GB

Forced draught gas burner

Modulating operation

Code	Model
20048377	RS 1200/E BIOGAS/GPL C01 FS2

20049577 (2) - 07/2012

1 Information and general instructions

1.1 Information about the instruction manual

1.1.1 Introduction

The instruction manual supplied with the burner:

- ➤ is an integral and essential part of the product and must not be separated from it; it must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. If the manual is lost or damaged, another copy must be requested from the Technical Assistance Service of the area;
- ➤ is designed for use by qualified personnel;
- ➤ offers important indications and instructions relating to the installation safety, start-up, use and maintenance of the burner.

Symbols used in the manual

In some parts of the manual you will see triangular DANGER signs. Pay great attention to these, as they indicate a situation of potential danger.

1.1.2 General dangers

The **dangers** can be of **3 levels**, as indicated below.

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

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

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

1.1.3 Other symbols

DANGER: LIVE COMPONENTS

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

DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.

DANGER: BURNING

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

DANGER: CRUSHING OF LIMBS

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

WARNING: MOVING PARTS

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

DANGER: EXPLOSION

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

PERSONAL PROTECTION EQUIPMENT

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

OBLIGATION TO ASSEMBLE THE COVER AND ALL THE SAFETY AND PROTECTION DEVICES

This symbol signals the obligation to reassemble the cover and all the safety and protection devices of the burner after any maintenance, cleaning or checking operations.

ENVIRONMENTAL PROTECTION

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

IMPORTANT INFORMATION

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

➤ This symbol indicates a list.

Abbreviations used

Ch.	Chapter
Fig.	Figure
Page	Page
Sec.	Section
Tab.	Table

1.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

➤ the instruction manual is delivered to the user by the system manufacturer, with the recommendation to keep it in the room where the heat generator is to be installed.

➤ The instruction manual shows:
– the serial number of the burner;

.....

– the address and telephone number of the nearest Assistance Centre.

.....
.....
.....

➤ The system supplier must carefully inform the user about:
– the use of the system;
– any further tests that may be required before activating the system;
– maintenance, and the need to have the system checked at least once a year by a representative of the manufacturer or another specialised technician.
To ensure a periodic check, the manufacturer recommends the drawing up of a Maintenance Contract.

1.2 Guarantee and responsibility

The manufacturer guarantees its new products from the installation date, in accordance with the regulations in force and/or the sales contract. At the moment of the first start-up, check that the burner is integral and complete.

WARNING

Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.

In particular, the rights to the guarantee and the responsibility will no longer be valid, in the event of damage to things or injury to people, if such damage/injury was due to any of the following causes:

➤ incorrect installation, start-up, use and maintenance of the burner;
➤ improper, incorrect or unreasonable use of the burner;
➤ intervention of unqualified personnel;
➤ carrying out of unauthorised modifications on the equipment;
➤ use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
➤ installation of untested supplementary components on the burner;
➤ powering of the burner with unsuitable fuels;
➤ faults in the fuel supply system;
➤ use of the burner even following an error and/or an irregularity;
➤ repairs and/or overhauls incorrectly carried out;
➤ modification of the combustion chamber with inserts that prevent the regular development of the structurally established flame;
➤ insufficient and inappropriate surveillance and care of those burner components most likely to be subject to wear and tear;
➤ the use of non-original components, including spare parts, kits, accessories and optional;
➤ force majeure.

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

2 Safety and prevention

2.1 Introduction

The burners have been designed and built in compliance with current regulations and directives, applying the known technical rules of safety and envisaging all the potential danger situations.

It is necessary, however, to bear in mind that the imprudent and clumsy use of the equipment may lead to situations of death risk for the user or third parties, as well as the damaging of the burner or other items. Inattention, thoughtlessness and excessive confidence often cause accidents; the same applies to tiredness and sleepiness.

It is a good idea to remember the following:

➤ The burner must only be used as expressly described. Any other use should be considered improper and therefore dangerous.

In particular:

it can be applied to boilers operating with water, steam, diathermic oil, and to other users expressly named by the manufacturer;

the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the room temperature must all be within the values indicated in the instruction manual.

➤ Modification of the burner to alter its performance and destinations is not allowed.

➤ The burner must be used in exemplary technical safety conditions. Any disturbances that could compromise safety must be quickly eliminated.

➤ Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.

➤ Only those parts envisaged by the manufacturer can be replaced.

WARNING

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

2.2 Personnel training

The user is the person, body or company that has acquired the machine and intends to use it for the specific purpose. He is responsible for the machine and for the training of the people working around it.

The user:

➤ undertakes to entrust the machine exclusively to suitably trained and qualified personnel;

➤ undertakes to inform his personnel in a suitable way about the application and observance of the safety instructions. With that aim, he undertakes to ensure that everyone knows the use and safety instructions for his own duties;

➤ Personnel must observe all the danger and caution indications shown on the machine.

➤ Personnel must not carry out, on their own initiative, operations or interventions that are not within their province.

➤ Personnel must inform their superiors of every problem or dangerous situation that may arise.

➤ The assembly of parts of other makes, or any modifications, can alter the characteristics of the machine and hence compromise operating safety. The manufacturer therefore declines any and every responsibility for any damage that may be caused by the use of non-original parts.

In addition:

➤ the user must take all the measures necessary to prevent unauthorised people gaining access to the machine

➤ the user must inform the manufacturer if faults or malfunctioning of the accident prevention systems are noticed, along with any presumed danger situation

➤ personnel must always use the personal protective equipment envisaged by legislation and follow the indications given in this manual

3 Technical description of the burner

3.1 Technical data

Model			RS 1200/E BIOGAS/GPL C01 FS2
Output (1)	max.	kW MBtu/hr	5500 - 12000 18766 - 40944
	min.	kW MBtu/hr	1500 5118
Fuel - max. delivery - pressure at max. delivery (2)		 SCFH “ wc	Natural gas 29973 17.9
Operation			Low - high or modulating
Standard applications			Boilers: water, steam, thermal oil
Ambient temperature		°F	32 - 104 (0 - 40 °C)
Combustion air temperature		°F max	140 (60 °C)
Noise levels (3)		dBA	99

Tab. A

(1) Reference conditions: Ambient temperature 68 °F (20 °C) - Barometric pressure 394” wc - Altitude 329 ft.
(2) Pressure at test point 5) (Fig. 5), with zero pressure in the combustion chamber, and maximum burner output
(3) Sound pressure measured in manufacturer’s combustion laboratory, with burner operating on test boiler and at maximum rated output.

3.2 Electrical data

Fan motor		IE2
Control circuit power supply	V/Ph/Hz	120/1/60
Main power supply (+/- 10%)	V/Ph/Hz	575/3/60
Fan motor	rpm V HP A	3520 575/795 34 30.8
Ignition transformer	V1 - V2 I1 - I2	120 V - 1 x 8 kV 1.6 A - 20 mA
Electrical power consumption	A max	33
Electrical control circuit consumption	W max	
Total electrical consumption	kW	26
Electrical protection		NEMA 1

Tab. B

3.3 Burner models designation

Model	Code	Voltage	Flame safeguard
RS 1200/E C01	20048377	575/3/60	Burner mounted

Tab. C

3.4 Packaging

➤ The packaging of the burner (Fig. 1) rests on a wooden platform that is particularly suitable for lift trucks.
The overall dimensions of the packaging are shown in the Tab. D.
➤ The weight of the burner complete with its packaging is shown in Tab. D.

inch	A	B	C	lbs
RS 1200/E C01	96 1/16“	63 37/64“	56 11/16“	1100

Tab. D

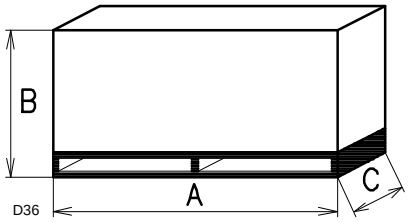


Fig. 1

3.5 Overall dimensions

The maximum dimensions of the burner are given in Fig. 2.

Bear in mind that inspection of the combustion head requires the burner to be opened by rotating the rear part on the hinge.

The overall dimensions of the burner when open are indicated by L and R.

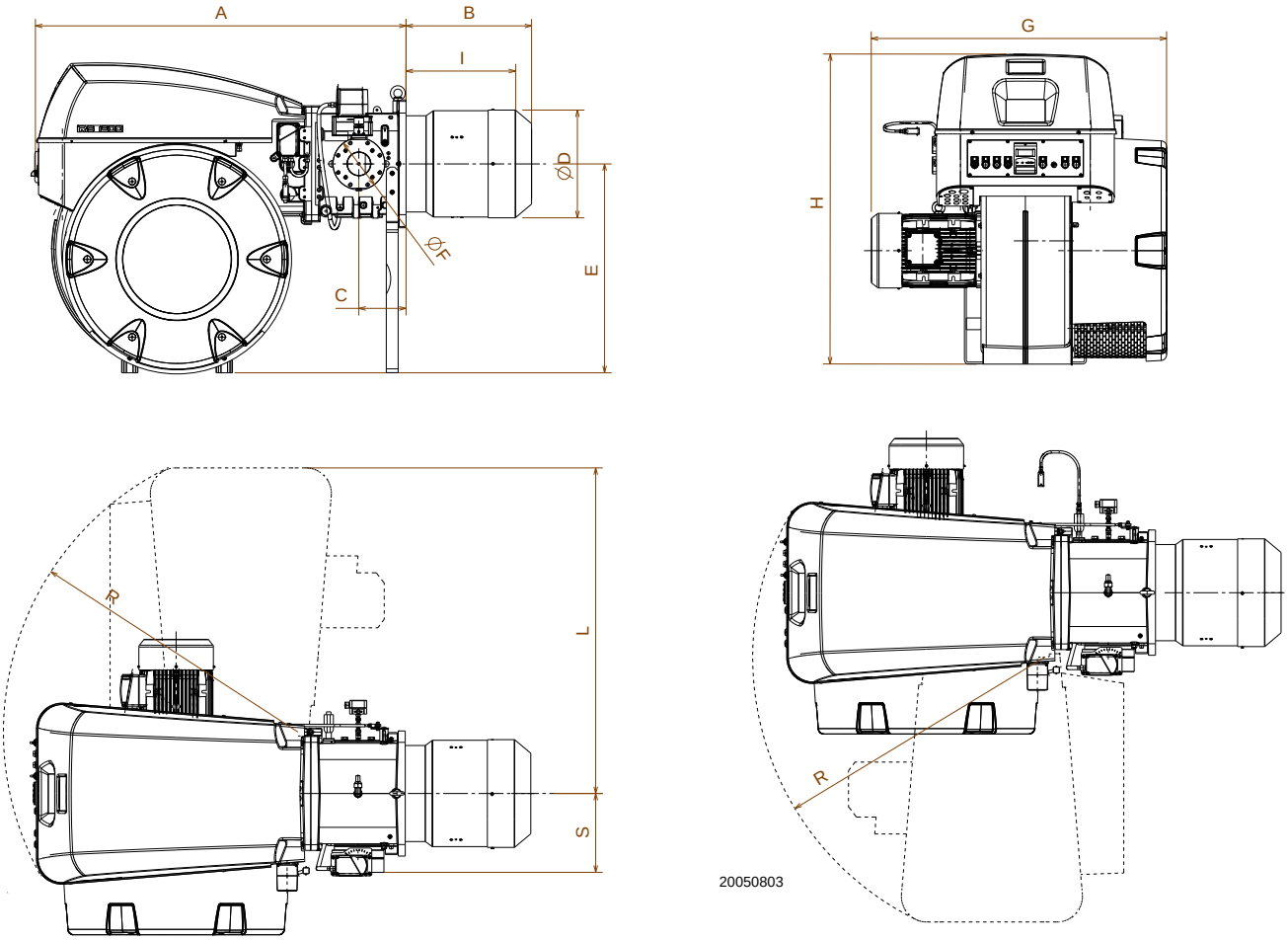


Fig. 2

inch	A	B	C	D	E	F	G	H	I	L	R	S
RS 1200/E C01	61 21/32“	20 61/64“	7 7/8“	17 61/64“	34 51/64“	DN80	49 7/32“	51 37/64“	18 3/16“	56“	52 23/64“	13 5/32“

Tab. E

3.6 Firing rate

Maximum output must be selected in the hatched area of the diagram.

