

GB Forced draught gas burners

Progressive two-stage or modulating operation



CODE - CÓDIGO	MODEL - MODELO	TYPE - TIPO
3788710	RS 34/M MZ	874 T
3788711	RS 34/M MZ	874 T
3788810	RS 44/M MZ	875 T
3788811	RS 44/M MZ	875 T
3788840	RS 44/M MZ	875 T
3788841	RS 44/M MZ	875 T

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N.B.

Figures mentioned in the text are identified as follows:

1)(A) = part 1 of figure A, same page as text;

1)(A)p.3 = part 1 of figure A, shown on page 3.

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.

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.

TECHNICAL DATA

MODEL		RS 34/M MZ		RS 44/M MZ		RS 44/M MZ	
TYPE		874 T		875 T		875 T	
OUTPUT ⁽¹⁾ MAX.	kW Mcal/h	125 - 390 108 - 336		203 - 550 175 - 473		203 - 550 175 - 473	
	MIN.	kW Mcal/h		80 69		80 69	
FUEL		NATURAL GAS: G20 - G21 - G22 - G23 - G25					
		G20	G25	G20	G25	G20	G25
- net calorific value	kWh/Sm ³ Mcal/Sm ³	9.45 8.2	8.13 7.0	9.45 8.2	8.13 7.0	9.45 8.2	8.13 7.0
- absolute density	kg/Sm ³	0.71	0.78	0.71	0.78	0.71	0.78
- max. delivery	Sm ³ /h	41	48	58	67.6	58	67.6
- pressure at max. delivery (2)	mbar	13.1	18.4	16.7	23.2	16.7	23.2
OPERATION		• On-Off (1 stop min each 24 hours). • Progressive two-stage or modulating by kit (see ACCESSOIRES).					
STANDARD APPLICATIONS		Boilers: water, steam, diathermic oil					
AMBIENT TEMPERATURE	°C	0 - 40					
COMBUSTION AIR TEMPERATURE	°C max	60					
ELECTRICAL SUPPLY	V Hz	230 ~ +/-10% 50/60 - single-phase				230 - 400 with neutral ~ +/-10% 50/60 - three-phase	
ELECTRIC MOTOR	rpm W V	2800 300 220 - 240		2800 420 220 - 240		2780 450 220/240-380/415	
ACCELERATION CURRENT	A	15		17		14 - 10	
WORKING CURRENT	A	3.2		3.5		2 - 1.4	
MOTOR CAPACITOR	µF/V	12.5/260		12.5/420		-	
IGNITION TRANSFORMER	V1 - V2 I1 - I2	230 V - 1 x 15kV 1 A - 25mA					
ELECTRICAL POWER CONSUMPTION	W max	600		700		750	
PROTECTION LEVEL		IP40					
NOISE ⁽³⁾	SOUND PRESSURE SOUND POWER	dBA		68 79		70 81	

(1) Reference conditions: Room temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0m above sea level.

(2) Socket pressure 7)(A)p.4 with zero pressure in the combustion chamber.

(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.

STRUCTURAL VERSIONS

Model	ELECTRICAL POWER SUPPLY	BLAST TUBE LENGTH mm
RS 34/M MZ	single-phase	216
	single-phase	351
RS 44/M MZ	single-phase	216
	single-phase	351
	three-phase	216
	three-phase	351

GAS CATEGORIES

DESTINATION COUNTRY	GAS CATEGORY
SE - FI - AT - GR - DK - ES - GB IT - IE - PT - IS - CH - NO	I _{2H}
DE	I _{2ELL}
NL	I _{2L} - I _{2E} - I ₂ (43,46 ÷ 45,3 MJ/m ³ (0°C))
FR	I _{2Er}
BE	I _{2E(R)B}
LU - PL	I _{2E}

ACCESSORIES (optional):

• 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	RS 34-44/M MZ
Code	3010386

• KIT LONG HEAD

BURNER	RS 34/M MZ	RS 44/M MZ
Code	3010428	3010429

• KIT FOR LPG OPERATION: the kit allows the RS 34-44/M MZ burners to burn LPG.

BURNER	RS 34/M MZ	RS 44/M MZ
Output kW	80/125 - 390 kW	120/200 - 530 kW
Blast tube length mm	216 - 351	216 - 351
Code	3010423	3010424

• KIT FOR MODULATING OPERATION

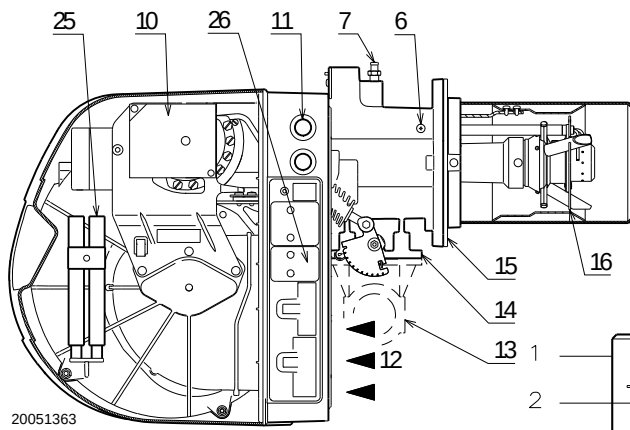
OUTPUT POWER REGULATOR KIT RWF						SIGNAL CONVERTER KIT 4-20 mA, 0-10V			
Two components should be ordered: • the Output power regulator to install on the burner; • the Probe to install on the heat generator						Two components should be ordered: • the Analogical signal converter; • the Potentiometer			
Parameter to control		Probe		Output power regulator		Potentiometer		Analogical Signal Converter	
	Adjustment field	Type	Code	Type	Code	Type	Code	Type	Code
Temperature	- 100...+500°C	PT 100	3010110	RWF50.2	20083339	ASZ...	3010420	E5202	3010410
Pressure	0...2.5 bar 0...16 bar	Output probe 4...20 mA	3010213 3010214	RWF55.5	20098541				

• POTENTIOMETER KIT FOR THE INDICATION OF LOAD POSITION	Code 3010420
• MAXIMUM GAS PRESSURE SWITCH	Code 3010418
• KIT CLEAN CONTACTS	Code 3010419
• KIT POST-PURGING	Code 3010451

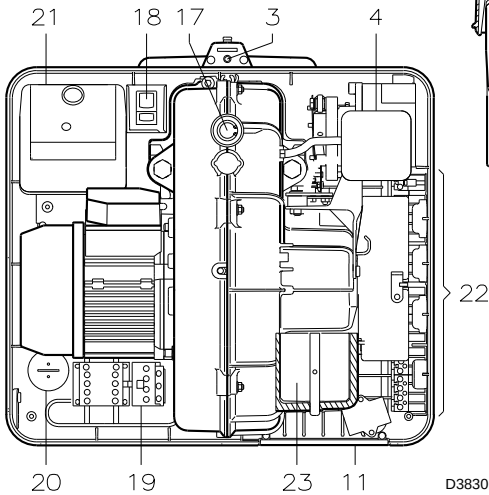
• KIT GROUND FAULT INTERRUPTER	Code 3010448
• KIT CONTINUOUS PURGING	Code 3010449
• KIT HOURCOUNTER	Code 3010450
• KIT INTERFACE ADAPTER RMG TO PC	Code 3002719

• GAS TRAINS TO COUPLE WITH THE BURNER, ACCORDING TO REGULATION EN 676 (complete with valves, pressure adjuster and filter): see page 9.

NOTE: The installer is responsible for the addition of any safety device not foreseen in this manual.



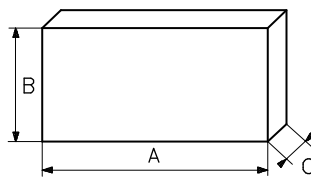
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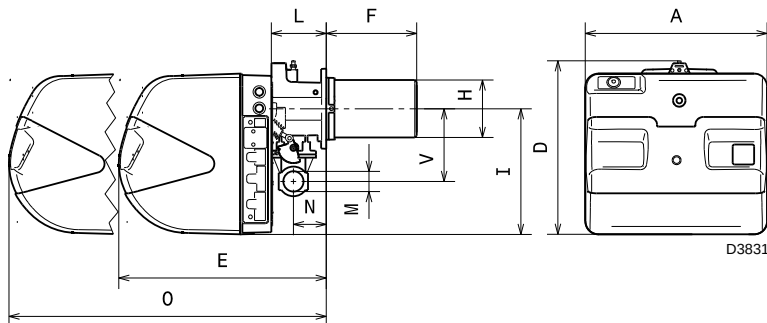
(A)

mm	A	B	C	kg
RS 34/M MZ	1000	500	485	32
RS 44/M MZ	1000	500	485	33



D88

(B)



D3831

(C)

mm	A	D	E	F ⁽¹⁾	H	I	L	O	N	V	M
RS 34/M MZ	442	422	508	216-351	140	305	138	780	84	177	1"1/2
RS 44/M MZ	442	422	508	216-351	152	305	138	780	84	177	1"1/2

(1) Blast tube: short-long

BURNER DESCRIPTION (A)

- Combustion head
- Ignition electrode
- Screw for combustion head adjustment
- Minimum air pressure switch (differential operating type)
- Flame sensor probe
- Air pressure socket
- Gas pressure test point and head fixing screw
- Screws securing fan to sleeve
- Slide bars for opening the burner and inspecting the combustion head
- Servomotor controlling the gas butterfly valve and the air damper (by means of a variable profile cam mechanism). When the burner is stopped, the air damper will be completely closed to reduce heat loss due to the flue draught, which tends to draw air from the fan air inlet.
- Areas for passage of electric cables
- Air inlet to fan
- Gas input pipework
- Gas butterfly valve
- Boiler mounting flange
- Flame stability disc
- Flame inspection window
- Power switch for different operations: automatic - manual - off
Button for:
power increase - power reduction
- Motor contact maker and thermal cutout with reset button (RS 44/M MZ three-phase)
- Motor capacitor (RS 34-44/M MZ single-phase)
- Control box with lockout pilot light and lockout reset button
- Sockets for electrical connection
- Air damper
- Plug-socket on ionisation probe cable
- Guide extensions (long head version)
- 4-pole socket cover (see electrical panel appendix)

Two types of burner failure may occur:

- CONTROL BOX LOCKOUT:**
if the control box 21)(A) pushbutton lights up, it indicates that the burner is in lockout. To reset, press the push button.
- MOTOR LOCKOUT** (RS 44/M MZ three-phase):
three-phase electrical supply; to unblock, press the thermal cutout switch 19)(A).

PACKAGING - WEIGHT (B) - Approximate measurements

- The burners are shipped in cardboard boxes with the maximum dimensions shown in tab. (B).
- The weight of the burner complete with packaging is indicated in tab. (B).

