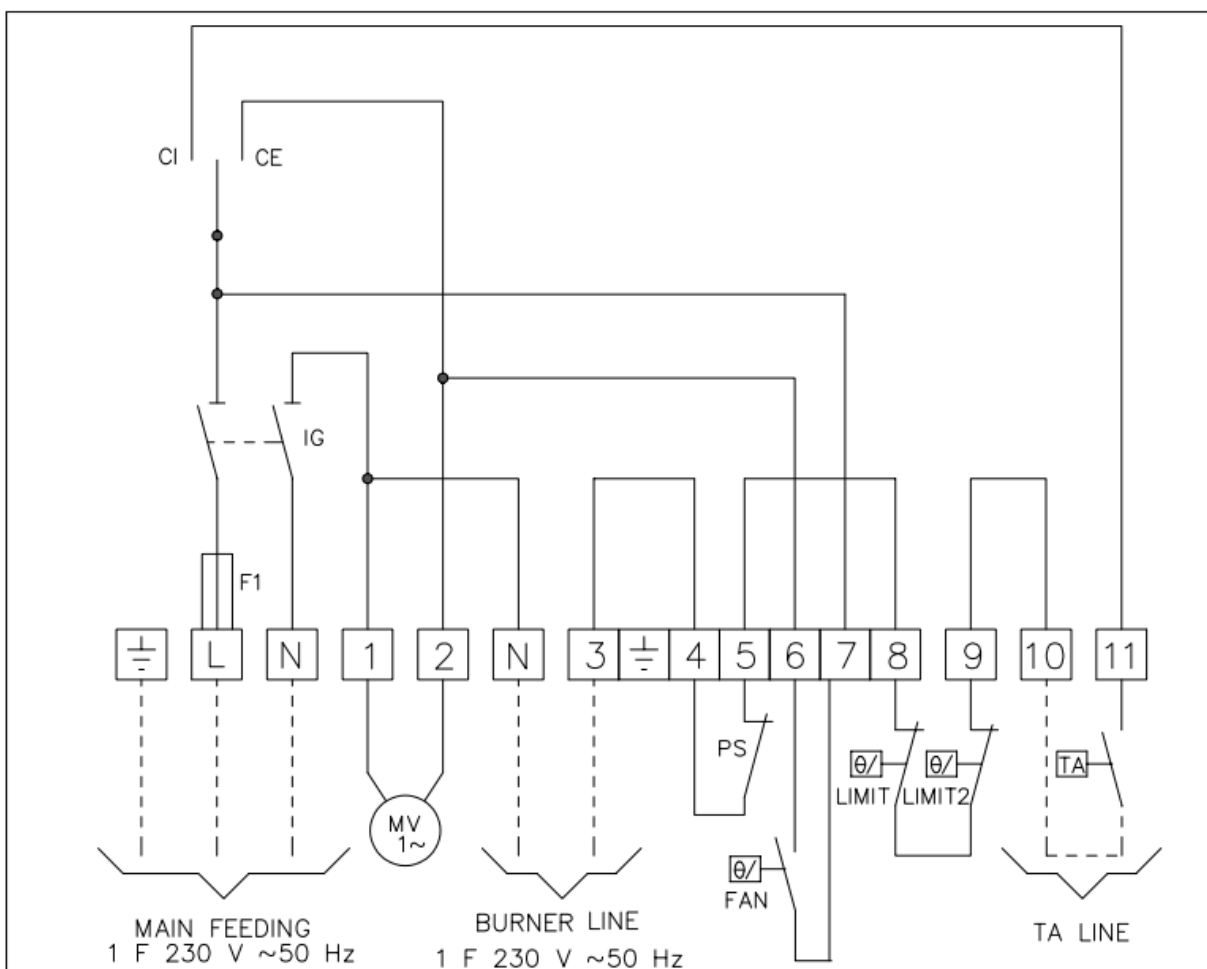
Once all these problems have been solved, if the fault persists contact the after-sales service or qualified personnel.



