ApenGroup®
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EN

Use, Installation and Maintenance Manual
MODULATING WARM AIR HEATER LRP - RAPID PRO AND CONDENSING WARM AIR HEATER LK - KONDENSA

CE

TRANSLATION OF ORIGINAL Manual

VER. 01.2020

Dichiarazione di Conformità
Statement of Compliance

CE

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Il presente documento dichiara che la macchina:
With this document we declare that the unit:

Modello: ***Model:***	**Generatore d'aria calda LRP, LK, LKC** ***Warm Air Heater LRP, LK, LKC***

è stata progettata e costruita in conformità con le disposizioni delle Direttive Comunitarie:
has been designed and manufactured in compliance with the prescriptions of the following EC Directives:

- **Regolamento Apparecchi a Gas 2016/426/UE**
  Gas Appliance Regulation 2016/426/UE
- **Direttiva compatibilità elettromagnetica 2014/30/UE**
  Electromagnetic Compatibility Directive 2014/30/UE
- **Direttiva Bassa Tensione 2014/35/UE**
  Low Voltage Directive 2014/35/UE
- **Regolamento ErP 2281/2016/CE**
  ErP Regulation 2281/2016/CE
- **Direttiva ROHS II 2011/65/UE e ROHS III 2015/863/UE**
  ROHS II 2011/65/UE and ROHS III 2015/863/UE Directives

è stata progettata e costruita in conformità con le norme:
has been designed and manufactured in compliance with the standards:

- **EN17082:2019**
- **EN60335-1**
- **EN60335-2-102**
- **EN60730-1**
- **EN 60068-2-1**
- **EN 60068-2-2**
- **2017/C 229/01**
- **EN55014-1**
- **EN55014-2**
- **EN61000-3-2**
- **EN61000-3-3**

Organismo Notificato:
Notified body:

Kiwa Cermet Italia S.p.A
0476
PIN 0476CQ0451

La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante
This declaration of conformity is issued under the sole responsibility of the manufacturer

Pessano con Bornago
26/05/2020

Apen Group S.p.A.
Un Amministratore
Mariagiovanna Rigamonti

Mariagiovanna Rigamonti

CODE SERIAL NUMBER

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1. GENERAL CAUTIONS

This manual is an integral part of the product and must always accompany it.
Should the equipment be sold or passed on to someone else, always make sure that this manual is supplied with the equipment for future reference by the new owner and/or installer.

The manufacturer shall not be held civilly or criminally responsible for injuries to people or animals or damages to things caused by incorrect installation, calibration and maintenance or by failure to follow the instructions contained in this manual or by operations carried out by unqualified staff.

This product must be used only for the applications for which it was designed or approved. Any other use must be regarded as hazardous. Improper use may impair the operation, service life and safety of the unit.

During the installation, operation and maintenance of the equipment described in this manual, the user must always strictly follow the instructions given in all the chapters of this use and instruction manual.

The condensing warm air heater must be installed in compliance with current regulations, according to the manufacturer's instructions and by qualified staff, technically specialised in the heating field.

First start-up, conversion between different types of gas and maintenance operations must be carried out only by suitably qualified staff of Technical Service Centres complying with the requisites required by the regulations in force in their country of competence.
Maintenance must be carried out with methods and timescales in compliance with the regulations in force in the country where the appliance is installed.

2. SAFETY-RELATED WARNINGS

This chapter describes the safety instructions to be followed by machine operators.

2.1. Fuel

Before starting up the heater, make sure that:
- the gas mains supply data are compatible with the data stated on the nameplate;
- the combustion air intake ducts (when fitted) and the flue gas pipes are only those specified by the manufacturer;
- the combustion air is supplied in such a way as to avoid even partial obstructions of the intake grille (caused by leaves etc.);
- the gas seal of the feeding system has been tested and approved in compliance with the applicable standards;
- the heater is supplied with the same type of fuel it has been designed for;
- the system is correctly sized for such flow rate and is fitted with all safety and monitoring devices required by applicable standards;
- the inside of the gas pipes and air distribution ducts for ducted heaters have been thoroughly cleaned;
- the fuel flow rate is suitable for the power required by the heater;
- the fuel supply pressure is between the range specified on the nameplate.

When connecting gas supply pipe to gas valve, do not tighten excessively in order to avoid damaging sealing gaskets. (See Par. 6 “Gas Connection”)

2.2. Gas Leaks

If you smell gas:
- do not operate electrical switches, the telephone or any other object or device that can cause sparks or naked flames;
- immediately open doors and windows to create an air flow to vent the gas out of the room;
- close the gas valves;
- switch off the power supply via a disconnector outside the unit;
- move away from the unit
- call for **qualified staff.**
- call the **Fire Brigade.**

NOTE: IT is strictly prohibited to supply gas to the circuit with pressures higher than 60 mbar. Such pressures could cause the valve to break.

2.3. Power supply

The heater must be correctly connected to an effective earthing system, made in compliance with current regulations (IEC 64-8, applies to Italy only).

Cautions

- Check the efficiency of the earthing system and, if required, call out a qualified engineer.
- Check that the mains power supply is the same as the power input stated on the equipment nameplate and in this manual.
- Do not mistake the neutral for the live wire.
- The heater can be connected to the mains power supply with a plug-socket only if the latter does not allow live and neutral to be swapped.
- The electrical system and, more specifically, the cable section, must be suitable for the equipment maximum power input, shown on the nameplate and in this manual.
- Do not pull electric cables and keep them away from heat sources.

NOTE: IT is compulsory to install, upstream of the power cable, a fused multipole switch with contact opening wider than 3mm. The switch must be visible, accessible and less than 3m away from the control board. All electrical operations (installation and maintenance) must be carried out by qualified staff.

2.4. Use

Do not allow children or inexperienced people to use any electrically powered equipment.
The following instructions must be followed:

- do not touch the equipment with wet or damp parts of your body and/or with bare feet;
- do not leave the equipment exposed to the elements (rain, sun etc...) unless it is adequately protected;
- do not use the gas pipes to earth electrical equipment;
- do not touch the hot parts of the heater, such as the flue gas duct;
- do not wet the heater with water or other fluids;
- do not place any object over the equipment;
- do not touch the moving parts of the heater.

2.5. Maintenance

Maintenance operations and combustion inspections must be carried out in compliance with current standards.

Before carrying out any cleaning and maintenance operations, isolate the boiler from the mains power supply using the switch located on the electrical system and/or on the shut-out devices.
If the heater is faulty and/or incorrectly operating, switch it off and do not attempt to repair it yourself, but contact our local Technical Service Centre.
All repairs must be carried out by using genuine spare parts. Failure to comply with the above instructions could compromise the safety of the equipment and invalidate the warranty.
If the equipment is not used for long periods, shut the gas supply off through the gas stopcock and disconnect it from the power supply.
If the heater is to be put out of service, in addition to the above operations, potential sources of hazard on the unit must be disabled.
It is strictly forbidden to obstruct the Venturi pipe inlet, located on the burner-fan unit, with your hands or with any other objects. Any obstruction could cause a backfire from the premixed burner.

DO NOT COVER IT WITH YOUR HAND OR OTHER OBJECTS!

2.6. Transport and Handling

The heater is delivered fastened to a pallet and covered with a suitably secured cardboard box.
Unload the heater from the truck and move it to the site of installation by using means of transport suitable for the shape of the load and for the weight.
If the unit is stored at the customer's premises, make sure a suitable place is selected, sheltered from rain and from excessive humidity, for the shortest possible time.
Any lifting and transport operations must be carried out by skilled staff, adequately trained and informed on the working procedures and safety regulations.
Once the equipment is moved to the correct position, the unpacking operation can be started.

2.7. Unpacking

The unpacking operation must be carried out by using suitable tools or safety devices where required. Recovered packaging materials must be separated and disposed of according to applicable regulations in the country of use. While unpacking the unit, check that the unit and all its parts have not been damaged during transport and match the order. If damages have occurred or parts are found to be missing, immediately contact the supplier. The manufacturer is not liable for any damages occurred during transport, handling and unloading.

Packing material disposal

The packing safeguards the product from transport damages. All the materials used are environmentally friendly and recyclable. Please contact a specialised distributor or your local administration for more information on waste disposal.

2.8. Disposal and Demolition

Should the machine be dismantled or demolished, the person in charge with the operation shall proceed as follows:

Disposal of end-of-life products

This equipment is marked in compliance with European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). This Directive defines the rules for collecting and recycling waste equipments throughout the entire territory of the European Union.

WEEE contains both pollutants (that can negatively affect the environment) and raw materials (that can be reused). IT is therefore necessary to subject WEEE to appropriate treatments, in order to remove and safely dispose of pollutants and to extract and recycle raw materials. IT is forbidden to dispose of WEEE as unsorted waste. These operations facilitate recovery and recycling of the materials, thus reducing the environmental impact.

NOTE: All materials recovered will be processed and disposed of according to what provided for by the laws in force in the country of use and/or according to the standards indicated in the safety sheets of the chemicals.

INFORMATION FOR DISPOSAL valid in ITALY (Legislative Decree 49/2014)

The heaters and relating accessories are considered “professional WEEE - waste electrical and electronic equipment”. According to the legislation in force in Italy, professional WEEE must be sent to treatment plants suitable for these types of waste. Please contact the Apen Group for end-of-life products so as to obtain all the information necessary for their correct waste disposal, which is possible thanks to the Collective System (Union) to which the company is associated. Please remember that product disposal without complying with the mode described above is a violation liable to administrative and penal sanctions.

INFORMATION FOR DISPOSAL valid abroad (EU COUNTRIES except Italy).

The European Directive 2012/19/EC shall be implemented in every EU member state. There may be different application modalities for the various member states, even in terms of modality for waste disposal depending on its type (House-hold or Professional WEEE). To this regard at the end of the life of the product, we highly recommend you call the distributor or installer so as to obtain information on the correct disposal, in compliance with the existing laws of the installation country.

2.9. Installation

The LK and LRP heat exchanger must be used in the following conditions:

- The fuel used must have a sulphur content according to the European standard, namely: maximum peak, for short periods, 150 mg/m^3, annual average lower than 30 mg/m^3;
- Combustion air must not contain chlorine, ammonia, alkalis or sulphides; for example, installation near swimming pools or laundries exposes the unit to the effects of such agents; if this is the case it is necessary to take air from the outside.

3. TECHNICAL FEATURES

The LRP-RAPID PRO and LK-KONDENSA series modulating warm air heaters have been designed to heat industrial and commercial environments.
The heater PCB continually modulates the heat output between the minimum and maximum power, according to heating requirements.
The premixing and modulating technology allows the heater to achieve efficiency above 108% of the L.C.V.
The heater can operate independently and can be started up by simply connecting it to the mains power supply and to the mains gas supply.
The heat output of these heaters ranges between 5 and 97 kW.

The units can be controlled in three ways:
- with an ON-OFF control;
- externally via modbus (through Smart Web or Easy);
- proportionally, with a 0-10 Vdc external control.

The heat exchanger complies with the manufacturing requirements for condensing warm air heaters, according to prevailing standards (EN17082:2019).

The combustion chamber and the surfaces in contact with condensation (such as the pipe bundle and exhaust hood), are made of AISI 441, in order to provide high resistance to condensation and temperature.
The following table shows the conversion of stainless steels used:

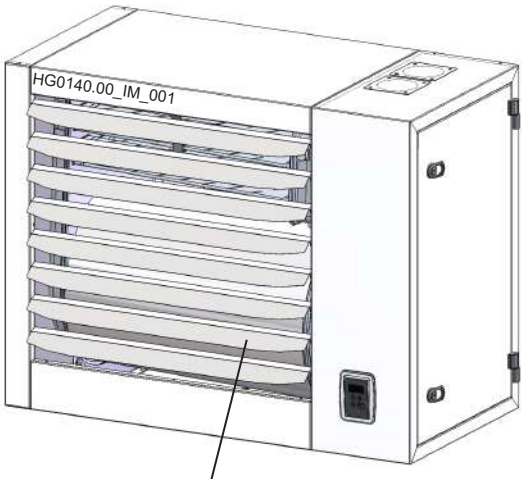
USA-AIS	EN-No.	COMPOSITION
AISI 441	1.4509	X2 CrTiNb 18

The innovative design and large heat exchanging surface of the combustion chamber and of the pipes ensure optimum efficiency and durability.
The burner is made entirely of stainless steel with special mechanical solutions to ensure optimal reliability and performance levels, as well as high thermal and mechanical resistance.

The control located on the front panel allows the service centre to check and view the working phases and identify any faults that may have occurred.

Inherent Safety
The efficiency increase at minimum power is achieved by using a sophisticated air/gas mixing technique and by regulating at the same time the combustion air flow and the fuel gas flow.
This technology increases the heater safety as the gas valve supplies the fuel according to the air flow. Unlike atmospheric burners, the CO_2 content remains constant throughout the heater operating range, allowing the heater to increase its efficiency when the heat output reduces.
If there is no combustion air, the valve will not supply gas; if the combustion air flow reduces, the valve will automatically reduce the gas flow yet will keep its combustion parameters at optimal levels.

Low emissions
The premixed burner, in combination with the air/gas valve, ensures "clean" efficient combustion having very low emissions.



ATTENTION: Before switching the heater on, open the louvers by at least 45°.

3.1. Technical Data

Model*		LRP018		LRP028		LRP035		LRP045		LRP055		LRP075		LRP102	
Type of equipment		B23 - B23P - C13 - C33 - C43 - C53 - C63													
EC approval	PIN.	0476CQ0451													
NOx class [EN1020:2009]	Val	5													
Type of fuel		Gaseous													
		Heater Performance													
		min	max	min	max	min	max	min	max	min	max	min	max	min	max
Burner heat output (Hi)	kW	10.1	16.5	16	27	20.2	34.8	26	44	29.8	52.2	44.4	73.5	51.8	100
Useful heat output [P_{min}, P_{rated}]*	kW	9.7	15.1	15.4	24.6	19.6	32.4	25.0	40.6	28.8	48.1	42.5	67.5	49.9	91.1
Hi Efficiency (N.C.V.) [η_{pi}, η_{nom}]*	%	95.8	91.8	96.3	91.2	96.8	93.1	96.3	92.3	96.8	92.1	95.8	91.8	96.4	91.1
Hs efficiency (G.C.V.) [η_{pi}, η_{nom}]*	%	86.2	82.6	86.7	82.1	87.1	83.8	86.7	83.1	87.1	82.9	86.2	82.6	86.8	82.0
Flue losses with burner on (Hi)	%	4.2	8.2	3.7	8.8	3.2	6.9	3.7	7.7	3.2	7.9	4.2	8.2	3.6	8.9
Flue losses with burner off (Hi)	%	<0,1		<0,1		<0,1		<0,1		<0,1		<0,1		<0,1	
		Flue gas emissions													
Carbon monoxide - CO - (0% of O_2) (1)	ppm	<5		<5		<5		<5		<5		<5		<5	
Emissions of nitrogen oxides - *NOx** (0% of O_2) (Hi) (2)		51 mg/kWh - 29 ppm		55 mg/kWh - 31 ppm		42 mg/kWh - 24 ppm		55 mg/kWh - 31 ppm		46 mg/kWh - 26 ppm		60 mg/kWh - 34 ppm		67 mg/kWh - 38 ppm	
Emissions of nitrogen oxides - *NOx** (0% of O_2) (Hs) (7)		46 mg/kWh - 26 ppm		49 mg/kWh - 28 ppm		38 mg/kWh - 21 ppm		49 mg/kWh - 28 ppm		42 mg/kWh - 23 ppm		54 mg/kWh - 31 ppm		60 mg/kWh - 34 ppm	
Pressure available at the flue	Pa	80		100		120		120		130		140		140	
		Flue gas temperature, CO_2 content and maximum flue gas flow rate: see gas tables on page 38 and on the following pages													
		Electrical Characteristics													
Supply voltage	V	230 Vac - 50 Hz single-phase													
Rated power	kW	0.1	0.143	0.15	0.197	0.13	0.184	0.25	0.32	0.268	0.33	0.454	0.493	0.49	0.582
Protection Rating	IP	IP 20													
Operating Temperatures	°C	from -15°C to +40°C - for lower temperatures, a burner housing heating kit is required (8)													
Storage Temperatures	°C	-25°C to +60°C													
		Connections													
Ø gas connection (3)	GAS	UNI/ISO 228/1-G 3/4"		UNI/ISO 228/1-G 3/4"		UNI/ISO 228/1-G 3/4"		UNI/ISO 228/1-G 3/4"		UNI/ISO 228/1-G 3/4"		UNI/ISO 228/1-G 3/4"		UNI/ISO 228/1-G 3/4" (4)	
Intake/exhaust pipes Ø	mm	80/80		80/80		80/80		80/80		80/80		80/80		100/100 (5)	
		Air flow rate													
Air flow rate (15° C)	m^3/h	2000		2700		3100		4300		4500		7800		7900	
Air temperature increase	°C	13.9	21.7	16.4	26.1	18.1	30.0	16.7	27.1	18.4	30.6	15.6	24.8	18.1	33.5
Number and diameter of fans (no. of poles)		1 X Ø350 (6P)		1 X Ø350(4P)		1 X Ø450(6P)		1 X Ø450(4P)		1 X Ø450(4P)		2 X Ø400 (4P)		2 X Ø400 (4P)	
Fans speed	rpm	920		1370		970		1370		1370		1370		1370	
Sound pressure (Lp) (6)	dB(A)	34		44		40		49		49		51		51	
		Weight													
Net Weight	kg	58		58		68		70		78		102		123	
Weight with packaging	kg	73		73		85		88		96		126		149	

NOTES:
* Symbol in compliance with Reg.EU/2281/2016.
(1) Value referred to cat. H (G20)
(2) Weighted value to EN17082 ref. to cat. H (G20), referred to net calorific value (Hi, N.C.V).
(3) The gas line must be dimensioned according to the length of the routing and not to the heater input diameter.
For countries requiring an ISO connection different from the one shown, an adaptor will be supplied.
(4) For LRP102 models, the minimum gas supply duct diameter must be UNI/ISO 228/1- G 1".
(5) Ø100/100 obtained by using adaptors supplied as standard.
(6) Measured at a distance of 6 m from the machine.
(7) Weighted value to EN17082 ref. to cat. H (G20), referred to gross calorific value (Hs, G.C.V).
(8) If the burner housing heater kit is installed, add 105 W (230V) to the rated power value on the nameplate.

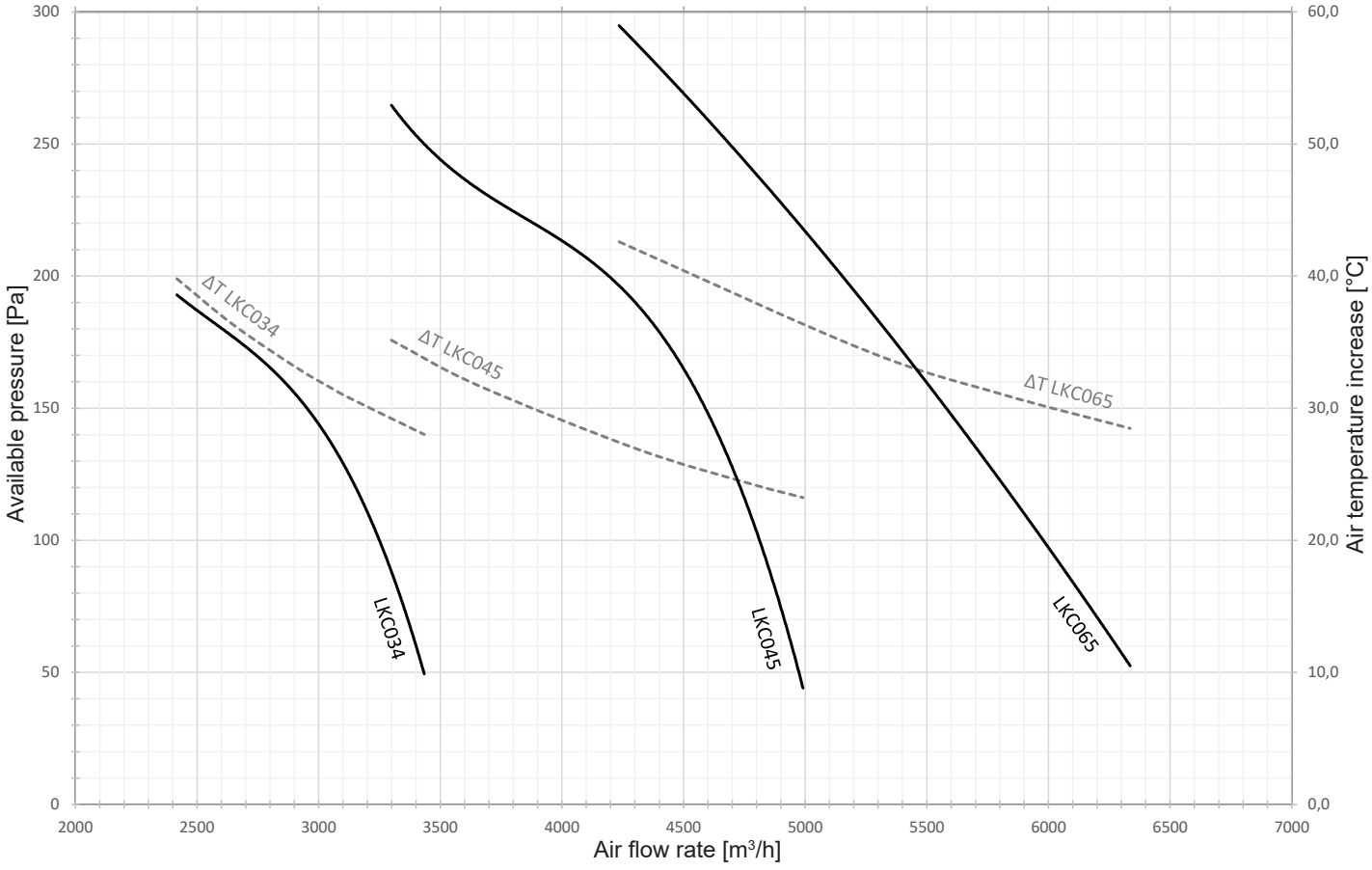
Model		LK020		LK034		LK045		LK065		LK080		LK105	
Type of equipment		B23 - B23P - C13 - C33 - C43 - C53 - C63											
EC approval	PIN.	0476CQ0451											
NOx class [EN1020:2009]	Val	5											
Type of fuel		Gaseous											
		Heater Performance											
		min	max	min	max	min	max	min	max	min	max	min	max
Burner heat output (Hi)	kW	4.75	19.00*	7.60	34.85	8.50	42.00	12.40	65.00	16.40	82.00	21.00	100.00
Useful heat output [P_{min}, P_{rated}]*	kW	4.97	18.18	8.13	33.56	8.97	40.45	13.40	62.93	17.77	80.03	22.77	97.15
Hi Efficiency (N.C.V.) [η_{pl}, η_{nom}]*	%	104.63	95.68*	106.97	96.30	105.50	96.30	108.06	96.82	108.35	97.60	108.40	97.15
Hs efficiency (G.C.V.) [η_{pl}, η_{nom}]*	%	94.26	86.20	96.37	86.76	95.07	86.76	97.36	87.22	97.62	87.93	97.68	87.52
Flue losses with burner on (Hi)	%	0.4	4.3	0.6	3.7	0.5	3.7	0.2	3.2	0.3	2.4	0.2	2.8
Flue losses with burner off (Hi)	%	<0,1		<0,1		<0,1		<0,1		<0,1		<0,1	
Max. condensation (1)	l/h	0.4		0.9		1.1		2.1		3.3		2.7	
		Flue gas emissions											
Carbon monoxide - CO - (0% of O_2) (2)	ppm	< 5		< 5		< 5		< 5		< 5		< 5	
Emissions of nitrogen oxides - *NOx*** (0% of O_2) (Hi) (3)		29 mg/kWh - 16 ppm		51 mg/kWh - 29 ppm		36 mg/kWh - 20 ppm		45 mg/kWh - 25 ppm		31 mg/kWh - 18 ppm		40 mg/kWh - 23 ppm	
Emissions of nitrogen oxides - *NOx*** (0% of O_2) (Hs) (8)		26 mg/kWh - 15 ppm		46 mg/kWh - 26 ppm		32 mg/kWh - 18 ppm		41 mg/kWh - 23 ppm		28 mg/kWh - 16 ppm		36 mg/kWh - 20 ppm	
Pressure available at the flue	Pa	80		90		100		120		120		120	
		Flue gas temperature, CO_2 content and maximum flue gas flow rate: see gas tables on page 38 and on the following pages											
		Electrical Characteristics											
Supply voltage	V	230 Vac - 50 Hz single-phase											
Rated power	kW	0.147	0.180	0.270	0.310	0.280	0.310	0.420	0.510	0.500	0.613	0.650	0.750
Protection Rating	IP	IP 20											
Operating Temperatures	°C	from -15°C to +40°C - for lower temperatures, a burner housing heating kit is required (9)											
Storage Temperatures	°C	-25°C to +60°C											
		Connections											
Ø gas connection (4)	GAS	UNI/ISO 228/1- G 3/4"		UNI/ISO 228/1- G 3/4"		UNI/ISO 228/1- G 3/4"		UNI/ISO 228/1- G 3/4"		UNI/ISO 228/1- G 3/4" (5)		UNI/ISO 228/1- G 3/4" (5)	
Intake/exhaust pipes Ø	mm	80/80		80/80		80/80		80/80		100/100 (6)		100/100 (6)	
		Air flow rate											
Air flow rate (15° C)	m^3/h	2700		4300		4500		7800		9000		11100	
Air temperature increase	°C	5.28	19.30	5.42	22.37	5.73	25.74	4.92	23.13	5.66	25.49	5.89	25.09
Number and diameter of fans		1 x Ø350		1 x Ø 450		1 x Ø450		2 x Ø400		2 x Ø450		3 x Ø400	
Fans speed	rpm	1370		1370		1370		1370		1370		1370	
Sound pressure (Lp) (7)	dB(A)	44		49		49		51		52		54	
		Weight											
Net Weight	kg	58		72		79		98		129		145	
Weight with packaging	kg	73		90		97		122		155		173	

NOTES:
* Symbol in compliance with Reg.EU/2281/2016.
(1) Max. condensation produced acquired from testing at 30%Qn.
(2) Value referred to cat. H (G20)
(3) Weighted value to EN17082 ref. to cat. H (G20), referred to net calorific value (Hi, N.C.V).
(4) The gas line must be dimensioned according to the length of the routing and not to the heater input diameter.
For countries requiring an ISO connection different from the one shown, an adaptor will be supplied.
(5) For the LK080 and LK105 models, the minimum gas supply duct diameter must be UNI/ISO 228/1- G 1".
(6) Ø100/100 obtained by using adaptors supplied as standard.
(7) Measured at a distance of 6 m from the machine.
(8) Weighted value to EN17082 ref. to cat. H (G20), referred to gross calorific value (Hs, G.C.V).
(9) If the burner housing heater kit is installed, add 105 W (230V) to the rated power value on the nameplate.