Minimum output must not be lower than the minimum limit shown in the diagram.

WARNING

The firing rate was obtained considering a room temperature of 68 °F and an atmospheric pressure of 394 “wc (approx. 0 ft above sea level), with the combustion head adjusted.

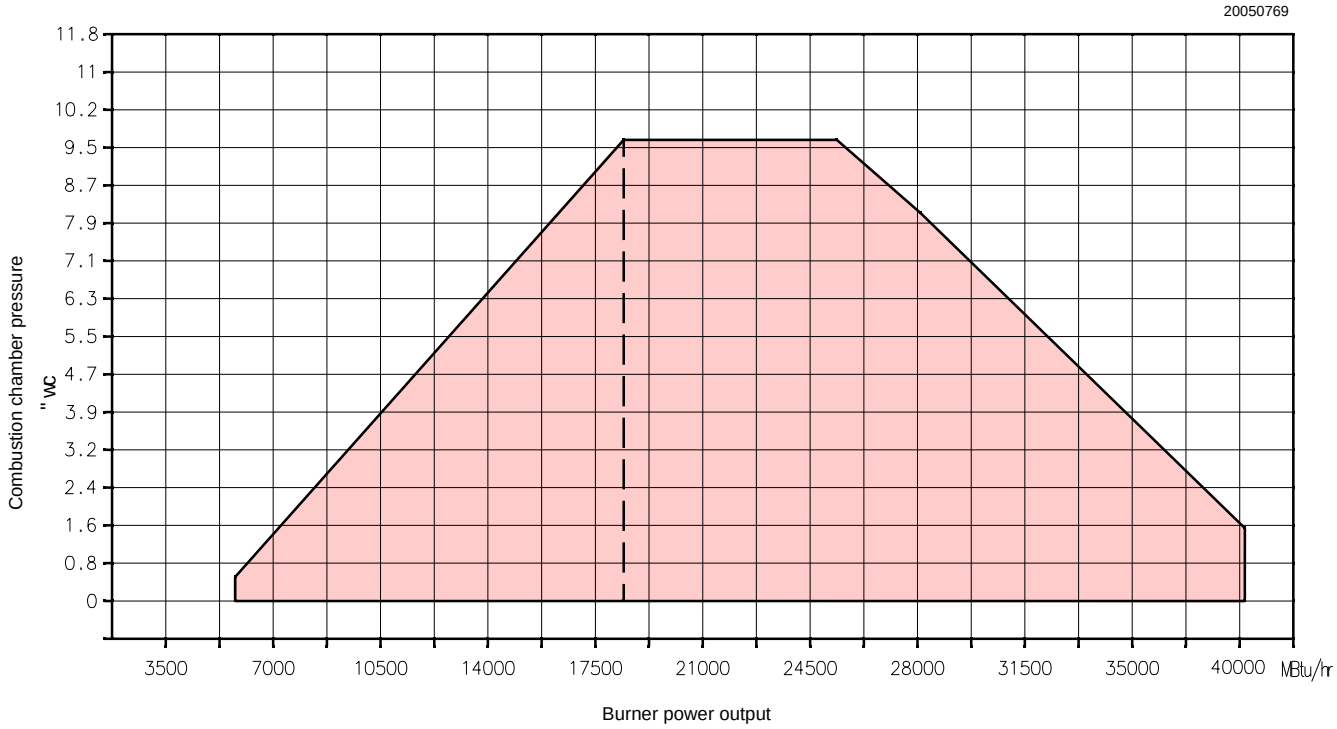


Fig. 3

3.6.1 Procedure to refer burner operating condition in high altitude plants

Find the **CORRECTED BURNER CAPACITY** for the plant's altitude in chart **1** and the **CORRECTED PRESSURE** in chart **2**.

Check in the firing rate graph of the burner (Fig. 4), if the working point defined by the values above is within the range limits.

If not, higher burner size is needed.

Note

➤ Charts are based only on altitude variation (reference temperature = 68°F, 20°C)

➤ To get the combined correction in case of different air temperature, a compensation of 1000 ft each 20°F (305 m each 11°C) is applicable (100 ft = 2°F).

Example

Rated capacity = 3000 MBtu/hr - Rated air pressure = 1.5" WC

Real altitude = 5000 ft - Real temperature = 108°F

Δ = 108°F - 68°F (reference temp.) = 40°F (equivalent 2000 ft variation)
40 : 2 = 20 x 100 = 2000 ft

Proceeding as descripted above and considering a "virtual altitude" of (5000 + 2000) ft:

– 3000 MBtu/hr at 7000 ft, the corrected capacity is 3847 MBtu/hr
– 1.5" WC at 7000 ft, the corrected burner air pressure is 1.92

Reference conditions:

– Ambient temperature 68 °F (20 °C)
– Barometric pressure 394" WC (1000 mbar)
– Altitude 328 ft a.s.l. (100 m a.s.l.).

1 CORRECTED BURNER CAPACITY ACCORDING TO ALTITUDE

Rated Capacity	Altitude										
	m a.s.l.	0	100	305	610	915	1220	1525	1830	2135	2440
	ft a.s.l	0	328	1000	2000	3000	4000	5000	6000	7000	8000
500		494	500	512	530	551	571	593	616	641	669
1000		987	1000	1023	1061	1101	1142	1186	1232	1282	1337
1500		1481	1500	1535	1591	1652	1713	1778	1848	1924	2006
2000		1974	2000	2046	2121	2202	2284	2371	2464	2565	2675
2500		2468	2500	2558	2652	2753	2855	2964	3079	3206	3343
3000		2962	3000	3069	3182	3303	3425	3557	3695	3847	4012
3500		3455	3500	3581	3712	3854	3996	4149	4311	4488	4680
4000		3949	4000	4092	4243	4404	4567	4742	4927	5130	5349
4500		4442	4500	4604	4773	4955	5138	5335	5543	5771	6018
5000		4936	5000	5116	5303	5505	5709	5928	6159	6412	6686
5500		5429	5500	5627	5834	6056	6280	6520	6775	7053	7355
6000		5923	6000	6139	6364	6606	6851	7113	7391	7694	8024
6500		6417	6500	6650	6894	7157	7422	7706	8006	8335	8692
7000		6910	7000	7162	7425	7708	7993	8299	8622	8977	9361
7500		7404	7500	7673	7955	8258	8564	8892	9238	9618	10029
8000		7897	8000	8185	8485	8809	9135	9484	9854	10259	10698
8500		8391	8500	8697	9016	9359	9705	10077	10470	10900	11367
9000		8885	9000	9208	9546	9910	10276	10670	11086	11541	12035
9500		9378	9500	9720	10076	10460	10847	11263	11702	12183	12704
10000		9872	10000	10231	10607	11011	11418	11855	12318	12824	13373
Average barometric pressure (20°C)	mbar	1013	1000	977.4	942.8	908.2	875.8	843.5	811.85	779.8	747.8
Average barometric pressure (68°F)	"w.c.	399	394	385	371	358	345	332	320	307	294

2 CORRECTED BURNER AIR PRESSURE ACCORDING TO ALTITUDE

Rated Pressure	Altitude										
	m a.s.l.	0	100	305	610	915	1220	1525	1830	2135	2440
	ft a.s.l	0	328	1000	2000	3000	4000	5000	6000	7000	8000
0.50		0.49	0.50	0.51	0.53	0.55	0.57	0.59	0.62	0.64	0.67
1.00		0.99	1.00	1.02	1.06	1.10	1.14	1.19	1.23	1.28	1.34
1.50		1.48	1.50	1.53	1.59	1.65	1.71	1.78	1.85	1.92	2.01
2.00		1.97	2.00	2.05	2.12	2.20	2.28	2.37	2.46	2.56	2.67
2.50		2.47	2.50	2.56	2.65	2.75	2.85	2.96	3.08	3.21	3.34
3.00		2.96	3.00	3.07	3.18	3.30	3.43	3.56	3.70	3.85	4.01
3.50		3.46	3.50	3.58	3.71	3.85	4.00	4.15	4.31	4.49	4.68
4.00		3.95	4.00	4.09	4.24	4.40	4.57	4.74	4.93	5.13	5.35
4.50		4.44	4.50	4.60	4.77	4.95	5.14	5.33	5.54	5.77	6.02
5.00		4.94	5.00	5.12	5.30	5.51	5.71	5.93	6.16	6.41	6.69
5.50		5.43	5.50	5.63	5.83	6.06	6.28	6.52	6.77	7.05	7.35
6.00		5.92	6.00	6.14	6.36	6.61	6.85	7.11	7.39	7.69	8.02
6.50		6.42	6.50	6.65	6.89	7.16	7.42	7.71	8.01	8.34	8.69
7.00		6.91	7.00	7.16	7.42	7.71	7.99	8.30	8.62	8.98	9.36
7.50		7.40	7.50	7.67	7.96	8.26	8.56	8.89	9.24	9.62	10.03
8.00		7.90	8.00	8.18	8.49	8.81	9.13	9.48	9.85	10.26	10.70
8.50		8.39	8.50	8.70	9.02	9.36	9.71	10.08	10.47	10.90	11.37
9.00		8.88	9.00	9.21	9.55	9.91	10.28	10.67	11.09	11.54	12.04
9.50		9.38	9.50	9.72	10.08	10.46	10.85	11.26	11.70	12.18	12.70
10.00		9.87	10.00	10.23	10.61	11.01	11.42	11.86	12.32	12.82	13.37
Average barometric pressure (20°C)	mbar	1013	1000	977.4	942.8	908.2	875.8	843.5	811.85	779.8	747.8
Average barometric pressure (68°F)	"w.c.	399	394	385	371	358	345	332	320	307	294

3.7 Minimum furnace dimensions

The firing rate was obtained in special test boilers.

Fig. 4 indicates the diameter and length of the test combustion chamber.

Example:
Output 26510 Mbtu/hr: - diameter 47.7 inch - length 20 ft.

