

## **GB** Forced draught gas burners

Progressive two stage or modulating operation



CODE	MODEL
C9321400	RS 28/E
20104515	RS 38/E



**Original instructions**

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**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.



**DANGER**

Maximum danger level!

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



**WARNING**

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



**CAUTION**

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**

**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 is present. An explosive atmosphere is defined as a mixture of dangerous substances with air, under atmospheric conditions, 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.



**MOUNT CASING**

This symbol indicates that it is mandatory to mount casing again after maintenance, cleaning or checks.



**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

### Delivery of the system and the instruction manual

When the system is delivered, it is important that:

- The instruction manual is supplied 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 carefully informs the user about:
  - the use of the system,
  - any further tests that may be necessary before the system is started up,
  - maintenance and the need to have the system checked at least once a year by 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 the 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 non authorised 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 power 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 flame, as structurally established;
- insufficient and inappropriate surveillance and care of those burner components most subject to wear and tear;
- use of non-original components, including spare parts, kits, accessories and optionals;
- force majeure.

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

### 1.2.1 Owner's responsibility

Please pay attention to the Safety Warnings contained within this instruction manual. Keep this manual for your records and provide it to your qualified service agency for use in professionally setting up and maintaining your burner.

Your burner will provide years of efficient operation if it is professionally installed and maintained by a qualified service technician. If at any time the burner does not appear to be operating properly, immediately contact your qualified service agency for consultation.

We recommend annual inspection/service of your gas heating system by a qualified service agency.

Failure to follow these instructions, misuse, or incorrect adjustment of the burner could lead to equipment malfunction and result in asphyxiation, explosion or fire.



**WARNING**

If you smell gas:

- Do not touch any electrical items.
- Open all windows.
- Close all gas supply valves.
- Contact your local gas authority immediately.
- Do not store flammable or hazardous materials in the vicinity of fuel burning appliances.
- Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or death.
- Refer to this manual for instructional or additional information.
- Consult a certified installer, service representative or the gas supplier for further assistance.
- Burner shall be installed in accordance with manufacturers requirements as outlined in this manual, local codes and authorities having jurisdiction.

## 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 volt-

age 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.

**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.
- Must take all the measures necessary to prevent unauthorised people gaining access to the machine.
- 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.
- 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.
- Personnel must follow 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 are obliged to 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 all responsibility for any damage that may be caused by the use of non-original parts.

### 3

### Technical description of the burner

#### 3.1 Technical data

Model			RS 28/E	RS 38/E
Output <sup>(1)</sup>	High	MBtu/hr kW	617 - 1232 181 - 361	880 - 1665 258 - 488
	Low	MBtu/hr kW	198 58	266 78
Fuel			Natural or propane gas	
• Max delivery		SCFH	1232	1665
• Pressure at maximum delivery <sup>(2)</sup> natural gas		" WC	2.95	2.6
Operation			Low - high-low or modulating	
Standard application			Boilers: water, steam, thermal oil	
Ambient temperature		°F	32 - 104 (0 - 40 °C)	
Combustion air temperature		°F max	140 (60 °C)	
Noise levels <sup>(3)</sup>	Sound pressure	dB(A)	70	72
	Sound power		81	83

Tab. A

(\*) Firing rate for C-UL Canadian Listing (CNL).

(1) Reference conditions: ambient temperature 68 °F (20°C) - Barometric pressure 394" WC - Altitude 329 ft.

(2) Pressure at test point 7)(Fig. 1, page 7) 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.

The sound power is measured with the "Free Field" method, as per EN 15036, and according to an "Accuracy: Category 3" measuring accuracy, as set out in EN ISO 3746.

#### 3.2 Electrical data

Model		RS 28/E	RS 38/E
Control circuit power supply	V/Ph/Hz	120/1/60	
Main power supply (+/-10%)	V/Ph/Hz	120/1/60	
Fan motor	rpm	3400	
	HP	0.5	
	V	120	
	A	5.2	
Motor capacitor	µF	45	
Ignition transformer	V1 - V2	120 V - 1 x 8 kV	
	I1 - I2	1.6 A - 20 mA	
Electrical power consumption	W	600	
Electrical control circuit consumption	W max	750	
Total electrical consumption	W	1350	
Electrical protection		NEMA 1	

Tab. B

#### 3.3 Burner models designation

Model	Code	RBNA code	Voltage	Flame safeguard
RS 28/E	20044216	C9321400	120/1/60	Burner mounted
RS 38/E	20105015	20104515	120/1/60	Burner mounted

Tab. C

3.4 Burner description

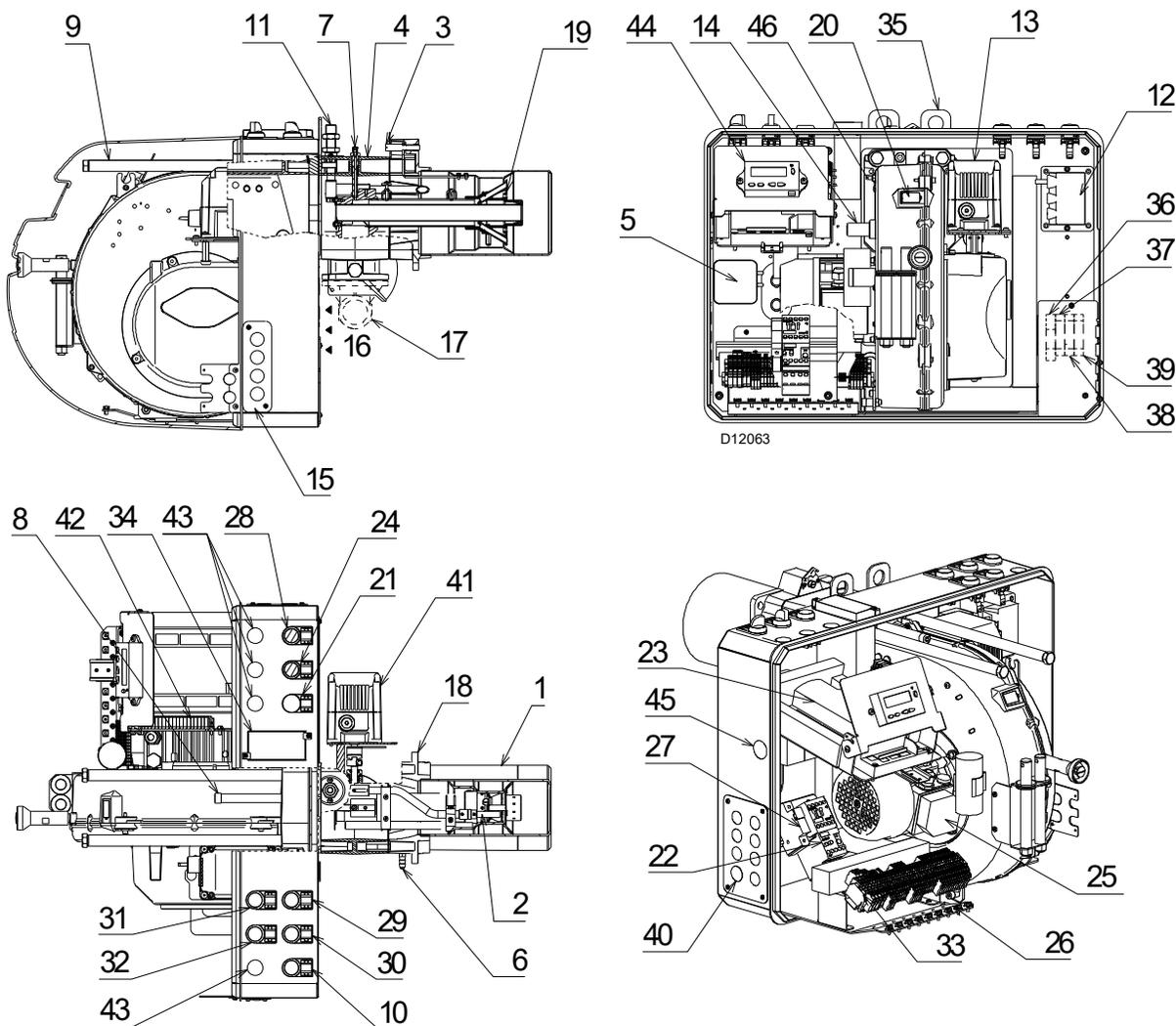


Fig. 1

- |  |  |  |
|--|--|--|
| 1 Combustion head  | 20 Flame inspection window                                 | 40 Holes for cable grommets for electrical wiring for accessories (to be carried out by the installer)                             |
| 2 Ignition pilot   | 21 Button "Alarm silence"                                  | 41 Gas actuator  |
| 3 Screw for combustion head adjustment                                 | 22 Fan motor contactor and thermal relay with reset button | 42 RWF55 terminal board "X3"   |
| 4 Sleeve   | 23 Flame control for checking flame and air/fuel ratio     | 43 Optional holes  |
| 5 Low air pressure switch  | 24 Switch "Local/remote"                                   | 44 Operator panel with LCD display   |
| 6 Air combustion head pressure test point                              | 25 Fan motor with capacitor                                | 45 Horn  |
| 7 Gas pressure test point and head fixing screw                        | 26 Ground terminals  | 46 Air pressure switch test point  |
| 8 Screw securing fan to sleeve   | 27 Auxiliary fuse  | Two types of burner failure may occur:   |
| 9 Slide bars for opening the burner and inspecting the combustion head | 28 Switch "OFF/ON"   | ➤ <b>Flame safeguard lock-out</b>  |
| 10 Signal "ALARM ON"   | 29 Signal "Power ON"                                       | If the alarm signal lamp 10)(Fig. 1) lights up, it indicates that the burner is in lock-out. To reset, press the reset pushbutton. |
| 11 Pilot attachment  | 30 Lamp signal "Call for heat"                             | ➤ <b>Motor trip</b>  |
| 12 Ignition transformer "TA"   | 31 Signal "Ignition ON"                                    | release by pressing the pushbutton on thermal overload, 22)(Fig. 1) see "Thermal relay calibration" page 21.                       |
| 13 Air actuator  | 32 Signal "Fuel ON"  |  |
| 14 UV flame sensor   | 33 Burner terminal board "X1"                              |  |
| 15 Plate with four hole knock-outs for electrical cable routing        | 34 RWF55 modulator (with analog output 4-20 mA)            |  |
| 16 Air inlet to fan  | 35 Lifting rings   |  |
| 17 Gas input connection  | 36 K2 relay  |  |
| 18 Boiler mounting flange  | 37 K1 relay  |  |
| 19 Flame stability disk  | 38 K3 relay  |  |
|  | 39 K5 relay  |  |

### 3.5 Packaging - weight

The burners are skid mounted. Outer dimensions of packaging are indicated in Tab. D.