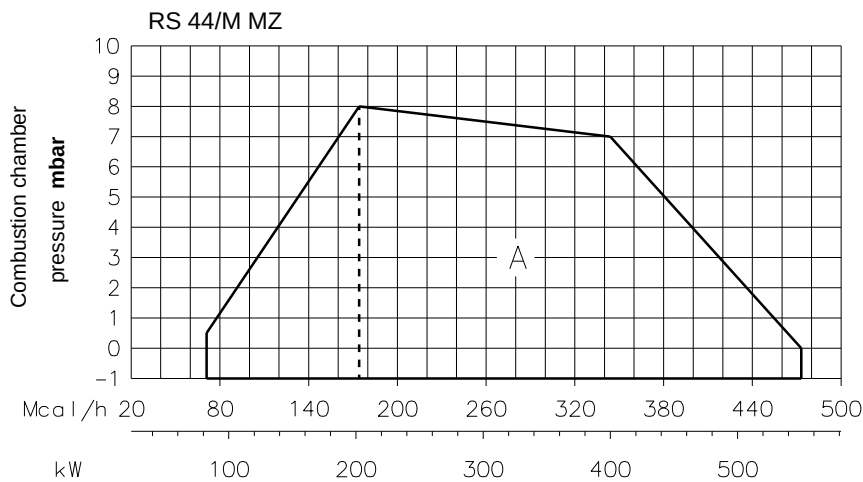
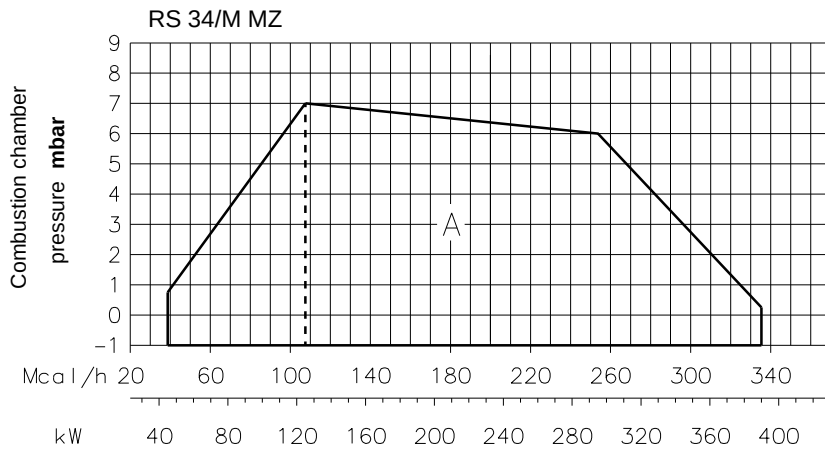
MAX. DIMENSIONS (C) - approximate measurements

The maximum dimensions of the burner are given in (C).

Bear in mind that, in order to inspect the combustion head, the burner must be pulled back.

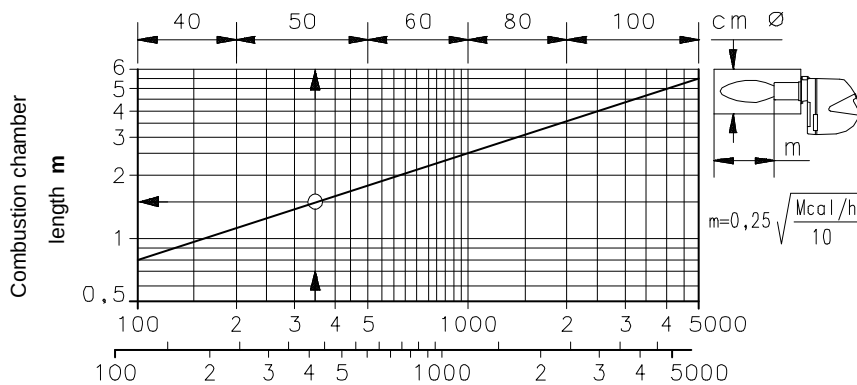
STANDARD EQUIPMENT

- Gas train flange
- Flange gasket
- Flange fixing screws M 8 x 25
- Screws to secure the burner flange to the boiler: M 8 x 25
- Thermal insulation screen
- Plugs for electrical connection (RS 34-44/M MZ single-phase)
- Plugs for electrical connection (RS 44/M MZ three-phase)
- Instruction booklet
- Spare parts list



(A)

D9304



(B)

D497

FIRING RATES (A)

During operation, burner output varies between:

- a **MAXIMUM OUTPUT**, selected within area A,
- and a **MINIMUM OUTPUT**, which must not be lower than the minimum limit in the diagram:

RS 34/M MZ = 45 kW

RS 44/M MZ = 80 kW

Important

The FIRING RATE values have been obtained considering an ambient temperature of 20°C, an atmospheric pressure of 1013 mbar (approx. 0m above sea level), and with the combustion head adjusted as shown on page 8.

TEST BOILER (B)

The firing rates were set in relation to special test boilers, according to EN 676 regulations.

Figure (B) indicates the diameter and length of the test combustion chamber.

Example

Output 350 Mcal/h:

diameter = 50 cm - length 1.5 m.

COMMERCIAL BOILERS

The burner/boiler combination does not pose any problems if the boiler is CE approved and its combustion chamber dimensions are similar to those indicated in diagram (B).

If the burner must be combined with a commercial boiler that has not been CE approved and/or its combustion chamber dimensions are clearly smaller than those indicated in diagram (B), consult the manufacturer.

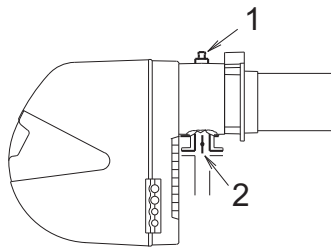
In addition, for inversion boilers you are advised to check the length of the combustion head, as indicated by the boiler manufacturer.

RS 34/M MZ

kW	1 Δp (mbar)	2 Δp (mbar)
	G20	G20
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
360	11,8	0,7
380	12,7	0,8
390	13,1	0,8

RS 44/M MZ

kW	1 Δp (mbar)	2 Δp (mbar)
	G20	G20
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	16,7	1,6

(A)**(B)**

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GAS PRESSURE

The adjacent tables show minimum pressure losses along the gas supply line depending on the maximum burner output operation.

Column 1

Pressure loss at combustion head.

Pressure of the gas at the socket 1)(B), with combustion chamber at 0 mbar.

Column 2

Pressure loss at gas butterfly valve 2)(B) with maximum opening: 90°.

The values shown in the various tables refer to:
natural gas G 20 PCI 9.45 kWh/Sm³
(8.2 Mcal/Sm³)

Calculate the approximate maximum output of the burner in this way:

- subtract the combustion chamber pressure from the gas pressure measured at test point 1)(B).
- Find, in the table relating to the burner concerned, the pressure value closest to the result of the subtraction.
- Read the corresponding output on the left.

Example - RS 34/M MZ:

- Maximum output operation
 - Natural gas G 20 PCI 9.45 kWh/Sm³
 - Gas pressure at test point 1)(B) = 9.3 mbar
 - Pressure in combustion chamber = 2 mbar
- $$9.3 - 2 = 7.3 \text{ mbar}$$

A pressure of 9.3 mbar (column 1) corresponds in the table RS 34/M MZ to an output of 260 kW.

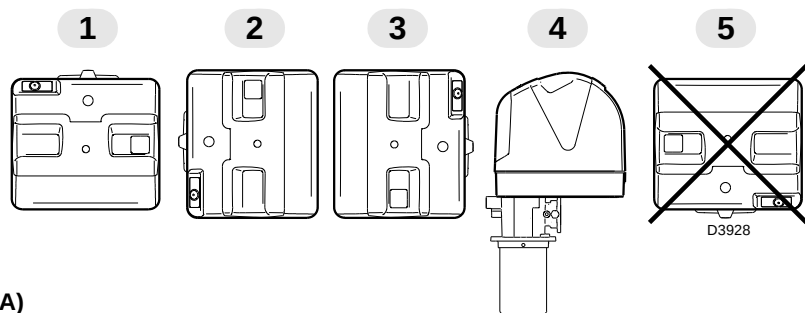
This value serves as a rough guide; the effective output must be measured at the gas meter.

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

- find the nearest output value in the table for the burner in question.
- Read, on the right (column 1) the socket pressure 1)(B).
- Add this value to the estimated pressure in the combustion chamber.

Example - RS 34/M MZ:

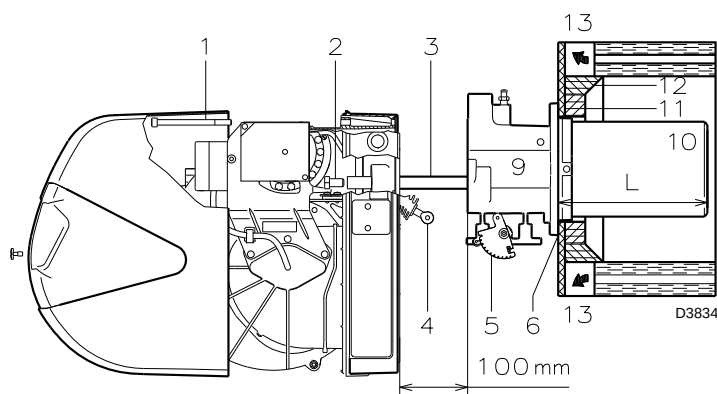
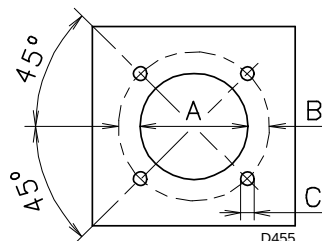
- Required burner maximum output operation: 260 kW
 - Natural gas G 20 PCI 9.45 kWh/Sm³
 - Pressure of the gas at an output of 260 kW, from the table RS 34/M MZ, column 1 = 7.3 mbar
 - Pressure in combustion chamber = 2 mbar
- $$7.3 + 2 = 9.3 \text{ mbar}$$
- pressure required at test point 1)(B).



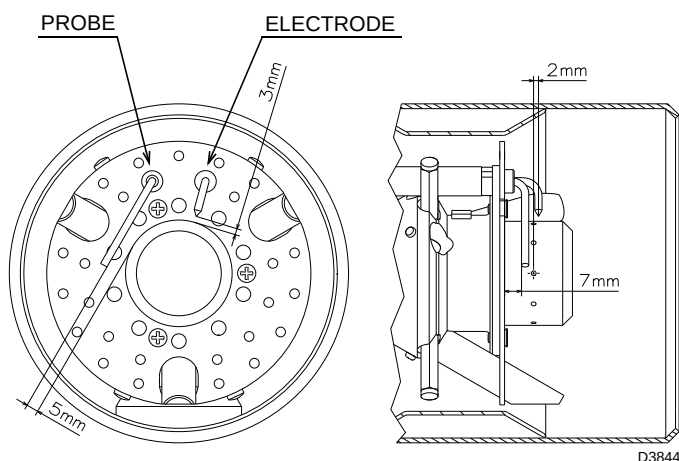
(A)

mm	A	B	C
RS 34/M MZ	160	224	M8
RS 44/M MZ	160	224	M8

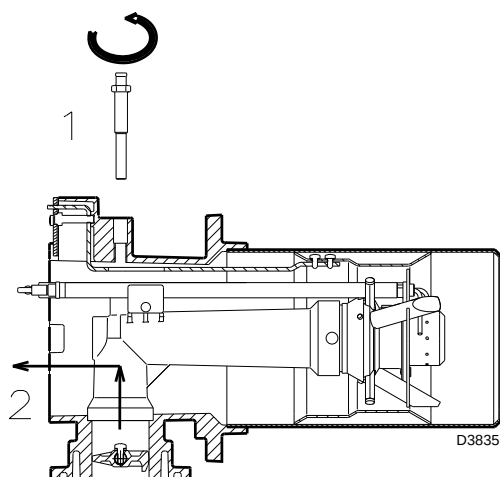
(B)



(C)



(D)



(E)

INSTALLATION

⚠ THE BURNER MUST BE INSTALLED IN CONFORMITY WITH LEGISLATION AND LOCAL STANDARDS.

WORKING POSITION (A)

⚠ The burner is designed to work only in the positions **1, 2, 3 and 4**.

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 the working, but make the operations of maintenance and checking of the combustion head more difficult page 15.

⊘ Any other position could compromise the correct working of the appliance. Installation **5** is forbidden, for safety reasons.

BOILER PLATE (B)

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

BLAST TUBE LENGTH (C)

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 lengths available, L (mm), is as follows:

blast tube 10)	RS 34/M MZ	RS 44/M MZ
• short	216	216
• long	351	351

For boilers with front flue passes 13) or flame inversion chambers, protective fettling in refractory material 11), must be inserted between the boiler fettling 12) and the blast tube 10).

