GB

Forced draught gas burners

Progressive two-stage operation

CE

CODE	MODEL	TYPE
3789010	RS 34 MZ	883 T
3789011	RS 34 MZ	883 T
3789110	RS 44 MZ	884 T
3789111	RS 44 MZ	884 T
3789140	RS 44 MZ	884 T
3789141	RS 44 MZ	884 T

➤ The burner **has EC marking** and conforms to the basic requisites of the following Directives:

– EC Reg. N.: **0085BR0381** in accordance with 2016/426/EU;

– Electromagnetic Compatibility Directive 2014/30/UE;

– Low voltage directive 2014/35/UE;

– Machine Directive 2006/42/EC.

➤ The burner meets protection level of IP 40 as EN 60529.

IDENTIFICATION

The Identification Plate on the product gives the serial number, model and main technical and performance data. If the Identification Plate is tampered with, removed or missing, the product cannot be clearly identified, thus making any installation or maintenance work potentially dangerous.

GENERAL WARNINGS

The dimension of the boiler's combustion chamber must respond to specific values, in order to guarantee a combustion with the lowest polluting emissions rate.
You are therefore advised to consult the Technical Assistance Department before choosing this type of burner for the combination with a boiler.
Qualified personnel are those with the professional and technical requirements indicated by Law no. 46 dated 5 March 1990. The commercial organisation has a widespread network of agencies and technical offices whose personnel participates periodically in instructional and refresher courses at the company training centre.
This burner must only be used for the application it was designed for.
The manufacturer cannot accept responsibility for any damage to persons, animals or property due to errors in installation or in the burner adjustment, or due to improper or unreasonable use or non-observance of the technical instructions enclosed with the burner, or due to the intervention of unqualified personnel.

USER INFORMATION

If faults arise in firing or operations, the burner performs a "safety stop", which is signalled by the red burner lock out LED. To rearm start-up conditions, press the release button. When the burner starts up again, the red LED goes out.
This operation can be repeated for a maximum of 3 times. If the "safety stop" recurs, then the Technical Assistance Centre must be contacted.

BASIC SAFETY RULES

➤ Children or inexpert persons must not use the appliance.

➤ Under no circumstances must the intake grids, dissipation grids and ventilation vents in the installation room be covered up with cloths, paper or any other material.

➤ Unauthorised persons must not attempt to repair the appliance

➤ It is dangerous to pull or twist the electric leads.

➤ Cleaning operations must not be performed if the appliance is not disconnected from the main power supply.

➤ Do not clean the burner or its parts with inflammable substances (e.g. petrol, alcohol, etc.).
The cover must be cleaned with soapy water.

➤ Do not place anything on the burner.

➤ Do not leave containers and inflammable products in the installation room.

The following symbols are used in this manual:

⚠ **ATTENTION =** for actions requiring special care and adequate preparation.

⛔ **FORBIDDEN =** for actions **THAT MUST NOT** be performed.

GB INDEX

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.4 = part 1 of figure A, page number 4.

INFORMATION ABOUT THE INSTRUCTION MANUAL

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 **Riello** 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, **Riello** recommends the drawing up of a Maintenance Contract.

TECHNICAL DATA

MODEL			RS 34 MZ		RS 44 MZ		RS 44 MZ	
TYPE			883 T		884 T		884 T	
OUTPUT (1)	2nd stage	kW Mcal/h	125 - 390 108 - 336		203 - 550 175 - 473		203 - 550 175 - 473	
	min. 1st stage	kW Mcal/h	45 39		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			• Intermittent (min. 1 stop in 24 hours) • Two-stage (high and low flame) and one-stage (all - nothing)					
STANDARD APPLICATION			Boilers: water, steam, diethermic oil					
AMBIENT TEMPERATURE		°C	0 - 40					
COMBUSTIVE AIR TEMPERATURE		°C max	60					
ELECTRICAL SUPPLY		V Hz	230 ~ +/-10% 50/60 - single-phase				230 - 400 with neutral ~ +/-10% 50/60 - three-phase	
ELECTRICAL MOTOR		rpm W V	2800/3400 300 220 - 240		2820/3400 420 220 - 240		2820/3400 450 220/240-380/415	
ACCELERATION CURRENT		A	15		17		14 - 10	
OPERATION CURRENT		A	3.2		3.5		2 - 1.4	
MOTOR CAPACITOR		mF/V	12.5/400		12.5/425		-	
IGNITION TRASFORMER		V1 - V2 I1 - I2	230 V - 1 x 15kV 1 A - 25mA					
ELECTRICAL POWER CONSUMPTION		W max	600		700		800	
NOISE (3)	SOUND PRESSURE SOUND POWER	dBA	68 79		70 81		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.

VARIANTS

MODEL	POWER SUPPLY	LENGTH BLAST TUBE mm
RS 34 MZ	Single phase Single phase	216 351
RS 44 MZ	Single phase Single phase Three phase Three phase	216 351 216 351

GAS CATEGORY

CATEGORY	COUNTRY
I2E(R)	BE
I2H	LV
I3B/P	CY, MT
I3P	BE
II2E3B/P	LU, PL
II2ELL3B/P	DE
II2Er3P	FR
II2H3B/P	AT, CH, CZ, DK, EE, FI, GR, HU, IS, IT, LT, NO, SE, SI, SK
II2H3P	ES, GB, IE, PT
I_{2L} - I_{2E} - I_2 (43,46 ÷ 45,3 MJ/m^3 (0°C))	NL

ACCESSORIES (optional):

• RADIO DISTURBANCEPROTECTION 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 MZ**
Code	3010386