The weight of the burner complete with packaging is indicated in Tab. D.

inch	A	B	C	lbs
RS 28/E	47 1/4"	23 5/8"	27 31/32"	152
RS 38/E	47 1/4"	23 5/8"	27 31/32"	154

Tab. D

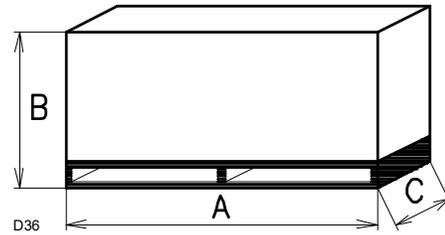


Fig. 2

### 3.6 Burner dimensions

The maximum dimensions of the burners are given in Fig. 3.

Inspection of the combustion head requires the burner to be opened and the rear part withdrawn on the slide bars.

The maximum dimension of the burner when open, without casing, is give in measurement H.

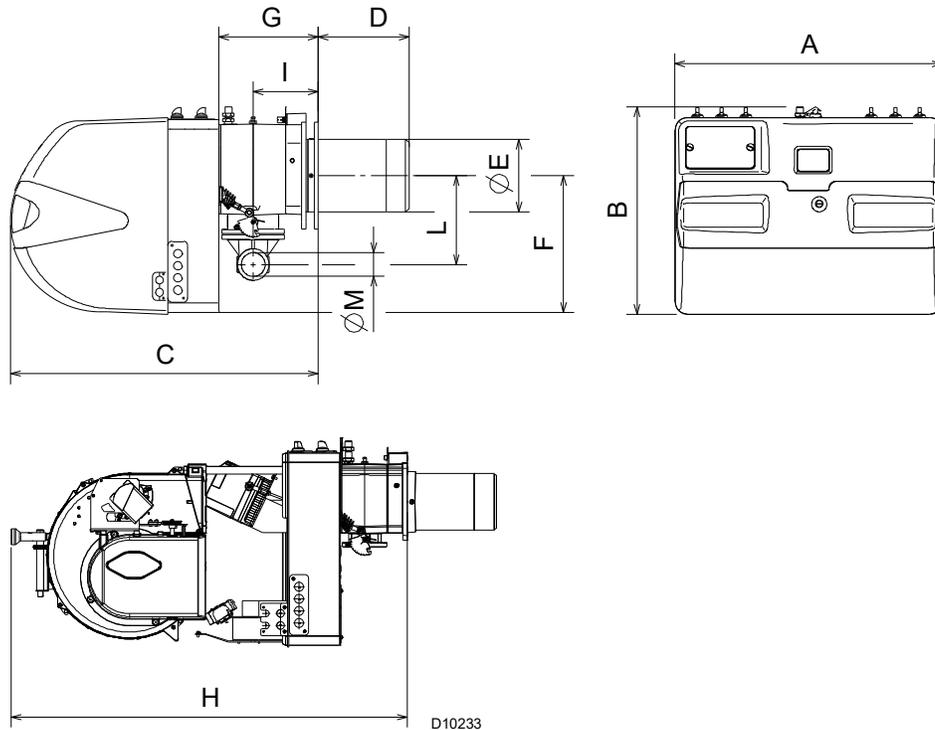


Fig. 3

inch	A	B	C	D(1)	E	F	G	H	I	L	M
RS 28/E	25 31/32"	20 7/32"	26 3/4"	8 1/2" - 13 15/16"	5 1/2"	13 5/16"	6 7/16"	37 7/32"	4 1/4"	6 5/8"	1 1/2"
RS 38/E	25 31/32"	20 7/32"	26 3/4"	8 1/2" - 13 15/16"	5 1/2"	13 5/16"	6 7/16"	37 7/32"	4 1/4"	6 5/8"	1 1/2"

Tab. E

(1) Blast tube: short - long (obtainable with the kit)

**3.7 Firing rate**

The burner can work in two ways: low and high fire.

**MAXIMUM OUTPUT** must be selected in area A (Fig. 4).

**MINIMUM OUTPUT** must not be lower than the minimum limit shown in the diagram.



The firing rate area values have been obtained considering an ambient temperature of 68 °F, and an atmospheric pressure of 394" WC and with the combustion head adjusted as shown at page 17.

Model	MBtu/hr	kW
RS 28/E	198	58
RS 38/E	266	78

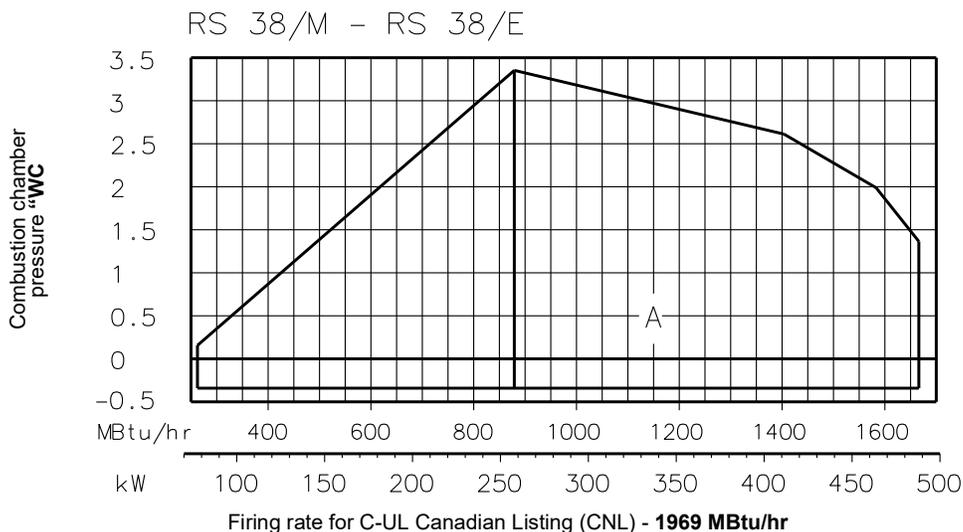
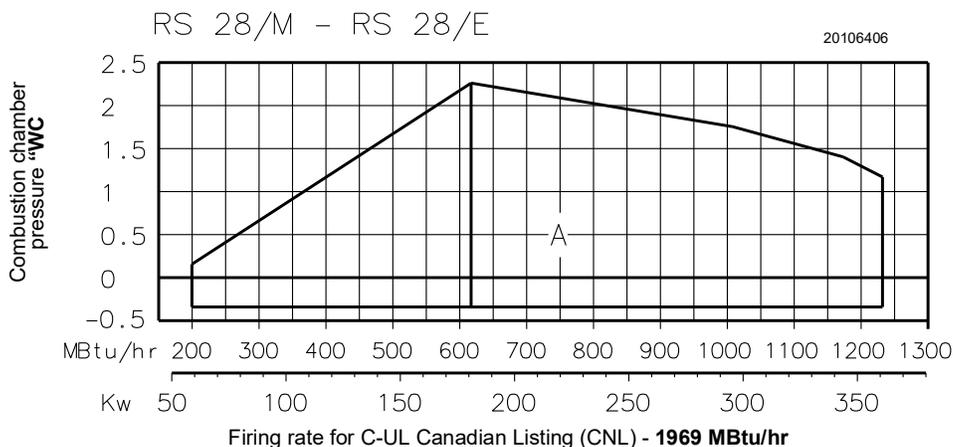


Fig. 4

**3.8 Standard equipment**

- Gas train flange ..... No. 1
- Flange gasket ..... No. 1
- Washers for screws ..... No. 4
- Flange fixing screws ..... No. 4
- Instruction manual ..... No. 1



It is recommended to tighten the screws of the gas flange with a tightening torque of 15 Nm ±10%.



Tighten the nuts gradually (first to 30%, then to 60% up to 100%) according to the cross pattern shown in the figure.

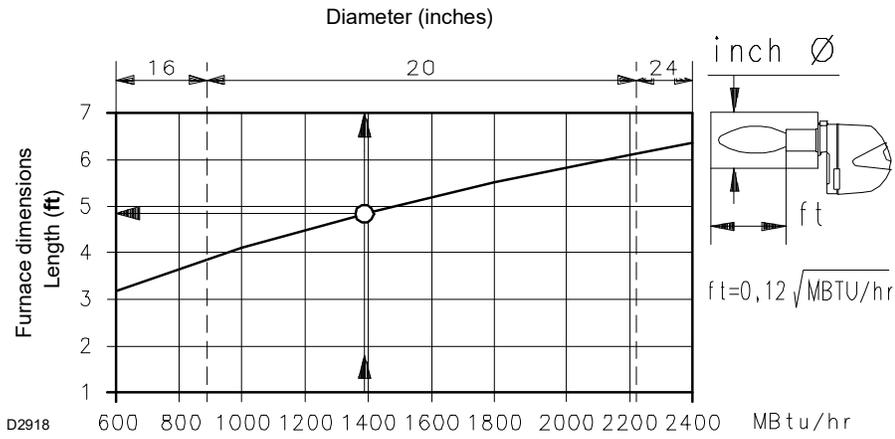
**3.9 Minimum furnace dimensions**

The firing rates were set in relation to certified test boilers.

**Example**

Fig. 5 indicates the diameter and length of the test combustion chamber.

Output 1388 MBtu/hr: diameter 20 inch - length 4.9 ft



**Fig. 5**

### 3.10 Flame control for the air/fuel ratio (LMV37.4...)

#### Warning notes



**WARNING**

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

The LMV37.4... is a safety device! Do not open, interfere with or modify the unit.

The manufacturer will not assume responsibility for any damage resulting from unauthorized interference!

- All activities (mounting, installation and service work, etc.) must be performed by qualified staff.
- Before making any wiring changes in the connection area, 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.
- Ensure protection against electric shock hazard by providing adequate protection for the burner control's connection terminals.
- Each time work has been carried out (mounting, installation, service work, etc.), check to ensure that wiring and parameters is in an orderly state.
- 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.