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

For boilers with a water-cooled frontpiece, a heat-resistant cover is not necessary 11)-12)(C), unless expressly requested from the boiler manufacturer.

FIXING THE BURNER TO THE BOILER (C)

Before fixing the burner to the boiler, check (from the opening of the blast tube) that the probe and the electrode are correctly positioned, as in (D).

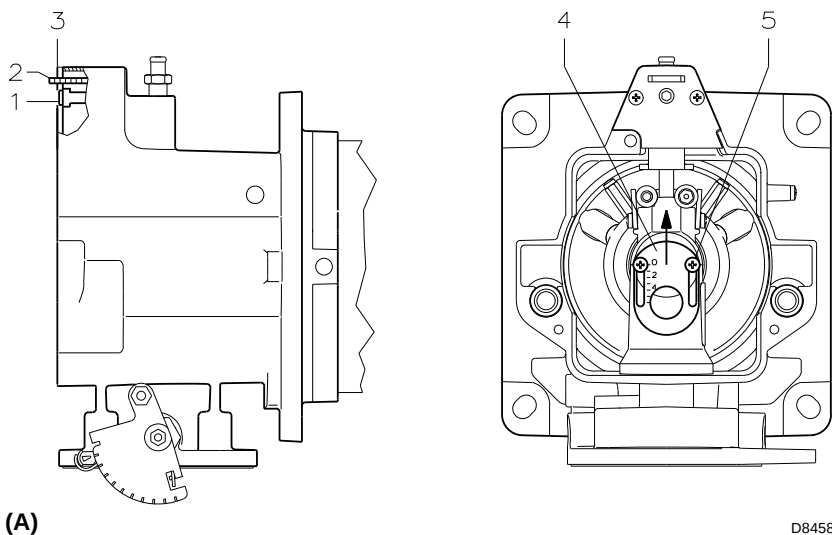
Separate the combustion head from the rest of the burner, fig. (C):

- disengage the articulated coupling 4) from the graduated sector 5);
- remove the screws 2) from the two slide bars 3);
- remove screw 1) and pull the burner back on slide bars 3) by about 100 mm;
- disconnect the probe and electrode leads, then unthread the burner completely from the guides.

Fix the unit 9)(C) to the boiler plate, inserting the supplied insulating gasket 6)(C). Use the 4 screws, also supplied with the unit, after first protecting the thread with an anti-locking product. The seal between burner and boiler must be airtight.

If, in the previous check, the position of the probe or electrode was not correct, remove the screw 1)(E), extract the inner part 2)(E) of the head, and adjust them. Do not rotate the probe: leave it as in (D). If it is located too close to the ignition electrode, the control box amplifier may be damaged.

⚠ ATTENTION
Proceed with the assembly of the inner part 2)(E) of the combustion head, tightening the screw 1)(E) with a tightening torque of $4 \div 6 \text{ Nm}$.



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. (A). It is therefore particularly easy to adjust the combustion head.

Air adjustment (A - B)

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

Example:

RS 44/M MZ burner, output = 300 kW.

From diagram (B) 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 column 1 on page 6.

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 (B).

Central air adjustment (A - C)

In case the application needs a particular setup, it is possible to modify the central air delivery using the ring nut 4)(A) up to the notch indicated in diagram (C).

In order to carry out this operation, unscrew the screws 5)(A) and lift up the ring nut 4)(A). At the end, tighten the screws 5)(A) again.

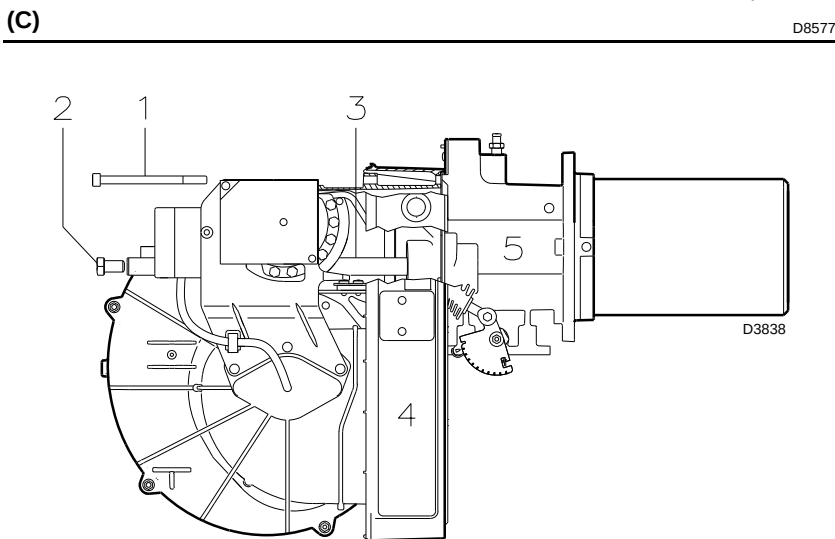
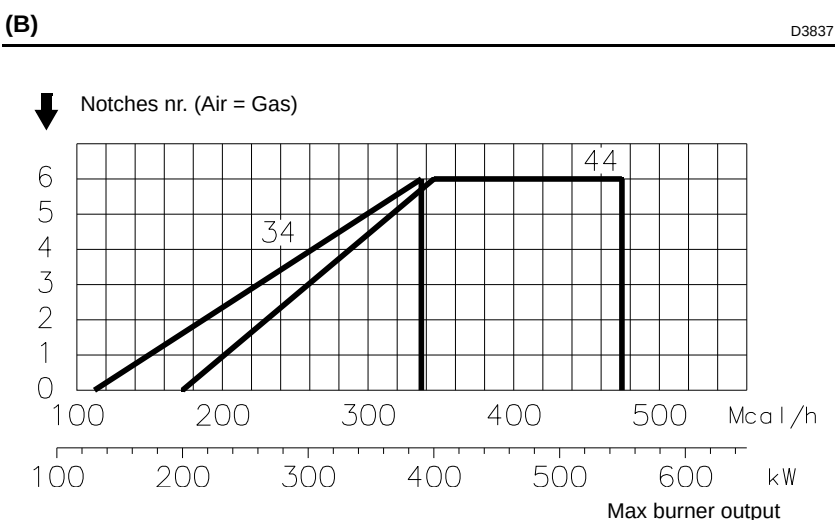
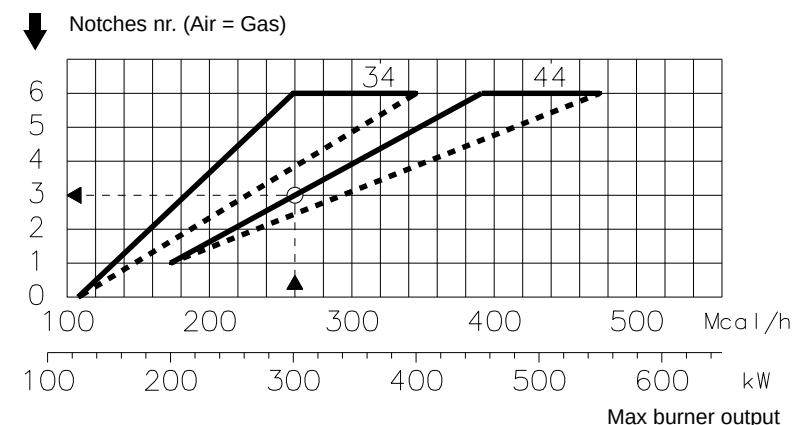
Once you have finished adjusting the head, reassemble the burner 4)(D) on the guides 3)(D) at about 100mm from the pipe coupling 5)(D) - burner in the position shown in fig. (C)p. 7 - insert the cable of the probe and the cable of the electrode, then slide the burner as far as the pipe coupling, burner in the position shown in fig. (D).

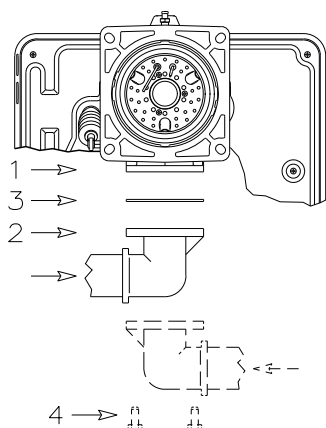
Refit screws 2) on slide bars 3).

Fix the burner to the pipe coupling with the screw 1).

Important

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

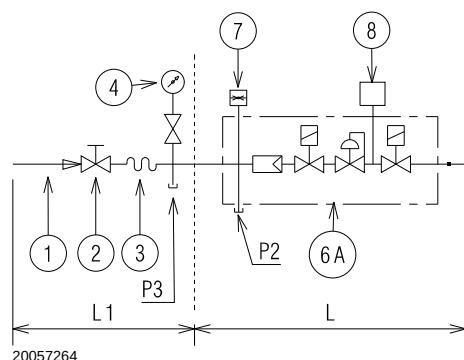




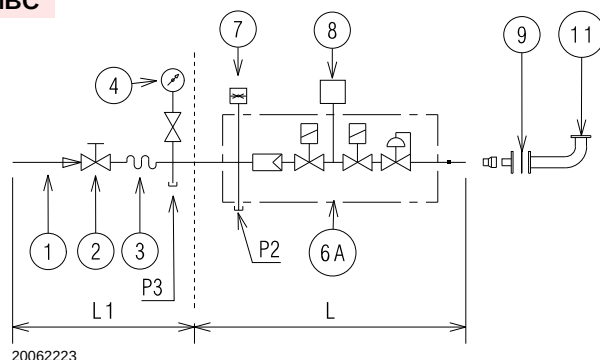
(A)

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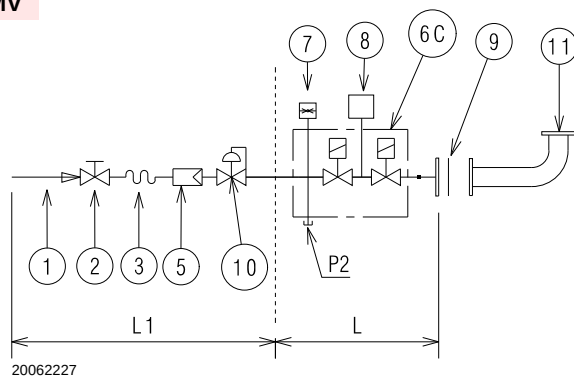
MB



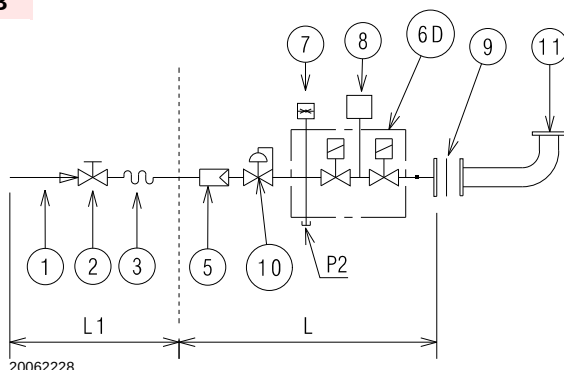
MBC



DMV



CB



GAS FEEDING LINE



WARNING

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



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

Precautions: avoid knocking, attrition, sparks and heat.

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

- The gas train must be connected to the gas attachment 1)(A), using flange 2), gasket 3) and screws 4) supplied with the burner.
- The gas train can enter the burner from the right or left side, depending on which is the most convenient, see fig.(A).
- 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.

GAS TRAIN

Approved, together with the burner, according to the regulation EN 676, and supplied separately from the burner.