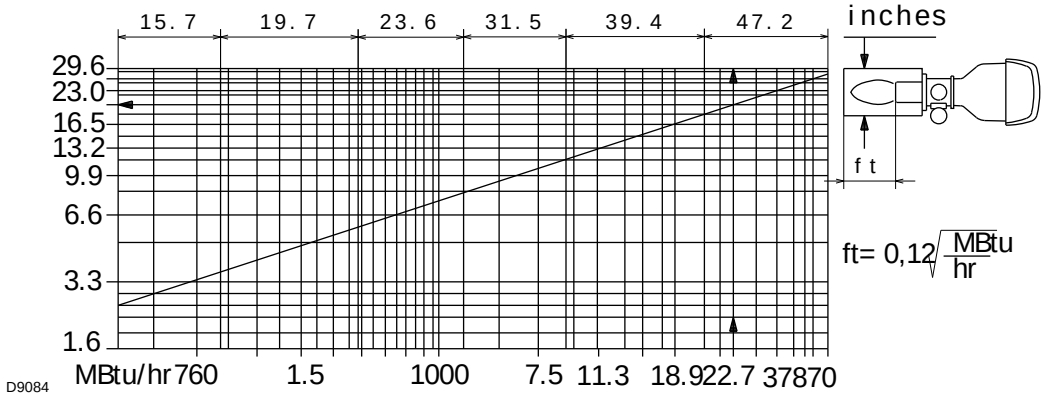


Fig. 4

3.8 Burner components

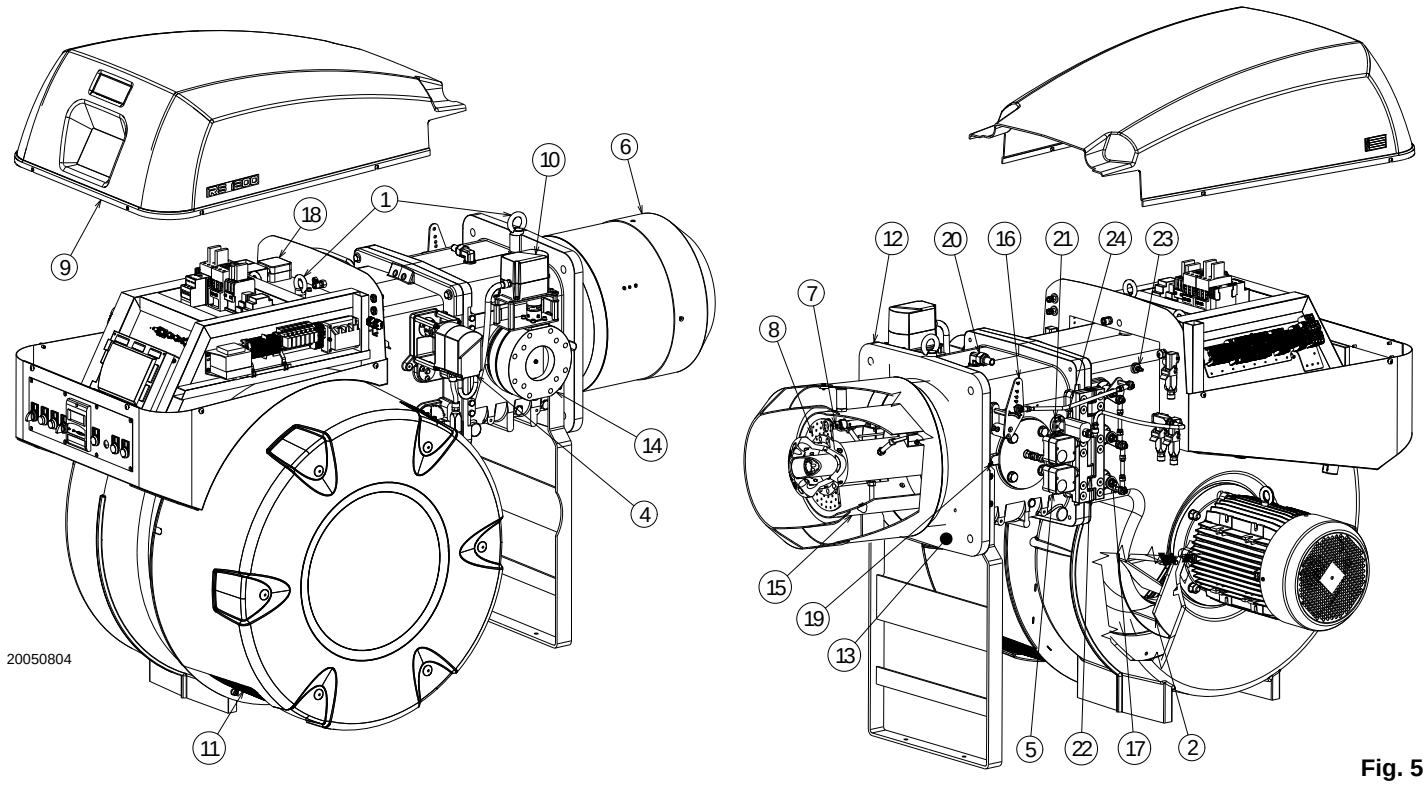


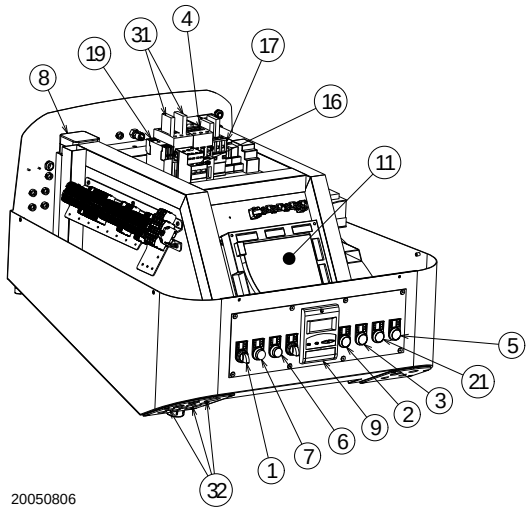
Fig. 5

1 Lifting eyebolts
2 Fan
3 Fan motor
4 Air gate valve servomotor
5 Maximum gas pressure switch with pressure test point
6 Combustion head
7 Ignition pilot
8 Flame stability disk
9 Electric panel board - cover
10 Servomotor for gas butterlfy valve
11 Air inlet to fan
12 Manifold
13 Thermal insulation screen for securing burner to boiler
14 Gas butterfly valve
15 Shutter
16 Lever for movement of combustion head
17 Tie rods for air damper movement
18 Air pressure switch
19 Air pressure test point
20 Ignition pilot attachment
21 UV fotocell holder
22 Hinge for opening burner
23 Air pressure test point pressure test point “+”
24 Electric board protection

WARNING

The burner can be opened either on the right or left sides, irrespective of the side from which fuel is supplied. When the burner is closed, the hinge can be re-positioned on the opposite side.

3.9 Panel board description



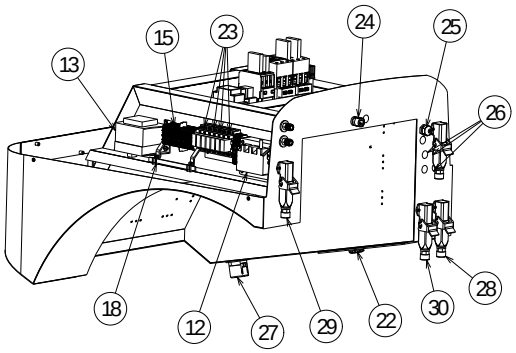


Fig. 6

1 “OFF - LOCAL - REMOTE” switch
2 “POWER ON” signal
3 “CALL FOR HEAT” signal
4 Contactor with auxiliary contact for star/delta start “KT1”
5 “FUEL ON” signal
6 “ALARM SILENCE” button
7 “BURNER LOCK-OUT and RESET” pushbutton
8 Low air pressure switch
9 Operator panel with LCD display
10 Burner terminal board “X1”
11 Control box for checking flame and air/fuel ratio
12 Ignition transformer “TA”
13 Control box trasformer “T1”
14 Step-down trasformer (available)
15 Terminal strip “X2”
16 Fan motor thermal relay with reset button “F1”
17 Contactor with auxiliary contact for star/delta start “KS1”
18 Bracket for shielded cables with thumbscrew
Warning: used only to avoid a break in the cable’s shielding, hence do not overtighten.
19 “KST1” timer
20 Auxiliary fuse
21 “IGNITION ON” signal
22 Horn
23 Relay
24 Electric joint for ignition cable
25 Electric joint for air pressure switch pipe
26 Free entrance for pilot gas train valves
27 Hole for fan motor cable
28 Plug/socket for QRI flame sensor
29 Plug/socket for air actuator
30 Plug/socket for maximum pressure switch
31 Contactor with auxiliary contact for star/delta start “KL1”
32 Holes for cables grommets for electrical wirings, accessories and power supply (to be carried out by the installer)

Two types of burner failure may occur:

➤ **Flame safeguard lock-out**
If the flame safeguard alarm 6)(Fig. 6) lights up, it indicates that the burner is in lock-out. To reset, press the reset push-button.

➤ **Fan motor trip**
Release by pressing the pushbutton on thermal overload 16)(Fig. 6). See “Thermal relay calibration” on page 22.

3.10 Burner equipment

The burner is supplied complete with:

Flange gasket. . . . . No. 1
Flange fixing screws M 16 x 50 . . . . . No. 4
Screws to secure the burner flange to the boiler: M 20 x 70. No. 4
Instruction manual and spare parts list . . . . . No. 1

3.11 Control box for the air/fuel ratio (LMV51...)

Warning notes

WARNING

To avoid injury to persons, damage to property or the environment, the following warning notes must be observed!

The LMV51... is a safety device! Do not open, interfere with or modify the unit.

Riello S.p.A. will not assume responsibility for any damage resulting from unauthorized interference! Risk of explosion!

Incorrect configuration can lead to excessive fuel supply which might cause an explosion! Operators must be aware that incorrect settings made on the AZL5… display and operating unit and incorrect settings of the fuel and / or air actuator positions can lead to dangerous burner operating conditions.

All activities (mounting, installation and service work, etc.) must be performed by qualified staff.

- ➤ Before making any wiring changes in the connection area of the LMV5..., completely isolate the plant from mains supply (all-polar disconnection). Ensure that the plant cannot be inadvertently switched on again and that it is indeed dead. If not observed, there is a risk of electric shock hazard.
- ➤ Protection against electrical shock hazard on the LMV5... and on all connected electrical components must be ensured through appropriate mounting.
- ➤ Each time work has been carried out (mounting, installation and service work, etc.), check to ensure that wiring is in an orderly state, that the parameters have been correctly set and make the safety checks.
- ➤ Fall or shock can adversely affect the safety functions. Such units must not be put into operation even if they do not exhibit any damage.
- ➤ In programming mode, the position check of actuators and VSD (checking electronic fuel / air ratio control) is different from the check during automatic operation.
  Like in automatic operation, the actuators are still jointly driven to their required positions. If an actuator does not reach the required position, corrections are made until that position is reached. However, in contrast to automatic operation, there are no time limits to these corrective actions.
  The other actuators maintain their positions until all actuators have reached the positions currently required.
  This is essential for setting fuel /air ratio control.
  This means that during the time the fuel / air ratio curves are programmed, the person making the plant settings must continuously monitor the quality of the combustion process (e.g. by means of a flue gas analyzer).
  Also, if combustion levels are poor, or in the event of dangerous situations, the commissioning engineer must take appropriate action (e.g. switching off manually).