#### Introduction

The flame control for the air/fuel ratio (Fig. 6), (hereafter referred to simply as the flame control), that equips the burners, carries out a series of integrated functions in order to optimise burner functioning, both for single operation and together with other units (e.g. double furnace boiler or more than one generator at the same time).

The basic functions carried out by the flame control relate to:

- flame control;
- the dosage of air and fuel via the positioning (with direct servo-control) of the relative valves, excluding the possible play in the mechanical cam calibration systems;
- the modulation of burner output, on the basis of the load requested by the system, maintaining the pressure or temperature of the boiler at the working values set;
- the safety diagnostic of the air and fuel circuits, via which it is possible to easily identify any causes of malfunctioning.

#### Mechanical design

The following system components are integrated in the LMV37.4... basic unit:

- Burner control with gas valve proving system
- Electronic air / fuel ratio control
- Control frequency converter air fan
- Modbus interface

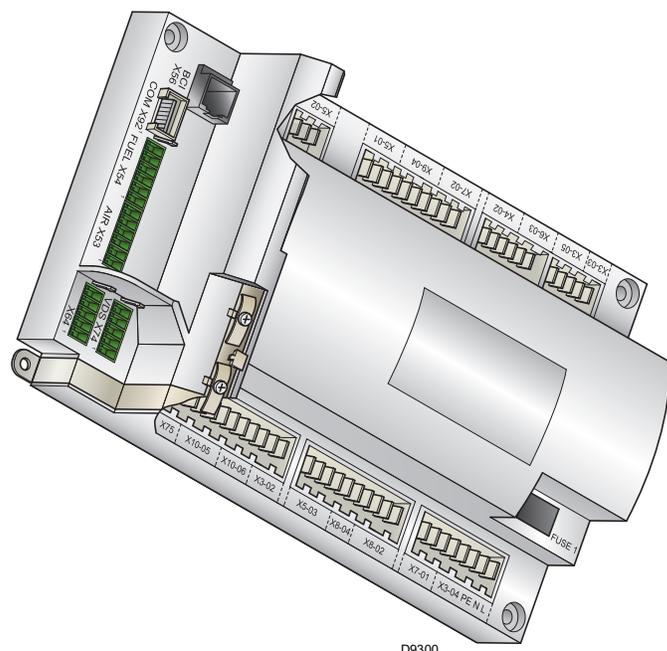


Fig. 6

#### Installation notes

- Always run high-voltage ignition cables separately while observing the greatest possible distance to the unit and to other cables.
- Do not mix up live and neutral conductors (fire hazard, dangerous failures, loss of protection against electric shock hazard, etc.).
- Do not lay the connecting cable from the LMV37.4... to the AZL2... together with other cables.



**WARNING**

The first start-up, like every further operation for the internal settings of the flame control, requires access by means of a password and is only to be carried out by personnel of the Technical Assistance Service who have been specifically trained in the internal programming of the tool.

#### Electrical connection of the flame detectors

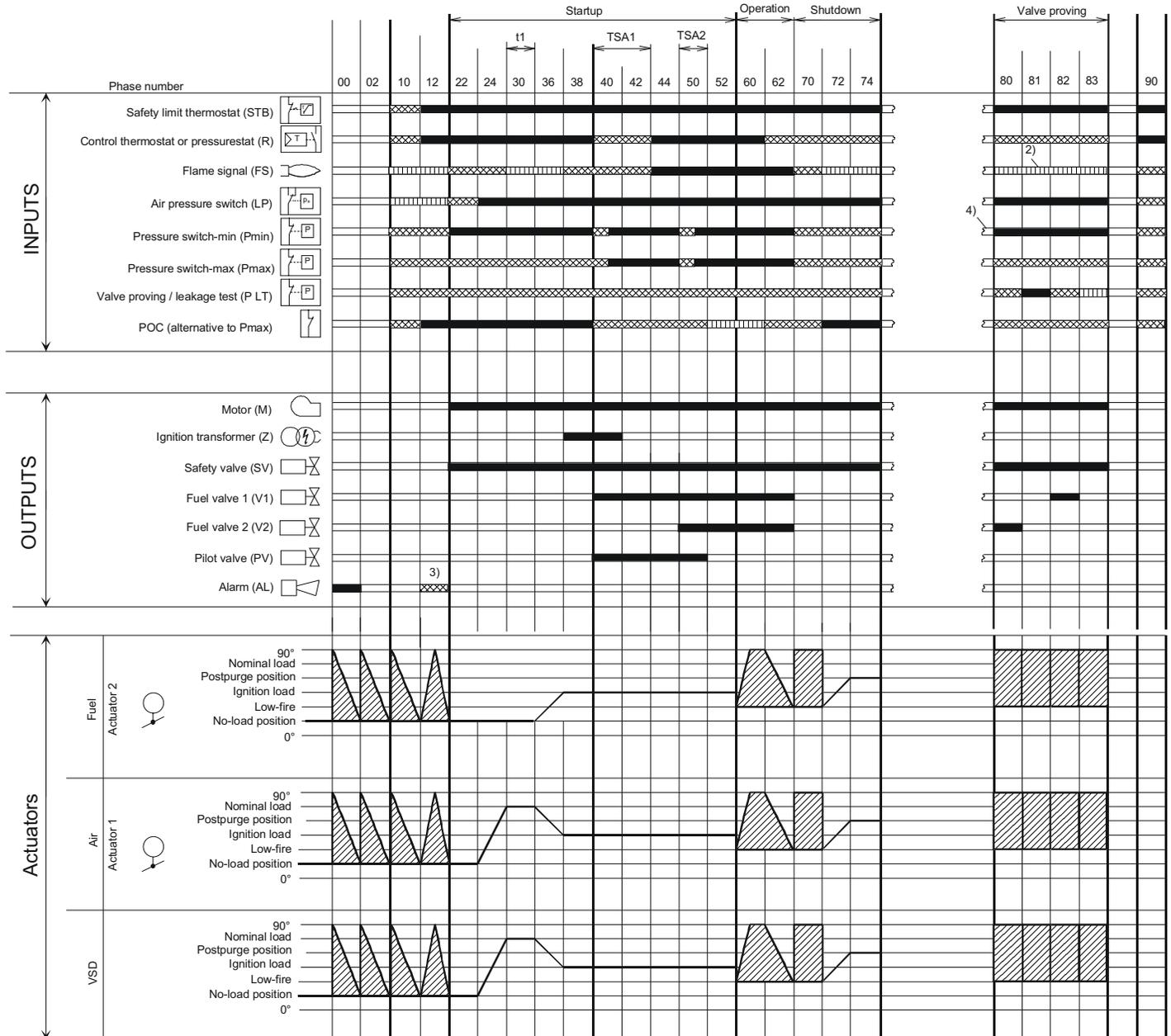
It is important to achieve practically disturbance- and loss-free signal transmission:

- Never run the detector cable together with other cables.
  - Line capacitance reduces the magnitude of the flame signal.
  - Use a separate cable.
- Observe the maximum permissible detector cable lengths.
- The ionization probe is not protected against electric shock hazard. It is mainspowered and 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

LMV37.4... basic unit	Mains voltage	AC 120 V -15 % / +10 %	
	Mains frequency	50 / 60 Hz $\pm$ 6 %	
	Power consumption	< 30 W (typically)	
	Safety class	I, with parts according to II and III to DIN EN 60730-1	
Terminal 'Inputs'	loading Unit fuse F1 (internally)	6.3 AT	
	Perm. mains primary fuse (externally)	Max. 16 AT	
	Undervoltage		
	<ul style="list-style-type: none"> <li>Safety shutdown from operating position at mains voltage</li> <li>Restart on rise in mains voltage</li> </ul>	Approx. AC 93 V Approx. AC 96 V	
Terminal 'Outputs'	loading <b>Total contact loading:</b>		
	<ul style="list-style-type: none"> <li>Nominal voltage</li> <li>Unit input current (safety loop) from:</li> <li>- Fan motor contactor</li> <li>- Ignition transformer</li> <li>- Valves</li> <li>- Oil pump / magnetic clutch</li> </ul>	AC 120 V, 50 / 60 Hz Max. 5 A	
	<b>Individual contact loading:</b>		
	Fan motor contactor		
	<ul style="list-style-type: none"> <li>Nominal voltage</li> <li>Nominal current</li> <li>Power factor</li> </ul>	AC 120 V, 50 / 60 Hz 1.6 A pilot duty load declaration to UL372 $\cos\phi > 0.4$	
	Alarm output		
	<ul style="list-style-type: none"> <li>Nominal voltage</li> <li>Nominal current</li> <li>Power factor</li> </ul>	AC 120 V, 50 / 60 Hz 1 A $\cos\phi > 0.4$	
	Ignition transformer		
	<ul style="list-style-type: none"> <li>Nominal voltage</li> <li>Nominal</li> <li>Power factor</li> </ul>	AC 120 V, 50 / 60 Hz current 1.6 A pilot duty load declaration to UL372 or 250 VA ignition load declaration to UL372 $\cos\phi > 0.2$	
	Fuel valves		
	<ul style="list-style-type: none"> <li>Nominal voltage</li> <li>Nominal current</li> <li>Power factor</li> </ul>	AC 120 V, 50 / 60 Hz 1.6 A pilot duty load declaration to UL372 $\cos\phi > 0.4$	
	Operation display		
	<ul style="list-style-type: none"> <li>Nominal voltage</li> <li>Nominal current</li> <li>Power factor</li> </ul>	AC 120 V, 50 / 60 Hz 0.5 A $\cos\phi > 0.4$	
	Cable lengths	Mains line	Max. 100 m (100 pF/m)
		Display,	BCI For used outside the burner cover or the control panel: Max. 3 m (100 pF/m)
External lockout reset button		Max. 20 m (100 pF/m)	
Environmental conditions	Operation	DIN EN 60721-3-3	
	Climatic conditions	Class 3K3	
	Mechanical conditions	Class 3M3	
	Temperature range	-20...+60 °C	
	Humidity	< 95 % r.h.	