KEY TO LAYOUT(B)

- 1 Gas input pipe
- 2 Manual valve
- 3 Vibration damping joint
- 4 Pressure gauge with pushbutton 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 device, supplied as an accessory or incorporated, based on the gas train code. In compliance with the EN 676 standard, the leak detection control is 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 Upstream pressure of valves/adjuster
- P3 Upstream pressure of the filter
- L Gas train supplied separately
- L1 The responsibility of the installer

Note

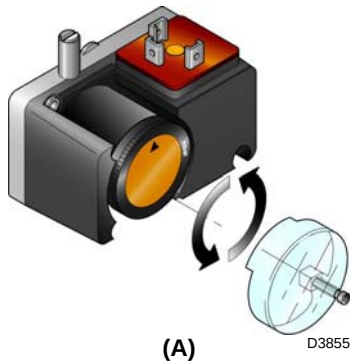
See the accompanying instructions for the adjustment of the gas train.

To select the correct model of the gas train, refer to the "burner-gas train combination" manual supplied.

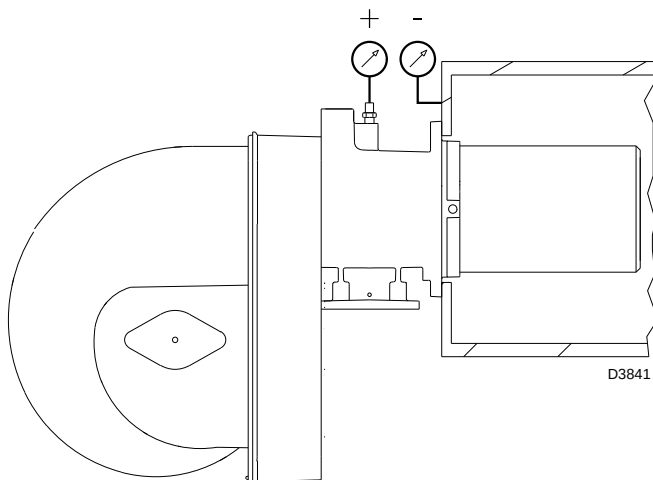
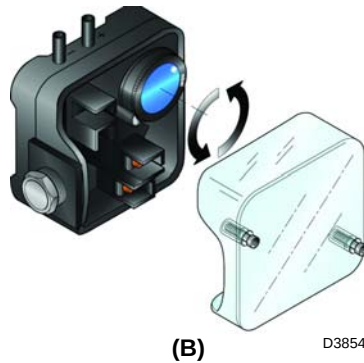
(B)

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MIN GAS PRESSURE SWITCH

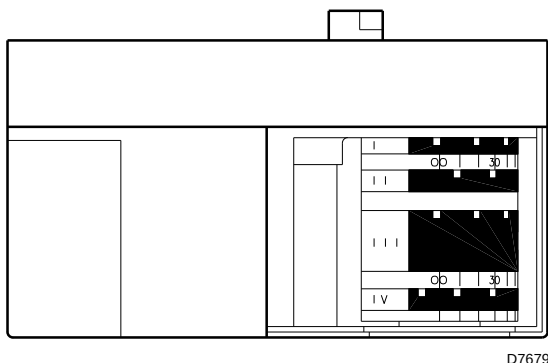


AIR PRESSURE SWITCH

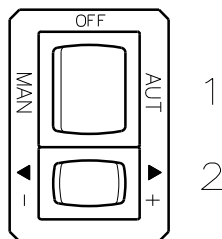


(C)

SERVOMOTOR



(D)



(E)

D3833



In the event of a burner lockout, more than two consecutive burner reset operations could cause damage to the installation. On the third lockout, contact the After-sales Service.

If further lockouts or burner faults occur, interventions must only be made by qualified, authorised personnel (as indicated in this manual, and in compliance with the laws and regulations currently in force).

ADJUSTMENTS PRIOR TO IGNITION



WARNING

THE FIRST IGNITION MUST BE CARRIED OUT BY QUALIFIED PERSONNEL WITH THE RIGHT INSTRUMENTS.

The adjustment of the combustion head, air, was described on page 8.

In addition, the following adjustments must also be made:

- open manual valves up-line from the gas train.
- Adjust the minimum gas pressure switch to the start of the scale (A).
- Adjust the air pressure switch to the start of the scale (B).
- Purge the air from the gas line.
Continue to purge the air (we recommend using a plastic tube routed outside the building) until gas is smelt.
- Assemble a pressure gauge (C) on the gas pressure socket of the pipe coupling.
The manometer readings are used to calculate MAX. burner power using the tables on page 6.
- Connect two lamps or testers to the two gas line solenoid valves VR and VS, to check the exact moment at which voltage is supplied.
This operation is unnecessary if each of the two solenoid valves is equipped with a pilot light that signals voltage passing through.

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.

SERVOMOTOR (D)

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 through 90° degrees in 24 seconds.

Do not alter the factory setting for the 4 cams; simply check that they are set as indicated below:

Cam I : 90°

Limits rotation toward maximum position. When the burner is at max output, the gas butterfly valve must be fully open: 90°.

Cam II : 0°

Limits rotation toward the minimum position.

When the burner is shut down, the air damper and gas butterfly valve must be closed: 0°.

Cam III : 15°

Adjusts the ignition position and the MIN output.

Cam IV : Integral with cam III

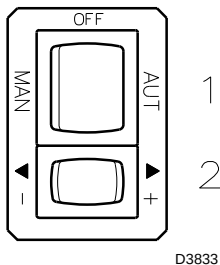
BURNER START-UP

Switch off the remote controls and place the switch 1)(E) in position "MAN".

As soon as the burner starts, check the direction of rotation of the fan blade, looking through the flame inspection window 17)(A)p.4. 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, stop the burner immediately and check the electrical connections.

BURNER IGNITION

Having completed the checks indicated in the previous heading, ignition of the burner should be achieved. 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 ignition is still not achieved, it may be that gas is not reaching the combustion head within the safety time period of 3 seconds. In this case, increase gas ignition delivery. The arrival of gas to the pipe coupling is shown by the pressure gauge (C). Once ignition has taken place, proceed with global calibration operations.



(A)

BURNER CALIBRATION

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

Adjust successively:

- 1 - Output upon ignition (minimum)
- 2 - Max. burner output
- 3 - Intermediate outputs between Min. and Max.
- 4 - Air pressure switch
- 5 - Minimum gas pressure switch

DETERMINATION OF OUTPUT UPON IGNITION (MINIMUM)

According to the regulation EN 676.

Burners with MAX output up to 120 kW

Ignition can be performed 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 be performed 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 regulations prescribe that the value be defined according to the control box safety time "ts":

for "ts" = 3s, ignition output must be equal to, or lower than, 1/3 of max. 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 24)(A)p.4 on the ionisation probe cable (the burner will fire and then go into lockout after the safety time has elapsed).
- Perform 10 ignitions with consecutive lockouts.
- Read, on the meter, the quantity of gas burned.

This quantity must be equal to, or lower than, the quantity given by the formula, for ts = 3s:

$$Vg = \frac{Qa \text{ (max. burner output)} \times n \times ts}{3600}$$

Vg: volume supplied upon ignitions carried out (Sm³)

Qa: ignition output (Sm³/h)

n: number of ignitions (10)

ts: safety time (sec)

Example for gas G 20 (9.45 kWh/Sm³):

ignition output 150 kW

corresponding to 15.87 Sm³/h.

After 10 ignitions with lockout, the output indicated on the meter must be equal to, or less than:

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

1 - OUTPUT UPON IGNITION (MINIMUM)

Min output must be selected within the firing rate range shown on page 5.

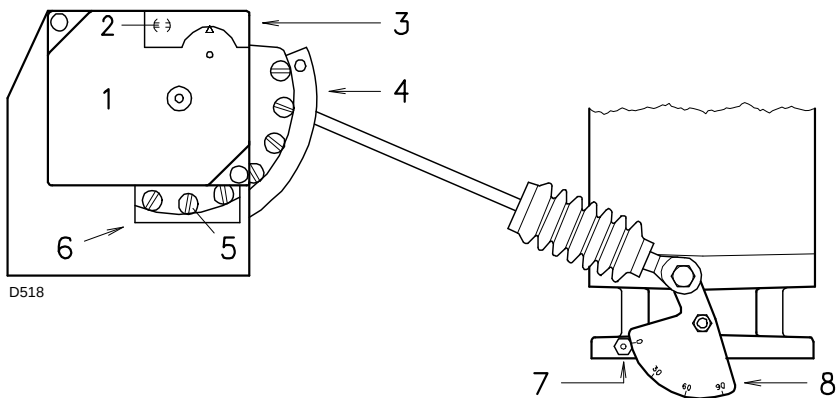
Press the button 2)(A) "output reduction", and keep it pressed until the servomotor has closed the air damper and the gas butterfly valve at 15° (adjustment made in the factory).

Adjusting gas delivery

Measure the delivery of gas from the gas meter.

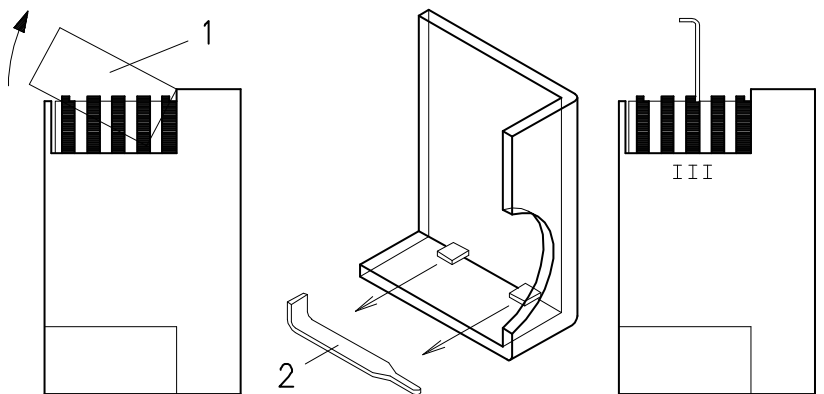
- If it is necessary to reduce it, reduce slightly the angle of cam III fig.(B)p.12 with small, regular movements, i.e. bring it from an angle of 15° to 13° - 11°....
- If it is necessary to increase it, press slightly the button "output increase" 2)(A) (open by 10-15° the gas butterfly valve), increase the angle of cam III fig.(B)p.12 with small, regular movements, i.e. bring it from an angle of 15° to 17° - 19°....

Then press the button "output reduction" until the servomotor is in the position of minimum opening, and measure the gas output.



- | | |
|-------------------------------------|---|
| 1 Servomotor | 5 Screws for adjusting the variable profile |
| 2 ⊖ Constraint / ⊕ Release of cam 4 | 6 Slit to access the screws 5 |
| 3 Cam cover | 7 Index of graduated sector 8 |
| 4 Variable profile cam | 8 Gas butterfly valve graduated sector |

(A)



(B)

NOTE

The servomotor follows the adjustment of cam III only when the angle of the cam is reduced. If it is necessary to increase the angle of the cam, you must first increase the angle of the servomotor by means of the "output increase" key, then increase the angle of cam III, and finally bring the servomotor to the position of MIN output, with the "output reduction" key.

If it is necessary to adjust cam III, remove the cover 1) (inserted with a trigger catch, as indicated in fig. (B)), extract the special key 2) from inside, and insert it in the notch of cam III.

Adjustment of air delivery

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

2 - MAX. OUTPUT

Max. output of the burner must be set within the firing rate range shown on page 5.

In the above description, we left the burner switched on, working at MIN output. Now press the button 2)(A)p.11 "output increase", and keep it pressed until the servomotor has opened the air damper and the gas butterfly valve at 90°.