To ensure the safety and reliability of the LMV5... system, the following points must also be observed:

– Condensation and ingress of humidity must be avoided. Should such conditions occur, make sure that the unit will be completely dry before switching on again!
– Static charges must be avoided since they can damage the unit's electronic components when touched.

D9301

Fig. 7

Mechanical design

The LMV5... is a microprocessor-based burner management system with matching system components for the control and supervision of forced draft burners of medium to large capacity.
The following components are integrated in the basic unit of the LMV5...:

- Burner control with gas valve proving system
- Electronic fuel / air ratio control with a maximum of 4 (LMV51…) or 6 (LMV52…) actuators
- Optional PID temperature / pressure controller (load controller)
- Optional VSD moduleMechanical design

Installation notes

- Ensure that the electrical wiring inside the boiler is in compliance with national and local safety regulations.
- Do not mix up live and neutral conductors.
- Make certain that strain relief of the connected cables is in compliance with the relevant standards (e.g. as per DIN EN 60730 and DIN EN 60 335).
- Ensure that spliced wires cannot get into contact with neighboring terminals. Use adequate ferrules.
- Always run high-voltage ignition cables separately while observing the greatest possible distance to the unit and to other cables
- The burner manufacturer must protect unused AC 120 V terminals with dummy plugs (refer to sections Suppliers of other accessory items).
- When wiring the unit, ensure that AC 120 V mains voltage cables are run strictly separate from extra low-voltage cables to warrant protection against electrical shock hazard.

Electrical connection of ionization probe and flame detector

It is important to achieve practically disturbance- and loss-free signal transmission:

- Never run the detector cables together with other cables:
  – Line capacitance reduces the magnitude of the flame signal.
  – Use a separate cable.
- Observe the permissible cable lengths.
- The ionization probe is not protected against electrical shock hazard. The mainspowered ionization probe must be protected against accidental contact.
- **Locate the ignition electrode and the ionization probe such that the ignition spark cannot arc over to the ionization probe (risk of electrical overloads).**

Technical data

LMV51... basic unit	Mains voltage	AC 120 V -15 % / +10 %
	Mains frequency	50 / 60 Hz ±6 %
	Power consumption	< 30 W (typically)
	Safety class	I, with parts according to II and III to DIN EN 60730-1
Terminal loading 'Inputs'	Unit fuse F1 (internally)	6.3 AT
	Perm. mains primary fuse (externally)	Max. 16 AT
	Undervoltage • Safety shutdown from operating position at mains voltage • Restart on rise in mains voltage	 < AC 96 V > AC 100 V
	Oil pump / magnetic clutch (nominal voltage) • Nominal current • Power factor	 1.6A cosφ > 0.4
	Air pressure switch test valve (nominal voltage) • Nominal current • Power factor	 0.5A cosφ > 0.4
Terminal loading 'Outputs'	**Total contact loading:** • Mains voltage • Input current of unit (safety loop) total load on contacts resulting from: - Fan motor contactor - Ignition transformer - Valve - Oil pump / magnetic clutch	 AC 120 V -15 % / +10 % Max. 5 A
	Single contact loading: Fan motor contactor (nominal voltage) • Nominal current • Power factor	 1A cosφ > 0.4
	Alarm output (nominal voltage) • Nominal current • Power factor	 1 A cosφ > 0.4
	Ignition transformer (nominal voltage) • Nominal current • Power factor	 1.6 A cosφ > 0.2
	Fuel valve gas (nominal voltage) • Nominal current • Power factor	 1.6 A cosφ > 0.4
	Fuel valve oil (nominal voltage) • Nominal current • Power factor	 1.6 A cosφ > 0.4
Cable lengths	Main line	Max. 100 m (100 pF/m)
Environmental conditions	Operation Climatic conditions Mechanical conditions Temperature range Humidity	DIN EN 60721-3-3 Class 3K3 Class 3M3 -20...+60 °C < 95 % r.h.

3.12 Servomotor (SQM48.4....)

Warnings

WARNING

To avoid accidents, material or environmental damage, observe the following instructions!

Avoid opening, modifying or forcing the actuators.

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ Before modifying the wiring in the SQM4... system connection area, fully disconnect the burner control device from the power supply (omnipolar separation).
- ➤ To avoid the risk of electrocution, protect the connection terminals in a suitable manner and correctly fix the cover.
- ➤ Check the wiring is in order.
- ➤ Falls and collisions can negatively affect the safety functions. In this case, the unit must not be operated, even if it displays no evident damage.

Assembly notes

- Check the relevant national safety standards are respected.
- The connection between the actuator command shaft and the control element must be rigid, without any mechanical play.
- To avoid an excessive load on the bearings due to rigid hubs, the use of compensation clutches without any mechanical play is recommended (e.g. metal bellows-type clutches).

Installation notes

- Arrange the H.V. ignition cables separately, as far as possible from the control box and the other cables.
- To avoid the risk of electrocution, make sure that the 230V AC section of the SQM4... unit is fully separated from the functional low-voltage section.
- The static torque is reduced when the electrical supply of the actuator is switched off.
- The housing cover may only be removed for short periods of time for wiring or when making the addressing. In similar cases, make sure that dust or dirt does not penetrate inside the actuator.
- The actuator comprises a PCB with ESD-sensitive components.
- The top side of the board carries a cover which affords protection against direct contact. This protective cover must not be removed! The underside side of the board must not be touched.

WARNING

During the maintenance or replacement of the actuators, be careful not to invert the connectors.

D8271

Fig. 8

Technical data

Operating voltage	AC 2 x 12V via bus cable from the base unit or via a separate transformer
Safety class	extra low-voltage with safe isolation from mains voltage
Power absorption	26...34 VA
Degree of protection	to EN 60 529, IP 54, provided adequate cable entries are used
Cable connection	RAST3,5 connectors
Rotation direction	- Anticlockwise (standard) - Clockwise (inverted rotation)
Nominal torque (max)	20 Nm
Holding torque (max)	20 Nm
Running time (min.) for 90°	30 s.
Weight	approx. 1.6kg
Environmental conditions:	
Operation	DIN EN 60 721-3-3
Climatic conditions	Class 3K3
Mechanical conditions	Class 3M3
Temperature range	-20...+60°C
Humidity	< 95% RH

Tab. F

4 Installation

4.1 Notes on safety for the installation

After carefully cleaning all around the area where the burner will be installed, and arranging the correct lighting of the environment, proceed with the installation operations.

DANGER

All the installation, maintenance and disassembly operations must be carried out with the electricity supply disconnected.

WARNING

The installation of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards and regulations of the laws in force.

DANGER

Combustion air inside the boiler must be free from hazardous mixes (e.g.: chloride, fluoride, halogen); if present, it is highly recommended to carry out cleaning and maintenance more frequently.

4.2 Handling

The packaging of the burner includes a wooden platform, so it is possible to move the burner (still packaged) with a transpallet truck or fork lift truck.

WARNING

The handling operations for the burner can be highly dangerous if not carried out with the greatest attention: keep any unauthorised people at a distance; check the integrity and suitableness of the available means of handling.
Check also that the area in which you are working is empty and that there is an adequate escape area (i.e. a free, safe area to which you can quickly move if the burner should fall).
When handling, keep the load at not more than 20-25 cm from the ground.

After positioning the burner near the installation point, correctly dispose of all residual packaging, separating the various types of material.

CAUTION

Before proceeding with the installation operations, carefully clean all around the area where the burner will be installed.

4.3 Preliminary checks

Checking the consignment

CAUTION

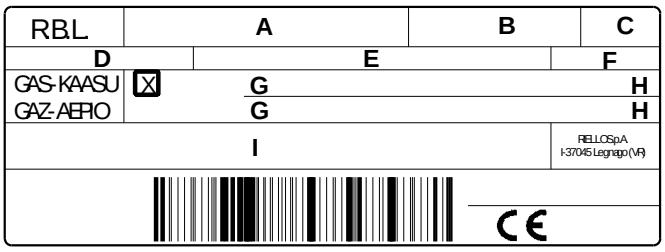
After removing all the packaging, check the integrity of the contents. In the event of doubt, do not use the burner; contact the supplier.

The packaging elements (wooden cage or cardboard box, nails, clips, plastic bags, etc.) must not be abandoned as they are potential sources of danger and pollution; they should be collected and disposed of in the appropriate places.

Checking the characteristics of the burner

Check the identification label of the burner (Fig. 9), showing:

A the burner model
B the burner type
C the cryptographic year of manufacture
D the serial number
E the data for electrical supply and the protection level
F the electrical power consumption
G the types of gas used and the relative supply pressures
H the data of the burner's minimum and maximum output possibilities (see Firing rate)
Warning. The burner output must be within the boiler's firing rate
I the category of the appliance/countries of destination



D10411

Fig. 9

WARNING

A burner label, or any other component, that has been tampered with, removed or is missing, prevents the definite identification of the burner and makes any installation or maintenance work difficult.

4.4 Operating position

WARNING

- The burner is designed to operate only in positions **1**, **2**, **3** and **4** (Fig. 10).
- Installation **1** is preferable, as it is the only one that allows the maintenance operations as described in this manual.
- Installations **2**, **3** and **4** permit operation but make maintenance and inspection of the combustion head more difficult.

DANGER

- Any other position could compromise the correct operation of the appliance.
- Installation **5** is prohibited for safety reasons.

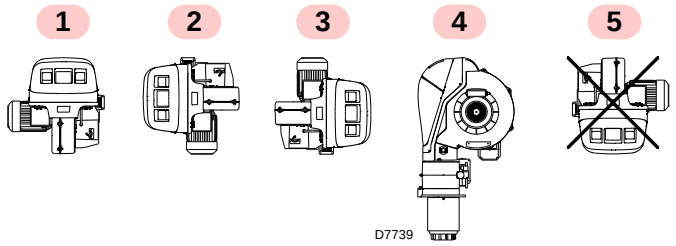


Fig. 10

4.5 Securing the burner to the boiler

4.5.1 Boring the boiler plate

Drill the combustion chamber locking plate as shown in (Fig. 11).

mm	A	B	C
RS 1200/E C01	19 11/16“	23 15/16“	51/64 W

Tab. G

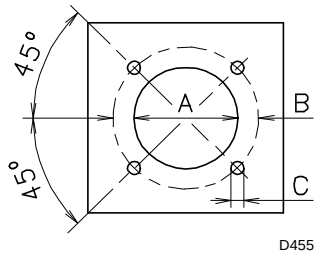


Fig. 11

4.6 Blast tube length

The length of the blast tube must be selected according to the indications provided by the manufacturer of the boiler, and in any case it must be greater than the thickness of the boiler door complete with its fettling.

For boilers with front flue passes 1)(Fig. 12) or flame inversion chambers, protective fettling in refractory material 5) must be inserted between the boiler fettling 2) and the blast tube 4).

This protective fettling must not compromise the extraction of the blast tube.

For boilers having a water-cooled front the refractory fettling 2)-5)(Fig. 10) is not required unless it is expressly requested by the boiler manufacturer.