• KIT LONG HEAD

BURNER	**RS 34 MZ**	**RS 44 MZ**
Code	3010428	3010429

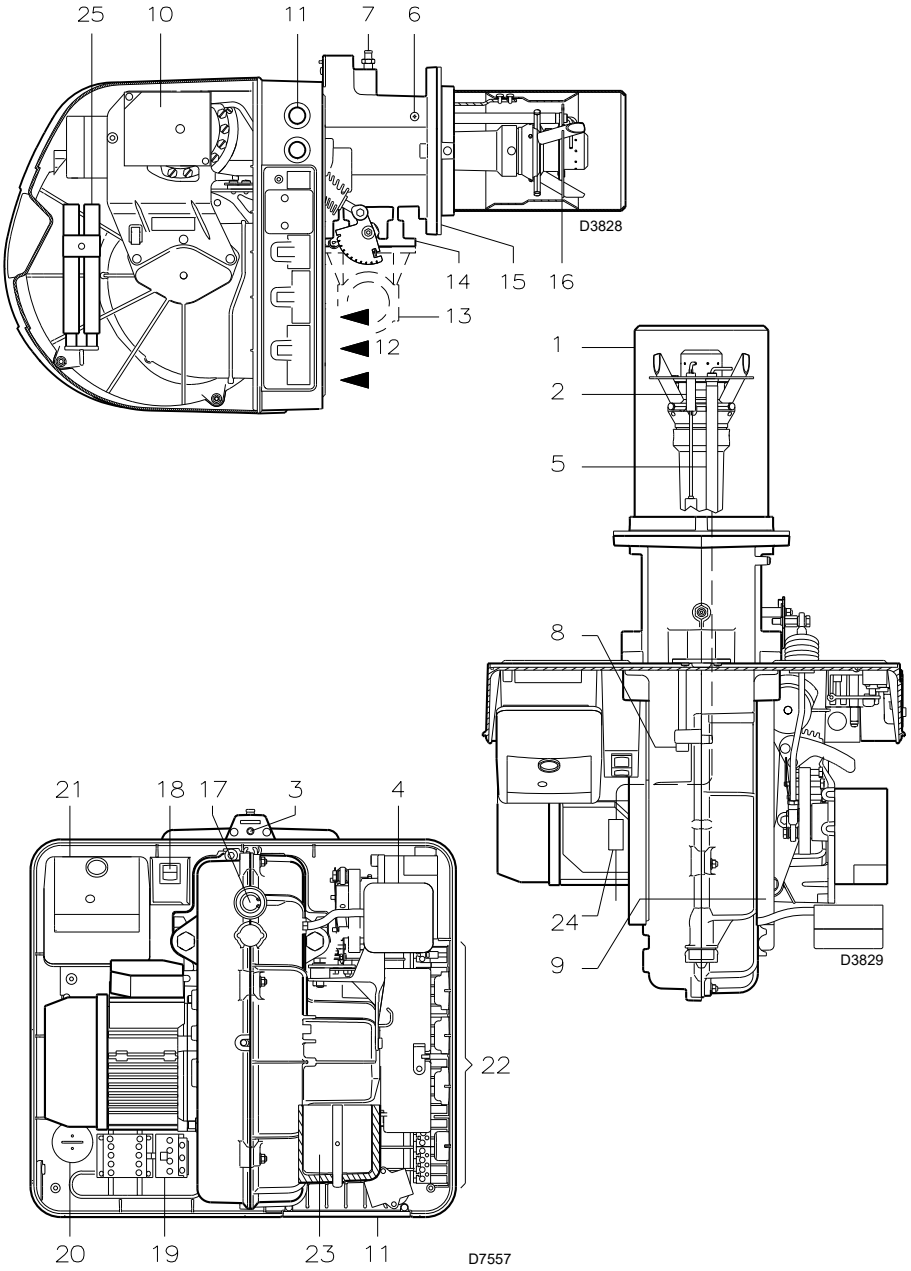
• KIT FOR LPG OPERATION: the kit allows the RS 34-44 MZ burners to operate on LPG.

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

• KIT MAXIMUM GAS PRESSURE SWITCH	Cod. 3010418
• KIT CLEAN CONTACTS	Cod. 3010419
• KIT POST-PURGING	Cod. 3010452
• KIT GROUND FAULT INTERRUPTER	Cod. 3010448
• KIT CONTINUOUS PURGING	Cod. 3010449
• KIT HOURCOUNTER	Cod. 3010450
• KIT INTERFACE ADAPTER RMG TO PC	Cod. 3002719

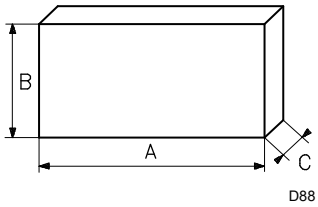
• GAS TRAINS TO COUPLE WITH THE BURNER, ACCORDING TO REGULATION EN 676 (complete with valves, pressure adjuster andfilter): see page 8.

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

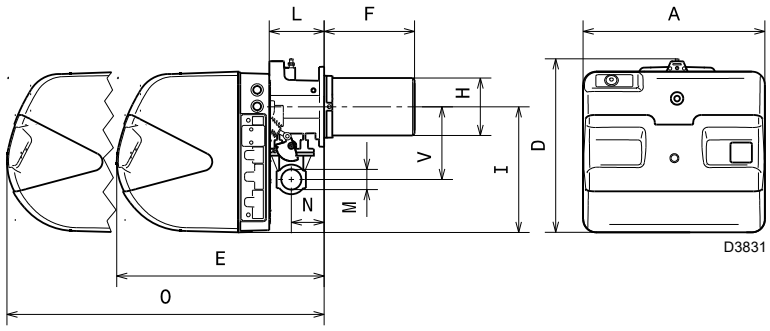


(A)

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



(B)



(C)

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

(1) Blast tube: short - long

BURNER DESCRIPTION (A)

1 Combustion head
2 Ignition electrode
3 Screw for combustion head adjustment
4 Minimum air pressure switch (differential operating type)
5 Flame sensor probe
6 Air pressure test point
7 Gas pressure test point and head fixing screw
8 Screws securing fan to pipe coupling
9 Guides for opening the burner and inspecting the combustion head
10 Servomotor controlling the gas butterfly valve and of 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 suction inlet.
11 Areas for passage of electric cables
12 Air inlet to fan
13 Gas input pipework
14 Gas butterfly valve
15 Boiler mounting flange
16 Flame stability disk
17 Flame inspection window
18 Two switches:
- one “burner off - on”
- one for “1st - 2nd stage operation”
19 Motor contact maker and thermal cut-out with reset button (RS 44 MZ three-phase)
20 Motor capacitor (RS 34-44 MZ single-phase)
21 Control box with lockout pilot light and reset button
22 Sockets for electrical wiring
23 Air damper
24 Plug-socket on ionisation probe cable
25 Guide extensions (long head version)

Two types of burner lockout 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 MZ three-phase): three-phase electrical supply; to reset, press the thermal cut-out switch 19)(A).

