



Floor standing hot air generators
indoor/outdoor gas condensing

AS COND - AS COND EX



INSTALLATION MANUAL

AS COND - AS COND 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.



WARNING

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 optionals;
- 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 potential dangerous situations.

However, it is necessary to take into account 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:

- UNI-CIG 7129 for natural gas installations
- UNI-CIG 7131 for LPG installations
- EN 17082: 2019
- Law 10/91 for the containment of energy consumption
- Law 46/90 for plant safety
- Ministerial Decree 08/11/2019 technical rule of fire prevention

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 www.accorroni.it - a2b@accorroni.it			
		GENERATORE D'ARIA CALDA A CONDENSAZIONE A CONVEZIONE FORZATA CON BRUCIATORE PREMISCELATO A GAS BASSO NOX CL 5 CONDENSING FORCED CONVECTION WARM AIR HEATER WITH GAS PREMIX BURNER LOW NOX CL 5			
MOD. /TYPE	XP 250	Serial N° Comm.	182015 18100432	MESE/ANNO MONTH/YEAR	nov-18
PORTATA TERMICA NOMINALE (Hi)		270		kW	
NOMINAL HEAT INPUT					
PORTATA TERMICA MINIMA (Hi)		135		kW	
MINIMUM HEAT INPUT					
POTENZA TERMICA ALLA NOMINALE (Hi)		269		kW	
THERMAL RATED POWER					
RESA TERMICA UTILE ALLA NOMINALE (Hi)		99,3		%	
THERMAL YIELD					
PERDITE DI CARICO DEL CIRC. DI COMB.		4		mbar	
COUNTERPRESSURE IN COM. CHAMBER					
PORTATA ARIA		20.800		mc/h	
AIR DELIVERY					
PRESSIONE STATICA UTILE LATO ARIA		250		Pa	
AIR PRESSURE					
POTENZA ELETTRICA ASSORBITA		400V/3Ph+N/50Hz			
RATED POWER INPUT		1		X 7,5kW	
COMBUSTIBILE FUEL	GAS	CATEGORIA CATEGORY	II2H3B/P		
PAESE DI DESTINAZIONE DESTINATION COUNTRY		IT			
PREDISPOSTO PER GAS TIPO: G20 FOR GAS TYPE: G20					
PRESSIONE ALL'INGRESSO: 20mb INLET GAS PRESSION: 20mb					
MADE IN ITALY - PIN 0476CT2703					
CONFIGURAZIONE TIPO: B 23		CONFIGURATION TYPE:			
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.					

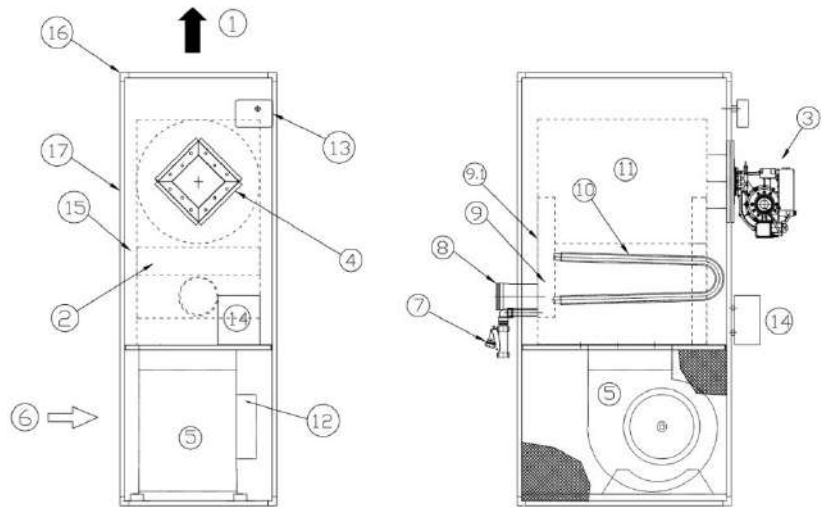
Figura 1 Facsimile della targhetta posta sul generatore d'aria calda.

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

CONSTRUCTION CHARACTERISTICS

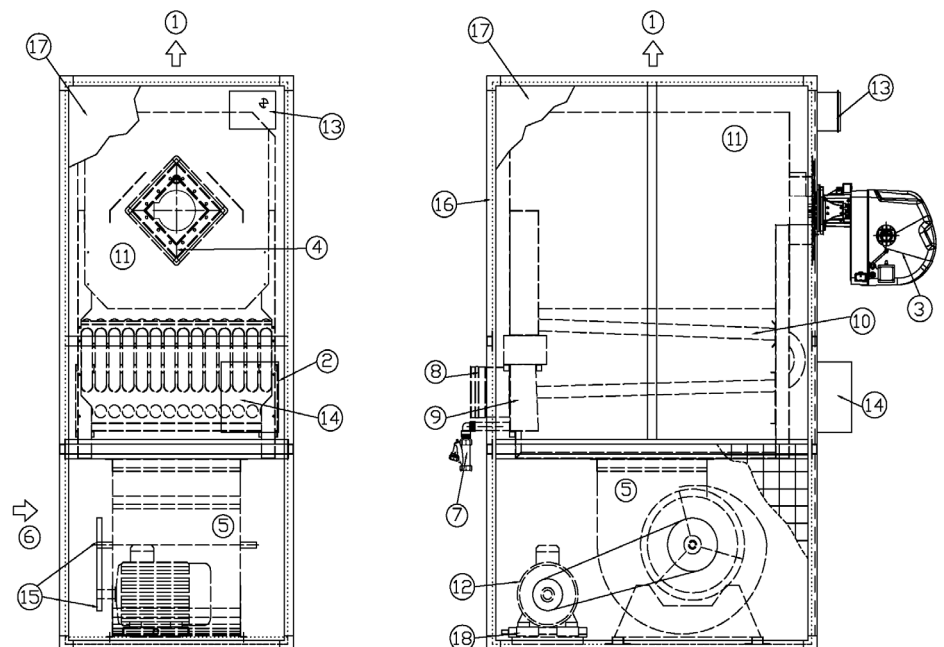
COMPOSITION OF THE "AS COND" VERSION Models from 50 to 65, with single-phase motor, and direct driven fan

- 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 250 and 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
- 19) Combustion air intake for type C

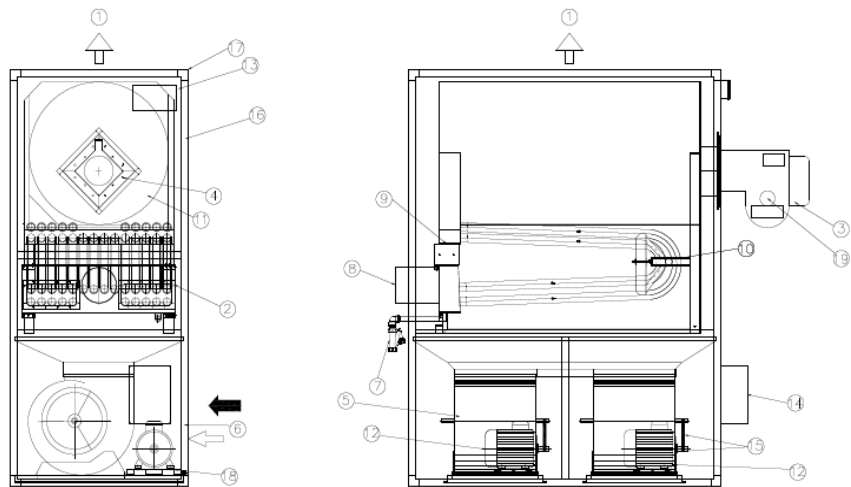
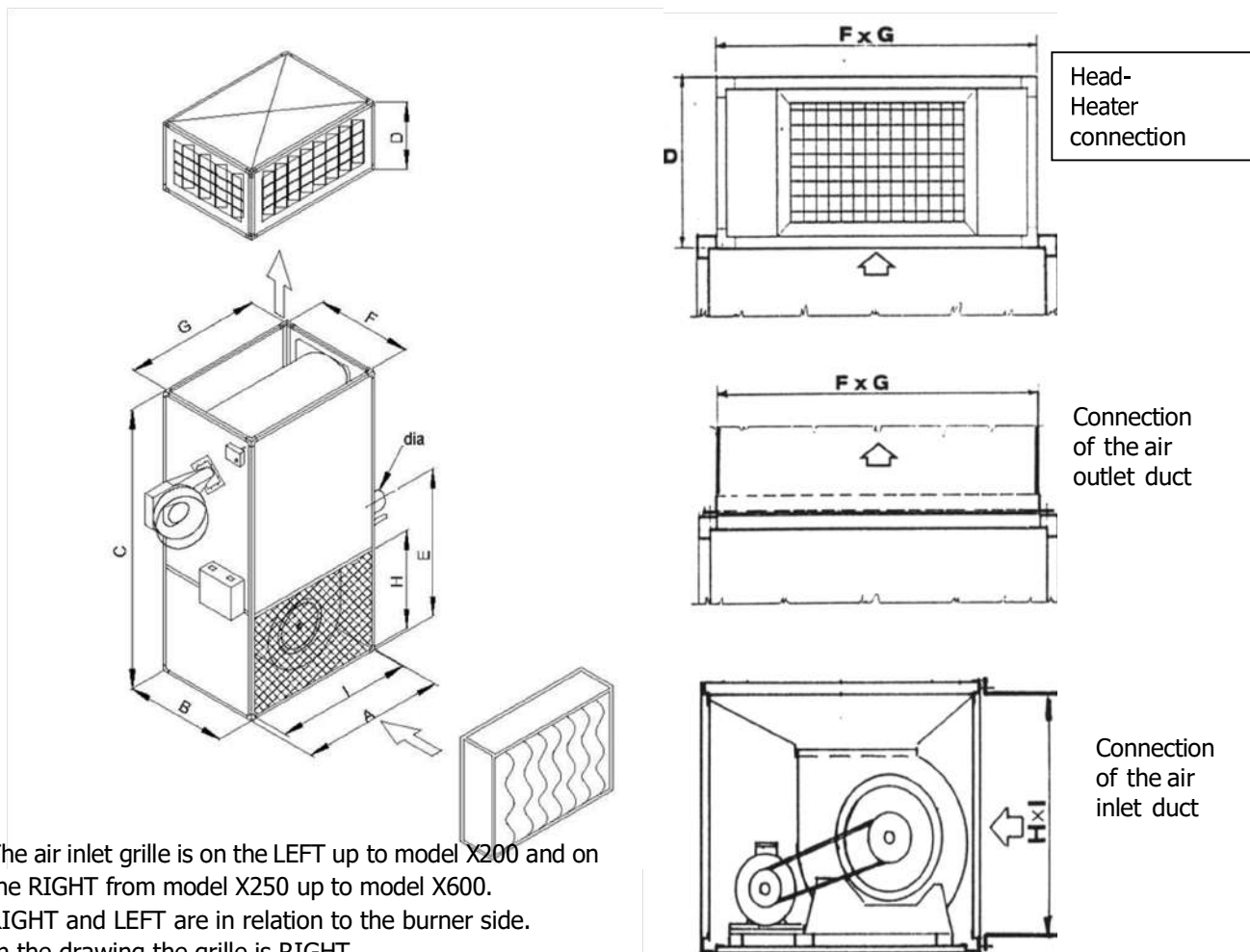


Fig. 3 Left: Warm air heater 1Ph with air inlet filter and head for direct air distribution.

Right: Warm air heater 3Ph with head for direct air distribution.

WEIGHTS and DIMENSIONS "AS COND" SERIES

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



MOD.	HEATER			Head height D	Flue height E	Air Outlet connection		Air Inlet connection		Frame profile L	Flue system Ø	Weight (1)		Net head weight Kg
	Lenght A	Width B	Height C									net Kg	Packed Kg	
AS COND 50	870	636	1750	305	860	596	830	630	830	20	100	165	175	10
AS COND 65	870	636	1750	305	860	596	830	630	830	20	100	170	180	12
AS COND 80	1020	750	1950	405	935	670	940	690	940	40	130	270	282	37
AS COND 100	1020	750	1950	405	935	670	940	690	940	40	130	275	287	37
AS COND 150	1440	1020	2340	405	1070	940	1360	760	1360	40	150	435	450	40
AS COND 175	1440	1020	2340	405	1070	940	1360	760	1360	40	150	440	455	40
AS COND 200	1440	1020	2340	405	1070	940	1360	760	1360	40	150	445	460	40
AS COND 250	1790	1020	2340	405	1130	940	1710	760	1710	40	200	570	590	46
AS COND 300	1790	1020	2340	405	1130	940	1710	760	1710	40	200	580	600	46
AS COND 425	2300	1340	2660	405	1220	1260	2220	930	2220	40	250	885	905	67
AS COND 500	2300	1340	2660	405	1220	1260	2220	930	2220	40	250	905	925	67
AS COND 600 (1)	2300	1500	2840	445	1400	1420	2220	1070	2220	40	250	1015	1035	70

*complete with burner and gas ramp

NOTA 1: The X 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 COND 600" and variants

The warm air heaters X 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. XO and XEO 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.

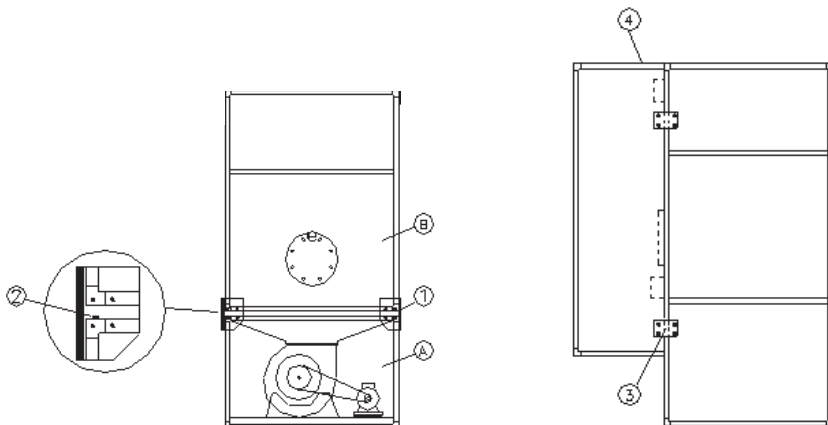


The warm air heater is supplied with screws, plates, brackets and self-adhesive gaskets for the versions XO e XEO.

ASSEMBLY OF THE BURNER PROTECTION CABIN FOR "AS COND EX 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 Ø 5 mm);
- screw the brackets with the supplied screws.



