

GB Forced draught gas burners

Progressive two-stage operation

**UK
CA**

CODE	MODEL
20190310	RS 34 MZ
20190311	RS 44 MZ



Original instructions

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1 Information and general warnings

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 Centre 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.



ATTENTION

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 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 date of installation, 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.



ATTENTION

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;
- continuation of use of the burner when a fault has occurred;
- 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;
- 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 safety rules 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.

Specifically:

it can be applied to boilers operating with water, steam, diathermic oil, and to other uses 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 ambient 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.



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

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:



- 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 Burner designation

Series: R									
Fuel:		S	Natural gas						
		L	Light oil						
		LS	Light oil / Natural gas						
		N	Heavy oil						
Size									
Adjustment:		E	Electronic cam						
		EV	Electronic cam and variable speed (with Inverter)						
		M	Mechanical cam						
		P	Proportional air/gas valve						
Emission:		...	Class 1 EN676						
		MZ	Class 2 EN676						
		BLU	Class 3 EN676						
		MX	Class 3 EN676						
Head:		TC	Standard head						
		TL	Extended head						
Flame control system:									
		FS1	Standard (1 stop every 24 h)						
		FS2	Continuous operation only with the use of a flame detection electrode (ionisation)						
Electrical supply of the system:									
		1/230/50	1 / 230V / 50Hz						
		3/400/50	3N / 400V / 50Hz						
		3/230/50	3 / 230V / 50Hz						
		3/400-230/50	3N / 400V-230V / 50Hz						
Voltage of auxiliaries:									
		230/50/60	230V / 50Hz						
		110/50/60	110V / 50-60Hz						
R	S	34		MZ	TC	FS1	1/230/50-60	230/50-60	
BASIC DESIGNATION									
EXTENDED DESIGNATION									

3.2 Models available

Designation		Power supply voltage	Start-up	Code
RS 34 MZ	TC	1N ~ 230V - 50-60Hz	Direct	20190310
RS 44 MZ	TC	1N ~ 230V - 50-60Hz	Direct	20190311

Tab. A

3.3 Technical data

Model			RS 34 MZ	RS 44 MZ		
Output ⁽¹⁾			G20 - G25	G20 - G25		
			Max.	kW	130 ÷ 390	200 ÷ 550
				Mcal/h	112 ÷ 336	172 ÷ 473
			Min.	kW	45	80
Mcal/h	39	69				
Fuel			Natural gas: G20 - G25			
Pressione gas alla potenza max. ⁽²⁾ Gas: G20 / G25		mbar	15.5 / 21.9	29.9 / 28.9		
Operation			- Intermittent (min. 1 stop in 24 hours). - Two-stage (high and low flame) and one-stage all - nothing).			
Standard applications			Boilers: water, steam, diathermic oil			
Ambient temperature		°C	0 - 40			
Combustion air temperature		°C max	60			
Noise levels ⁽³⁾	Sound pressure	dB(A)	68	70		
	Sound power		79	81		

Tab. B

- (1) Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m a.s.l.
(2) Pressure at the test point of the pressure switch (Fig. 26 on page 24) with zero pressure in the combustion chamber and at maximum burner output.
(3) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum output. The sound power is measured using the "Free Field" method, required by EN 15036 standard, and according to an "Accuracy: Category 3" measurement, as described in EN ISO 3746.

3.4 Electrical data

Model			RS 34 MZ	RS 44 MZ
Main electrical supply			230V ~ +/-10% 50/60Hz single phase	
Fan motor	rpm		2800	2800
	V		230	230
	W		300	420
Operating current	A		2.4	2.6
Motor capacitor	µF		12.5/260	12.5/420
Ignition transformer	V1 - V2		220/240 V - 1 x 15 kV 45VA - 25 mA	
	I1 - I2			
Absorbed electrical power	W max		720	820
Protection level			IP 40	

Tab. C

3.5 Maximum dimensions

The dimensions of the burner are given in Fig. 1.
Bear in mind that inspection of the combustion head requires the burner to be opened and the rear part drawn back on the slide bars.
The dimensions of the open burner are indicated by dimension U.

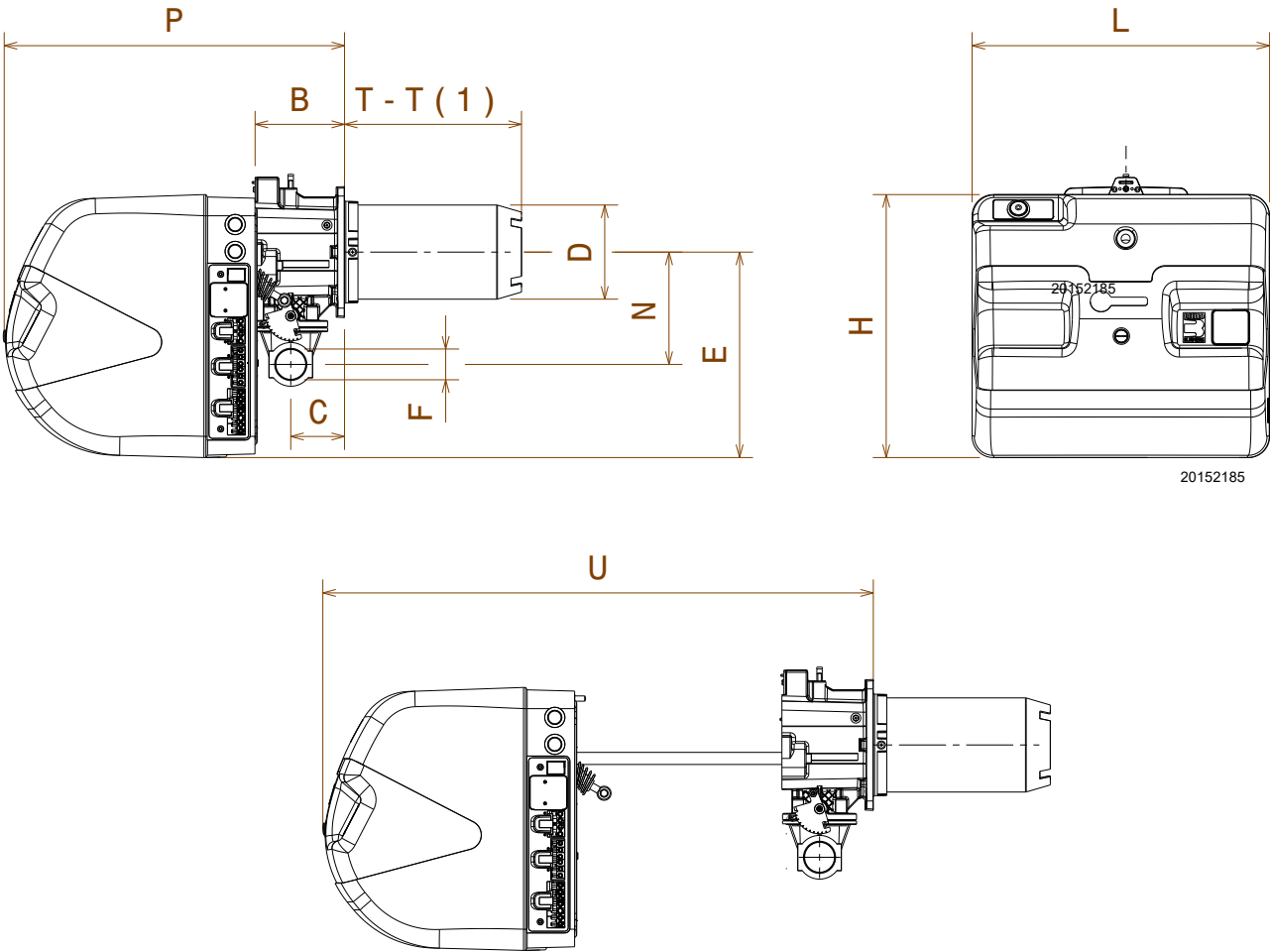


Fig. 1

mm	B	C	D	E	F	H	L	N	P	T - T (1)	U
RS 34 MZ	138	80	140	305	1"1/2	422	444	167	508	220 - 355	827
RS 44 MZ	138	80	152	305	1"1/2	422	444	167	508	220 - 355	827

Tab. D

3.6 Firing rates

The **maximum output** is chosen within area A.

The **minimum output** must not be lower than the minimum limit of the diagram:

RS 34 MZ = 45 kW

RS 44 MZ = 80 kW



ATTENTION

The firing rate value (Fig. 2) has been obtained considering an ambient temperature of 20 °C, an atmospheric pressure of 1013 mbar (approx. 0 m a.s.l.), and with the combustion head adjusted as shown on page 18.

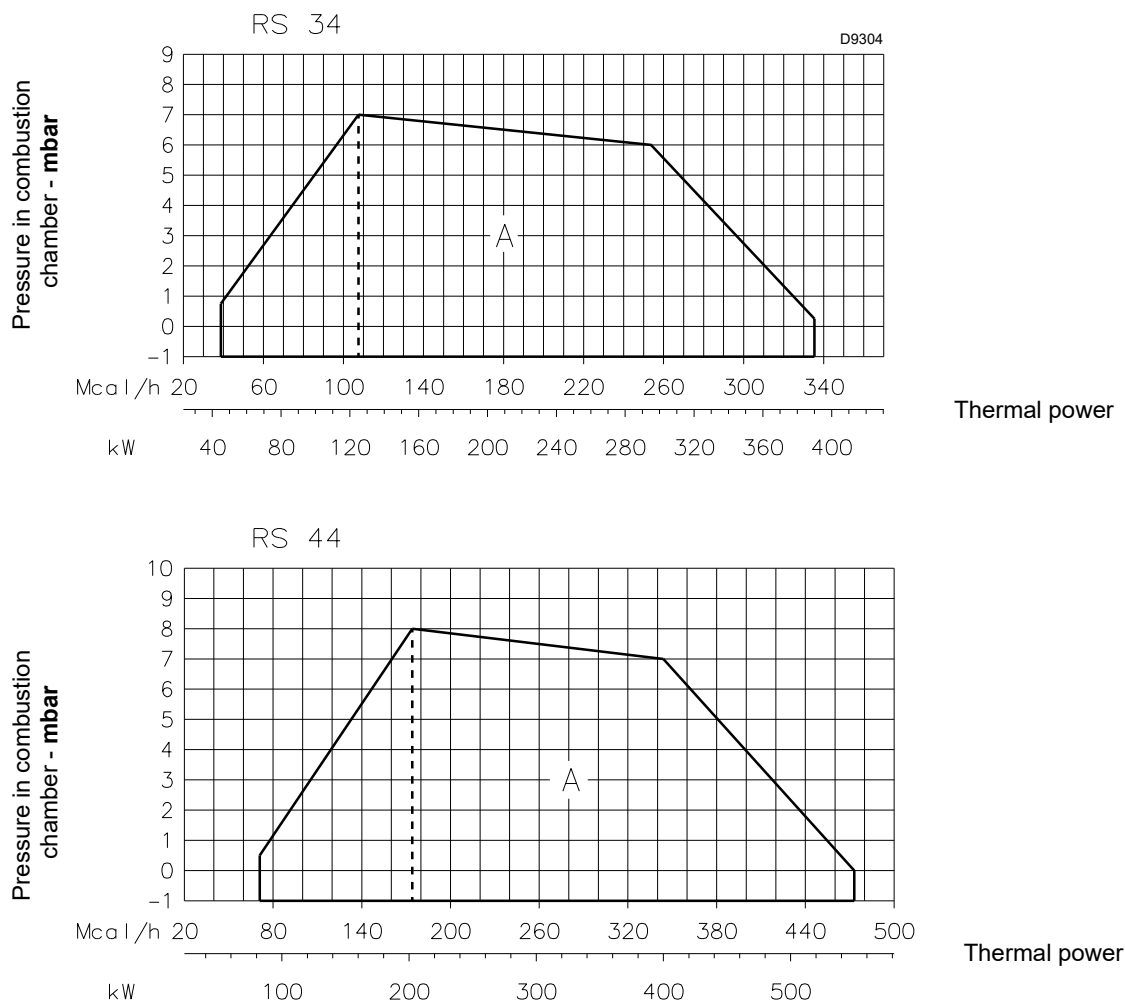


Fig. 2

3.7 Test boiler

The firing rates were obtained in special test boilers, according to EN 676 regulations.
In Fig. 3 you can see the diameter and length of the test combustion chamber.