PACKAGING - WEIGHT (B) - Approximate measurements

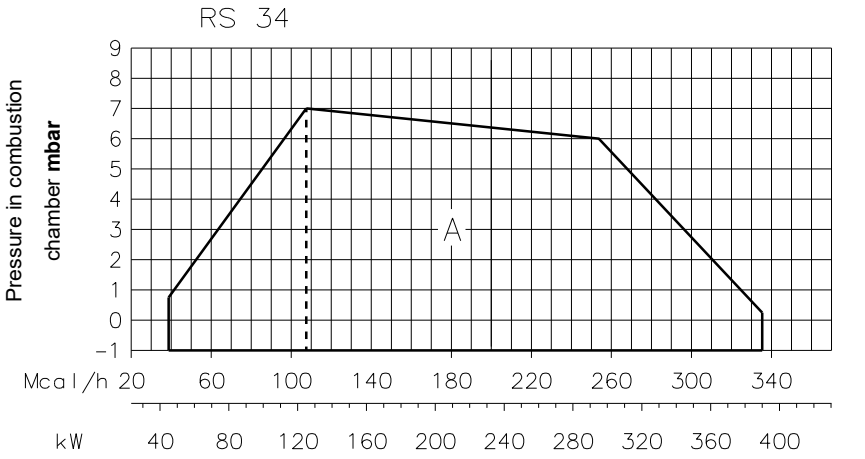
- The burners are shipped in cardboard boxes with the overall dimensions shown in tab. (B).
- The weight of the burner complete with packaging is indicated in tab. (B).

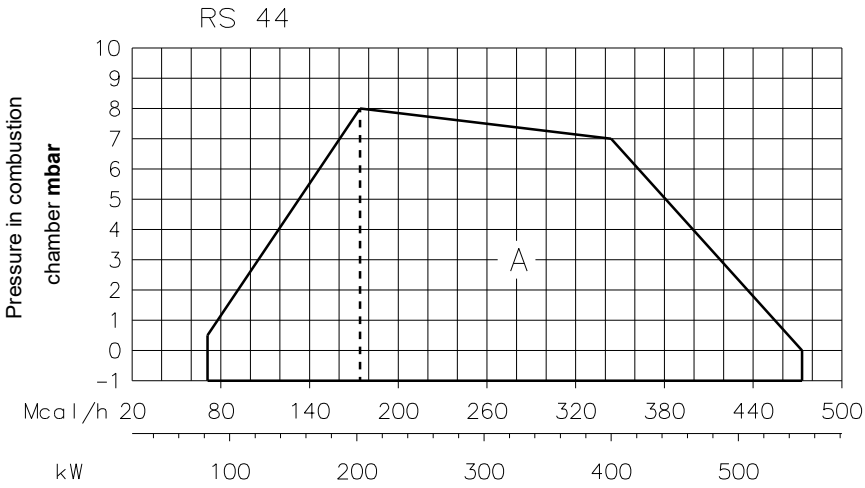
OVERALL DIMENSIONS (C)

Approximate measurements
The overall 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.

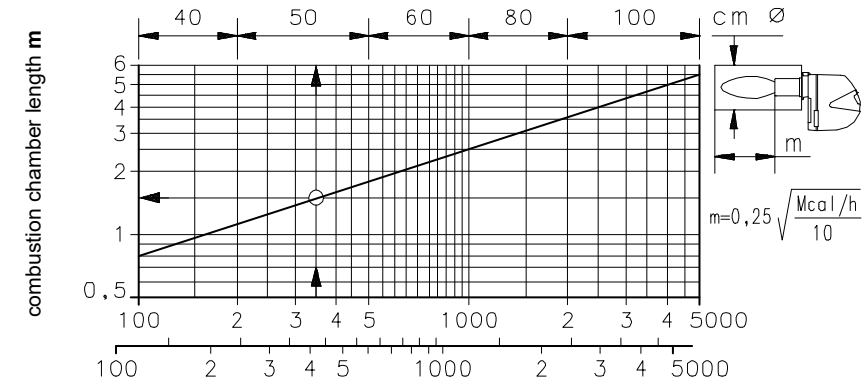
STANDARD EQUIPMENT

1 - Gas train flange
1 - Flange gasket
4 - Flange fixing screws M 8 x 25
4 - Screws to secure the burner flange to the boiler: M 8 x 25
1 - Thermal insulation screen
3 - Plugs for electrical connection (RS 34-44 MZ single-phase)
4 - Plugs for the electrical connection (RS 44 MZ three-phase)
1 - Instruction booklet
1 - 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 MZ = 45 kW
RS 44 MZ = 80 kW

Attention

The FIRING RATE values have been obtained considering an ambient temperature of 20 °C, a barometric pressure of 1013 mbar (approx.0m above sea level) and with the combustion head adjusted as shown on page 7.

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 type-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.