FIXING THE HEAD FOR DIRECT AIR DISTRIBUTION ON THE WARM AIR HEATERS AS COND 300-425-500- 600 series

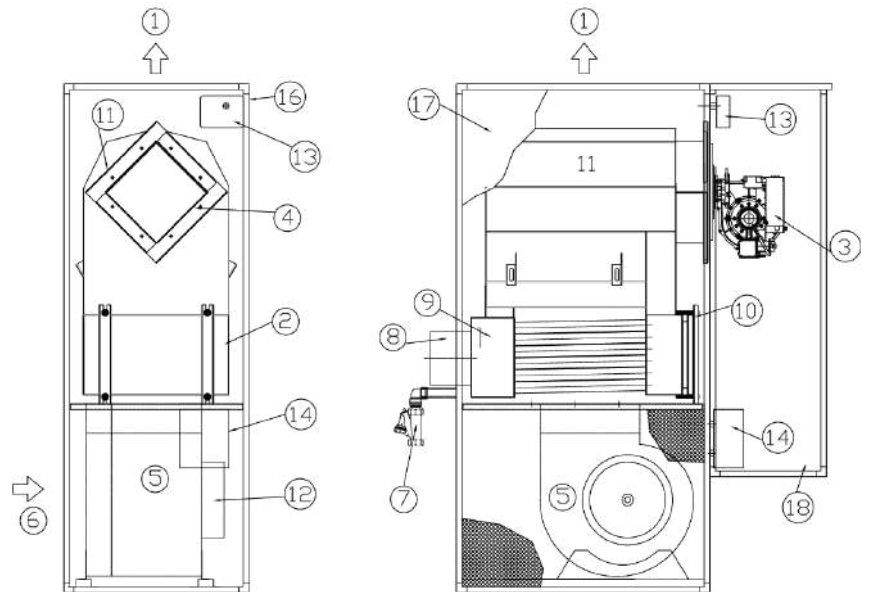
- Place the head for direct air distribution on the warm air heater
- Position the 4 brackets supplied (as shown in the photo).
- Screw the 16 self-drilling screws 6.3x16 supplied both on the profile of the warm air heater and on the profile of the head



COMPOSITION OF WARM AIR HEATER "AS COND EX" VERSION

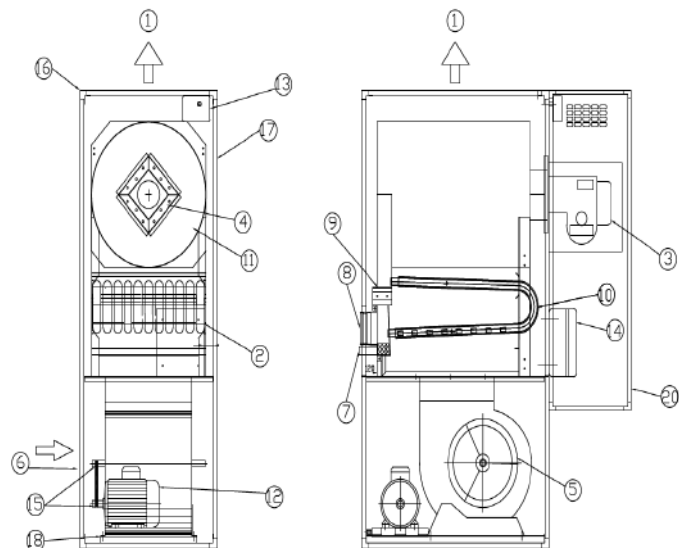
Models "50" and "65" with single-phase motor and direct driven fan

- 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



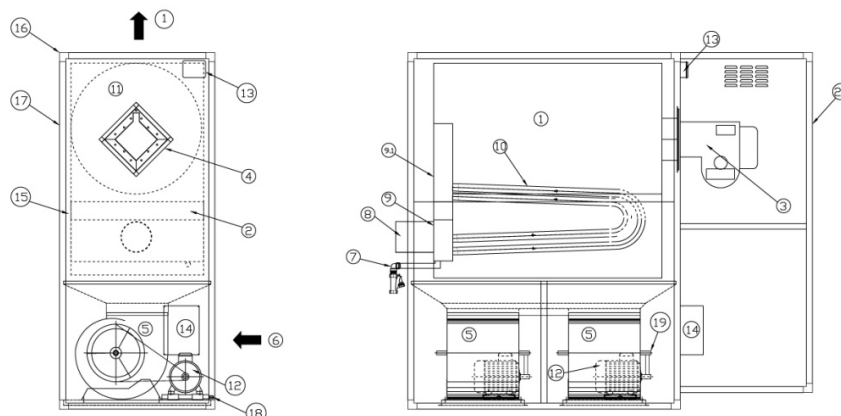
Models from "AS COND EX 80" to "AS COND EX 200" with three-phase motor and transmission driven fan

- 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
- 20) Burner cabin protecting burner and electric components



Models "AS COND EX 250", "AS COND EX 300" with three-phase- motor and transmission driven fan

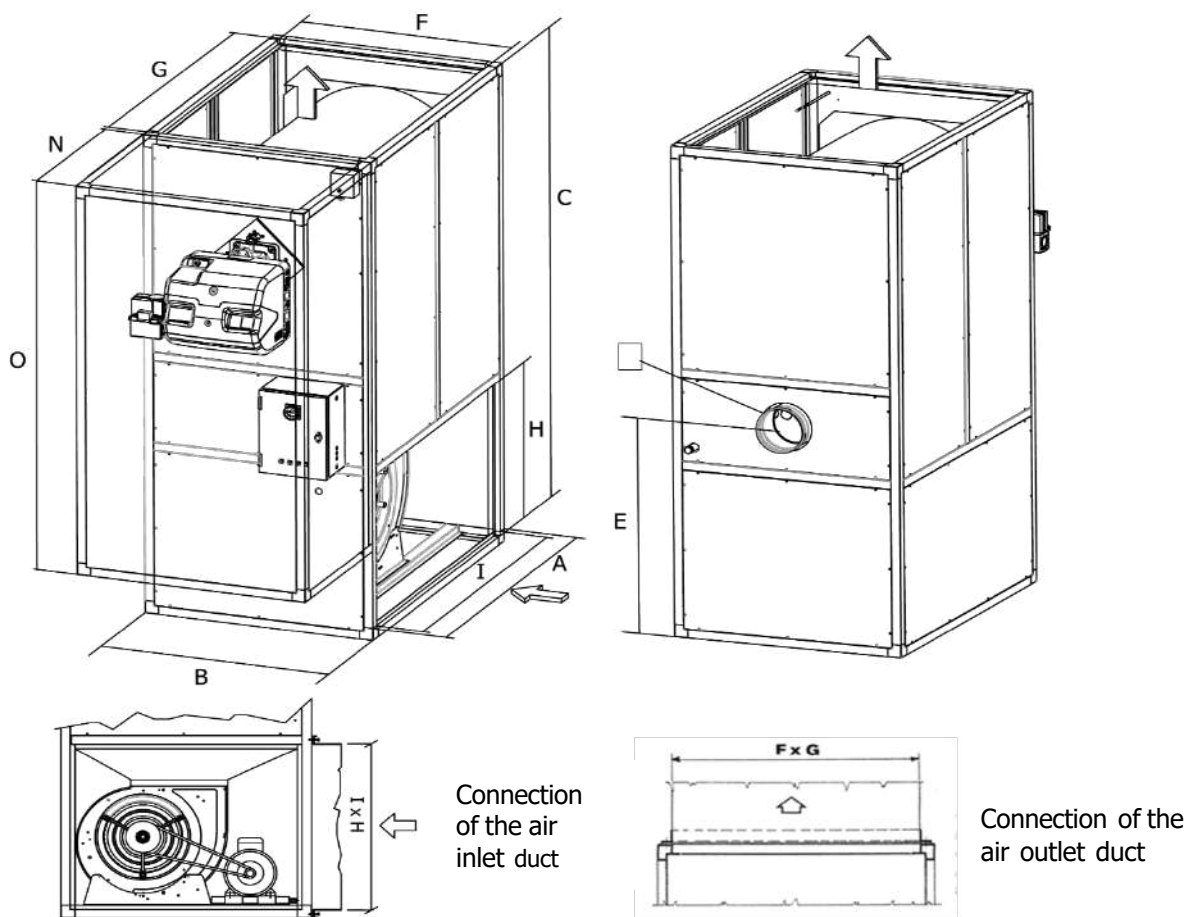
- 1) Air outlet
- 2) Rear smoke box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain with siphon
- 8) Smoke exhaust connection
- 9) Rear smoke box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Tri-thermostat
- 14) Electrical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



**Warm air heater XE for outdoor
Installations in vertical version**

WEIGHTS and DIMENSIONS "AS COND EX" SERIES

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



The air inlet grille is on the LEFT till model XE200 and on the RIGHT from model XE250 up to model XE600.
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 (*)	
	Lenght	Width	Height						Depth	Height		Net	Packed
	A	B	C		E	F	G	H	I	N		O	Ø
AS COND EX 50	870	636	1750	860	596	830	630	830	400	1100	100	187	197
AS COND EX 65	870	636	1750	860	596	830	630	830	400	1100	100	192	202
AS COND EX 80	1020	750	1950	935	670	940	690	940	400	1220	130	295	307
AS COND EX 100	1020	750	1950	935	670	940	690	940	400	1220	130	300	312
AS COND EX 150	1440	1020	2340	1070	940	1360	760	1360	600	1700	150	479	494
AS COND EX 175	1440	1020	2340	1070	940	1360	760	1360	600	1700	150	484	499
AS COND EX 200	1440	1020	2340	1070	940	1360	760	1360	600	1700	150	489	504
AS COND EX 250	1790	1020	2340	1130	940	1710	760	1710	800	2170	200	615	635
AS COND EX 300	1790	1020	2340	1130	940	1710	760	1710	800	2170	200	625	645
AS COND EX 425	2300	1340	2660	1220	1260	2220	930	2220	900	2500	250	970	985
AS COND EX 500	2300	1340	2660	1220	1260	2220	930	2220	900	2500	250	990	1005
AS COND EX 600(1)	2300	1500	2840	1400	1420	2220	1070	2220	900	2680	250	1120	1140

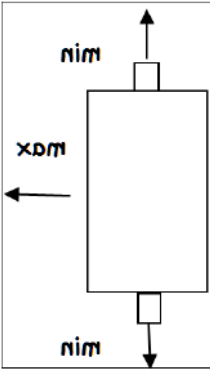
(*) complete with burner and gas train

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

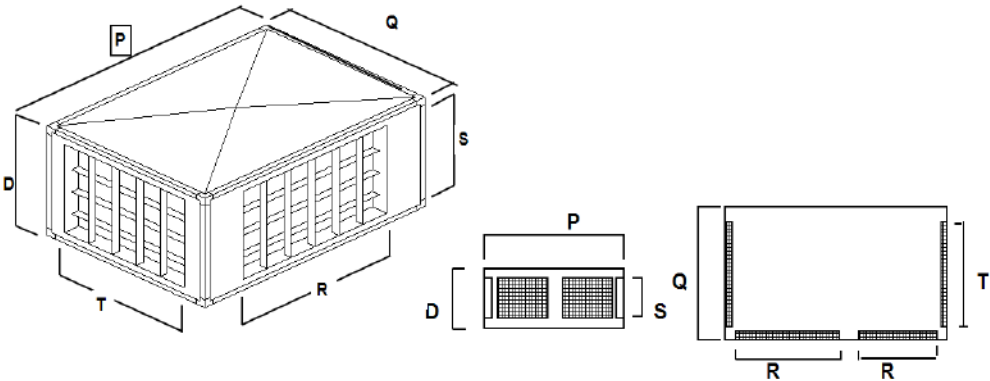
STANDARD HEAD FOR DIRECT AIR DISTRIBUTION WARM AIR HEATERS OF THE "AS COND EX "

Air blown and dimensions in mm with horizontal and vertical 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
50	825	591	305	300	300	200	1+1+1	16	16
65	825	591	305	300	300	200	1+1+1	16	16
80	935	665	405	550	550	300	1+1+1	34	34
100	935	665	405	550	550	300	1+1+1	38	38
150	1355	935	405	750	750	300	1+1+1	55	55
175	1355	935	405	750	750	300	1+1+1	60	60
200	1355	935	405	750	750	300	1+1+1	63	63
250	1355	935	405	750	750	300	1+2+1	74	60
300	1355	935	405	750	750	300	1+2+1	80	62
425	2215	1255	405	650	750	300	1+3+1	90	69
500	2215	1255	405	650	750	300	1+3+1	94	72
600	2215	1415	405	650	750	300	1+3+1	102	84

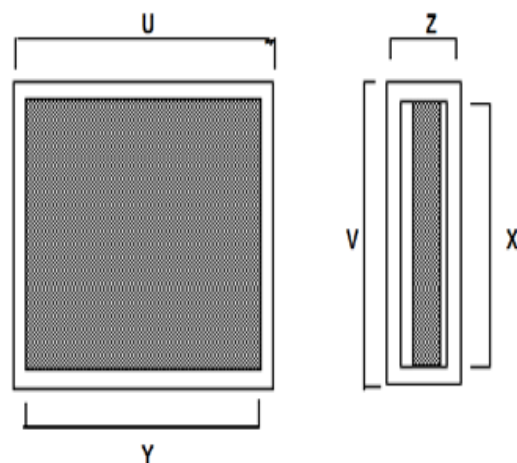


- 1) Short side (Q) + long side (P) + short side (Q).
- 2) The final speed of the blown air is 0.15 m/sec, and the nozzle fins' deflection is 0°. If deflection = 30°, multiply the blown air value by 0.65.



FILTER BOXES ON AIR INLET DELIVERY WARM AIR HEATERS OF THE "AS COND " **and "AS COND EX " SERIES**

MOD.	U mm	V mm	Z mm	Y mm	X mm	Filters (1) [mm]	Pressure drop (2)
AS COND 50	870	640	60	820	595	1x640x810x48	70
XE50	870	640	60	820	595	2x500x400x48	70
AS COND 80	980	700	60	940	630	1x910x695x48	88
AS COND EX 80	1020	780	60	980	740	1x625x500x48	88
AS COND 100	980	700	60	940	630	1x625x400x48 1x910x695x48	110
AS COND EX 100	1020	780	60	980	740	1x625x500x48	110
AS COND 150	1440	840	200	1400	800	1x625x400x48 4x625x400x98	68
AS COND EX 150	1440	840	200	1400	800	2x625x500x98	62
AS COND 175	1440	840	200	1400	800	1x625x400x98 4x625x400x98	85
AS COND EX 175	1440	840	200	1400	800	2x625x500x98 1x625x400x98	75
AS COND 200	1440	840	200	1400	800	4x625x400x98	105
AS COND EX 200	1440	840	200	1400	800	2x625x500x98 1x625x400x98	85
AS COND 250	1790	840	200	1750	800	2x625x400x98 4x500x400x98	85
AS COND EX 250	1790	840	200	1750	800	3x625x400x98 1x625x500x98	85
AS COND 300	1790	840	200	1750	800	2x625x400x98 4x500x400x98	105
AS COND EX 300	1790	840	200	1750	800	3x625x400x98 1x625x500x98	105
AS COND 425	2300	1010	200	2260	970	8x500x500x98	90
AS COND EX 425	2300	1010	200	2260	970	4x625x400x98 4x500x400x98	100
AS COND 500	2300	1010	200	2260	970	8x500x500x98	100
AS COND EX 500	2300	1010	200	2260	970	4x625x400x98 4x500x400x98	128
AS COND 600	2300	1010	200	2260	970	8x500x500x98	123
AS COND 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)

DATA SHEET WARM AIR HEATER series "AS COND" "AS COND EX"