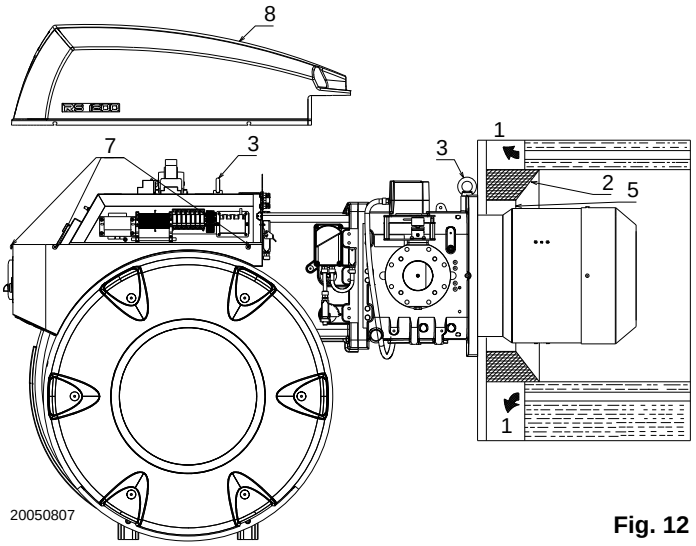


Fig. 12

4.7 Burner securing

Prepare a suitable lifting system.

➤ Create a suitable hoisting system by hooking onto the rings 3)(Fig. 10), removing the fastening screws 7) securing the cover 8) first.
➤ Slip the thermal protection onto the blast tube 4) (Fig. 10).
➤ Place entire burner on the boiler hole (arranged previously, see Fig. 9), and fasten with the screws given as standard equipment.
➤ The coupling of the burner-boiler must be airtight.

WARNING

The seal between burner and boiler must be airtight.

4.8 Accessibility to the interior of the combustion head

Be careful as some drops of fuel may leak out during this phase.

➤ Open burner at hinge as illustrated in Fig. 11 after releasing the tie rod of the head movement lever 1) and removing the 4 fastening screws 2).
➤ Disconnect the wire 3) from the electrode.
➤ Disconnect the tube of ignition pilot 4).
➤ Unscrew the screw 5) after removing the gas pressure switch (5 Fig. 5).
➤ Extract the internal part 6) of the combustion head.
➤ In case of replacement of biogas combustion head 6) with LPG combustion head, use the nut and ogive from the connector 59) (page 31) supplied with the burner and install them on the new pilot tube. After assembling the same combustion head on the burner; provide to tighten on the other side of the elbow, already present on the pipe coupling.

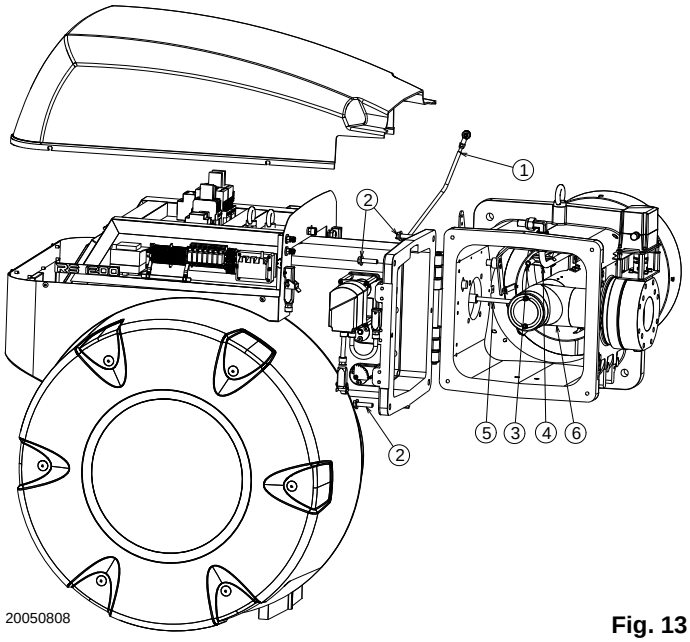


Fig. 13

4.9 Electrode positioning

Make sure that the electrode and the ignition pilot are positioned as shown in figure (Fig. 13).

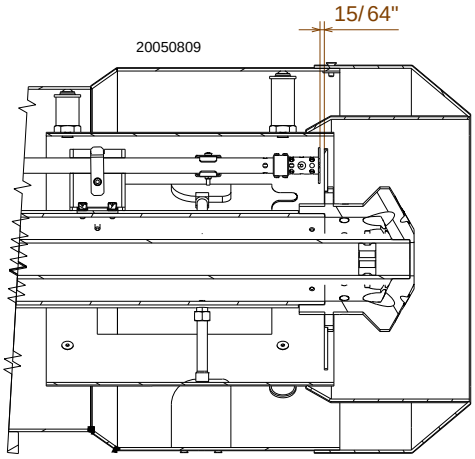


Fig. 14

4.10 Combustion head setting

In addition to varying air flow depending on the output requested, the air gate valve servomotor 4) (Fig. 5) by means of a lifting assembly - varies the setting of the combustion head.

This system allows an optimal setting even at a minimum firing rate. For the same servomotor rotation, combustion head opening can be varied by moving the tie rod onto holes 5-6-7, Fig. 15.

When dealing with boilers featuring a strong back pressure, if air delivery is insufficient even with the damper fully open, you can use a different setting shows in the following table do this by moving the tie rod onto the next highest hole numerically speaking, thus increasing the combustion head's opening and hence air delivery.

Hole lever 1)	Power Btu	
	From	To
5	5118	18766
5	18766	25590
6	25590	30025
10	30025	40944

Tab. H

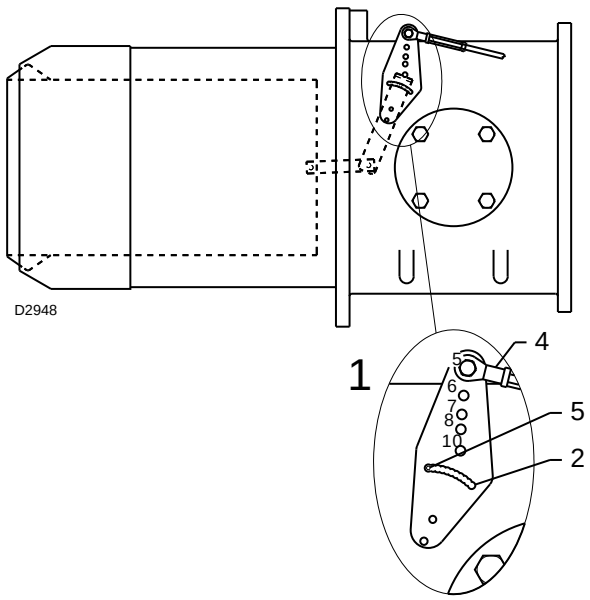


Fig. 15

4.11 Gas train

4.11.1 Gas feeding line

Explosion danger due to fuel leaks in the presence of a flammable source.

Precautions: avoid knocking, attrition, sparks and heat.

Make sure that the fuel interception tap is closed before performing any operation on the burner.

WARNING

The fuel supply line must be installed by qualified personnel, in compliance with current standards and laws.

It must be type-approved according to required standards and is supplied separately from the burner.

Key to lay-out (Fig. 16)

1 Gas input pipe for main burner
2 Manual valve
3 Low gas pressure switch
4 Safety shut-off valve
5 NO vent valve
6 Regulating shut off valve
7 Gas input pipe for pilot
8 Gas adjustment butterfly valve
9 Burner
10 High gas pressure switch
11 Manual valve (for seal control)
12 Pilot regulator

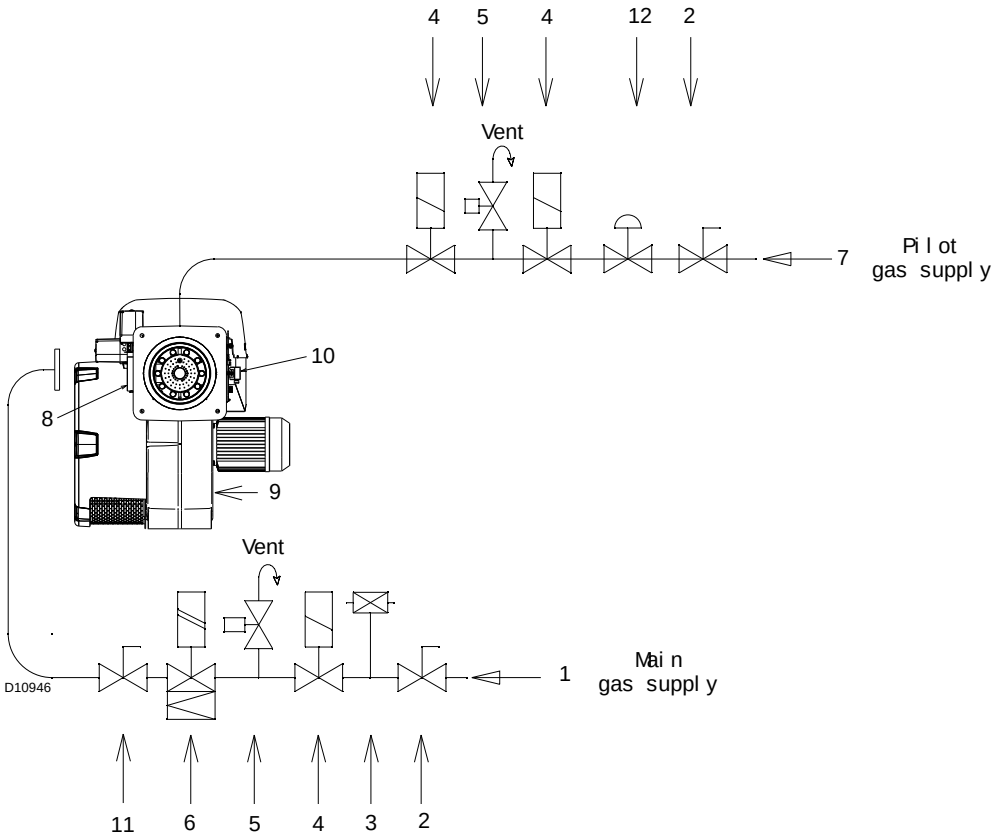


Fig. 16

4.11.2 Gas pressure

WARNING

The pressure at the head of the burner from Tab. I refers to zero in the combustion chamber; to obtain true pressure, measured by a U-type manometer, add the counter-pressure of the boiler.

NOTE:
See the accompanying instructions for the adjustment of the gas train.

GCV MBtu/hr	Combustion Head "WC	Gas butterfly + Adaptor "WC
13254	3.5	0.2
15148	4.8	0.2
18935	7.4	0.4
22723	10.1	0.5
26510	13.8	0.7
30297	17.6	0.9
30676	17.9	0.9

Tab. I

4.12 Electrical wiring

4.12.1 Notes on safety for the electrical wiring

DANGER

- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be carried out by qualified personnel and in compliance with the regulations currently in force in the country of destination.
  Refer to the electrical layouts given in Appendix A.
- The Manufacturer declines all responsibility for modifications or connections different from those shown in the electrical layouts.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- Do not invert the neutral with the phase in the electrical supply line.
  Any inversion would cause a lockout due to firing failure.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards.
  It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel.
  Do not use the gas tubes as an earthing system for electrical devices.
- The electrical system must be suitable for the maximum input power of the device,as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for the input power of the device.
- For the main power supply of the device from the electricity mains:
- - do not use adapters, multiple sockets or extensions;
- - use an omnipolar switch with an opening of at least $^1/_8$" (overvoltage category) between the contacts, as indicated by the current safety standards.
- Do not touch the device with wet or damp body parts and/or in bare feet.
- Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:

DANGER

Disconnect the electrical supply from the burner by means of the main system switch.