3.2. Technical data of centrifugal models

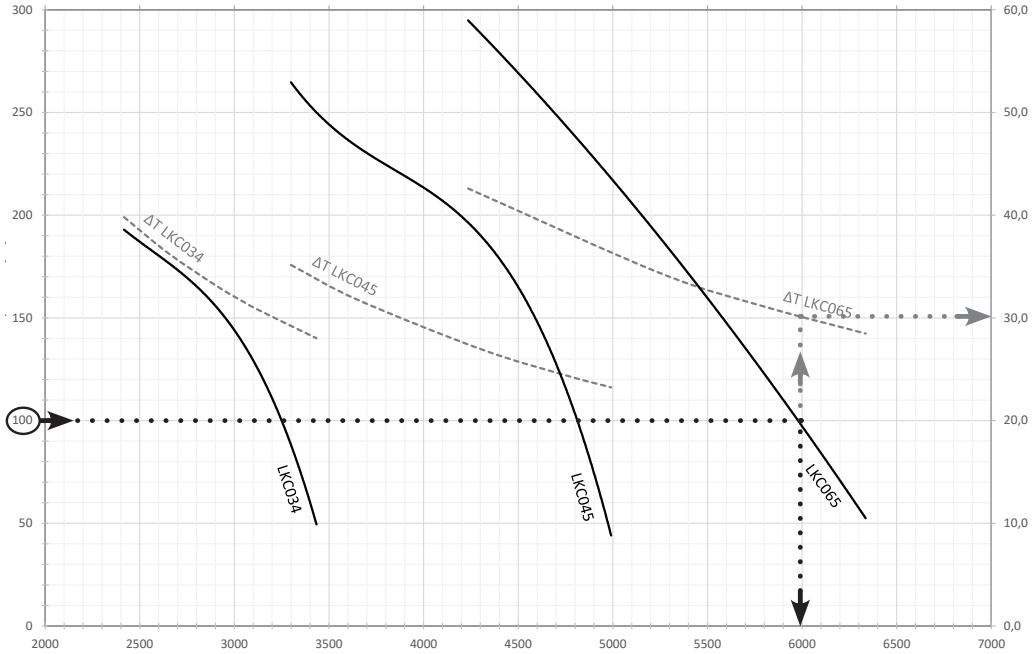
Model*		LKC034	LKC045	LKC065
Type of equipment		B23 - B23P - C13 - C33 - C43 - C53 - C63		
EC approval	PIN.	0476CQ0451		
NOx class [EN1020:2009]	Val	4		
Type of fuel		Gaseous		
		Heater Performance		
		See LK034	See LK045	See LK065
		Flue gas emissions		
		See LK034	See LK045	See LK065
		Electrical Characteristics		
		See LK034	See LK045	See LK065
		Connections		
		See LK034	See LK045	See LK065
		Air flow rate		
Air flow rate (15° C)	m³/h	3050	4650	5650
Available pressure	Pa	140	140	140
Rated power	kW	1.120	1.260	2.080

Graph "Air flow rate - pressure drop" of centrifugal heaters



The graph shows the air flow rate curves according to the pressure loss of the LKC centrifugal heaters and the air temperature increase curves (ΔT) based on the flow rate (dashed curves) for the same models.

Following is a graph reading example:



Model LKC045

Available pressure: 100 Pa

Air flow rate: 4800 m^3/h

ΔT: 28°C

3.3. REGULATION (EU) 2016/2281

Product Information in accordance with Annex 2 point 5 a)

Model:	See table
Warm air heaters B1 [yes/no]:	No
Warm air heaters C2 [yes/no]:	No
Warm air heaters C2 [yes/no]:	No
Type of fuel [gaseous/liquid/electricity]:	Gaseous

Model	Capacity		Useful efficiency		Other elements					Consumption of Power supply		
	Rated heating capacity	Minimum capacity	Useful efficiency at rated heating capacity	Useful efficiency at minimum capacity	Casing loss factor	Ignition burner consumption	Emissions of nitrogen oxides	Output efficiency	Seasonal space heating energy efficiency	At rated heating capacity	At minimum capacity	In stand-by mode
	$P_{rated,h}$	P_{min}	η_{nom}	η_{pl}	F_{env}	P_{ign}	NO_x	$\eta_{s,flow}$	$\eta_{s,h}$	el_{max}	el_{min}	el_{sb}
	kW	kW	%	%	%	kW	mg/kWh ref. GCV	%	%	kW	kW	kW
LRP018	15.1	9.7	82.6	86.2	0.0	0.0	46	94.9	78.3	0.063	0.024	0.005
LRP028	24.6	15.4	82.1	86.7	0.0	0.0	49	93.8	78.1	0.069	0.023	0.005
LRP035	31.9	19.6	83.8	87.1	0.0	0.0	38	93.1	78.2	0.074	0.023	0.005
LRP045	40.2	25.0	83.1	86.7	0.0	0.0	49	93.7	78.3	0.074	0.026	0.005
LRP055	48.1	28.9	82.9	87.1	0.0	0.0	42	92.9	78.1	0.102	0.028	0.005
LRP075	67.5	42.5	82.6	86.2	0.0	0.0	54	94.1	78.2	0.112	0.033	0.005
LRP102	91.1	49.9	82.0	86.8	0.0	0.0	60	92.9	78.1	0.121	0.030	0.005
LK020	18.2	5.0	86.1	94.3	0.0	0.0	26	97.5	90.4	0.045	0.011	0.005
LK034	33.6	8.1	86.7	96.3	0.0	0.0	46	97.3	92.1	0.074	0.011	0.005
LK045	40.6	9.0	87.0	95.0	0.0	0.0	32	97	90.7	0.082	0.024	0.005
LK065	62.9	13.4	87.2	97.3	0.0	0.0	41	97.4	93.2	0.097	0.015	0.005
LK080	80.0	17.8	87.9	97.6	0.0	0.0	28	97.1	93.1	0.123	0.040	0.005
LK105	97.2	22.8	87.5	97.6	0.0	0.0	36	97.0	93.1	0.130	0.020	0.005
LKC034	33.6	8.1	86.7	96.3	0.0	0.0	46	96.1	86.2	0.074	0.011	0.005
LKC045	40.6	9.0	87.0	95.0	0.0	0.0	32	97.1	86.0	0.082	0.024	0.005
LKC065	62.9	13.4	87.2	97.3	0.0	0.0	41	96.3	87.4	0.097	0.015	0.005

3.4. Noise

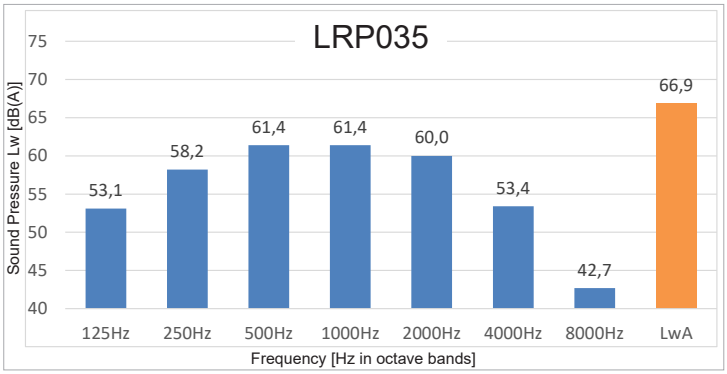
Sound power

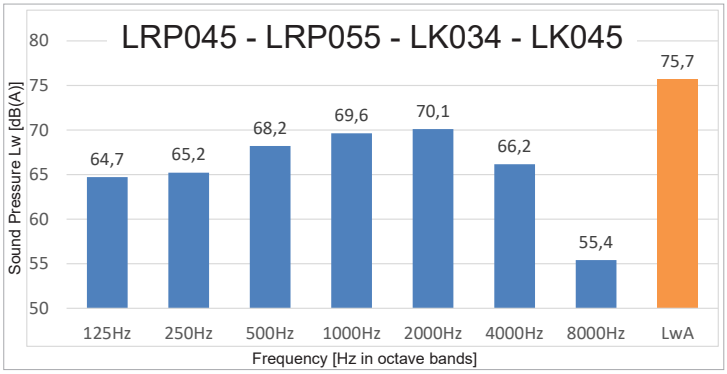
The sound power of a source (energy emitted per unit time) is a characteristic of the same source and does not depend on the environment in which the sound is emitted: this measurement allows comparing the noise of different machines.
The sound power of the LK and LRP warm air heaters has been measured in a reverberation room according to the following standard:

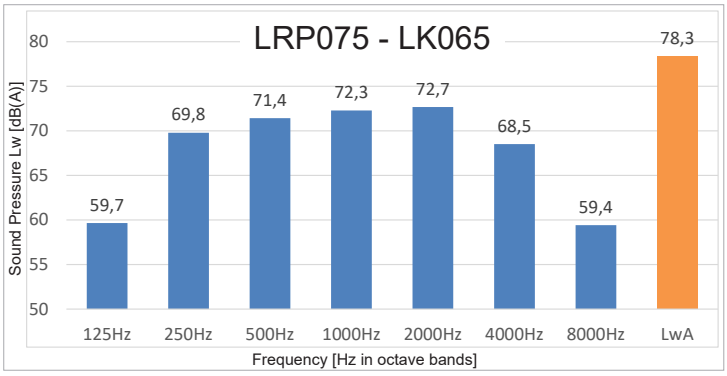
ISO 3741 Acustica - Determinazione dei livelli di potenza sonora e dei livelli di energia sonora delle sorgenti di rumore mediante misurazione della pressione sonora - Metodi di laboratorio in camere riverberanti

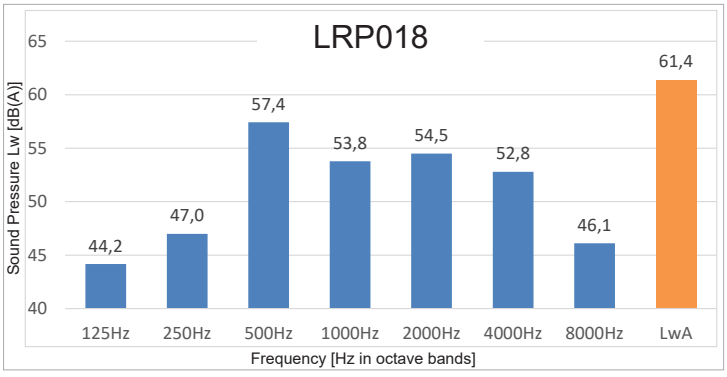
ISO 3741 Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for reverberation test rooms

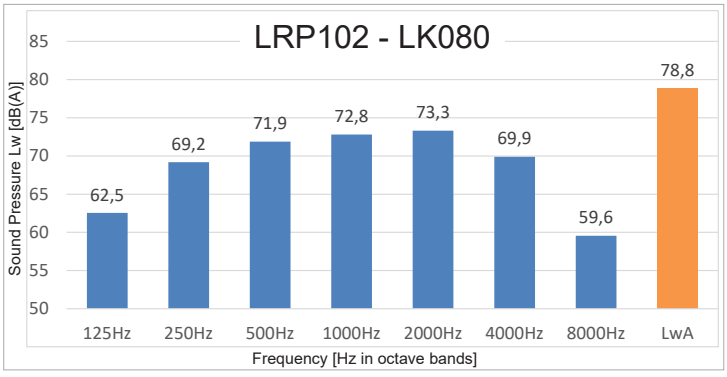
APEN GROUP has chosen to use one-speed fans favouring the air flow rate to increase the system output, decrease the stratification in the room and thus the time required to heat the room.

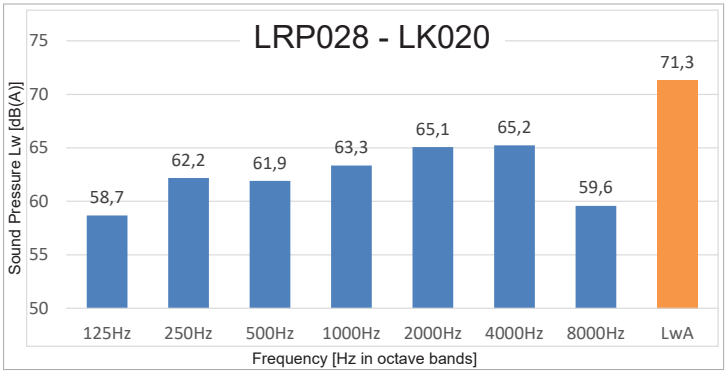


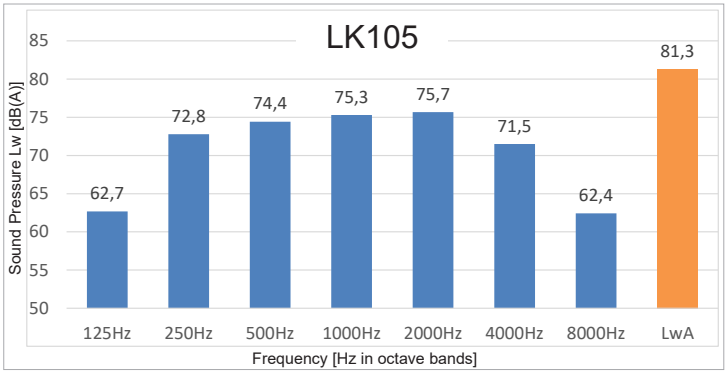






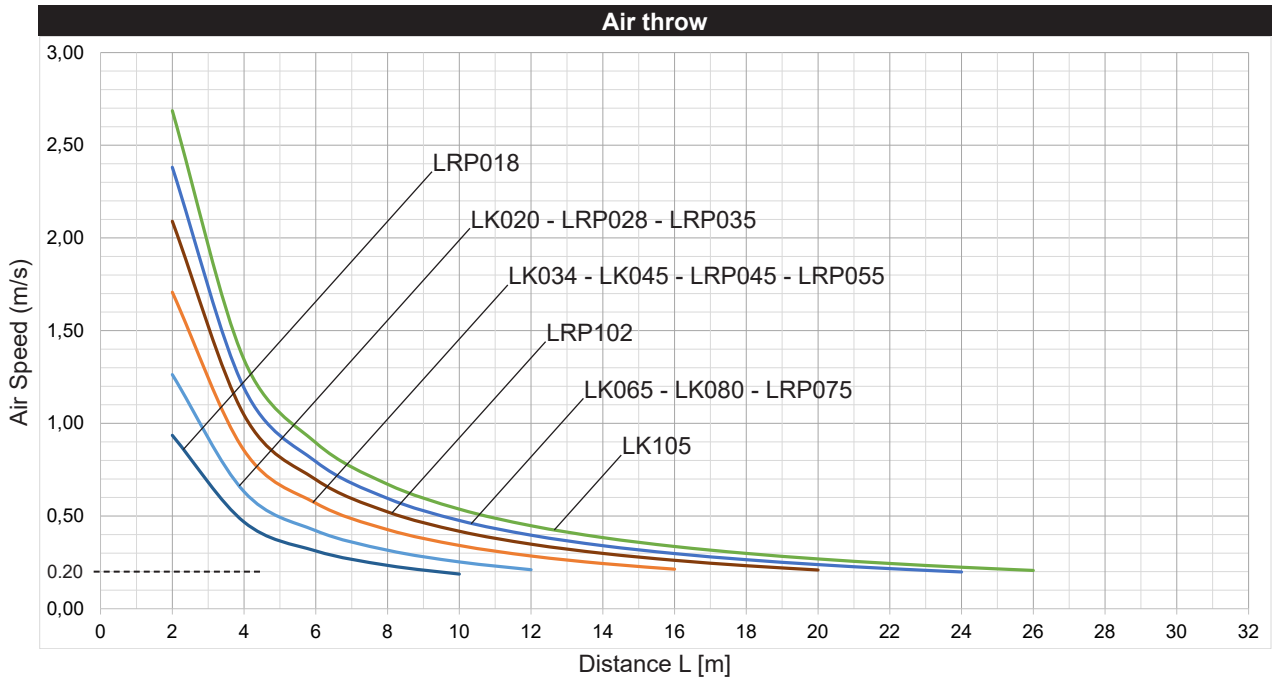




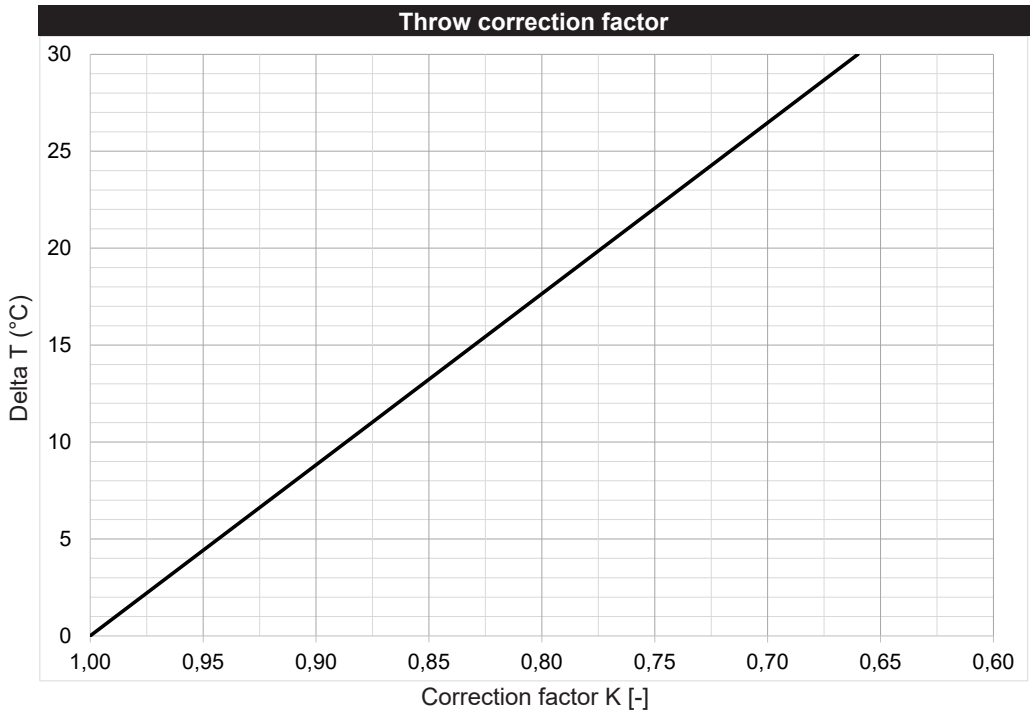


3.5. Air flow performance

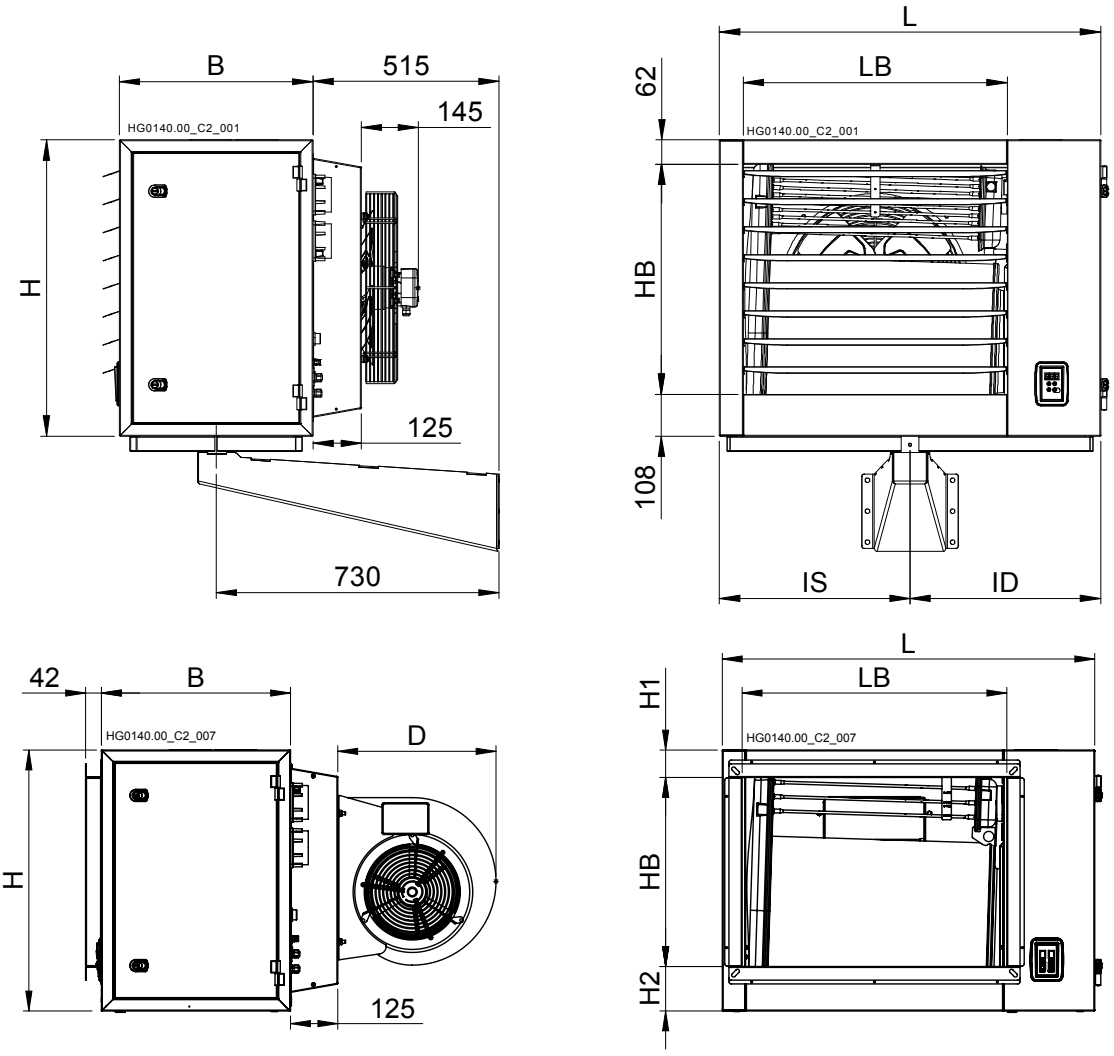
The air flow range, or air throw, is the distance reached by the air jet before its speed decreases and equals the reference speed, assumed to be 0.2 m/s.
The throw depends on the speed of the air leaving the heater, which in turn depends on the air flow rate and on the section of the heater air passage.
Below is a graph showing the air speed as a function of the distance from the heater outlet. The curves shown in the graph refer to isothermal air throw conditions (i.e. with the warm air heater switched off and therefore at constant air temperature over the entire supply surface) and with horizontal and parallel supply fins.



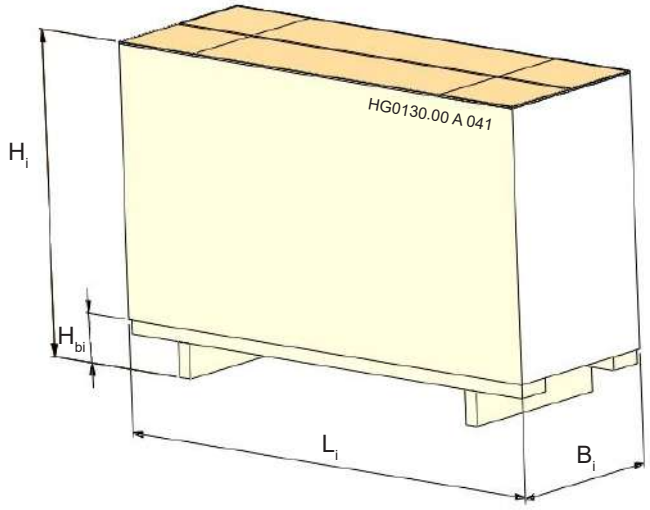
In non-isothermal conditions (warm air heater operating) the air throw is reduced proportionally to the temperature difference between the warm supply air and the room air ("air temperature increase" ΔT values - see table "Technical data", paragraph 3.1). For example, with a ΔT of 15K, the throw is about 83% of the isothermal throw.
The corrected throw value (Lc) on the basis of the ΔT is as follows: **Lc = L * K**

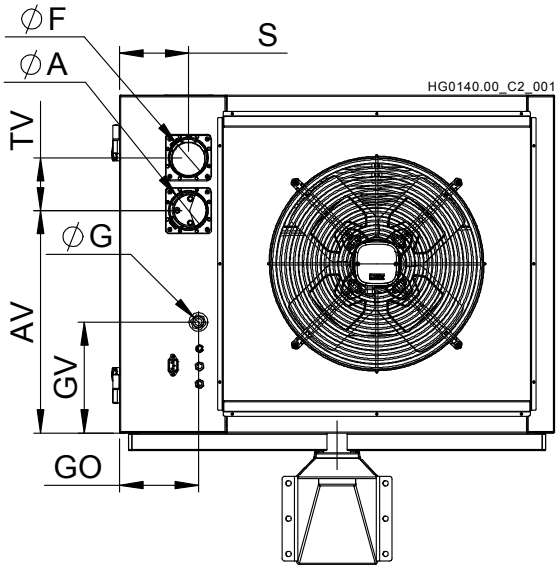


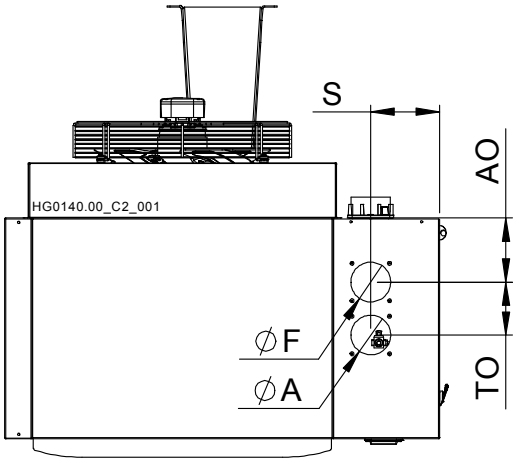
3.6. Dimensions



Mod. LRP and LK	Overall dimensions				Louver				Shelf		Supply GAS			Packaging			
	B	H	L	D	HB	LB	H1	H2	IS	ID	ØG	GO	GV	Bi	Li	Hi	Hbi
LRP018,LRP028, LK020	500	690	795		520	490			395	400	3/4"	180	255	815	870	850	118
LRP035,LRP045, LK034			985			680			490	495					1065		
LRP055, LK045		765			595											920	
LRP075, LK065			1310			1010			605	710					1395		
LRP102, LK080		845	1515		675	1180			720	795		210	275		1595	1040	
LK105			1740			1410			805	935					1820		
LKC034		690	985	425	500	700	74	118				180	255	1165	1065	850	112
LKC045		765		490	600		61	105								920	
LKC065			1310	420		1000								1115	1400		







Mod. LRP and LK	Horizontal exhausts (STD)				
	A	F	AV	TV	S
LRP018, LRP028, LK020	80	80	430	120	155
LRP035, LRP045, LK034					
LRP055, LK045			505		
LRP075, LK065					
LRP102, LK080	100*	100*	560	140	185
LK105					

* Obtained by using the adaptors supplied as standard

Mod. LRP and LK	Vertical drains (OPT.)				
	A	F	AO	TO	S
LRP018, LRP028, LK020	80	80	145	120	155
LRP035, LRP045, LK034					
LRP055, LK045					
LRP075, LK065					
LRP102, LK080	100*	100*		140	185
LK105					

* Obtained by using the adaptors supplied as standard

4. USER'S INSTRUCTIONS

4.1. Operating Cycle

The wall mounted LRP and LK heaters operation is fully automatic; they are equipped with electronic equipment with self check facility that manages all the burner control and monitoring operations and with a microprocessor based electronic PCB that controls the heat output regulation.

The heat demand depends on the parameter d0 setting of the heater PCB:
- d0=2: input ID2-IDC2 closed and NTC1<ST1;
- d0=5: input ID2-IDC2 closed and input 0-10Vdc>Von;
- d0=7: input ID2-IDC2 closed and control from Modbus ON.

The boiler is switched on when the following two conditions are met:
- the heater is powered on and has not been locked out;
- when the contact is closed on terminals ID2/IDC2 of the heater PCB.

In these conditions the burner fan will be immediately started; after pre-cleaning time has elapsed, the flame will light up with an ignition power equal to approximately 30% of its maximum output. Once the flame stabilising time has expired, the burner will start to modulate its heat output according to the supply air temperature.
If there is no flame during the ignition phase, the heater will make other 4 ignition attempts; at the fifth attempt, if ignition is not successful, the heater will be locked out.
The heater will be switched off when the ID2/IDC2 contact opens on the terminal box; disconnecting the power supply is prohibited, except for emergencies because, when the heater is switched off, the fume extractor fan will continue to work for approximately 90 seconds to clean up the combustion chamber (combustion chamber post-cleaning phase).
Failure to perform the post-cooling operations on the exchanger will cause:
- a shorter lifetime of the exchanger and the guarantee will be null and void;
- the safety thermostat to operate and the associated requirement to manually reset the heater.