THERMAL PERFORMANCE	Mod.	50	65	80	100	150	175	200	250	300
Rated heat input, Qnom	kW	61,1	76	98,5	122	179	203	238	270	313
Rated heat output, Pn	kW	59,8	73,0	96,3	116,6	178,6	201,8	234,2	269	310
Thermal efficiency at rated heat input, Pn	%	97,9	96,1	97,8	95,6	99,8	99,4	98,4	99,3	98,7
Heat input at 50% of the rated heat input	kW	30,55	38	49,25	61	89,5	101,5	119	162	187,8
Heat rating at 50% of the rated heat input	kW	31,8	39,0	51,6	62,1	93,8	106,0	123,6	167,3	191,3
Thermal efficiency at 50% of the rated heat input	%	104,2	102,6	104,9	101,8	104,8	104,5	103,9	103,3	101,8
Minimum heat input Qmin	kW	22	22	31	31	53	53	53	88	102
Heat rating at Qmin	kW	23,3	23,3	33,4	33,4	56,65	56,65	56,65	94,51	109
Thermal efficiency at minimum heat input Qmin	%	106	106	107,8	107,8	106,9	106,9	106,9	107,4	106,9
Backpressure in the combustion chamber, with G20 at Qn	mbar	4,3	7,5	3,4	5,1	3,9	5,2	6,2	4	4,8
Backpressure in the combustion chamber, with G30 at Qn	mbar	4	7,4	3,1	4,7	3,7	5	5,9	3,8	4,6
Condensate produced when the room temperature is 20°C	l/h	2,15	2,15	4,06	4,06	4,5	4,5	4,5	5,52	5,2
AERAULIC PERFORMANCE										
Air flow rate at 18 °C	mc/h	4700	6100	7560	9200	13000	15800	18000	20800	24000
Useful static pressure	Pa	150	150	150	150	200	200	200	200	200
DELTA T AIR at PN °C	°C	37,4	35,1	37,2	37,2	40,4	37,6	38,3	37,1	37
MAX GAS CONSUMPTION AT 15°C-1013 mbar										
METHANE G20 at 20 mbar	mc/h	6,47	8,04	10,42	12,91	18,94	21,48	25,19	28,57	33,12
NAT. GAS G25 at 25 mbar	mc/h	7,52	9,4	12,1	15,0	22,0	25,0	29,3	33,24	38,53
PROPANE G31 at 37 mbar	Kg/h	4,75	5,90	7,65	9,48	13,91	15,77	18,49	20,98	24,32
BUTANE G30 at 28 mbar	Kg/h	4,82	5,99	7,77	9,62	14,12	16,01	18,77	21,29	24,68
CO2 at Qn with G20 (tolerance ± 0.2)	%	8,7	8,9	8,9	8,9	8,8	8,7	8,7	8,3	8,3
CO2 at Qn with G31 (tolerance ± 0.2)	%	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10	10
NOx (≤50 Mg/kWh)	CL	Classe 5								
ELECTRICAL DATA										
Fan motor capacity	kW x n.	0,736	0,736	1,5	2,2	3	4	5,5	3x2	4 x 2
Fan motor supply voltage	V-Ph-Hz	230 V - 1 - 50			400 V - 3+N - 50					
Fan motor absorption	A	7,7	7,7	3,6	5,1	7	9,2	12	7 x 2	9,2 x 2
Fan motor absorption/voltage 3F 230V 50Hz	A			6,2	9,3	12	15	20	12 x 2	15 x 2
Sound pressure (at 5 m)	dB(A)	70	72	72	73	71	73	74	74	75
Protection degree of "XE" "XEO" "XR" versions	IP	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D
ELECTRICAL DATA, WITH USEFUL PRESSURE = 300 Pa										
Fan motor capacity	kW	1,1	1,5	2,2	3	4	5,5	7,5	3 x 2	5,5 x 2
Fan motor supply voltage	V-Ph-Hz	400 V - 3+N - 50								
Fan motor absorption/voltage 3F 400V 50Hz	A	2,9	3,6	5,1	7	9,2	12	17,8	7 x 2	9,2 x 2
Fan motor absorption/voltage 3F 230V 50Hz	A	4,8	6,2	9,3	12	15	20	31	12 x 2	15 x 2
Flue connection/combustion air intake	Ø	100/100		130/130		150/150			200/200	
GAS CATEGORY		is the gas category of the burner								
Type of appliance, based on exhaust devices/combustion air intake	type	B23 – C13 – C33 – C53								
Warm air heaters can be used together with RIELLO burner	RIELLO	RX80 S/PV	RX80 S/PV	RX100 S/PV	RX120 S/PV	RX250 S/PV	RX250 S/PV	RX250 S/PV	RX360 S/PV	RX360 S/PV
Warm air heaters can be used together with BALTUR burner	BALTUR	BPM 90	BPM 90	BPM 140	BPM 140	BPM 200	BPM 200	BPM 300	BPM 350	BPM 450
Warm air heaters can be used together with RIELLO burner for GPL - G31	RIELLO					RX250 S/PV + pilot Cod. 20127 965	RX250 S/PV + pilot Cod. 20127 965	RX250 S/PV + pilot Cod. 20127 965	RX360 S/PV + pilot Cod. 20127 965	RX360 S/PV + pilot Cod. 20127 965

DATA SHEET WARM AIR HEATER series: "AS COND" "AS COND EX"

THERMAL PERFORMANCE	Mod.	X425	X500	X600
Rated heat input, Qnom	kW	425	500	600
Rated heat output, Pn	kW	428,4	495,5	592,8
Thermal efficiency at rated heat input, Pn	%	100,8	99,1	98,8
Heat input at 50% of the rated heat input	kW	128	150	180
Heat rating at 50% of the rated heat input	kW	137,7	159,0	189,5
Thermal efficiency at 50% of the rated heat input	%	107,6	106,0	105,3
Minimum heat input Qmin	mbar	4,9	6,1	7,9
Heat rating at Qmin	mbar	4,6	5,8	7,6
Thermal efficiency at minimum heat input Qmin	Lt/h	14,8	13	14,4
AERAULIC PERFORMANCE				
Air flow rate at 18 °C	mc/h	32.500	38.300	41.000
Useful static pressure	Pa	200	200	160
DELTA T AIR at PN °C	°C	37,2	37,5	36,8
MAX GAS CONSUMPTION AT 15°C-1013 mbar				
METHANE G20 at 20 mbar	mc/h	44,97	52,9	63,5
NAT. GAS G25 at 25 mbar	mc/h	52,3	61,5	73,8
PROPANE G31 at 37 mbar	Kg/h	32,8	38,6	46,3
BUTANE G30 at 28 mbar	Kg/h	33,5	39,4	47,3
CO2 at Qn with G20 (tolerance ± 0.2)	%	8,8	8,8	8,7
CO2 at Qn with G31 (tolerance ± 0.2)	%	10,5	10,5	10,5
NOx (≤50 Mg/kWh)	mg/kWh GCV	43	38,2	44,5
ELECTRICAL DATA				
Fan motor capacity	KW x n.	4x2	5,5x2	5,5x2
Fan motor supply voltage	V-Ph-Hz	400V-3+N-50		
Fan motor absorption	A	8,3x2	11,3x2	11,3x2
Fan motor absorption/voltage 3F 230V 50Hz	A	14,4x2	19,6x2	19,6x2
Sound pressure (at 5 m)	dB(A)	74	75	75
Protection degree of "XE" "XEO" "XR" versions	IP	X5D	X5D	X5D
ELECTRICAL DATA, WITH USEFUL PRESSURE = 300 Pa				
Fan motor capacity	kW	5,5x2	7,5x2	7,5x2
Fan motor supply voltage	V-Ph-Hz	400V-3+N-50		
Fan motor absorption/voltage 3F 400V 50Hz	A	11,3x2	15x2	15x2
Fan motor absorption/voltage 3F 230V 50Hz	A	19,6x2	26,3x2	26,3x2
Flue connection/combustion air intake	Ø	250		
GAS CATEGORY		is the gas category of the burner		
Type of appliance, based on exhaust devices/combustion air intake	tipo	B23		
Warm air heaters can be used together with RIELLO burner	RIELLO	RX500 S/PV	RX700 S/PV	RX700S/PV; RX850S/PV
Warm air heaters can be used together with BALTUR burner	BALTUR	BPM 500	BPM 650	BPM 800
Warm air heaters can be used together with RIELLO burner for GPL - G31	RIELLO	RX500S/PV + pilot Cod. 20127965	RX700S/PV + pilot Cod. 20127965	RX700S/PV + pilot Cod. 20127965

ECODESIGN

ECODESIGN: DIRECTIVE 2009/125/EC ErP REGULATION 2016/2281/EC

INFORMATION REQUIREMENTS FOR WARM AIR HEATERS SERIES AS COND - AS COND EX

Warm air heater type and corresponding variation as above	symbol	unit	X50		X65		X80		X100		X150		X175	
			1	2	1	2	1	2	1	2	1	2	1	2
1) installed in heated area; 2) not installed in heated area			no	no	no	no	no	no	no	no	no	no	no	no
B1 warm air heater	yes/no		no	no	no	no	no	no	no	no	no	no	no	no
C2 warm air heater	yes/no		no	no	no	no	no	no	no	no	no	no	no	no
C4 warm air heater	yes/no		no	no	no	no	no	no	no	no	no	no	no	no
Type of fuel	gas/liquid		gas	gas	gas	gas	gas	gas	gas	gas	gas	gas	gas	gas
Rated heating capacity	P rated,h	kW	59,8	59,8	73	73	96,3	96,3	116,6	116,6	178,6	178,6	201,8	201,8
Minimum capacity	P min	kW	23,3	23,3	23,3	23,3	33,4	33,4	33,4	33,4	56,7	56,7	56,7	56,7
Electric power consumption at rated heating capacity	el max	Kw	0,100	0,100	0,120	0,120	0,140	0,140	0,200	0,200	0,150	0,150	0,200	0,200
Electric power consumption at minimal capacity	el min	Kw	0,020	0,020	0,020	0,020	0,020	0,020	0,020	0,020	0,020	0,020	0,020	0,020
Electric power consumption in standby mode	el sb	Kw	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005
Usefull efficiency at rated heating capacity	η nom	%	88,1	88,1	86,4	86,4	88,0	88,0	86,0	86,0	89,8	89,8	89,5	89,5
Usefull efficiency at minimum capacity	η pl	%	95,3	95,3	95,3	95,3	97,0	97,0	97,0	97,0	96,3	96,3	96,3	96,3
Envelope loss factor	Fenv	%	0	0	0	0	0	0	0	0	0	0	0	0
Ignition burner power consumption	Pign	Kw	0	0	0	0	0	0	0	0	0	0	0	0
Emission of nitrogen oxides by Hs (GCV)	NOx	mg/kWh(a)	15	15	20	20	38	38	47	47	44	44	41	41
Emission efficiency	ηs flow	%	94,1	94,1	95,1	95,1	94,5	94,5	95,2	95,2	94,5	94,5	95,2	95,2
Seasonal space heating energy efficiency	ηs	%	88,0	87,1	89,2	88,3	90,1	89,1	90,7	89,8	89,9	89,0	90,7	89,8
Premixed gas modulating burner RIELLO	TYPE		RX80S/PV				RX100S/PV		RX120S/PV		RX250S/PV		RX250S/PV	
Premixed gas modulating burner BALTUR	TYPE		BPM 90				BPM 140				BPM 200			
Warm air heater type and corresponding variation as above	symbol	unit	X200		X250		X300		X425		X500		X600	
1) installed in heated area; 2) not installed in heated area			1	2	1	2	1	2	1	2	1	2	1	2
B1 warm air heater	yes/no		no	no	no	no	no	no	no	no	no	no	no	no
C2 warm air heater	yes/no		no	no	no	no	no	no	no	no	no	no	no	no
C4 warm air heater	yes/no		no	no	no	no	no	no	no	no	no	no	no	no
Type of fuel	gas/liquid		gas	gas	gas	gas	gas	gas	gas	gas	gas	gas	gas	gas
Rated heating capacity	P rated,h	kW	234,2	234,2	269,0	269,0	310,0	310,0	428,4	428,4	495,5	495,5	592,8	592,8
Minimum capacity	P min	kW	56,7	56,7	94,5	94,5	109	109	137,7	137,7	159	159	189,5	189,5
Electric power consumption at rated heating capacity	el max	Kw	0,360	0,360	0,150	0,150	0,300	0,300	0,6	0,6	0,7	0,7	0,7	0,7
Electric power consumption at minimal capacity	el min	Kw	0,020	0,020	0,020	0,020	0,020	0,020	0,06	0,06	0,08	0,08	0,08	0,08
Electric power consumption in standby mode	el sb	Kw	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005
Usefull efficiency at rated heating capacity	η nom	%	88,6	88,6	89,7	89,7	89,1	89,1	90,7	90,7	89,2	89,2	88,9	88,9
Usefull efficiency at minimum capacity	η pl	%	96,3	96,3	96,6	96,6	96,2	96,2	96,8	96,8	95,4	95,4	94,8	94,8
Envelope loss factor	Fenv	%	0	0	0	0	0	0	0	0	0	0	0	0
Ignition burner power consumption	Pign	Kw	0	0	0	0	0	0	0	0	0	0	0	0
Emission of nitrogen oxides by Hs (GCV)	NOx	mg/kWh(a)	44	44	36	36	29	29	43	43	38,2	38,2	44,55	44,5
Emission efficiency	ηs flow	%	95,6	95,6	94,4	94,4	94,4	94,4	94,7	94,7	94,8	94,8	94,2	94,2
Seasonal space heating energy efficiency	ηs	%	90,9	89,9	89,9	89,0	89,4	88,5	90,6	89,7	89,4	88,4	88,3	87,3
Premixed gas modulating burner RIELLO	TYPE		RX250S/PV				RX360S/PV				RX700S/PV			
Premixed gas modulating burner BALTUR	TYPE		BPM 300		BPM 350		BPM 450		BPM 500		BPM 650		BPM 800	

a) con bruciatori RX.....

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.



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.



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.

MODULATION REGULATOR CAREL TYPE CLIMA

(read his instructions supplied with the heater)

The burner, of modulating type, is controlled (during flame modulation phases) by the ambient terminal device type "Clima", supplied with the heater, with an air sensor NTC in it.

The "Clima" is to be installed in the room to be heated.



Fig. CAREL CLIMA Regulator

The "Clima" device operates on the burner as modulation control, room thermostat, clock thermostat.

To set the ambient temperature for the modulation read here down:

For example: when we set 20°C, the modulating starts on at 18°C and the burner will be turned off just when it will reach 20°C.

The burner will start anew at 19,5°C.

The regulator CLIMA is powered with 24V, so the electric board contains the transformer of 230V-24V. The regulator send a signal of 0- 10V for flame modulation.

The communication cable 0-10V between Clima and burner could have the max distance of 10 m with section 0,5 mm², or just max 30 mt with concealed cable with section 1,5 mm².



Is possible make a climatic setting from remote by a remote ambient temperature probe NTC (see Errore. L'origine riferimento non è stata trovata.) installed in the room to be heated.

In this case the "Clima" regulator can be installed also in a room other than the room to be heated.



NTC remote ambient temperature probe .

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 the warm air heater for a distance calculated according to M.D. 08-11-2019.

Distance of the warm air heater from walls

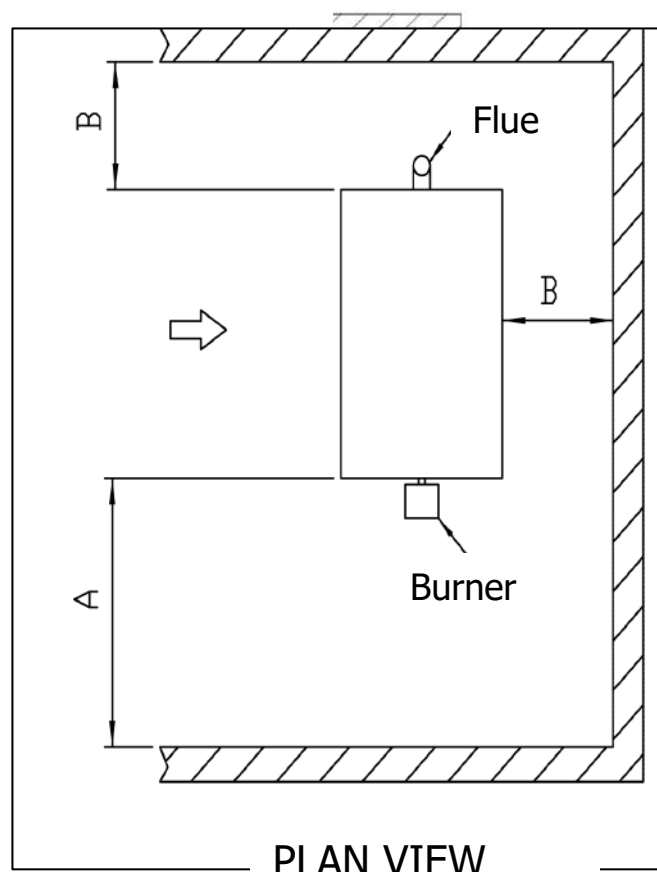
In order to calculate the minimum distances of the warm air heater from the walls and ceilings, you must refer to the Ministerial Decree 08-11-2019 and other legislative provisions in force.