Check, before the first start-up, that the tri-thermostat bulbs are inclined upwards and do not touch the heat exchanger.



# Wiring diagram AS L 30 - AS L EX 30 - AS L 60 - AS L EX 60



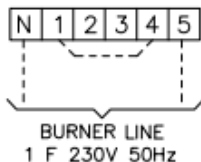
- IG = Main switch
- CE = VENTILATION – Position of the commutator
- CI = HEATING – Position of the commutator
- FAN = Automatic control thermostat of the ventilator
- LIMIT = General thermostat of the burner with automatic resetting
- LIMIT2 = Main security thermostat of the burner with manual resetting
- MV = Fan motor
- TA = Room thermostat
- F1 = Fuse of line (10A for mod 30, 16A for mod 60)
- PS = Flue discharge pressure switch

— — — — Installer connections

		Description			KIND OF MODIFICATION	
		CONNECTION ELECTRIC DIAGRAM OF THE WARM AIR HEATER				
European system		The CMT S.r.l. has the copyright on this drawing because it's severely forbidden reproduce it or divulge it without CMT autorisation				
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G. Autol.	26/01/2021			SL 3060-01		

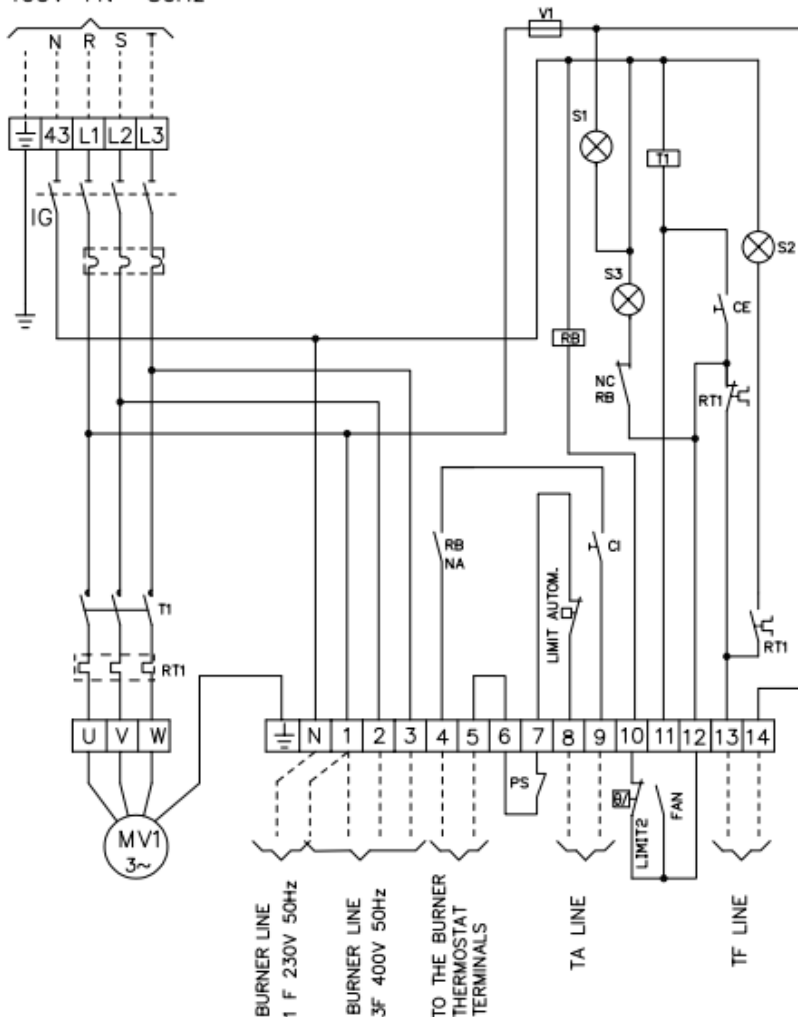


# Wiring diagram AS L 80÷200 - AS L EX 80÷200



When on the burner there are not the terminals for thermostat, use this connection electric diagram.