If, during the cooling cycle, there is a new demand for heat, the modulation PCB will wait for the cooling fans to shut down and then reset the counters and start a new cycle.
Parameter **d6** of the modulation PCB, which can be programmed from 0 to 256 seconds, controls the minimum interval between the time the equipment is switched off and restarted.

IMPORTANT: Powering off the machine before completing the cooling cycle and/or with machine set to ON is strictly prohibited. Failure to follow these instructions shall invalidate the warranty and cause early deterioration of the heat exchanger.

4.2. Interface Panel

The LRP and LK heaters are fitted as standard with a multifunction LCD panel located on the front panel of the suspended heater, which is used to control, configure and diagnose all operating parameters of the equipment.
This panel cannot be remotely controlled.

The panel is fitted with a red 3-digit LCD display and with four function keys: ↑ , ↓ , ESC and ENTER; the display allows the user to display the heater operating mode and its Faults.
It also allows the service centre to change the main operating parameters.
Changing parameters requires a password.

Viewing the machine status
The machine status is shown on the display by the following wordings:

rdy the machine is on without burner flame, it is waiting for the ON control and/or the heat demand from the thermostat;

On the machine is on with burner flame or is in the ignition phase;

OFF the machine is turned off by the control on the LCD. **Any heat demands will be ignored.** To light the burner, the LCD must show the wording "heater ON";

Fxx Fault detected.

During normal operation, the display will show the wording **On** if the burner is on; **rdy** when the boiler is being switched off or the room temperature has been reached.

Air **the EST operation has been selected under the FUN menu; set FUN to ON or OFF;**

Axx **LRP or LK heater address;** If the heater has an address other than Ø, the display will show, alternating it with the operation in progress, the address assigned to the heater.

In the event of communication problems between CPU-SMART PCB and LCD panel, the word **CPU** will flash on the display if the problem is caused by the CPU; three flashing dots will be displayed if the problem is caused by the display PCB. If needs be, check that the display and the PCB are correctly connected and that the small cable RJ11 is securely held in the connector.

Navigating the menu
The menu has three levels. The first is accessible without entering a password, the second and third require entering second level passwords to change the parameters.
If the LRP or LK heater PCB is connected to a Smart Web or Easy, and therefore with an address different from Ø, all parameters can be viewed and modified from the remote control. The service centre requiring to work on such parameters must enter the relevant level password.

Use the arrows to scroll the menus: ↑ (up arrow) and ↓ (down arrow). Press ENTER to select the menu, and again to select the parameter. Change the parameter with the arrows and confirm the change by pressing ENTER.
To exit the parameter or menu, press ESC. If you exit the programming function, after about 10 minutes the program will exit the menu and go back to the "machine status" display.
To change the parameter, press the arrow keys: pressing ↑ (up arrow) increases the parameter by 1, pressing ↓ (down arrow) reduces it by 1. When the arrows keys are pressed for at least three seconds, the parameter scrolling speed is increased.

To confirm a change in parameters, press ENTER for at least 3 seconds. A change in the parameter is indicate by the display flashing.
All submenus can be scrolled from the bottom to the top, and they start over when the end of the menu is reached.

First level menus
The following menus are available on the first level:

machine status	provides information about its operation (ex. rdy, ON, OFF);
FUN	from FUN it is possible to select the function ON, OFF or SUM;
REG	this menu allows the user to force the burner to the minimum or the maximum for combustion tests; it automatically returns to the previous position at the end of the preset time (10 minutes);
TIN	allows the user to read the value of the 0/10 Vdc signal (if present) to the heater input;
Pra	not used;
ABI	used to enter the PWD to access and modify the second and third level menus;
Prt	it displays the value of the instantaneous heat input [kW];
Con	it displays the value of the instantaneous gas consumption [m3/h].
Frc	it allows operating the circulator manually (if any)

Entering the password
- From the initial screen (ON/OFF/rdy/FXX) use the ↑ (up arrow) and ↓ (down arrow) keys to reach the ABI function; hold down the ENTER key for 3 seconds;
- Set the password inside the ABI and menu confirm it with ENTER; hold it down per approximately 3 seconds (the flashing display will confirm that the parameter has been stored);
- Press ESC and, by using the ↑ and ↓ arrow keys, return to the initial screen (ON/OFF/rdy/FXX); press ENTER for 3 seconds;
- Use the ↑ and ↓ arrow keys to reach the desired menu item (Flt, I/O, SET, PAR);
- Press ENTER to access the function;
- Use the ↑ and ↓ arrow keys to select the parameters to be displayed and edited;
- Press ENTER to display the parameter value;
- Use the ↑ and ↓ arrow keys to edit the value (only SET and PAR);
- Press ENTER to confirm the change made;
- To exit the parameter and the menu, press ESC until the initial screen is displayed (ON/OFF/rdy/FXX).

Second and third level menus
The second and third level menus are reserved to the Service Centre and said parameters can be modified only by entering a password, which can be requested to the manufacturer's Service Centre. For more detail, see Paragraph 7.3 "Programming with a LCD panel".

4.3. Reset and Fault index

In case of lockout, the modulation PCB of the heater allows the operator to identify about thirty different causes of lockouts with a code. This makes it possible to manage each event very accurately.
To reset the Fault and unlock the heater, simply press the two LDC panel arrow keys (↑ and ↓) simultaneously for at least 3 seconds or operate one of the remote controls provided, if any.
Lockouts may be remotely controlled by using:
- the digital input ID4-IDC4 - button N.O.;
- the Smart Web/Easy - optional;
- the ModBus protocol.

The Faults are classified according to the type of error; the most common and easier to sort out by user are:
F1x these faults are caused by the burner failed ignition; they all require a manual reset.
F20 heater safety thermostat lockout; this fault must be manually reset.
F22 opening of the safety thermostat of the heater at start-up, due to a fault or to a temperature below -20°C.
F21 jumper missing across terminals ID1 and IDC1.
F3x lockouts caused by faults of the fume extractor.
F4x lockouts caused by an error or by a missing temperature probe; they must be sorted out by the Service Centre.
F51 the temperature of the air supplied has exceeded the upper limit set in parameter TH1; as the temperature drops, the lockout will sort itself out; manual reset is not required.
F60 on the LCD panel only, the heater is connected to a Smart Web or Easy but does not communicate. When communication is restored, the lockout condition will disappear; manual reset is not required.
If ignition fails, the flame monitoring system reattempts ignition four times. After four failed attempts, it will lock out and will display the code F10.
If the flame monitoring equipment has locked out (codes from F10 to F20), it can be reset it by using the button on the equipment itself. This lockout is shown by a LED that lights up on the equipment.

The list and meanings of all lockout codes, with any relevant cause, are shown in the FAULT table in Paragraph 5.7 "Analysis of lockouts - faults".

WARNING: The flame monitoring equipment memorises the number of manual resets that are performed during its lifetime. In case of five resets performed in a period of 15 minutes, without a flame being ignited and detected, the equipment will go into a "timed" lockout (F13). In this case, it is required to wait another 15 minutes before resetting it again. Press the reset button on the equipment to immediately reset this lockout condition.

NOTE: SHOULD THE SAFETY THERMOSTAT (STB) BE "OPEN" BEFORE THE START-UP CYCLE IS STARTED, F22 LOCKOUT IS SIGNALLED. THIS CAN OCCUR, FOR EXAMPLE, IN THE PRESENCE OF LOW TEMPERATURES

4.4. Adjustment

The LRP or LK heaters have three heat output regulation modes:
- 0-10 Vdc;
- ModBus;
- NTC1 temperature probe.

NOTE: The NTC1 probe is always active as a limit, even with 0-10V and ModBus regulation modes.

To correctly set the regulation mode, it is necessary to program

d0 parameter, which identifies the type of regulation associated with the heater.

Function	d0 parameter programming	Regulation mode
Modulation Flame	d0=2	NTC1
	d0=5	0-10Vdc
	d0=7	Modbus

Safety thermostats
LRP and LK heaters are fitted with a safety thermostat with automatic reset and positive safety setting. A safety operation of this thermostat occurs when its sensitive component is broken. The breaking of the sensitive element corresponds to a safety intervention. When the thermostat clicks in, through the flame monitoring equipment, the burner stops and the flame equipment is locked out.
The lockout of the unit, caused by the safety thermostat triggering, is indicated on the LCD display of the CPU PCB on board the machine with F20 or F22.
The lockout is classified as "non-volatile" and requires a manual reset.
Near the safety thermostat, there is an NTC1 probe set to the value of the ST1 parameter, which reduces the burner's heat output when the set point is reached, regardless of other input signals. The probe monitors the heat output/cooling air flow ratio. It is not advisable to change the ST1 value without consulting the APEN GROUP Service Centre.

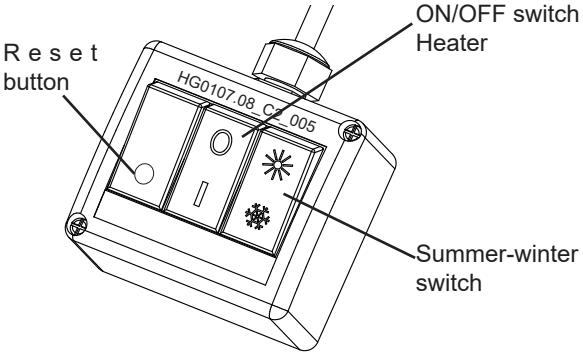
4.5. Accessories

Ambient temperature adjustment
The LRP and LK heaters are supplied without remote control and/or thermostat to regulate the room temperature as they can operate with the most common remote controls available on the market: APEN GROUP can supply several dedicated remote controls that can be integrated as accessories.

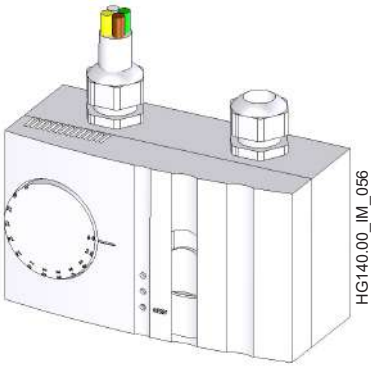
Types of remote control:
- ordinary remote control;
- thermostat or chronothermostat;
- Smart Web (code G27700) or Smart Easy (code G27500).

Instructions on how to operate the accessories can be found in manuals supplied with the accessories.

Operation with ordinary remote control (OPTIONAL)
IT is possible to install an ordinary remote control with a voltage free contact, across terminals ID2/IDC2 of the heater modulation PCB; when the contact opens/closes, the heater switches on/off. To simplify the heater operation, Apen Group can provide an optional accessory (code G27800) that allows its operation to be remotely controlled. The remote control G27800 allows the user to switch the equipment on and off [0/I], to switch between summer/winter, to receive a signal in case of lockout and to operate the reset button.



Operation with thermostat (OPTIONAL)
By connecting to the heater a thermostat with a voltage-free contact between the ID2/IDC2 terminals of the heater modulation PCB.
Apen Group can provide an optional thermostat (code G27400) that allows to switch the heater on/off by means of room temperature control, during heating, and allows managing summer ventilation and remote reset.



Operation with chronothermostat (OPTIONAL)
The heater operation is entirely automatic and, by using a chronothermostat, the ambient temperatures can be regulated. The chronothermostat and the PCB monitor all the control and regulation functions, whilst the safety functions are performed by the flame monitoring equipment and by the safety thermostats.

NOTE: To control the room temperature, *the heater must be connected to a room thermostat (or chronothermostat) or to an ON/OFF switch.*

If a thermostat supplied by third parties is installed, the room temperature must be programmed on the thermostat.
In this type of installation, we recommend that the remote controls G27700 or G27500 shown below are used so that the user can check the lockout conditions and, if necessary, remotely reset the heater.

Operation with SMART series (WEB or EASY) chronothermostat (OPTIONAL)
The remote controls of the Smart series (WEB G27700 or EASY G27500) act as a chronothermostat and can be used to remotely control and manage all the parameters of the heater. Through ModBus protocol, they can be used as a monitoring device for a single zone system at the same temperature, where up to 32 machines can be installed simultaneously, controlled by a single control.

The remote controls of the Smart series are equipped with a colour TFT 4.3" touch screen (480x272 pixel resolution), from

which it is possible to read and adjust all the parameters of the connected devices, performing the function of supervisor/viewer and controller (active part of the regulation) able to:
- display the status of the burners
- display the percentage of modulation
- manage alarms and resets
- manage the units in automatic or manual mode
- manage the weekly and annual calendar planning
- manage the scheduling of daily time slots.

To use the Smart series chronothermostat, simply set, on each heater, the parameter d0 = 7 (ModBus management) with Smart in PID mode. By setting the parameter D0 = 7, but with Smart in ON/OFF mode, the heater will always set to minimum. The address of the modulation boards of the heaters must be set as shown below.
To activate the heating request, close input ID2 of the heater modulation PCB (by closing terminals ID2/IDC2, voltage-free dry contact), and input ID1 of the Smart itself (by closing terminals ID1/GND, voltage-free dry contact).
The Smart (WEB or EASY) remote controls are supplied with a voltage of 12 Vdc +10%/-15%.
An integrated temperature probe allows the management of the room temperature of the controlled area; the remote controls of the Smart series also offer the possibility to connect up to 3 individually programmable remote probes, in addition to the one integrated on board, as main or additional probes, which allow obtaining an average room temperature on 4 points.

The remote NTC probes that can be connected must be of 10 KΩ, β 3435 type and connected to NTC/NTC terminals.

NOTE: The remote NTC probes are optional external probes (code G07202 or G07202); not to be mistaken with the modulation probe NTC1.

The remote controls of the Smart series allow, through the PID regulation, calculating in real time a percentage of modulation of the power needed to reach the desired set-point and sending it to each heater, obtaining economic savings and ensuring a greater degree of room comfort.
The WEB version, in addition, allows the complete management of all the system functions, including unit resets, directly from a PC connected to the network, without having to install any additional software, but simply through a browser interface.

For more information on operation and installation diagrams, please refer to the manual ***HG0060.00 "SMART WEB / SMART EASY CHRONOTHERMOSTAT. Operating, Installation and Programming Manual"***.

Analogue and digital inputs
Should it be necessary to remotely connect one or more analogue inputs, through the connection of an external NTC probe, the relevant cable sections are indicated below according to the cable length:

Type	Length < 50 m	Length < 100 m
NTC	0.5 mm^2	1 mm^2

ATTENTION: All remote controls must have a maximum connection length of less than 10 m and up to 500 m in the case of Smart series chronothermostats.

NOTE: Always keep the cables coming from the analogue and digital inputs separated (about 5 cm) from the power load cables to avoid possible electro-magnetic disturbances. Never insert power cables and signal cables into the same cable duct.

5. INSTALLATION INSTRUCTIONS

Instructions for installing and setting the heater are intended for suitably qualified personnel only.

5.1. General installation instructions

Where allowed, the heater can be installed directly in the room to be heated.
To install the heaters inside the rooms, different regulations and requirements must be complied with according to the type of fuel used and to the country of destination.
In fact, the installer must strictly comply with applicable standards and regulations in the country where the machine will be installed and therefore set up.

Air Vents
The room where gas fired heater will be installed must be provided with one or more air vents.
These air vents must be fitted:
- flush to the ceiling for gases with density lower than 0.8;
- flush to the floor for gases with density higher or equal to 0.8.

The air vents must be fitted to walls facing the open air. The sections must be sized according to the heat output installed.

Condensate drain (LK only)
The heater is supplied completed with water trap to drain the condensation. The water trap is an integral part of the heater and is regarded as a safety component; therefore, replacing it with a different type, not approved by the heater's manufacturer is prohibited.
The condensate must be drained in compliance with standards applicable in the country where the heater is installed.

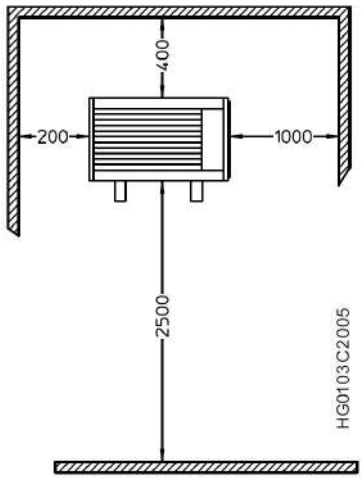
5.2. Installation

The minimum installation distances of the heaters from the walls and the floor, indicated in the following drawing, are necessary for the maintenance activities and are expressed in mm. They refer to walls of at least REI30 type and in class 0. Otherwise, the minimum distances must be:

- > 600 mm from walls
- > 1000 mm from the ceiling.

2500 mm is the minimum height required by the standard to consider the application of "suspended" machines.

MINIMUM DISTANCES TO BE OBSERVED

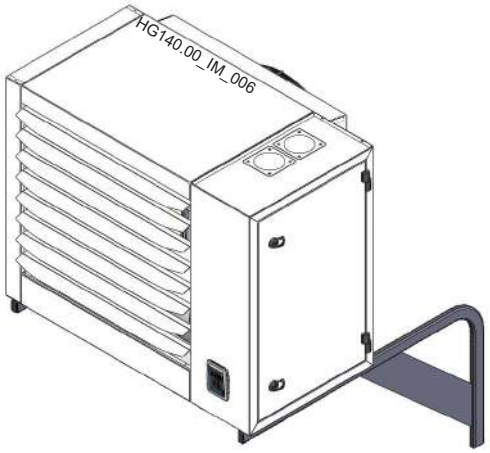


Two types of supporting shelves, fixed and rotating, are available for the installation.
The codes for the available shelves are:
G27900 Fixed shelf kit for LRP018-055 or LK020-045;
G27820 Rotating shelf kit for LRP018-028 or LK020;
G27830 Rotating shelf kit for LRP035-055 or LK034-045;
G27850 Rotating shelf kit for LRP075-102 or LK065-080;
G27870 Rotating bracket kit LK105.

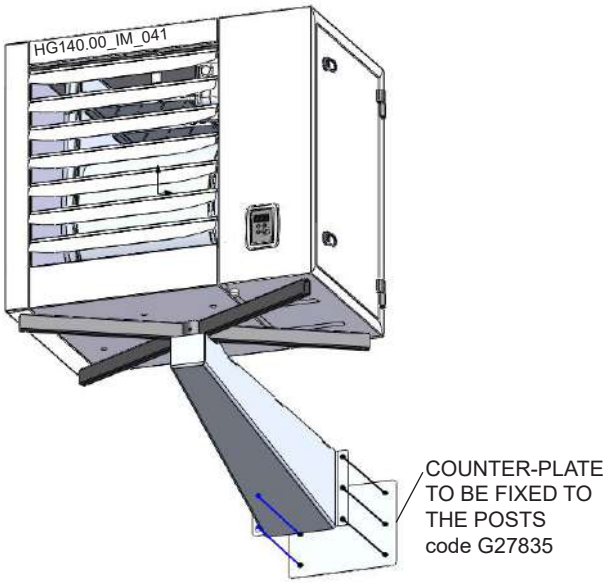
Fixed shelves
To install the fixed shelves to the walls:
- fix it to the wall and level the bracket with a spirit level;
- use the paper template supplied with the heater to correctly position the brackets on the wall;

NOTE: Make sure that the size of the screws and the type of plug are correct for the type of wall and suitable to withstand the weight of the heater.

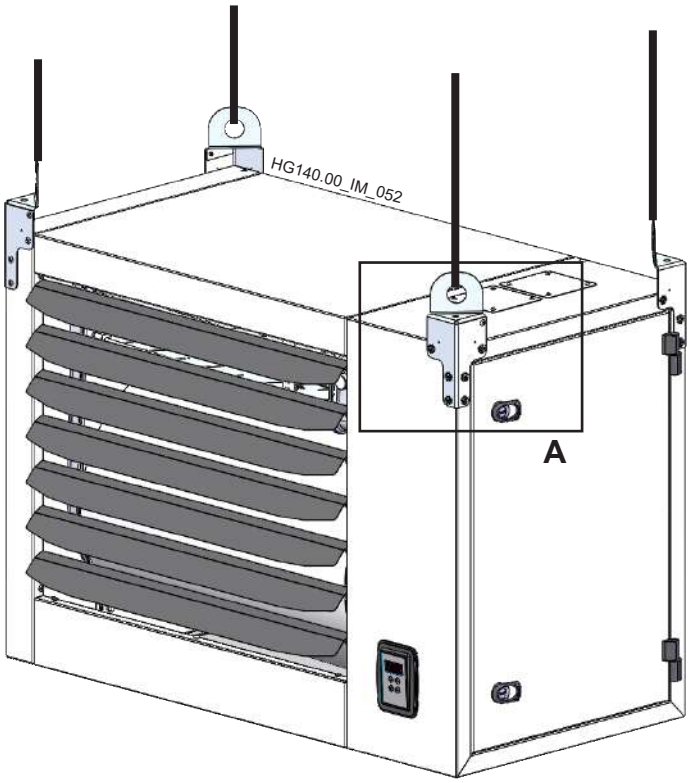
- place the suspended heater by centring it on the brackets in order to match the holes on the heater with the holes on the brackets, taking into account that, for all models, the tips of the brackets are flush with the edge of the suspended heater;
- fix the heater in position with the M8 screws supplied, and insert spring washers between screw and bracket.



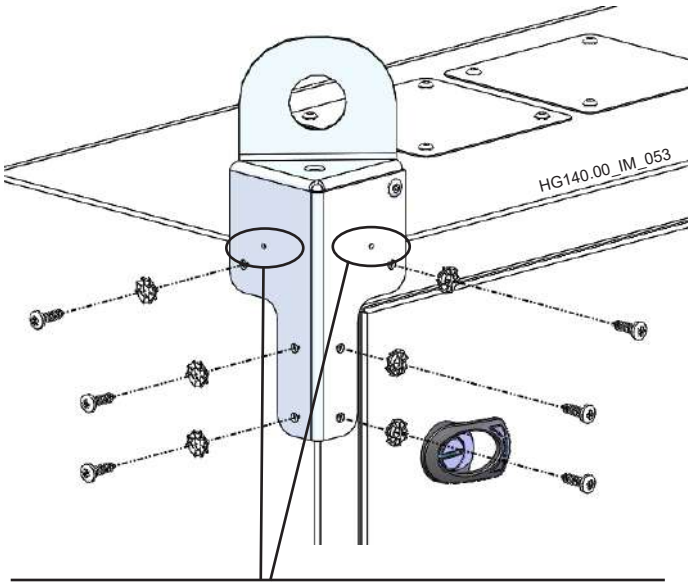
Rotating shelves
The instructions on how to fit the rotating shelf and a paper template to position the shelf onto the wall can be found inside the shelf packaging.
Using rotating shelves is recommended in the following cases:
a) when fitting the heater onto a corner;
b) when fitting the shelf onto a pole;
c) when fitting the heater at a right angle with the wall it is fixed to.



Suspended heater
FOR ALL LRP and LK HEATERS
To install a suspended heater by using chains or threaded bars, a kit containing supporting pins is available as an accessory; its code is: G27940. This kit is suitable for all LRP and LK models.

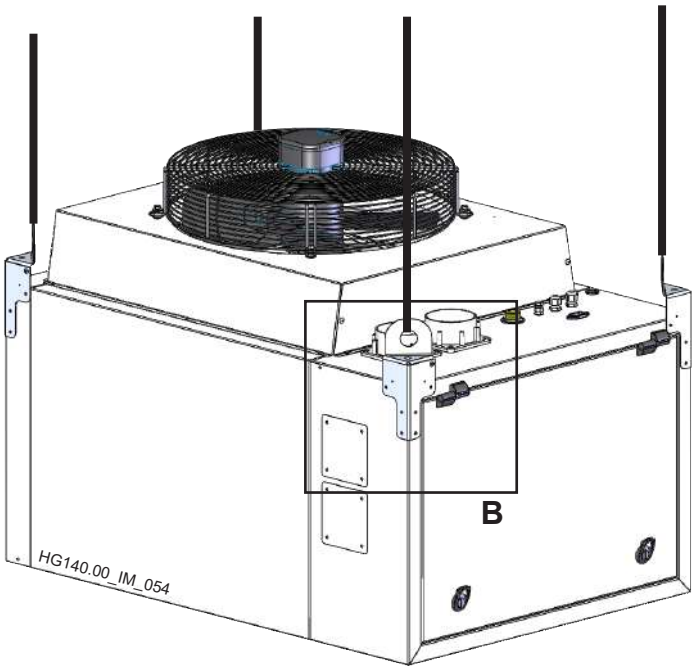


DETAIL **A**:
24 screws and 24 toothed washers included in the kit

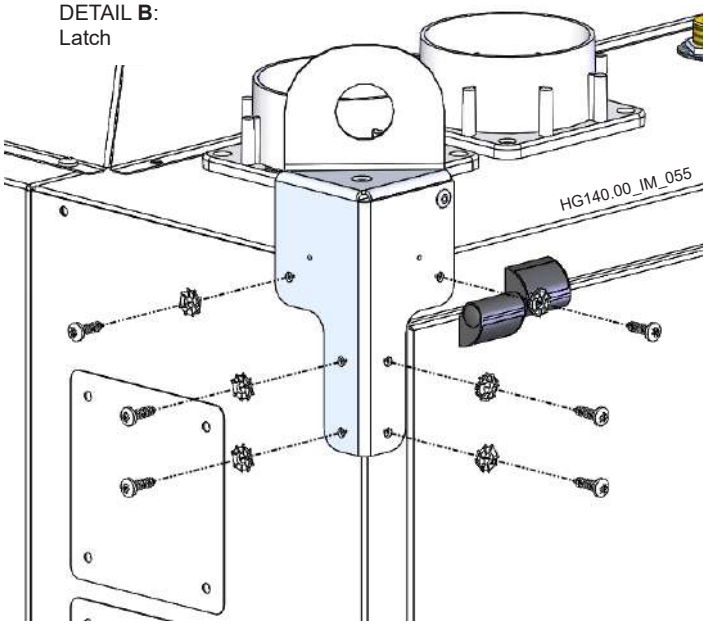


Note: To position the suspension hooks correctly, make sure that the two guide holes on each hook are on the external edge of the upper panel (or rear panel in case of vertical installation) as shown in the figures.

Vertical heater
The heater can be installed with air intake from top to bottom by requesting the kit code G27940 (installation with chains). The kit includes the supporting rings and fixing screws.
IT is important to indicate the vertical configuration (-00V0) of the suspended unit in the order, which includes the thermostat protecting against the overheating of the fan and an additional trap.



DETAIL **B**:
Latch

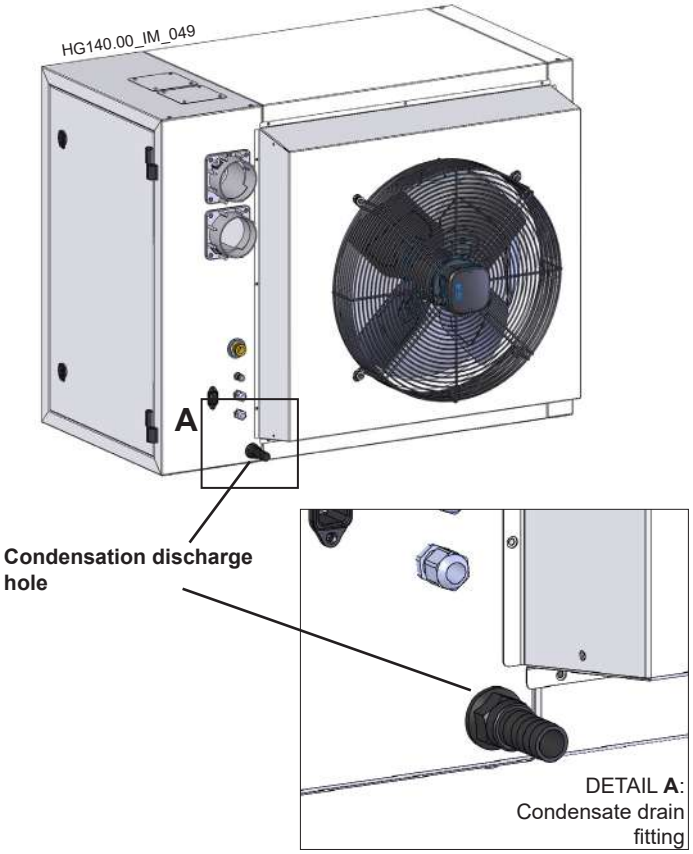


24 screws and 24 toothed washers included in the kit

5.3. Condensate drain

The LK series heaters are flue gas condensing appliances. The lowering of the flue gas temperature in the tube bundle of the heat exchanger causes the formation of condensate that must be duly drained outside the heat exchanger.
To this end, the appliances are already fitted as standard with a condensate drain kit made up of:

- trap equipped with a detection electrode;
- condensate drain fitting (condensate drain hole placed at the back of the appliance).