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

MOD.	A	B
AS COND 50-65	800	600
AS COND 80-100	1000	600
AS COND 150-175-200	1300	600
AS COND 250-300	1300	600
AS COND 425-500	1700	600
AS COND 600	1700	600
AS COND EX 60	1700	600
AS COND EX 80-100	1400	600
AS COND EX 150-175-200	1300	600
AS COND EX 250-300	1300	600
AS COND EX 425-500	1700	600
AS COND 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.



PLAN VIEW
"AS COND - AS COND EX"

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 "XE", "XEO" and "XP" 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.

BURNER INSTALLATION

The warm air heater is supplied together with a modulating pre-mixed gas burner (series RX), complete with gas ramp, modulating kit and modulating air sensor: all these elements can form a complete heating unit. The burner is assembled, wired to the warm air heater and the tri-thermostat, adjusted and tested.

NOTE: For operation with LPG – G31, the RIELLO burners must also have the pilot gas train cod. 20127965 (see technical data on pages 23, 24 and 29, 30 and 52, 53).

Anyway, during the first start-up and periodical inspections, check that combustion parameters are the ones shown in the technical data table on Chapter **DATA SHEET**.

If the appliance has to be re-adjusted (for example if the burner is replaced), this operation must be performed by a qualified engineer, according to the instructions provided in the RX burner manual, delivered together with the heater.



NOTE: the CO value should range between 0 and 20 ppm

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 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 electrical connections already made with the exception of the general power supply and the CAREL "Clima" regulator which must be performed by the installer following the instructions given in the **ATTACHMENTS** Chapter of this manual. CAREL "Clima" regulator.



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 **50 - 65**;
- 400/3/50 for models from **80 to 600**.

When installing the CAREL "Clima" regulator, keep the following in mind:

- place the thermostat in the room heated by the warm air heater;
- avoid placing the room thermostat near heat sources or sunny areas;
- do not place it on external walls but rather on internal walls;
- avoid that the thermostat is directly hit by the jet of air coming out of the warm air heater.



If you install a clock, NEVER connect it in series to the general power line to prevent the clock from intervening on the warm air heater.

ALWAYS install the clock on the room thermostat line!

Connection of the flue gas exhaust to the chimney

Where local regulations do not allow it or in case you want to choose differently from what is reported in the following paragraph it is possible connect the warm air heater to a sized and built chimney

with certified materials and installed in compliance with national laws and standards e local authorities as well as respecting the environment.

The pipes of the connecting duct from the warm air heater to the chimney they must have a diameter greater than or equal to the smoke outlet on the warm air heater and all joints must be sealed.

Check when sizing the connection ducts / chimney system that the maximum pressure drop does not exceed 50 Pa.



Example of installation of flue gas exhaust and combustion air intake pipes

Smoke exhaust / combustion air intake



The X series warm air heaters are suitable for the following flue gas exhaust / combustion air intake configurations:

- from model 50 to model 300 and variants:
 - B23;
 - C13, C33, C53, (sealed type systems)
- from model 425 to model 600 and variants:
 - B23

We invite you to inform yourself about the regulations in force at national and local level on the subject to make sure that the outlet / intake system chosen is in compliance with the law.

Respect the installation diagrams contained in this manual.

The sum of the maximum pressure drop between the flue gas discharge and combustion air intake pipes (where present), terminals included, must not exceed 50 Pa.

For more information regarding duct joints, please contact the manufacturer or your supplier directly.

Below is the table of the pressure drops of the elements supplied by the manufacturer that make up the flue gas exhaust / combustion air intake system.

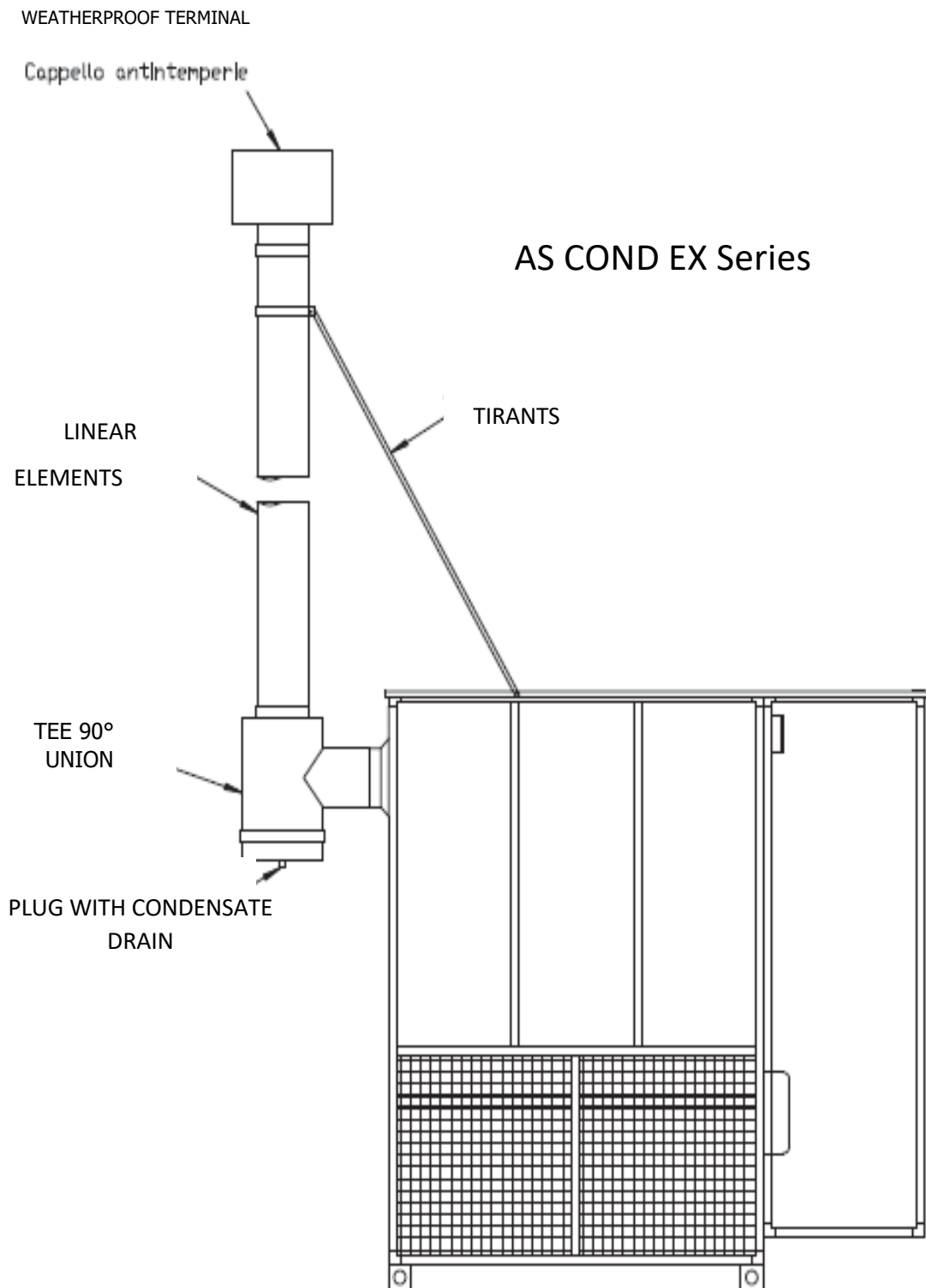
These pipes and elements (POCED) are made of smooth single-walled AISI 316 stainless steel, suitable for outdoor installation, certified according to EN 1856-1: 2009. On request we can also supply multi-wall elements.

The tightness of the junction between the elements is ensured by silicone gaskets and clamps.

In the case of warm air heaters installed outdoors (XE, XEO, XP series), the vertical terminal must be of the weatherproof type, to protect against rain, snow, leaves.

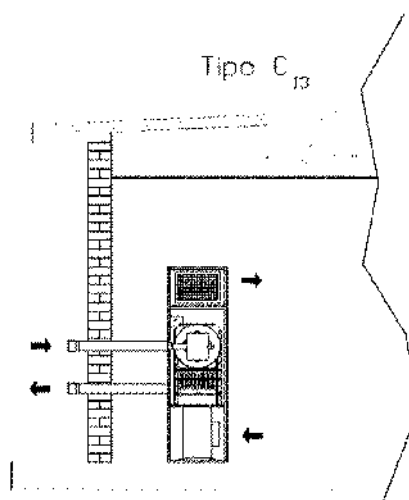
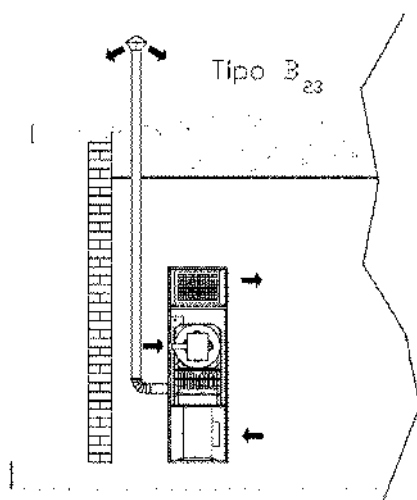
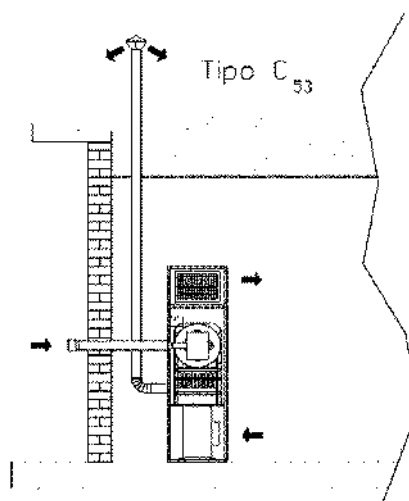
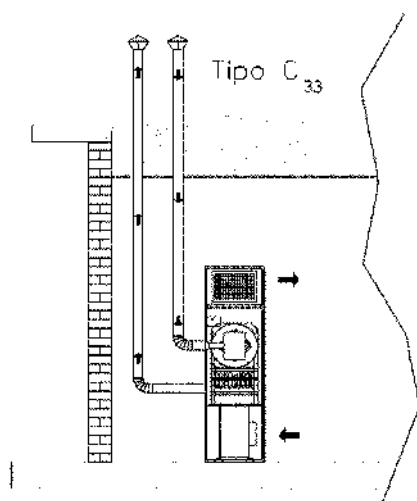
The length of the smoke outlet must be contained between 2 and 8 meters.

Below is an example of assembly of the elements

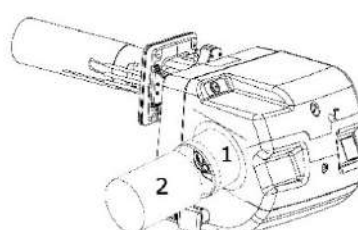


The manufacturer guarantees the machine performance if are used pipes and elements that are supplied by it, that can be find in the table at chapter **TABLE OF A2B ACCORRONI PIPES AND ELEMENTS FOR FLUE.** The installer can use other elements but they must be homologated and the pressure losses can't 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.



AS COND 50 / 100



AS COND 150 / 300

In Configuration **B23** in the X-XO-XR versions, it is possible to use the Collar (1) for the intake of combustion air in the room.

In Configuration **B23** of the X-XO-XR versions, the intake of combustion air in the environment occurs directly through the Collar (1).

In the **C** Configurations of the X-XO-XR versions, inside the Collar (1), the male pipe (2), which is the responsibility of the installer, must be inserted to suck the combustion air outside the served environment.

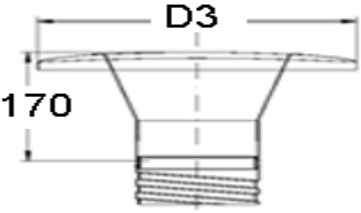
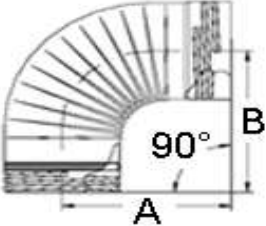
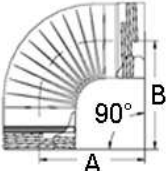
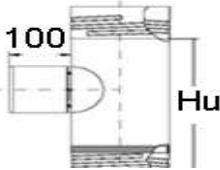
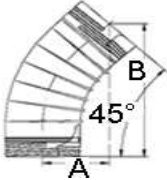
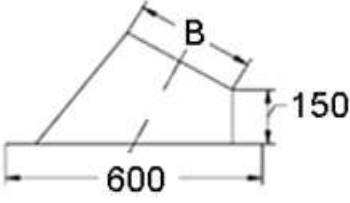
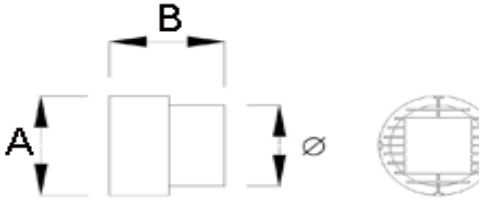
**TABLE OF PIPES AND ELEMENTS FOR FUME EXHAUST APPROVED (POCED)
AND RELATED PRESSURE DROP**