Example:
Output 407 kW (350 Mcal/h) - diameter 50 cm, length 1.5 m.

Although combination is guaranteed when boiler has a CE type-approval, preliminary tests are recommended for boilers or furnaces having a combustion chamber size much different than the one specified in Fig. 3.

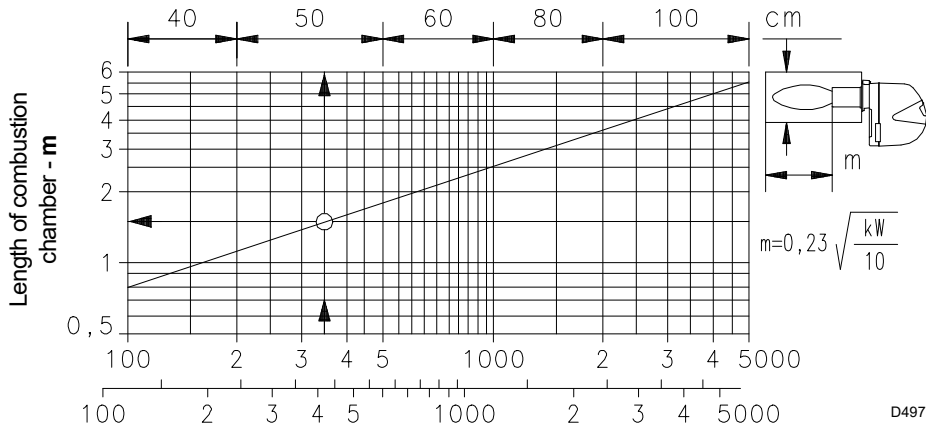


Fig. 3

3.8 Burner equipment

- The burner is supplied complete with:
- Gas train flange No. 1
 - Gasket for gas train flange No. 1
 - Flange fixing screws M8 x 25 No. 4
 - Screws to fix the burner flange to the boiler M8 x 25 flange to the boiler No. 4
 - Thermal flange gasket No. 1
 - Plugs for the electrical wiring No. 3
 - Instructions No. 1
 - Spare parts list No. 1

3.9 Burner description

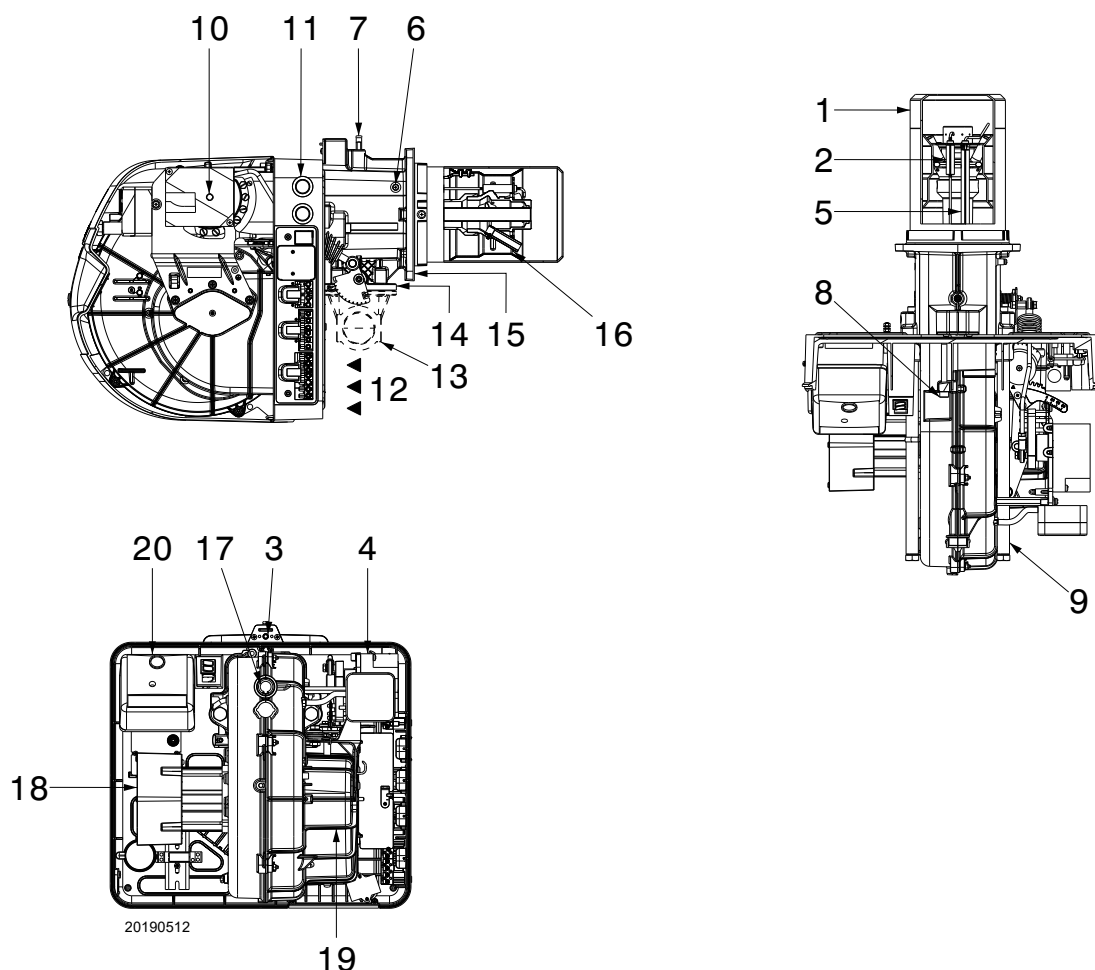


Fig. 4

- 1 Combustion head
- 2 Ignition electrode
- 3 Screw for combustion head adjustment
- 4 Air pressure switch (differential type)
- 5 Flame sensor probe
- 6 Air pressure test point
- 7 Gas pressure test point and head fixing screw
- 8 Screws to secure fan to pipe coupling
- 9 Slide bars for opening the burner and inspecting the combustion head
- 10 The servomotor controls the gas butterfly valve and the air damper through the variable profile cam mechanism.
When the burner is not operating the air damper is fully closed in order to reduce heat dispersion from the boiler due to the flue draught, which draws air from the fan suction inlet
- 11 Areas for passage of electric cables
- 12 Air inlet to fan
- 13 Gas input pipe
- 14 Gas butterfly valve
- 15 Boiler fixing flange
- 16 Flame stability disc
- 17 Flame inspection window
- 18 Fan motor
- 19 Air damper
- 20 Control box

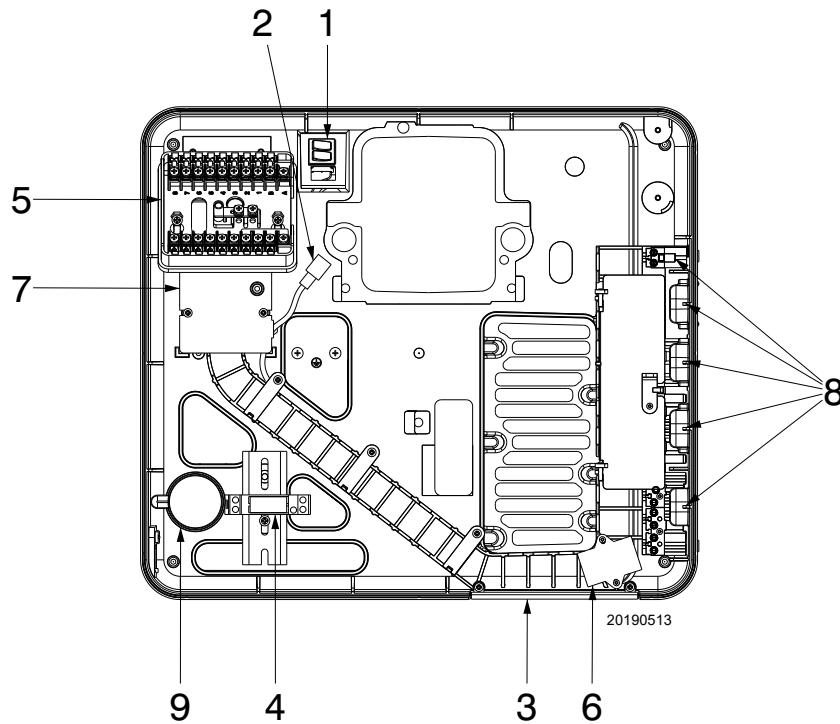
NOTE:

Burner lockout may occur

CONTROL BOX LOCKOUT:

if the control box button lights up, it indicates that the burner is in lockout.

Press the push-button to reset.

3.10 Electrical panel description

Fig. 5

- 1 Two switches:
- one "burner off - on"
- one for "1st - 2nd stage operation"
- 2 Ionisation probe connector
- 3 Areas for passage of electric cables
- 4 Relay
- 5 Control box base
- 6 Filter to protect against radio disturbance
- 7 Ignition transformer
- 8 Sockets for electrical connection
- 9 Capacitor (only for RS 34 MZ)

3.11 Control box RMG88...

Important notes



ATTENTION

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

The control box RMG88... is a safety device! Avoid opening or modifying it, or forcing its operation. Riello S.p.A. cannot assume any responsibility for damage resulting from unauthorised interventions!

- All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- Before modifying the wiring in the control box connection area, fully disconnect the system from the power supply (omnipolar separation). Check the system is not powered and cannot be accidentally reconnected. Failure to do this will lead to the risk of electrocution.
- Protection against electrocution from the control box and all connected electric components is obtained with the correct assembly.
- Before any intervention (assembly and installation operations, assistance, etc.), ensure the wiring is in order and that the parameters are correctly set, then make the safety checks.
- Falls and collisions can negatively affect the safety functions.
In this case, the control box must not be operated, even if it displays no evident damage.
- Press the reset button of the burner lockout command or the reset button (by applying a force of not more than 10 N), without the aid of tools or sharp objects.

For the safety and reliability of the control box, comply with the following instructions:

- avoid conditions that can favour the development of condensate and humidity. Otherwise, before switching on again, make sure that the entire control box is perfectly dry!
- Static charges must be avoided since they can damage the control box's electronic components when touched.



S8906

Fig. 6

Technical data

Mains voltage	AC 220...240 V +10 % / -15 %
Mains frequency	50 / 60 Hz ±6%
Power absorption	20 VA
Protection level	IP20
Safety class	I
Weight	approx. 260g
Cable length	
Thermostat cable	Max. 20 m at 100 pF/m
Air pressure switch	Max. 1 m at 100 pF/m
Gas pressure switch	Max. 20 m at 100 pF/m
Remote reset	Max. 20 m at 100 pF/m
CPI	Max. 1 m at 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.

Mechanical structure

The control box is made of plastic to resist knocks, heat and flame propagation.

The control box contains the following components:

- a microprocessor that controls the program sequence, and a relay for controlling the load;
- an electronic flame signal amplifier;
- a built-in reset button with 3 signalling colours (LED) for status and error messages.