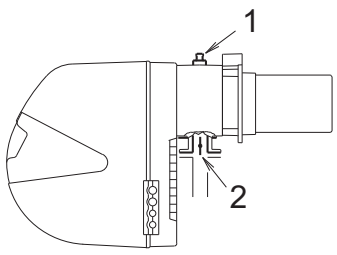
RS 34 MZ

kW	1 Δp (mbar)	2 Δp (mbar)
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 MZ

kW	1 Δp (mbar)	2 Δp (mbar)
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)

S8738

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/Sm^3
(8.2 Mcal/Sm^3)
With:
natural gas G 25 PCI 8.13 kWh/Sm^3
(7.0 Mcal/Sm^3)
multiply the values of the table:
- columns 1-2: by 1.5;
- column 3: by 1.35.

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 off the corresponding output on the left.

Example - RS 34 MZ:
- Maximum output operation
- Natural gas G 20 PCI 9.45 kWh/Sm^3
- Gas pressure at test point 1)(B) =9.3 mbar
- Pressure in combustion chamber = 2 mbar

9.3 - 2 =7.3 mbar

A pressure of 7.3 mbar (column 1) corresponds in the table RS 34 MZ to an output of 260 kW.
This value serves as a rough guide, the effective delivery must be measured at the gas meter.

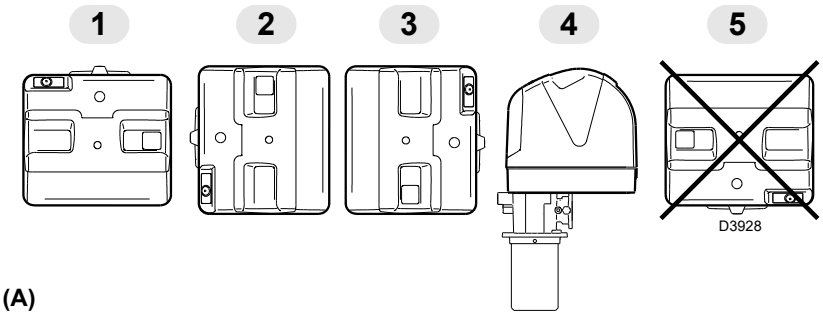
To calculate the required gas pressure at test point 1)(B), set the maximum output required from the burner operation:
- find the nearest output value in the table for the burner in question.
- Read off the pressure at test point 1)(B) on the right in column 1.
- Add this value to the estimated pressure in the combustion chamber.

Example - RS 34 MZ:
- Required burner maximum output operation: 260 kW
- Natural gas G 20 PCI 9.45 kWh/Sm^3
- Pressure of the gas at an output of 260 kW, from the table RS 34 MZ, column 1 =7.3 mbar
- Pressure in combustion chamber = 2 mbar

7.3 + 2 =9.3 mbar

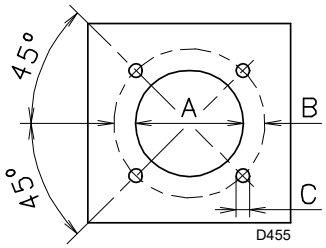
pressure required at test point 1)(B).

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



(A)

mm	A	B	C
RS 34 MZ	160	224	M 8
RS 44 MZ	160	224	M 8



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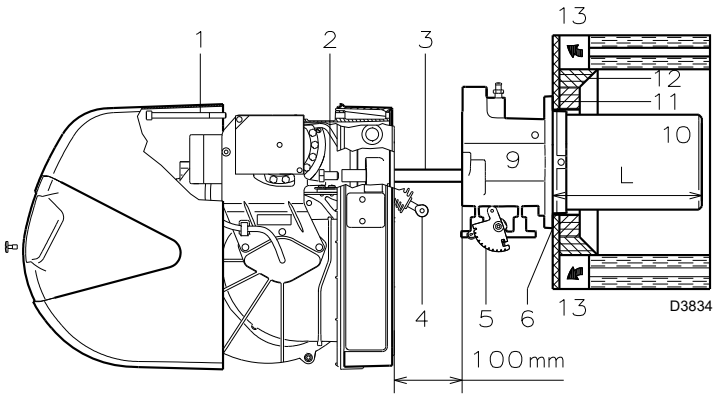

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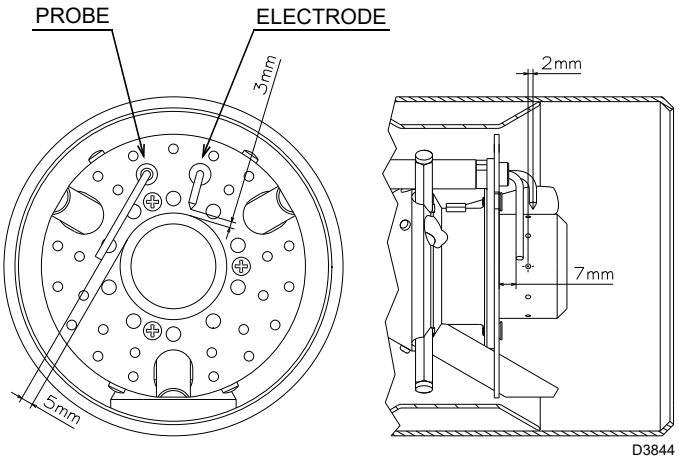
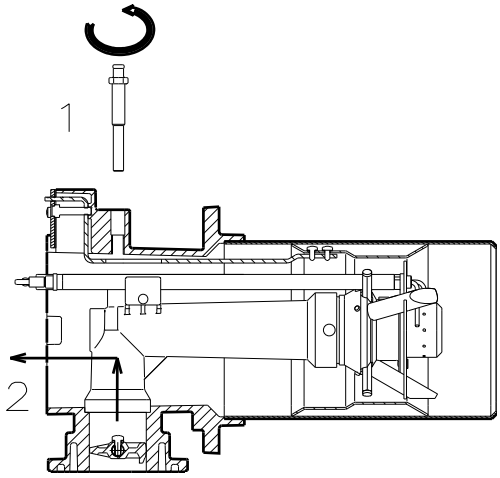


(D)



(E)

INSTALLATION

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

OPERATION POSITION (A)

The burner is designed to operate 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.