MODEL		50	65	80	100	150	175	200
Available pressure (Pa) for flue and combustion air intake		50	50	50	50	50	50	50
PIPES DESCRIPTION		Pressure drop in CMT pipe for length unit Pa/m (a)						
Rigid pipe Ø 100 mm -Length 1 m	Flue	2,7	4	6,5	9,8	-	-	-
	Combustion air intake	2	3	4,8	7,2	-	-	-
Rigid pipe Ø 130 mm -Length 1 m	Flue	0,8	1,1	1,8	2,7	5,4	6,2	9,1
	Combustion air intake	0,6	0,8	1,3	1,9	4,0	7,5	6,7
Rigid pipe Ø 150 mm -Length 1 m	Flue	0,4	0,6	1,0	1,5	2,9	3,0	4,9
	Combustion air intake	0,3	0,4	0,7	1,0	1,9	2,0	3,3
ELEMENTS DESCRIPTION		Pressure loss Pa/element						
90° moulded bend R/D=1.5 - Ø 100 mm	Flue	5,4	8,0	13,0	19,6	-	-	-
	Combustion air intake	4,0	6,0	9,6	14,4	-	-	-
90° moulded bend R/D=1.5 - Ø 130 mm	Flue	1,5	2,2	3,6	5,4	10,8	12,4	18,2
	Combustion air intake	1,1	1,6	2,6	3,9	8,0	15,0	13,4
90° moulded bend R/D=1.5 - Ø 150 mm	Flue	-	1,2	2,0	3,0	5,8	6,0	9,8
	Combustion air intake	-	0,8	1,3	1,9	3,9	4,0	6,6
45° moulded bend R/D=1.5 - Ø 100 mm	Flue	2,7	4,0	6,5	9,8	-	-	-
	Combustion air intake	2,0	3,0	4,8	7,2	-	-	-
45° moulded bend R/D=1.5 - Ø 130 mm	Flue	0,8	1,1	1,8	2,7	5,4	6,2	9,1
	Combustion air intake	0,6	0,8	1,3	1,9	4,0	7,5	6,7
45° moulded bend R/D=1.5 - Ø 150 mm	Flue	-	0,6	1,0	1,5	2,9	3,0	4,9
	Combustion air intake	-	0,4	0,7	1,0	1,9	2,0	3,3
"Chinese hat" terminal Ø 100	Flue	3,8	5,6	9,1	13,7	-	-	-
"Chinese hat" terminal Ø 130	Flue	1,1	1,6	2,5	3,8	7,6	8,7	12,7
"Chinese hat" terminal Ø 150	Flue	0,6	0,9	1,4	2,1	4,1	4,2	6,9
Weatherproof terminal Ø 100	Flue	4,7	7,0	11,4	17,2	-	-	-
Weatherproof terminal Ø 130	Flue	1,3	2,0	3,2	4,7	9,5	10,9	15,9
Weatherproof terminal Ø 150	Flue	0,7	1,1	1,8	2,6	5,1	5,3	8,6
TE90° union - Ø 100	Flue	8,1	12,0	19,5	29,4	-	-	-
TE90° union - Ø 130	Flue	2,3	3,4	5,4	8,1	16,2	18,6	27,3
TE90° union - Ø 150	Flue	1,26	1,83	3	4,5	8,7	9	14,7
TR terminal - Ø 100 mm	Flue	2,7	4,0	6,5	9,8	-	-	-
	Combustion air intake	2,0	3,0	4,8	7,2	-	-	-
TR terminal - Ø 130 mm	Flue	0,8	1,1	1,8	2,7	5,4	6,2	9,1
	Combustion air intake	0,6	0,8	1,3	1,9	4,0	7,5	6,7
TR terminal - Ø 150 mm	Flue	-	0,6	1,0	1,5	2,9	3,0	4,9
	Combustion air intake	-	0,4	0,7	1,0	1,9	2,0	3,3

**TABLE OF PIPES AND ELEMENTS FOR FUME EXHAUST APPROVED (POCED)
AND RELATED PRESSURE DROP**

MODEL		250	300	425	500	600	
Available pressure in Pa for exhaust fumes		50	50	50	50	50	
PIPES DESCRIPTION		Pressure drop in CMT pipe for length unit Pa/m (a)					
Rigid pipe Ø 200 mm -Length 1 m	Flue	2,5	3,4				
	Combustion air intake	1,7	2,3				
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	
	Combustion air intake	0.4	0.5				
PIPES DESCRIPTION (POCED)		Pressure loss Pa/element					
90° moulded bend R/D=1.5 - Ø 200 mm	Flue	5,0	6,8				
	Combustion air intake	3,4	4,6				
90° moulded bend R/D=1.5 - Ø 250 mm	Flue	-	-	5,2	6,8	10,4	
90° moulded bend R/D=1.5 - Ø 300 mm	Flue	1	0.7	2,8	3,6	5,6	
	Combustion air intake	0.7	0.5				
45° Moulded bend R/D=1,5 - Diam. 200mm	Flue	2,5	3,4				
	Combustion air intake	1,7	2,3				
45° Moulded bend R/D=1,5 - Diam. 250mm	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	
	Combustion air intake	0.4	0.5				
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				
Weatherproof terminal Ø 200 mm	Flue	2,9	3,9				
Weatherproof terminal Ø 250 mm	Flue			3	3,9	6,1	
Weatherproof terminal Ø 300 mm	Flue	0.6	0.8				
TEE90° union - Ø 200	Flue	3,8	5,1				
TEE90° union - Ø 250	Flue			3,9	5,1	8	
TEE90° union - Ø 300	Flue	0.8	1				
TR terminal dia 200	Flue	2,5	3,4				
	Combustion air intake	1,9	2,5				
TR terminal dia 300	Flue	0.5	0.7				
	Combustion air intake	0.4	0.5				

FLUE AND COMBUSTION AIR INTAKE ELEMENTS(POCED)

	DESCRIPTION	ELEMENT DIMENSIONS mm				
		D1	100	130	150	200
	"T6" CHINESE HAT	D3	240	320	320	400
	"T20" WEATHERPROOF TERMINAL	D3	240	320	320	400
	90° MOULDED BEND	A B	185 205	210 225	240 240	185 135
	90° T UNION	HU	275	275	445	440
	45° MOULDED BEND	A B	92 213	90 235	95 245	140 310
	5/30° ADJUSTABLE FLASHING ("T7")	B	110	140	160	210
	WINDPROOF WALL TERMINAL ("TR")	A B	120 150	160 150	170 150	220 150

Calculation of the combustion smoke weight

We propose the equation for calculating the combustion smoke weight based on the kW of methane burned:

$$X = 1,623 Y$$

X = combustion smoke weight (kg)

Y = kW burned

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 (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.

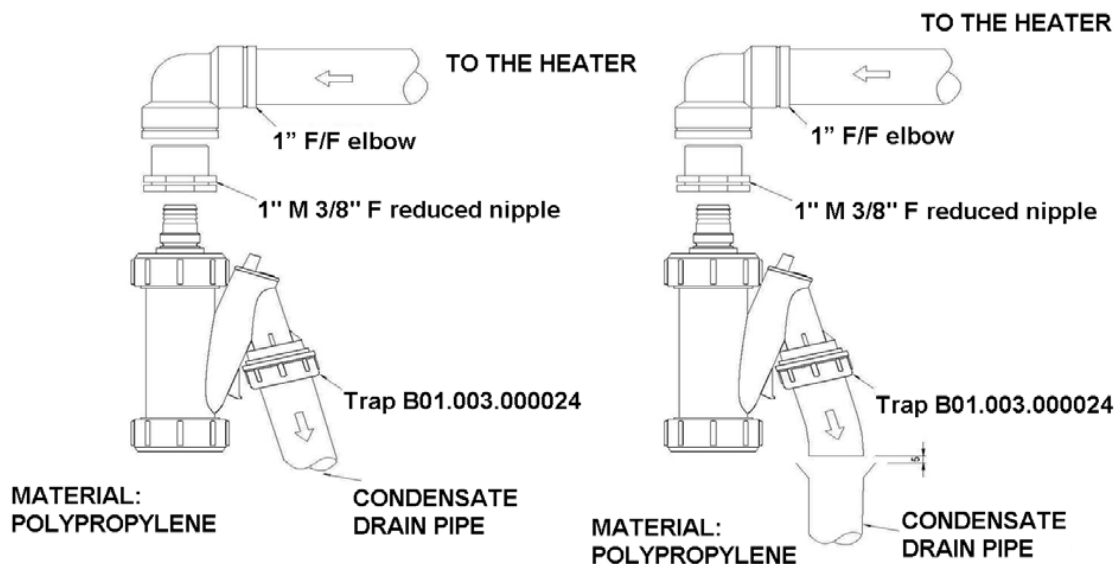


Fig.8 Trap with closed piping and trap with open piping

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** of this manual; 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.



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 performance of burner RX and make sure that the emissions of CO₂, CO and No_x do not exceed the pre-determined tolerances, as shown in the table on Chapter **DATA SHEET**. Consul the manual of the RX burner, delivered together with this warm air heater.
- 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.)
- Check motor absorption by means of ammeter and make sure it does not exceed the values specified on Chapter **DATA SHEET**.
- Check the performance of heater thermostats: FAN, LIMIT and LIMIT2 (see Chapter **TRI-THERMOSTAT**)
- Perform a combustion analysis
- 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.

Perform a combustion analysis.

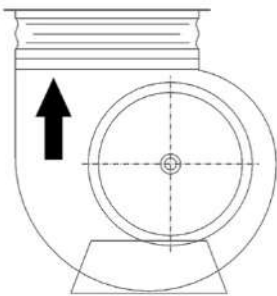
- 1) In the combustion analysis of the warm air heater, combined with a modulating burner, the combustion analysis must be done both at Q_{nom} (nominal heat input), and at Q_{min} (minimum heat input). The combustion, efficiency and hygiene values obtained, including those of NO_x , must be recorded at these two thermal flows.
- 2) To calculate NO_x in mg / kWh, according to EN 17082: 2019 point 6.8.2.2.2, proceed as follows:
 - Take the values of NO_x in mg / kWh at Q_{nom} (nominal heat input) and NO_x at Q_{min} (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_x calculated).

For the ErP Regulation 2016/2281 / EU, STEP II ° the NO_x value calculated 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 to the PCI (lower calorific value).

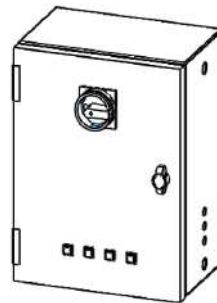
Any tolerances and uncertainties of measurement permitted by local authorities must be added to this value.

Territorial bodies can establish their own minimum energy performances and NO_x values other than those indicated in point 2.

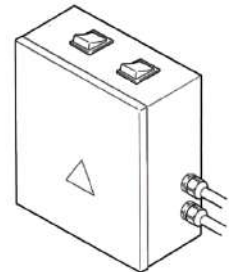
Draw up a plant or plant booklet for mandatory registrations according to laws, rules, regulations and prescriptions in force.



Direction of rotation of the fan(s)



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 XP models**, **EXCEPT** for installations such as **PRESSURE STATIC** structure, the fan is operated as described in paragraph FAN (TR).
- For installation of **XP 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.

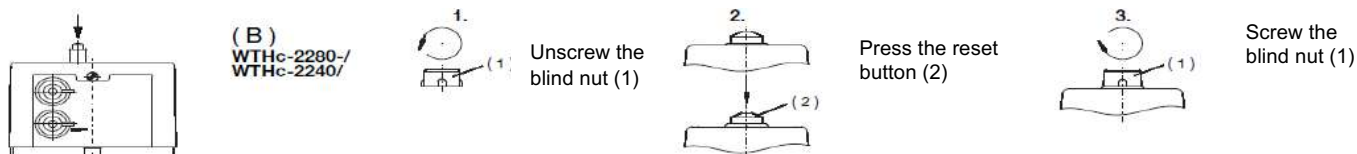
automatic stop the burner in case the average air outlet temperature overheat above the pre- set value imposed by the regulation.

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.

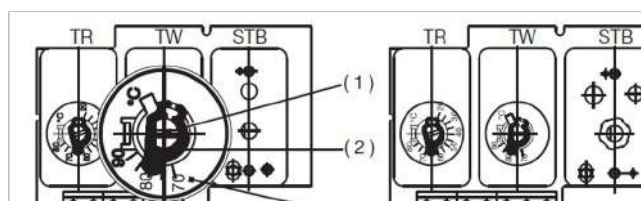
Its intervention stops the burner, while the fan keeps turning to cool the heat exchanger.

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. In types from XO-XEO400 up to XO-XEO620 a LIMIT, when intervening, stops both burners. The set point, fixed by the manufacturer inside the casing, is at 70°C; and can be increased maximum at 80°C. The LIMIT reset is automatic, when air outlet temperature drops of about 14°C, below his set point.



- (1) Setpoint spindle
(2) Setpoint marker
(3) Internal scale

- Remove housing cover and adjust setpoint spindle using a screwdriver.
- Put housing cover back on and tighten up the

- (1) Potentiomètre
(2) Repère de consigne
(3) Echelle interne

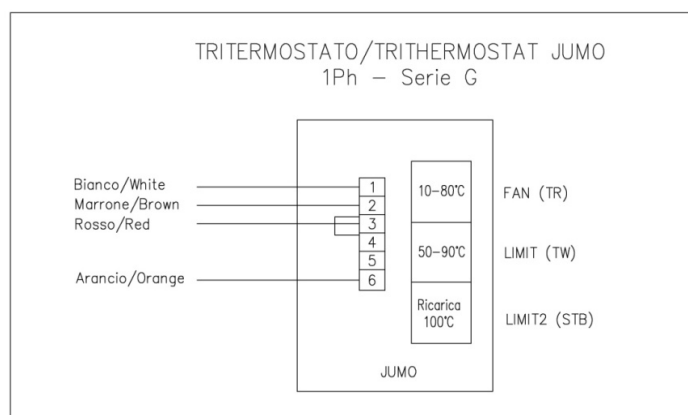
- Retirer le couvercle du boîtier et régler le potentiomètre à l'aide du tournevis.
- Replacer et visser le co

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

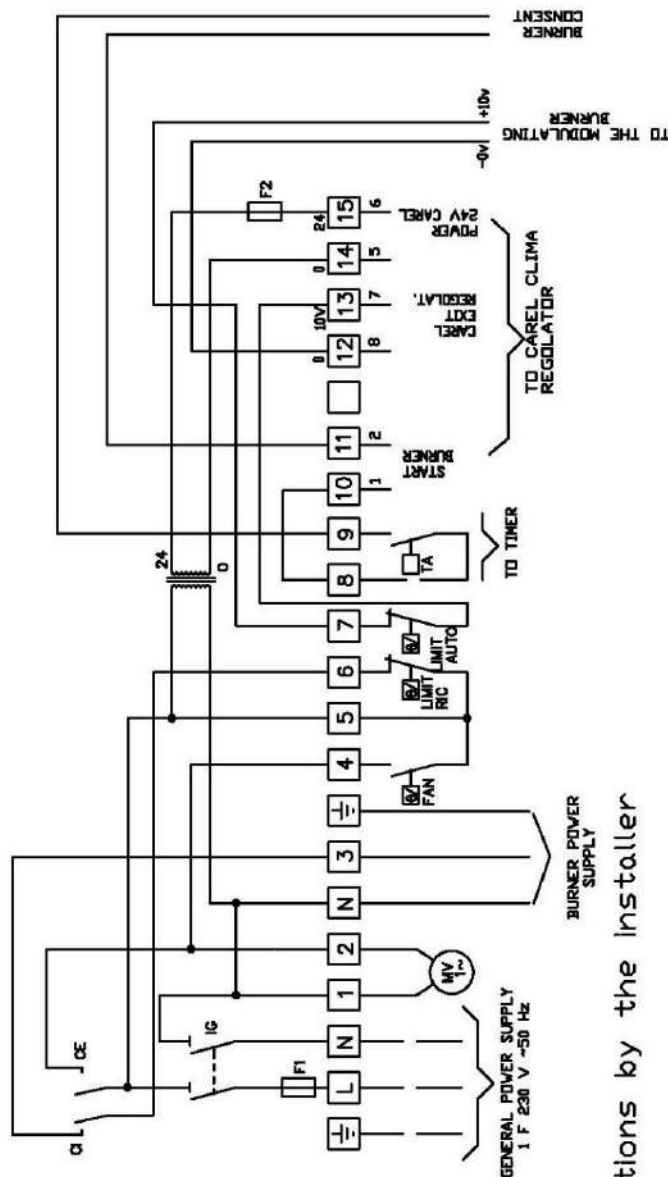
- **Low air flow rate, caused by obstructions and obstacles in the air exhaust/distribution system**
- **Clogged air filters (if installed)**
- **Heater stopped using the master switch or owing to a power failure during operation**
- **Closing fire dumper intervention**
- **Tri-thermostat sensors' sloping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