MAIN FEEDING  
3F 400V +N ~50Hz



- IG = Electromagnetic main switch
- CE = - VENTILATION - Position of the commutator
- CI = - HEATING - Position of the commutator
- FAN = Automatic control thermostat of the ventilator
- LIMIT = General thermostat of the burner with automatic resetting
- LIMIT2 = Main security thermostat of the burner with manual resetting
- T1 = Remote control switch for fan motor 1
- RT1 = Remote control switch for triangle start
- RB = Control burner relay
- V1 = Fuse on the control circuit (3,15 A)
- S1 = Voltage light
- S2 = Intervention light of the remote control switch thermal cutout
- S3 = Intervention light signal of the security LIMIT2
- MV1 = Fan motor
- TA = Room thermostat
- TF = Fire stop damper
- PS = Flue discharge pressure switch

### CAUTION!

In case of short circuit or electric overload, the main switch disconnects automatically and a light signal light. For its resetting, turn it in the anticlockwise and then in the clockwise direction. Verify the cause of the fault, before carrying out this intervention.

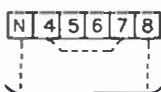
The security LIMIT 2 intervention, to switch off the burner, is signaled by the light S3. To reset it, push the resetting button of the LIMIT 2

For the heater safety, connect LIMIT and LIMIT2 (Terminals 4-5) to the line of the burner thermostat. No LIMIT operation on the burner in fault of this connection.

--- INSTALLER CONNECTIONS

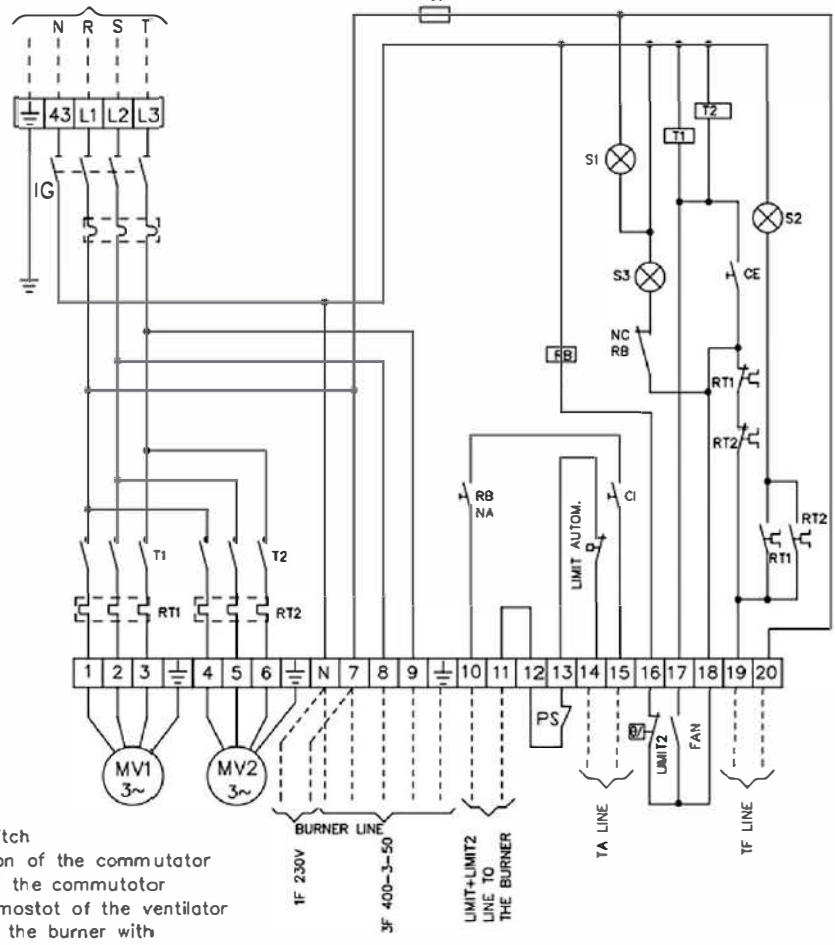
	Description			KIND OF MODIFICATION	
	CONNECTION ELECTRIC DIAGRAM OF THE WARM AIR HEATER				
	The CMT S.r.l. has the copyright on this drawing beware: it's severely forbidden reproduce it or divulge it without CMT autorisation				
Signature	Date	controlled	scale	Drawing number	
G. Autol.	26/01/2021			SL 8020-01	