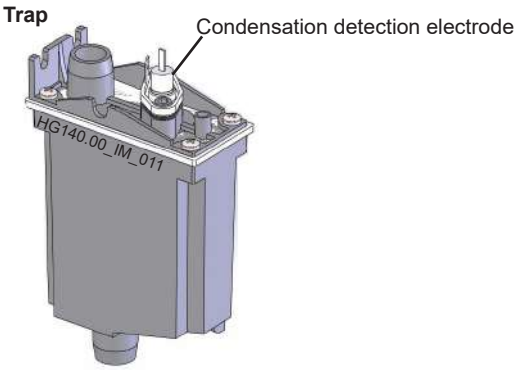
NOTE: during the first installation, remember to remove the condensation drain protection cap, to allow its regular operation.

Connection of the condensate drain fitting

THE condensate drain fitting must be connected with a drain pipe. The condensate drain fitting consists of a straight hose barb quick connector with an external diameter of Ø 19mm. The pipe must be sized according to the maximum amount of condensate produced by the appliance (see Par. "Technical data"), and made of a material suitable for the passage of condensate with an acidity degree between PH 2.8-3.9 (for example: aluminium, stainless steel, silicone, Viton, EPDM, PVC or other suitable plastic material).

ATTENTION: Do NOT use copper, galvanized iron or other material NOT suitable for condensate passage when connecting the condensate drain fitting.

The trap, installed inside the heater, has a condensate detection electrode that shuts down the generator in case the condensate does not flow out correctly from the drain, in order to prevent condensate from remaining inside the heat exchanger. A possible cause of condensate drain failure is the freezing of the condensate within a section of the draining circuit. To prevent the risk of freezing, it is advisable to install the condensate drain pipe as long as possible inside the rooms to be heated.

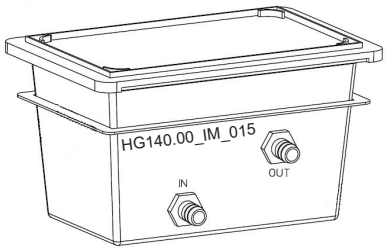


Neutralising the condensation

The condensate produced by the appliance has an acidity degree between PH 2.8-3.9. If required by current regulation, install an acidity neutraliser.
Apen Group can supply different optional kits to neutralise the condensate.
The kits differ according to their capacity, as shown below, and are made up of:

- plastic tray for the collection of condensate (measuring BxHxL 30x18x20cm);
- calcium carbonate bag.

Condensate neutralisation vessel



IT IS possible to convey the condensate deriving from several heaters into a single neutralisation kit, adding the power values together, according to the maximum limit of the kit itself, as follows:

- G14304 120 kW max
- G05750 1500 kW max

CAUTIONS

Special attention must be paid to the condensate drain; an incorrectly installed draining system, in fact, could jeopardize the correct operation of the appliance.

The main factors to be taken into account are:

- risk of condensate build-up inside the heat exchanger;
- risk of condensate water freezing in the pipes.

During normal heater operation, condensate water must not be allowed to accumulate within the heat exchanger. When installing the heater, special attention must be paid to make sure it is perfectly level in order to maintain the typical inclination of the tube bundle.

Additional WARNINGS

- For the condensate drain pipe linear sections, provide for a slope of min. 1%, i.e. 1 cm for each metre (otherwise provide for a booster pump);
- if necessary, install the condensate neutralisation kit in the heated rooms, near the condensate drain fitting of the heater, to prevent condensate water from freezing inside the tray;
- do not drain the condensate in pipes made with materials incompatible with the condensate acidity: risk of corrosion;
- draining condensate into the ground, in a neutralising sump, is generally prohibited, but permitted in the case of isolated settlements, installations or buildings, provided that it complies with regional regulations.

ATTENTION: Heater condensate drain and disposal must be carried out in compliance with current technical standards and regulations in force in the installation country.

5.4. Connections to the Flue

The LRP and LK heaters are fitted with a watertight combustion circuit and with a fan located upstream of the heat exchanger. Connection to the flue, according to where the heater is installed, can be made as "C" type, with combustion air being drawn from outside, or as "B" type with combustion air being drawn from the heater installation site.
More specifically, the heater is certified for the following exhausts: C13-C33-C43-C53-C63-B23-B23P.
EC-CERTIFIED pipes and terminals must be used.
The air intake and fume exhaust terminals must prevent access to a sphere with a diameter higher than or equal to 12mm.

APEN GROUP can supply certified exhaust and intake terminals, which can be purchased separately.

LRP and LK heaters are fitted as standards with horizontal fittings, chimney and air intake, placed at the back of the heater. DURING the installation, the fume exhaust and air intake fittings can be moved to the top section; this is useful when fumes must be exhausted through the roof.
On request, and according to the quantity, the heater can be provided with fittings in the top section to fit a vertical exhaust.
To make the fume exhaust, taking into account that the heaters are of a condensing type, the following material must be used:

- Aluminium with a thickness higher than or equal to 1.5 mm;
- Stainless steel with a thickness of at least 0.6 mm; steel must have a carbon content of maximum 0.2%.

Pipes fitted with a seal must be used in order to prevent that the fumes exit the pipes; the seal must be suitable to withstand fume temperatures ranging between 70°C and 210°C for LRP heaters and 25°C and 130°C for LK heaters.

ATTENTION: IT IS STRICTLY PROHIBITED TO USE PLASTIC MATERIALS ON THE FUME EXHAUST DUCT.

For long fume exhaust pipe sections, it is recommended to install a condensate drain before the heater inlet.

IMPORTANT: The horizontal sections of flue must be installed with a slightly incline (1°- 3°) towards the heater, in order to prevent the build up of condensation in the exhaust.

Insulate the pipe if required to protect the flue from accidental contact.
For the air intake, use:

- Aluminium with a thickness higher than or equal to 1.0 mm;
- Stainless steel with a thickness higher than or equal to 0.4 mm.

Selection Guide
The table showing the fume exhaust system calculation data can be found in Paragraph 7.2 "Gas settings data table".
The maximum permitted recirculation percentage is 11%.

The tables below show the pressure drop for the most used terminals and exhaust ducting.
If the terminal is not directly connected to the heater and, therefore, extra routing is required, according to the length of the ducting, the diameter of the selected terminals, extensions and bends must be checked.
After establishing the routing, the pressure drop must be calculated for each component by referring to the tables below according to the LRP or LK heater used; each component has a different pressure drop value as the glue gases flow rate is different.
Add together the pressure drops of the single components, checking that the result is not higher than the available value for the heater to be used. If a combustion air supply pipe is fitted, the pressure drops must be added to the fume exhaust pressure drops.
If the sum of the pressure drops is higher than the available pressure, ducting with higher diameter must be used, rechecking the calculation; a pressure drop higher than the pressure available at the fume exhaust reduces the heater heat output.

NOTE: If the module is installed indoor:

- the use of coaxial connections is allowed for heaters with a maximum length of 3 metres;
- the fume exhaust terminal must be installed in compliance with reference national regulation requirements.

NOTE: The following pictures show examples of fume exhausts and air intakes that can be made by using the kits available from our catalogue; the table shows the maximum length of the section between the heater and the terminal. If the duct routing requires the use of bends, their length must be subtracted from the available length:

Bend Ø 80	90°	EqL 1.65 m
Bend Ø 80	45°	EqL 0.80 m
Bend Ø 100	90°	EqL 2.30 m
Bend Ø 100	45°	EqL 1.03 m

* Equivalent lengths valid for wide radius bends.

LRP models	018	028	035	045	055	075	102	
Pressure available at the exhaust	80	100	120	120	130	140	140	[Pa]
Component	*Pressure drop [Pa]*							*Code*
Ø80 SMOOTH PIPE [l=1m]	0.8	1.9	3.0	4.6	5.9	10.7	18.2	G15820-08-XXX
BEND Ø80 WIDE RADIUS 90°	1.3	3.3	5.1	7.7	10.0	18.1	31.0	G15810-08-90
BEND Ø80 WIDE RADIUS 45°	0.6	1.5	2.4	3.6	4.7	8.5	14.6	G15810-08-45
Ø80 WALL-MOUNTED TERMINAL FROM SEPARATE TO COAX	7.1	17.1	26.1	38.2	50.5	88.9	149.8	TC13-08-HC1
Ø80 ROOF-MOUNTED TERMINAL FROM SEPARATE TO COAX	7.2	18.9	30.6	47.5	65.6	125.6	226.4	TC33-08-VC1
Ø80 ROOF-MOUNTED TERMINAL, WINDPROOF EXHAUST ONLY	0.0	0.0	0.2	0.4	0.8	2.1	-	TB23-08-VSW
Ø100 SMOOTH PIPE [l=1m]	0.0	0.7	1.0	1.6	2.1	3.6	6.5	G15820-10-XXX
BEND Ø100 WIDE RADIUS 90°	0.0	1.3	2.0	3.2	4.1	7.3	13.1	G15810-10-90
BEND Ø100 WIDE RADIUS 45°	0.0	0.6	0.9	1.5	1.9	3.3	5.9	G15810-10-45
Ø100 WALL-MOUNTED TERMINAL FROM SEPARATE TO COAX	3.8	9.1	14.6	22.7	31.5	61.3	112.0	TC13-10-HC2
Ø100 ROOF-MOUNTED TERMINAL FROM SEPARATE TO COAX	3.0	7.7	12.6	20.2	28.4	56.5	105.0	TC33-10-VC2
Ø100 ROOF-MOUNTED TERMINAL, WINDPROOF EXHAUST ONLY	-	0.1	0.3	0.7	1.2	2.9	6.2	TB23-10-VSW
SMOOTH Ø130 PIPE [l=1m]	0.0	0.2	0.3	0.5	0.6	1.1	1.8	G15820-13-XXX
Ø130 WALL-MOUNTED TERMINAL FROM SEPARATE TO COAX	3.1	3.7	4.7	6.5	8.7	17.0	32.4	TC13-13-HC5
Ø130 ROOF-MOUNTED TERMINAL FROM SEPARATE TO COAX	1.1	2.8	4.6	7.2	10.0	19.3	35.3	TC33-13-VC5
Ø130 ROOF-MOUNTED TERMINAL, WINDPROOF EXHAUST ONLY	-	0.1	0.3	0.7	1.2	2.9	6.2	TB23-13-VSW
ADAPTOR Ø80/100	0.2	0.5	0.8	1.2	1.7	3.4	-	G15815-08-10
ADAPTOR Ø100/80	0.2	0.5	0.8	1.2	1.7	3.4	6.4	G15815-10-08
ADAPTOR Ø100/130	0.1	0.3	0.6	0.9	1.3	2.7	5.0	G15815-10-13
ADAPTOR Ø130/100	0.1	0.2	0.4	0.6	0.8	1.7	3.1	G15815-13-10
COMBUSTION AIR UPTAKE ONLY								
Ø80 HORIZONTAL AIR UPTAKE ONLY	0.5	1.5	2.6	4.3	6.1	12.3	-	TB23-08-HS0
Ø100 HORIZONTAL AIR UPTAKE ONLY	0.3	0.8	1.3	2.1	2.9	5.7	10.4	TB23-10-HS0

LK models	020	034	045	065	080	105	
Pressure available at the exhaust	80	90	100	120	120	120	[Pa]
Component	*Pressure drop [Pa]*						*Code*
Ø80 SMOOTH PIPE [l=1m]	0.8	2.0	2.8	5.8	8.8	12.4	G15820-08-XXX
BEND Ø80 WIDE RADIUS 90°	1.3	3.4	4.8	9.8	14.9	21.1	G15810-08-90
BEND Ø80 WIDE RADIUS 45°	0.6	1.6	2.2	4.6	7.0	9.9	G15810-08-45
Ø80 WALL-MOUNTED TERMINAL FROM SEPARATE TO COAX	9.0	25.3	34.3	70.2	103.4	144.9	TC13-08-HC1
Ø80 ROOF-MOUNTED TERMINAL FROM SEPARATE TO COAX	9.2	29.6	42.0	95.9	149.2	218.2	TC33-08-VC1K
Ø80 ROOF-MOUNTED TERMINAL, WINDPROOF EXHAUST ONLY	-	0.1	0.4	1.4	2.7	4.4	TB23-08-VSW
Ø100 SMOOTH PIPE [l=1m]	0.3	0.7	1.0	2.1	2.9	4.4	G15820-10-XXX
BEND Ø100 WIDE RADIUS 90°	0.5	1.4	1.9	4.1	5.8	8.8	G15810-10-90
BEND Ø100 WIDE RADIUS 45°	0.2	0.6	0.9	1.9	2.6	4.0	G15810-10-45
Ø100 WALL-MOUNTED TERMINAL FROM SEPARATE TO COAX	4.7	14.1	20.0	46.5	73.1	107.9	TC13-10-HC2
Ø100 ROOF-MOUNTED TERMINAL FROM SEPARATE TO COAX	3.8	12.2	17.7	42.5	67.8	101.0	TC33-10-VC2K
Ø100 ROOF-MOUNTED TERMINAL, WINDPROOF EXHAUST ONLY	-	0.3	0.6	2.0	3.7	5.9	TB23-10-VSW
SMOOTH Ø130 PIPE [l=1m]	0.1	0.2	0.3	0.6	0.8	1.2	G15820-13-XXX
Ø130 WALL-MOUNTED TERMINAL FROM SEPARATE TO COAX	3.1	4.6	5.9	12.7	20.5	31.1	TC13-13-HC5
Ø130 ROOF-MOUNTED TERMINAL FROM SEPARATE TO COAX	1.4	4.4	6.3	14.7	23.0	34.0	TC33-13-VC5K
Ø130 ROOF-MOUNTED TERMINAL, WINDPROOF EXHAUST ONLY	-	0.3	0.6	2.0	3.7	5.9	TB23-13-VSW
ADAPTOR Ø80/100	0.2	0.7	1.2	2.6	4.1	6.2	G15815-08-10
ADAPTOR Ø100/80	0.2	0.7	1.2	2.6	4.1	6.2	G15815-10-08
ADAPTOR Ø100/130	0.2	0.6	0.9	2.0	3.2	4.8	G15815-10-13
ADAPTOR Ø130/100	0.1	0.4	0.6	1.2	2.0	3.0	G15815-13-10
COMBUSTION AIR UPTAKE ONLY							
Ø80 HORIZONTAL AIR UPTAKE ONLY	0.6	2.5	4.1	9.2	14.8	22.2	TB23-08-HS0
Ø100 HORIZONTAL AIR UPTAKE ONLY	0.4	1.3	2.0	4.3	6.8	10.0	TB23-10-HS0

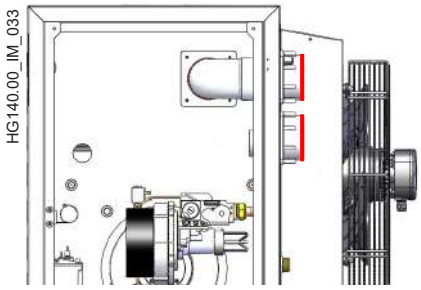
NOTE: Values calculated on the flue gas mass flow rate achieved with natural gas G20.

Installing the terminals
The LRP and LK heaters are fitted with a top and bottom provision for air inlet and fume exhaust.
According to installation requirements, the terminals can be fitted at the back or at the top.
The exhaust and drainage castings are normally installed on the back of the machine; should it be necessary to use the top outlets, remove the castings from the rear section and the covers (with their seals) from the top holes, fit the castings again in their seats on the upper side and the covers (with seals) on the unused rear holes, in order to ensure their tightness.

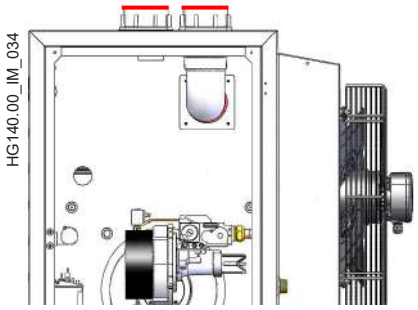
ATTENTION: When changing the intake/exhaust side, pay attention to the mounting direction of the terminals. (UP arrow) DO NOT INVERT the flue outlet terminal with the air intake terminal.

NOTE: The terminals are supplied with silicone seals; on request, only for LK models, a kit with EPDM seals can be requested.

Fume exhaust and rear air intake



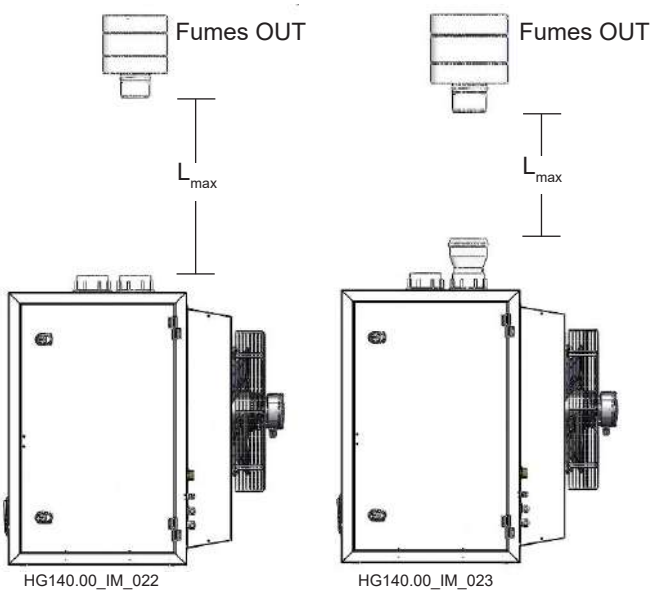
Fume exhaust and upper air intake



Vertical B23 terminal
Open combustion circuit, combustion air intake from the room and exhaust to the outdoor. Standards UNI-CIG 7129 and 7131 require the provision of suitable vents on the walls.

NOTE: In this configuration, combustion air intake requires an IP20 safety meshing to be fitted, which must prevent a solid object with a diameter higher than 12mm from going through; at the same time, the meshing must have holes larger than 8mm.

L_{max} of the pipe routing made with the Ø shown, excluding the terminal.
The terminal consists of:
- Adaptor from LRP or LK outlet to exhaust Ø (where necessary);
- Roof-mounted terminal, only windproof exhaust.



Ø80 pipes and bends: TB23-08-VSW

Mod. LK	020	034	045	065	080	105
L_{max} [m]	30	30	30	15	-	-

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	30	30	30	30	25	10	-

Ø100 pipes and bends: TB23-10-VSW + G15815-08-10 (eccentric adaptor only for mod. LK020-065 and LRP018-075)

Mod. LK	020	034	045	065	080	105
L_{max} [m]	-	-	-	30	30	20

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	-	-	-	-	30	30	25

Type C53 terminal
Combustion circuit watertight to the environment. One of the ducts is connected to the roof, the other to the wall.
L_{max} of the pipe routing made with the Ø shown, excluding the terminal.
The terminal consists of:

- Adaptor from LRP or LK outlet to exhaust Ø (where necessary);
- An adaptor from LRP or LK outlet to intake Ø (where necessary);
- Roof-mounted terminal, only windproof exhaust.

NOTE: The maximum length available has been split in equal parts between the exhaust (L_{1max}) and the intake (L_{2max}); the lengths between intake and exhaust can also be split differently without exceeding the sum shown.

Ø80 pipes and bends: TB23-08-VSW + TB23-08-HS0

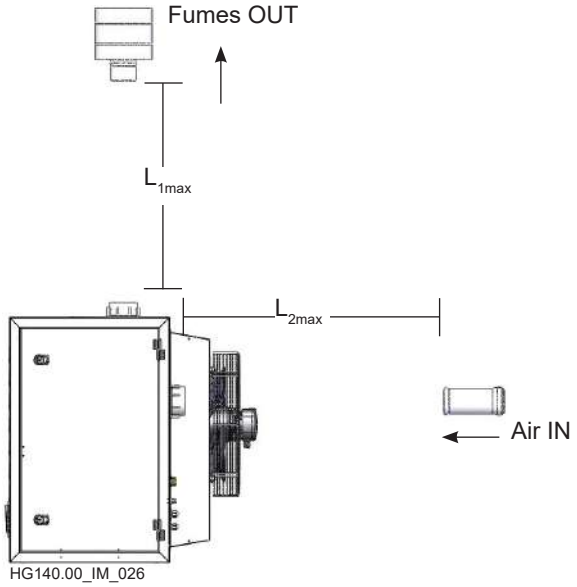
Mod. LK	020	034	045	065	080	105
L_{max} [m]	30+30	20+20	15+15	8+8	-	-

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	30+30	30+30	25+25	15+15	10+10	7+7	-

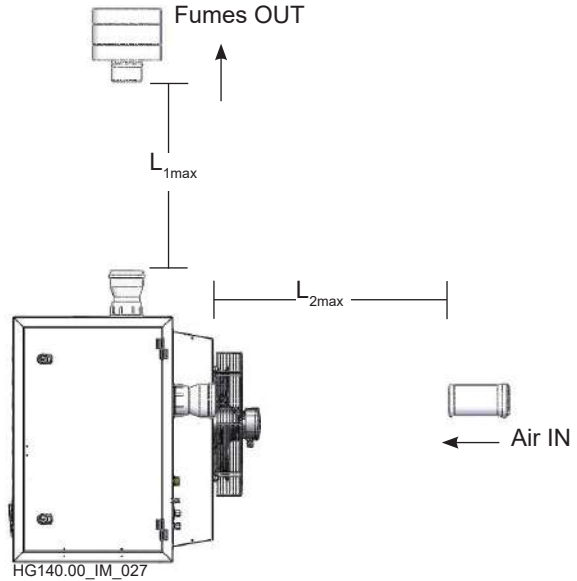
Ø100 pipes and bends: TB23-10-VSW + 2xG15815-08-10 + TB23-10-HS0 (adaptors only for model LK020-065 and LRP018-075)

Mod. LK	020	034	045	065	080	105
L_{max} [m]	-	-	30+30	25+25	15+15	10+10

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	-	-	30+30	30+30	30+30	25+25	10+10



HG140.00_IM_026



HG140.00_IM_027

Horizontal coaxial C13 terminal

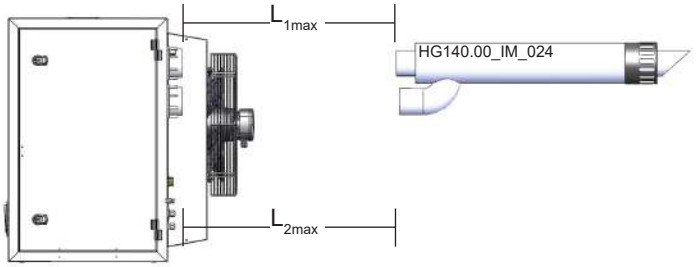
Combustion circuit watertight to the environment. The ducts go directly through the wall.

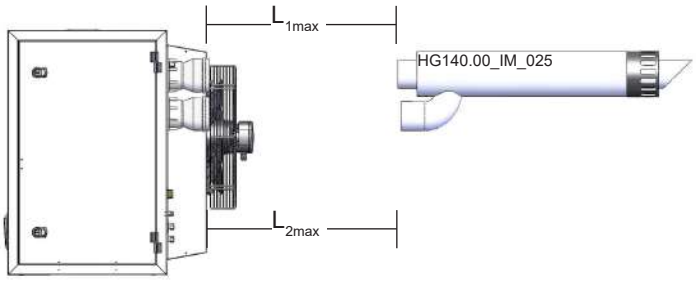
L_{max} of the pipe routing made with the Ø shown, excluding the terminal.

The terminal consists of:

- Adaptor from LRP or LK outlet to exhaust Ø (where necessary);
- An adaptor from LRP or LK outlet to intake Ø (where necessary);
- A horizontal coaxial terminal.

NOTE: The maximum length available has been split in equal parts between the exhaust (L_{1max}) and the intake (L_{2max}); the lengths between intake and exhaust can also be split differently without exceeding the sum shown.





Ø80 pipes and bends: TC13-08-HC1

Mod. LK	020	034	045	065	080	105
L_{max} [m]	30+30	30+30	15+15	5+5	-	-

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	30+30	30+30	20+20	10+10	8+8	2+2	-

Ø100 pipes and bends: TC13-10-HC2 + 2xG15835-08-10 (eccentric adaptors only for mod. LK020-065 and LRP018-075)

Mod. LK	020	034	045	065	080	105
L_{max} [m]	-	-	30+30	15+15	5+5	1+1

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	-	-	30+30	30+30	30+30	10+10	2+2

Ø130 pipes and bends: TC13-13-HC5 + 2xG15815-10-13 + 2xG15810-13-45 (adaptors and bends only suitable to model LK080-105 and LRP102)

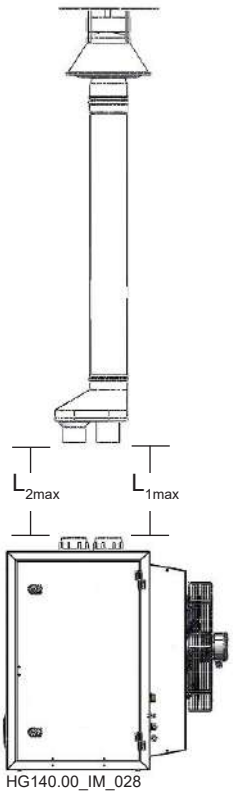
Mod. LK	020	034	045	065	080	105
L_{max} [m]	-	-	-	-	30+30	30+30

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	-	-	-	-	-	-	30+30

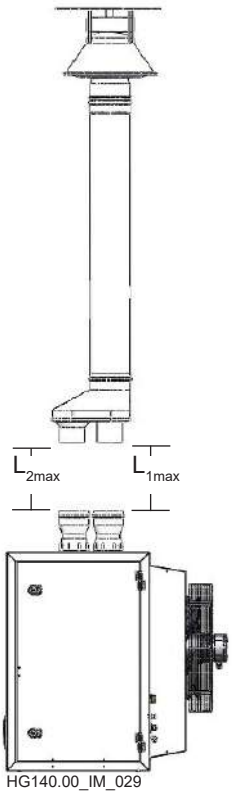
C33 type coaxial roof-mounted terminal
Combustion circuit watertight to the environment. The ducts are connected to the outside with a coaxial terminal.
L_{max} of the pipe routing made with the Ø shown, excluding the terminal.
The terminal consists of:

- Adaptor from LRP or LK outlet to exhaust Ø (where necessary);
- An adaptor from LRP or LK outlet to intake Ø (where necessary);
- Roof-mounted terminal from separate to coaxial.

NOTE: The maximum length available has been split in equal parts between the exhaust (L_{1max}) and the intake (L_{2max}); the lengths between intake and exhaust can also be split differently without exceeding the sum shown.