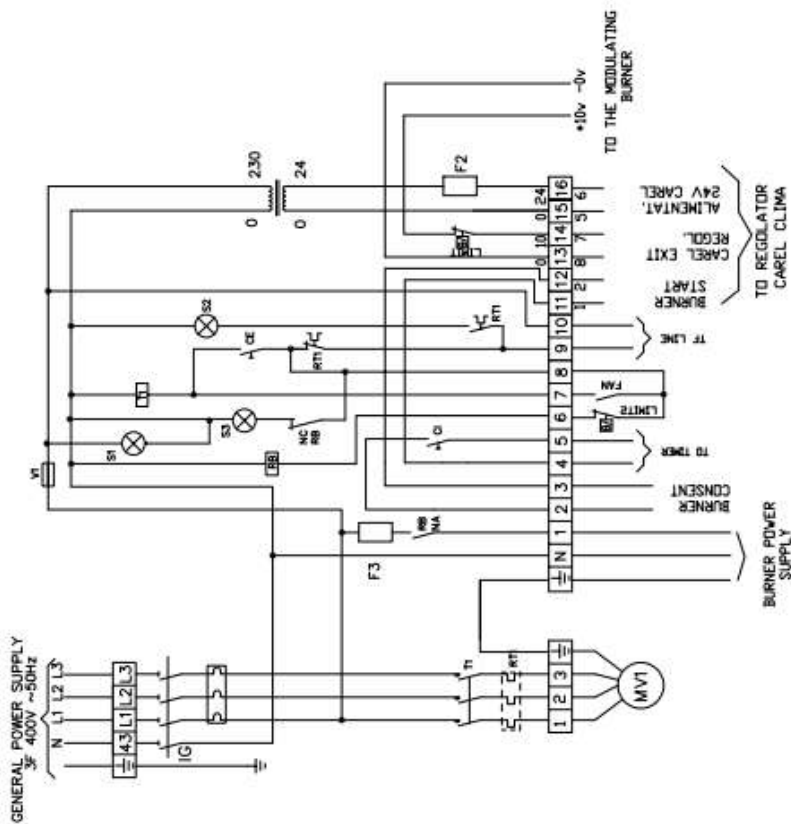
ELECTRICAL DIAGRAMS



---Connections by the installer

- IG =Master switch
- CE =Switchin VENTILATION position
- CI =Switchin HEATING position
- FAN =Automatic control thermostat of the fan
- LIMIT2 =Burner safety thermostat,with manual reset
- LIMIT =Max,thermostat of the burner,with automatic reset
- MV =Fan motor
- TA = Timer line or TA
- F1 =Line fuse (8A for X25and X35,16A for X50 andG X65)
- SB =Burner locking signal output
- h1 =burner operation counter output
- h2 =burner operation counter output-stage2
- TR = Transformer 230/24 V

Descrizione		Oggetto della modifica	
DIAGRAM OF X 50-65 WARM AIR HEATERS, AS CONDEX with CAREL REGULATOR		A) AGGIORNATO IN DATA 19-07-18 MR	
Verificato		Disegnato	
G. AUTOL		XB 0078-01	
16-04-2011		A	



IG =Master switch
 CE =Switchin VENTILATION position
 CI =Switchin HEATING position
 FAN =Automatic control thermostat of the fan
 LIMIT2 =Burner safety thermostat,with manual reset

MV1 =fan motor

S1 = Voltage signal lamp

S3 = Signal lamp operation of SAFETY LIMIT

V1 = Line fuse (3,15 A)

F2 = Fuse secondair du transformateur (150mA)

F3 = Fusible of burner

TF = Fire stop damper

TA = Timer line or TA

TR = Transformer 230/24 V

SB =Burner locking signal output

h1 =Burner operation counter output

h2 =burner peration counter output-stage2

RB = Control burner relay

T1 = Remote control switch for fan motor MV1

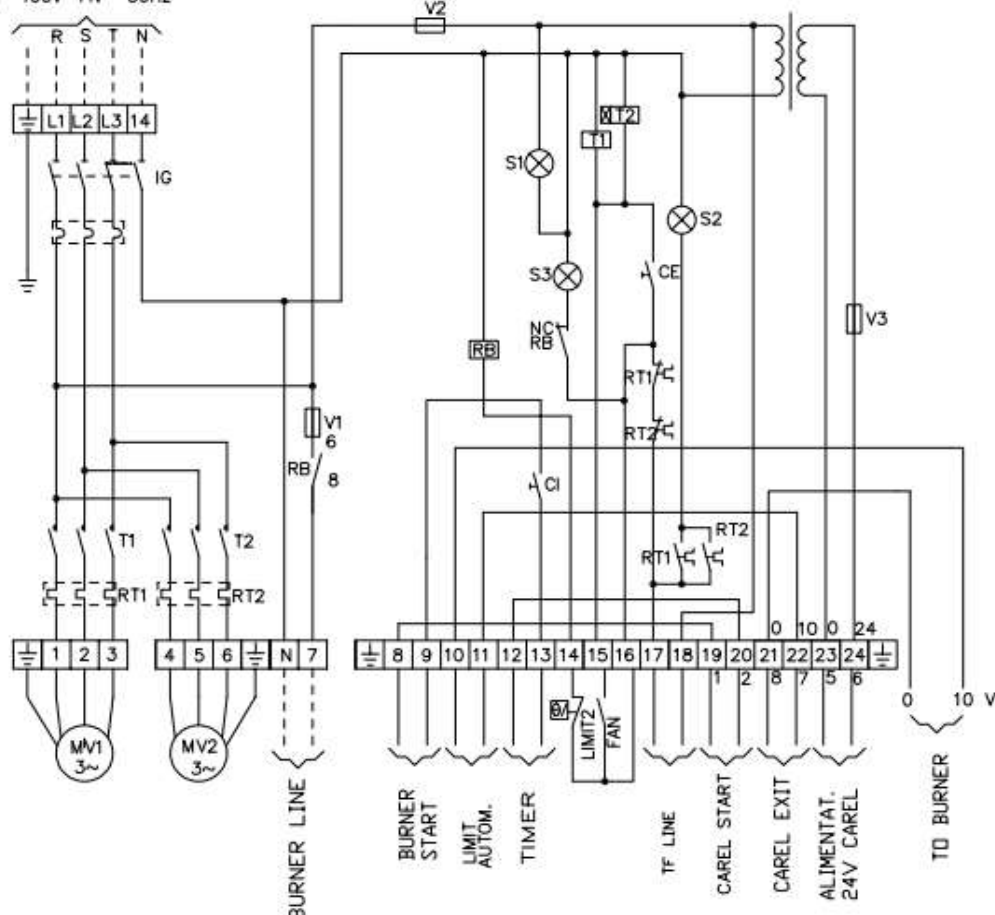
RT1 = Remote control switch thermal outout T1

In case of short-circuit or overload, the master switch (IG) disconnected automatically.
 To reset it turn the selch anticlockwise, and then clockwise.
 Before these operation, try to identify the reason for the problem.
 The operation of safety LIMIT2 what turns off the burner is signalled by lamp S3.
 To reset it push the resetting button of the limit2.

Description		Oggetto della modifica	
ELECTRIC DIAGRAM AS COND 80-100-150-175-200 WITH CAREL REGULATOR			
La C.N.T. s.p.a. si riserva il diritto di legge in proposito per eventuali modifiche tecniche e funzionali in futuro.			
Disegnato	Verificato	Scala	Modificato
MR			
18-07-18			
		XB 0080-02	

GENERAL POWER SUPPLY

3F 400V +N ~50Hz



IG =Master switch
 CE =Switch in VENTILATION position
 CI =Switch in HEATING position
 FAN =Automatic control thermostat of the fan
 LIMIT2 =Burner safety thermostat,with manual reset
 LIMIT =Max.thermostat of the burner,with automatic reset
 MV1 =Fan motor 1° FAN
 MV2 =Fan motor 2° FAN

S1 = Voltage signal lamp
 S2 = Signal lamp operation of remote control swiches thermal relays
 S3 = Signal lamp operation of SAFETY LIMIT2
 V1 = Line fuse (8 A) CERAMICO
 V2 = Line fuse (3,15 A)
 F2 = Fuse du transformateur
 F3 = Fusible of 24V line

TF = Fire stop damper
 TA = Timer line or TA
 TR = Transformer 230/24 V
 SB =Burner locking signal output
 h1 =burner operation counter output
 h2 =burner peration counter output-stage2

RB = Control burner relay

T1 = Remote control switch for fan motor MV1
 RT1 = Remote control switch thermal cutout T1
 T2 = Remote control switch for fan motor MV2
 RT2 = Remote control switch thermal cutout T2

R1 = Timer Fan start
 R2 = Timer Fan Off

In case of short-circuit or overload, the master swich (IG) disconnected automatically.
 To reset it turn the swich anticlockwise, and then clockwise.
 Before thise operation, try to identify the reason for the problem.
 The operation of safety LIMIT2 yhat turns off the burner is signalled by lamp S3.
 To reset it push the resetting button of the limit2

--- INSTALLER CONNECTION

ELECTRIC DIAGRAM AS COND EX 250

KIND OF MODIFICATION

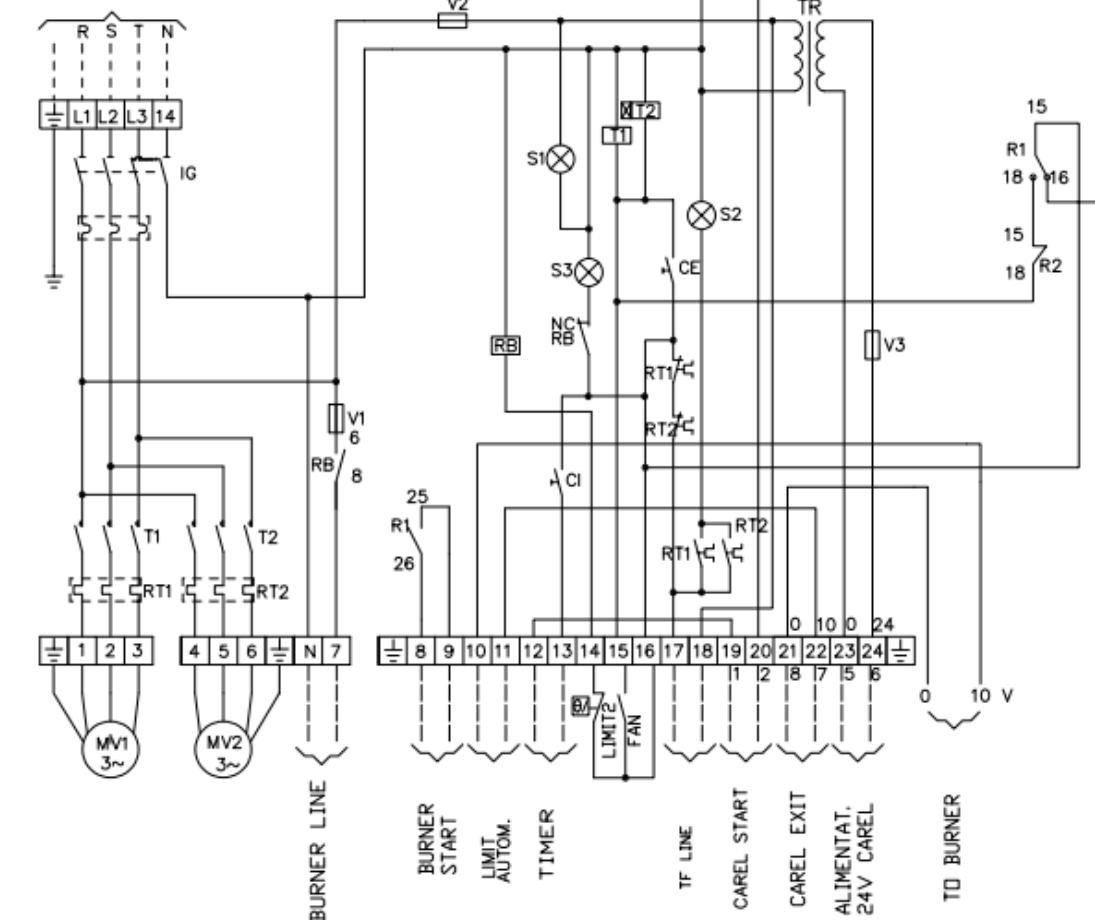
Sistema Europeo

G. AUTOL. 31/10/2011

XB 0093-01

GENERAL POWER SUPPLY

3F 400V +N -50Hz



IG =Master switch
 CE =Switchin VENTILATION position
 CI =Switchin HEATING position
 FAN =Automatic control thermostat of the fan
 LIMIT2 =Burner safety thermostat,with manual reset
 LIMIT =Max.thermostat of the burner,with automatic reset
 T1 = Remote control switch for fan motor MV1
 T2 = Remote control switch for fan motor MV2
 RT1 = Remote control switch thermal cutout T1
 RT2 = Remote control switch thermal cutout T2
 RB = Control burner relay
 V1 = Line fuse (8 A) CERAMICO
 V2 = Line fuse (3,15 A)
 V3 = Transformer line fuse
 S1 = Voltage signal lamp
 S2 = Signal lamp operation of remote control swiches thermal relays
 S3 = Signal lamp operation of SAFETY LIMIT2
 MV1 =Fan motor 1° FAN
 MV2 =Fan motor 2° FAN
 TA = Timer line or TA
 R1 = Timer Fan start
 R2 = Timer Fan Off
 TR = Transformer 230/24 V

In case of short-circuit or overload, the master swich (IG) disconnected automatically.
 To reset it turn the swich anticlockwise, and then clockwise.
 Before this operation, try to identify the reason for the problem.
 The operation of safety LIMIT2 yhat turns off the burner is signalled by lamp S3.

To reset it push the resetting button of the limit2

--- INSTALLER CONNECTION

 COSTRUZIONE MACCHINE TERMOTECNICHE PARABIGLIO (NO)		Descrizione			Oggetto della modifica					
		ELECTRIC DIAGRAM AS COND 300 - 600								
 Sistema Europeo		La CMT srl si riserva a termini di legge la proprietà del presente disegno con divieto di riproduzione o di divulgazione senza sua previa autorizzazione								
Disegnato		Data		Visto	Scala	N°disegno				
MR		19-11-2020				XB 0093-02				

MAINTENANCE



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



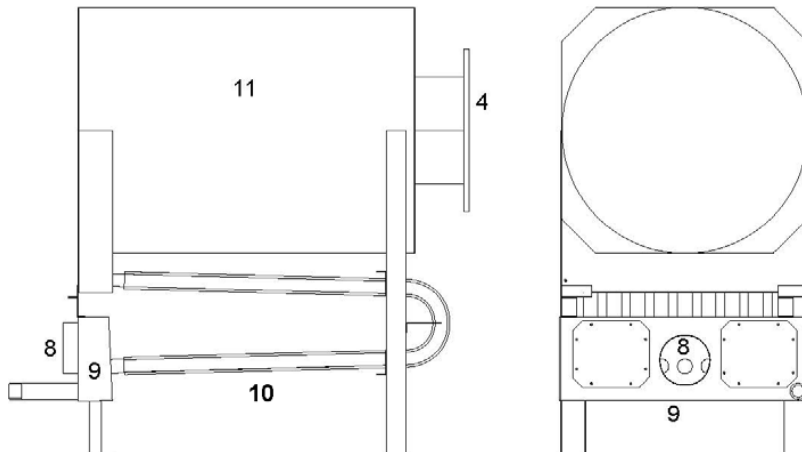
The heat exchanger must be cleaned from soot and deposits, to preserve heat exchange capacity.

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.



FLUES (10)

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

Clean the pipe interior (10), after removing the turbulators.

Collect the soot at the back.

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

Remove the pipe on flue connection (8) and clean rear fume box (9).

COMBUSTION CHAMBER (11)

Remove the burner from its plate (4).

Clean external walls for soot and deposits.