# Wiring diagram AS L 250 - AS L EX 250


  
**BURNER LINE**  
 1 F 230V 50Hz

When on the burner there are not the terminals for thermostat, use this connection electric diagram.

**MAIN FEEDING**  
 3F 400V +N ~50Hz



- IG = Electromagnetic main switch
- CE = - VENTILATION - Position of the commutator
- CI = - HEATING - Position of the commutator
- FAN = Automatic control thermostat of the ventilator
- LIMIT = General thermostat of the burner with automatic resetting
- LIMIT2 = Main security thermostat of the burner with manual resetting
- T1 = Remote control switch for fan motor MV1
- T2 = Remote control switch for fan motor MV2 with delaying device
- RT1 = Remote control switch thermal cutout T1
- RT2 = Remote control switch thermal cutout T2
- RB = Burner relay
- V1 = Fuse on burner line (20 A)
- V2 = Fuse on the control circuit (3,15 A)
- S1 = Voltage light
- S2 = Intervention light of the remote control switch thermal cutout
- S3 = Intervention light signal of the security LIMIT2
- MV1 = Motor of the 1' ventilator
- MV2 = Motor of the 2' ventilator
- TA = Room thermostat
- TF = Fire stop damper
- PS = Flue discharge pressure switch

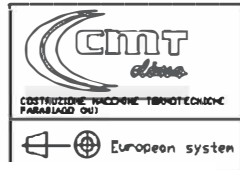
--- INSTALLER CONNECTIONS

**CAUTION!**

In case of short circuit or electric overload, the main switch disconnects automatically and a light signal light. For its resetting, turn it in the anticlockwise and then in the clockwise direction. Verify the cause of the fault, before carrying out this intervention.

The security LIMIT 2 intervention, to switch off the burner, is signaled by the light S3. To reset it, push the resetting button of the LIMIT 2

For the heater safety, connect LIMIT and LIMIT2 (Terminals 10-11) to the line of the burner thermostat. No LIMIT operation in fault of this connection.