## Operation sequence of the burner



D9288

Fig. 7

### Legend to the sequence diagrams:

Valve proving takes place depending on the parameter:

- 2) Only with valve proving on start-up
- 3) Parameter: with/without alarm in the event of start prevention
- 4) In the event of an erroneous signal on start-up, followed by phase 10, otherwise phase 70

0° Position as supplied (0°)

90° Actuator fully open (90°)

- Signal ON
- Signal OFF
- Any signal is allowed



In standby: after referencing, the actuator is driven to the no-load position

Assignment of times:

t1 Purge time

TSA1 Safety time 1 gas / oil

TSA2 Safety time 2 gas / oil

### 3.11 Actuators (SQM33.5...)

#### Warning notes



WARNING

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

**Do not open, interfere with or modify the actuators!**

- 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 units, completely isolate the equipment from mains supply (all-polar disconnection). If not observed, there is a risk of electric shock hazard.
- Ensure protection against electric shock hazard by providing adequate protection for the connection terminals and by securing the housing cover.
- After any kind of activity (mounting, installation and service work, etc.), check wiring. Also ensure that the parameters are correctly set.
- 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.



WARNING

**The actuator's housing must not be opened. The actuator contains an optical feedback system.**

#### Use

The actuators (Fig. 8) are used to drive and position the air damper and the gas butterfly valve, without mechanical leverages but via the interposition of an elastic coupling.

They are commanded by the flame control, which constantly checks their position by means of a return signal from the optic sensor inside the actuator.

The position (in degrees) of the actuators can be seen on the display of the Operator Panel.

Index "0" for fuel actuator, index "1" for air actuator.

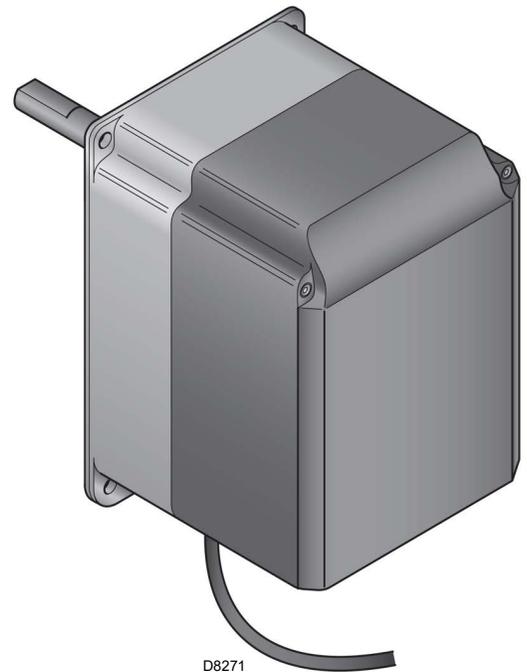
#### Installation notes

- Always run the high-voltage ignition cables separate from the unit and other cables while observing the greatest possible distance.
- The holding torque is reduced when the actuator is disconnected from power.



WARNING

**When servicing or replacing the actuators, take care not to invert the connectors.**



D8271

Fig. 8

#### Technical data

Operating voltage	AC / DC 24 V $\pm$ 20 % (load on interface)
Safety class	2 to EN 60 730 part 1 and parts 2...14
Power consumption	max. 10 W
Degree of protection	IP54 to EN 60 529-1
Opening time 0 - 90°	min: 5s, max.: 120s (depending on the type of flame control)
Firing rate	0 - 90°
Cable connection	RAST2,5 connectors
Direction of rotation	Clockwise/anticlockwise (can be selected from the flame control)
Nominal output torque	3 Nm
Holding torque (when live)	3 Nm
Holding torque (when dead)	2.6 Nm
Weight	approx. 1 kg
Environmental conditions:	
Operation	DIN EN 60 721-3-3
Climatic conditions	class 3K5
Mechanical conditions	class 3M4
Temperature range	-20...+60 °C
Humidity	< 95 % r.h.

**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.



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



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.

**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.

With regard to the transport in the obligatory passages, refer to the overall dimensions shown in Fig. 2, page 8.



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 suitability 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). During the handling, keep the load at not more than 10" from the ground.



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



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.



The output of the burner must be within the boiler's firing rate.

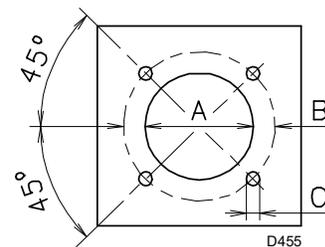


A burner label that has been tampered with, removed or is missing, along with anything else that prevents the definite identification of the burner makes any installation or maintenance work difficult.

**4.4 Boiler plate**

Drill the combustion chamber mounting plate as shown in (Fig. 9). The position of the threaded holes can be marked using the head gasket supplied with the burner.

inch	A	B	C
RS 28/E	6 9/32"	8 13/16"	3/8 W
RS 38/E	6 9/32"	8 13/16"	3/8 W



**Fig. 9**

### 4.5 Blast tube length

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

The range of lengths available, L (inch), is as follows:

Model	L (short blast tube)	L (long blast tube)
RS 28/E	8 1/2"	13 13/16"
RS 38/E	8 1/2"	13 13/16"

- For boilers with front flue passes (6) or flame inversion chambers, protective insulation (4) must be inserted between the boiler refractory (5) and the blast tube (3).
- This protective insulation must not compromise the extraction of the blast tube.
- For boilers having a water-cooled front the insulation (4)-5)(Fig. 10) is not required unless it is required by the boiler manufacturer.

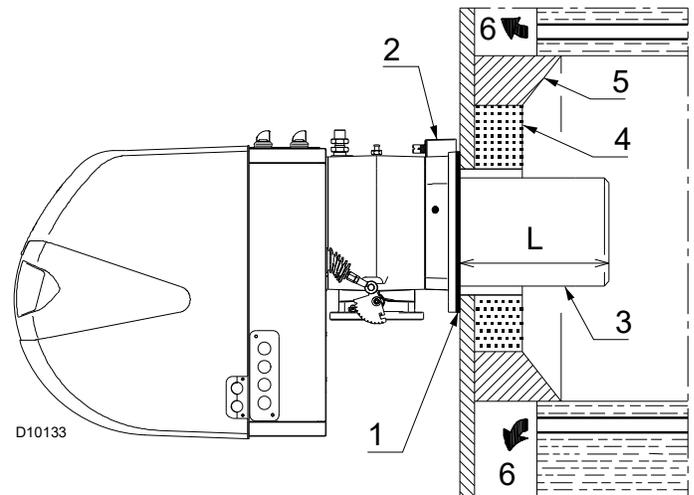


Fig. 10

### 4.6 Securing the burner to the boiler

- Secure the flange (2)(Fig. 10) to the boiler plate, inserting the gasket (1)(Fig. 10).
- Use the 4 screws, supplied with the unit, after first protecting the thread with an anti-locking product.
- The seal between burner and boiler must be airtight.

### 4.7 Ignition pilot adjustment

Place the pilot and electrode as shown in Fig. 11.

The pilot works correctly at pressures ranging from 5 - 12" WC.

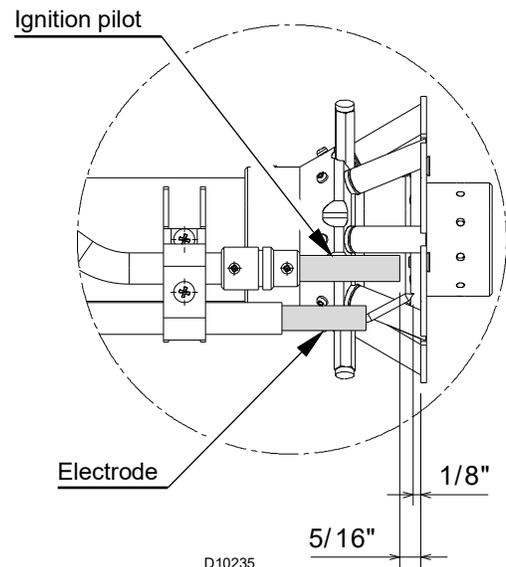


Fig. 11

**4.8 Combustion head setting**

Installation operations are now at the stage where the blast tube and sleeve are secured to the boiler as shown in Fig. 12.



The fan part of the burner shall be completely backward using the guides.

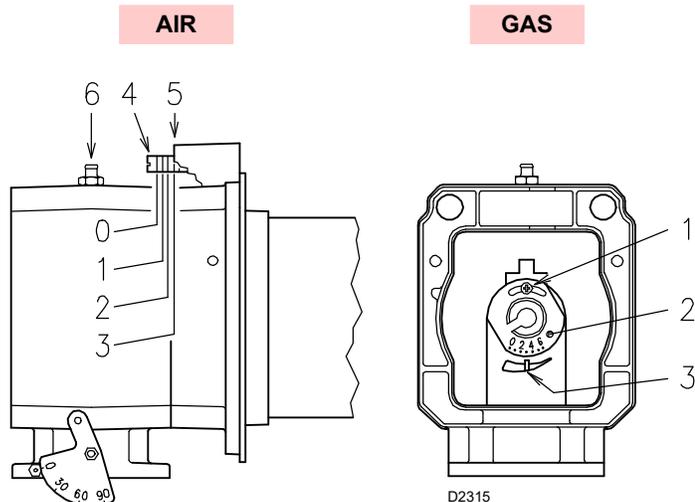


Fig. 12

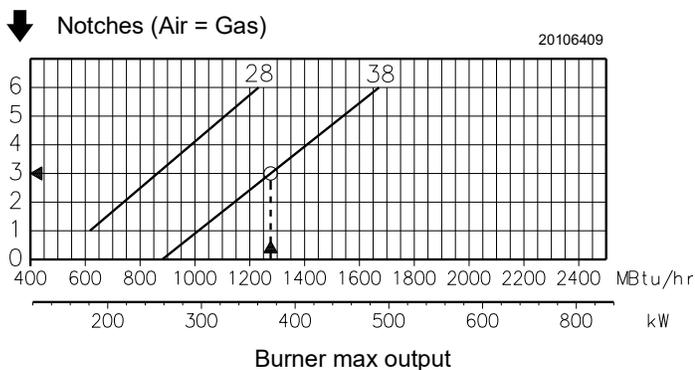


Fig. 13

**4.8.1 Modulation minimum output**

When the MIN output is within the value range given in Tab. F, the gas ring 2)(Fig. 12) is adjusted to zero.

Model	MBtu/hr	kW
RS 28/E	198 - 280	58 - 82
RS 38/E	266 - 375	78 - 110

Tab. F

There are two possible cases:

**A The MIN burner output is not in the values of Tab. F**

In diagram (Fig. 13), depending on the MAX output, find the notch to use for adjusting the air and the gas.

Proceed as follows:

**Air adjustment (Fig. 12)**

- Turn screw 4) until the notch identified is aligned with the front surface 5) of the flange.