Any other position could compromise the correct operation 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 insulation 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 MZ	RS 44 MZ
• short	216	216
• long	351	351

For boilers with front flue gases 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)

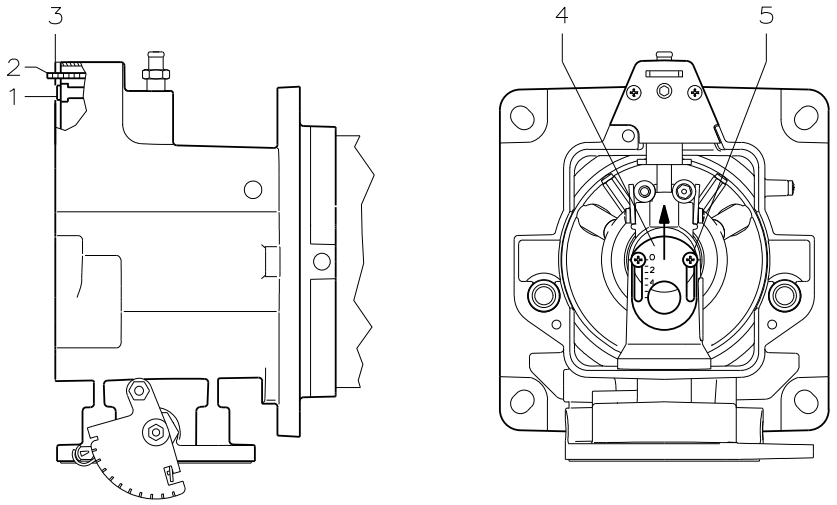
Before fixing the burner to the boiler, check (from the opening of the blast tube) that the probe and the electrode are correctly positioned, as in (D).

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 guides 3);
- remove screw 1) and pull the burner back on guides 3) by about 100 mm;
- disconnect the probe and electrode leads, then unthread the burner completely from the guides.

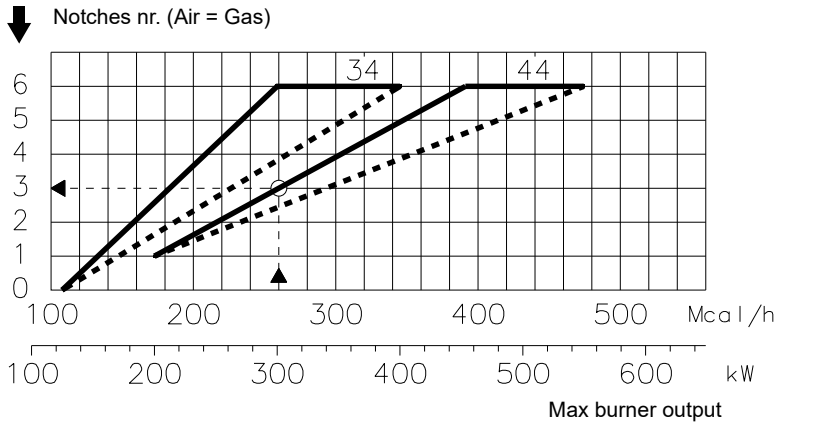
Fix the unit 9)(C) to the boiler plate, inserting the supplied insulating gasket 6)(C). Use the 4 screws, also supplied with the unit, after first protecting the thread with an anti-locking product. The seal between burner and boiler must be airtight.

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 ÷ 6 Nm**.



(A) D8458



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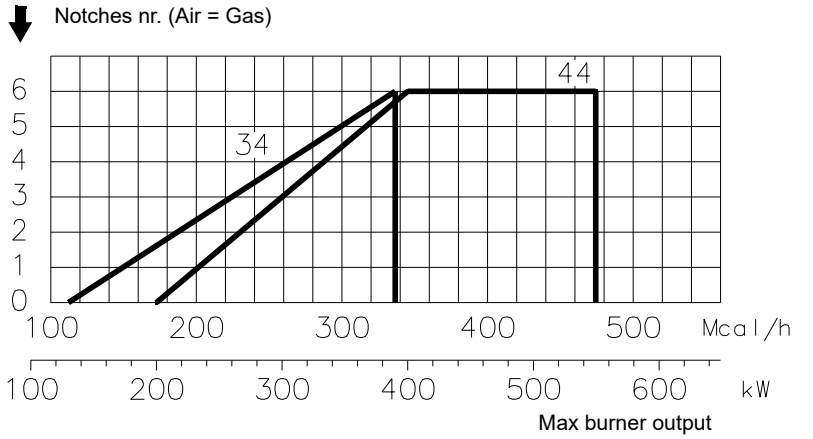
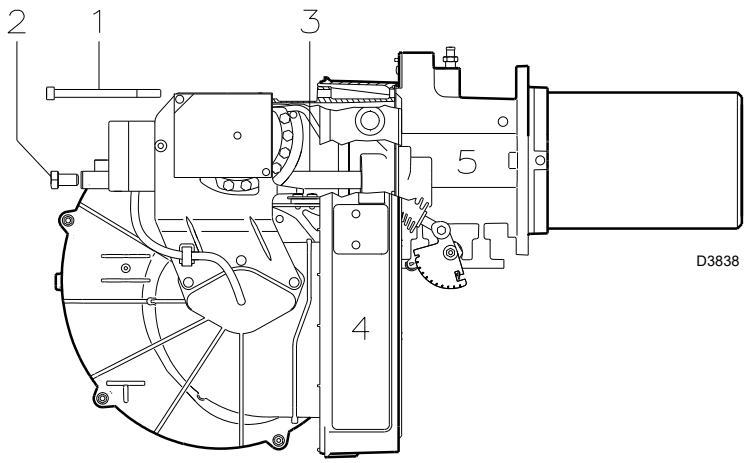


(C) D8577



(D)

SETTING THE COMBUSTION HEAD

Installation operations are now at the stage where the blast tube and the pipe coupling 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 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).