Check that the combustion chamber is not damaged.

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

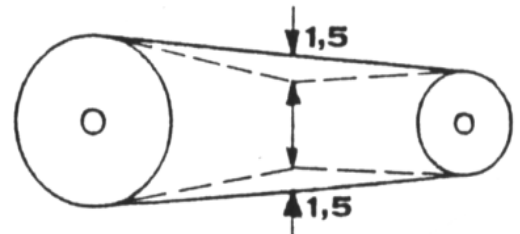
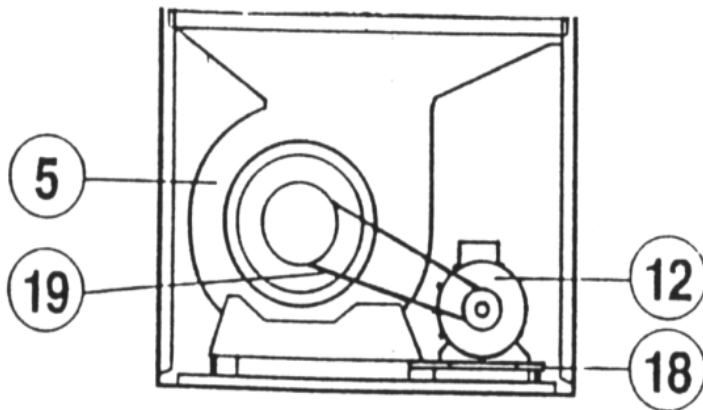
1. At least once, at the beginning of each heating season, unless the current standards require shorter intervals, do a combustion analysis carried out and recorded in the POWER PLANT HANDBOOK or PLANT HANDBOOK.



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.
	Checking the tightness of all bolts, nuts and flanges that vibration could have loosened.



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

TROUBLESHOOTING

Use the table below to identify any possible problems. If a problem cannot be solved as suggested in the table, contact the authorised after-sales service or qualified personnel.		
FAILURE	CAUSE:	REMEDY:
1. The master 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.	1. E' intervenuta la termica del teleruttore e ha tolto tensione al motore. 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. Contact the after-sales service, to have the component repaired or replaced.
	2. Defective burner.	2. Contact the after-sales service, to check the burner.
	3. The max. LIMIT thermostat is on.	3. Wait until the air temperature drops below 65°C.
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, as described on Chapter TRI-THERMOSTAT
5. Come al punto 3), ma il bruciatore dopo la fase di prelavaggio va in blocco e non si forma la fiamma.	1. Defective burner, or no more fuel.	4. Contact the authorised after-sales service of the burner.
6. The burner is on, but the ventilating unit is not yet running and, then, starts/stops continuously.	1. Excess FAN calibration. .	1. Calibrate it (see Chapter TRE-THERMOSTAT)
	2. Defective FAN.	2. Contact the after-sales service to have it replaced.
	3. The temperature of the incoming air is below 0°C.	3. Try to increase this temperature.
	4. Insufficient gas flow rate.	4. Contact the authorised after-sales service of the burner.
7. The burner is on, but the fan does not start and the REMOTE CONTROL SWITCH THERM. lamp is on only for 3-phase voltage heaters	1. The remote control switch's thermal relays are on, due to the motor.	1. Reset the thermal relays, according to § 2).
	2. Faulty electric motor(s), defective contact or seized bearings.	2. Contact the after-sales service, to check the ventilating unit.
8. During operation, the burner stops before the room thermostat or timer operation.	1. LIMIT Operation	1. Waiting the temperature to go below 65°C.
	2. Safety LIMIT2 operation.	2. 2. Reset the burner See Chapter .TRI-THERMOSTAT).
NOTE: IN CASE OF BURNER FAILURE, CONSULT THE MANUAL OF THE "RX" BURNER, DELIVERED TOGETHER WITH THE WARM AIR HEATER.		

ANNEXES

MANUAL "Clima" CAREL for the modulation of burner

Clock digital proportional temperature regulator. Timer and real-time clock for day and night operation. Delivered with the warm air heater series X and variation, or with roof top AMC..XR..fitted with modulating burner RX

General features

"CLIMA" Carel mod. ADCA000110, is an electronic instrument, installed in the heated room, as the remote user terminal, with following operating functions:

- 1) Regulates the modulation of the RX burner. The modulation starts when **"CLIMA"** detects a room temperature of Set-Point T minus 2°C (configured by the manufacturer with parameter **dFA**). **"CLIMA"** operates a proportional regulation (modulation) of the RX burner, with 0-10V analogue output. Example:
"CLIMA" room temperature Set-Point 20°C; **"CLIMA"** starts modulate the burner when detect 18°C and modulates between 18-20°C.
The modulation can be operated even by a NTC sensor on air outlet temperature (example SET POINT 44°C of air outlet temperature. The modulation starts at 42°C of air outlet temperature); or by NTC sensor on air recirculation temperature (example SET POINT 20°C of air recirculation temperature; modulation starts at 18°C). In this case there is a need of a room thermostat to switch ON-OFF the burner. This solution is applied also with roof top operated by PCB controller.
- 2) Operates as room thermostate: switch-off the burner when detects room temperature of Set-Point T (11) set on the **"CLIMA"**. The burner start-on again when room temperature is -0,5°C (configured by the manufacturer with parameter **dIF**) of Set-Point T (11). The burner start-on at a modulate thermal power, set by the manufacturer with parameter **dSA**. Example: **"CLIMA"** room temperature Set-Point 20°C; **"CLIMA"** switch-off the burner when detects 20°C; when detects 19,5°C in the room **"CLIMA"** starts-on again the burner. **This function is not operating with roof top, because operated by PCB controller.**
- 3) Setting the clock, the time bands, and the default value of the timer for the burner RX and so for the warm air heater X, in "heating". For this setting press **PRG** and, by pressing in sequence **SET**, **▲▼**, **SET** set the following parameters: **rtC** : real time; **dAy**: starting time of day mode; **nlt**: starting time of night mode; **SLP** eventually: time interval between **dAy** day running mode, and **nlt** night running mode. With the clock incorporate is possible set the time bands modes, 2 bands per day, the same for all the 7 days of the week. In case of electric feeding's lack, **rtC** real time remains in memory for 2 days maximum.
The supervisor remote control option (purchasing the accessory code IROPZ48500) allows the data from the instrument to be monitored and saved.

The function, of Set-Point compensation based on the outdoor temperature probe reading NTC is available. For this **"CLIMA"** must be connect to the NTC outdoor temperature probe reading (option on demand).

Installation

"CLIMA" regulator is delivered, together with the warm air heater and burner, with parameters **dFA** , **dSA**, **dIF** already configured by the manufacturer (see par. 1 and 2). The installer must set the **rtC** real time parameter; and **dAy**: starting time of day mode; **nlt**: starting time of night mode; **SLP** eventually: time interval between **dAy** day running mode, and **nlt** night running mode.

Disconnect the power supply to the controller and the loads before working on the instrument.

For correct installation, proceed as follows:

- separate the front panel from the rear part by levering the tab, as shown in Figure 2.
- Fasten the instrument to the wall horizontally, so as to allow the circulation of air. For accurate measurements, position the instrument away from sources of heat or humidity, away from windows or outside walls.
- Pass the connection cables through the centre hole in the bottom shell and connect them to the terminal block provided, observing the markings shown on the label. Separate the connection and control cables from the relay cables.
- Place a clamp around the two groups of cables (signal and power supply, relay outputs) near the terminals.
- Check inside the **"CLIMA"** the dipswitches must be in the following position (see the table below).

Name	Switch 1	Switch 2	Switch 3	Switch 4	Model	Product code
T	Off	On	Off	On Heating mode	Basic temperature control with one relay only. Analogue output associated with temperature.	ADCA000110

- Reconnect, if previously disconnected, the flat connection cable between the rear and the front panel, ensuring the polarity is correct.

- Close the instrument with the opposite movement, making sure the flat connection cable does not hinder the operation.
- To ensure electrical safety (EN60730-1), insert the plastic tab and tighten the screw to stop the instrument from opening (see Fig. 2).

SERIAL CONNECTION OPTION

To connect the instrument to the supervisor serial line, the accessory code IROPZ48500 is required. For correct operation, turn the instrument off and connect the option to J1, as shown in Fig. 6. For details on the RS485 serial line, see the instruction sheet enclosed with the accessory.

PARAMETER PROGRAMMING OPTION

The optional programming key code PSOPZKEY00 or PSOPZKEYA0 can be used to program the parameters on the instrument. To connect the key, turn the instrument off and connect the key to J1, as shown in Fig. 6. For further information on the operation of the key, see the corresponding instruction sheet.

GENERAL WARNINGS

Avoid installing the boards in environments with the following characteristics:

- Strong vibrations or knocks.
- Exposure to jets of water.
- Strong magnetic and/or radio frequency interference (for example, near transmitting antennae).
- Exposure to direct sunlight and to the elements in general.
- To clean the display use a soft cloth. Do not use water or solvents.
- Operation at particularly low temperatures may cause an evident decrease in the response speed of the display. This should be considered normal and does not indicate a malfunction.
- A power supply voltage other than that specified may seriously damage the instrument.
- Separate as much as possible the control cables from the cables to the inductive loads and power cables to avoid possible electromagnetic disturbance. Never insert power cables (including the electrical cables) and probe and serial communication cables 0-10V in the same conduits.

Do not install the communication cables in the immediate vicinity of power devices (contactors, circuit breakers or similar).

The cables that come out of the controller must not be in view, but rather run inside the conduit.

- If the appliance is used in a manner not specified by the manufacturer, the rated protection of the appliance may be compromised

FUNDAMENTAL OPERATIONS OF THE INSTRUMENT

Below is the meaning of the buttons in normal operating conditions:

BUTTON	MEANING
Power	Switch the "CLIMA" instrument On/Off. The button may be disabled, if the On/Off function is associated with the digital input. When the instrument is switched off, all controls are disabled, except for the antifreeze function.
C/F	Selects the temperature display mode, between degrees Celsius and Fahrenheit. When pressed switches between the two temperature units.
SET	Used to display and when necessary set, using the buttons   , the set point displayed in the SMALL field. If pressed for more than 5 seconds, accesses the parameters menu. To scroll the various parameters, use   . When on a parameter, to modify press SET, then modify with   and confirm by pressing the SET button again; and to exit the parameters menu, press the PRG button.
	Activates the opposite operating mode to the current mode (sleep when in day mode or day when in sleep mode), for the time displayed. To change or reset the timer, use  to increase or decrease the time. Press again to exit and return to the main menu. If the mode is already active pressing the button will show the time remaining until the timer expires.
	Accesses the menu for setting the clock, the time bands, and the default value of the timer . When first pressing the button, the current time is displayed (rtc); to display the other parameters, use the   . To set a new parameter's value press SET when the required parameter is displayed and change the value using with   . Press again PRG to exit and return to the main menu.
	Accesses the menu for displaying the current outside temperature, and the maximum and minimum since the instrument was last switched on. To display the various temperatures press   . For the meanings see the box with the house symbol. Press the PRG button to return to the main menu.
	From the main menu increases the value of set point displayed in the large field. From the other menus displays the variables or the parameters or alternatively changes the value if first pressing SET.

▼	From the main menu decreases the value of set point displayed in the large field. From the other menus displays the variables or the parameters or alternatively changes the value if first pressing SET.
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Important: the operating mode can be changed with the instrument on or off. When the mode is changed, the user is asked whether to use the default parameters for that mode. If yes, press SET, tasto UP and SET again. Otherwise press PRG to exit.

TABLE OF ERRORS

Code displayed	Description
ALE	External alarm generated by the digital input. If set from parameter
EE	Parameter memory alarm. Stops control of the instrument until the default parameters are loaded
E1	Inside temperature probe alarm
E2	Outside temperature probe alarm
Eth	Digital temperature or humidity sensor alarm (only in the models where featured)
Ert	Real time clock alarm (only in the models where featured)
ELN	No link: control of the outputs by supervisor has been set, but there is no connection (parameter Lin = on)

TECHNICAL SPECIFICATIONS

- Power supply: 24 Vac +10% -15% 50/60Hz 1 VA, 22-35 Vdc 0.5W
- Operating conditions: 0T60°C, 10-90%RH non-condensing
- Storage conditions: -20T70°C, 10-90%RH non-condensing
- Dimensions (mm): 135x86x36mm;
- Environmental pollution: normal;
- Degree of pollution: degree II;
- Software class and structure: A;
- Actions type: 1C
- Index of protection: IP20;
- Ball pressure test temperature on the plastic of the frontal case: 100 °C;
- Ball pressure test temperature on the plastic of the back case: 125 °C;
- Classification according to protection against electric shock: II, to be integrated into class I or II appliances;
- Period of electrical stress across the insulating parts: long;
- Control device designed to be supplied to: manufacturers, installers and maintenance personnel;
- Immunity against voltage surges: category 1;
- Cross-section of the wires (mm²): from 0.5 to 1.5 mm²;
- Precision of the inside temperature measurement: +/- 1°C
- Precision of the outside temperature measurement: NTC (standard 10k) range -40 + 60 °C precision +/- 0.5 °C + sensor precision, +/- 1°C from 0 to 40 °C, +/- 1.5 °C above
- 0-10V analogue output, non-insulated, for proportional control: precision +/-5% max load 2 KOhm, max current 5 mA
- Approval of the relay outputs: EN60730-1: NO 1(1)A 250Vac, class II reinforced insulation from the instrument. Basic insulation between the relays.
UL-873: NO 1A resistive 24Vac, 30Vdc, 100,000 cycles/ PILOT DUTY: 24Vac, I make 15A, break 1A, 30.000 cycles.
- Precision of humidity measurement (in the models where featured): +/- 3%rh at 25C, +/- 5% rH from 0 to 60 °C, range 10-90 % Rh

CONNECTIONS

The installer must connect the "CLIMA" regulator (see fig. 4) to the electric control board of roof top, with n. 6 cables (4 cables when operating with roof top AMC..XR..), and keeping separate the tension cables from the analogue output 0-10V ones for the RX burner proportional regulation . The "CLIMA" regulator must be installed not more than 30 m. from the warm air heater X or roof top, as cable length.

- digital input:
 - non-insulated version: direct connection of the voltage-free contact; contact closing current: 3-5 mA .
 - insulated version with external power supply and 24 Vac contact: class II safety external power supply separated from the 24 Vac of the instrument (Fig. 4b)
- Outside probe connection with standard Carel probes (10K 25°C B=3435):
 - maximum length: 30 m with min cable cross-section 0.5 mm².
- Digital input connection: maximum length 10 m, min. cable cross-section 0.5 mm².
- Analogue output connection: maximum length 10 m, min. cable cross-section 0.5 mm².
- Relay output connections: cable length max 30 m. And cross-section from 1.5 to 2.5 mm². Reinforced insulation class II
- Relay output:: to use the instrument in compliance with UL-873, a load with a maximum voltage of 24 Vac, class II, can be connected.
- UL instructions for the connections:
 - Use 75° copper (CU) conductor and wire size No. 22-14 AWG, stranded or solid

- Use Terminal tightening torque of 4 Lb-In when green (PTR) terminal block is used or 7 Lb-In when black (SAURO) terminal series is used.

WARNING: All connections, except for the relays, must be connected to low voltage circuits with reinforced insulation.

IMPORTANT WARNINGS

The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com.

The client (builder, developer or installer of the final equipment) assumes every responsibility and risk relating to the phase of configuration the product in order to reach the expected results in relation to the specific final installation and/or equipment.

The lack of such phase of study, which is requested/indicated in the user manual, can cause the final product to malfunction of which CAREL can not be held responsible.