**CONNECTION ELECTRIC DIAGRAM**  
 OF THE WARM AIR HEATER  
 MOD. L250  
 ET VARIANTS LE-LO-LED

KIND OF MODIFICATION



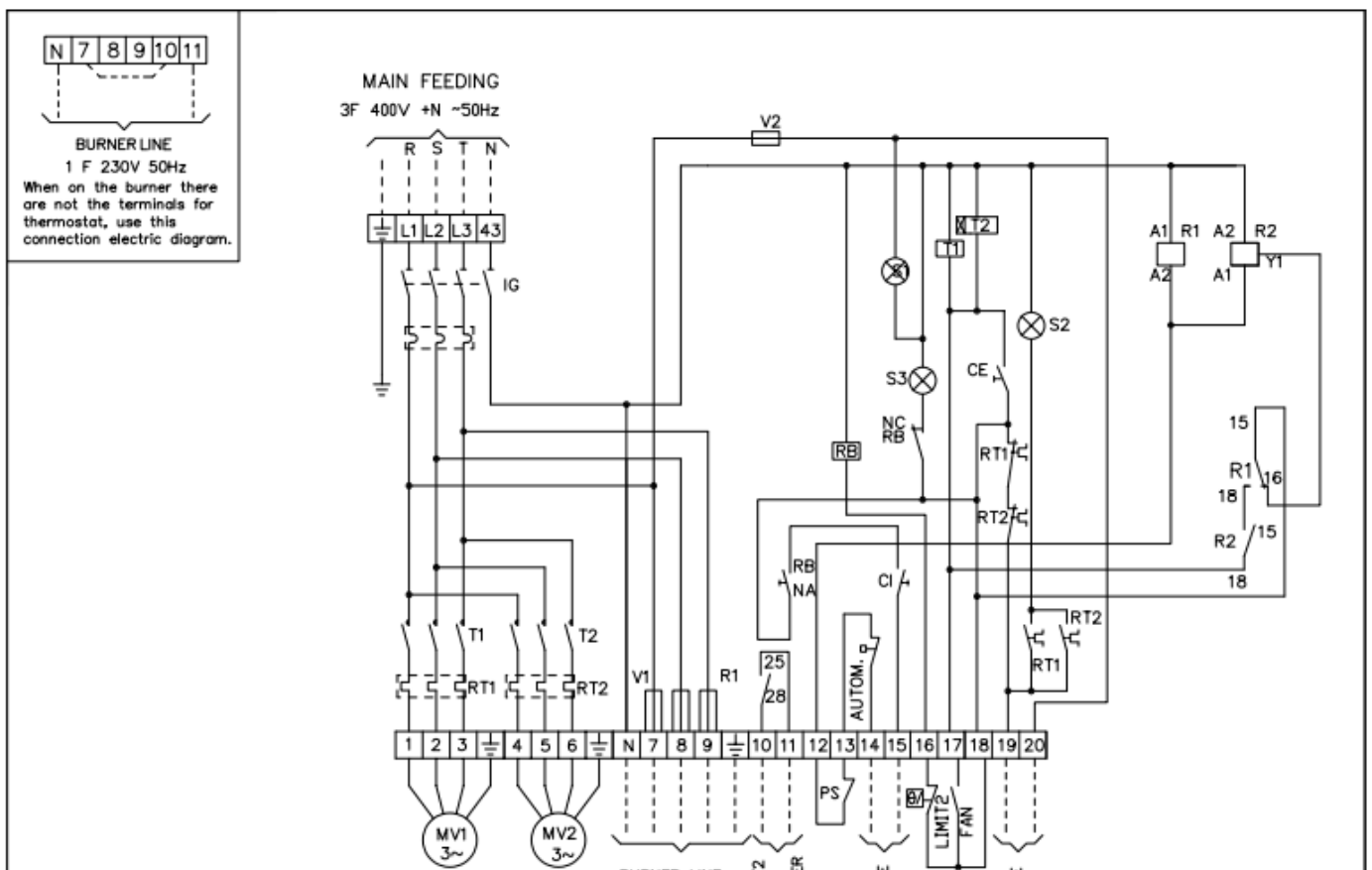
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		SI 2530-01

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# Wiring diagram AS L 300-425-500-600 - AS L EX 300-425-500-600



- R1 = RETARDED
- IG = Electromagnetic main switch
- CE = VENTILATION - Position of the commutator
- CI = HEATING - Position of the commutator
- FAN = Automatic control thermostat of the ventilator
- LIMIT = General thermostat of the burner with automatic resetting
- LIMIT2 = Main security thermostat of the burner with manual resetting
- T1 = Remote control switch for fan motor MV1
- T2 = Remote control switch for fan motor MV2 with delaying device
- RT1 = Remote control switch thermal cutout T1
- RT2 = Remote control switch thermal cutout T2
- RB = Burner relay
- V1 = Fuse on burner line (10 A)
- V2 = Fuse on the control circuit (3,15 A)
- S1 = Voltage light
- S2 = Intervention light of the remote control switch thermal cutout
- S3 = Intervention light signal of the security LIMIT2
- MV1 = Motor of the 1' ventilator
- MV2 = Motor of the 2' ventilator
- TA = Room thermostat
- TF = Fire stop damper
- R1 = Timer for fan start
- R2 = Timer for fan switching off
- PS = Flue discharge pressure switch

--- INSTALLER CONNECTIONS

### CAUTION!

In case of short circuit or electric overload, the main switch disconnects automatically and a light signal light. For its resetting, turn it in the anticlockwise and then in the clockwise direction. Verify the cause of the fault, before carrying out this intervention.