HG140.00_IM_028



HG140.00_IM_029

Ø80 pipes and bends:
TC33-08-VC1K

Mod. LK	020	034	045	065	080	105
L_{max} [m]	30+30	10+10	8+8	1+1	-	-

TC33-08-VC1

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	30+30	30+30	20+20	10+10	5+5	1+1	-

Ø100 pipes and bends:
TC33-10-VC2K + 2xG15835-08-10 (eccentric adaptors only for mod. LK020-065 and LRP018-075)

Mod. LK	020	034	045	065	080	105
L_{max} [m]	-	30+30	30+30	15+15	8+8	2+2

TC33-10-VC2 + 2xG15835-08-10 (eccentric adaptors only for mod. LK020-065 and LRP018-075)

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	-	-	30+30	30+30	30+30	10+10	2+2

Ø130 pipes and bends:
TC33-13-VC5K +2xG15815-10-13 + 2xG15810-13-45 (adaptors and bends only suitable only for mod. LK080-105)

Mod. LK	020	034	045	065	080	105
L_{max} [m]	-	-	-	-	30+30	25+25

TC33-13-VC5 +2xG15815-10-13 + 2xG15810-13-45 (adaptors and bends only suitable only for mod. LRP102)

Mod. LRP	018	028	035	045	055	075	102
L_{max} [m]	-	-	-	-	-	-	30+30

5.5. Electrical Connections

Power supply

The heater must be correctly connected to an effective earthing system, fitted in compliance with current legislation.

Single phase 230VAC power supply with neutral; do not swap the neutral with the live wire.

For safety reasons, the flame monitoring device prevents operation if phase and neutral are swapped, fault F10.

The heater can be connected to the mains power supply with a plug-socket only if the latter does not allow live and neutral to be swapped.

The electrical system and, more specifically, the cable section, must be suitable for the heater maximum power input, see Paragraph 3.1 "Technical Data" - Table, and in any case not lower than 1.5mm².

Keep power cables away from heat sources.

NOTE: IT IS compulsory to fit, upstream of the heater, a multipole isolator fitted with a suitable electric protection element. The phase, earth and neutral cable section must be at least 1.5mm².

Connecting the room thermostat and the ON/OFF control

It is recommended to connect a room temperature control, to the ID2/IDC2 terminals of the heater PCB, to ensure greater energy savings and a high degree of comfort.

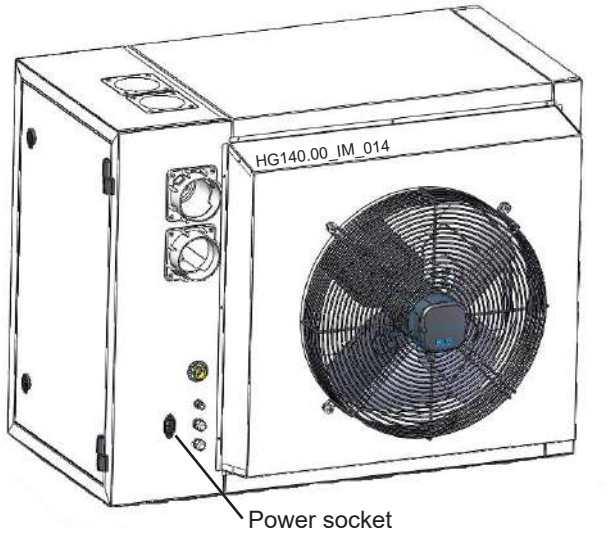
If it is not possible to install a room temperature control, connect an ON/OFF switch to allow the management of the on/off phases of the heater, and avoid disconnecting voltage.

IMPORTANT: Powering off the machine before completing the cooling cycle and/or with machine set to ON is strictly prohibited. Failure to follow these instructions shall invalidate the warranty and cause early deterioration of the heat exchanger.

It is however at the user's and/or installer's discretion to remotely control the heater from the room.

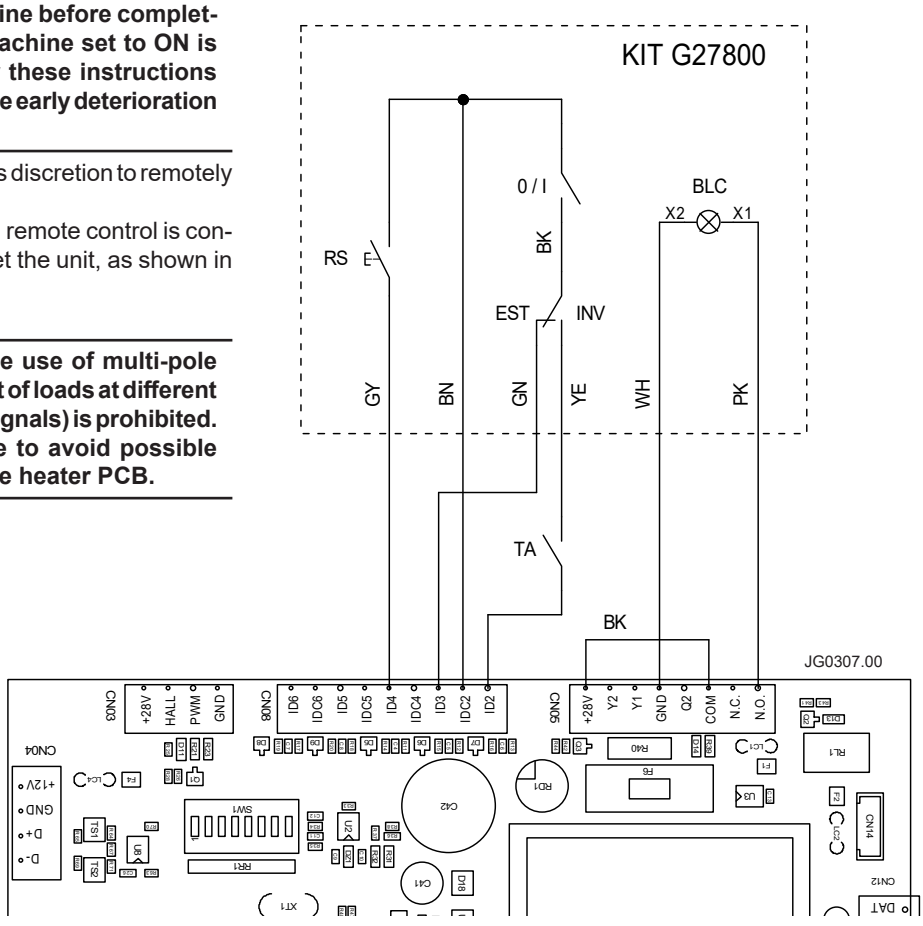
We recommend that at least the G27800 remote control is connected to allow the user to remotely reset the unit, as shown in the diagram on the side.

ATTENTION: For safety reasons, the use of multi-pole cables for the simultaneous transport of loads at different voltages (power supply and control signals) is prohibited. Moreover, keep the cables separate to avoid possible electromagnetic disturbances on the heater PCB.



Key

RS	Reset button
I/O	ON-OFF switch
SUM/WIN	Summer/winter switch
BLC	Lockout indicator light; 24 Vdc
TA	Room thermostat [to be fitted by the installer]
GY	Grey
BN	Brown
GN	Green
BK	Black
YE	Yellow
WH	White
PK	Pink



Smart Web/Easy connection

The Smart Web/Easy must be connected by using the connector provided. Connect the power supply, making sure polarity is correct.

Connect the RS485 network to its terminals, making sure polarity is correct.

For multiple heaters, connect terminals D+ and D-, making sure polarity is correct; the network can be made both as a serial and star network.

NOTE: THE correct address for each PCB must then be set up. Addresses must start from 1 to N without interruptions in the numbering sequence. The address of each PCB, if different from zero, is displayed on the LCD as "Axx", where xx is the address. To program the Smart Web/Easy, please read the operating manual supplied with the accessory.

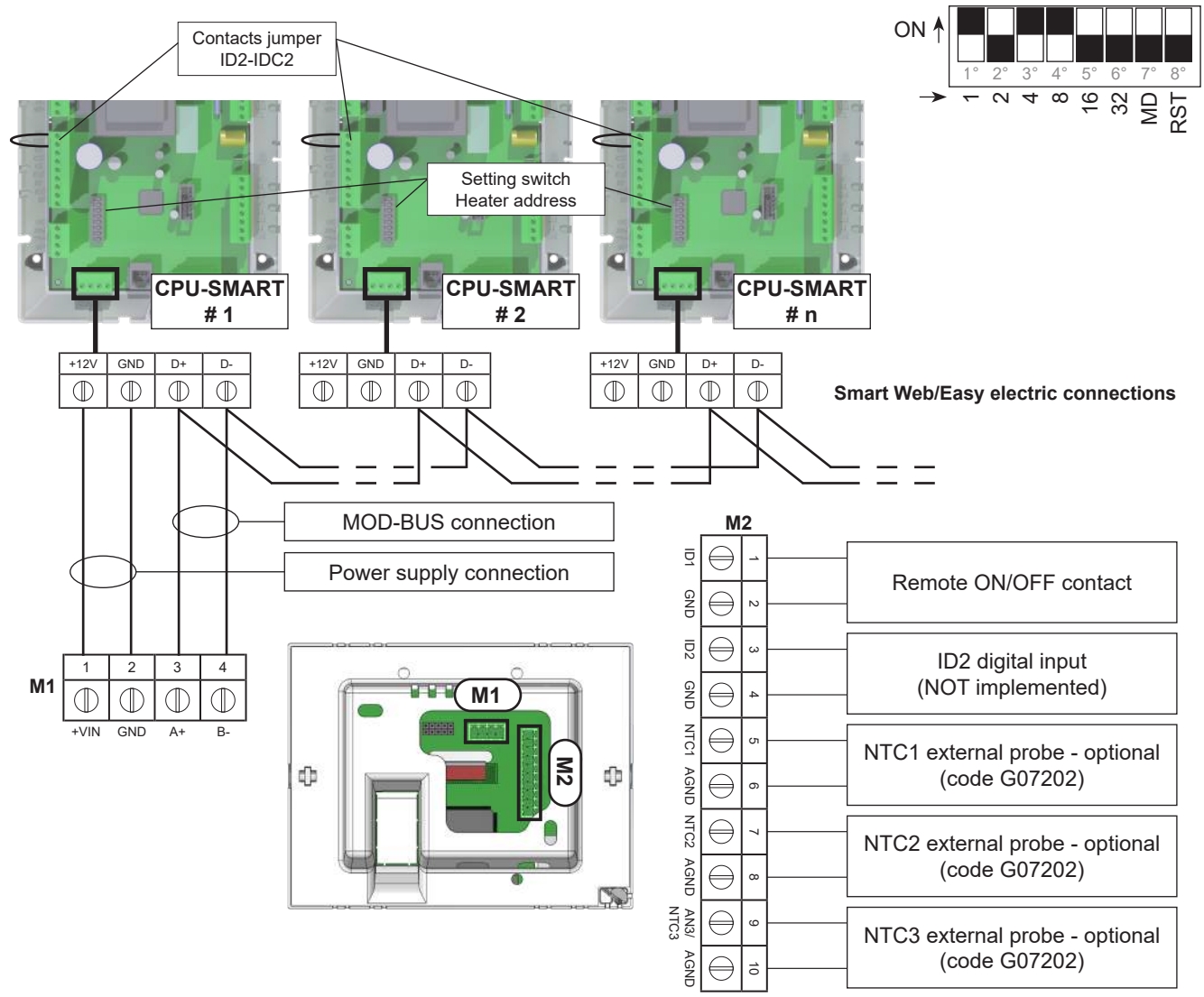
Summer ventilation

To enable the fans only (summer ventilation with burner off), three types of controls are available:

- the ID3-IDC2 contact;
- with Smart Web/Easy;
- manual control with the LDC control on board of the machine.

NOTE: Before switching off the blowers, the heater carries out the post-ventilation cycle.

The switches program the address by using a binary code; the corresponding values are listed below:
1°=**1**; 2°=**2**; 3°=**4**; 4°=**8**; 5°=**16**; 6°=**32**.
Therefore, to program address 13, you must set to ON switches 4°+3°+1°; the matching address will be **8**+**4**+**1**=13.
When an address is changed, the PCB must be powered off and on again.



Smart Web/Easy electric connections

5.6. Modulation PCB Parameters

All values of the parameters of the CPU-SMART PCB are shown for all LRP and LK heater models.
(1) parameters that could be modified with "001" Password via remote LCD control (even with modbus address ≠ 0).
(2) parameters that could be modified with a second level Password, which can be requested to the manufacturer's Service Centre (even with modbus ≠ 0 address).
(3) parameters that could be modified only with a Smart Web/Easy or via modbus.

Parameters of CPU-SMART PCB version 7.03.xx					
PARAMETER			LRP018 LRP028 LK020 / LRP035 LRP045 LK034 / LRP055 LK045 / LRP075 LK065 / LRP102 LK080 / LK105		DESCRIPTION
Control parameters					
d0	(2)		2		Flame modulation: 2=NTC1; 5=0÷10Vdc; 7=Modbus (with Smart Web/Easy in PID mode)
d1	(2)		0		Type of equipment: 0=heater; 2=boiler; 5=PCH; 8=PKA/E; 10=Queen; 12=Fan heater
d2	(2)		1		Remote lockout signal output (Q1): 0=disabled; 1=enabled
d3	(2)	sec	45		Fan delay time ON (RL2): 0÷255
d4	(2)	sec	30 (=150 sec)		Fan delay time OFF (RL2): 0÷255 (1=5sec 60=300 sec)
d5	(2)		0		Flue gas T control enabling (NTC3): 0=disabled; 1=enabled. DO NOT MODIFY
d6	(2)	sec	5		Interval between switching off and on (Off timer): 0÷255
d7	(2)		0		1= Fault reset counter; 2= Burner hour-meter reset
d8	(2)		0		Boiler antifreeze enabling (NTC1): 0=disabled; 1=enabled. NOT USED
d9	(2)		0		Dampers enabling: 0=disabled; DO NOT CHANGE
d10	(2)		0		Continuous ventilation: 0= disabled; 1= enabled (fans always active); 2= enabled with par. d3 delay upon remote heat request - active in Fault in case of heat request. DO NOT MODIFY
Burner parameters					
b1	(2)	rpm	see "Burner parameters - motor rpm" table below		Motor RPM MINIMUM value (PWM1): 90÷999 (1=10 RPM)
b2	(2)	rpm	see "Burner parameters - motor rpm" table below		Motor RPM MAXIMUM value (PWM1): 90÷999 (1=10RPM)
b3	(2)	rpm	see "Burner parameters - motor rpm" table below		Motor RPM START-UP value (PWM1): 90÷999 (1=10RPM)
b4	(2)		2		HALL signal divider: 2÷3
b5	(2)	rpm	50		Error F3x; no. of revolutions x10 (50=500rpm): 0÷300
b6	(2)	sec	20		Error F3x; error dwell time before fault F3x: 0÷255
b7	(2)	sec	20		Pre-cleaning time with maximum output: 0÷255. DO NOT MODIFY
b8	(2)	sec	10		Flame stabilisation time (ignition): 0÷255
b9	(2)	sec	90		Combustion chamber post-cleaning time (FAN ON): 0÷255
b10	(2)	%	5		Motor rpm % increase for each b11 seconds: 1÷100
b11	(2)	sec	5		Time interval for motor rpm increase: 1÷100
b12	(2)	%	30		Antifreeze mode FAN motor modulation % value: 30÷100
b13	(2)	pwm	65		Integral factor value (ki_pwm) for PWM1 calculation - (exA36):0÷249
b14	(2)	pwm	45		Proportional factor value (kp_pwm) for PWM1 calculation - (exA37): 0÷249
b15	(2)	sec	0		with d1=0 or 5: delay time ON flame control equipment (TER); with d1=2 (boiler): F85/F86 water flow delay alarm at start-up
b16	(2)		0		ID5 - ID5 input control: 0=input disabled; 1=enabled with N.C. input required; 2=enabled with N.O. input required; 3= enabled with N.C. input required with auto-reset;
b17	(2)		0		ID6 - ID6 input control: 0=input disabled; 1=enabled with N.C. input required; 2=enabled with N.O. input required; 3= enabled with N.C. input required with auto-reset;

Parameters of CPU-SMART PCB version 7.03.xx

PARAMETER			LRP018 LRP028 LK020 / LRP035 LRP045 LK034 / LRP055 LK045 / LRP075 LK065 / LRP102 LK080 / LK105	DESCRIPTION
Heat input and fuel instantaneous consumption calculation parameters				
Qmin	(3)	kW	see table in Par. 3.1 “Technical Data"	Minimum heat input (ref. Lower calorific value - Hi)
Qmax	(3)	kW	see table in Par. 3.1 “Technical Data"	Maximum heat input (ref. Lower calorific value - Hi)
LCV	(3)	kW/m^3	see table of "Gas-type parameters” here below	Lower calorific value (Hi)
Modulation probe NTC1 control with limit D0=2 in case of D0=5 or 7				
SEL	(2)		1	Modulation probe 1=NTC probe1; 3=NTC3 probe
S1	(2)		1	NTC1 probe enabling: 0=disabled; 1=enabled
ST1	(1)	°C LRP	38	NTC1 setpoint: -10÷140
		°C LK	36	
SP1	(2)	°C	5	SP1 hysteresis: 0÷10
XD1	(3)	%	16	Proportional band from 4 to 100
TN1	(3)	sec	6	Integral coefficient: 1÷255
AC1	(3)		0	0=modulation only; 1= modulation and ON/OFF if D0=5 or 7, modulation 0/10V or MODBUS
TH1	(2)	°C	70 (mod. LRP) / 60 (mod. LK)	Upper Temperature limit for fault F51 activation: 10÷95 autoreset if NTC1<TH1-15°C
S3	(2)		0	NTC3 probe enabling: 0=disabled; 1=enabled. DO NOT MODIFY
TH3	(2)	°C	140	Upper temperature limit for F53 fault activation (auto-reset if NTC3<TH3): 0÷140. NOT USED
Control 0/10 Vdc - D0=5				
H51	(1)		1	Active only with D0=5 (0/10V) 0=modulation only; 1=modulation and ON/OFF
H52	(1)	V	0.5	OFF voltage, burner switching off if H51=1
H53	(1)	V	0.5	Voltage Delta with burner ignition ON
H54	(3)	sec	10	Lower input dwell time: 0÷255
H55	(3)	sec	10	Upper input dwell time: 0÷255
Circulator output control - NOT USED ON LRP and LK				
H11	(2)		0	0=output disabled; 1=analogue output Y1 enabled (PWM); 2=analogue output Y2 enabled (0÷10Vdc); 3=outputs Y1 (PWM) and Y2 (0÷10Vdc) enabled; 4=outputs Y1 (PWM) and Y2 (0÷10Vdc) enabled for pressostatic structures; 5=analogue output Y2 (0÷10Vdc) enabled for operating mode d1=10/12; 6=outputs Y1 (PWM) and Y2 (0÷10Vdc) enabled for boiler summer ventilation with EC fan heater
H12	(3)	V	6.0	Y2 output minimum voltage: 0÷10
H13	(3)	V	10.0	Y2 output maximum voltage: 0÷10
H14	(3)	%	80	PWM minimum value: 0÷100
H15	(3)	%	100	PWM maximum value: 0÷100
H16	(3)		2	0, 1=not used; 2=blower modulation proportional to FAN (do not change); 3=blower modulation proportional to B1 input (0-10V); 4 proportional to B2 input for pressure check in pressostatic structures; 5= proportional NTC1 for checking Queen/Fan heaters (only output Y2)

Parameters of CPU-SMART PCB version 7.03.xx

PARAMETER			LRP018 LRP028 LK020 / LRP035 LRP045 LK034 / LRP055 LK045 / LRP075 LK065 / LRP102 LK080 / LK105	DESCRIPTION
H17	(3)		1	0=PWM (Y1) or 0/10V (Y2) output according to "direct" logic; 1=PWM (Y1) or 0/10V (Y2) output according to "reverse" logic; 2= PWM (Y1) "reverse" and 0/10V (Y2) "direct" output; 3= PWM (Y1) "direct" and 0/10V (Y2) "reverse" output
H18	(1)		8	Y2 output fixed voltage in summer ventilation
H19	(3)		32	Reading of NTC1 to which the minimum value of Y2 output corresponds
H20	(3)		65	Reading of NTC1 to which the maximum value of Y2 output corresponds
NTC2 control - NOT USED ON LRP and LK				
S2	(2)		0	0=NTC2 disabled; 1=NTC2 enabled; 2=blower output activation for compartment heating function (only with d1=5)
ST2	(1)	°C	2.0	NTC2 setpoint: -10÷90
P2	(2)	°C	1.0	ST2 hysteresis: 0÷40
XD2	(3)		40	Neutral area, proportional modulation band divided by 100: 4 ÷100
TN2	(3)	sec	5	Integration time: 1÷255
ANTIFREEZE control - active with D8=1 - NOT USED ON THE LRP and LK				
STA	(3)	°C	2.0	Antifreeze setpoint: -10÷+20
PA	(3)	°C	1.0	Antifreeze setpoint hysteresis: 0÷10
FUMES TEMPERATURE control - active with D5=1 - NOT USED ON LRP and LK				
H41	(2)	°C	5	Flue gas temperature (NTC3); neutral band from 1÷50
H42	(3)	sec	5	Run time for flue gas control cycle (15=30 seconds): 0÷255
H43	(1)	°C	95	Flue gas temperature at maximum capacity (Tmax with PT%=100): 0÷140
H44	(1)	°C	85	Flue gas temperature at medium capacity (Tmed with PT%=50): 0÷140
H45	(1)	°C	75	Flue gas temperature at minimum capacity (Tmin with PT%=0): 0÷140
H46	(3)		0	Flue gas temperature operation: 0=modulation only - 1=burner OFF
Hydraulic circuit WATER PRESSURE control - NOT USED ON LRP and LK				
S5	(2)		6	Pressure probe B2 output enabling: 0=disabled; 1=enabled as ON/OFF input; 2=enabled as analogue input without F83 fault auto-reset; 3=enabled as analogue input with F83 fault auto-reset; 4=enabled as air pressure control analogue input without F80 auto-reset; 5=enabled as air pressure control analogue input with F80 fault auto-reset; 6=enabled read only (no Fault) for pressure control via Modbus
ST5	(1)	bar	0.7	B2 setpoint: 0÷9.99
P5	(2)	bar	0.3	ST5 hysteresis: 0÷9.99
XA5	(3)	V	0.5	B2 pressure probe signal input minimum voltage: 0÷9.99
XB5	(3)	V	4.5	B2 pressure probe signal input maximum voltage: 0÷9.99
YA5	(3)	bar	0	Pressure matching the B2 probe input minimum voltage
YB5	(3)	bar	9.99	Pressure matching the B2 probe input maximum voltage
TH5	(3)	V	9.99	Upper pressure limit for fault F82 activation: 0÷9.99

Parameters of CPU-SMART PCB version 7.03.xx

PARAMETER			LRP018 LRP028 LK020 / LRP035 LRP045 LK034 / LRP055 LK045 / LRP075 LK065 / LRP102 LK080 / LK105	DESCRIPTION
Hydraulic circuit WATER FLOW control - NOT USED ON LRP and LK				
S6	(2)		0	Flow sensor B3 output enabling: 0=disabled 1=enabled as ON/OFF input without F85 fault autoreset 2=enabled as ON/OFF input with F85 fault autoreset 3=enabled as pulsed input without F85 and F86 fault autoreset 4=enabled as pulsed input with F85 and F86 fault autoreset
ST6	(1)	From l/h	56	Flowmeter setpoint - in l/h (x10)
P6	(2)		5	ST6 hysteresis: - in l/h (x10)
XA6	(3)	Hz	14	B3 pressure probe signal input minimum frequency: 0÷999
XB6	(3)	Hz	229	B3 pressure probe signal input maximum frequency: 0÷999
YA6	(3)	l/h	29	Flow rate matching the B3 probe inlet minimum frequency
YB6	(3)	l/h	500	Flow rate matching the B3 probe inlet maximum frequency
TR6	(3)	sec	2	Fault F85/F86 indication time delay (1=1second): 0÷250. During the ignition stage, the b15 value is used.
PRESSURE control - PID parameters for ventilation of Pressostatic structures - NOT USED ON LRP and LK				
kp	(3)	%	20	Proportional Gain
ki	(3)	%	5	Integral Gain
kd	(3)	%	10	Derivative Gain
li	(3)	%	100	Maximum limit of integral part

"Burner parameters - motor rpm" Table

PARAMETER		LRP018	LRP028	LRP035	LRP045	LRP055	LRP075	LRP102	DESCRIPTION
b1	rpm	540	460	427	410	417	416	346	Motor RPM MINIMUM value (PWM1): 90÷999 (1=10 rpm)- DO NOT CHANGE
b2	rpm	815	730	703	660	690	645	618	Motor RPM MAXIMUM value (PWM1): 90÷999 (1=10RPM) - DO NOT CHANGE
b3	rpm	340	320	315	290	355	320	317	Motor RPM START-UP value (PWM1): 90÷999 (1=10RPM) - DO NOT CHANGE

PARAMETER		LK020	LK034	LK045	LK065	LK080	LK105	DESCRIPTION
b1	rpm	213	210	169	182	172	172	Motor RPM MINIMUM value (PWM1): 90÷999 (1=10 rpm)- DO NOT CHANGE
b2	rpm	660	710	580	651	655	635	Motor RPM MAXIMUM value (PWM1): 90÷999 (1=10RPM) - DO NOT CHANGE
b3	rpm	320	300	345	340	355	240	Motor RPM START-UP value (PWM1): 90÷999 (1=10RPM) - DO NOT CHANGE

Table of "Gas-type parameters"

PARAMETER			G20	G25	G25.3	G25.1	G27	G2.350	G30 G31	DESCRIPTION
LCV	(3)	kW/m³	9.45	8.13	8.31	8.14	7.75	6.75	12.4	Lower calorific value (Hi)

5.7. Analysis of lockouts- faults

The CPU-SMART manages two types of lockouts:
- preventive, it warns the customer that the LRP and LK heaters require maintenance;
- operational, it stops the LRP or LK heater for safety reasons or to ensure its correct operation.

Some operational faults require manual reset; others reset themselves when the problem that caused them is solved.
Below is a complete list of faults, possible causes and possible solutions.