Adjusting gas delivery

Measure the delivery of gas from the gas meter. As a general rule, it can be seen from the table on page 6, just read the gas pressure on the pressure gauge, see fig.(C)p.10, and follow the indications given on page 6.

- 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)(A) by turning the cam adjustment screws as they appear through the access opening 6)(A).

- Turn the screws clockwise to increase air delivery.
- Turn the screws anti-clockwise to reduce air delivery.

3 - INTERMEDIATE OUTPUTS

Adjusting gas delivery

No adjustment of gas delivery is required.

Adjustment of air delivery

Press the key 2)(A)p.11 "output increase" a little so that a new screw 5)(A) appears in the opening 6)(A). Adjust it until optimal combustion is obtained. Proceed in the same way with the other screws.

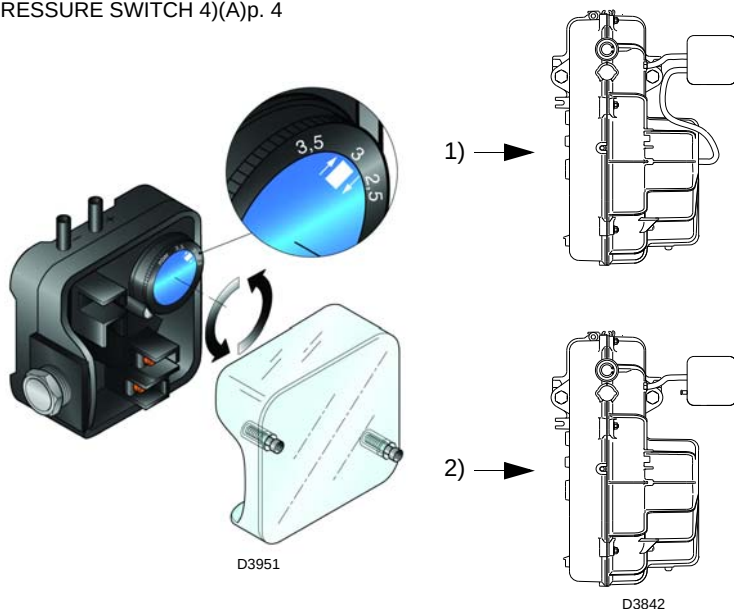
Take care that the cam profile variation is progressive.

Switch the burner off with the switch 1)(A)p.11. Release the variable profile cam by putting the servomotor slot 2)(A) in a vertical position and check more than once, rotating the cam forward and backward by hand, that the movement is soft and smooth, without sticking.

As far as is possible, try not to move those screws at the ends of the cam that were previously adjusted for the opening of the air damper to MAX and MIN output.

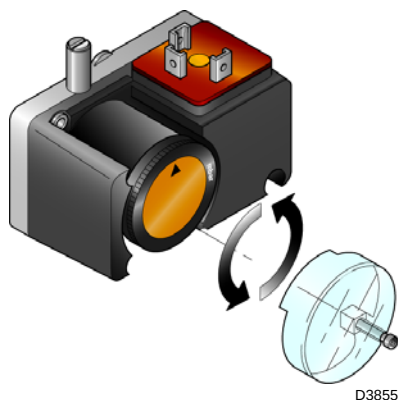
NOTE

Once you have finished adjusting outputs MAX - MIN - INTERMEDIATE, check ignition once again: noise emission at this stage must be identical to the following stage of operation. If you notice any sign of pulsations, reduce the ignition stage delivery.

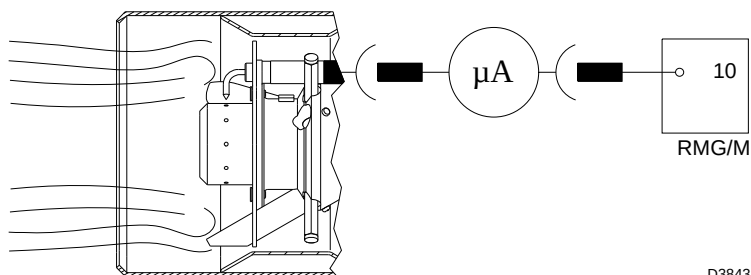


(A)

MINIMUM GAS PRESSURE SWITCH



(B)



(C)

4 - AIR PRESSURE SWITCH (A)

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

With the burner working at MIN output, insert a combustion analyser in the stack, slowly close the suction inlet of the fan (for example, with cardboard) until the CO value does not exceed 100 ppm.

Then slowly turn the appropriate knob clockwise until the burner reaches the lockout position.

Check the indication of the arrow pointing upwards on the graduated scale (A). Turn the knob clockwise again, until the value shown on the graduated scale corresponds with the arrow pointing downwards (A), and so recovering the hysteresis of the pressure switch (shown by the white mark on a blue background, between the two arrows).

Now check the correct start-up of the burner.

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

The incorporated air pressure switch can work in a "differential" way if connected with two pipes; see 1)(A). If a strong depression in the combustion chamber during the pre-purging phase does not allow the air pressure switch to commute, commutation can be obtained by applying a second tube between the air pressure switch and the suction inlet of the fan. In this way, the pressure switch will work in differential mode.

5 - MINIMUM GAS PRESSURE SWITCH (B)

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

Then turn the knob anti-clockwise by 5mbar and repeat burner starting to ensure it is uniform.

If the burner locks out again, turn the knob anti-clockwise again by 1mbar.

FLAME PRESENCE CHECK (C)

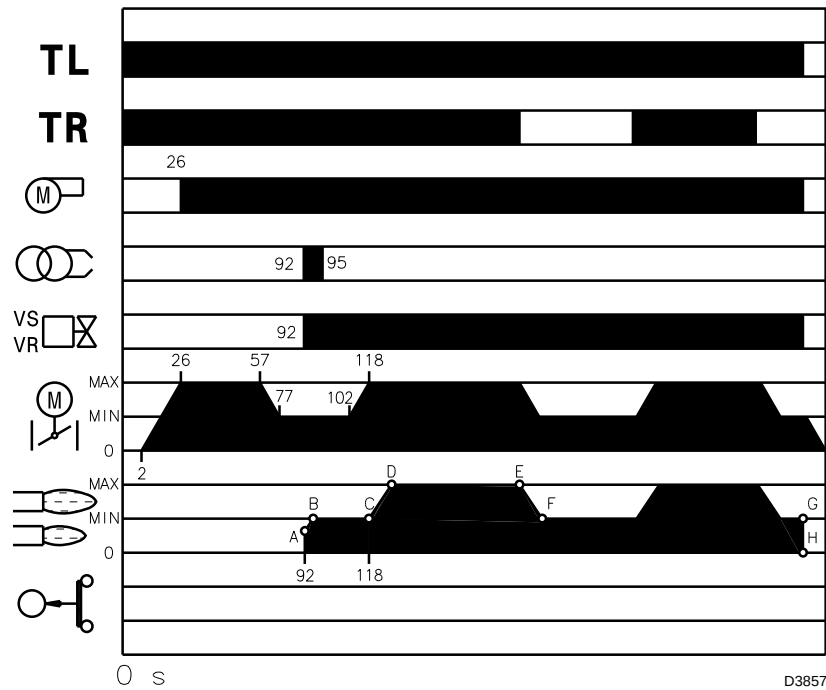
The burner is fitted with an ionisation system which ensures that a flame is present. The minimum current for control box operation is 6 μ A. The burner provides a much higher current, so controls are not normally required. However, if it is necessary to measure the ionisation current, disconnect the plug-socket 24)(A)p.4 on the ionisation probe cable and insert a direct current microammeter with a base scale of 100 μ A. Carefully check polarities.



1 kPa = 10 mbar

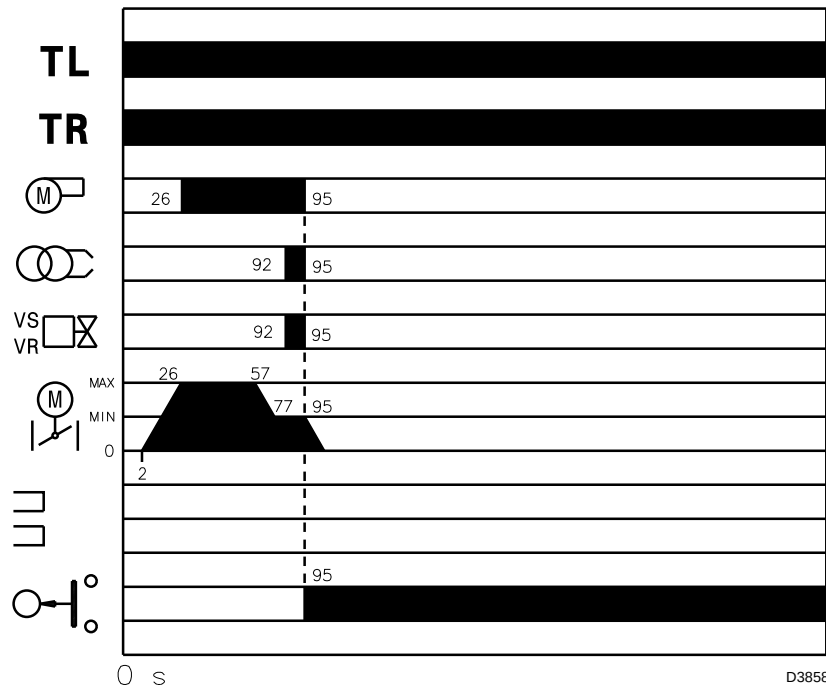
STANDARD IGNITION

(n° = seconds from the moment 0)



(A)

IGNITION FAILURE



(B)

BURNER OPERATION

BURNER START-UP (A)

- 0s: Closure of thermostat/pressure switch TL.
- 2s: Start of electrical control box programme. Servomotor starts: rotate to the left by 90°, i.e. until the contact intervenes with cam I (D)p. 10.
- 26s: The air damper arrives to the MAX. output position. The fan motor starts up. Start of the pre-purging phase.
- 57s: The servomotor rotates towards the right, as far as the angle set on cam III (D)p. 10 for MIN. output.
- 77s: The air damper and the gas butterfly valve adopt the MIN output position (with cam III)(D)p.10 at 15°).
- 92s: Ignition electrode strikes a spark. The safety valve VS opens, along with the adjustment valve VR, quick opening. The flame is ignited at a low output level, point A. Delivery is then progressively increased, with the valve VR opening slowly up to MIN. output, point B.
- 94s: The spark goes out.
- 118s: The start-up cycle ends.

STEADY STATE OPERATION (A)

Burner without modulating operation kit

Once the start-up cycle is completed, the servomotor command moves on to the thermostat/pressure switch TR that controls the pressure or the temperature in the boiler, point C. (The electrical control box still continues to check the presence of the flame and the correct position of the air and gas pressure switches).

- If the temperature or the pressure is low, so the thermostat/pressure switch TR is in the output request position, the burner progressively increases the output up to the MAX value (tract C-D).
- If the temperature or the pressure increases until the commutation of TR, the burner progressively reduces the output up to the MIN value (tract E-F). And so on.
- The burner locks out when demand for heat is less than the heat supplied by the burner at min. output, (section G-H). The thermostat/pressure switch TL opens, and the servomotor returns to the angle 0°. The damper closes completely to reduce thermal dispersions to a minimum.

Burner with modulating operation kit

See the handbook enclosed with the regulator.

IGNITION FAILURE (B)

If the burner does not switch on, the gas valve goes into lockout within 3s of the opening.

BURNER FLAME GOES OUT DURING OPERATION

If the flame goes out by accident during the operation, the burner goes into lockout within 1s.

FINAL CHECKS (with the burner working):

- disconnect a wire of the minimum gas pressure switch;
- switch on the thermostat/pressure switch TL;
- switch on the thermostat/pressure switch TS;
the burner must stop.
- disconnect the air addition tube of the pressure switch;
- disconnect the wire of the ionisation probe;
the burner must stop in lockout.