3.12 Servomotor (SQN90...)

Important notes

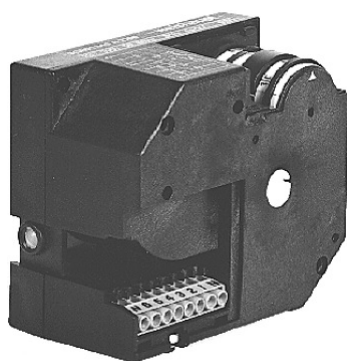


ATTENTION

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

Avoid opening, modifying or forcing the servomotor.

- All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- Falls and collisions can negatively affect the safety functions. In this case, the servomotor must not be operated, even if it displays no evident damage.
- Fully disconnect the burner from the mains when working near terminals and servomotor connections.
- Condensation and exposure to water are not allowed.
- For safety reasons, the servomotor must be checked after long periods of non-use.



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Fig. 7

Technical data

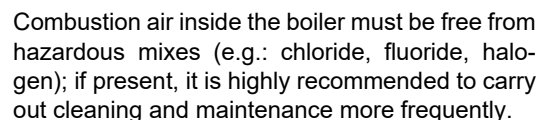
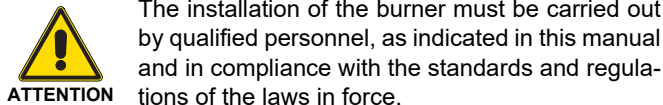
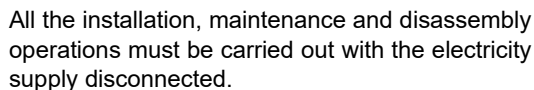
Mains voltage	AC 220V-15%...AC 240V+10% AC 100V-15%...AC110V+10%
Mains frequency	50 / 60 Hz +/- 6%
Power absorption	8 VA
Motor	Synchronous
Drive angle	up to 90°
Cable connection	terminal board for 0.5 mm ² (min.) and 2.5 mm ² (max)
Rotation direction	Anticlockwise
Operation time	12 s. at 90°
Weight	approx. 0.55 kg
Breakdown voltage	24...250V AC
Safety class	II to DIN EN 60730
Environmental conditions:	
Storage	DIN EN 60721-3-1
Climatic conditions	Class 1K3
Mechanical conditions	Class 1M2
Temperature	-20...+60°C
Humidity	< 95 % RH

Tab. E

4

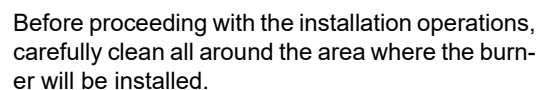
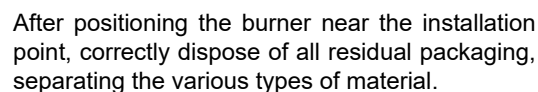
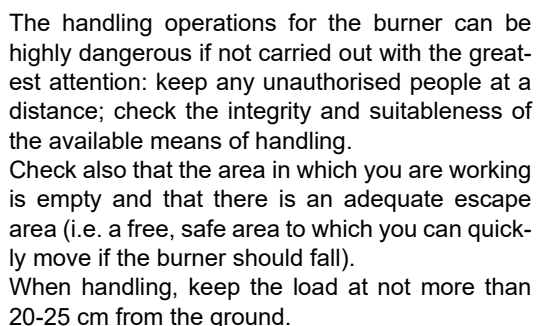
4.1

After carefully cleaning all around the area where the burner is to be installed, and arranging for the environment to be illuminated correctly, proceed with the installation operations.



4.2

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.



4.3

Chemical

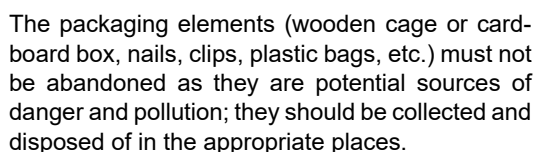
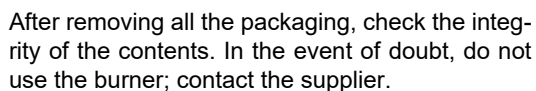
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Fig. 8

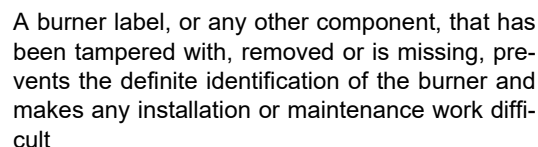
Chem

Check the identification label of the burner (Fig. 8), 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 possible minimum and maximum output (see Firing rate).

Warning: The burner output must be within the boiler's firing rate;

- the category of the appliance/countries of destination.



4.4 Operating position



ATTENTION

- The burner is designed to operate only in positions 1, 2, 3 and 4 (Fig. 9).
- 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 allow operation but make maintenance and inspection of the combustion head more difficult.



DANGER

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

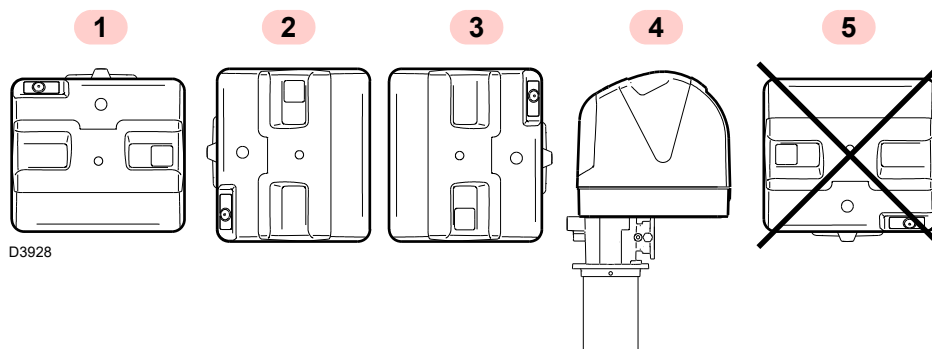


Fig. 9

4.5 Preparing the boiler

4.5.1 Boring the boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 10. The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

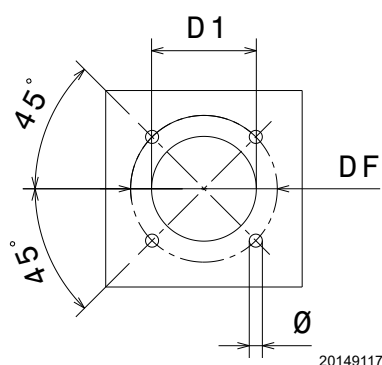


Fig. 10

mm	D1	DF	Ø
RS 34-44 MZ	160	224	M 8

4.5.2 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.

The range of available lengths L, are as follows:

Blast tube	Short (mm)	Long (mm)
RS 34 MZ	216	351
RS 44 MZ	216	351

For boilers with front flue passes 13)(Fig. 11), a protection in refractory material 11) must be inserted between the boiler refractory 12) and the blast tube 10).

This protection must not compromise the extraction of the blast tube.

For boilers with a water-cooled front piece, a refractory lining 11)-12)(Fig. 11) is not necessary, unless expressly requested by the boiler manufacturer.

4.5.3 Securing the burner to the boiler

Before securing the burner to the boiler, check (through the opening of the blast tube) that the probe and electrode are correctly positioned, as in Fig. 13 on page 17.



Provide an adequate lifting system.

- Separate the combustion head from the rest of the burner (Fig. 11):
- disengage the articulated coupling 4) from the graduated sector 5);
- remove screws 2) from the two slide bars 3);
- remove screw 1) and pull the burner back on slide bars 5) by about 100 mm.

Disconnect the probe and electrode cables, then completely unthread the burner from the slide bars.

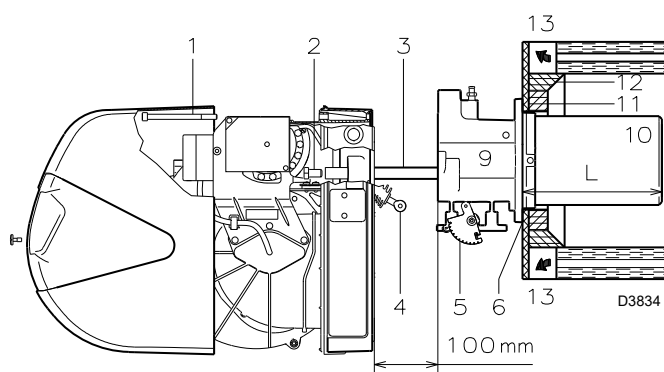


Fig. 11

Fix the unit 9)(Fig. 11) to the boiler plate, inserting the supplied insulating gasket 6)(Fig. 11). Use the 4 screws, also supplied, after protecting their thread with an anti-locking product.

4.6 Access to head internal part

In order to reach inside the combustion head (Fig. 12) proceed as follows:

- remove the screw 1) and the internal part 2).



The burner-boiler seal must be hermetic; after burner start-up check there is no leakage of flue gases into the external environment.

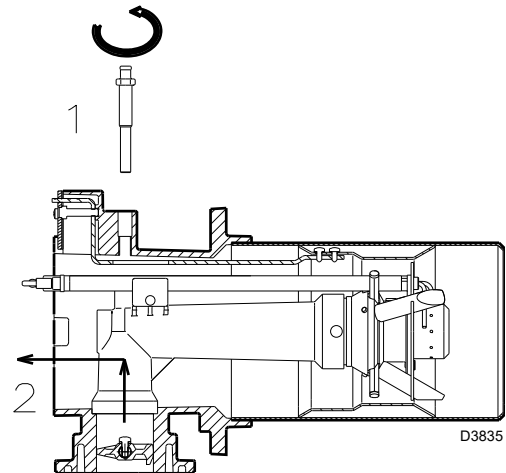


Fig. 12

4.7 Positioning the probe - electrode



Before securing the burner to the boiler, check (through the opening of the blast tube) that the probe and electrode are correctly positioned, as in Fig. 13.

If the probe or electrode is not correctly positioned, you must:

- remove the screw 1)(Fig. 12)
- take out the inner part 2)(Fig. 12) of the head and then calibrate them.



Do not rotate the probe but leave it as in Fig. 13; if it is too close to the ignition electrode, it could damage the control box amplifier.



Respect the dimensions shown in Fig. 13.

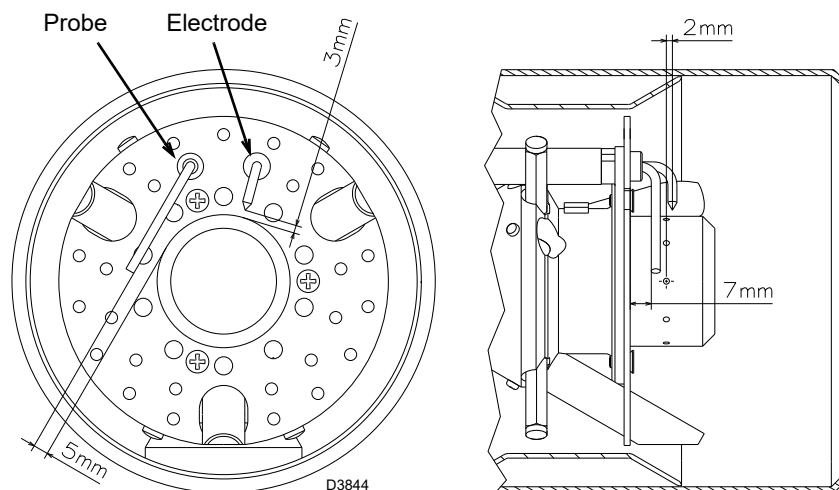


Fig. 13

4.8 Combustion head adjustment

Installation operations are now at the stage where the blast tube and sleeve are secured to the boiler as shown in Fig. 14. It is therefore particularly easy to adjust the combustion head.