**Gas adjustment (Fig. 12)**

- Loosen screw 1) and turn ring 2) until the notch identified is aligned with index 3).
- Tighten the screw 1) fully down.

**Example:**

the burner RS 28/E varies its output between:  
MIN = 300 and MAX = 990 MBtu/hr.

The MIN output of 300 MBtu/hr is not found in the values of Tab. F and therefore diagram (Fig. 13) is valid, from which it results that for a MAX output of 990 MBtu/hr the gas and air adjustments are done on notch 4, as in Fig. 12.

In this case the pressure load loss of the combustion head is given by column A Tab. G, page 19.

Diagram (Fig. 13) shows the ideal settings for the ring 2)(Fig. 12).

If the gas supply pressure is too low to reach the max output operation pressure indicated in Tab. G, and if the ring 2)(Fig. 12) is not fully open, it can be opened wider by 1 or 2 notches.

Continuing with the previous example, Tab. G indicates that for burner RS 28/E with output of 990 MBtu/hr a pressure of approximately 2.2" WC is necessary at test point 6)(Fig. 12).

If this pressure cannot be reached, open the ring 2)(Fig. 12) to notch 4 or 5.

Make sure that the combustion characteristics are satisfactory and free of pulsations.

**B The MIN burner output is found in the values of the Tab. F**

**Air adjustment (Fig. 12)**

- The same as the previous case: follow diagram (Fig. 13).

**Gas adjustment (Fig. 12)**

- The gas ring 2)(Fig. 12) is always adjusted to position 0, irrespective of the MAX burner.
- In this case the pressure load loss of the combustion heads is given by column B in Tab. G.

### 4.9 Gas piping

The main gas train must be connected to the gas attachment 1)(Fig. 14), using flange 2), gasket 3) and screws 4) supplied with the burner.

The main gas train can enter the burner from the right or left side, depending on which is the most convenient.

Gas safety shut-off valves 5)-6)(Fig. 15) must be as close as possible to the burner to ensure gas reaches the combustion head within the safety time range.

The pilot gas train must be connected to the gas attachment 5)(Fig. 14) and can enter the burner from the right or left side.

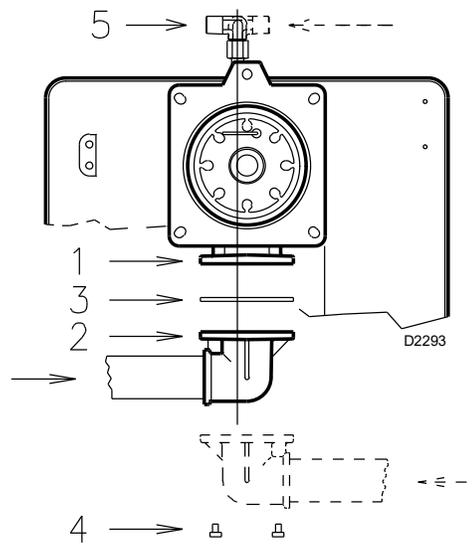


Fig. 14

### 4.10 Gas train

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



**See the accompanying instructions for the adjustment of the gas train.**

#### Key to layout

- 1 Gas input pipe
- 2 Manual valve
- 3 Pressure regulator
- 4 Low gas pressure switch
- 5 1<sup>st</sup> safety shut off valve
- 6 2<sup>nd</sup> safety shut off valve
- 7 Standard issue burner gasket with flange
- 8 Gas adjustment butterfly valve
- 9 Burner

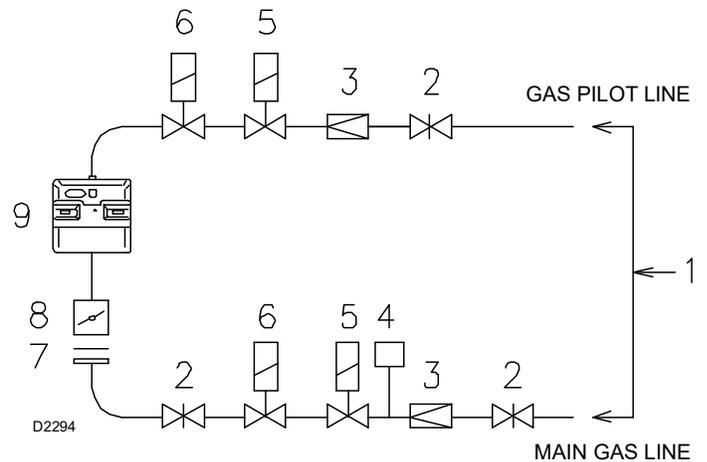
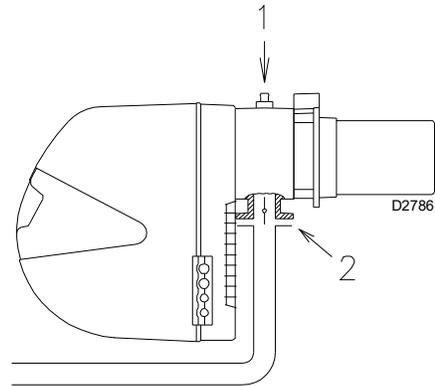


Fig. 15

**4.11 Gas pressure**

The Tab. G is used to calculate manifold pressure taking into account combustion chamber pressure.

Model	MBtu/hr	kW	Δp (" WC)	
			A	B
RS 28/E	624	183	0.98	0.98
	699	205	1.22	1.3
	795	233	1.57	1.69
	891	261	1.85	2.05
	986	289	2.17	2.28
	1078	316	2.48	2.68
	1174	344	2.76	3.07
	1232	361	2.95	3.58
RS 38/E	870	255	1.02	1.02
	979	287	1.22	1.38
	1099	322	1.46	1.77
	1211	355	1.69	2.28
	1327	389	1.89	2.72
	1440	422	2.13	3.11
	1552	455	2.36	3.54
	1665	488	2.6	4.21



**Fig. 16**

**Tab. G**

Calculate the approximate maximum output of the burner as follows:

- subtract the combustion chamber pressure from the gas pressure measured at test point 1)(Fig. 16);
- find the nearest pressure value to your result in column A or B (Tab. G) for the burner in question;
- read off the corresponding output on the left.

**Example with natural gas**

- Maximum output operation
- Gas ring 2)(Fig. 12) adjusted as indicated in diagram (Fig. 13)
- Gas pressure at test point 1)(Fig. 16) = 3" WC
- Pressure in combustion chamber = 0.8" WC
- 3 - 0.8 = 2.2" WC

A maximum output of 990 MBtu/hr shown in Tab. G corresponds to 2.2" WC pressure, column A.

This value serves as a rough guide, the effective delivery must be measured at the gas meter.



**The data of thermal output and combustion head gas pressure are related to full open (90°) gas butterfly valve.**

### 4.12 Electrical wiring

#### Notes on safety for the electrical wiring

- 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.
- 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  $\frac{1}{8}$ " (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.

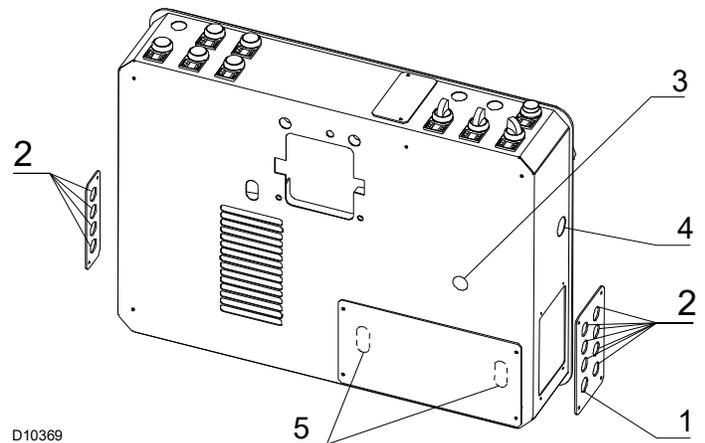
If the hood is still present, remove it and proceed with the electrical wiring.

All the cables to be connected to the burner are fed through the grommets.

The use of the cable grommets can take various forms.

By the way of example we indicate the following mode (Fig. 17) (according to **UL795**):

- 1 Three phase power supply with  $\frac{1}{2}$ " cable grommet (no single phase);
- 2 Single phase power supply with  $\frac{1}{2}$ " cable grommet. Available: Consents/safety, minimum gas pressure switch, gas valves and other devices with  $\frac{3}{8}$ " cable grommet.
- 3 Available: maximum gas pressure switch (kit) and other
- 4 Horn
- 5 Available: step down transformer



WARNING

The control panel is in compliance with **UL508A**.

**4.13 Thermal relay calibration**

Depending on the burner type, there are two different thermal relays:

- Electro-mechanical thermal relay (used for single phase motors)
- Electronic thermal relay (used for three phase motors)

**4.13.1 Electro-mechanical thermal relay**

The electro-mechanical thermal 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.

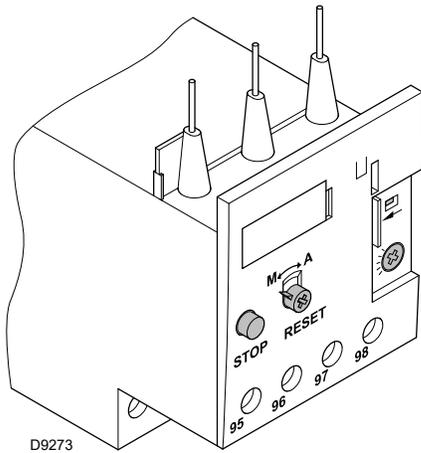


Fig. 18

- 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).



**Automatic resetting can be dangerous.**  
**This action is not provided for the burner operation.**

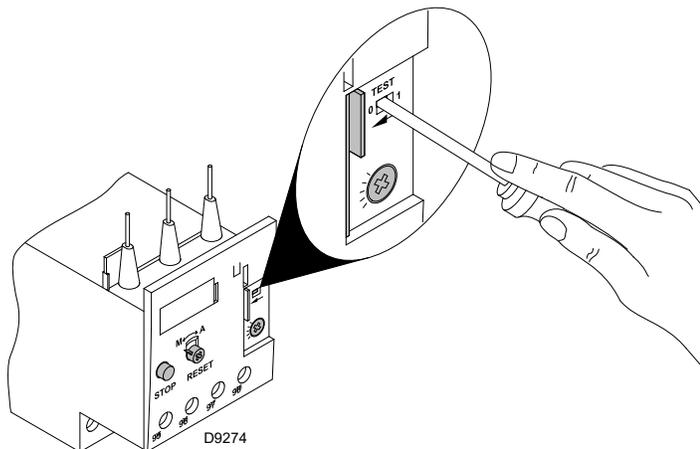


Fig. 19

**4.13.2 Electronic thermal relay**

- To reset, in the case of an intervention of the thermal relay, press the button "RESET" (Fig. 20).