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

MAINTENANCE



The burner requires periodic maintenance carried out by a qualified and authorised technician **in conformity with legislation and local standards.**



Periodic maintenance is essential for the reliability of the burner, avoiding the excessive consumption of fuel and consequent pollution.



Before carrying out any cleaning or control, always switch off the electrical supply to the burner, using the main switch of the system.

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 there are no gas leaks on the pipe-work between the gas meter and the burner.

Gas filter

Substitute the gas filter when dirty (see train instructions).

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. If in doubt, disassemble the elbow.

Servomotor

Release the cam 4)(A)p.12, rotating by 90° the notch 2)(A)p.12, and manually check that it rotates smoothly backwards and forwards. Constrain the cam again 4)(A)p.12.

Burner

Check for excess wear or loose screws in the mechanisms that control 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.

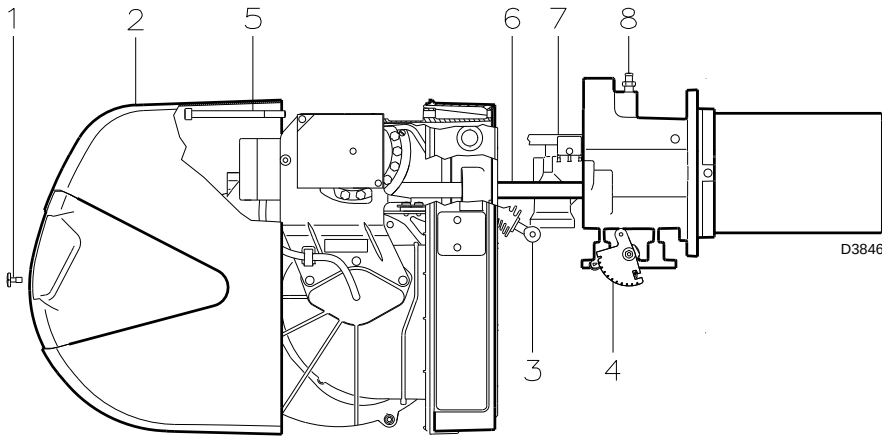
Clean the outside of the burner, taking special care with the transmission joints and cam 4)(A)p.12.

Combustion

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

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

OPENING THE BURNER



(A)

TO OPEN THE BURNER (A):

- Switch off the electrical power.
- Remove the screw 1) and pull out the hood 2).
- Disengage the articulated coupling 3) from the graduated sector 4).
- Remove the screw 5) only with the long head models; pull the burner back on the guides 6) for about 100mm. Disconnect the probe and electrode leads and then pull the burner fully back.

Now extract the gas distributor 7) after having removed the screw 8).

Remove the screws 2)(B)p. 7 and tighten the two extensions 25)(A)p.4 supplied with the burner.

Retighten the two screws 2)(B)p.7 on the terminal of the extensions.



ATTENTION

Proceed with the assembly of the inner part of the combustion head, tightening the screw 8)(A) with a tightening torque of $4 \div 6 \text{ Nm}$.

TO CLOSE THE BURNER (A):

- Push the burner up to approximately 100mm from the pipe coupling.
- Reconnect the leads and slide in the burner until it comes to a stop.
- Replace the screw 5) and carefully pull the probe and electrode cables outwards until they are slightly taut.
- Re-couple the articulated coupling 3) to the graduated sector 4).
- In the long head models, unscrew the extensions and reposition them in the appropriate space; tighten the screws to the guides 2)(C)p.7.
- Reposition the hood 2) and fix with the screw 1).

SWITCHBOARD MAINTENANCE

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

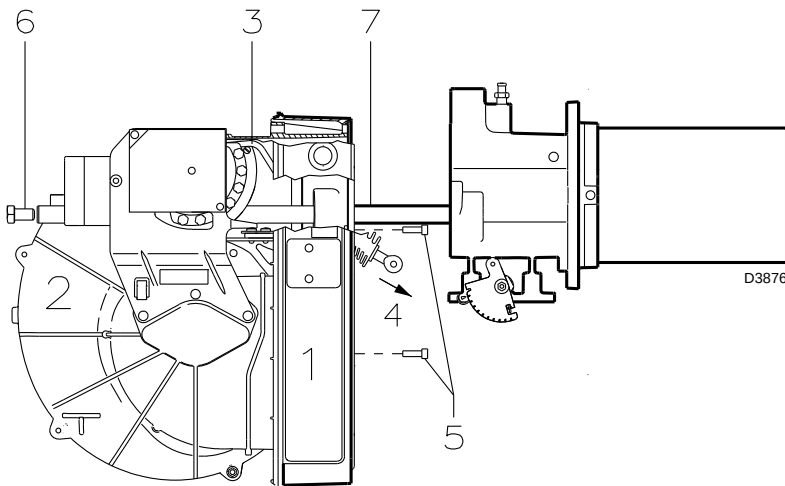
With the burner open as in fig.(A), unhook the tie-rod 3)(B), removing the screw on the variable profile cam, and extract it from the tip 4)(B).

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

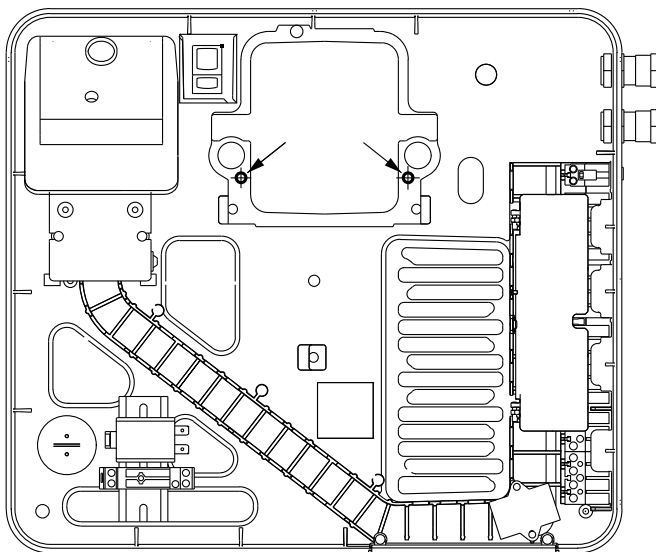
Remove the 3 screws 5)(B) positioned on the protective cover.

Removing the 2 screws 6)(B), it is possible to unthread the fan unit 2)(B) from the guides 7)(B).

Finally, you can use 2 of the 3 screws 5)(B) to fix the electrical switchboard to the pipe coupling, in the points indicated in fig.(C), and then carry out the maintenance operations.



(B)



(C)

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BURNER START-UP CYCLE DIAGNOSTICS

During start-up, the indications are explained in the following table:

COLOUR CODE TABLE	
Sequences	Colour code
Pre-purging	● ● ● ● ● ● ● ● ● ●
Ignition phase	● ○ ● ○ ● ○ ● ○ ●
Operation, flame OK	□ □ □ □ □ □ □ □ □
Operation with weak flame signal	□ ○ □ ○ □ ○ □ ○ □
Electrical supply lower than ~ 170V	● ▲ ● ▲ ● ▲ ● ▲ ●
Lockout	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲
Extraneous light	▲ □ ▲ □ ▲ □ ▲ □ ▲
Key to layout: ○ Off ● Yellow □ Green ▲ Red	

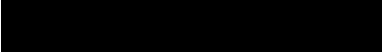
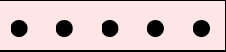
RESET OF CONTROL BOX AND DIAGNOSTICS USE

The control box supplied features a diagnostics function, through which any causes of malfunctioning can be easily identified (indicator: **RED LED** signal).

To use this function, wait at least 10 seconds from when the safety condition has been set (**lockout**), then press the reset button.

The control box generates a sequence of led pulses (1 second apart) that is repeated at constant intervals of 3 seconds.

Once the number of LED pulses has been visualised, and the possible cause identified, it is necessary to reset the system, keeping the button pressed for 1-3 seconds.

RED LED illuminated wait at least 10s	Lockout	Press reset for > 3 s	led pulses	Interval 3 s	led pulses
					

Below, a list of the possible methodologies for carrying out the resetting of the control box and for using the diagnostics.

CONTROL BOX RESET

To reset the control box, proceed as follows:

- Press and hold the button for 1-3 seconds.

The burner starts up again, 2 seconds after the button is released. If the burner does not restart, make sure the limit thermostat is closed.



In the event of a burner lockout, more than two consecutive burner reset operations could cause damage to the installation. On the third lockout, contact the Aftersales Service.



If further lockouts or burner faults occur, interventions must only be made by qualified, authorised personnel (as indicated in this manual, and in compliance with the laws and regulations currently in force).

VISUAL DIAGNOSTICS

Indicate the type of burner fault that leads to the lockout.

To display the diagnostic, proceed as follows:

- Keep the button pressed for more than 3 seconds from when the red LED (burner lockout) switches on.

The end of the operation will be shown by a yellow led pulse.

Release the button when you see the flashing. The number of flashes indicates the cause of the malfunctioning, on the basis of the code given in the table on page 18.

SOFTWARE DIAGNOSTICS

Gives an analysis of the life of the burner, through optical connections with a PC showing the working hours, number and types of lockout, control box serial number etc.

To display the diagnostic, proceed as follows:

- Keep the button pressed for more than 3 seconds from when the red LED (burner lockout) switches on.

The end of the operation will be shown by a yellow led pulse.

Release the button for 1 second, then press it again for more than 3 seconds, until you see another yellow flash.

When you release the button, the red led will flash intermittently with high frequency: only then is it possible to insert the optical connection.

When the operation is completed, it is necessary to reset the start-up condition of the control box, using the reset procedure described above.

PRESSURE ON THE BUTTON	STATE OF CONTROL BOX
From 1 to 3 seconds	Reset of the control box without visualisation of the visual diagnostics.
More than 3 seconds	Visual diagnostics of the lockout condition: (led flashes at 1 second intervals).
More than 3 seconds, starting from the condition of visual diagnostics	Software diagnostics, with the help of optical interface and PC (possibility to visualise the working hours, irregularities, etc.)

The sequence of led pulses issued by the control box identifies the possible types of fault, which are listed in the table on page 18.