Air adjustment

Rotate the screw 1)(Fig. 14) until the notch on the lamina 2)(Fig. 14) corresponds with the surface of the plate 3)(Fig. 14).

Example:

RS 44 MZ burner, output = 300 kW.

From diagram (Fig. 15) you can see that, for the MAX output of 300 kW, the air should be adjusted at notch 3, subtracted from the value of the pressure in the chamber.

In this case, the loss of pressure in the combustion head is shown in paragraph "Gas pressure" on page 20.

NOTE:

If the pressure in the chamber is equal to 0 mbar, the air is adjusted with reference to the broken line of the diagram (Fig. 15).

Central air adjustment

- In case the application needs a particular setup, it is possible to modify the central air delivery using the ring nut 4)(Fig. 14) up to the notch indicated in diagram (Fig. 16).
- In order to carry out this operation, unscrew the screws 5)(Fig. 14) and lift up the ring nut 4)(Fig. 14).
- At the end, tighten the screws 5)(Fig. 14) again.
- Once you have finished adjusting the head, reassemble the burner 4)(Fig. 17) on the guides 3)(Fig. 17) at about 100mm from the pipe coupling 5)(Fig. 17) - burner in the position shown in Fig. 11 on page 16 - insert the cable of the probe and the cable of the electrode, then slide the burner as far as the pipe coupling, burner in the position shown in Fig. 17.
- Refit screws 2) on slide bars 3).
- Fix the burner to the pipe coupling with the screw 1).



ATTENTION

When fitting the burner on the two guides, it is advisable to gently draw out the high voltage cable and flame detection probe cable until they are slightly taut.

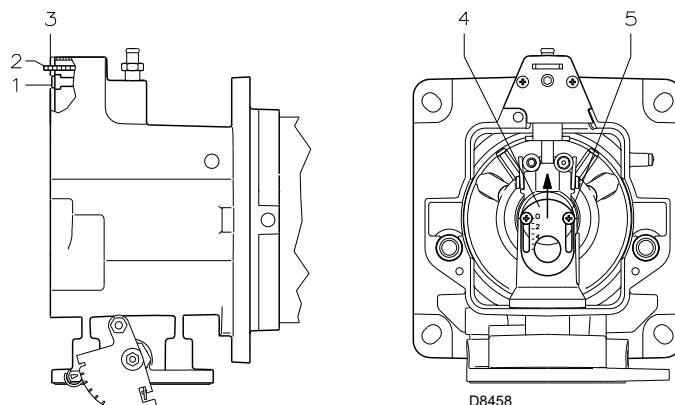


Fig. 14

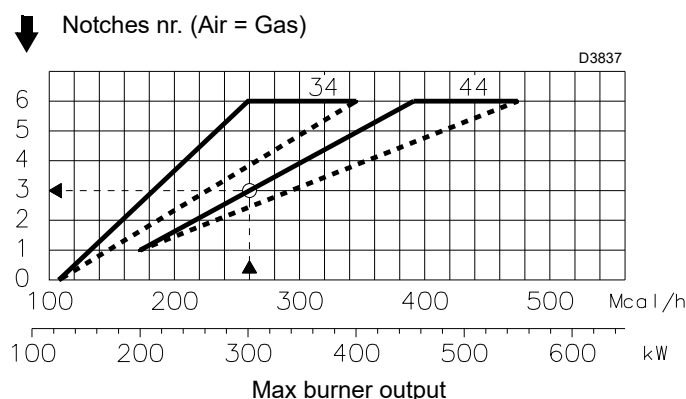


Fig. 15

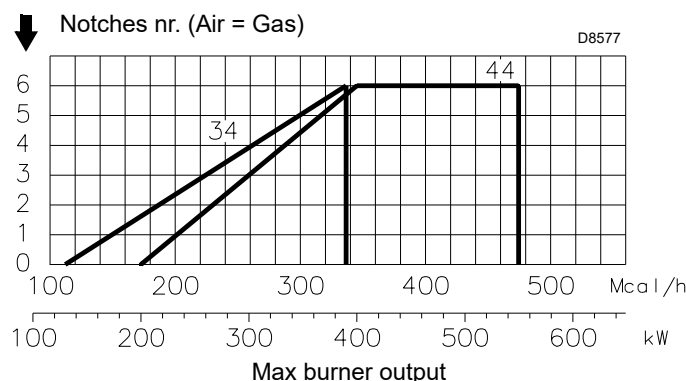


Fig. 16

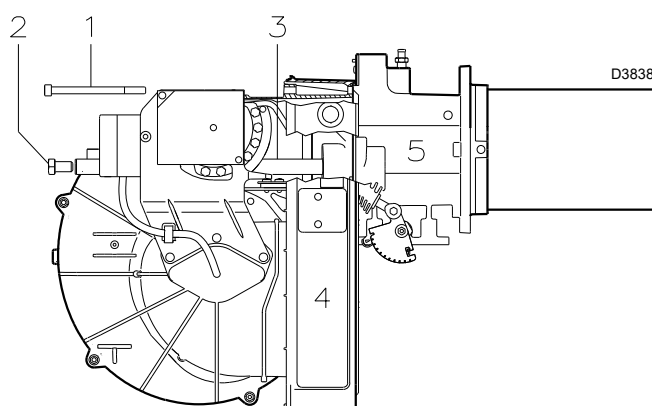


Fig. 17

4.9 Gas supply



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

Precautions: avoid knocking, attrition, sparks and heat.

Make sure the fuel shut-off valve is closed before performing any operation on the burner.



ATTENTION

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

4.9.1 Gas feeding line

Key (Fig. 18 - Fig. 19 - Fig. 20 - Fig. 21)

- 1 Gas input pipe
- 2 Manual valve
- 3 Vibration damping joint
- 4 Pressure gauge with button cock
- 5 Filter
- 6A Includes:
 - filter
 - working valve
 - safety valve
 - pressure adjuster
- 6C Includes:
 - safety valve
 - working valve
- 6D Includes:
 - safety valve
 - working valve
 - pressure adjuster
 - filter
- 7 Minimum gas pressure switch
- 8 Leak detection control, supplied as an accessory or built-in, based on the gas train code. In compliance with the EN 676 standard, gas valve leak detection control devices are compulsory for burners with maximum outputs over 1200 kW.
- 9 Gasket, for “flanged” versions only
- 10 Pressure adjuster
- 11 Train-burner adaptor, supplied separately
- P2 Pressure upstream of valves/adjuster
- P3 Pressure upstream of the filter
- L Gas train, supplied separately
- L1 Responsibility of the installer

MB

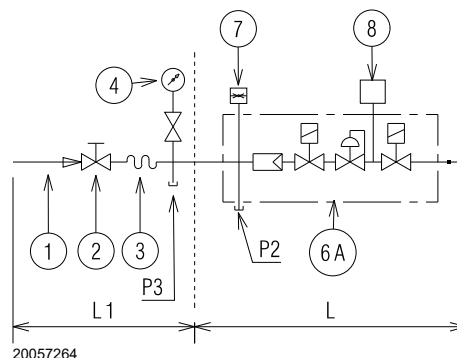


Fig. 18

MBC - VGD

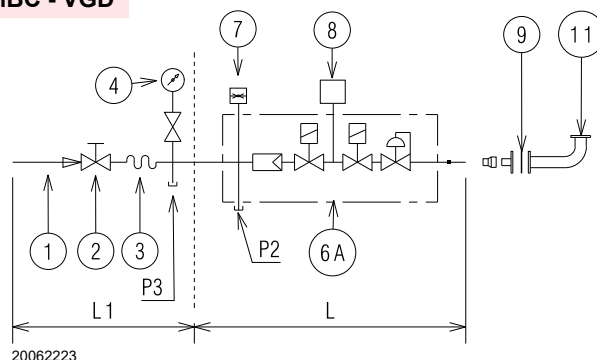


Fig. 19

DMV

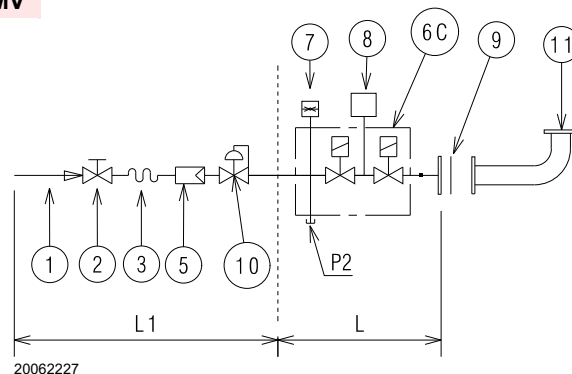


Fig. 20

CB

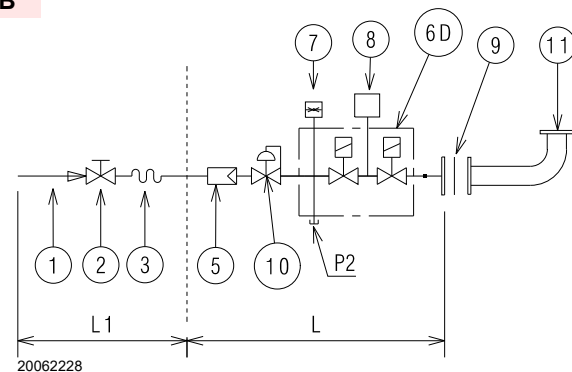


Fig. 21

4.9.2 Gas train

Type-approved in accordance with EN 676 and supplied separately from the burner.

4.9.3 Gas train installation



Disconnect the power supply using the system main switch.



Check that there are no gas leaks.



Pay attention when handling the train: danger of crushing of limbs.



Make sure that the gas train is properly installed by checking for any fuel leaks.



The operator must use the required equipment during installation.

The train can enter the burner from the right or left side, depending on which is the most convenient, see Fig. 22.

The gas train must be connected to the gas connection 1)(Fig. 22), using the flange 2), seal 3) and screws 4) supplied with the burner.

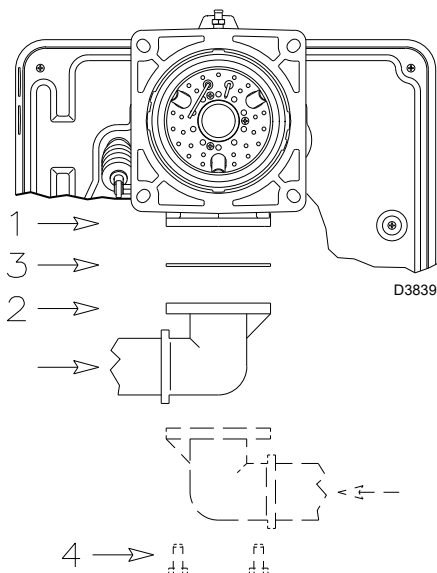


Fig. 22



The gas solenoids must be as close as possible to the burner to ensure that the gas reaches the combustion head within the safety time of 3s.

Make sure that the maximum pressure necessary for the burner is within the calibration range of the pressure regulator.

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

4.9.4 Gas pressure

Tab. F indicates the pressure drops of the combustion head and gas butterfly valve depending on the burner operating output.

	kW	1 Δp (mbar)	2 Δp (mbar)
		G 20	G 20
RS 34 MZ	130	1.5	0.1
	140	2.0	0.1
	160	2.9	0.1
	180	3.8	0.2
	200	4.6	0.2
	220	5.5	0.3
	240	6.4	0.3
	260	7.3	0.4
	280	8.2	0.4
	300	9.1	0.5
	320	10.0	0.5
	340	10.9	0.6
RS 44 MZ	360	11.8	0.7
	380	12.7	0.8
	390	15.5	0.8
	200	3.0	0.2
	225	4.0	0.3
	250	4.9	0.3
	275	5.9	0.4
	300	6.9	0.5
	325	7.9	0.6
	350	8.9	0.6
	375	9.8	0.7
	400	10.8	0.8
	425	11.8	1.0
	450	12.8	1.1
	475	13.8	1.2
	500	14.7	1.3
	525	15.7	1.5
	550	29.9	1.6

Tab. F



Data of head thermal power and gas pressure refer to operation with gas butterfly valve fully open (90°).