FAULT	DESCRIPTION	CAUSE	UNLOCK
Lockout caused by Flame - Caused by the flame monitoring equipment (TER)			
F10	Failure to ignite flame after 4 attempts performed by the equipment.	• No gas • Gas supply pressure too high (>60mbar) • Live and neutral reversed • Earth wire not connected • Phase-phase connection without neutral • Start-up electrode failed or badly positioned • Detection electrode failed or badly positioned • Detection electrode that moves or disperses to the earthing system when hot • Condensation detection electrode defective or earthed	Manual reset
F11	Untimely flame (detection of flame when, for to the flame control equipment, it should not be present)		
F12	Ignition failure; not visible. The count, displayed in the history, indicates whether the heater has had problems with ignition.		
F13	The TER equipment does not accept the reset command from CPU-PLUS	• TER has finished its 5 reset attempts in the period of 15 minutes.	Wait 15 min or press the reset button on the equipment
F14	Lack of communication between TER equipment and CPU for more than 60 seconds	• TER equipment or CPU-PLUS PCB broken • Connections on the STB thermostat to earth • Capillary of the STB thermostat that discharges on the earth faston of the thermostat body	Auto-reset
F15	The CPU-SMART PCB sent the ignition signal to the TER equipment which, after 300 seconds and with no lockout, has not communicated its correct operation status.	• Poor gas mains pressure • Low CO_2 value • Faulty TER equipment	Manual reset, auto-reset after 5 minutes
F16	Generic equipment lockout	• It indicates that if the heat request has remained active for more than 24 consecutive hours, the TER equipment has performed a control cycle switching temporarily to stand-by mode	Manual reset, auto-reset after 5 minutes
F17	Internal malfunction of TER equipment that does not accept reset command from CPU-PLUS	• Faulty TER equipment	Manual reset, auto-reset after 5 minutes
Lockouts caused by temperature (safety lockouts)			
F20	Activation of safety thermostat STB	• Excess air temperature due to lack of air circulation • Safety thermostat broken or not connected	Manual reset
F21	(NOT USED - Jumped) Input ID1 open	• ID1 - IDC1 jumper missing	Manual reset
F22	Opening of safety thermostat STB at ignition	• Frost or temperature below -20°C • Safety thermostat broken or not connected	Auto-reset
FAN lockout - burner fan			
F30	Fan speed too low in start up phase - VAG	• Burner fan broken. • FAN electric cables interrupted, not connected or wrongly connected	Manual reset
F31	Fan speed too high in start up phase - VAG		
F32	Fan speed, during operation, outside minimum and maximum set parameters - VAG		Manual reset, auto-reset after 5 minutes
F35	Alarm from ID5 input	• Contact ID5 open/closed when b16 ≠ 0; • Contact open when b16 = 1; contact close when b16 = 2.	Manual reset

FAULT	DESCRIPTION	CAUSE	UNLOCK
F38	Alarm from ID6 input	• Contact ID6 open/closed when b17 ≠ 0; • Contact open when b17 = 1; contact close when b17 = 2.	Manual reset
		NTC probes broken or missing	
F41	Probe NTC1 error, air intake temperature	• No signal from probe or broken probe	Auto-reset
F43	Probe NTC3 error, flue gas temperature		Auto-reset
		Over-temperature	
F51	The temperature of the air intake probe NTC1>TH1	• The minimum heat output of the heater is oversized compared to the heat output required by the environment. • Check the TH1 parameter - air intake set point. • Cooling fan(s) inoperative. • Fan grille clogged or dirty. • Air vent closed or partially closed.	Auto-reset if NTC1< TH1-15
		Check ModBus communication	
F60	Communication error between CPU-SMART PCB and ModBus, Smart Web or SMART Easy network	• ModBus network is disconnected. • The address of the PCB is wrong and/or not configured in the ModBus network.	Autoresolve
		No voltage	
F75	No voltage during operation cycle (excluding stand-by); the fault is not visible on remote control but only counted.	• No voltage during operation	Autoresolve
F80	Pressure gauge error	• Pressure gauge at fault or not connected • Input signal at B2 is < 0.2 Vdc	Auto-reset
F81	Pressure less than B2 setpoint	• Input signal at B2 is < ST5 setpoint	Auto resolve
F82	Higher pressure at B2 setpoint	• Input signal at B2 is < ST5 setpoint + TH5	Auto resolve
F99	CPU-PLUS PCB parameter programming error	• S1=0 with SEL=1 and D0=2 • S3=0 with SEL=3 and D0=2 • D2≠0 and D9=1 • D10=1 with D8=1	Auto resolve
		Internal malfunction of CPU-SMART PCB	
F00	Internal malfunction of CPU-PLUS PCB	• Perform a manual reset of the PCB; replace the CPU-SMART PCB if the problem persists. • One or more parameters of the CPU PCB have a value outside of the expected range	Manual reset
CPU	CPU-PLUS PCB communication error	• RJ11 cable disconnected or faulty • CPU-SMART PCB faulty	Auto resolve
...	LCD panel PCB communication error	• RJ11 cable disconnected or faulty • LCD panel PCB faulty	Auto resolve

6. GAS CONNECTION

Use the gas line connections only with CE certified components.

The heater is supplied complete with:
- a dual gas valve;
- a gas governor and filter.

Al components are fitted inside the burner housing. To complete the installation, as required by current standards, the following components must be fitted by the installer:

- Anti-vibration joint
- Gas valve

FURTHERMORE, using a high capacity gas filter without pressure stabiliser is mandatory, as the gas filter fitted as standard upstream of the gas valve has a limited surface.

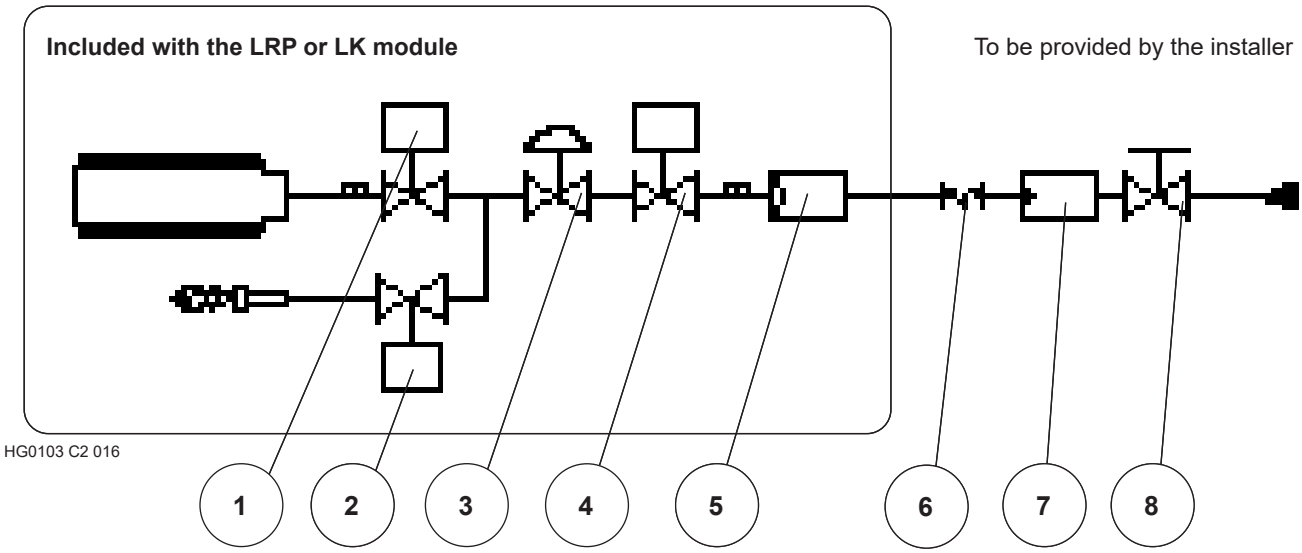
NOTE: For ease of maintenance, connect the heater by means of a seal and swivel gasket.

Avoid using threaded connections directly on the gas connection.

Current legislation allow a maximum pressure inside the rooms, or thermal station, of 40mbar; higher pressure must be reduced upstream of the boiler room or the site where the heater is installed.

KEY

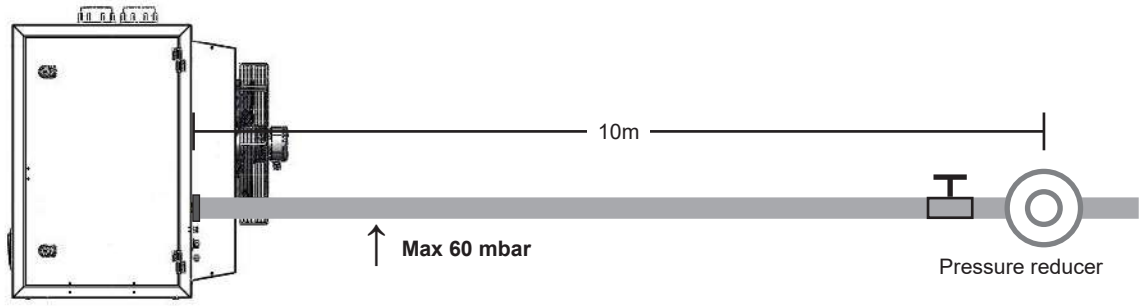
1	Main burner gas solenoid valve
2	Pilot burner gas solenoid valve
3	Pressure stabiliser
4	Safety gas solenoid valve
5	Gas filter (small section)
6	Anti-vibration joint
7	Gas filter (large section)
8	Gas valve



During the installation, it is recommended to tighten the external gas supply pipe nut without exceeding a tightening torque of 150 Nm for Ø 3/4".

IT is strictly prohibited to supply gas to the circuit with pressures higher than 60 mbar. Such pressures could cause the valve to break.

If pressure is higher than 60 mbar, a pressure reducer must be installed at a distance of at least 10 m and no pressure stabiliser must be fitted between the pressure reducer and the heater, but leaving the gas filter.



7. SERVICING INSTRUCTIONS

The first start-up must be carried out only by authorised service centres.
The first start-up also includes a combustion analysis, which is compulsory.
The equipment is certified in the EC and non-EC countries, according to the gas categories shown below.

7.1. Country Table - Gas Category

Country	Category	Gas	Pressure	Gas	Pressure
AT, CH	II2H3B/P	G20	20 mbar	G30/G31	50 mbar
BE <70kW	I2E(S)B, I3P	G20/G25	20/25 mbar	G31	37 mbar
BE >70kW	I2E(R)B, I3P	G20/G25	20/25 mbar	G31	37 mbar
DE	II2ELL3B/P	G20/G25	20 mbar	G30/G31	50 mbar
DK, FI, GR, SE, NO, IT, CZ, EE, LT, SI, AL, MK, BG, HR, TR	II2H3B/P	G20	20 mbar	G30/G31	30 mbar
RO	II2L3B/P	G25	20 mbar	G30/G31	30 mbar
ES, GB, IE, PT, SK	II2H3P	G20	20 mbar	G31	37 mbar
FR	II2Esi3P	G20/G25	20/25 mbar	G31	37 mbar
LU	II2E3P	G20/G25	20 mbar	G31	37/50 mbar
NL	II2EK3B/P	G20/G25.3	20/25 mbar	G30/G31	30 mbar
HU	II2HS3B/P	G20/G25.1	25 mbar	G30/G31	30 mbar
CY, MT	I3B/P			G30/G31	30 mbar
LV	I2H	G20	20 mbar		
IS	I3P			G31	37 mbar
PL	II2ELwLs3B/P	G20/G2.350	20/13 mbar	G30/G31	37 mbar
RU	II2H3B/P	G20	20 mbar	G30/G31	30 mbar

The following information is clearly printed on the equipment packaging: country of destination, gas category and equipment code. The code allows finding out the factory settings.

NOTE: In compliance with standards EN17082, EN 437 and ISO3166, GB refers to the United Kingdom.

Codes with no extension:

- LK020IT if there is no extension, it means that the equipment has been tested and set to run with natural gas [G20]

Codes with extension:

The fourth letter indicates the type of gas the equipment has been set up for:

- LK020FR-xxx**0** 0 indicates that the equipment has been tested and set up for natural gas [G20];
- LK020MT-xxx**1** 1 indicates that the equipment has been tested and set up for LPG [G31];
- LK020NL-xxx**2** 2 indicates that the equipment has been tested and set up for 'L' [G25] or ‘K’ [G25.3] natural gas;
- LK020HU-xxx**3** 3 indicates that the equipment has been tested and set up for natural gas [G25.1];
- LK020PL-xxx**4** 4 indicates that the equipment has been tested and set up for gas [G2.350].

Another adhesive label, located near the fuel connection of the equipment, specifically indicates the type of gas and the supply pressure for which the equipment has been set up and tested.

NOTE: The unit is supplied already set for natural gas [G20] and equipped with the kit for conversion to LPG.
The kit for conversion to LPG is not supplied in countries where conversion is prohibited.

NOTE: Conversion is strictly prohibited in some countries, such as Belgium, which do not allow the double gas category.

7.2. Gas Settings Table

LRP-RAPID PRO Table

TYPE OF GAS G20 - Cat. E-H															
TYPE OF MACHINE		LRP018		LRP028		LRP035		LRP045		LRP055		LRP075		LRP102	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table													
SUPPLY PRESSURE	[mbar]	20* [min 15-max 25]													
PILOT NOZZLE Ø	[mm]	0.7													
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	1.07	1.75	1.69	2.86	2.14	3.68	2.75	4.66	3.15	5.52	4.70	7.78	5.48	10.58
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.7	8.8	8.7	8.8	8.7	8.8	8.7	8.8	8.7	8.8	8.7	8.8	8.7	8.8
FLUE GAS TEMPERATURE	[°C]	110	200	100	190	95	180	98	190	95	180	115	190	100	205
FLUE GAS MASS FLOW RATE (MAX.)	[kg/h]	27		45		58		73		86		122		165	
GAS ORIFICE PLATE	[mm]	3.9		5.7		6.0		7.0		6.8		9.7		9.9	
AIR ORIFICE PLATE	[mm]	15.5		Not required											
* For Hungary, supply pressure is 25 mbar															

TYPE OF GAS G25 - Cat. L-LL															
TYPE OF MACHINE		LRP018		LRP028		LRP035		LRP045		LRP055		LRP075		LRP102	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table													
SUPPLY PRESSURE	[mbar]	25* [min 18-max 30]													
PILOT NOZZLE Ø	[mm]	0.7													
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	1.24	2.03	1.97	3.32	2.48	4.28	3.20	5.41	3.67	6.42	5.46	9.04	6.37	12.30
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.6	8.7	8.8	8.9	8.8	8.9	8.9	9	8.7	8.8	8.7	8.8	8.7	8.8
FLUE GAS TEMPERATURE	[°C]	110	200	100	190	95	180	98	190	95	180	115	190	100	205
GAS ORIFICE PLATE	[mm]	4.4		6.3		6.6		8.5		8.1		Not necessary		Thickness of	
AIR ORIFICE PLATE	[mm]	15.5		Not required											
* For Germany and Romania, supply pressure is 20 mbar															

TYPE OF GAS G25.3 - Cat. K															
TYPE OF MACHINE		LRP018		LRP028		LRP035		LRP045		LRP055		LRP075		LRP102	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table													
SUPPLY PRESSURE	[mbar]	25 [min 20-max 30]													
PILOT NOZZLE Ø	[mm]	0.7													
GAS CONSUMPTION (15°C-1013mbar)	[kg/h]	1.22	1.99	1.93	3.25	2.43	4.19	3.13	5.29	3.59	6.28	5.34	8.84	6.23	12.03
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.7	8.9	8.7	8.9	8.8	8.9	8.8	8.9	8.8	8.9	8.8	8.9	8.7	9
FLUE GAS TEMPERATURE	[°C]	110	200	100	190	95	180	98	190	95	180	115	190	100	205
GAS ORIFICE PLATE	[mm]	4.4		6.3		6.6		7.4		8.1		Not necessary		Thickness of	
AIR ORIFICE PLATE	[mm]	15.5		Not required											

TYPE OF GAS G2.350 - Cat. Ls (Only for PL-Poland)													
TYPE OF MACHINE		LRP018		LRP028		LRP035		LRP045		LRP055		LRP075*	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	13 [min 10-max 16]											
PILOT NOZZLE Ø	[mm]	0.75											
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	1.50	2.44	2.37	4.00	2.99	5.16	3.85	6.52	4.41	7.73	6.58	9.33
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.5	8.8	8.7	8.8	8.8	8.9	8.7	8.8	8.7	8.8	8.6	8.7
FLUE GAS TEMPERATURE	[°C]	110	200	100	190	95	180	98	190	95	180	115	190
GAS ORIFICE PLATE	[mm]	5.8		Not required									
AIR ORIFICE PLATE	[mm]	15.5		Not required								29	
* Maximum nominal heat output 63.0 kW													

TYPE OF GAS G25.1 - Cat. S (Only for HU-Hungary)													
TYPE OF MACHINE		LRP018		LRP028		LRP035		LRP045*		LRP055		LRP075	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	25 [min 20-max 33]											
PILOT NOZZLE Ø	[mm]	0.70											
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	1.24	2.03	1.97	3.32	2.48	4.28	3.19	5.16	3.66	6.41	5.45	9.03
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.9	9	9.1	9.2	8.8	8.9	8.9	9.5	9.5	9.6	9.5	9.6
FLUE GAS TEMPERATURE	[°C]	110	200	100	190	95	180	98	180	95	180	115	190
GAS ORIFICE PLATE	[mm]	4.4		6.3		7.7		8.5		8.1		Not required	
AIR ORIFICE PLATE	[mm]	15.5		Not required									
* Maximum nominal heat output 42.0 kW													

TYPE OF GAS G27 - Cat. Lw (Only for PL-Poland)													
TYPE OF MACHINE		LRP018		LRP028		LRP035		LRP045		LRP055		LRP075	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	20 [min 16-max 23]											
PILOT NOZZLE Ø	[mm]	0.70											
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	1.30	1.96	2.06	3.21	2.61	4.14	3.35	5.24	3.85	6.21	5.73	8.75
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.9	9	8.8	8.9	8.8	8.9	8.8	8.9	8.8	8.9	8.7	8.8
FLUE GAS TEMPERATURE	[°C]	110	200	100	190	95	180	98	190	95	180	115	190
GAS ORIFICE PLATE	[mm]	4.7		7.0		8.0		9.2		9.2		Not required	
AIR ORIFICE PLATE	[mm]	15.5		Not required									

TYPE OF GAS G30 - Cat. 3B-P															
TYPE OF MACHINE		LRP018		LRP028		LRP035		LRP045		LRP055		LRP075		RLP102*	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table													
SUPPLY PRESSURE	[mbar]	30 [min 25-max 35] - 37 [min 42.5-max 57.5] - 50 [min 42.5-max 57.5]													
PILOT NOZZLE Ø	[mm]	0.51													
GAS CONSUMPTION (15°C-1013mbar)	[kg/h]	0.84	1.37	1.33	2.24	1.68	2.89	2.16	3.65	2.47	4.33	3.68	6.10	4.15	8.63
CARBON DIOXIDE -CO_2 CONTENT	[%]	9.9	10	9.9	10	9.9	10	9.7	9.8	9.7	9.9	10.2	10.3	10.3	10.4
FLUE GAS TEMPERATURE	[°C]	75	204	70	191	70	170	75	190	80	175	80	190	80	194
GAS ORIFICE PLATE	[mm]	2.6		3.7		4.1		5.3		4.8		5.9		7.5	
AIR ORIFICE PLATE	[mm]	15.5		Not required											
* Maximum nominal heat output 104.0 kW															

TYPE OF GAS G31 - Cat. 3P															
TYPE OF MACHINE		RP018		LRP028		LRP035		LRP045		LRP055		LRP075		LRP102	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table													
SUPPLY PRESSURE	[mbar]	30 [min 25-max 35] - 37 [min 25-max 45] - 50 [min 42.5-max 57.5]													
PILOT NOZZLE Ø	[mm]	0.51													
GAS CONSUMPTION (15°C-1013mbar)	[kg/h]	0.80	1.35	1.26	2.21	1.59	2.85	2.05	3.60	2.35	4.27	3.50	6.01	4.09	8.18
CARBON DIOXIDE -CO_2 CONTENT	[%]	9.7	9.8	9.7	9.8	9.6	9.7	9.6	9.7	9.7	9.8	9.7	9.8	9.7	9.8
FLUE GAS TEMPERATURE	[°C]	75	204	70	191	70	170	75	190	80	175	80	190	80	194
FLUE GAS MASS FLOW RATE (MAX.)	[kg/h]														
GAS ORIFICE PLATE	[mm]	2.6		3.7		4.1		5.3		4.8		5.9		7.5	
AIR ORIFICE PLATE	[mm]	15.5		Not required											

LK-KONDENSA Table

TYPE OF GAS G20 - Cat. E-H													
TYPE OF MACHINE		LK020		LK034		LK045		LK065		LK080		LK105	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	20* [min 17-max 25]											
PILOT NOZZLE Ø	[mm]	0.7											
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	0.51	2.01	0.80	3.69	0.90	4.44	1.31	6.88	1.74	8.68	2.22	10.6
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.8	9.1	8.7	9.1	8.7	9.1	8.7	9.1	8.7	9.1	8.5	9.1
FLUE GAS TEMPERATURE	[°C]	38	111	31	94	30	93	31	86	26	70	28	80
FLUE GAS MASS FLOW RATE (MAX.)	[kg/h]	31		58		70		108		136		165	
GAS ORIFICE PLATE	[mm]	4.4		6.0		7.2		10		9.7		Thickness of	
AIR ORIFICE PLATE	[mm]	Not required											
* For Hungary, supply pressure is 25 mbar													

TYPE OF GAS G25 - Cat. L-LL													
TYPE OF MACHINE		LK020		LK034		LK045		LK065		LK080		LK105	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	25* [min 17-max 30]											
PILOT NOZZLE Ø	[mm]	0.7											
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	0.59	2.34	0.93	4.29	1.05	5.17	1.53	8.00	2.02	10.1	2.21	12.3
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.8	9	8.6	9	8.8	8.9	8.8	9.2	8.6	9.1	8.8	9
FLUE GAS TEMPERATURE	[°C]	38	111	31	94	30	93	31	86	26	70	28	80
GAS ORIFICE PLATE	[mm]	5.3		7.2		9.0		Not required				Thickness of	
AIR ORIFICE PLATE	[mm]	Not required											
* For Germany and Romania, supply pressure is 20 mbar													

TYPE OF GAS G25.3 - Cat. K													
TYPE OF MACHINE		LK020		LK034		LK045		LK065		LK080		LK105	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	25 [min 20-max 30]											
PILOT NOZZLE Ø	[mm]	0.7											
GAS CONSUMPTION (15°C-1013mbar)	[kg/h]	0.57	2.29	0.91	4.19	1.02	5.05	1.49	7.82	1.97	9.87	2.53	12.03
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.7	9.1	8.8	9	8.8	9.1	8.9	9.1	8.7	9.1	8.8	9.4
FLUE GAS TEMPERATURE	[°C]	38	111	31	94	30	93	31	86	26	70	28	80
GAS ORIFICE PLATE	[mm]	5.3		7.2		9		Not required				Thickness of	
AIR ORIFICE PLATE	[mm]	Not required											

TYPE OF GAS G2.350 - Cat. Ls (Only for PL-Poland)									
TYPE OF MACHINE		LK020		LK034		LK045		LK065*	
		min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table							
SUPPLY PRESSURE	[mbar]	13 [min 10-max 16]							
PILOT NOZZLE Ø	[mm]	0.75							
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	0.71	2.81	1.13	5.17	1.26	6.22	1.84	9.63
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.4	9	8.4	9	8.6	9	7.3	7.9
FLUE GAS TEMPERATURE	[°C]	38	111	31	94	30	93	31	86
GAS ORIFICE PLATE	[mm]	7.9		Not required					
AIR ORIFICE PLATE	[mm]	Not required						30.5	
* Maximum nominal heat output 57.0 kW									

NOTE: The MAX heat input of model LK065 is lower with respect to the operation with G20.
Models LK080 and LK105 are not suitable to operate with gas G2.350.
The conversion kit for G2.350 is only supplied on request.

TYPE OF GAS G25.1 - Cat. S (Only for HU-Hungary)													
TYPE OF MACHINE		LK020		LK034		LK045		LK065		LK080		LK105*	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	25 [min 20-max 33]											
PILOT NOZZLE Ø	[mm]	0.70											
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	0.59	2.33	0.93	4.29	1.04	5.16	1.52	7.99	2.01	10.1	2.21	12.3
CARBON DIOXIDE -CO_2 CONTENT	[%]	9.3	9.5	9.1	9.6	9.4	9.6	9.3	9.7	9.8	10.3	9.4	9.6
FLUE GAS TEMPERATURE	[°C]	38	111	31	94	30	93	31	86	26	70	28	80
GAS ORIFICE PLATE	[mm]	5.3		7.2		9.5		Not required				Thickness of	
AIR ORIFICE PLATE	[mm]	Not required											
* Maximum nominal heat output 94.0 kW													

TYPE OF GAS G27 - Cat. Lw (Only for PL-Poland)													
TYPE OF MACHINE		LK020		LK034		LK045		LK065*		LK080**		LK105***	
Output		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	20 [min 16-max 23]											
PILOT NOZZLE Ø	[mm]	0.70											
GAS CONSUMPTION (15°C-1013mbar)	[m^3/h]	0.57	2.26	0.90	4.15	1.01	5.00	1.48	7.74	1.95	9.76	2.50	11.90
CARBON DIOXIDE -CO_2 CONTENT	[%]	8.7	9.2	8.7	9.1	8.6	9.1	8.6	8.8	8.7	9.1	8.5	8.7
FLUE GAS TEMPERATURE	[°C]	38	111	31	94	30	93	31	77	26	67	28	74
GAS ORIFICE PLATE	[mm]	5.7		8.1		9.5		Not required				Thickness of	
AIR ORIFICE PLATE	[mm]	Not required								30.5		Not required	
* Maximum nominal heat output 57 kW ** Maximum nominal heat output 75 kW *** Maximum nominal heat output 94 kW													

TYPE OF GAS G30 - cat. 3B-P													
TYPE OF MACHINE		LK020		LK034		LK045		LK065		LK080*		LK105**	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	30 [min 25-max 35] - 50 [min 42.5-max 57.5]											
PILOT NOZZLE Ø	[mm]	0.51											
GAS CONSUMPTION (15°C-1013mbar)	[kg/h]	0.40	1.58	0.63	2.90	0.71	3.49	1.03	5.39	1.49	6.80	1.70	8.30
CARBON DIOXIDE -CO_2 CONTENT	[%]	10.8	11.4	10.8	11.5	10.8	10.9	10.7	11.3	10.1	10.3	10.4	10.6
FLUE GAS TEMPERATURE	[°C]	38	111	31	94	30	93	31	86	26	70	28	80
GAS ORIFICE PLATE	[mm]	3.0		4.3		5.2		6.3		6.0		7.8	
AIR ORIFICE PLATE	[mm]	Not required											

* Minimum nominal heat output 18 kW
** Minimum nominal heat output 24 kW

TYPE OF GAS G31 - Cat. 3P													
TYPE OF MACHINE		LK020		LK034		LK045		LK065		LK080		LK105	
		min	max	min	max	min	max	min	max	min	max	min	max
CATEGORY		according to the country of destination - see reference table											
SUPPLY PRESSURE	[mbar]	30 [min 25-max 35] - 37 [min 25-max 45] - 50 [min 42.5-max 57.5]											
PILOT NOZZLE Ø	[mm]	0.51											
GAS CONSUMPTION (15°C-1013mbar)	[kg/h]	0.4	1.58	0.63	2.9	0.71	3.49	1.03	5.39	1.49	6.8	1.70	8.3
CARBON DIOXIDE -CO_2 CONTENT	[%]	9.3	9.8	9.2	9.7	9.3	9.4	9.4	9.6	9.3	9.6	9.5	9.8
FLUE GAS TEMPERATURE	[°C]	38	111	31	94	30	93	31	86	26	70	28	80
FLUE GAS MASS FLOW RATE (MAX.)	[kg/h]	24		45		58		84		107		130	
GAS ORIFICE PLATE	[mm]	3.0		4.3		5.2		6.3		6.0		7.8	
AIR ORIFICE PLATE	[mm]	Not required											

7.3. Configuring with LCD Display

The parameters can be changed only if they have been enabled by entering the password from **Abi** menu.
The modification is also possible with a modbus address of the board equal to Ø.

Abi (enabling change of setpoint and parameters)
The **Abi** menu has the following functions:
- enables the change of heater setpoints under **Set** menu; the password is one (1);
- enables the change of parameters under **Par** menu; this password is used by CATs and is indicated in the table of Paragraph 5.6 "Modulation PCB Parameters".

Once the password is enabled, if no key is pressed for 10 minutes, the programme automatically returns to the machine status.
Move using the menu arrows, select the parameter or setpoint to be displayed with ENTER, change the parameter by pressing the arrow keys until the desired value, then press and hold ENTER for at least 3 seconds; the display flashes to indicate that the value has been stored.

Setpoint Menu
For the meaning and the default values please refer to the parameter table of Paragraph 5.6 "Modulation PCB Parameters".

H51	0/10 Vdc control;
H52	0/10 Vdc control;
H53	0/10 Vdc control;
St1	Modulation temperature;
St2	Not used;
H43	Not used;
H44	Not used;
H45	Not used;
St5	Not used;
St6	Not used;
H12	Not used;
H13	Not used;
H18	Not used.

Parameter Menu
The **Par** submenu allows the access to "b" and "d" parameters:
- from **b1** to **b17** burner parameters;
- from **d0** to **d10** heater operation configuration.