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	1 - The operation solenoid lets little gas through 2 - One of the two solenoid valves does not open. 3 - Gas pressure too low 4 - Ignition electrode incorrectly adjusted 5 - Electrode grounded due to broken insulation 6 - High voltage cable defective 7 - High voltage cable deformed by high temperature 8 - Ignition transformer defective. 9 - Incorrect valve or transformer electrical wiring 10 - Defective control box 11 - A closed valve upline the gas train 12 - Air in pipework 13 - Gas valves unconnected or with interrupted coil	Increase Replace Increase pressure at governor Adjust Replace Replace Replace and protect Replace Check Replace Open Bleed air Check connections or replace coil
3 blinks ● ● ●	The burner does not switch on, and the lockout appears The burner switches on, but then stops in lockout Lockout during pre-purging phase	14 - Air pressure switch in operating position - Air pressure switch inoperative due to insufficient air pressure: 15 - Air pressure switch incorrectly adjusted. 16 - Pressure switch pressure test point pipe blocked 17 - Poorly adjusted head 18 - High pressure in the furnace 19 - Defective motor control contactor (only three-phase version) 20 - Defective electrical motor. 21 - Motor lockout (defective electrical motor)	Adjust or replace Adjust or replace Clean Adjust Connect air pressure switch to fan suction line Replace Replace Replace
4 pulses ● ● ● ●	The burner switches on, but then stops in lockout Lockout when burner stops	22 - Flame simulation 23 - Permanent flame in the combustion head or flame simulation	Replace the control box Eliminate persistence of flame or replace control box
6 blinks ● ● ● ● ● ●	The burner switches on, but then stops in lockout	24 - Defective or incorrectly adjusted servomotor.	Adjust or replace
7 blinks ● ● ● ● ● ● ●	The burner goes into lockout immediately following the appearance of the flame Burner locks out when shifting from minimum to maximum output and vice versa Burner goes into lockout during operation	25 - The operation solenoid lets little gas through 26 - Ionisation probe incorrectly adjusted 27 - Insufficient ionisation (less than 5 A) 28 - Earth probe 29 - Burner poorly grounded 30 - Phase and neutral connections inverted 31 - Defective flame detection circuit 32 - Too much air or too little gas 33 - Probe or ionisation cable grounded	Increase Adjust Check probe position Withdraw or replace cable Check grounding Invert them Replace the control box Adjust air and gas Replace worn parts
10 blinks ● ● ● ● ● ● ● ● ● ●	The burner does not switch on, and the lockout appears The burner goes into lockout	34 - Incorrect electrical wiring 35 - Defective control box 36 - Presence of electromagnetic disturbances in the thermostat lines 37 - Presence of electromagnetic disturbance	Check Replace Filter or eliminate Use the radio disturbance protection kit
No blink	The burner does not start The burner continues to repeat the start-up cycle, without lockout Ignition with pulsations Burner does not reach maximum output Burner stops with air damper open	38 - No electrical power supply 39 - A limiter or safety control device is open 40 - Line fuse blocked. 41 - Defective control box 42 - No gas supply 43 - Mains gas pressure insufficient 44 - Minimum gas pressure switch fails to close. 45 - Servomotor fails to move to min. ignition position 46 - The gas pressure in the gas mains lies very close to the value to which the minimum 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 47 - Poorly adjusted head 48 - Ignition electrode incorrectly adjusted 49 - Incorrectly adjusted fan air damper: too much air 50 - Output during ignition phase is too high. 51 - Remote control device TR fails to close. 52 - Defective control box 53 - Defective servomotor 54 - Defective servomotor	Close all switches - Check connections Adjust or replace Replace Replace Open the manual valves between contactor and train Contact your GAS COMPANY Adjust or replace Replace Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge. Adjust Adjust Adjust Reduce Adjust or replace Replace Replace Replace

NORMAL OPERATION / FLAME DETECTION TIME

The control box has a further function to guarantee the correct burner operation (signal: **GREEN LED** permanently on).

To use this function, wait at least ten seconds from the burner ignition and then press the control box button for a minimum of 3 seconds.

After releasing the button, the GREEN LED starts flashing as shown in the figure below.



The pulses of the LED constitute a signal spaced by approximately 3 seconds.

The number of pulses will measure the probe DETECTION TIME since the opening of gas valves, according to the following table:

SIGNAL	FLAME DETECTION TIME
1 blink ●	0.4s
2 blinks ● ●	0.8s
6 blinks ● ● ● ● ● ●	2.8s

This is updated in every burner start-up.

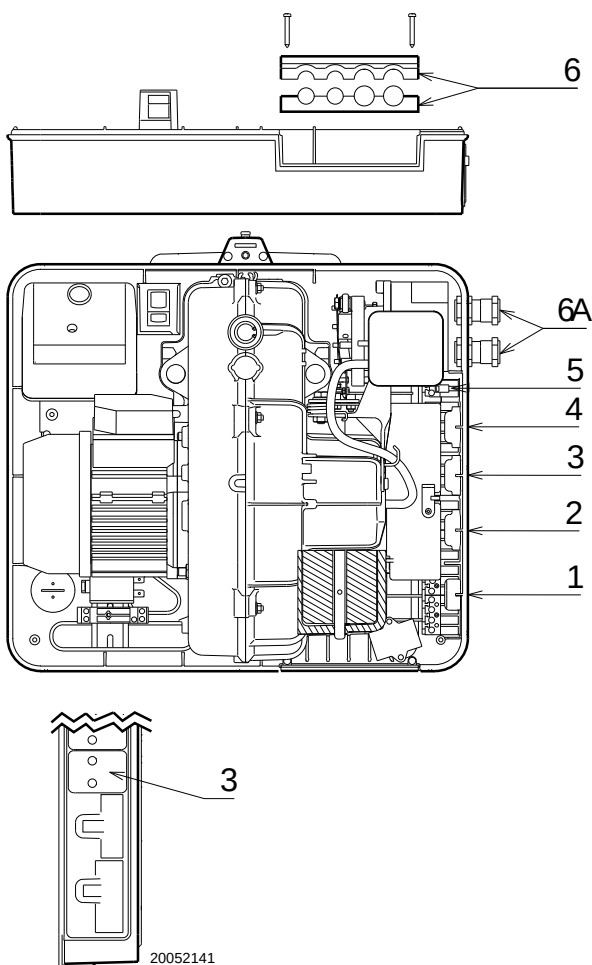
Once read, the burner repeats the start-up cycle by briefly pressing the control box button.

WARNING

If the result is > 2s, ignition will be retarded.

Check the adjustment of the hydraulic brake of the gas valve, the air damper and the combustion head adjustment.

KIT INTERFACE ADAPTER RMG TO PC Code **3002719**



Electrical connections



NOTES

The electrical wirings must be carried out in conformity with the regulations in force in the countries of destination, and by qualified personnel.
Riello S.p.A. cannot accept any responsibility for modifications or connections other than those shown in these diagrams.

Use flexible cables, in accordance with the regulation EN 60 335-1.

All the cables to be connected to the burner must pass through cable grommets.

The use of cable grommets can take various forms; the following way is just one possible solution:

RS 34-44/M MZ single-phase

- 1- 7-pole socket for single-phase power supply, thermostat/pressure switch TL
- 2- 6-pole socket for gas valves, gas pressure switch or device for checking the valve seal
- 3- 4-pole socket for thermostat/pressure switch TR (with removable cover)
- 4- 5-pole socket, not used
- 5- 2-pole socket for max gas pressure switch accessory
- 6 - 6A Fittings for pipe unions
(Pierce, if it is necessary to use the pipe unions 6A)

RS 44/M MZ three-phase

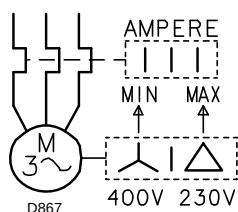
- 1- 7-pole socket for single-phase power supply, thermostat/pressure switch TL
- 2- 6-pole socket for gas valves, gas pressure switch or device for checking the valve seal
- 3- 4-pole socket for thermostat/pressure switch TR (with removable cover)
- 4- 5-pole socket for three-phase power supply
- 5- 2-pole socket for max gas pressure switch accessory
- 6 - 6A Fittings for pipe unions
(Pierce, if it is necessary to use the pipe unions 6A)



The socket cover 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.



ADJUSTMENT OF THERMAL CUTOUT (RS 44/M MZ THREE-PHASE)

Used to avoid the burning of the motor owing to a strong increase in the absorption, caused by the lack of a phase.

- If the motor is star-driven, **400V**, the cursor must be positioned on "MIN".
 - If it is delta-driven, **230V**, the cursor is positioned on "MAX".
- If the scale of the thermal cutout does not include the absorption of rating of the motor at 400V, the protection is guaranteed anyway.

NOTES

- The model RS 44/M MZ three-phase leaves the factory with an electrical supply setting of **400V**. If **230V** power supply is used, change the motor connection from star to delta and change the setting of the thermal cutout as well.
- The burners RS 34-44/M MZ have been approved for intermittent operation. This means they should be compulsorily stopped at least once every 24 hours to enable the control box to perform a check of its own efficiency at start-up. Normally, the stopping of the burner is guaranteed by the boiler's thermostat/pressure switch. If this is not the case, a time switch should be fitted in series to IN to provide for burner shut-down at least once every 24 hours.
- The burners RS 34-44/M MZ leave the factory set for two-phase operation, so the thermostat/pressure switch TR must be connected. If you want the burner to work with single-phase operation, insert (in place of the thermostat/pressure switch TR) a bridge between the terminals T6 - T7 of the plug X4.

MODULATING OPERATION

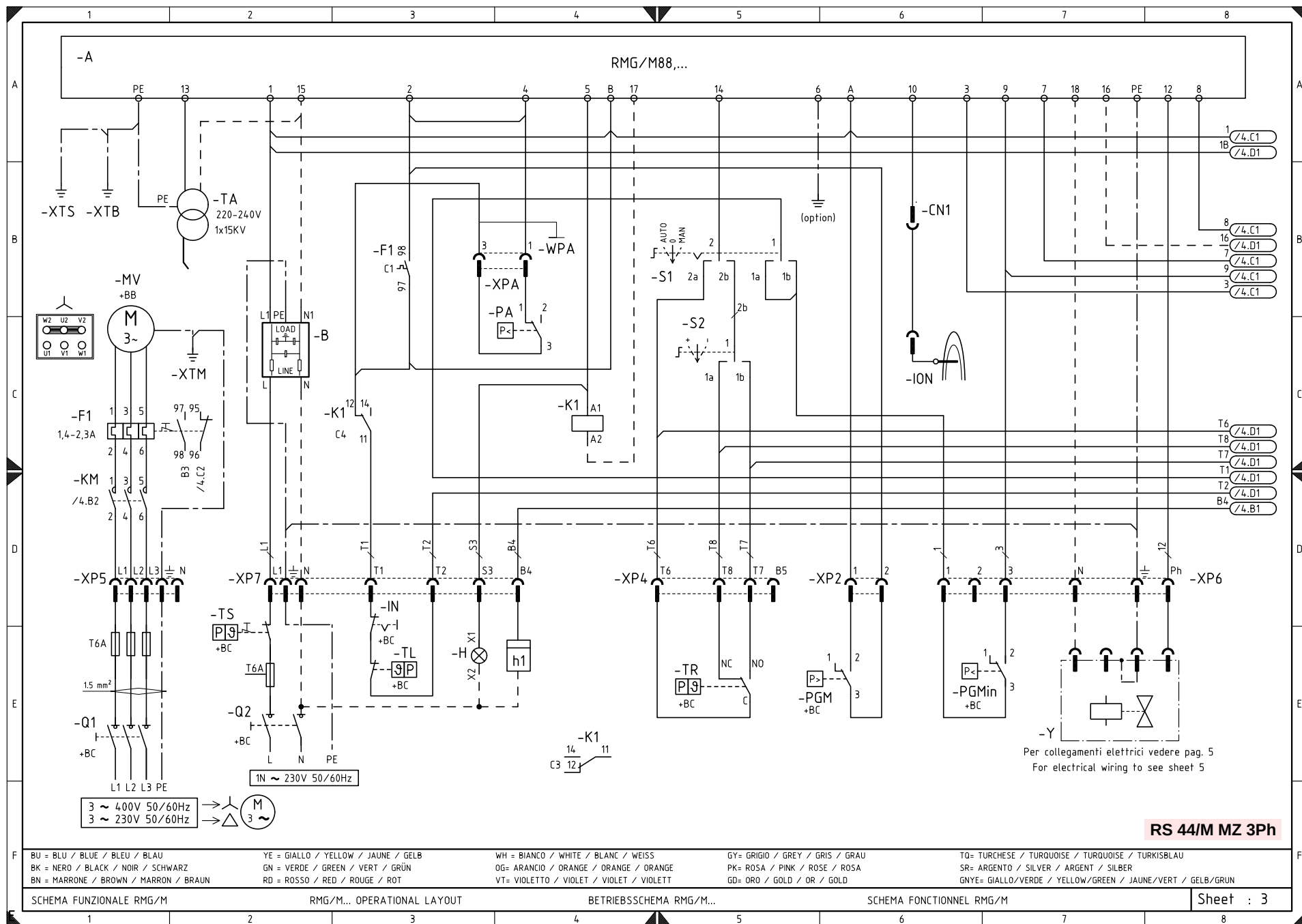
If the output power regulator kit RWF or the converter 0...10V / 4...20mA is connected, in 3-point signal, the thermostat/pressure switch TR must be removed (if the 4-pole socket becomes unhooked, apply the supplied cover).