The values shown in refer to:

- Natural gas G 20 NCV 9.45 kWh/Sm³ (8.2 Mcal/Sm³)
- Natural gas G 25 NCV 8.13 kWh/Sm³ (7.0 Mcal/Sm³)

Column 1

Combustion head pressure drop.

Gas pressure measured at test point 1)(Fig. 23), with:

- combustion chamber at 0 mbar
- burner working at maximum output

Column 2

Pressure drop at gas butterfly valve 2)(Fig. 23) with maximum opening: 90°.

To calculate the approximate output at which the burner operates:

- subtract the combustion chamber pressure from the gas pressure measured at test point 1)(Fig. 23).
- Find, in the Tab. F relating to the burner concerned, column 1, the pressure value closest to the result you want.
- Read the corresponding output on the left.

Example with natural gas G 20 for RS 34 MZ:

Maximum output operation

Gas pressure at test point 1)(Fig. 23)	=	9.3 mbar
Pressure in combustion chamber	=	2.0 mbar
$9.3 - 2.0$	=	7.3 mbar

A pressure of 7.3 mbar, column 1, corresponds in the table to an output of 260 kW.

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

To calculate the required gas pressure at test point 1)(Fig. 23), set the maximum modulating output required from the burner operation:

- find the nearest output value in Tab. F for the burner in question.
- Read, on the right (column 1), the pressure at the test point 1)(Fig. 23).
- Add this value to the estimated pressure in combustion chamber.

Example with natural gas G 20 for RS 34 MZ:

Operating at the desired maximum output: 260 kW

Gas pressure at an output of 260 kW	=	7.3 mbar
Pressure in combustion chamber	=	2.0 mbar
$7.3 + 2.0$	=	9.3 mbar

pressure required at test point 1)(Fig. 23).

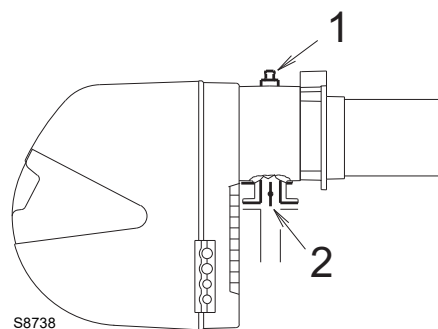


Fig. 23

4.10 Electrical connections

Notes on safety for the electrical wiring



- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be made in accordance with the regulations currently in force in the country of destination and by qualified personnel. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- The burner has been type-approved for intermittent use.
This means they should compulsorily be stopped at least once every 24 hours to enable the control box to perform checks of its own start-up efficiency. Normally, burner stopping is guaranteed by the boiler's thermostat/pressure switch.
- If this is not the case, a time switch should be fitted in series to TL to stop the burner at least once every 24 hours. Refer to the wiring diagrams.
- 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 power absorption of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for that level of power absorption.
- For the main power supply of the device from the electricity mains:
 - do not use adapters, multiple sockets or extensions;
 - use a multiple pole switch with at least a 3 mm gap between the contacts (overvoltage category III), as envisaged by the present 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:



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



Close the fuel interception tap.



Avoid condensate, ice and water leaks from forming.

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

Use flexible cables in compliance with the EN 60 335-1 standard.

4.10.1 Supply cables and external connections passage

All cables to connect to the burner are connected to the appropriate sockets on the side of the burner (Fig. 24), (use the supplied plugs for the connections).

The use of the cable grommets can take various forms.

By way of example we indicate the following mode:

RS 34-44 MZ single phase

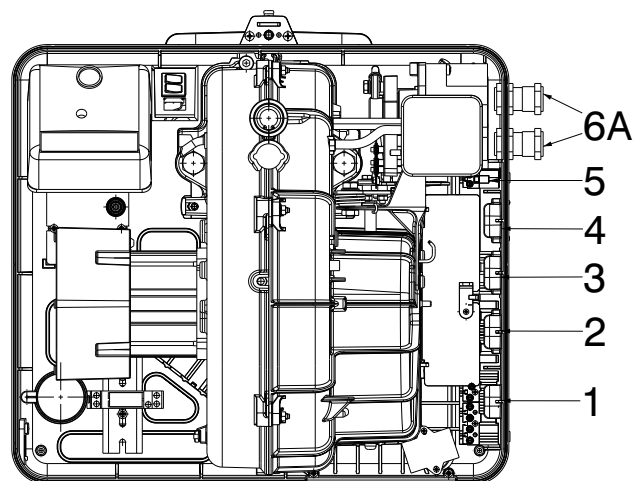
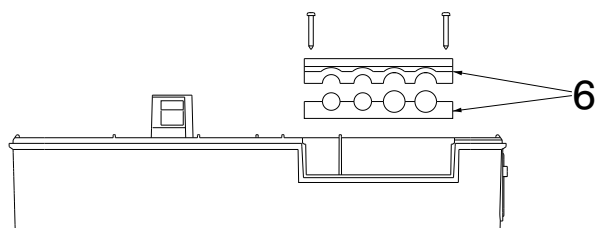
- 1 7-pole socket for single phase power supply, TL thermostat/pressure switch
- 2 6-pole socket for gas valves, gas pressure switch or the valve leak detection device
- 3 4-pole socket for TR thermostat/pressure switch (with removable cover)
- 4 5-pole socket not used
- 5 2-pole socket for maximum gas pressure switch accessory
- 6-6A Set-up for pipe unions (drill if 6A pipe unions are required)



The socket cover 3)(Fig. 24) must only be removed when the 4-pole socket is in use.

When the 4-pole socket is not in use the cover must be in place.

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



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Fig. 24



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

4.11 Motor rotation

As soon as the burner starts, place yourself in front of the cooling fan of the fan motor and check that it turns anticlockwise.

If this is not the case:

- put the switch of the burner to "0" (off) and wait until the control box carries out the switching off phase.



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

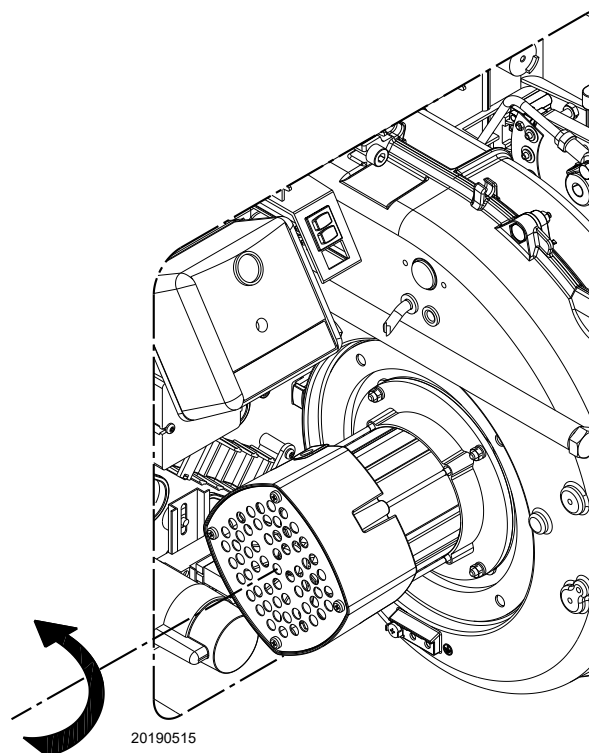


Fig. 25

5 Start-up, calibration and operation of the burner

5.1 Notes on safety for the first start-up



ATTENTION

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.



ATTENTION

Before starting up the burner, refer to section "Safety test - with no gas supply" on page 30.



ATTENTION

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

5.2 Adjustments prior to ignition

The following adjustments must be carried out:

- open the manual valves upstream of the gas train.
- Adjust the minimum gas pressure switch to the start of the scale (Fig. 32 on page 27).
- Adjust the air pressure switch to the start of the scale (Fig. 31 on page 27).
- Purge the air from the gas line.
We recommend using a plastic tube routed outside the building and to purge air until gas is smelt.
- Assemble a pressure gauge (Fig. 26) on the gas pressure test point of the pipe coupling.
The manometer readings are used to calculate MAX burner output using the .
- Connect two lamps or testers parallel to the two gas line solenoid valves VR and VS in order to check the exact moment at which voltage is supplied.
This operation is not required 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.



Excessive gas pressure can damage the components of the gas train and lead to a risk of explosion.

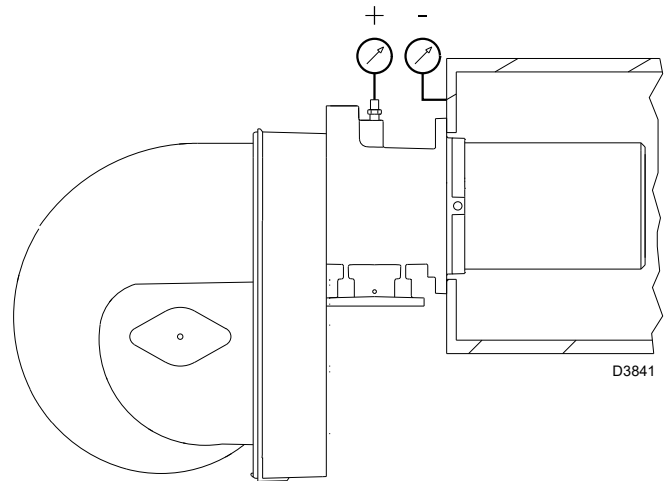


Fig. 26

5.3 Servomotor adjustment

The servomotor provides simultaneous adjustment of the air damper, by means of the variable profile cam and the gas butterfly valve.

The angle of rotation of the servomotor is equal to the angle on the graduated sector controlling the gas butterfly valve.

The servomotor rotates by 90° in 12 seconds.

Do not alter the factory setting for the 4 cams; just check that they are as specified below:



ATTENTION

Do not alter the factory setting for the 4 cams; just check that they are as specified below:

- Cam St2:** 90°. Limits rotation toward maximum position. When the burner is in 2nd stage operation the gas butterfly valve must be fully open: 90°.
- Cam St0:** 0°. Limits rotation toward the minimum position. When the burner is shut down the air gate valve and the gas butterfly valve must be closed: 0°.
- Cam St1:** 15°. Adjusts the ignition position and the output in 1st stage operation.
- Cam MV:** Not used.



Fig. 27

5.4 Burner start-up

Close the remote controls and set:

- switch 1)(Fig. 28) to "Burner ON" position
- switch 2)(Fig. 28) to "1st STAGE" position.

As soon as the burner starts check the direction of rotation of the fan blade, looking through the flame inspection window 17)(Fig. 4 on page 11).

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

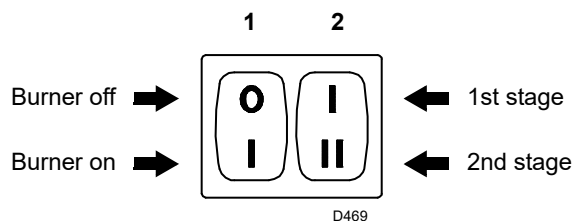


Fig. 28

5.5 Burner ignition

Having completed the checks indicated in the previous heading, the burner should ignite.

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

If firing 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 delivery during firing.

The arrival of gas at the pipe coupling is indicated by the U-type manometer (Fig. 26).