The security LIMIT 2 intervention, to switch off the burner, is signaled by the light S3. To reset it, push the resetting button of the LIMIT 2

For the heater safety, connect LIMIT and LIMIT2 (Terminals 10-11) to the line of the burner thermostat. No LIMIT operation in fault of this connection.

NOTE! Make sure that the R1 retarder (OMRON H3DE-S2) is selected on 'A'



CONNECTION ELECTRIC DIAGRAM OF THE WARM AIR HEATER

KIND OF MODIFICATION

European system

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controlled

scale

Drawing number

SL 4260-01

## MAINTENANCE



WARNING

Before doing any maintenance the machine must be disconnected from power supply using the general switch on the frontal panel of the electric board (positioned on machine).

### Close adduction of the fuel



**The warm air heater and the burner must be serviced by an authorised service centre or by qualified personnel, in compliance with the requirements set forth by law. The personnel servicing the machine must follow the safety rules in force.**



Personnel operating or maintaining the machine must wear clothing conform to the safety rules in force in the country destination of the machine, as indicated in the EU Directives relative to use of personal protective equipment (PPE)



**Before doing any maintenance the machine must be disconnected from power supply and close the adduction of the fuel.**

To proceed to maintenance provide:

- Sufficient space in the surrounding of the machine
- A sufficient light to let the operations to be done in safety
- Prohibit access to non authorized personnel



## CLEANING THE HEAT EXCHANGER



The heat exchanger must be cleaned from soot and deposits, to preserve heat exchange capacity.

Clean it at the end of each heating season or more often, depending on usage.

Start-up defects of the burner could be due to the presence of soot inside the heat exchanger, obstructing the exhaust gas line.

The accumulation of excess soot could depend on faulty draught, poor quality fuel or lack of air in the burner. To clean the heat exchanger, proceed as follows.

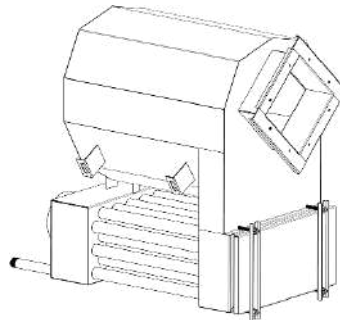


Fig. 11 Combustion chamber/heat exchanger L30/60

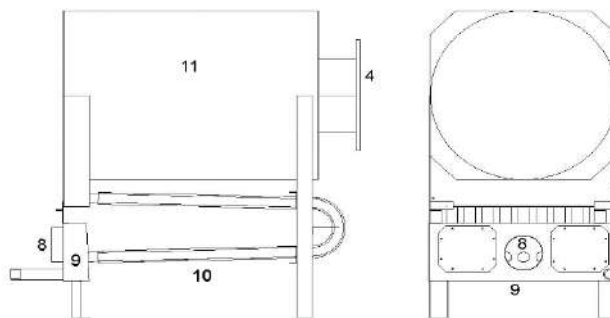


Fig. 12 Combustion chamber/heat exchanger from L80 to L600

## FLUES (10)

MOD. 30 and 60:

Remove the rear panel, the flue connection and the rear fume box cover.

MOD. 80 to 600:

Remove the rear panel, flue connection (8) and the 2 covers of rear fume box (9). (10), after removing the turbulators.

Clean the fume pipes (10) interior through the openings of fume discharge tube and fume box.

Collect the soot at the back.

Before reinstalling the 2 covers of the fume box/boxes, check that its seals are intact; otherwise, replace them with similar seals (with the same code).

Mount back the rear panel and the flue connections

## COMBUSTION CHAMBER

Remove the burner from its plate (4).

Clean external walls from soot and deposits.

Check that the **combustion chamber (11)** is not damaged nor deformed.