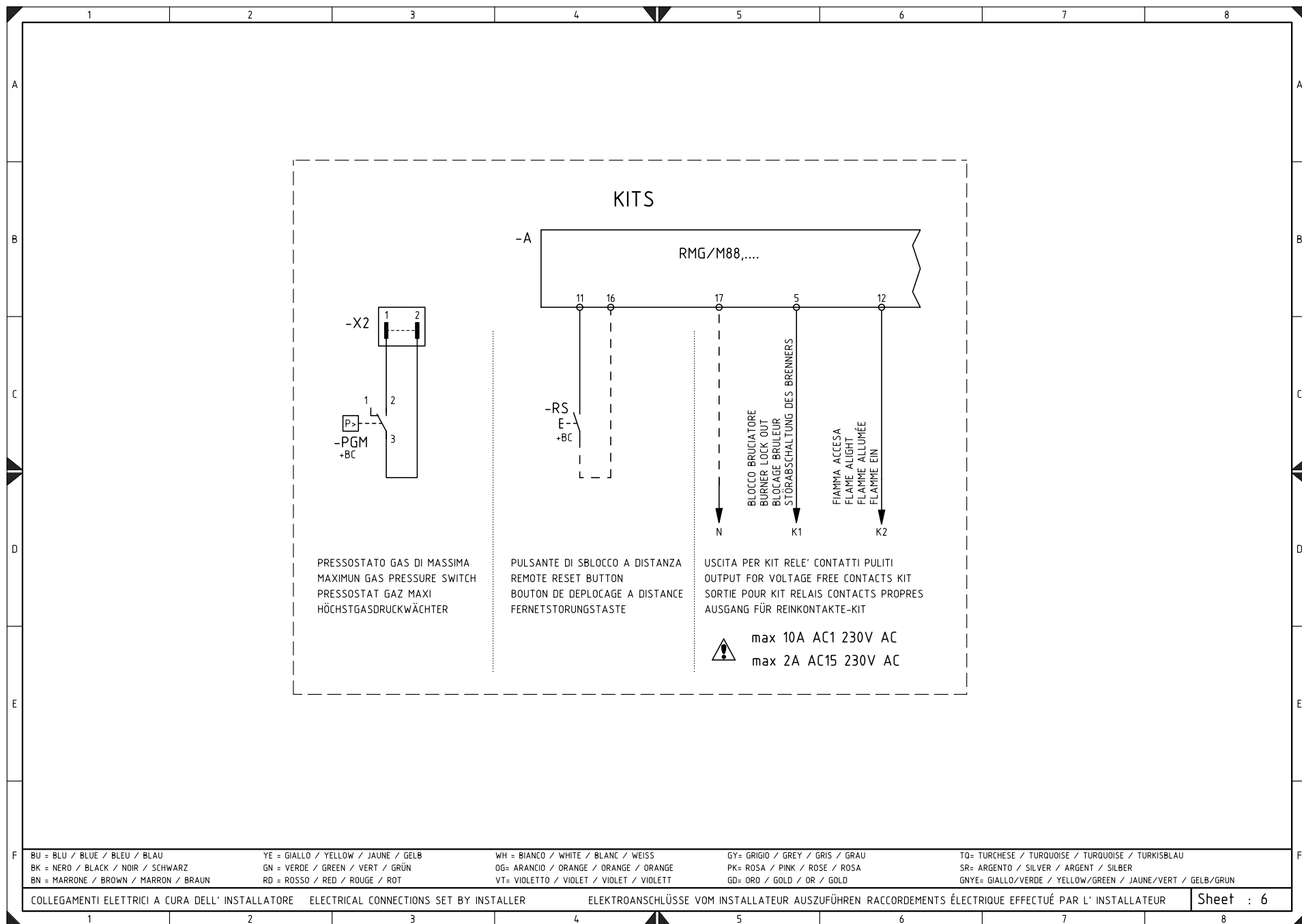
Using just the regulator RWF also remove the TL thermostat/pressure switch.



ATTENTION:

- Do not invert the neutral with the phase in the electrical supply line. An inversion would lead to lockout due to ignition failure.
- Replace the components only with original spare parts.





KEY TO ELECTRICAL LAYOUT

A	Electrical control box
B	Radio noise filter
B1	Output power regulator RWF
BA	Input under current 4...20 mA DC
BA1	Input under current 4...20 mA DC to modify the setpoint
+BB	Components on burners
+BC	Components on boiler
BP	Pressure probe
BP1	Pressure probe
BR	Remote setpoint potentiometer
BT1	Thermocouple probe
BT2	Two-wire probe Pt100
BT3	Three-wire probe Pt100
BT4	Four-wire probe Pt100
BTEXT	External probe for climatic setpoint compensation
BV	Input under voltage 0...10 V DC
BV1	Input under voltage 0...10 V DC to modify the remote setpoint
C1	Capacitor
CN1	Ionisation probe connector
CN2	Connector
CN3	Connector
F1	Fan motor thermal relay
H	Remote lockout signalling
H1	Lockout YVPS
IN	Manual burner stop switch
ION	Ionisation probe
h1	Hour counter
K1	Relay
KM	Motor contact maker
MV	Fan motor
PA	Air pressure switch
PGM	Maximum gas pressure switch
PGMin	Low gas pressure switch
Q1	Three phase knife switch
Q2	Single-phase knife switch
RS	Remote reset button
S1	Unlit / automatic/ manual selector switch
S2	Power increase/decrease selector switch
SM	Servomotor
TA	Ignition transformer
TL	Limit thermostat/pressure switch
TR	Adjustment thermostat/pressure switch
TS	Safety thermostat/pressure switch
Y	Gas regulation valve + gas safety valve
YVPS	Gas valve leak detection control device
XPA	Air pressure switch connector
XP1	Modulation kit socket
XP2	Maximum gas pressure switch connector
XP4	4-pole socket
XP5	5-pole socket
XP6	6-pole socket
XP7	7-pole socket
XRWF	Output power regulator RWF terminal strip
XSM	Servomotor connector
XTB	Shelf earth
XTM	Fan assembly earth
XTS	Servomotor assembly earth
X2	2-pin plug
X4	4-pin plug
X5	5-pin plug
X6	6-pin plug
X7	7-pin plug
X9	9-pin plug

LEYENDA ESQUEMAS ELÉCTRICOS

A	Caja de control eléctrica
B	Filtro antiinterferencias radio
B1	Regulador de potencia RWF
BA	Entrada en corriente 4...20 mA DC
BA1	Entrada en corriente 4...20 mA DC para modificar setpoint a distancia
+BB	Componentes a bordo de los quemadores
+BC	Componentes a bordo de la caldera
BP	Sonda de presión
BP1	Sonda de presión
BR	Potenciómetro setpoint a distancia
BT1	Sonda a termopar
BT2	Sonda Pt100 de 2 hilos
BT3	Sonda Pt100 de 3 hilos
BT4	Sonda Pt100 de 4 hilos
BTEXT	Sonda externa para la compensación climática del setpoint
BV	Entrada en tensión 0...10 V DC
BV1	Entrada en tensión 0...10 V DC para modificar setpoint a distancia
C1	Condensador
CN1	Conector para sonda de ionización
CN2	Conector
CN3	Conector
F1	Relé térmico motor ventilador
H	Señalización de bloqueo a distancia
H1	Bloqueo YVPS
IN	Interruptor parada manual del quemador
ION	Sonda de ionización
h1	Cuentahoras
K1	Relé
KM	Contador motor
MV	Motor ventilador
PA	Presostato aire
PGM	Presostato gas de máxima
PGMin	Presostato gas de mínima
Q1	Interruptor seccionador trifásico
Q2	Interruptor seccionador monofásico
RS	Botón de desbloqueo quemador a distancia
S1	Selector apagado / automático / manual
S2	Selector aumento / disminución de potencia
SM	Servomotor
TA	Transformador de encendido
TL	Termostato/presostato de límite
TR	Termostato/presostato de regulación
TS	Termostato/presostato de seguridad
Y	Válvula de regulación gas + válvula de seguridad gas
YVPS	Dispositivo de control de estanqueidad válvula gas
XPA	Conector presostato aire
XP1	Conector hembra para kit modulación
XP2	Conector presostato gas de máxima
XP4	Conector hembra de 4 contactos
XP5	Conector hembra de 5 contactos
XP6	Conector hembra de 6 contactos
XP7	Conector hembra de 7 contactos
XRWF	Conector regulador de potencia RWF
XSM	Conector servomotor
XTB	Tierra ménsula
XTM	Tierra grupo ventilador
XTS	Tierra grupo servomotor
X2	Conector macho de 2 contactos
X4	Conector macho de 4 contactos
X5	Conector macho de 5 contactos
X6	Conector macho de 6 contactos
X7	Conector macho de 7 contactos
X9	Conector macho de 9 contactos

LEGENDA ESQUEMAS ELÉTRICOS

A	Caixa de controlo eléctrica
B	Filtro contra radio-interferências
B1	Regulador de potência RWF
BA	Entrada em corrente 4...20 mA DC
BA1	Entrada em corrente 4...20 mA DC para modificação do ponto de referência remoto
+BB	Componentes bordo queimadores
+BC	Componentes bordo caldeira
BP	Sonda de pressão
BP1	Sonda de pressão
BR	Potenciómetro ponto de referência remoto
BT1	Sonda por termopar
BT2	Sonda Pt100 de 2 fios
BT3	Sonda Pt100 de 3 fios
BT4	Sonda Pt100 de 4 fios
BTEXT	Sonda externa para a compensação climática do ponto de referência
BV	Entrada em tensão 0...10 V DC
BV1	Entrada em tensão 0...10 V DC para modificação do ponto de referência remoto
C1	Condensador
CN1	Conector sonda de ionização
CN2	Conector
CN3	Conector
F1	Relé térmico motor ventilador
H	Sinalização de bloqueio remoto
H1	Bloqueio YVPS
IN	Interruptor paragem manual queimador
ION	Sonda de ionização
h1	Conta-horas
K1	Relé
KM	Contactador motor
MV	Motor ventilador
PA	Pressostato de ar
PGM	Pressostato gás de máxima
PGMin	Pressostato de gás de mínima
Q1	Interruptor seccionador trifásico
Q2	Interruptor seccionador monofásico
RS	Botão de desbloqueio queimador a distância
S1	Selector desligado / automático / manual
S2	Selector aumento / diminuição potência
SM	Servomotor
TA	Transformador de acendimento
TL	Termóstato/pressostato de limite
TR	Termóstato/pressostato de regulação
TS	Termóstato/pressostato de segurança
Y	Válvula de regulação gás + válvula de segurança gás
YVPS	Dispositivo de controlo da estanquidade das válvulas gás
XPA	Conector pressostato de ar
XP1	Tomada para kit modulação
XP2	Conector pressostato gás de máxima
XP4	Tomada de 4 pólos
XP5	Tomada de 5 pólos
XP6	Tomada de 6 pólos
XP7	Tomada de 7 pólos
XRWF	Conector regulador de potência RWF
XSM	Conector servomotor
XTB	Terra consola
XTM	Terra grupo ventilador
XTS	Terra grupo servomotor
X2	Ficha de 2 pólos
X4	Ficha de 4 pólos
X5	Ficha de 5 pólos
X6	Ficha de 6 pólos
X7	Ficha de 7 pólos
X9	Ficha de 9 pólos