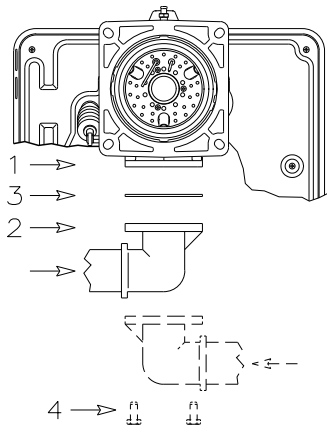
Central air adjustment (A - C)

n 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 guides 3).
Fix the burner to the pipe coupling with the screw 1).

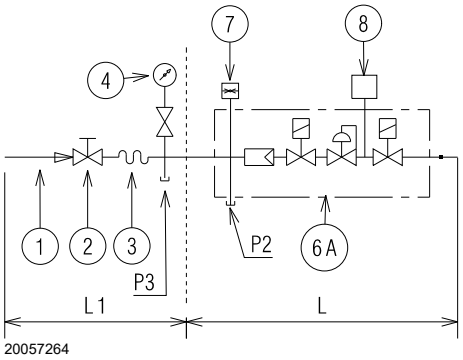
Attention

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 stretched.



(A) D3839

MB



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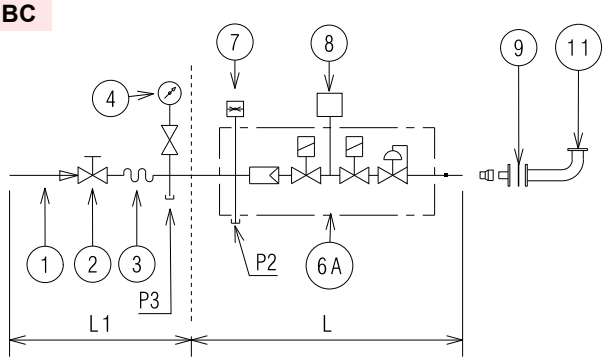
MBC



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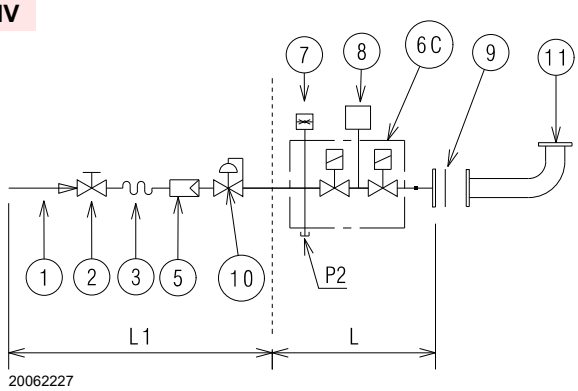
DMV



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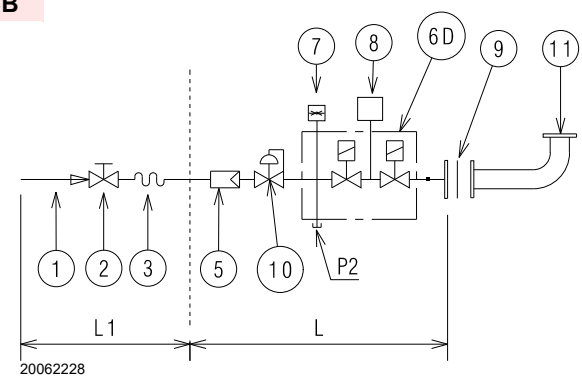
CB



20062228

(B)

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

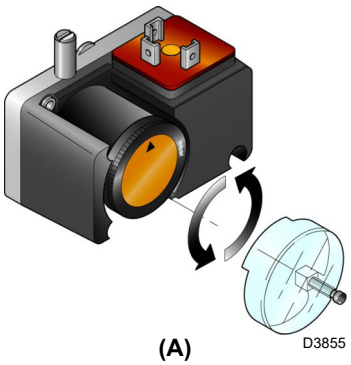
7 Minimum gas pressure switch
8 Leak detection device, supplied as an accessory or incorporated, based on the gas train code. In compliance with the EN 676 standard, the leak detection control is compulsory for burners with maximum outputs over 1200 kW.
9 Gasket, for “flanged” versions only
10 Pressure 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.

MIN GAS PRESSURE SWITCH



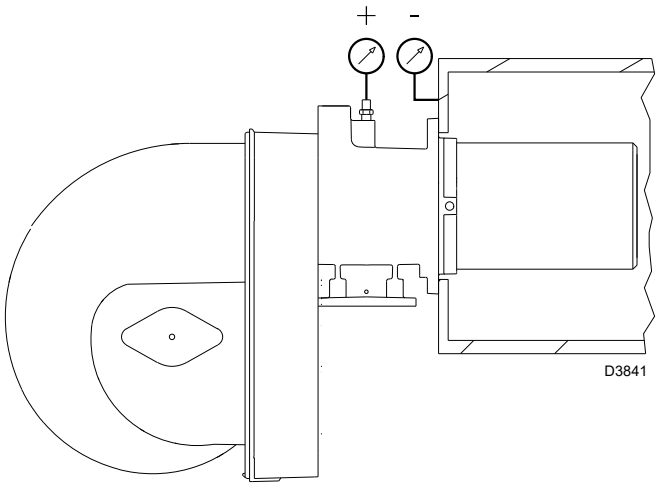
D3855

(A)

AIR PRESSURE SWITCH

D3854

(B)



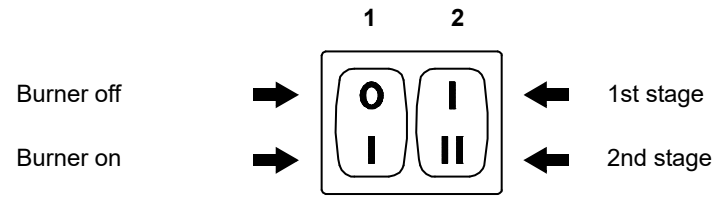
D3841

(C)

SERVOMOTOR

D517

(D)



(E)

D469

Refer to paragraph "Safety test - with gas ball valve closed" on page 15 before the first start-up.