Check that the seal of the burner supporting plate and the relevant seal on the nozzle are in good condition; if not, replace them with seals having the same code.

When mounting back the burner (4) check the tightening of the bolts on the burner plate.



**Note: All seals are asbestos-free and compliant with EC standards**

## CLEANING THE FILTER ON AIR INLET

A dirty filter reduces the air flow, increases discharge temperature, reduces heat exchange and heater efficiency. It is very important to clean the filter at regular intervals to guarantee the correct functioning of the machine.

The cleaning interval depends on the amount of dust in filtered air.

To clean it, proceed as follows:

- Remove the filter from its seat
- Shake it and leave the dust fall
- Blow the filter with compressed air in counter-current
- Place the filter back in its seat



**the filter is an accessory to be ordered separately.**

## VENTILATING UNIT

**Check**, at least once at the beginning of each season:

- The proper alignment of pulleys and drive belts, if any, and check them for wear (if necessary, replace them with belts of the same type and size)
- The direction of rotation of the ventilating unit, indicated by the arrow on the fan (see fig 9)
- The belt tensioning.
  - Grasp them: they must not become loose by more than 2-3 cm (see fig 13).
  - To adjust tensioning, screw or unscrew the belt tightening bolt on the motor slide (13).
- The motor absorption, in Ampere, must not exceed the value specified on Chapter **DATA SHEET**.
- Check the tri-thermostat performance (see Chapter **TRI-THERMOSTAT**).

## BURNER

For burner maintenance, comply with the instructions provided in the burner manual.

Check:

1. The gas pipe tightness
2. The tightness and condition of the chimney and connecting ducts or of the flue system/combustion air intake.

## Combustion Analysis

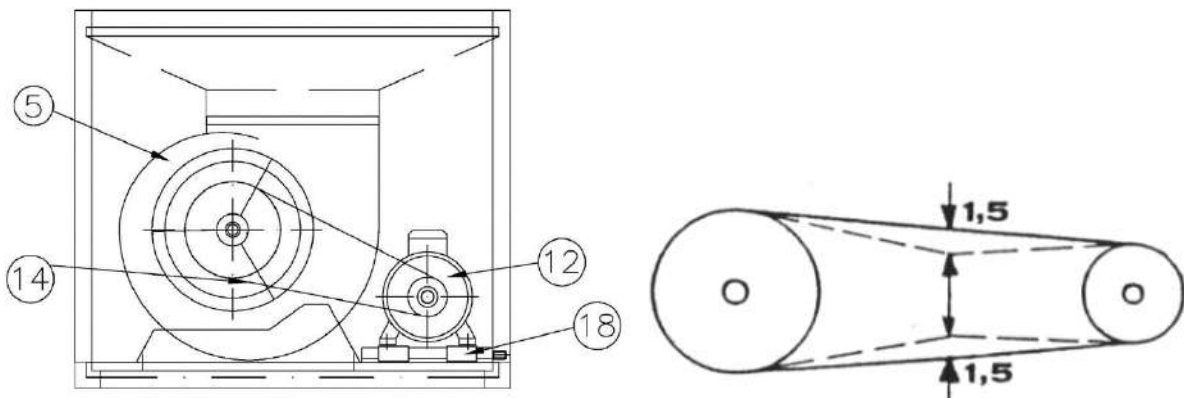
1. At least once, at the beginning of each heating season, unless the current standards require shorter intervals, do a combustion analysis carried out and recorded in the POWER PLANT HANDBOOK or PLANT HANDBOOK.