For the meaning and the default values please refer to the parameter table of Paragraph 5.6 "Modulation PCB Parameters".
Besides "b" and "d" parameters, the following parameters can be changed:

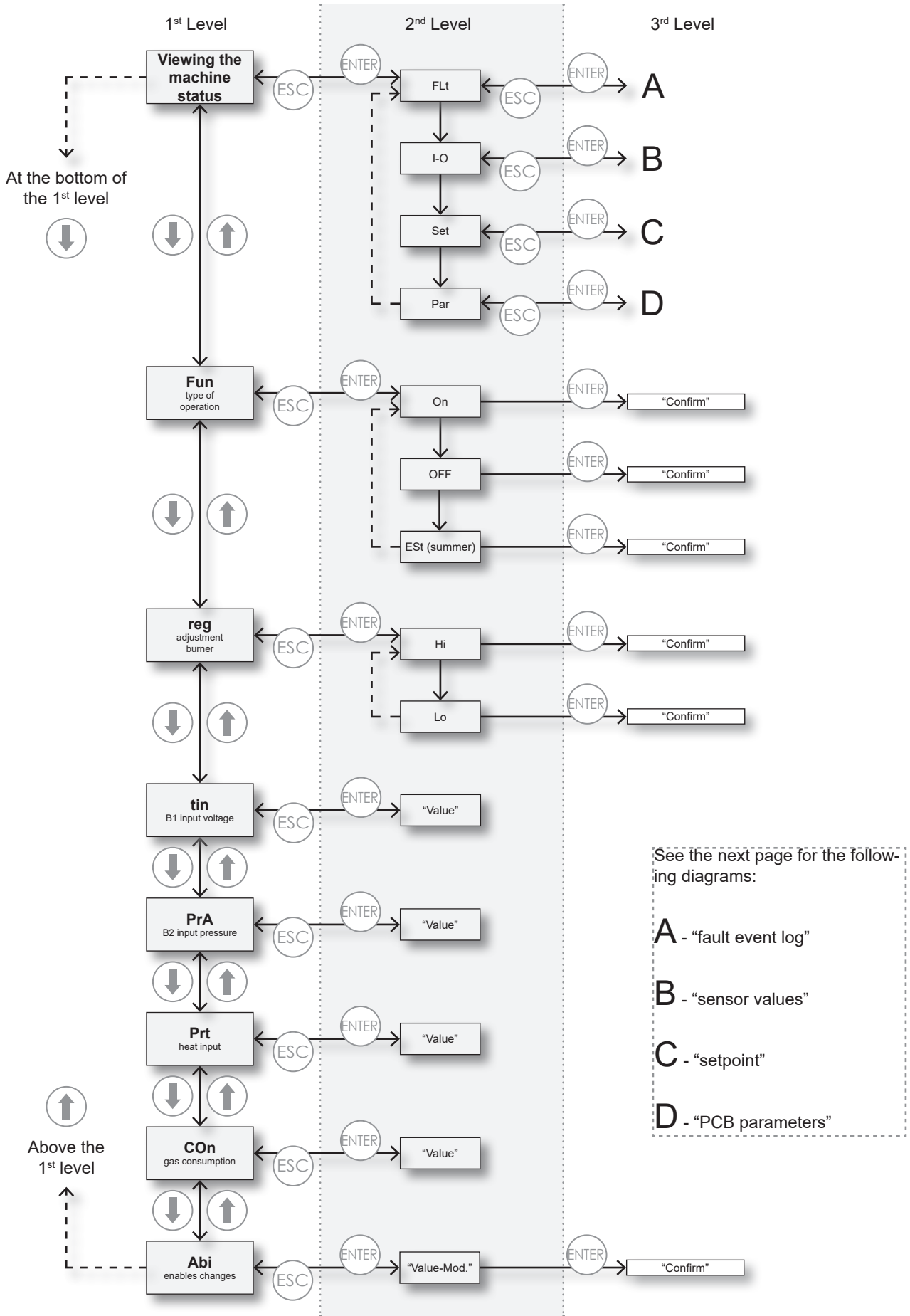
S1	Modulation probe enabling;
SP1	ST1 hystereris (only if the probe is used as temperature limit);
tH1	Maximum temperature of the modulation probe, switches the burner off regardless of the other conditions set;
S2	Not used;
P2	Not used;
S5	Not used;
P5	Not used;
S6	Not used;
P6	Not used;
H11	Not used;
H41	Not used
S3	Not used;
Sel	Not used;
TH3	Not used.

I/O menu - Inputs outputs
From **I/O** menu it is possible to display the values measured by the sensors.

NTC1	Air intake temperature;
NTC2	Not used;
NTC3	Not used;
An1	0/10V input - if used;
PrH	Not used;
FLH	Not used;
rPu	no. of FAN revolutions;
Pu2	Not used;
uSA	Not used;
IOn	measures the ionization current; 0 to 100 for currents 0 to 2 microamperes, 100 above 2 microamperes.

FIt Menu (Fault)
It displays the fault event log; use the arrow keys to scroll the list of error codes and press **ENTER** to display the historical value of the selected fault.
The first visible value, **rst**, is used to reset the fault event log; this operation must not be performed by the user but by the service centre. The reset operation can be carried out by changing the parameter to 1 and confirming it by pressing and holding **ENTER** for at least 3 seconds. After the reset, **rst** returns to 0.
The list and meanings of all faults are shown in the FAULT table in Paragraph 5.7 "Analysis of Lockouts - Faults".

Navigation map of LCD display menu



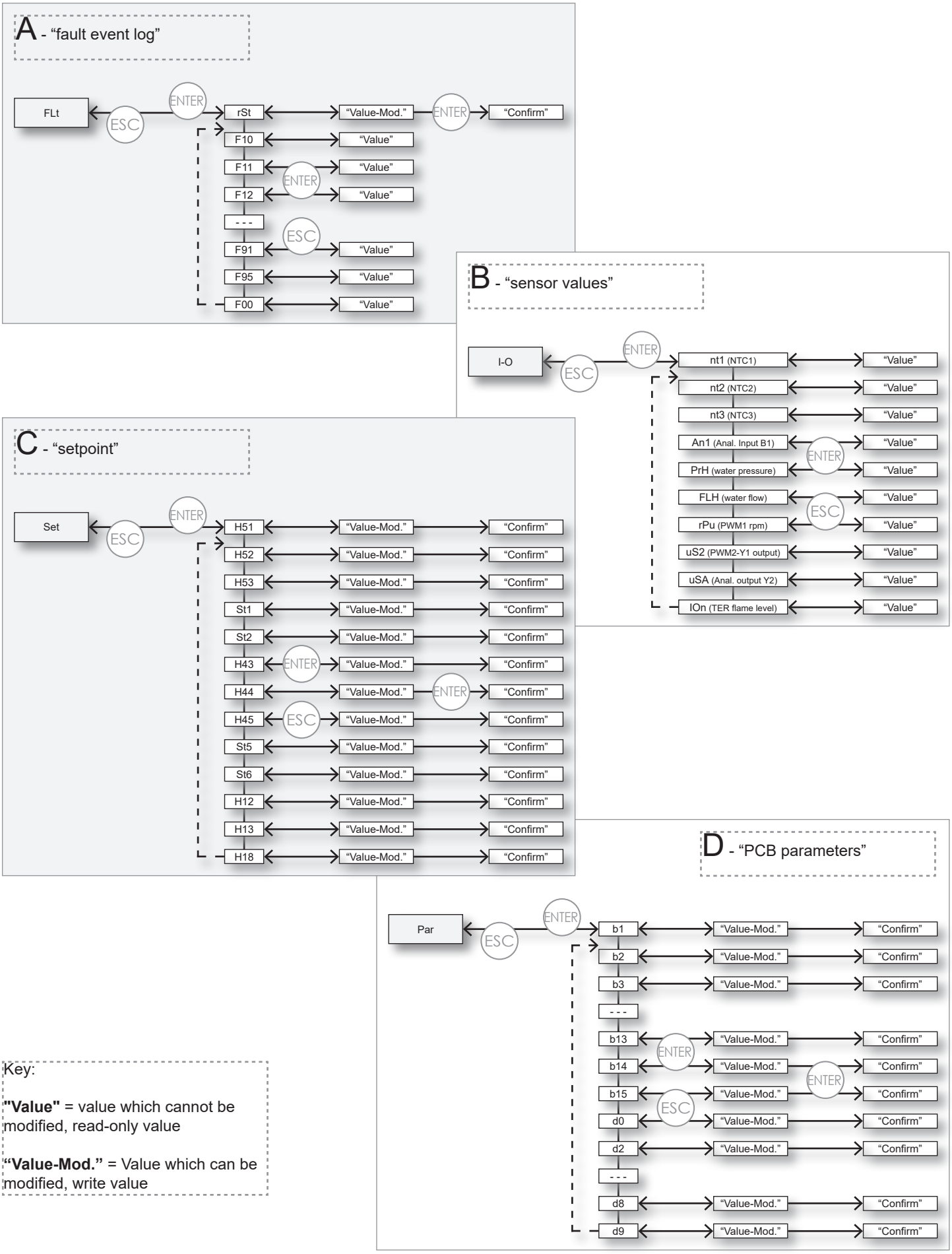
See the next page for the following diagrams:

A - "fault event log"

B - "sensor values"

C - "setpoint"

D - "PCB parameters"



Key:

"Value" = value which cannot be modified, read-only value

“Value-Mod.” = Value which can be modified, write value

7.4. Starting up for the first time

The LRP and LK heaters are supplied with settings entered and tested for the gas specified on the nameplate. Before turning on the heater, check the following:

- make sure the gas being supplied matches the gas for which the heater has been set up;
- check, with the pressure intake "IN" on the gas valve, that the valve input pressure corresponds to that required for the type of gas being used;
- check that electrical connections correspond to those indicated in this manual or other wiring diagrams enclosed with the unit;
- check that efficient earthing connections have been completed, carried out as specified by current safety regulations;
- power on the heater with the general switch located on the unit and insert the power plug inside the compartment.

To turn on the heater, follow the instructions below:
Check that the display shows RDY; if OFF is displayed instead, work on the control, under FUN, and set the device to ON**;**
Check that heat is being demanded by the connected control. When ON appears on the LCD display, the heater starts the ignition cycle.

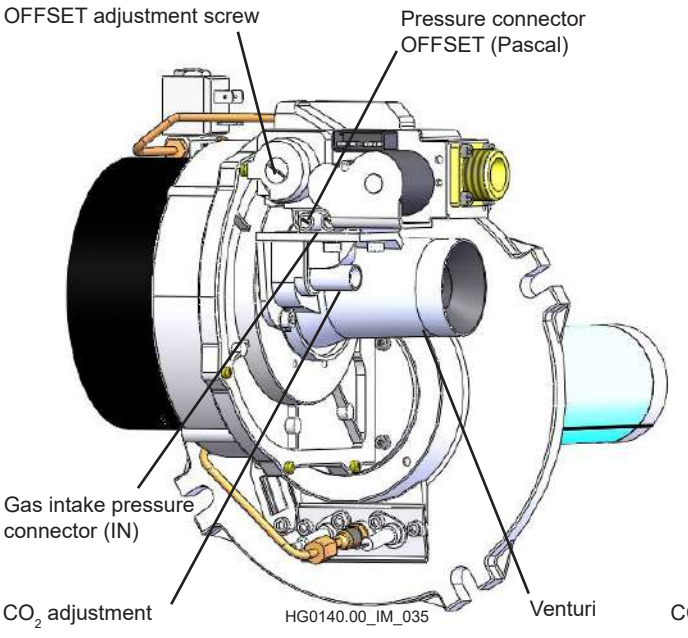
NOTE: Frequently, when turned on for the first time, the pilot burner cannot ignite because there is air in the gas pipe. This will lock out the equipment. You will need to reset the equipment and repeat the operation until it ignites.

Wait until the heater is switched on. Check that the heater reaches its maximum power: from the LCD display, access the REG menu, then use the Hi and Lo controls to force operation at maximum or minimum output.
If the heater is controlled via the Smart Web/Easy, the function shown is valid and the switches must not be reset to control the operation from the LCD panel.
At maximum output, check again that the input pressure in the valve corresponds to the value required; adjust if necessary.
Perform the combustion analysis to verify that the level of CO_2 corresponds to the figures in the tables in Paragraph 7.2 "GAS Connections tables".
If the measured value is different, turn the adjustment screw on the Venturi pipe. Loosening the screw will increase the CO_2 level, screwing it down will decrease the level.
Set the heater to minimum output, and verify that the level of CO_2 corresponds to the figures in the tables in Paragraph 7.2 "GAS Connections Tables". If the values do not match, screw or loosen the offset screw respectively to increase or decrease the CO_2 level and repeat the procedure.

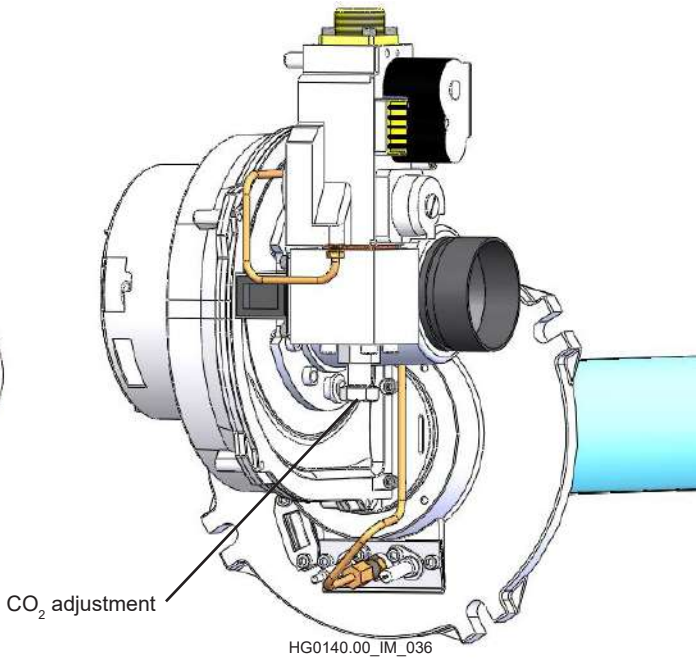
NOTE: The heater directly supplied to function with LPG is set up for G31 gas. If the unit runs on G30 instead, it is necessary to verify and possibly adjust settings for CO_2 as shown in the tables in Paragraph 7.2 "Gas settings tables".

7.5. Analysis of combustion

For models: LRP018-075 and LK020-080



For models: LRP102 and LK105



7.6. Conversion to LPG

Conversion is strictly prohibited in some countries, such as Belgium, which do not allow the double gas category.

The unit is supplied already set for natural gas and with the kit for conversion to LPG, including:
- calibrated gas orifice plate;
- pilot nozzle;
- adhesive plate "Equipment converted...".

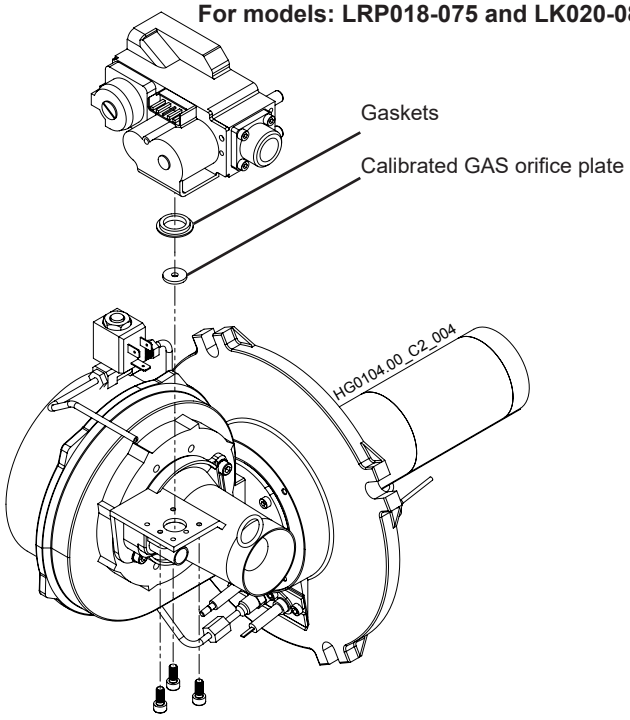
The kit is not supplied in countries where conversion is prohibited.
To convert the unit, follow these instructions:
- disconnect from power supply;
- between the gas valve and the Venturi, replace the gas orifice plate fitted (natural gas) with the one supplied with the kit (for LPG);
- replace the pilot nozzle (natural gas) with the one in the kit (LPG);
- restore power supply and set the heater up for ignition;
- while the start-up electrode is sparking, make sure there are no gas leaks.

When the burner is lit and working at maximum capacity, verify that the valve intake pressure corresponds to the value required for the type of gas that you are using.

Perform the combustion analysis as described in Paragraph 7.5 "Combustion Analysis" and check that:
- the value of CO_2, at maximum and minimum heat output, is within the limits indicated for the type of gas being used (tables in Paragraph 7.2 "Gas Settings Table"). If a different value is detected, change it by turning the adjustment screw: screwing it down decreases the CO_2 level, loosening it increases the level.
- that the gas valve Venturi pipe connector does not leak.

After converting and regulating the unit, replace the nameplate indicating "Equipment regulated for natural gas" with the one in the kit that indicates "Equipment converted ...".

For models: LRP018-075 and LK020-080



7.7. Conversion to gas G25 - G25.1 - G25.3 - G27

Conversion for gasses from G20 to G25 or G25.1 or G25.3 or G27 is allowed only in countries of category II2ELL3B/P [Germany], II2Esi3P [France], II2E3P [Luxembourg] and category II2HS3B/P [Hungary] and category II2ELwLs3B/P [Poland]. For countries in category II2EK3B/P [Netherlands] the unit is supplied already set up and regulated for G25.3.
For category I2E countries, where conversion from G20 to G25 is not permitted [Belgium], the unit is supplied set for operation with G20 gas.
Conversion from one type of gas to another can only be performed by authorised service centres.
Conversion to G25 and/or G25.1, G25.3, G27 where possible, consists in:
- insertion of orifice plate (according to the gas type and the equipment model)

After the conversion, relight the burner and:
- check that the intake pressure to the gas valve corresponds to the level required for the type of gas [see tables in Paragraph 7.2 "GAS Connection Tables"];
- check that the level of CO_2, at maximum and minimum heat output, is between the values indicated for the type of gas. If the value is different, change it by turning the adjustment screw on the Venturi pipe: screwing it down decreases the value, loosening it increases the value.

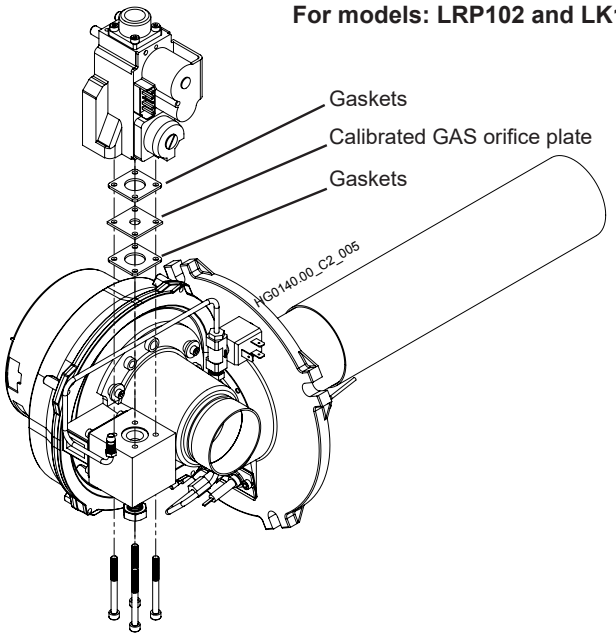
Stick the nameplate "Equipment converted for gas G25...." in place of the one that says "Equipment set up for .....".

NOTE: Always pay close attention to the level of CO_2 in G25.1; for G25.1 minimum and maximum heat output in the LK105 model will always be lower than when used with G20.

The model LRP102 is not suitable for operation with gas G27 and G25.1.

NOTE: The conversion kit to G25 , G25.1 and G27 is only supplied on request. The conversion kit to G25 is included in the standard supply for France, Germany and Luxembourg.

For models: LRP102 and LK105



7.8. Conversion to gas G2.350

Conversion is allowed only for Poland.
Conversion from one type of gas to another can only be performed by authorised service centres.
Conversion to G2.350 consists in:

- for all models: pilot nozzle replacement.
- only for model LK020: mounting a calibrated gas orifice plate [see tables in Paragraph 7.2 "Gas Settings Tables"].
- only for model LK065: mounting a calibrated orifice plate on the air intake of the Venturi pipe [see tables in Paragraph 7.2 "Gas Settings Tables"].

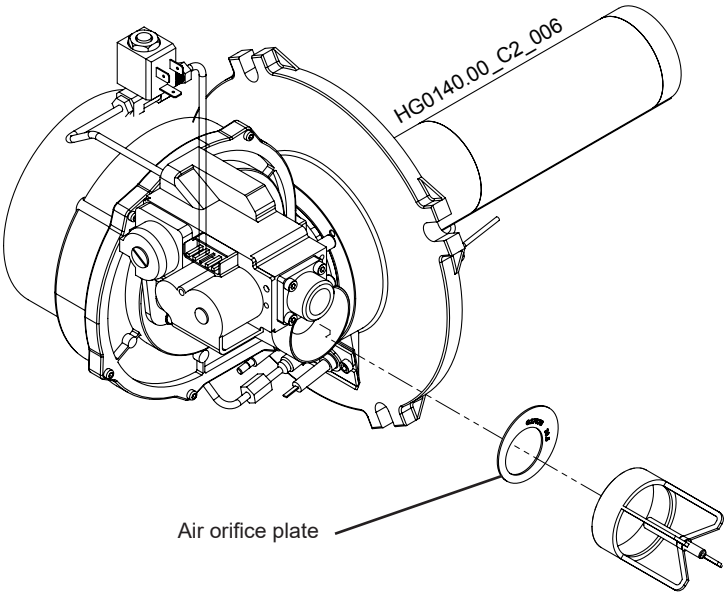
After the conversion, relight the burner and:

- check that the intake pressure to the gas valve corresponds to the level required for the type of gas [see tables in Paragraph 7.2 "GAS Connection Tables"];
- check that the level of CO_2, at maximum and minimum heat output, is between the values indicated for the type of gas. If the value is different, change it by turning the adjustment screw on the Venturi pipe: screwing it down decreases the value, loosening it increases the value.

Stick the nameplate "Equipment converted for gas G2.350...." in place of the one that says "Equipment set up for .....".

NOTE: The minimum and maximum heat outputs of model LK065 are lower with respect to the operation with G20. Models LK080 and LK105 are not suitable to operate with gas G2.350. The model LRP102 is not suitable for operation with gas G2.350.

NOTE: The conversion kit is supplied on request



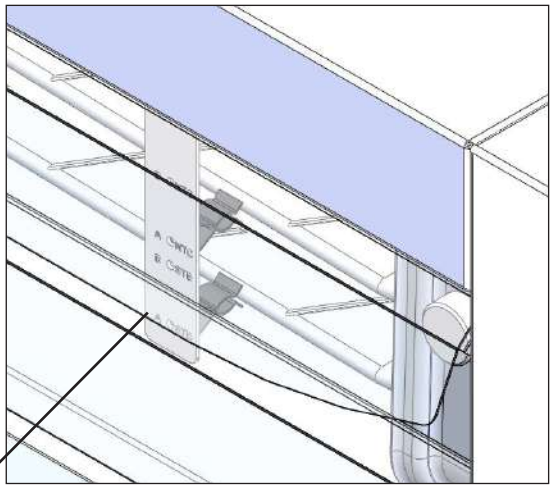
7.9. Replacing the Gas Valve

If the gas valve must be replaced, it is required to proceed with an inspection and possibly calibrate the CO_2 level through the adjustment on the Venturi pipe.
It is advisable not to calibrate the offset: the valve calibration is performed by the manufacturer.
If necessary, carry out the combustion analysis procedure as described in Paragraph 7.4 "Analysis of combustion".
It is recommended to always carry out the flue gas analysis after replacing the gas valve.

7.10. Replacing STB and NTC

If STB thermostat and NTC probe need to be replaced, it is necessary to comply with their position shown in the table and on the relevant bracket on the unit.

MODEL	POSITION STB	POSITION NTC
LRP018	A	C
LRP028		
LK020		
LRP035	H	E
LRP045	B	A
LK034		D
LRP055	E	G
LK045		
LRP075	F	H
LK065		
LRP102	M	P
LK080		
LK105	L	N



Bracket with the indication of the position (A, B, C, etc.) of STB and NTC

7.11. Replacing the modulation PCB

When replacing the PCB, it is required to carry out a few checks and set a few parameters through the LCD command or Smart Web/Easy.
Every LRP and LK heater has a list of pre-programmed default values. It is advisable to update the list at every change performed on site in order to be able to reprogram a spare PCB if needed.

Check the hardware configuration of the PCB
Modify the address of the PCB with the switches, copying the exact configuration of the PCB that was just replaced.

Programming the parameters
The parameters that must be programmed are the following:
- d0, d1, and d5 - to identify the type of equipment;
- b1, b2, b3 - regulate the motor revolutions of the flue fan;
- S1 - enables the NTC1 hot air intake probe;
- ST1 is the set point value for NTC1;
- H51, H52 and H53 - to regulate the 0/10 Vdc (if provided);
- S2, ST2 and P2 - to heat the electrical compartment (if provided).
- TH1 is the upper temperature limit above which you have the F51 fault

Programming the parameters - Operating mode
Parameters can be modified from the LCD display on the machine or, alternatively, from Smart Web/Easy.

The Smart Web/Easy can be used to access all parameters [see tables on previous pages]; parameters have passwords, which are issued by the APEN GROUP assistance service.
Please refer to the Smart Web/Easy manual for instructions for the procedure for access and modification of functional parameters.
Please remember that all changes to parameters must be done ONLY with the burner OFF (with display showing rdy or off).

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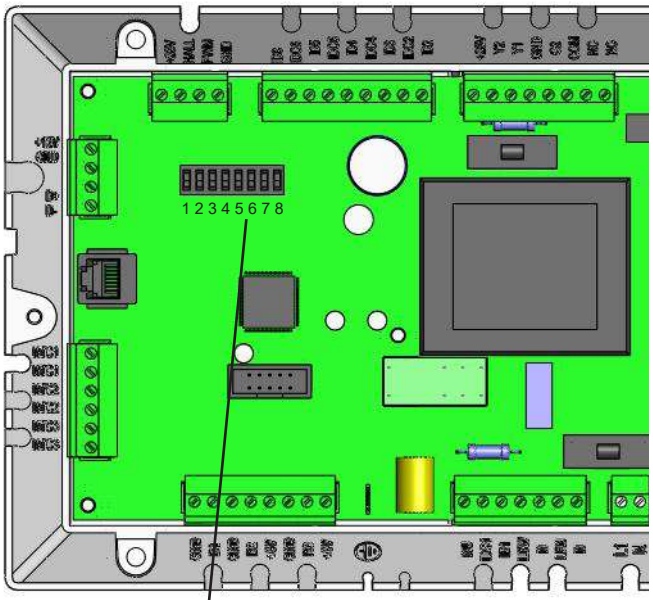


Switch for Smart Web/Easy

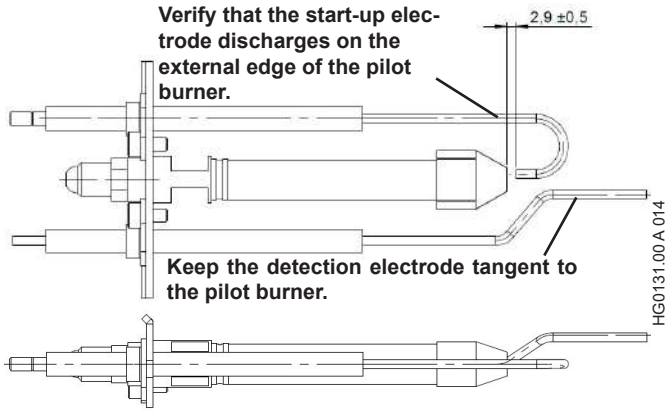
8. MAINTENANCE

To keep the heater efficient and guarantee a long lifetime of the same, it is advisable to run some inspections at regular intervals:
1) check the status of start-up and detection electrodes, pilot flame and relevant seal;
2) check the status of flue exhaust and air intake ducts and terminals;
3) check the status of the Venturi pipe;
4) check and if necessary clean the exchanger and burner;
5) check and clean the water trap;
6) check the intake pressure at the gas valve;
7) check the operation of flame monitoring equipment;
8) check the safety thermostat(s);
9) check the ionization current.