ADJUSTMENTS PRIOR TO FIRING

ATTENTION

THE FIRST FIRING 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 zero position 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 firing 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 gate valve, 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 12 seconds.
Do not alter the factory setting for the 4 cams; simply check that they are set as indicated 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.

BURNER START-UP

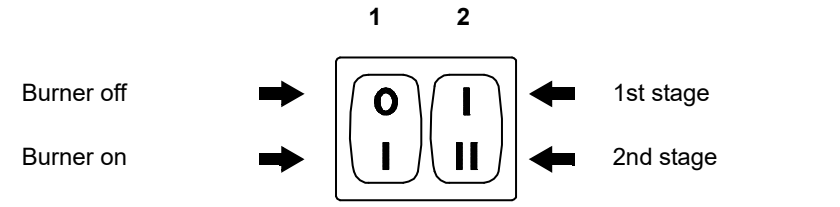
Close the remote controls and set:

- switch 1)(E) to "Burner ON" position
- switch 2)(E) 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 18)(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, then **immediately** stop the burner and check electrical connections.

BURNER FIRING

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



(A) D469

BURNER CALIBRATION

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

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

DETERMINATION OF OUTPUT UPON FIRING (MINIMUM)

According to EN 676 Regulation

Burners with max. output up to 120 kW

Firing can be performed at the maximum operation output level. Example:
- max. operation output : 120 kW
- max. firing output : 120 kW

Burners with max. output above 120 kW

Firing must be performed at a lower output than the max. operation output.
If the firing output does not exceed 120 kW, no calculations are required. If firing output exceeds 120 kW, the regulation prescribes that the value be defined according to the control box safety time "ts":
for "ts" = 3s, firing output must be equal to, or lower than, 1/3 of max. operation output.

Example
MAX operation output of 450 kW.
The firing output must be equal to, or less than, 150 kW with ts = 3s

In order to measure the firing 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 firings with consecutive lockouts.
- Read the quantity of gas burned on the meter. This quantity must be equal to, or lower than, the quantity given by the formula, for ts = 3s:

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

Vg: volume supplied upon firings carried out (Sm^3)
Qa: firing output (Sm^3/h)
n: number of firings (10)
ts: safety time (sec)

Example for gas G 20 (9.45 kWh/Sm^3):
firing output 150 kW
corresponding to 15.87 Sm^3/h.
After 10 firings with lockout, the output indicated on the meter must be equal to, or less than:

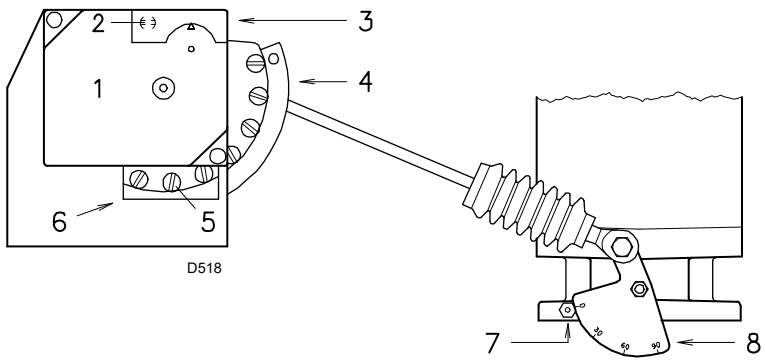
$$\mathbf{Vg = \frac{15.87\ x\ 10\ x\ 3}{3600} = 0.132\ Sm^3}$$

1 - 2ND STAGE BURNER OUTPUT

2nd stage output of the burner must be set within the firing rate range shown on page 5.
In the above instructions we left the burner running in 1st stage operation. Now set switch 2)(A) 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 tables on page 6, simply read off the gas pressure on the manometer, see fig.(C) on page 10, and follow the instructions 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.



1 Servomotor

2 Cam 4 ⊖ engaged/ ◍ disengages

3 Cam cover

4 Adjustable profile cam

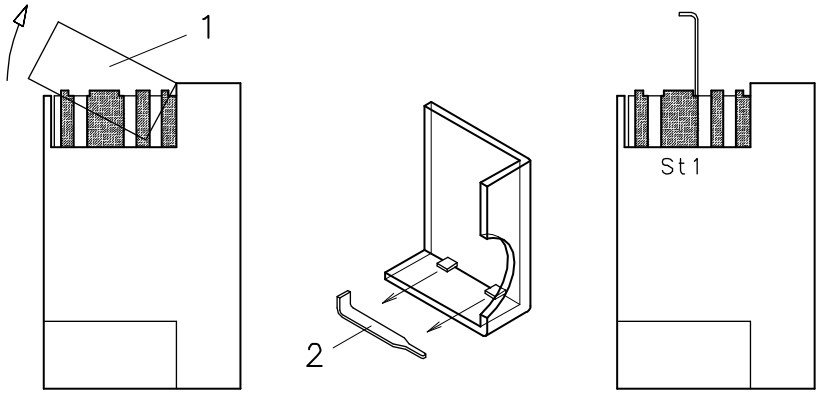
5 Cam profile adjustment screws

6 Opening for access to screws 5

7 Index for graduated sector 8

8 Graduated sector for gas butterfly valve

(A)



(B)

Adjusting 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).

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

2 - 1ST STAGE BURNER OUTPUT

Burner power in 1st stage operation must be selected within the firing rate range shown on page 5.

Set the switch 2)(A) p.11 to the 1st stage position: the servomotor 1)(A) 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 (B) 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)(A) p.11 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), as shown in fig.(B), extract the relevant key 2) from inside, and fit it into the keyway in cam St1.

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.

3 - INTERMEDIATE OUTPUTS

Adjustment of gas delivery

No adjustment of gas delivery is required.