**NOTE: Take note of all replaced components.**

## TABLE OF MINIMUM MAINTENANCE INTERVALS

MINIMUM FREQUENCY	TYPE OF OPERATION
Every day	Clean air filters, if installed, if they are clogged.
Once every 80 hours of working time	Checking the perfect fixing of the fan section parts.
Once every 80 hours of working time	Check the burner plates bolts tightening.
At least once at the beginning of each heating season	
At least once at the beginning of each heating season	Clean and inspect the combustion chamber.
	Change the transmission belts.
	Clean and inspect the ventilating unit.
	Check the performance of electrical components.
	Combustion analysis.
At least once every 12 months and at the beginning of each heating season	Checking the tightness of all bolts, nuts and flanges that vibration could have loosened.
	Check that the smoke pressure switch is working correctly and that the electrical contact is open before starting the burner.  Check the correct installation of the silicone tube, which must be sloping from the pressure switch (1) to the pressure intake point (2), to avoid the formation of condensation inside it or its return to the pressure switch (1) (see page 40).



**Fig. 13**

### Belts tensioning



Adjust motor pulley tension moving the motor base (belt tensioner sledge) until the belts results well tight.  
Check the motor pulley alignment with the fan pulley with a specific ruler, a wire or through a laser alianment.

# TROUBLESHOOTING

Use the table below to identify any possible problems. If a problem cannot be solved as suggested in the table, contact the authorized after-sales service or qualified personnel.

<b>FAILURE</b>	<b>CAUSE:</b>	<b>REMEDY:</b>
1. The main switch is on -I- and the change-over switch in the VENTILATION position: the signal lamp is off and the ventilating unit stopped.	1. The electrical board is not energised.	1. Check that the master switch upstream of the electrical board is on.
	2. The line fuse is burnt.	2. Replace the fuse with another piece, with the same characteristics.
2. Like n° 1), but the REMOTE CONTROL SWITCH THERM. lamp is on. only for 3-phase voltage heaters	1. The contactor thermal relays are on only for 3-phase voltage heaters	1. To reset, turn off the master switch (IG), open the electrical board cover and press the push-button of the remote control switch's thermal relays.
3. With the master switch on -I-, the voltage lamp on, the change-over switch in the HEATING position and the room thermostat on: the burner does not start.	1. Poor connection of the room thermostat/timer.	1. Verify the wirings
	2. Problems related to the burner.	2. Contact the authorised after-sales service of the burner
	3. The max. LIMIT thermostat is on.	3. Wait for the air temperature to drop to about 65°C (65°F)
4. Like § 3), with the SAFETY LIMIT OPERATION switch on.	1. The max. LIMIT2 thermostat is on, because the air leaving the appliance is overheated.	1. Reset the burner, (see Chapter <b>TRI-THERMOSTAT</b> )
5. like failure number 3), but the burner after the prewashing phase stops and the flame doesn't ignite.	1. Absence of fuel or air in the fuel tubes	
	2. Burner detection electrode defective or not correctly positioned.	
	3. Burner start electrode not correctly placed.	
	4. Incorrectly grounding	2. Contact burner service center or supplier
	5. Burner equipment defective	
6. The burner is on, but the fan delay to start and after that start and stop continuously	1. the FAN has a too high set point.	1. Verify FAN set point (see Chapter <b>TRI-THERMOSTAT</b> )
	2. the FAN is defective.	2. Order a new Tri-thermostat.
	3. Air inlet is below 0°C.	3. Increase heat output of the burner
	4. Insufficient gas flow rate	4. Contact the authorised after-sales service of the burner.
7. The burner is on, but the fan, even after the heating phase, does not start and the warning light comes on. REMOTE CONTROL SWITCH THERM. Only for 3-phase voltage heaters.	1. The contactor thermal relays are on due to a too high power absorption of the motor.	1. Reset the thermal relays according to failure 2). remedy
	2. The electric motor(s) is/are burner(s) there is a fault or faulty contact or the bearings are blocked	2. Check the electric motor(s).
8. During operation, the burner stops before the room thermostat or timer operation.	1. LIMIT has intervened	1. Waiting the temperature to go below 65°C.
	2. Safety LIMIT2 has intervened.	2. Reset the burner (see Chapter <b>TRI-THERMOSTAT</b> )

NOTE: IN CASE OF BURNER FAILURE, CONSULT THE MANUAL OF THE BURNER.



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