NOTE: Operations at points 1, 2, 3, 4 and 5 must be performed after disconnecting the heater from the electrical mains and closed the gas supply. Operations at point 6, 7, 8 and 9 must be done with the heater on.

Maintenance interval chart

Maintenance	Every year	Extraordinary
1) Electrodes and Pilot	●	
2) Flue gas/Air Terminals	●	
3) Venturi pipes	●	
4) Exchanger/Burner		●
5) Trap and condensate collection tray	●	
6) Gas valve	●	
7) Flame Equipment	●	
8) Safety thermostat(s)	●	
9) Ionization current	●	



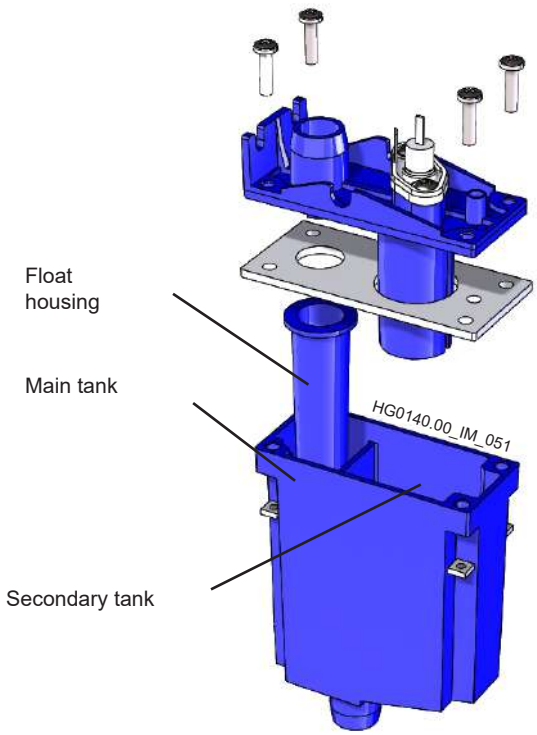
1) Inspection of electrodes
Dismantle the complete pilot flame and use a jet of compressed air to clean the mesh and nozzle. Check the integrity of the ceramic and use sandpaper to remove any oxidation on the metal parts of the electrodes. Check the correct position of the electrodes (see drawing below). It is important that the detection electrode is tangent to the head of the pilot and not inside it. The start-up electrode must discharge onto the mesh of the pilot burner.

2) Inspection of flue gas exhaust and air intake ducts
Visually inspect where possible or use specific tools to check the status of the ducts.
Remove dust that forms on the air intake terminal.

3) Inspection and cleaning of the Venturi pipe
Remove any dirt at the mouth of the Venturi pipe with a brush, and be careful to not let it fall inside the piece.

4) Inspection and cleaning of the exchanger and burner
Perfect combustion in LRP and LK heaters prevents soot forming, which is normally caused by bad combustion. It is advisable, therefore, to not clean the exchanger and burner unless there are exceptional circumstances.
An accumulation of dirt inside the exchanger could be revealed by a considerable variation in the gas capacity that is not caused by improper functioning of the gas valve.
Should it become necessary to clean the burner and/or exchanger, all the gaskets between the burner and the exchanger must be replaced.

5) Inspection and cleaning of the trap and condensation collection tray
Clean the trap every year, and check the connections. Make sure there are no traces of metallic residue. If metallic residue has formed, increase the number of inspections.
Remove the cover retaining screws and clean the internal part of the trap and the relevant float (it is possible to clean the trap under running water) by checking that all ducts are free. Check the seal conditions. Check the integrity of the detection electrode and use sandpaper to remove any oxidation on the metal part.
Fill in the main tank with clean water and close the cover. Reconnect the trap to the condensate drain system.
To check that the salts inside the tray are still active, use litmus paper to check that the pH level of water flowing out of is greater than 6.
If the pH is lower, replace the calcium carbonate present in the tray.



6) Inspection of intake gas pressure
Check that the intake pressure at the valve corresponds to the value required for the type of gas that you are using.
This verification must be done with the heater on at the maximum heat capacity.

7) Inspection of flame monitoring equipment
With the heater running, close the gas tap and verify that the machine is locked out, signalled on the LCD display of the CPU PCB on the machine with F10. Reopen the gas tap, reset the lockout and wait for the heater to restart.

8) Inspection of the safety thermostat(s)
This procedure must be done with the heater on and the burner lit. Open the thermostat series with an insulated tool [230 V], remove the fast-on from the safety thermostat, wait for the F20 block signal to appear on the LCD display on the CPU PCB on the machine. Close again the thermostat series, then reset the lockout.

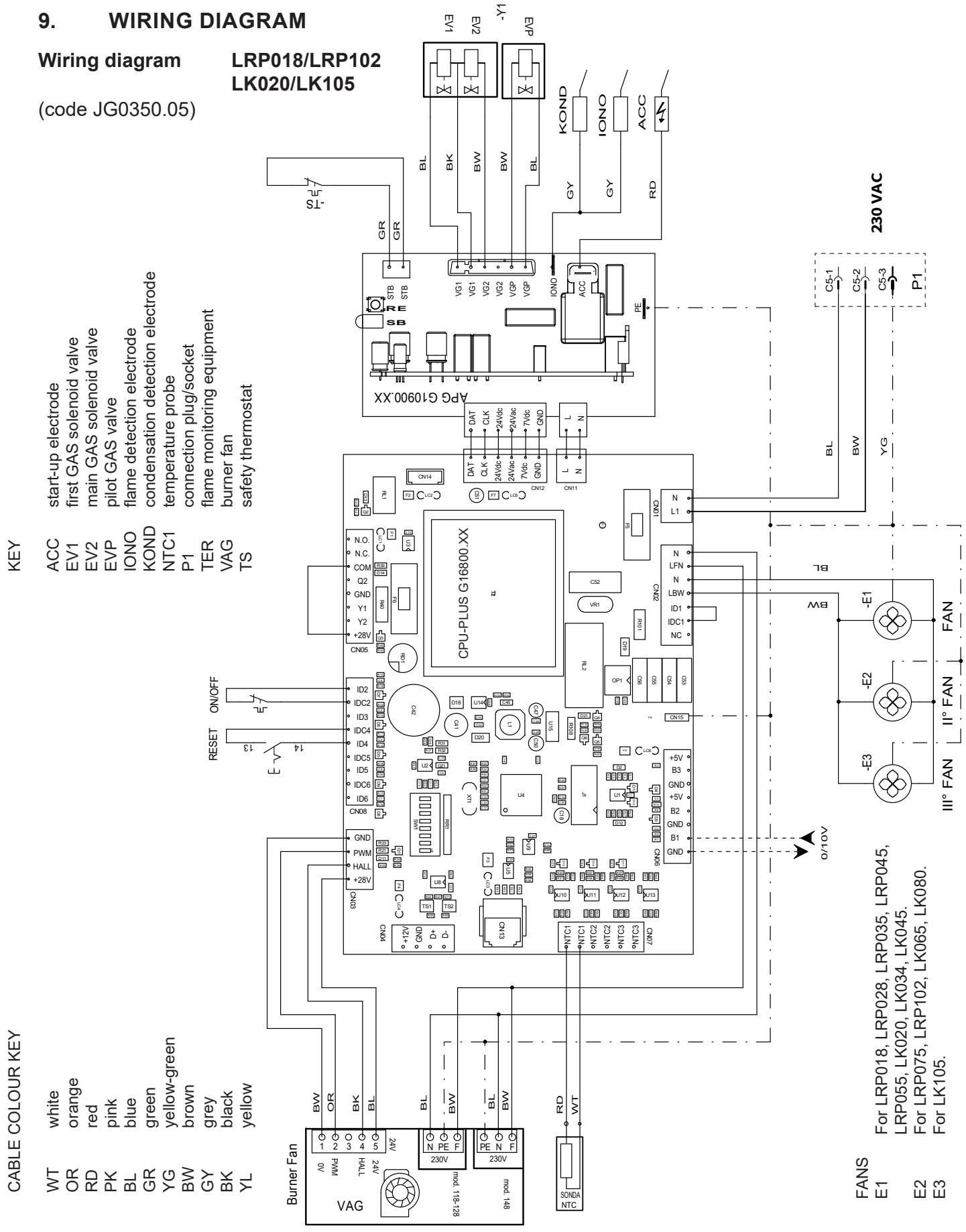
9) Inspection of the ionization current
This procedure can be done directly from the LCD display by entering into the I/O menu. The IOn parameter indicates the value of the ionization current, and the reading is as follows:
- 100, indicates that the value is more than 2 microAmperes, which is plenty for the equipment to function;
- from 0 to 100, indicates a value from 0 to 2 microAmperes; for example, 35 corresponds to 0.7 microAmperes, which is the minimum threshold detectable for the flame monitoring equipment.

The value of the ionisation current must not be below 2 microAmperes. Lower values indicate: the detection electrode in a bad position, a rusted electrode or one about to stop functioning.

9. WIRING DIAGRAM

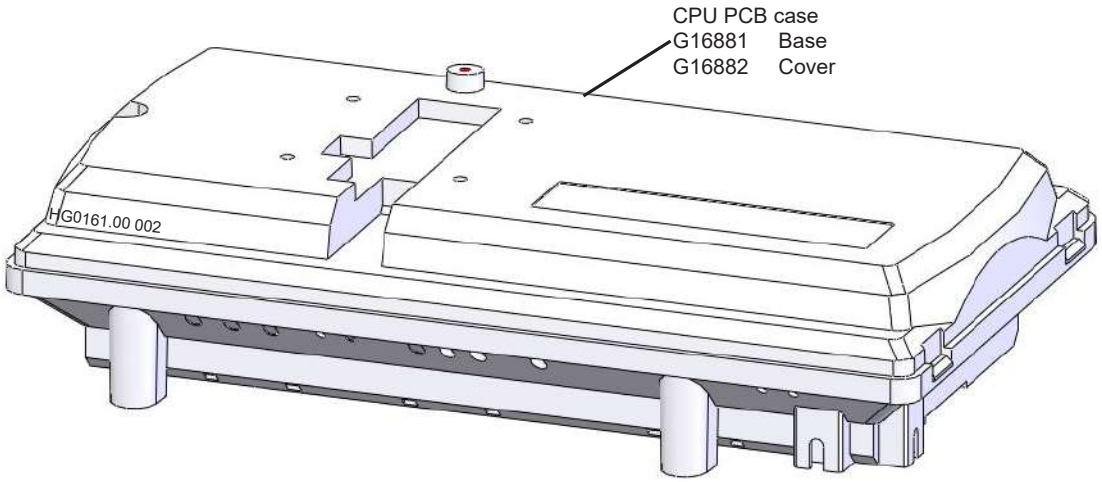
Wiring diagram **LRP018/LRP102**
LK020/LK105

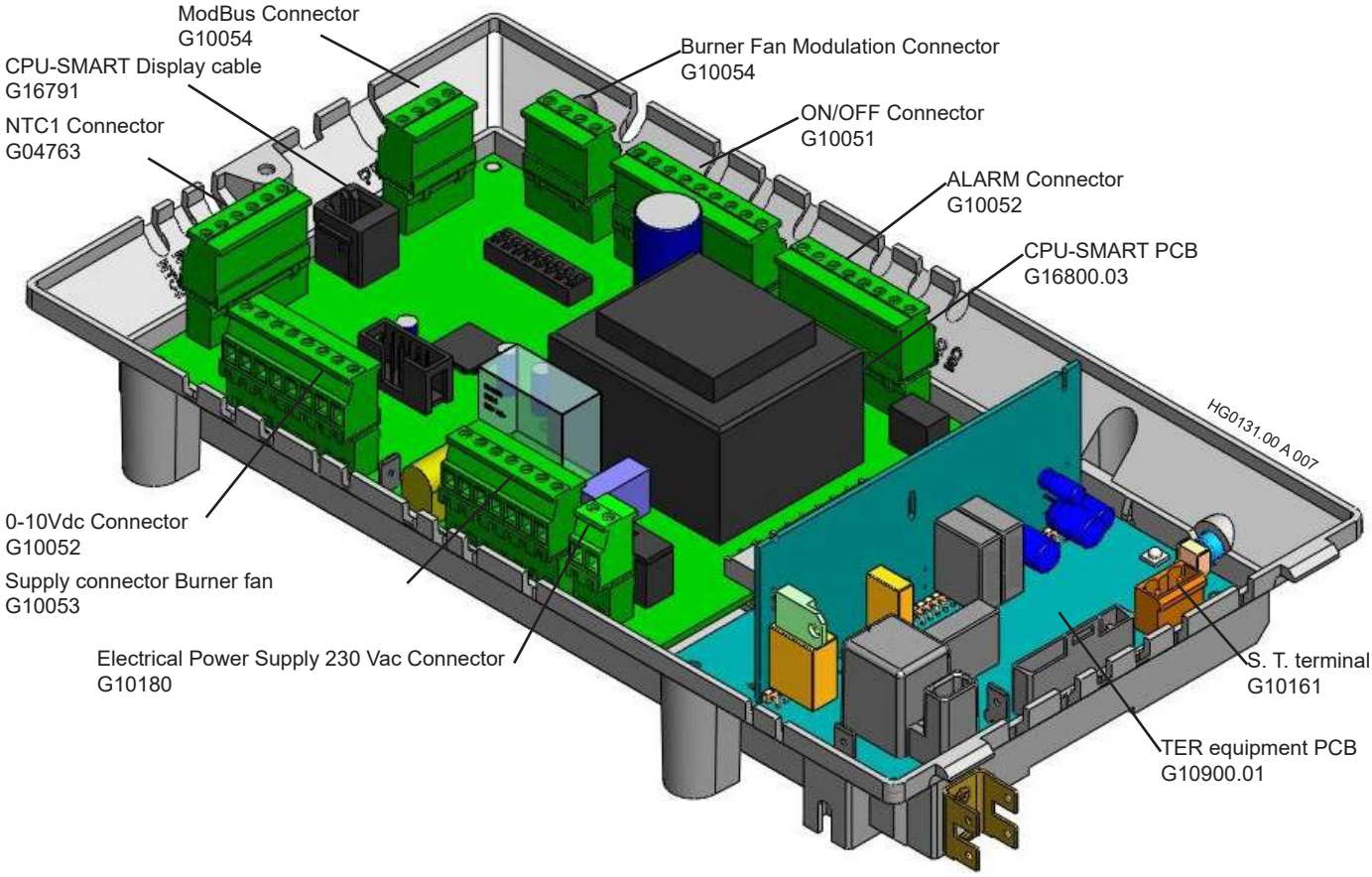
(code JG0350.05)



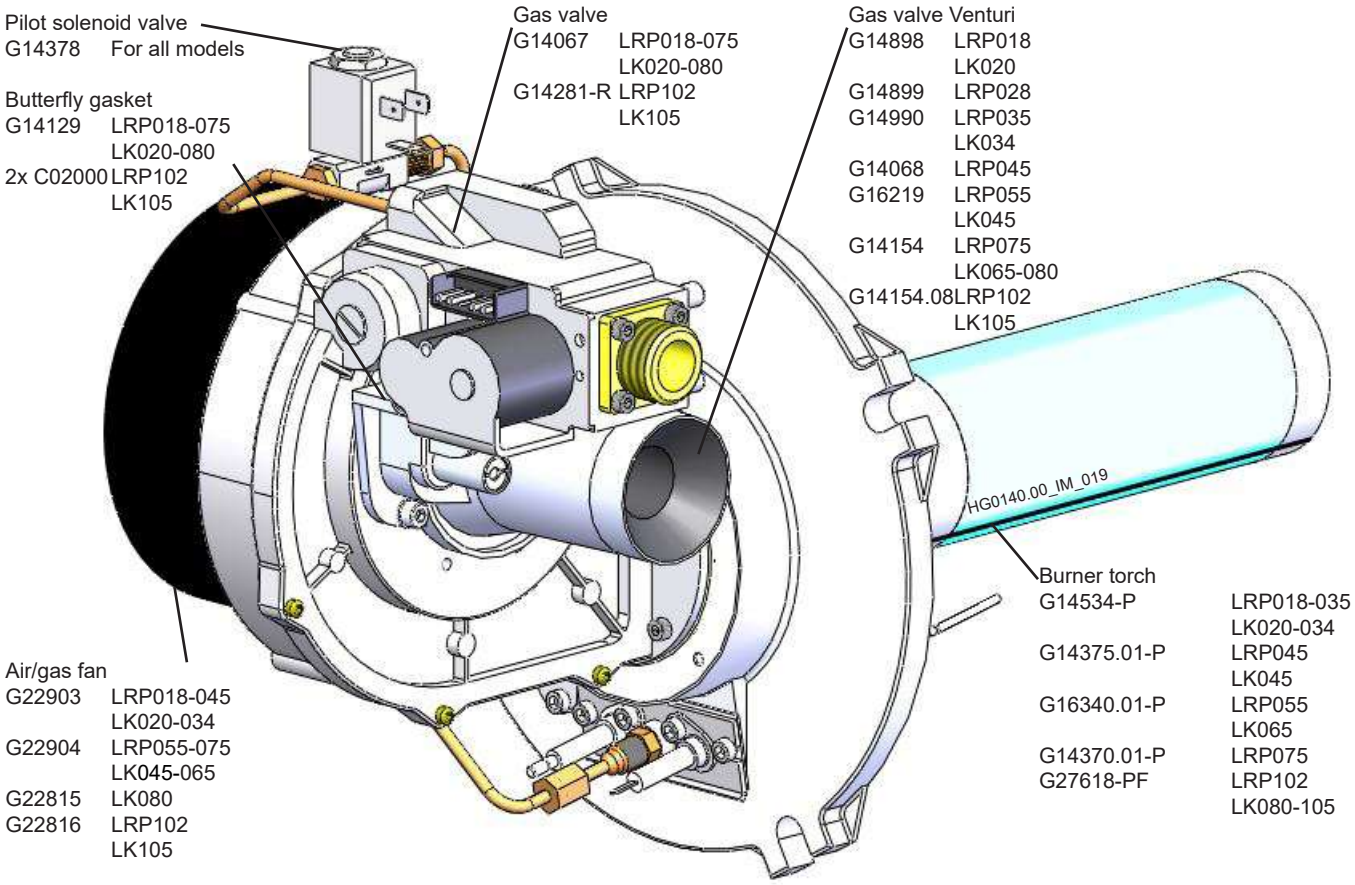
10. LIST OF SPARE PARTS

10.1. Parts for the control panel

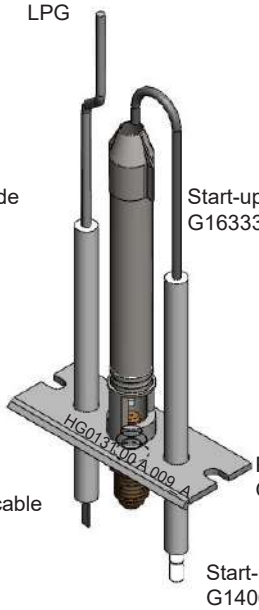


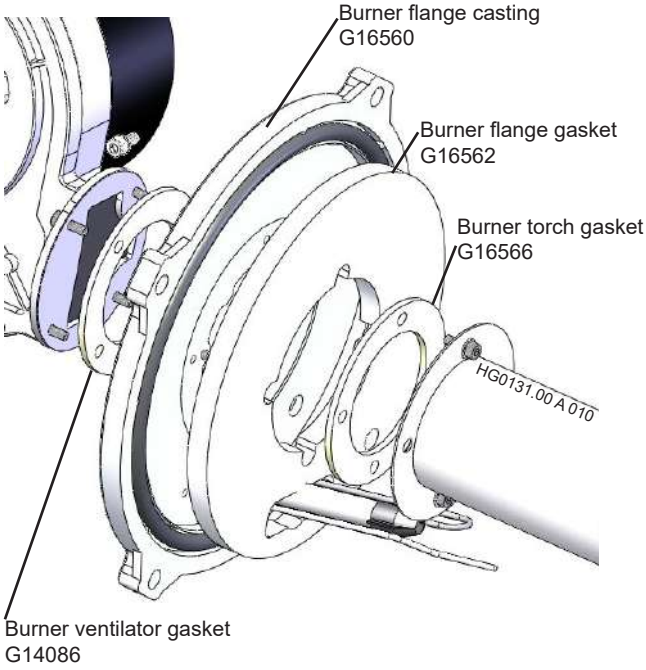


10.2. Parts for the burner unit



Pilot flame unit
G28030.01 G20
G28030.01-1 LPG

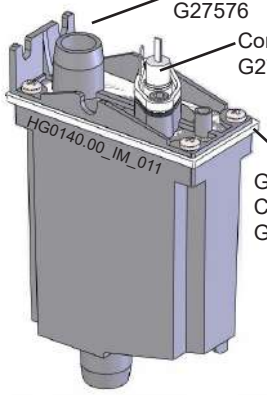




Water trap complete with condensation detection electrode
G27810 For all models

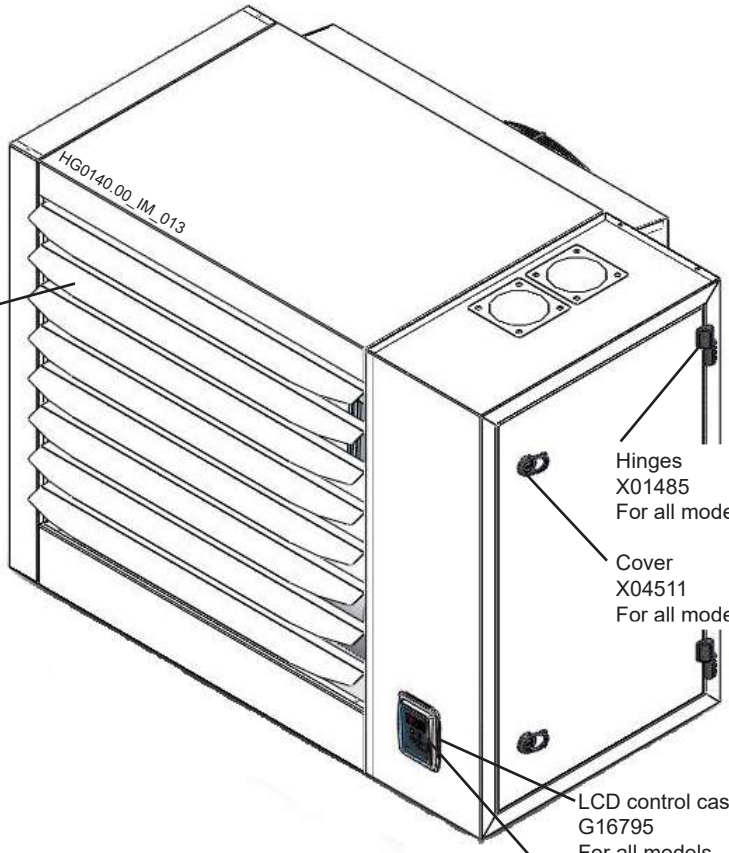
Water trap pipe
G27576 For all models

Condensation detection electrode
G27806 For all models



Gasket
Condensate trap
G28827

RVK cable
condensation detection
G28303 (only for LK)



Tabs

G27582	no.7	LRP018-028 LK020
G27583	no.7	LRP035-045 LK034
	no.8	LRP055 LK045
	no.18	LK105
G27585	no.8	LRP075 LK065
G27586	no.18	LRP102 LK080

NTC1 probe
G16400 For all models

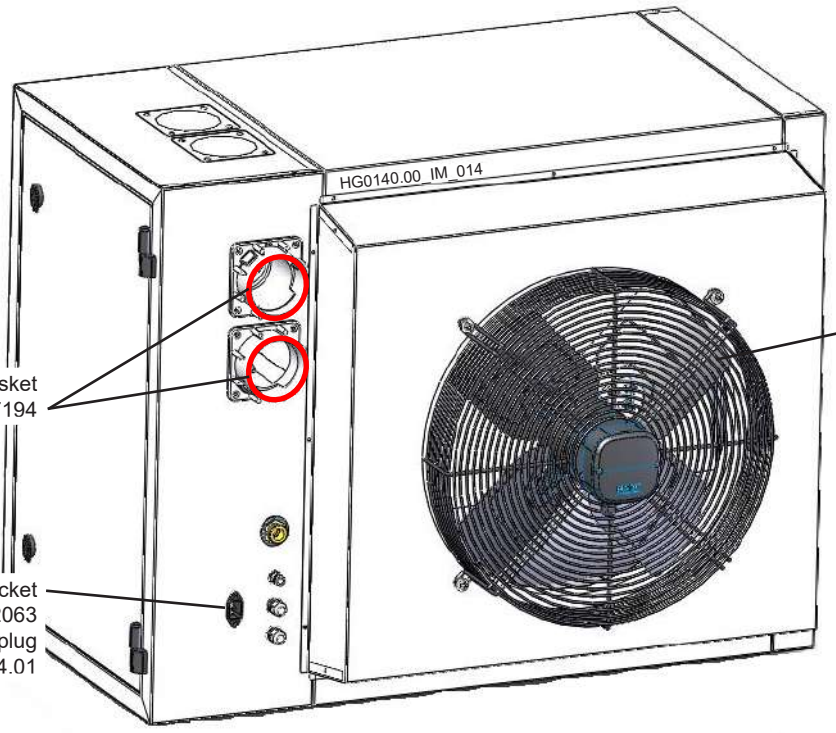
Safety thermostat
G16300 For all models

Hinges
X01485
For all models

Cover
X04511
For all models

LCD control case
G16795
For all models

Display PCB
G16790
For all models



Gasket
G27194

Power socket
G12063
Power supply plug
G12064.01

Fan

G04429.01	no.1	LRP018
G07660.01	no.1	LRP028 LK020
G10734	no.1	LRP035
G03270	no.2	LRP075 LK065
	no.3	LK105
	n.2	LRP102
G04990	no.1	LRP045-055 LK034-045 LK080

Pessano con Bornago, 12/10/2020

MANUFACTURER'S DECLARATION

pursuant to MD 06/08/2020 - Annex A - par. 4.1

"Technical requirements for access to tax deductions for the energy upgrading of buildings - also known as Ecobonus"
[Official Journal no. 246 of 5-10-2020]

Manufacturer:	Apen Group S.p.A Via Isonzo, 1 20060 Pessano c/Bornago,MI (Italy)
Type of intervention:	Replacement of existing winter air conditioning systems with systems equipped with condensing heaters [art.2 paragraph 1 letter e)]
Type of heater:	Condensing warm air heater
Commercial Name:	Kondensa - LK series

APEN GROUP SPA DECLARES THAT:

The condensing warm air heater models of our own production, belonging to the **LK**series:

- have a **useful heat efficiency**, at a load equal to 100% of the nominal useful heat output, greater than or equal to 93+2LogPn[1];
- have a value of the seasonal space heating energy efficiency ($\eta_{s,h}$) greater than or equal to 90% according to Regulation EU/2281/2016;

For the replacement of winter air conditioning systems with systems having a burner nominal power **greater than or equal to 100 kW**, for the purposes of asseveration, it is declared that the LK series heaters:

- are suitable for climate controlled operation. This regulation is available on the Smart Easy/Web Chronothermostat and acts directly on the burner;
- the burner is of modulating type

Apen Group S.p.A.

An Administrator

[1] Test Report no. 150500451 issued by Kiwa Cermet Italia SpA, as Notified Body in compliance with GAR Regulation EU/426/2016 (Gas Appliance Regulation)

Notes

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