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

5.6 Adjusting the burner

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

Adjust in sequence:

- 1 2nd stage burner output
- 2 1st stage burner output
- 3 Intermediate outputs
- 4 Air pressure switch
- 5 Minimum gas pressure switch

Vg volume supplied in ignitions carried out (Sm³)

Qa ignition delivery (Sm³/h)

n number of ignitions (10)

ts safety time (sec)

Example for gas G20 (9.45 kWh/Sm³):

ignition output 150 kW corresponding to 15.87 Sm³/h.

After 10 ignitions with a lockout, the delivery indicated on the meter must be equal to or lower than:

$$V_g = \frac{15.87 \times 10 \times 3}{3600} = 0.132 \text{ Sm}^3$$

5.6.1 Ignition output

According to EN 676.

Burners with MAX output up to 120 kW

Ignition can occur at the maximum operation output level.

Example:

- max. operation output: 120 kW
- max. ignition output: 120 kW

Burners with MAX output above 120 kW

Ignition must occur at a lower output than the max. operation output.

If ignition output does not exceed 120 kW, no calculations are required.

If ignition output exceeds 120 kW, the regulatory standard sets that the value is to be defined according to the control box safety time "ts":

for ts = 3 s ignition output must be equal to or less than 1/3 of the maximum operation output.

Example:

MAX operation output of 450 kW.

The ignition output must be equal to or less than 150 kW with ts = 3s

In order to measure the ignition output:

- disconnect the plug-socket on the ionisation probe cable (the burner will fire and then go into lockout after the safety time has elapsed);
- perform 10 consecutive ignitions with lockouts;
- read the quantity of burned gas on the meter: this quantity must be equal to, or lower than, the quantity given by the formula, for ts = 3 s:

$$V_g = \frac{Q_a \text{ (max. burner delivery)} \times n \times ts}{3600}$$

5.6.2 2nd stage burner output

2nd stage output of the burner must be set within the firing rate Fig. 2 on page 9.

In the above instructions we left the burner running in 1st stage operation. Now set switch 2)(Fig. 28) to the 2nd stage position: the servomotor will open, simultaneously, the air damper and the gas butterfly valve to 90°.

Adjustment of gas delivery

Measure the delivery of gas from the gas meter.

A guideline indication can be calculated from the Tab. F on page 20, simply read off the gas pressure on the manometer Fig. 26 on page 24, and follow the "Gas pressure" on page 20.

- If delivery needs to be reduced, diminish outlet gas pressure and, if it is already very low, slightly close adjustment valve VR.
- If delivery needs to be increased, increase outlet gas pressure.

Adjustment of air delivery

Progressively adjust the end profile of cam 4)(Fig. 29) by turning the cam adjustment screws as they appear through the access opening 6)(Fig. 29).

- Lock the screws to increase air delivery.
- Loose the screws to reduce air delivery.

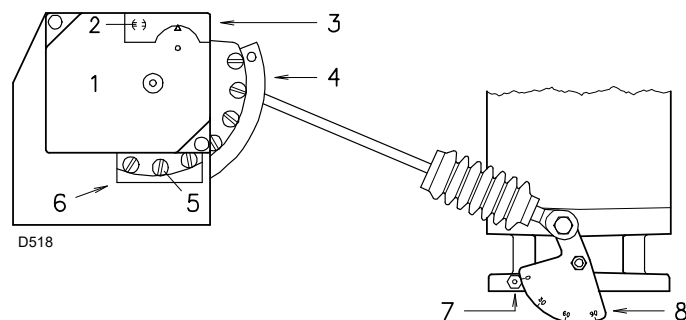


Fig. 29

- 1 Servomotor
- 2 Cam 4 engaged/ ① disengaged
- 3 Cam cover
- 4 Variable profile cam
- 5 Screws for adjusting the adjustable profile
- 6 Slit to access the screws 5)
- 7 Index of graduated sector 8)
- 8 Gas butterfly valve graduated sector

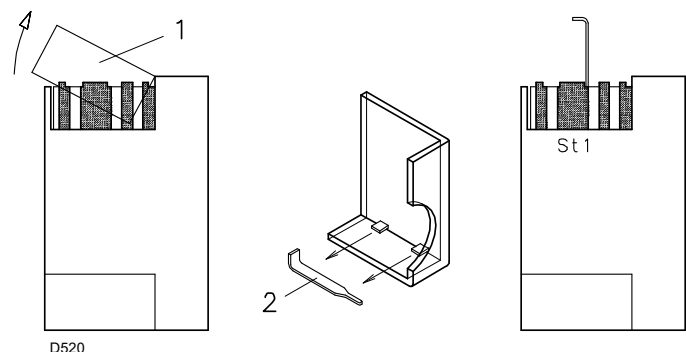


Fig. 30

5.6.3 1st stage burner output

Burner power in 1st stage operation must be selected within the firing rate range Fig. 2 on page 9.

Set the switch 2)(Fig. 28) to the 1st stage position: the servomotor 1)(Fig. 30) will close the air damper and, at the same time, closes the gas butterfly valve down to 15°, i.e. down to the original factory setting.

Adjustment of gas delivery

Measure the delivery of gas from the gas meter.

- If this value is to be reduced, decrease the angle of cam St1 (Fig. 30) slightly by proceeding a little at a time until the angle is changed from 15° to 13° or 11°....
 - If it is necessary to increase it, move to 2nd stage operation by altering the setting of switch 2)(Fig. 28) and increase the angle of cam St1, proceeding a little at a time until the angle is changed from 15° to 17° - 19°....
- At this point return to 1st stage operation and measure gas delivery.

NOTE:

The servomotor follows the adjustment of cam St1 only when the angle is reduced. If, however the angle must be increased, switch to 2nd stage operation, increase the angle and then return to 1st stage operation to check the effect of the adjustment.

If you increase the angle of St1 while the burner is operating in 1st stage, lockout will result.

In order to adjust cam St1, remove press-fit cover 1)(Fig. 30), extract the relevant key 2)(Fig. 30), from inside, and fit it into the keyway in cam St1.

Adjustment of air delivery

Progressively adjust the starting profile of cam 4)(Fig. 29) by turning the screws working through the access hole 6)(Fig. 29). It is preferable not to turn the first screw since this is used to set the air damper to its fully-closed position.

5.6.4 Intermediate outputs

Adjustment of gas delivery

No adjustment of gas delivery is required.

Adjustment of air delivery

Switch off the burner using switch 1)(Fig. 28), disengage the variable profile cam, set the servomotor shaft slot 2)(Fig. 29) to a vertical position and turn the central screws of the cam so that the cam offers a progressive gradient.

Try turning the cam back and forth by hand a few times until the movement is completely smooth with no signs of sticking.

Do not alter the position of the screws at each end of the cam track, which have already been adjusted for 1st and 2nd stage air damper control.

NOTE:

Once you have finished adjusting 2nd stage - 1st stage - intermediate outputs, check firing once again: noise emission at this stage must be identical to the following stage of operation. If you notice any sign of pulsation, reduce the firing stage delivery.

5.7 Pressure switch adjustment

5.7.1 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. 31).

With the burner operating in 1st stage, increase adjustment pressure by slowly turning the relative knob clockwise until the burner locks out.

Then turn the knob anticlockwise by about 20% of the set point and repeat burner starting to ensure it is correct.

If the burner locks out again, turn the knob anticlockwise a little bit more.



ATTENTION

As a rule, the air pressure switch must limit the CO in the fumes to less than 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 may operate in "differential" operation if connected to two pipes. If a negative pressure in the combustion chamber during pre-purging prevents the air pressure switch from switching, switching may be obtained by fitting a second pipe between the air pressure switch and the suction inlet of the fan. In such a manner the air pressure switch operates as differential pressure switch.



ATTENTION

The use of the air pressure switch with differential operation is allowed only in industrial applications and where rules enable the air pressure switch to control only fan operation without any reference to CO limit.

5.7.2 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. 32).

With the burner operating in 2nd stage, increase adjustment pressure by slowly turning the relative knob clockwise until the burner locks out. Then turn the knob anticlockwise by 2 mbar (0.2 kPa) and repeat burner starting to ensure it is uniform.

If the burner locks out again, turn the knob anticlockwise again by 1 mbar (0.1 kPa).

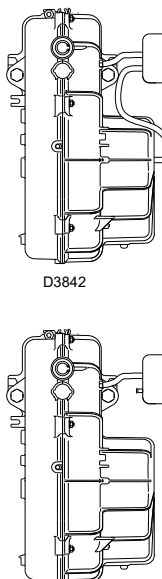


Fig. 31

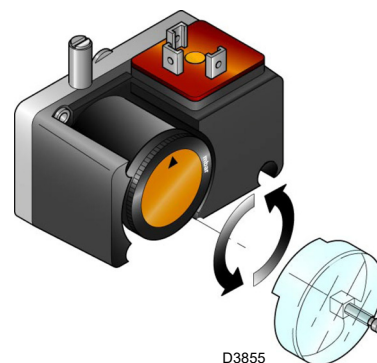


Fig. 32



ATTENTION

1 kPa = 10 mbar

5.7.3 Flame presence check

The burner is fitted with an ionisation system to check that a flame is present.

The minimum current required for the control box operation is 6 μ A. The burner supplies a significantly higher current value, so that no check is usually needed.

However, if it is necessary to measure the ionisation current, disconnect the plug-socket on the ionisation probe cable and insert a direct current microammeter with a base scale of 100 μ A.

Carefully check polarities.

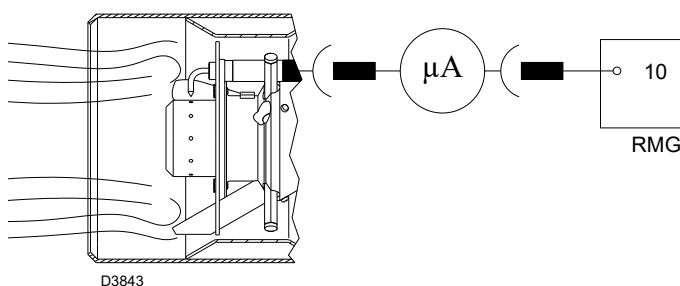


Fig. 33

5.8 Burner operation

5.8.1 Burner start-up

Remote control TL closes.

Servomotor starts: it rotates during opening up to the angle set on cam St1.

After about 3s:

0 s The control box starting cycle begins.

2 s Fan motor starts.

3 s Servomotor starts: it rotates during opening until contact on cam St2 is tripped.

The air damper is positioned to 2nd stage output.

Pre-purge stage with air delivery at 2nd stage output.

Duration 25 seconds.

28 s Servomotor starts: it rotates during closing up to the angle set on cam St1.

43 s The air damper and the gas butterfly are positioned to 1st stage output.

Ignition electrode strikes a spark.

Safety valve VS and adjustment valve VR (rapid opening) open. The flame is ignited at a low output level, point A. Output is then progressively increased, with the valve opening slowly up to 1st stage output, point B.

45 s The spark goes out.

53 s If remote control device TR is closed or if it has been replaced by a bridge, the servomotor will continue to turn until the cam St2 come into operation, setting the air damper and the gas butterfly valve to the 2nd stage operation position, section C-D.

The control box starting cycle ends.

The control box starting cycle ends. When heat demand (TL) is satisfied, the post-purging phase (*20s) starts.

5.8.2 Steady state operation

System equipped with one remote control TR

Once the starting cycle has come to an end, control of the servomotor passes on to the remote control TR that controls boiler temperature or pressure, point D.

(The control box will continue, however, to monitor flame presence and the correct position of the air pressure switch).