DANGER

Close the fuel interception tap.

DANGER

Avoid condensate, ice and water leaks from forming.

If the cover is still present, remove it and proceed with the electrical wiring according to the wiring diagrams.

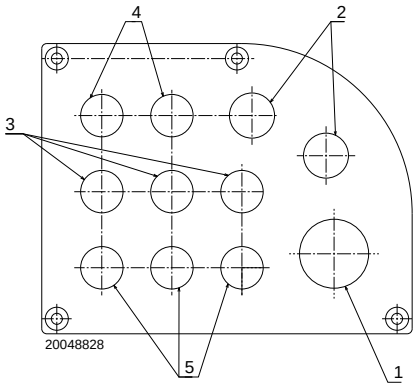
After carrying out maintenance, cleaning or checking operations, reassemble the hood and all the safety and protection devices of the burner.

All the cables to be connected to the burner are fed through the grommets (Fig. 17).The use of the cable grommets can take various forms. By way of example we indicate the following mode (according to **UL795**):

1 Three phase power supply with 1 inch cable grommet
2 Available: single phase power supply and other devices with $^1/_2$ inch cable grommet
3 Available: consents/safety, minimum gas pressure switch, gas valves and other devices with $^3/_8$ inch cable grommet
4 Available: pressure and temperature probe sensor with $^3/_8$ inch cable grommet
5 Available

WARNING

The control panel is in compliance with UL508A.



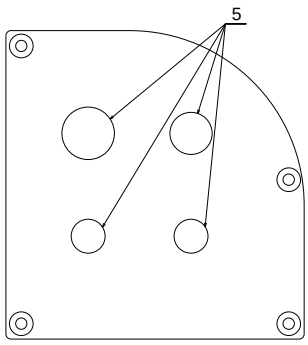


Fig. 17

4.13 Thermal relay calibration

Depending on the burner type, there are two different thermal relays:
– Electro-mechanical termal relay (used for single phase motors)
– Electronic thermal relay (used for three phase motors)

4.13.1 Electro-mechanical thermal relay

The electro-mechanical termal relay (Fig. 18) is used to avoid damage to the motor owing to a strong increase in absorption or the lack of a phase.

For the calibration, refer to the table given in electrical layout. If the minimum value of the scale of the thermal relay is greater than the rating absorption of the motor, protection is still ensured.

This arises when the power supply of the motor is 400V.

➤ To reset, in the case of an intervention of the thermal relay, press the button “**RESET**” (Fig. 18).

➤ The button “**STOP**” (Fig. 18) opens the NC (95-96) contact and stops the motor.

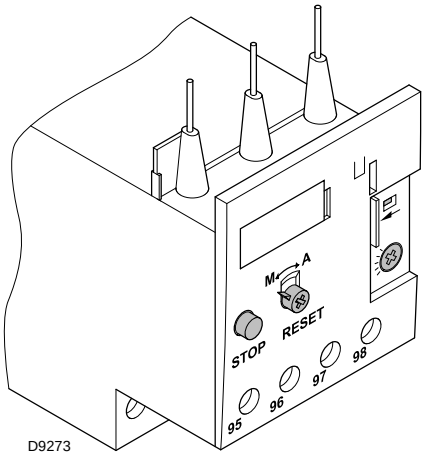


Fig. 18

➤ To test the thermal relay, insert a screwdriver in the window “**TEST**” (Fig. 19) and move it in the sense of the arrow (towards right).

WARNING
WARNING

Automatic resetting can be dangerous.

This action is not provided for the burner operation.

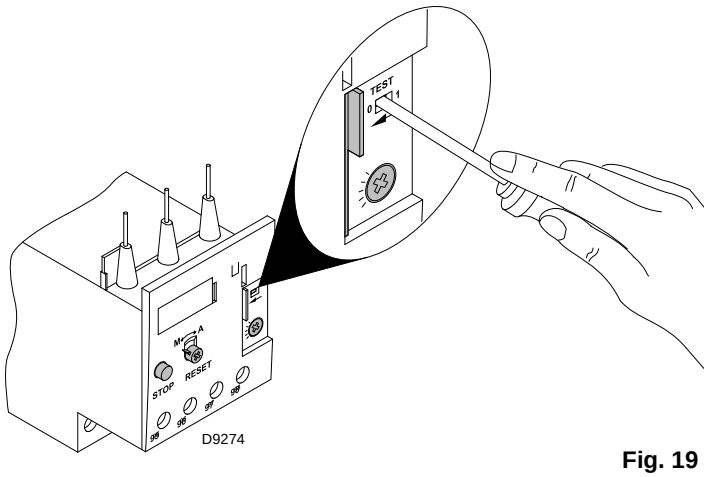


Fig. 19

4.13.2 Electronic thermal relay

➤ To reset, in the case of an intervention of the thermal relay, press the button “**RESET**” (Fig. 20).

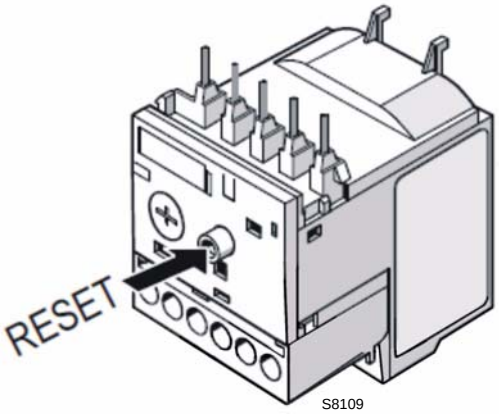


Fig. 20

There are two different solution to test the electronic thermal relay:

➤ **Device test (Fig. 21)**
Push slowly the button in the window with a little screwdriver.

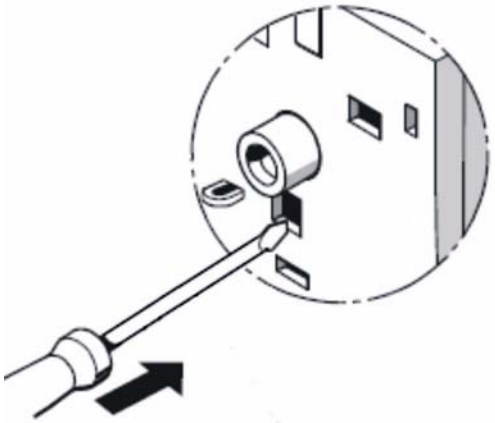


Fig. 21

➤ **Contact test NC (95-96) and NO (97-98)(Fig. 22)**
Insert in the window a little screwdriver and move it in the sense of the arrow.

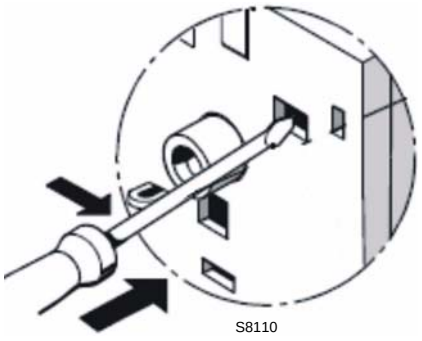


Fig. 22

4.14 Reversible direction

WARNING:
If it is necessary to reverse the direction then reverse the two main supply phases.
For example: L1 with L2, there is not difference between **IE1** and **IE2/Epact.**

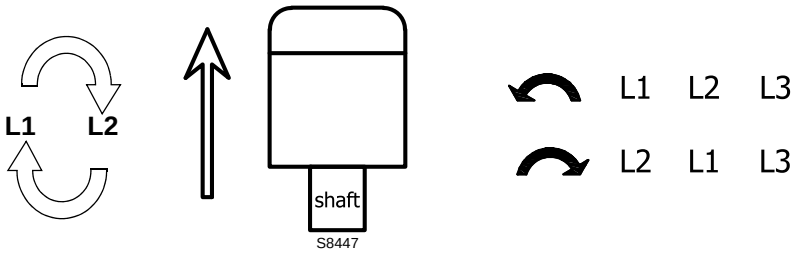


Fig. 23

5 Start-up, calibration and operation of the burner

5.1 Notes on safety for the first start-up

WARNING

The first start-up of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards and regulations of the laws in force.

WARNING

Check the correct working of the adjustment, command and safety devices.

5.2 Adjustments before first firing

Adjustment of the combustion head has been illustrated in Fig. 15.

In addition, the following adjustments must also be made:

- ➤ Open manual valves up-line from the gas train.
- ➤ Adjust the minimum gas pressure switch (Fig. 28) to the start of the scale.
- ➤ Adjust the maximum gas pressure switch (Fig. 27) to the end of the scale.
- ➤ Adjust the air pressure switch (Fig. 26) to the start of the scale.
- ➤ Purge the air from the gas line.
  Continue to purge the air (we recommend using a plastic tube routed outside the building) until gas is smelt.
- ➤ Fit a U-type manometer (Fig. 24) to the gas pressure test point on the sleeve.
  The manometer readings are used to calculate MAX. burner power.
- ➤ Connect two lamps or testers to the two gas line solenoid valves to check the exact moment at which voltage is supplied. This operation is unnecessary if each of the two solenoid valves is equipped with a pilot light that signals voltage passing through.

CAUTION

Before starting up the burner, it is good practice to adjust the gas train so that ignition takes place in conditions of maximum safety, i.e. with gas delivery at the minimum.

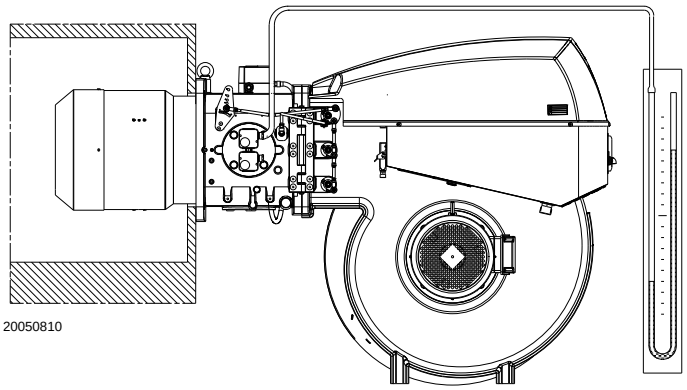


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Fig. 24

5.3 Burner start-up

Close the local controls and position the selector 1)(Fig. 25) to "**LOCAL**".

Make sure that the lights or testers connected to the solenoids, or the pilot lights on the solenoids themselves, indicate that no voltage is present. If voltage is present, stop the burner immediately and check the electrical connections.

When the limit thermostat (TL) is closed, the "**CALL FOR HEAT**" 2)(Fig. 25) signal must be on and the burner starts the starting cycle.