The final client must use the product only in the manner described in the documentation related to the product itself. The liability of CAREL in relation to its own product is regulated by CAREL's general contract conditions edited on the website www.carel.com and/or by specific agreements with clients.



Fig. 1

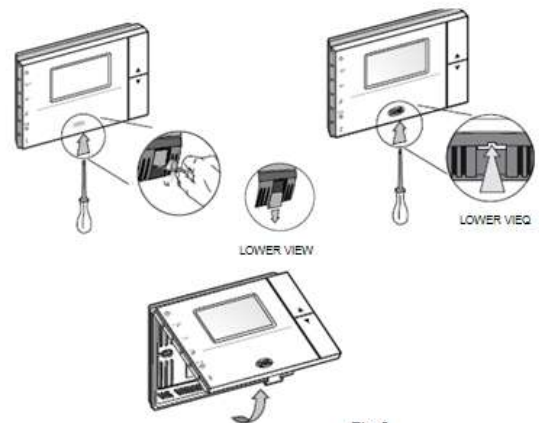


Fig.2

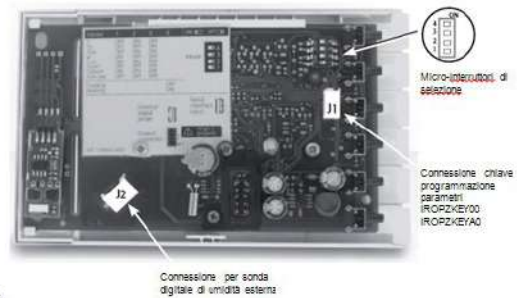
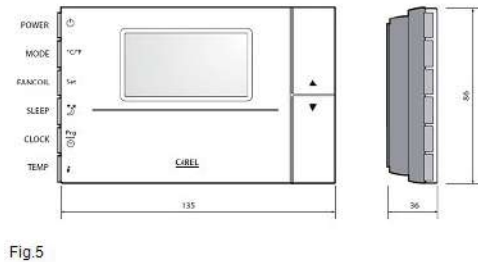
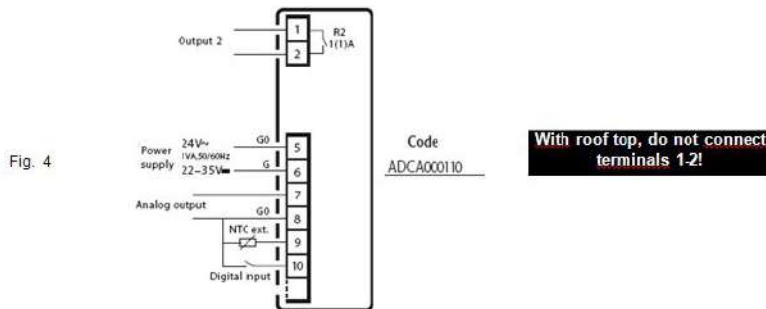


Fig. 3

Rif.	Description
1	Set point setting mode for the value on the large display
2	LARGE field. Displays ambient temperature checked by the "CLIMA"
3	Select Sleep operating mode
4	Lock mode. The parameter has already been set
5	Time bands active or display Clock
6	Select temperature: inside/outside - maximum/minimum
7	AUTO operating mode
8	Set point setting mode for the value on the small display
9	Cooling/heating mode. Ramp symbol on: the temperature control relay is active
10	Dehumidify/humidify mode. Ramp symbol on: the humidity control relay is active
11	SMALL field. Displays temperature of Set Point.

(A) - Version with direct connection for the digital input

Relay 1	Model ADCA000110
Ambient Temperature	T



MOST IMPORTANT PARAMETERS TO BE SET BY THE INSTALLER

We remember that:

- parameters **dFA e dSA** are factory set and must not be changed by the installer/customer, iif not agree with the manufacturer of the warm air heater
- parameter **rtC** real time must be set by the installer
- parameters **SLP, dAy, nlt** and **relevant ambient temperature Set Point T**, winter, summer, day, night : can be modified by the installer, from the default value factory set, see table of parameters.

In order to set/verifie the parameters procede as follows:

- SETPOINT for ambient temperature T: depending on different function modes **dAy, nlt**, several temperature Set Point T are factory set, you can see on display SMALL (11, fig. 3). To reset/change press SET for more than 5 seconds, for enter the parameter's menu.

To scroll the various parameters, use . When on a parameter, to modifie press **SET**, than modifie with and confirm by pressing the **SET** button again. For the current parameter on display is possibile change it directly with . To exit the parameters menu, press the **PRG** button.

Ambient temperature factory Set Point are:

- Set winter day (default 20.0°C) and night (default 18°C, minimum setting temperature 10°C)

CLOCK, TIME BANDS Press button **PRG**: parameter **rtC** is show; to scroll the various parameters, use . When on a parameter, to modifie press **SET**, than modifie with and confirm by pressing the **SET** button again. To exit the parameters menu, press the **PRG** button.

Parameters to verifie/reset are:

code	parameter	Factory set
rtC	clock hh.min	
dAy	start day band	Default 08:00
nlt	start night band	Default 20:00
SLP	manual changeover duration between dAy and nlt	Default 8 hours

To disable the time bands function, set parameter **rtC** OFF, as follows: press the **PRG** button, select parameter **rtC**, and change his value into 00:00, than press once more with to select OFF and press SET to confirm.

By parameter **rtC** OFF the function mode is allways day, and only day Set Points are operating; the night Set Points will be operating only by pressing button , change of status manual.

SLP manual changeover duration between **dAy** day band and **nlt** night band. To change this duration, press **PRG** and scroll to display **SLP**. Press **SET** and with modifie **SLP** value; or eliminate it, down to OFF. Press **SET** to confirm. To exit the parameters menu, press the **PRG** button.

After time bands are set, simbol CLOCK will appear on display.

The "**CLIMA**" regulator is ready. To start operate press **ON**.

For more information on the regulator "**CLIMA**", consult the general Clima CAREL manual on web site: www.carel.com and go on the type **ADCA000110**

6.1 Description of the parameters for the standard version

The parameters available depend on the clima model used and the level set (LE = 1 or 2)

code	parameter	range	default	UOM	note
	day temperature set point in cooling	10 to 50	24.0	°C	
 	night temperature set point in cooling	10 to 50	26.0	°C	
	day temperature set point in heating	10 to 50	20.0	°C	
 	night temperature set point in heating	10 to 50	18.0	°C	
 	single day temperature set point for automatic modes	10 to 50	20.0	°C	
  	single night temperature set point for automatic modes	10 to 50	18.0	°C	
dF	Temperature differential for relay 1	0.1 to 10	1.0	°C	
	This is an absolute value and is added to or subtracted from the set point depending on the control mode, cooling or heating.				
dF2	Temperature differential for relay 2.	0.1 to 10	1.0	°C	
	This is an absolute value and is added to or subtracted from the set point depending on the control mode, cooling or heating.				
dS1	Temperature offset for relay 1	-10 to 10	0.5	°C	
	This value is added to or subtracted from the set point based on the active control mode. May be positive or negative, so as to offer complete flexibility in the position of the step.				
dFA	Analogue output differential	0 to 10	1.0	°C	
	This value is added to or subtracted from the set point according to the control mode selected, cooling or heating.				
dSA	Analogue output offset from to the set point	-10 to 10	0.0	°C/ % RH	
	This value is added to or subtracted from to the set point according to the operating mode, cooling or heating.				
EHI	Maximum water temperature for ON/OFF radiant floor heating control (mode 8, all dipswitches off). The screen shows alarm EHI and the relay output is deactivated, irrespective of the control mode.	10 to 80	40	°C	
ELO	Minimum water temperature for ON/OFF radiant floor cooling control (mode 8, all dipswitches off). The screen shows alarm ELO and the relay output is deactivated, irrespective of the control mode.	0 to 50	10	°C	
	Humidification set point	10 to 70	50.0	% RH	
	Dehumidification set point	10 to 70	70.0	% RH	
dFH 	Humidity differential for the activation of the analogue output and the relay.	1 to 20	5.0	% RH	
dFd 	Dehumidification differential for the activation of the relay.	1 to 20	5.0	% RH	
SFH  	Parameter to define the humidification/dehumidification status in day and night mode Activates or deactivates humidification or dehumidification control (based on DIP 4) with the time bands. The parameter can have the following three values: 0 - Time bands disabled: The humidification/dehumidification control is always active, if featured, and is configured in relation to dip4 1 - Time bands enabled: When switching to the daytime band, humidification/dehumidification control (depends on dip4) is activated. When switching to the night band, humidification/dehumidification control (depends on dip4) is deactivated. 2 - Time bands enabled: When switching to the daytime band, humidification/dehumidification control (depends on dip4) is deactivated. When switching to the night band, humidification/dehumidification control (depends on dip4) is activated.	0 to 2	0	-	
AUT 	Humidity set point automatically compensated by the outside temperature if humidity control is featured, the ambient humidity is controlled with an automatic set point, defined from 1H to 7H using the buttons, as specified in the corresponding table (see page 15). if set to OFF the mode is disabled. Setting one of the levels in the table, the controller independently sets a humidity set point in relation to the outside temperature.	OFF 1H to 7H	OFF	-	

code	parameter	range	default	UOM	note
CSt	Parameter for set point compensation Parameter CSt enables and sets the gain for set point compensation according to the outside temperature. If CSt = 0 compensation is disabled. Also see parameters Ctt and Cts.	-1 to 1	0.0	°C	
CdF	Max differential for the compensated set point The maximum value for the compensated set point is limited by this parameter. In heating mode, if the difference calculated for set point compensation is higher than CdF, the instrument uses CdF as the maximum difference from the set point. Similarly, in cooling mode if the difference calculated for set point compensation is less than CdF, the instrument uses CdF as the maximum difference from the set point.	0 to 20	2.0	°C	
Ctt	Threshold for set point compensation in heating mode Temperature set point compensation in heating based on the outside temperature measurement: compensated set point = setpoint - (set point - Text - Ctt) * CSt Compensation is activated only if: Text < set point - Ctt	0 to 25	10.0	°C	
Cts	Threshold for set point compensation in cooling mode. Temperature set point compensation in cooling based on the outside temperature measurement: compensated set point = setpoint + (Text - set point - Cts) * CSt Compensation is activated only if: Text > set point + Cts	0 to 25	10.0	°C	
AdC	Configuration T2A e T2A+H Additional modes for the automatic operation: For temperature control only (T2A): Configuration 1: temperature control with set point and dead band only (2xdS1). Configuration 2: temperature control only with automatic changeover of the set point. Configuration 3: temperature control only with cooling and heating set point, automatic changeover and manual ON/OFF control for outlet fan. For temperature + humidity control (T2A+H): Configuration 1: temperature control with set point and dead band only (2xdS1). Two set points for humidity. Configuration 2: temperature and humidity control with cooling and heating set point and automatic changeover.	1 to 3	1	-	
		1 to 2		-	
dys	Active display configuration Used to set the values shown in the large and small fields on the display	1 to 4	1	-	
rtc 	Current time The large field displays the hours and the small field the minutes	00:00 23:59	00:00	h	
SLP 	Duration of manual day-night mode changeover The large field displays the hours and the small field the minutes (15 minute steps)	0 to 12	8 h	h	
dAy 	Day band threshold The large field displays the hours and the small field the minutes (15 minute steps)	00:00 23:59	8.00	h	
nlt 	Night band threshold The large field displays the hours and the small field the minutes (15 minute steps)	00:00 23:59	20.00	h	
di	Digital input configuration OFF: disabled 1: select remote cooling /heating 2: remote ON/OFF 3: select day/night(set alternative) 4: remote alarm	OFF to 4	OFF	-	
POL	Digital contact polarity Used to choose whether to consider the digital input active when closed or open or alternatively whether or not there is voltage in the optically-isolated version. Voltage-free contact: nE: active when the input is closed pO: active when the input is open Optically isolated: nE: active when voltage is present at the input pO: active when voltage is not present at the input	nE, pO	nE	-	
Ei  	Control cooling/heating operating mode Enables the possibility to define the operating mode, cooling/heating, by parameter rather than by DIP 4. dIS: Parameter Ei is disabled, cooling/heating mode is selected by DIP 4 on the rear. En: Parameter Ei is enabled, cooling/heating mode is selected by parameter Ei.	dIS, En	dIS	-	
Ei  	Select cooling/heating operation only active if this mode is enabled by the previous parameter. Selects the mode, cooling or heating. E: The instrument works in cooling mode I: The instrument works in heating mode	E, I	E	-	

code	parameter	range	default	UOM	note
Lin	Instrument output control mode. Enabling this parameter allows the outputs to be controlled directly via the serial connection. Warning, if enabled no control is performed independently by the instrument. If active and the supervisor does not query the instrument for more than two minutes, the outputs are automatically disabled and the no link error (ELn) is signalled on the display. no: the function is disabled, YES: the function is enabled.	no, YES	no	-	
CAL+ Int 	Inside temperature calibration, digital sensor or NTC. Within a maximum of $\pm 10^{\circ}\text{C}$	-10 to 10	0.0	$^{\circ}\text{C}$	
CAL+ ESt 	Outside temperature calibration, NTC sensor. Within a maximum of $\pm 10^{\circ}\text{C}$	-10 to 10	0.0	$^{\circ}\text{C}$	
CAL+Hum 	Digital humidity sensor calibration. Within a maximum of $\pm 15\%$ RH	-15 to 15	0.0	% RH	
LE	Parameter access level Level of access the control parameters for the active mode: Level 1: basic access, only the essential parameters for correct operation. Level 2: advanced access, used to set all the parameters for the selected control mode.	1, 2	1	-	
LOC 	Lock The lock parameter used to disable some functions of the instrument, as per the following settings: LOC = OFF LOC = 1: The UP/DOWN and time bands buttons are disabled LOC = 2: Only the time bands button is disabled In these cases, the LOCK symbol is shown on the display whenever attempting to perform an unauthorised operation.	OFF to 2	OFF		
Unt 	Temperature display mode Sets the temperature display mode, in degrees Fahrenheit or Centigrade. Unlike direct selection using the button, if changing the temperature display mode using parameter Unt, this becomes the default display mode when switching the instrument on.	$^{\circ}\text{C}$, $^{\circ}\text{F}$	$^{\circ}\text{C}$	-	
nEd	Parameter for control with average value sensor values Defines the average control temperature (T_m), based on the weighted average of the inside temperature (T_i) and outside temperature (T_e). Both the measurements must be valid and T_m is achieved with the following formula: $T_m = (T_i \cdot (100 - nEd) + T_e \cdot nEd) / 100$ The average temperature calculated is used for control and display.	0 to 100	0.0	%	
Add	RS485 serial address (the external option code IROPZ48500 is required), it can be read by the supervisor and can only be changed with direct access on the instrument.	1 to 207	1	-	
SEr	Select serial communication protocol 0: CAREL protocol 9.6 kb/s 1: CAREL protocol 19.2 kb/s 2: Modbus 9.6 kb/s, even parity, 8 bits, 1 stop 3: Modbus 19.2 kb/s, even parity, 8 bits, 1 stop 4: Modbus 9.6 kb/s, no parity, 8 bits, 2 stop 5: Modbus 19.2 kb/s, no parity, 8 bits, 2 stop	0 to 5	1	-	
PS	Password for accessing the parameters Set to 0: no password is required. Set other than zero: the same value must be entered to access the parameters.	0 to 999	0	-	
FAC+ SET	Factory set Reset the default values (manufacturer) on the instrument for the current mode.	no, YES	no	-	

Tab. 6.2



Note: the "+" symbol means that the parameter is shown on 2 fields.