- When the temperature or the pressure increases until the control device TR opens, the servomotor closes the gas butterfly valve and the air damper and the burner passes from the 2nd to the 1st stage of operation, section E-F.
- When the temperature or pressure decreases until the control device TR closes, the servomotor opens the gas butterfly valve and the air damper and the burner passes from the 1st to the 2nd stage of operation. The sequence repeats endlessly.
- The stopping of the burner occurs when the heat requirement is lower than that supplied by the burner in the 1st stage, tract G - H. The TL remote control opens, the servomotor returns to angle 0° limited by cam St0. The air damper closes completely to reduce heat losses to a minimum.

Systems not equipped with TR (bridge installed)

The burner is fired as described in the case above. If the temperature or pressure increase until control device TL opens, the burner shuts down (Section A-A in the diagram).

STANDARD IGNITION
(no. = seconds from instant 0)

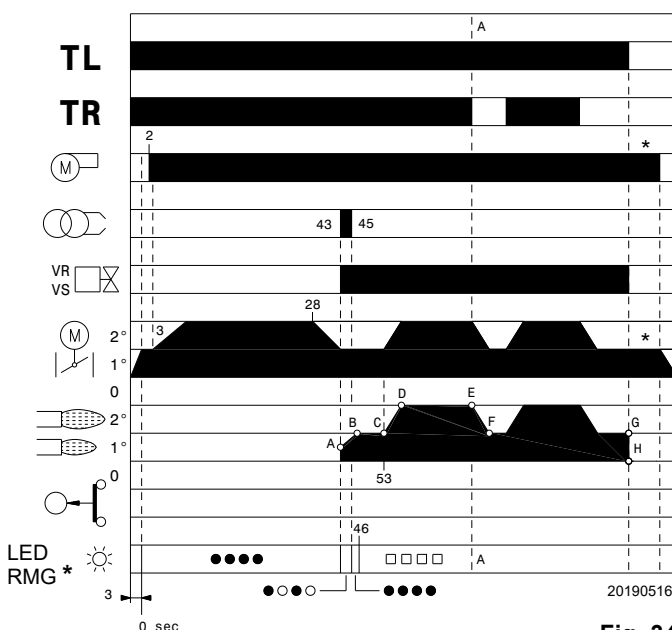


Fig. 34

* ○ Off ● Yellow □ Green ▲ Red

For further details see page 33.

5.8.3 Ignition failure

If the burner does not fire, it goes into lockout within 3 s of the opening of the gas solenoid valve and 49 s after the closing of remote control TL. The control box red pilot light will light up.

Burner flame goes out during operation

If the flame should accidentally go out during operation, the burner will lock out within 1s.

IGNITION FAILURE

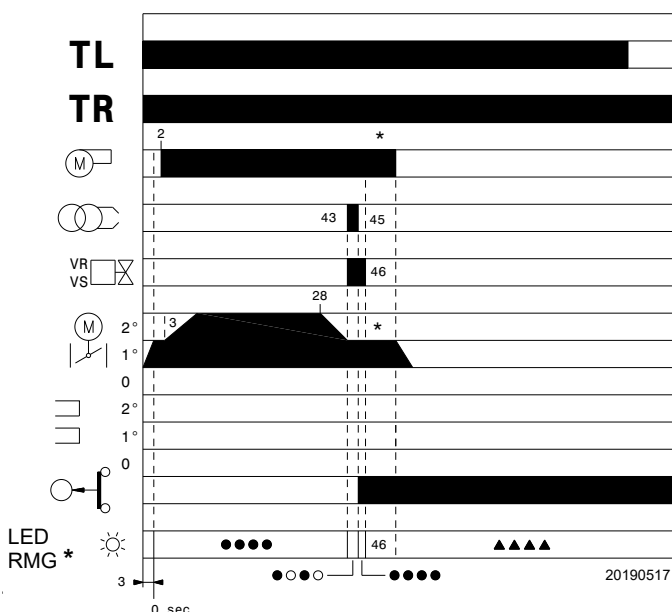


Fig. 35

* ○ Off ● Yellow ▲ Red

For further details see page 33.

5.9 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 knob 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 wire of the ionisation probe		The burner must stop in lockout due to ignition failure

Tab. G

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 system main switch.



Close the fuel shut-off valve.



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 no gas supply

To perform commissioning in safety conditions, it is very important to check correct wiring between gas valves and burner. For this purpose, after checking that connections comply with the burner wiring diagrams, it is necessary to carry out a start-up cycle with gas cock closed (dry test).

- 1 The manual gas valve must be closed using the locking/unlocking device ("Lock-out / tag out" procedure).
- 2 Ensure that burner limit electrical contacts are closed
- 3 Ensure that minimum gas pressure switch contact is closed
- 4 Try to start the burner.

The start-up cycle must occur according to the following steps:

- Fan motor start-up for pre-purging
- Gas valve leak detection control, if applicable.
- Pre-purging completion
- Achievement of the ignition point
- Power supply of the ignition transformer
- Supply of gas valves.

As gas is closed, the burner cannot ignite and its control box will switch to stop or safety lockout condition.

The actual supply of gas valves can be checked by inserting a tester; some valves are equipped with lights (or closing/opening position indicators) that activate as soon as they are powered.



IF POWER SUPPLY OF GAS VALVES OCCURS IN UNEXPECTED MOMENTS, DO NOT OPEN THE MANUAL VALVE, DISCONNECT POWER SUPPLY, CHECK WIRINGS, CORRECT THE ERRORS AND CARRY OUT THE WHOLE TEST AGAIN.

6.2.3 Checking and cleaning



The operator must use the required equipment during maintenance.

Combustion

Carry out an analysis of the combustion flue gases.

Significant differences with respect to the previous measurements indicate the points where most 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, free of material corrosion and correctly positioned.

Fan

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

Servomotor

Release the cam 4)(Fig. 29 on page 26) turning the notch 2)(Fig. 29 on page 26) by 90° and manually checking that its rotation, backwards and forwards, is smooth.

Engage cam 4)(Fig. 29 on page 26) again.

Burner

Check for excess wear or loose screws in the mechanisms controlling the air damper and the gas butterfly valve. In addition, the screws that fix the cables in the terminal board must be blocked, along with the burner sockets.

Clean the outside of the burner, taking special care with the articulated couplings and the cam 4)(Fig. 29 on page 26).

Gas leaks

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

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.

Combustion control

If the combustion values measured before starting maintenance do not comply with applicable Standards or do not indicate efficient combustion, consult the table below or contact our Technical Support Service to implement the necessary adjustments.

EN 676		Air excess		CO
		Max. output $\lambda \leq 1.2$	Max. output $\lambda \leq 1.3$	
GAS	Theoretical max CO ₂ 0 % O ₂	CO ₂ % Calibration		mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$	
G 20	11.7	9.7	9	≤ 100
G 25	11.5	9.5	8.8	≤ 100
G 31	13.7	11.4	10.5	≤ 100

Tab. H

6.2.4 Safety components

The safety components must be replaced at the end of their life cycle indicated in Tab. I.

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
Flexible hoses (if present)	5 years or 30.000 pressurised cycles
Fan impeller	10 years or 500.000 start-ups

Tab. I

6.3 Opening the burner



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



Close the fuel shut-off valve.



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

- Loosen the screw 1)(Fig. 36) and remove the hood 2).
- Disengage the articulated coupling 3) from the graduated sector 4)(Fig. 36).
- Remove the screw 5)(Fig. 36) only with the long head models; pull the burner back on the slide bars 6)(Fig. 36) for about 100mm.
- Disconnect the probe and electrode leads and then pull the burner fully back.
- Now extract the gas distributor 7)(Fig. 36) after having removed the screw 8)(Fig. 36).

- Remove the screws 2)(Fig. 11 on page 16) and tighten the two extensions 18)(Fig. 4 on page 11) supplied with the burner.
- Re-tighten the two screws 2)(Fig. 11 on page 16) on the terminal of the extensions.



Assemble the inner part of the combustion head by tightening the screw 8)(Fig. 36) to a tightening torque of $4 \pm 6 \text{ Nm}$.

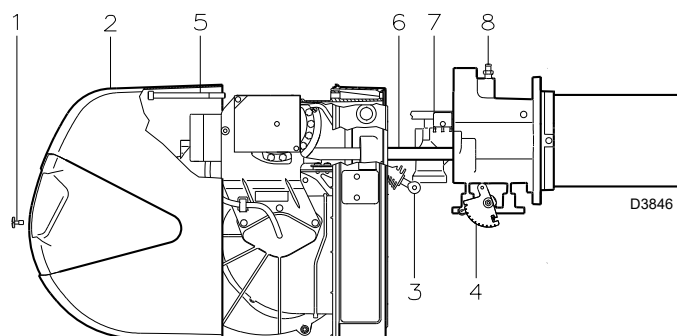


Fig. 36

6.4 Closing the burner

- Push the burner to approximately 100 mm from the pipe coupling.
- Reconnect the previously disconnected cables and slide in the burner until it comes to a stop.
- Replace the screw 5)(Fig. 36) and carefully pull the probe and electrode cables outwards until they are slightly taut.
- Reconnect the articulated coupling 3) to the graduated sector 4).

- In extended head models, unscrew the extensions and reposition them in the appropriate space; tighten the screws 2)(Fig. 11 on page 16) on the slide bars.
- Reposition the cover 2)(Fig. 36) and fix with the screw 1)(Fig. 36).



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

6.5 Electrical panel maintenance

If it is necessary to carry out maintenance on the electrical panel 1)(Fig. 37), it is possible to remove only the fan unit 2)(Fig. 37), to allow improved access to the electrical components.

With the burner open as in Fig. 36, unhook the tie-rod 3)(Fig. 37), removing the screw on the adjustable profile cam, and extract it from the tip 4)(Fig. 37).

At this point, disconnect the cables relating to the air pressure switch, the servomotor and fan motor.

Remove the 3 screws 5)(Fig. 37) positioned on the protective cover.

Removing the 2 screws 6)(Fig. 37), it is possible to unthread the fan unit 2)(Fig. 37) from the slide bars 7)(Fig. 37).

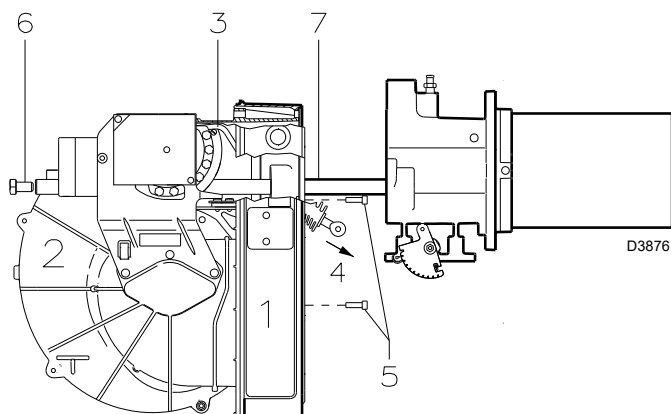


Fig. 37

Finally, you can use 2 of the 3 screws 5)(Fig. 37) to fix the electrical panel to the pipe coupling, in the points indicated in Fig. 38, and then carry out the maintenance operations.