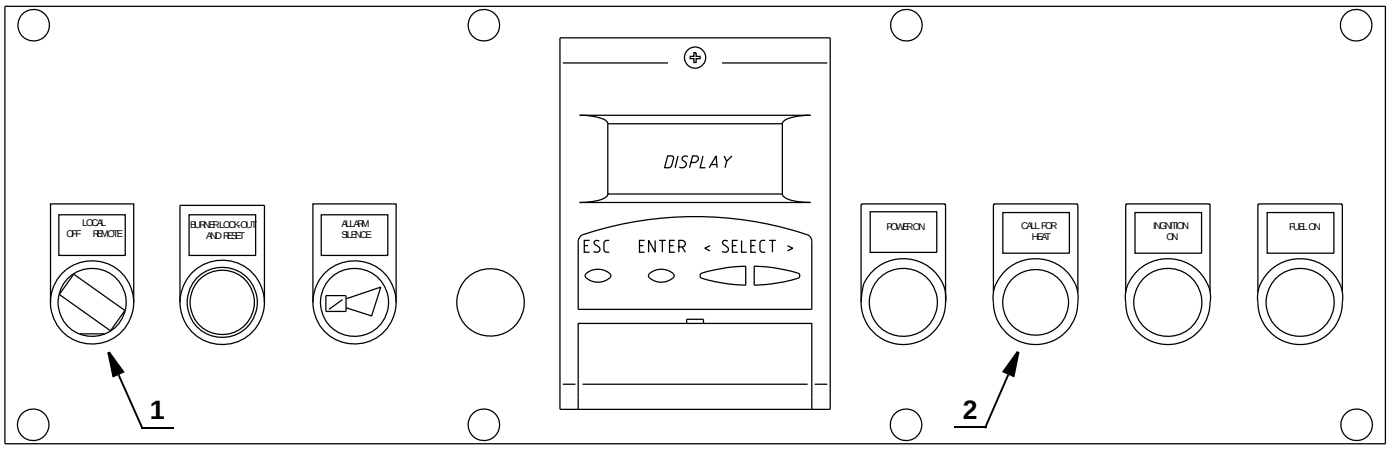

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Fig. 25

5.4 Burner ignition

Once the above steps are complete, the burner should light.

If the motor starts up, but the flame does not appear and the control box goes into lockout, reset it and wait for a new ignition attempt.

If ignition is still not achieved, it may be that gas is not reaching the combustion head within the safety time period of 3 seconds. In this case increase gas ignition delivery.

The arrival of gas at the pipe coupling is indicated by the U-type pressure gauge (Fig. 25).

If further burner lockouts occur, refer to the “Release procedure” given in the equipment manual supplied.

Once the burner has ignited, proceed with the global adjustment of the burner.

5.4.1 Air / gas adjustment and output modulation

The air/gas regulator and output modulation system equipping **RS** series burners performs a number of integrated functions to optimise burner function, in both individual installations and in combination with other units (e.g. double furnace boiler or multiple heat generators in parallel).

The basic system functions control:

1 The dosage of the air and fuel through positioning using direct servocommands of the relevant valves eliminating the possible play in the calibration systems with mechanical cam lever mechanisms, used on traditional modulating burners.

2 The modulation of the burner output in accordance with the load required by the system, with maintenance of the pressure or temperature of the boiler at the operating values set.

3 The sequence (cascade adjustment) of more than one boiler through the suitable connection of the various units and the activation of the internal software of the individual systems (option).

Further interfaces and communication functions with computers, for remote control or integration in central supervision systems are available on the basis of the configuration of the system.

WARNING

The first start up and every further internal setting operation of the adjustment system or the expansion of the base functions require access by means of password and are to be carried out by service personnel who are especially trained for the internal programming of the instrument and the specific application created with this burner.

The first start-up and curve synchronisation manual is supplied with the burner.

At request, the complete manual for the control and setting of all parameters is available.

5.5 Final calibration of the pressure switches

5.5.1 Air pressure switch

Adjust the air pressure switch after having performed all other burner adjustments with the air pressure switch set to the start of the scale (Fig. 26).

With the burner operating at min. output, increase adjustment pressure by slowly turning the relative dial clockwise until the burner locks out.

Then turn the dial anti-clockwise by about 20% of the set point and repeat burner starting to ensure it is correct.

If the burner locks out again, turn the dial anti-clockwise a little bit more.

WARNING

As a rule, the air pressure switch must prevent the air pressure from lowering below 80% of the adjustment value as well as preventing the CO in the fumes from exceeding 1% (10,000 ppm).

To check this, insert a combustion analyser into the chimney, slowly close the fan suction inlet (for example with cardboard) and check that the burner locks out, before the CO in the fumes exceeds 1%.

The air pressure switch is fitted in an "absolute" mode, that is, connected only to the pressure test point “+” 23)(Fig. 5).

D3854

Fig. 26

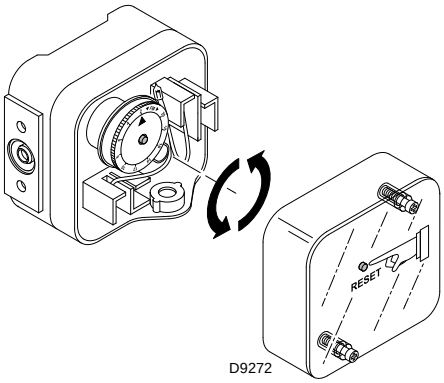
5.5.2 Maximum gas pressure switch

Adjust the maximum gas pressure switch after having performed all other burner adjustments with the maximum gas pressure switch set to the end of the scale (Fig. 27).

With the burner operating at MAX output, reduce the adjustment pressure by slowly turning the adjustment dial anticlockwise until the burner locks out.

Then turn the dial clockwise by 0.8” WC and repeat burner firing.

If the burner locks out again, turn the dial again clockwise by 0.4” WC.



D9272

Fig. 27

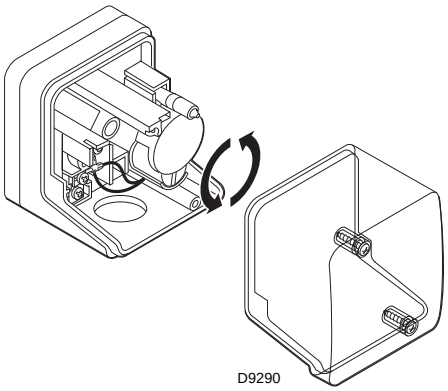
5.5.3 Minimum gas pressure switch

Adjust the minimum gas pressure switch after having performed all the other burner adjustments with the pressure switch set at the start of the scale (Fig. 28).

With the burner operating at MAX output, increase adjustment pressure by slowly turning the relative dial clockwise until the burner locks out.

Then turn the dial anti-clockwise by 0.8” WC and repeat burner starting to ensure it is uniform.

If the burner locks out again, turn the dial anti-clockwise again by 0.4” WC.



D9290

Fig. 28

5.6 Final checks (with burner operating)

➤ Open the thermostat/pressure switch TL ➤ Open the thermostat/pressure switch TS	⇨	The burner must stop
➤ Turn the gas maximum pressure switch knob to the minimum end of scale position ➤ Turn the air pressure switch to the maximum end of scale position.	⇨	The burner must stop in lockout
➤ Turn off the burner and cut off the power. ➤ Disconnect the minimum gas pressure switch connector.	⇨	The burner must not start
➤ Disconnect the ionisation probe wire	⇨	The burner must stop in lockout due to ignition failure

Tab. J

WARNING

Make sure that the mechanical locking systems on the various adjustment devices are fully tightened.

6 Maintenance

6.1 Notes on safety for the maintenance

The periodic maintenance is essential for the good operation, safety, yield and duration of the burner.

It allows you to reduce consumption and polluting emissions and to keep the product in a reliable state over time.

DANGER

The maintenance interventions and the calibration of the burner must only be carried out by qualified, authorised personnel, in accordance with the contents of this manual and in compliance with the standards and regulations of current laws.

Before carrying out any maintenance, cleaning or checking operations:

DANGER

Disconnect the electrical supply from the burner by means of the main system switch.

DANGER

Close the fuel interception tap.

Wait for the components in contact with heat sources to cool down completely.

6.2 Maintenance programme

6.2.1 Maintenance frequency

The gas combustion system should be checked at least once a year by a representative of the manufacturer or another specialised technician.

6.2.2 Checking and cleaning

The operator must use the required equipment during maintenance.

Combustion
Carry out an analysis of the combustion discharge gases.
Significant differences with respect to the previous check indicate the points where more care should be exercised during maintenance.

Combustion head
Open the burner and make sure that all components of the combustion head are in good condition, not deformed by the high temperatures, free of impurities from the surroundings and correctly positioned.

Fan
Check to make sure that no dust has accumulated inside the fan or on its blades, as this condition will cause a reduction in the air flow rate and provoke polluting combustion.

Burner
Clean the outside of the burner.

Measurement of detector current

Measurement of the detector's signal (Fig. 29) with a Voltmeter is not normally required since the flame signal's intensity is shown on the AZL...display and operating unit.

Min. value for a good work: 3.5 Vdc (AZL dosplay flame approx. 50%).

If the value is lower, it can depend on:
– photocell positioned incorrectly;
– low corrent (lower than 96V);
– bad regulation of the burner.

To measure power, use a voltometer with a 10 Vdc scale, connected as illustrated in Fig. 29.

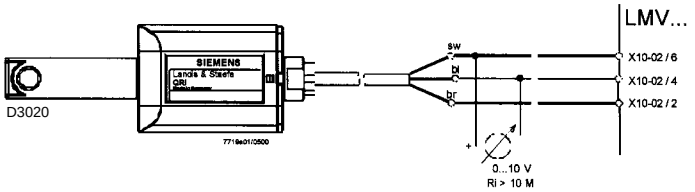


Fig. 29

Boiler
Clean the boiler as indicated in its accompanying instructions in order to maintain all the original combustion characteristics intact, especially the flue gas temperature and combustion chamber pressure.

Gas leaks
Make sure that there are no gas leaks on the pipes between the gas meter and the burner.

Gas filter
Replace the gas filter when it is dirty.

Combustion

Adjust the burner if the combustion values found at the beginning of the operation do not comply with the regulations in force or, at any rate, do not produce good combustion.
Use the appropriate card to record the new combustion values; they will be useful for subsequent controls.

Gas leaks

Make sure there are no gas leaks on the conduit between the gas meter and the burner.

Gas filter

Replace the gas filter when it is dirty.

Combustion

Adjust the burner if the combustion values found at the beginning of the operation do not comply with the regulations in force or, at any rate, do not produce good combustion.

Use the appropriate card to record the new combustion values; they will be useful for subsequent controls.

6.3 Opening the burner

Disconnect the electrical supply from the burner by means of the main system switch.

Close the fuel interception tap.

Wait for the components in contact with heat sources to cool down completely.

➤ Remove the tie-rod 1)(Fig. 30) of the head movement lever, undoing the nut 2).
➤ Disconnect the socket 4) of the gas servomotor.
➤ Remove the screws 3).

At this point, it is possible to open the burner on the hinge.