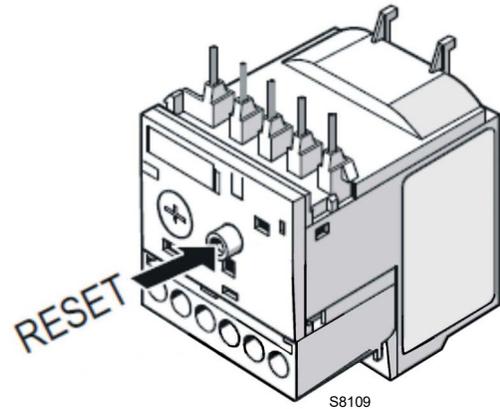


Fig. 20

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.

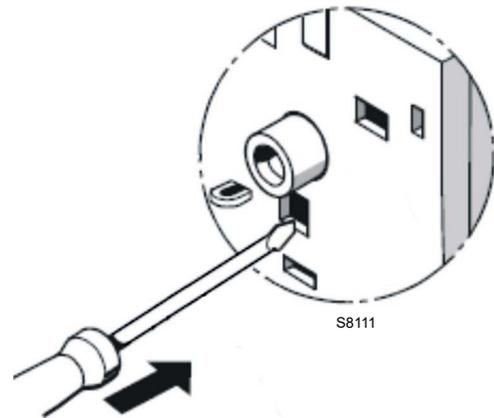


Fig. 21

- **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.

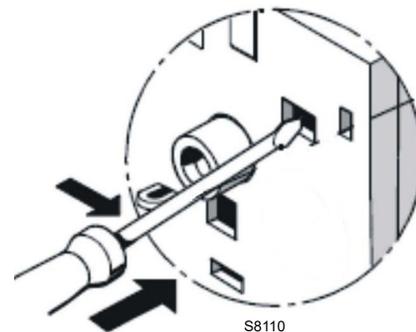


Fig. 22

**5**

**Start-up, calibration and operation of the burner**

**5.1 Notes on safety for the first start-up**



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.



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

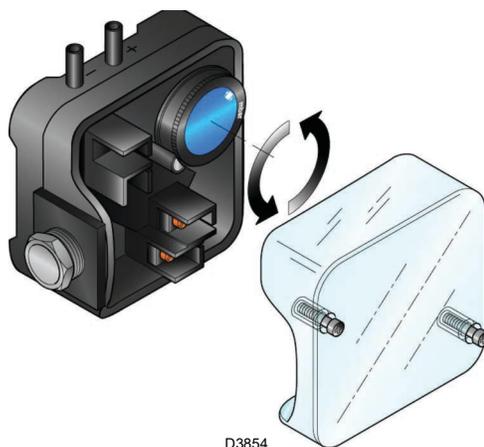


Refer to paragraph “Safety test - with gas ball valve closed” on page 26 before the first start-up.

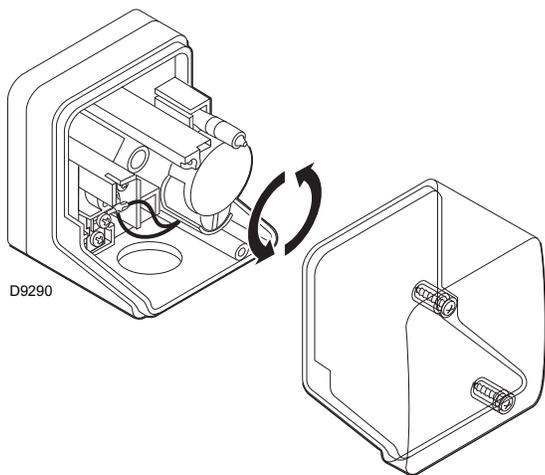
**5.2 Operations before start-up**

- Ensure that the gas supply company has carried out the supply line vent operations, eliminating air or inert gases from the piping.
- Slowly open the manual valves situated upstream of the gas train.
- Adjust the minimum gas pressure switch (Fig. 23) to the start of the scale.
- Adjust the air pressure switch (Fig. 24) to the start of the scale.
- Purge the air from the gas line. Fit a U-type manometer (Fig. 25) to the gas pressure test point on the sleeve. The manometer readings are used to calculate the MAX. burner power.

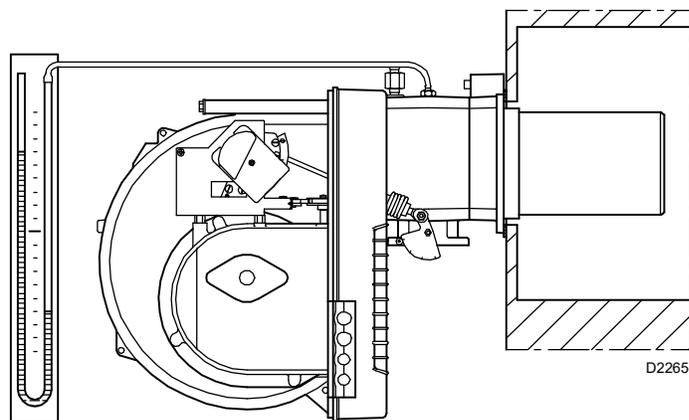
Before starting up the burner it is good practice to adjust the gas train so that ignition takes place in conditions of maximum safety, i.e. with gas delivery at the minimum.



**Fig. 24**



**Fig. 23**



**Fig. 25**

**5.3 Burner firing**

Having completed the checks indicated in the previous heading, the pilot of the burner should fire.

If the motor starts but the flame does not appear and the flame safeguard goes into lock-out, reset and wait for a new firing attempt.

Pilot adjustment has been illustrated on Fig. 11, page 16.

Having adjusted the pilot, reconnect the main valve and ignite the main flame; it might require several attempts to purge the air from the gas lines or to adjust the valve with little gas.

Once the burner has fired, now proceed with calibration operations.

**5.4 Burner calibration**

The optimum calibration of the burner requires an analysis of the flue gases at the boiler outlet.

Adjust successively:

- Firing output
- Maximum burner output

- Minimum burner output
- Intermediate outputs between low and high fire
- Air pressure switch
- Minimum gas pressure switch

**5.5 Burner start-up**

Feed electricity to the burner via the disconnecting switch on the boiler panel.

Close the thermostats/pressure switches, set the parameters on the RWF 55 regulator.

Please refer to the specific manual for this operation. Turn the switch of Fig. 26 to position “ON” and turn the switch of Fig. 26 to position “LOCAL”.



Make sure that the lamps or testers connected to the solenoids, or indicator lights on the solenoids themselves, show that no voltage is present. If voltage is present, stop the burner **immediately** and check the electrical wiring. When the burner starts, check the direction of the motor rotation, as indicated in Fig. 26.

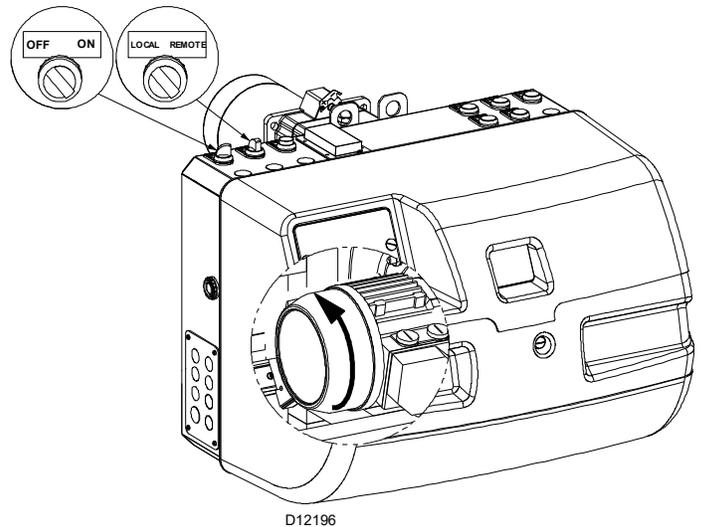
As the burner is not fitted with a device to check the sequence of the phases, the motor rotation may be incorrect. As soon as the burner starts up, go in front of the cooling fan of the fan motor and check it is rotating anticlockwise.

If this is not the case:

- place the switch of Fig. 26 in position “OFF” and wait for the flame control to carry out the switch-off phase;
- disconnect the electrical supply from the burner;
- invert the phases on the three-phase power supply.



**For the start-up procedure and the parameters calibration, refer to the specific instruction manual of the LMV37... electronic cam supplied with the burner.**



**Fig. 26**

**5.5.1 Adjusting gas/air delivery**

- Adjust the burner up to the maximum output (gas butterfly valve completely open);
- adjust the required maximum output with the gas pressure stabilizer;
- set the combustion parameters with the air servomotor and store the maximum combustion value;
- proceed slowly to the decrease of the output by synchronizing the combustion with the two servomotors and storing the different setting values.

### 5.6 Air pressure switch

The air pressure switch is connected in differential (Fig. 28) and is activated by both the negative pressure of the air intake and the air pressure from the fan.

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

With the burner operating at low fire, adjust the pressure switch by slowly turning the relative knob clockwise until the burner locks out.

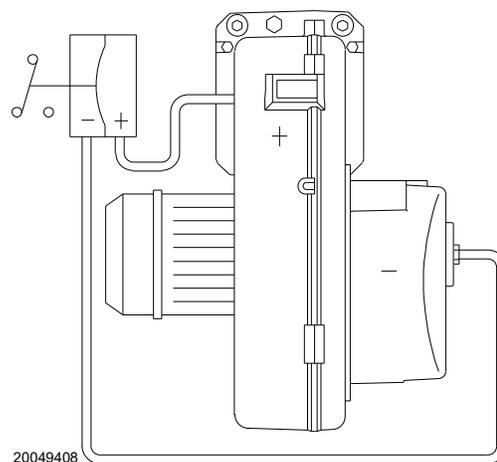
Then turn the knob counter-clockwise about 20% of the set point and start-up the burner again to ensure the set point is correct.