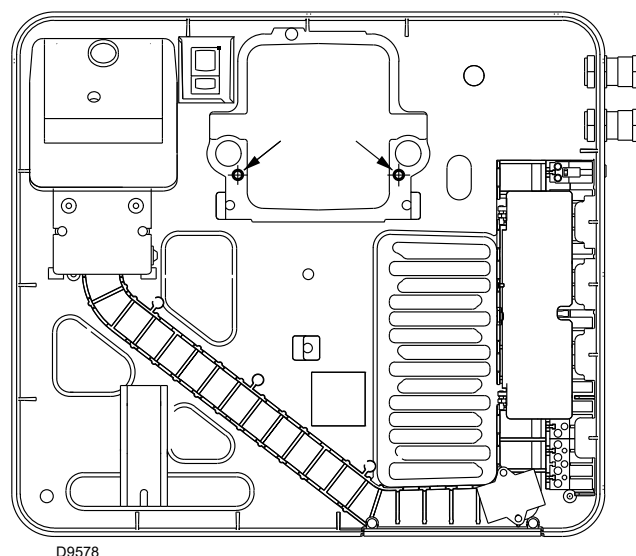


Fig. 38

7 Faults - Possible causes - Solutions



In the event the burner stops, in order to prevent any damage to the installation, do not unblock the burner more than twice in a row. If the burner locks out for a third time, contact the customer service.



In the event there are further lockouts or faults with the burner, the maintenance interventions 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.

Signal	Problem	Possible cause	Recommended remedy
2 blinks ● ●	Once the pre-purging phase and safety time have passed, the burner goes into lockout without the appearance of the flame.	The operation solenoid lets little gas through.	Increase
		One of the two solenoid valves does not open	Replace
		Gas pressure too low	Increase pressure at governor
		Ignition electrode incorrectly adjusted	Adjust it
		Electrode grounded due to broken insulation	Replace
		High voltage cable defective	Replace
		High voltage cable deformed by high temperature	Replace and protect
		Ignition transformer defective	Replace
		Incorrect valve or transformer electrical wiring	Check
		Defective control box	Replace
		A closed valve upline the gas train	Open
		Air in pipework	Bleed air
		Gas valves unconnected or with interrupted coil	Check connections or replace coil
3x flashes ● ● ●	The burner does not switch on, and the lock-out appears	Air pressure switch in operating position	Adjust or replace
	The burner switches on, but then stops in lockout	Air pressure switch does not switch owing to lack of air pressure:	
		Air pressure switch poorly adjusted	Adjust or replace
		Pressure switch pressure point pipe blocked	Clean
		Poorly adjusted head	Adjust
		High pressure in the furnace	Connect air pressure switch to fan suction line
	Lockout during pre-purging phase	Defective motor control contactor (only three-phase version)	Replace
		Defective electrical motor	Replace
Motor lockout (only three-phase version)		Replace	
4 blinks ● ● ● ●	The burner switches on, but then stops in lockout	Flame simulation	Replace the control box
	Lockout when burner stops	Permanent flame in the combustion head or flame simulation	Eliminate persistence of flame or replace control box
6 blinks ● ● ● ● ● ●	The burner switches on, but then stops in lockout	Defective or incorrectly adjusted servomotor	Adjust or replace
7 blinks ● ● ● ● ● ● ●	The burner goes into lockout immediately following the appearance of the flame	The operation solenoid lets little gas through	Increase
		Ionisation probe incorrectly adjusted	Adjust
		Insufficient ionisation (less than 5 A)	Check probe position
		Earth probe	Withdraw or replace cable
		Burner poorly earthed	Check earthing
		Phase and neutral connections inverted	Invert them
		Defective flame detection circuit	Replace the control box
	Burner locks out when shifting from minimum to maximum output and vice versa	Too much air or too little gas	Adjust air and gas
	Burner goes into lock-out during operation	Probe or ionisation cable grounded	Replace worn parts

Signal	Problem	Possible cause	Recommended remedy
10 blinks ●●●●●● ●●●●●●	The burner does not switch on, and the lock-out appears	Incorrect electrical wiring	Check
	The burner goes into lockout	Defective control box	Replace
		Presence of electromagnetic disturbances in the thermostat lines	Filter or eliminate
		Presence of electromagnetic disturbance	Use the radio disturbance protection kit
No blink	The burner does not start	No electrical power supply	Check connections
		A limiter or safety control device is open	Adjust or replace
		Line fuse blocked	Replace
		Defective control box	Replace
		No gas supply	Open the manual valves between contactor and train
		Mains gas pressure insufficient	Contact your gas company
		Minimum gas pressure switch fails to close	Adjust or replace
		Servomotor fails to move to min. ignition position	Replace
	The burner continues to repeat the start-up cycle, without lockout	The gas pressure in the gas mains lies very close to the value to which the gas pressure switch has been set. The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner comes to a halt. Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. And so on	Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge.
	Ignition with pulsations	Poorly adjusted head	Adjust
		Ignition electrode incorrectly adjusted	Adjust it
		Incorrectly adjusted fan air damper: too much air	Adjust
		Output during ignition phase is too high	Reduce
	Burner does not reach maximum output	Remote control device TR fails to close	Adjust or replace
		Defective control box	Replace
		Defective servomotor	Replace
	Burner stops with air damper open	Defective servomotor	Replace

Tab. J

A Appendix - Accessories**Kit for LPG operation**

Burner	Output kW	Code
RS 34 MZ	120/200 - 470	3010423
RS 44 MZ	120/200 - 470	3010424

Extended head kit

Burner	Code
RS 34 MZ	3010428
RS 44 MZ	3010429

Town gas kit

Burner	Code
RS 34 MZ	3010502
RS 44 MZ	3010503

Spacer kit

Burner	Code
RS 34-44 MZ	3010095

Hour counter kit

Burner	Code
RS 34-44 MZ	3010450

Soundproofing box kit

Burner	Code
RS 34-44 MZ	3010403

Clean contacts kit

Burner	Code
RS 34-44 MZ	3010419

Flange connection Kit

Burner	Code
RS 34 - 44 MZ	3010138

PC interface kit

Burner	Code
RS 34 - 44 MZ	3002719

Differential circuit breaker kit

Burner	Code
RS 34-44 MZ	3010448

Continuous purging kit

Burner	Code
RS 34-44 MZ	3010449

Vibration reduction kit

Burner	Code
RS 34 MZ	20098750 - 20098753
RS 44 MZ	20098746

Maximum gas pressure switch Kit

Burner	Code
RS 34-44 MZ	3010418

Radio disturbance protection kit

If the burner is installed in places particularly subject to radio disturbance (emission of signals exceeding 10 V/m) owing to the presence of an INVERTER, or in applications where the length of the thermostat connections exceeds 20 metres, a protection kit is available as an interface between the control box and the burner.

Burner	Code
RS 34-44 MZ	3010386

Gas trains in compliance with EN 676

Please refer to manual.

B Appendix - Electrical panel layout

1	Index of layouts
2	Indication of references
3	Operation layoutRS 34 MZRS 44 MZ
4	Operation layout
5	Electrical connection set by installer

2

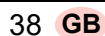
Indication of references

Sheet no.

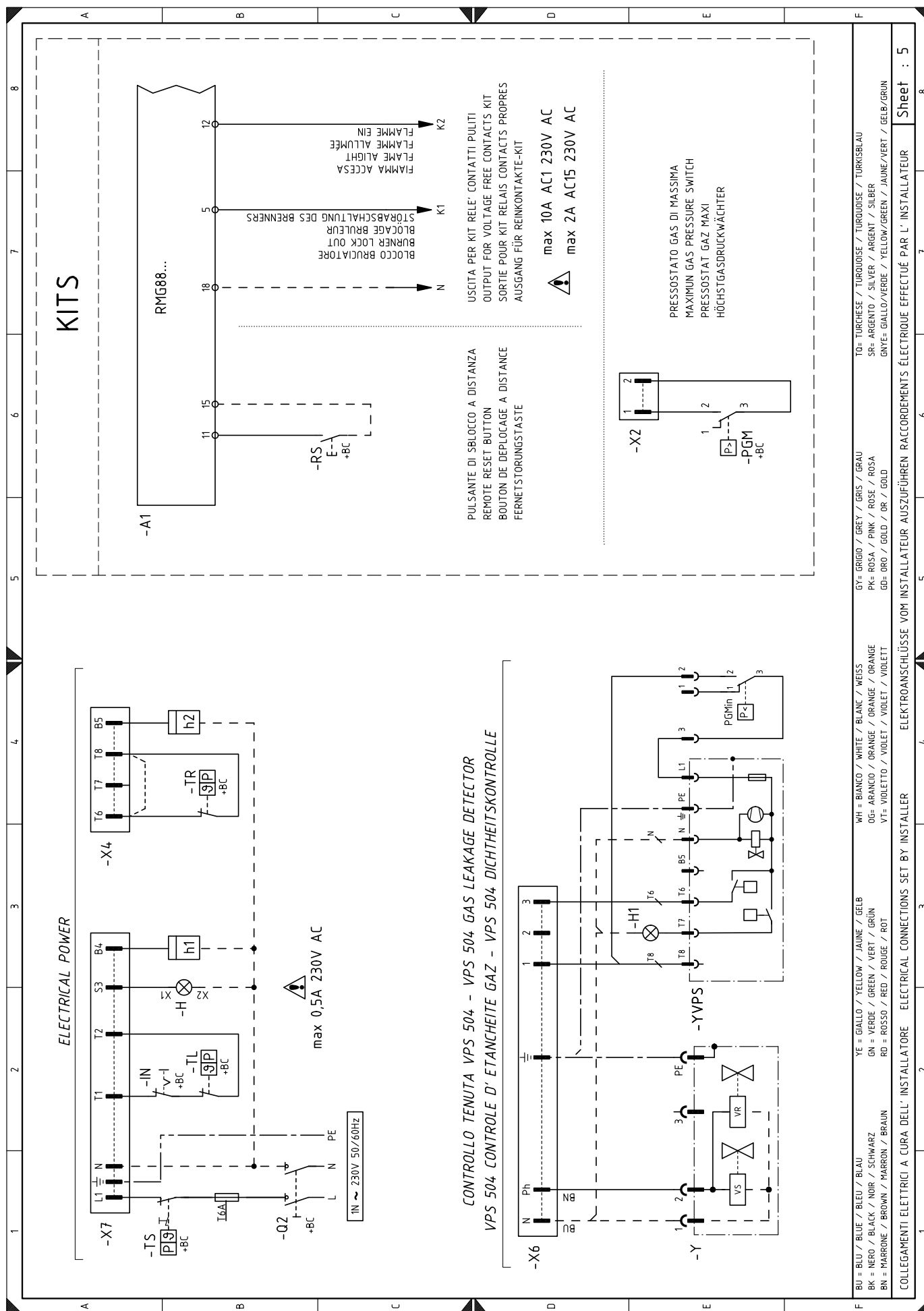
Coordinates

/1.A1









Wiring layout key

A1	Electrical control box
B	Filter to protect against radio disturbance
+BB	Burner components
+BC	Boiler components
C1	Capacitor
CN1	Ionisation probe connector
H	Remote lockout signalling
H1	Lockout YVPS
h1	Hour counter
h2	Hour counter 2 nd stage
ION	Ionisation probe
IN	Burner manual stop switch
K1	Relay
MV	Fan motor
PA	Air pressure switch
PGM	Maximum gas pressure switch
PGMin	Minimum gas pressure switch
Q2	Single-phase disconnecting switch
RS	Remote burner reset button
SM	Servomotor
S1	Selector: burner off-on
S2	Selector: 1st - 2 nd stage operation
TA	Ignition transformer
TL	Limit thermostat/pressure switch
TR	Adjustment thermostat/pressure switch
TS	Safety thermostat/pressure switch
X2	2-pin plug
X4	4-pin plug
X6	6-pin plug
X7	7-pin plug
XPA	Air pressure switch connector
XP2	Maximum gas pressure switch connector
XP4	4-pole socket
XP6	6-pole socket
XP7	7-pole socket
XSM	Servomotor connector
XTB	Shelf earth
XTM	Fan unit earth
XTS	Servomotor unit earth
Y	Gas adjustment valve + gas safety valve
YVPS	Gas valve leak detection device



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