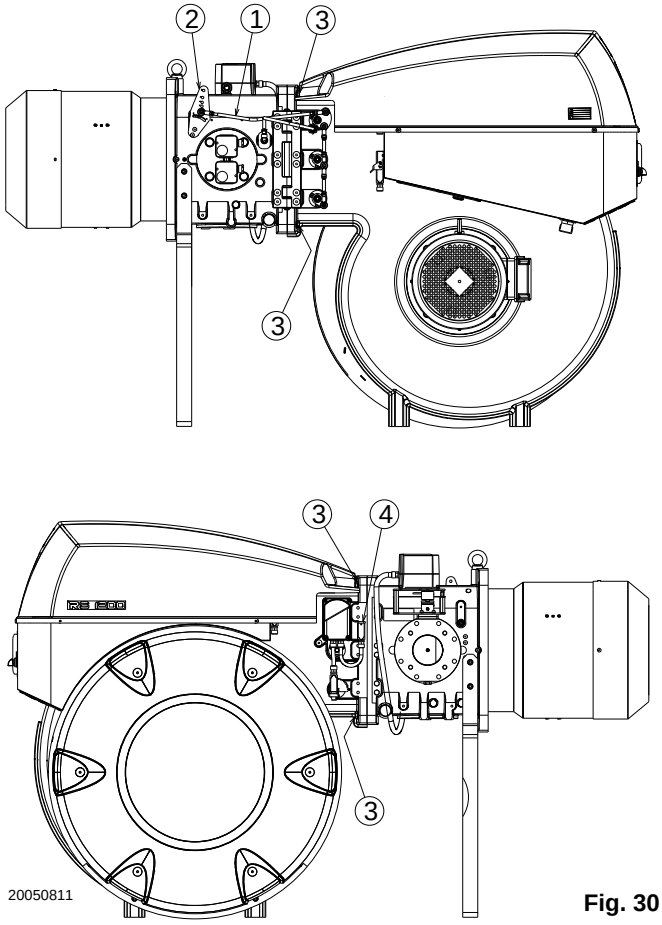


Fig. 30

6.4 Closing the burner

Refit following the steps described but in reverse order; refit all burner components as they were originally assembled.

After carrying out maintenance, cleaning or checking operations, reassemble the hood and all the safety and protection devices of the burner.

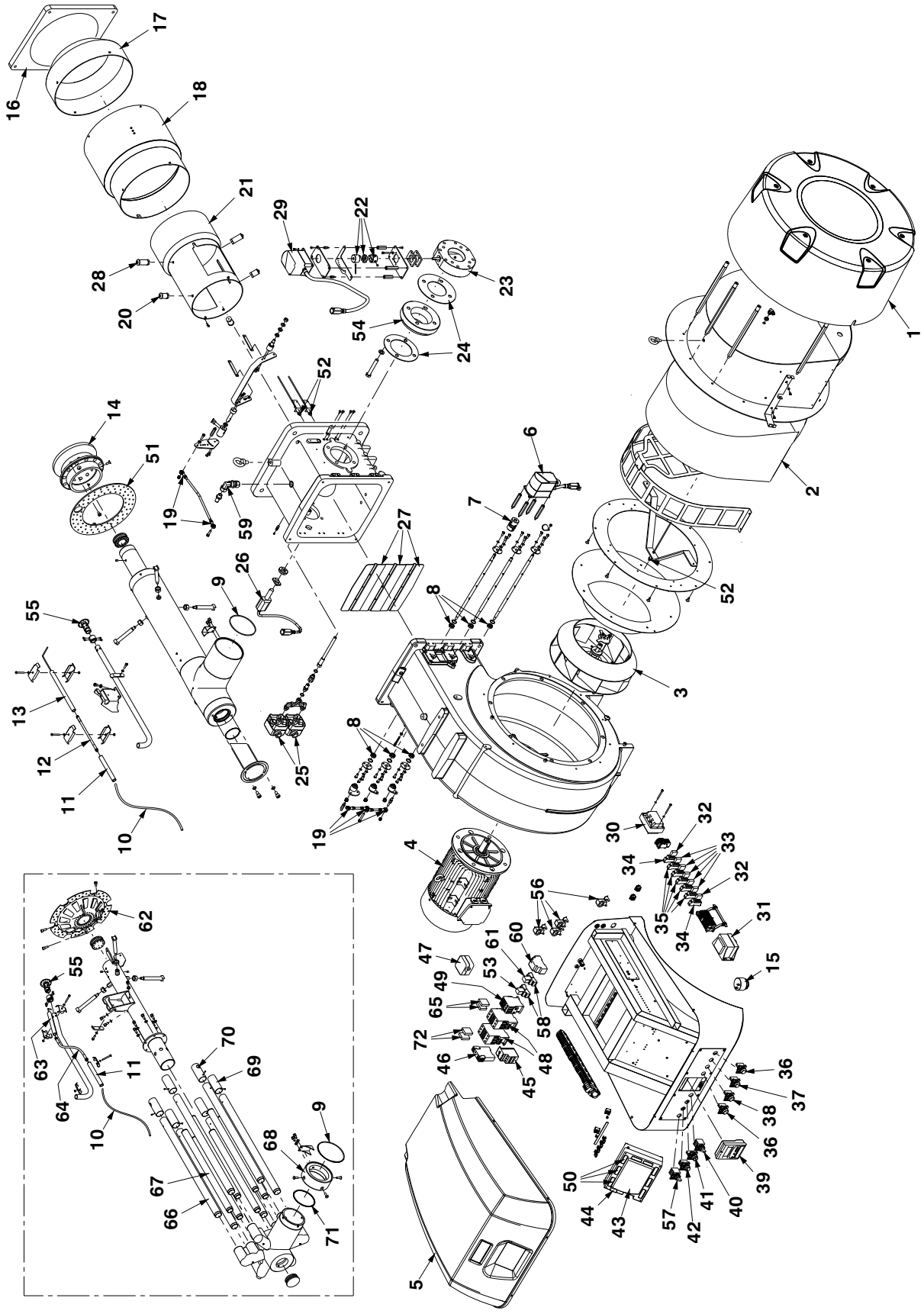
7 Faults - Probable causes - Solutions

If faults arise in ignition or operations, the burner performs a “safety stop”, which is signalled by the red burner lockout LED.

The display visualises alternately the lockout code and the relative diagnostic. To reset the start-up conditions, refer to the “Reset procedure” indicated in the control box manual supplied.

When the burner starts again, the red LED goes out and the control box is reset.

A Appendix - Spare parts



N.	CODE	DESCRIPTION	*
1	20032624	COVER	B
2	20032626	SOUND DAMPING	
3	20039521	FAN	C
4	20050122	FAN MOTOR	C
5	20045908	COVER	B
6	20036148	GAS SERVOMOTOR	B
7	20039351	JOINT	A
8	3012795	BEARING	C
9	20017613	O-RING	B
10	3012162	ELECTRODE CONNECTION	A
11	3012258	INSULATOR	A
12	3013522	ELECTRODE CONNECTION	A
13	20014630	ELECTRODE	A
14	20050126	GAS DIFFUSER	
15	20031413	HORN	
16	3013392	FLANGE GASKET	
17	3014074	END CONE	B
18	3013390	CYLINDER	C
19	3012669	PIN JOINT	C
20	20039366	SUPPORT ELECTRODE	
21	3013155	SHUTTER	C
22	20041427	JOINT	A
23	20050131	GAS REGULATOR	C
24	20050136	SEAL	B
25	20014103	GAS PRESSURE SWITCH	B
26	20039362	PROBE	A
27	20032625	AIR DAMPER	
28	20034046	SUPPORT ELECTRODE	
29	3013253	GAS SERVOMOTOR	B
30	3012956	TRANSFORMER	
31	3013284	ELECTRONIC CAM TRASFORMER	B
32	3020068	RELAY	C
33	20010969	RELAY	C
34	20043289	CONTROL BOX	
35	3012841	CONTROL BOX	
36	20036017	GREEN SIGNAL LIGHT	A
37	20027020	YELLOW SIGNAL LIGHT	A
38	20036019	WHITE SIGNAL LIGHT	A
39	3013283	DISPLAY	
40	3013474	SWITCH	C
41	20010962	SILENCE BUTTON	
42	3013354	SIGNAL BUTTON	C
43	20014365	CONTROL BOX	B
44	3006211	FUSE	A
45	2001397	OVERLOAD	C
46	20013936	TIMER	B
47	20014073	AIR PRESSURE SWITCH	A
48	20043330	CONTACTOR	C
49	20013973	CONTACTOR	C
50	20013932	CONNECTORS ASSEMBLY	B
51	20050138	DISC	A
52	3013501	PROXIMITY SWITCH	
53	3012782	RELAY	C
54	20050143	GAS ADAPTOR	
55	20029529	PILOT DIFFUSER	

N.	CODE	DESCRIPTION	*
56	3013363	7 POLE SOCKET CONNECTION	A
57	20010963	SWITCH	C
58	3003935	CONTROL BOX	
59	20014633	CONNECTOR	C
60	20050144	FEEDER	
61	3012782	RELAY	C
62	20017231	DIFFUSER DISC	A
63	20050435	ELECTRODE	A
64	3012267	ELECTRODE CONNECTION	A
65	20013969	AUXILIARY CONTACT	C
66	3013158	TUBE	
67	3013159	TUBE	
68	20050438	CONTROL WHEEL	
69	20050445	GAS DIFFUSER	
70	20050447	GAS DIFFUSER	
71	20050441	O-RING	B
72	20013967	AUXILIARY CONTACT	C

*

ADVISED PARTS

A = Spare parts for minimum fittings
A+B = Spare parts for basic safety fittings
A+B+C = Spare parts for extended safety fittings

B Appendix - Accessories

Software interface kit

Burner	Code
RS 1200/E C01	3010388

Soundproofing box kit

Burner	Code
RS 1200/E C01	3010401

Probe for checking temperature/pressure

Parameter to be checked		Probe	
	Adjustment field	Type	Code
Temperature	- 100...+ 500°C	PT 100	3010110
Pressure	0...2.5 bar 0...16 bar	Output probe 4....20 mA	3010213 3010214

Gas train according to UL Standards

Gas train according to UL Standards

WARNING

The installer is responsible for the supply and installation of any required safety device(s) not indicated in this manual.

C Appendix - Burner start up report

Model number:	Serial number:
Project name:	Start-up date:
Installing contractor:	Phone number:

Model number:		Serial number:	
Project name:		Start-up date:	
Installing contractor:		Phone number:	

GAS OPERATION

Gas Supply Pressure:		CO_2: Low Fire		High Fire	
Main Power Supply:		O_2: Low Fire		High Fire	
Control Power Supply:		CO: Low Fire		High Fire	
Burner Firing Rate:		NO_X: Low Fire		High Fire	
Manifold Pressure:		Net Stack Temp - Low Fire:		High Fire	
Pilot Flame Signal:		Comb. Efficiency - Low Fire:		High Fire	
Low Fire Flame Signal:		Overfire Draft:			
High Fire Flame Signal:					

CONTROL SETTINGS

Operating Setpoint:		Low Oil Pressure:	
High Limit Setpoint:		High Oil Pressure:	
Low Gas Pressure:		Flame Safeguard Model Number:	
High Gas Pressure:		Modulating Signal Type:	

NOTES