If the burner locks out again, turn the knob counter-clockwise a little bit more.



D3854

Fig. 27



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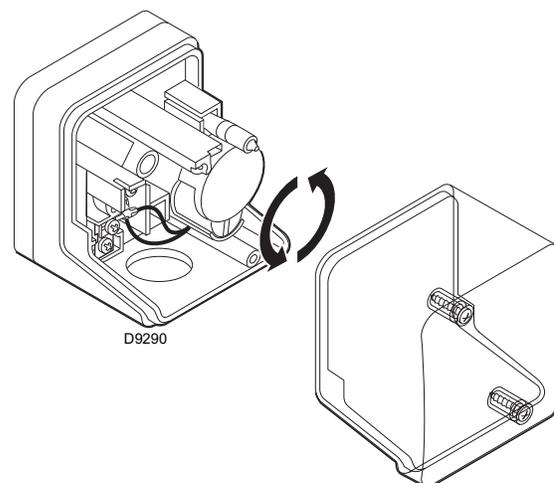
Fig. 28

### 5.7 Minimum gas pressure switch

The purpose of the minimum gas pressure switch is to prevent the burner from operating in an unsuitable way due to too low gas pressure.

Adjust the minimum gas pressure switch (Fig. 29) after having adjusted the burner, the gas valves and the gas train stabiliser. With the burner operating at maximum output:

- install a pressure gauge downstream of the gas train stabiliser (for example at the gas pressure test point on the burner combustion head);
- choke slowly the manual gas cock until the pressure gauge detects a decrease in the pressure read of about 0.1 kPa (1 mbar). In this phase, verify the CO value which must always be less than 100 mg/kWh (93 ppm).
- Increase the adjustment of the gas pressure switch until it intervenes, causing the burner shutdown;
- remove the pressure gauge and close the cock of the gas pressure test point used for the measurement;
- open completely the manual gas cock.



D9290

Fig. 29



1 kPa = 10 mbar

WARNING

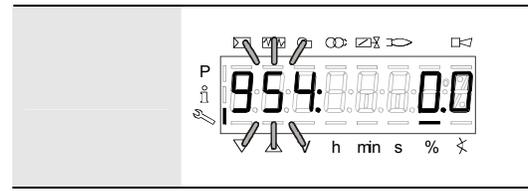
**5.8 Flame signal measurement**

Check the flame signal through the parameter 954, as indicated in Fig. 30. The displayed value is expressed in percentage.

For further and specific information, please refer to the specific instruction manual.

The value during the operation must be higher than 24%. If at the burner start-up the value is higher or equal of 18%, the burner locks out due to the extraneous light.

The display (Fig. 30) shows parameter **954**: flashing on the left. On the right, the flame's intensity is displayed as a percentage. Example: **954: 0.0**



S8171

**Fig. 30**

**5.9 Final checks (with the burner working)**

<ul style="list-style-type: none"> <li>➤ Open the control limit operation</li> <li>➤ Open the high limit operation</li> </ul>		<p>The burner must stop</p>
<ul style="list-style-type: none"> <li>➤ Rotate the maximum gas pressure switch knob to the minimum end-of-scale position (if installed)</li> <li>➤ Rotate the air pressure switch knob to the maximum end of scale position</li> </ul>		<p>The burner must stop in lockout</p>
<ul style="list-style-type: none"> <li>➤ Switch off the burner and disconnect the voltage</li> <li>➤ Disconnect the minimum gas pressure switch</li> </ul>		<p>The burner must not start</p>
<ul style="list-style-type: none"> <li>➤ Cover the UV flame sensor</li> </ul>		<p>The burner must stop in lockout due to firing failure</p>



**WARNING**

Make sure that the mechanical locking systems on the different 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.



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:



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.

## 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 Safety test - with gas ball valve closed

It is fundamental to ensure the correct execution of the electrical connections between the gas solenoid valves and the burner to perform safely the commissioning.

For this purpose, after checking that the connections have been carried out in accordance with the burner's electrical diagrams, an ignition cycle with closed gas ball valve -dry test- must be performed.

- 1 The manual ball gas valve must be closed
- 2 The electrical contacts of the burner limit switch need to be closed
- 3 Ensures closed the contact of the low gas pressure switch
- 4 Make a trial for burner ignition

The start-up cycle must be as follows:

- starting the fan for pre-ventilation
- Performing the gas valve seal control, if provided
- Completion of pre-ventilation
- Arrival of the ignition point
- Power supply of the ignition transformer
- Electrical Supply of solenoid gas valves

Since the manual gas ball valve is closed, the burner will not light up and its flame control will go to a safety lockout condition.

The actual electrical supply of the solenoid gas valves can be verified by inserting a tester. Some valves are equipped with light signals (or close/open position indicator) that turn on at the same time as their power supply.



**IF THE ELECTRICAL SUPPLY OF THE GAS VALVES OCCURS AT UNEXPECTED TIMES, DO NOT OPEN MANUAL GAS BALL VALVE, SWITCH OFF POWER LINE; CHECK THE WIRES; CORRECT THE ERRORS AND REPEAT THE COMPLETE TEST.**

## 6.2.3 Checking and cleaning



The operator must use the required equipment during maintenance.

**Combustion**

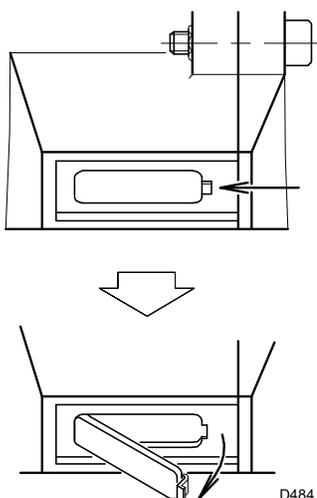
The optimum calibration of the burner requires an analysis of the flue gases. Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.

**Gas leaks**

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

**Flame inspection window**

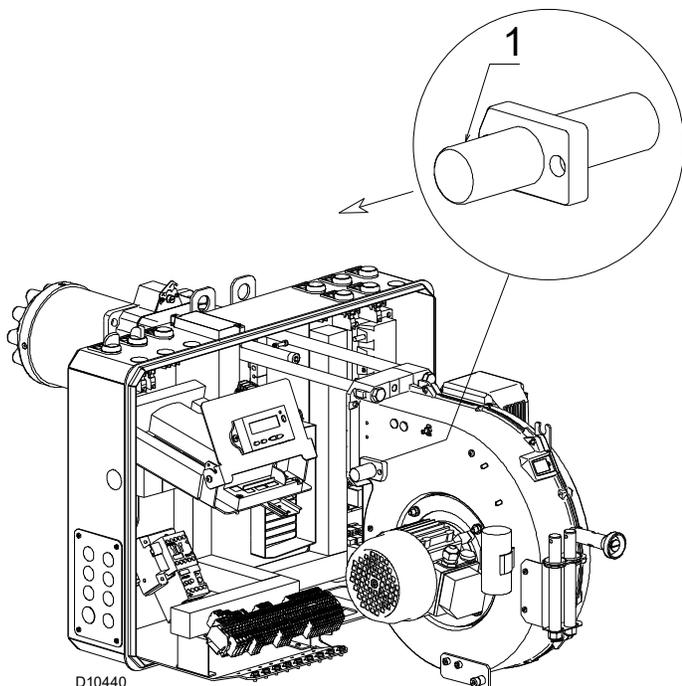
Clean the flame inspection window (Fig. 31).



**Fig. 31**

**UV flame sensor**

Clean the glass cover from any dust that may have accumulated. In order to reach the UV flame sensor, extract the flame sensor 1)(Fig. 32).



**Fig. 32**

**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.

**Burner**

Check for excess wear or loose screws in the mechanisms controlling the air damper and the gas butterfly valve.

Also make sure that the screws securing the electrical leads in the burner connections are fully tightened.

**Combustion**

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

**6.2.4 Safety components**

The safety components must be replaced at the end of their life cycle indicated in Tab. H. The specified life cycles do not refer to the warranty terms indicated in the delivery or payment conditions.

Safety component	Life cycle
Flame control	10 years or 250,000 operation cycles
Flame sensor	10 years or 250,000 operation cycles
Gas valves (solenoid)	10 years or 250,000 operation cycles
Pressure switches	10 years or 250,000 operation cycles
Pressure adjuster	15 years
Servomotor (electronic cam) (if present)	10 years or 250,000 operation cycles
Oil valve (solenoid) (if present)	10 years or 250,000 operation cycles
Oil regulator (if present)	10 years or 250,000 operation cycles
Oil pipes/ couplings (metallic) (if present)	10 years
Fan impeller	10 years or 500,000 start-ups

**Tab. H**

### 6.3 Opening the burner

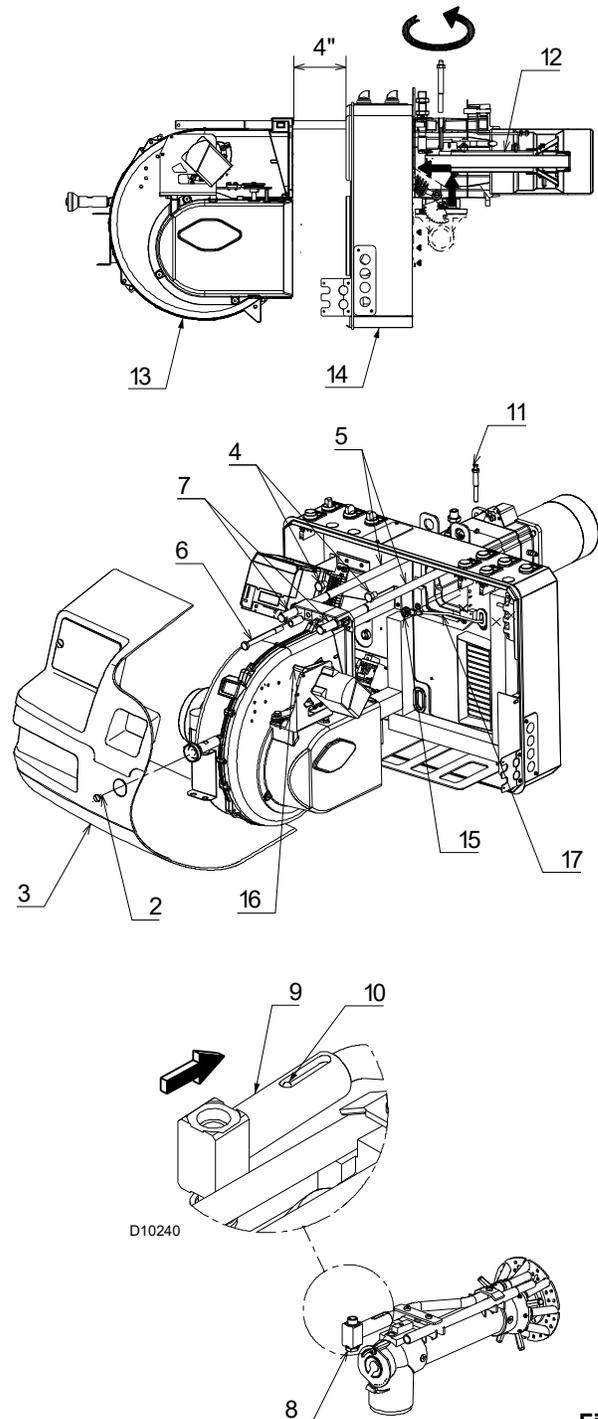


**WARNING**

Switch off the electrical power.

To open the burner proceed as follows:

- remove the screws 2)(Fig. 33) from the slide bars 3);
- install the extension bars 4);
- remove screw 1) and pull the burner back on slide bars 3) by about 4" (Fig. 33);
- disconnect the electrode wires and then pull the burner completely back;
- unscrew the pin 8) from the connection 9)(Fig. 33);
- push ahead the connection to the end stop on the plug 10)(Fig. 33), therefore extract the inner part of the combustion head 12)(Fig. 33).



**Fig. 33**

### 6.4 Closing the burner

To close the burner proceed as follows:

- push the burner 13)(Fig. 33) at approximately 4" from the electrical board 14);
- insert the ignition electrode cables and then slide the burner up to the sleeve so that it is positioned as shown in Fig. 33.
- disinstall and arrange in the correct site the extension bars 4);
- refit screws 2) on slide bars 3);
- secure the burner to the sleeve by tightening screw 1).

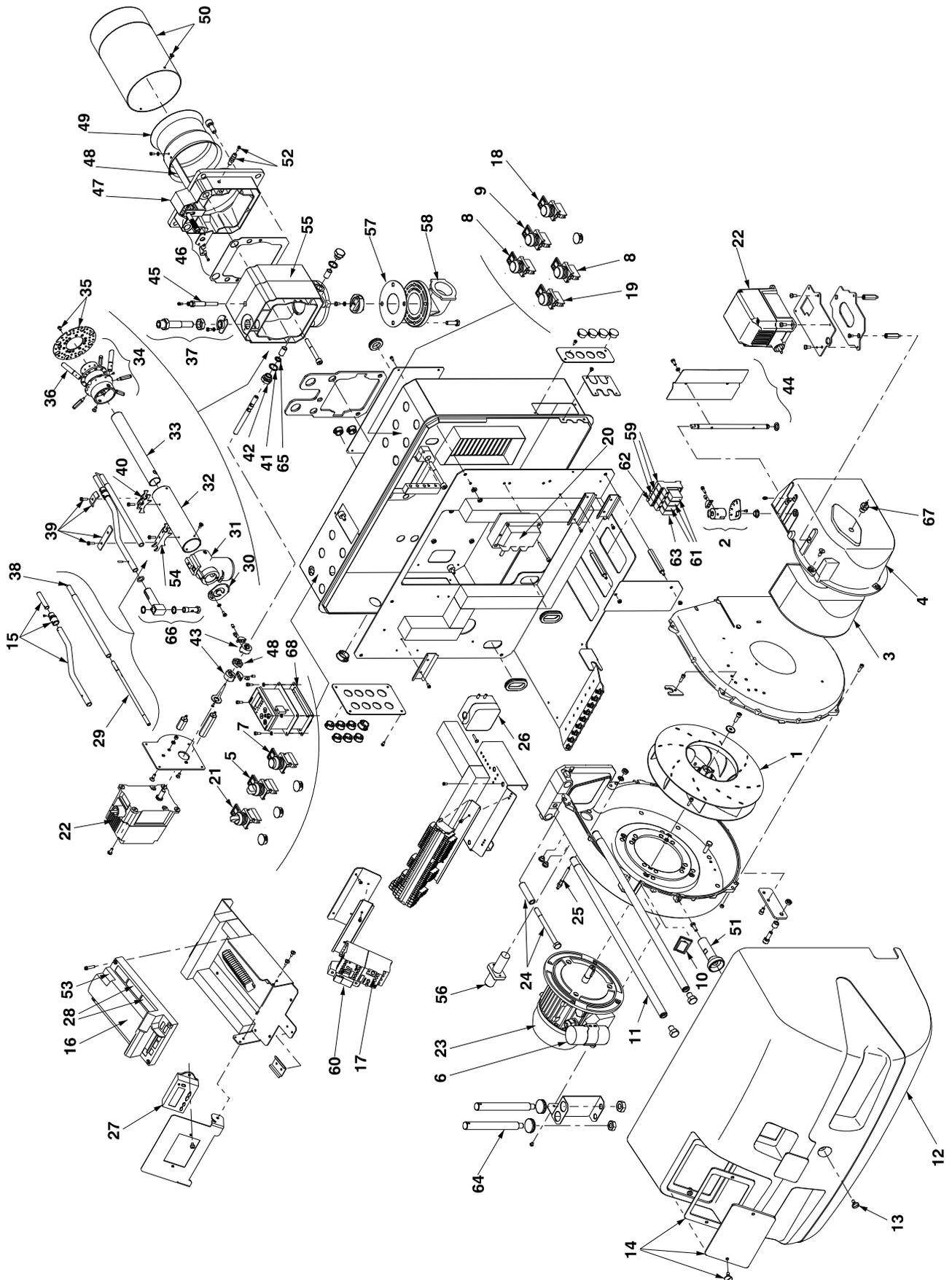


**WARNING**

When fitting the burner on the two slide bars, it is advisable to gently draw out the high tension cables until they are slightly stretched.

**A**

**Appendix - Spare parts**



N.	CODE	C9321400	20104515	DESCRIPTION	*
1	3003760	•		FAN	A
1	3012986	•		FAN	A
2	3014194	•	•	GRADUATE SECTOR	
3	3003830	•	•	SOUND DAMPING	
4	20060108	•	•	AIR INTAKE	
5	20027023	•	•	SWITCH	
6	3012988	•	•	CONDENSER	B
7	20010962	•	•	BUTTON	C
8	20027013	•	•	LIGHT SIGNAL	C
9	20027014	•	•	LIGHT SIGNAL	C
10	3003763	•	•	INSPECTION WINDOW	
11	20026772	•	•	BAR	C
12	20026773	•	•	COVER	C
13	3013727	•	•	SCREW	
14	20026784	•	•	VIEWING PORT AND SEAL	
15	20026787	•	•	PILOT TUBE	
16	3013927	•	•	FLAME CONTROL	
17	20027017	•	•	CONTACTOR	C
18	20027018	•	•	LIGHT SIGNAL	
19	20027020	•	•	LIGHT SIGNAL	
20	3012956	•	•	TRANSFORMER	B
21	20027021	•	•	SWITCH	C
22	20008601	•	•	SERVOMOTOR	B
23	3012993	•	•	MOTOR 0,50HP 120/1/60	C
24	20027028	•	•	SCREW	
25	3003891	•	•	CONNECTOR	C
26	3012948	•	•	AIR PRESSURE SWITCH	A
27	3013926	•	•	DISPLAY	
28	3013940	•	•	CONNECTORS	
29	3003794	•	•	ELECTRODE CONNECTOR	A
30	3003846	•		FERRULE	
30	3003845	•		FERRULE	
31	3003854	•	•	ELBOW	
32	3013129	•	•	EXTERIOR TUBE	
33	3003857	•		INTERIOR TUBE	
33	3003859	•		INTERIOR TUBE	
34	3012081	•		GAS HEAD	
34	3012082	•		GAS HEAD	
35	3012997	•		DISC	A
35	3012998	•		DISC	A
36	3003865	•		TUBE	
36	3003866	•		TUBE	
37	20026794	•	•	PILOT CONNECTOR UNIT	
38	3013136	•	•	ELECTRODE	A
39	20027450	•	•	U BOLT	

N.	CODE			DESCRIPTION	*
		C9321400	20104515		
40	3013002	•	•	SUPPORT	
41	3007088	•	•	SEAL	C
42	3003863	•	•	PLUG	
43	20019263	•	•	HUB	
44	20027030	•	•	AIR DAMPER ASSEMBLY	C
45	3003873	•	•	TEST POINT	
46	3003797	•	•	CONTROL DEVICE	
47	3003798	•	•	FRONT PIECE	
48	3003799	•		SQUARE	
48	3003801	•		SQUARE	
49	3003805	•	•	SHUTTER	C
50	3003807	•		END CONE	C
50	3003809	•		END CONE	C
51	20091984	•	•	SPACER	
52	3003893	•	•	TEST POINT	
53	3006211	•	•	FUSE	A
54	20026791	•	•	SUPPORT	
55	20027033	•	•	MANIFOLD	
56	3003396	•	•	FLAME SENSOR	A
57	3005483	•	•	SEAL	C
58	3013004	•	•	FLANGE AND ELBOW	
59	3012841	•	•	BASE RELAY	C
60	20014366	•	•	FUSE HOLDER	A
61	20010969	•	•	RELAY	C
62	3020071	•	•	BASE RELAY	C
63	3020068	•	•	RELAY	C
64	3003764	•	•	EXTENTION	
65	3003203	•	•	PISTON SEAL	
66	20026793	•	•	CONNECTOR	C
67	20031413	•	•	HORN	
68	20096592	•	•	RWF 55	B

## ★

## 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**

- **Kit for LPG operation**

The kit allows the burner to operate on LPG.

Burner	MBtu/hr	Code
RS 28/E	358 - 1232	3010270
RS 38/E	437 - 1665	3010271

- **Gas train according to UL Standards**



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:	_____

**GAS OPERATION**

Gas Supply Pressure:	_____	CO <sub>2</sub> : Low Fire	_____	High Fire	_____
Main Power Supply:	_____	O <sub>2</sub> : Low Fire	_____	High Fire	_____
Control Power Supply:	_____	CO: Low Fire	_____	High Fire	_____
Burner Firing Rate:	_____	NO <sub>x</sub> : 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**

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