Adjustment of air delivery

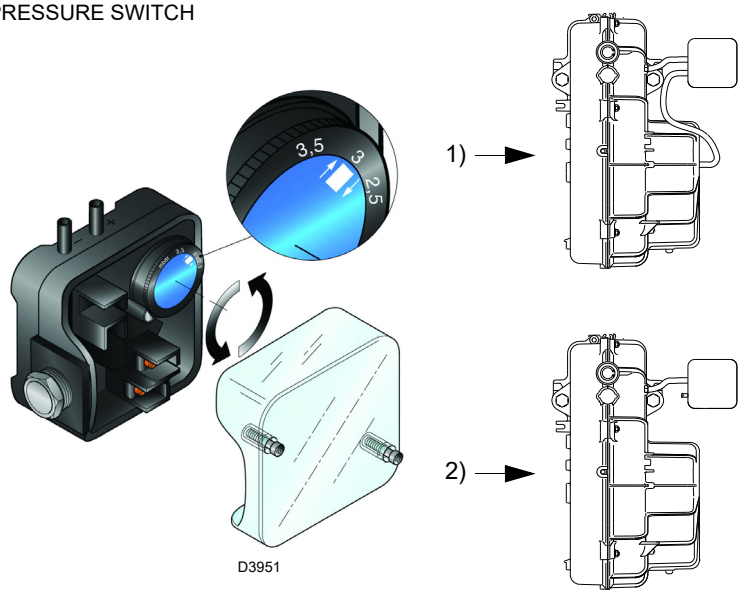
Switch off the burner using switch 1)(A) p.11, disengage the variable profile cam, set the servomotor shaft slot 2)(A) to a vertical position and turn the central screws of the cam so that the cam offers a progressive gradient. Try turning the cam back and forth by hand a few times until the movement 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

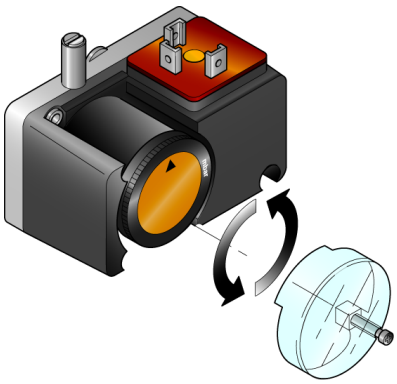
Once you have finished adjusting 2nd stage - 1st stage - intermediate outputs, check firing once again: noise emission at this stage must be identical to the following stage of operation. If you notice any sign of pulsation, reduce the firing stage delivery.

AIR PRESSURE SWITCH

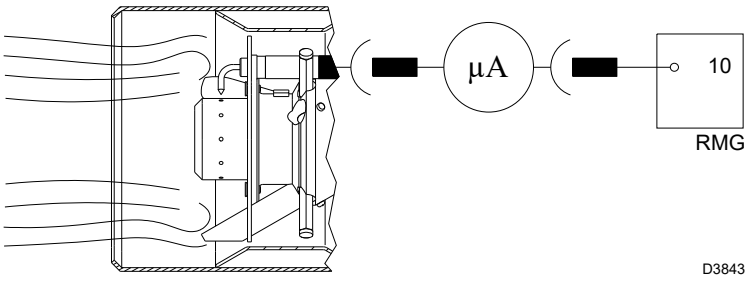


(A)

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 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 - MINIMUM GAS PRESSURE SWITCH (B)

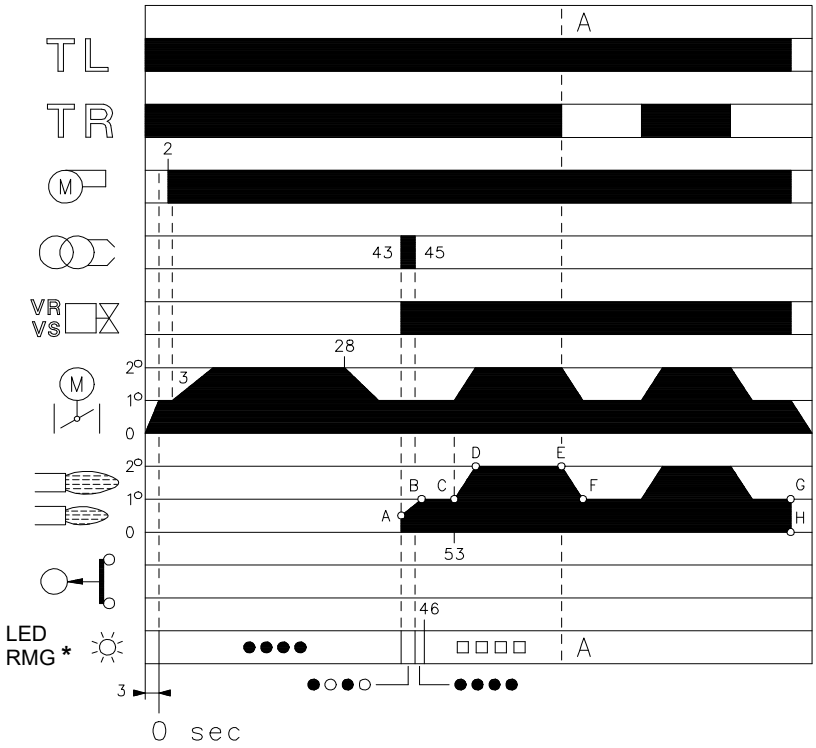
Adjust the minimum gas pressure switch after having performed all the other burner adjustments with the pressure switch set at the start of the scale (B).
With the burner operating in 2nd stage, increase adjustment pressure by slowly turning the relative knob clockwise until the burner locks out.
Then turn the knob anticlockwise by 0,2 kPa (2 mbar) and repeat burner starting to ensure it is uniform.
If the burner locks out again, turn the knob anticlockwise again by 0,1 kPa (1 mbar).

FLAME PRESENT 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 µA. The burner provides a much higher current, so that 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 µA. Carefully check polarities!

1 kPa = 10 mbar

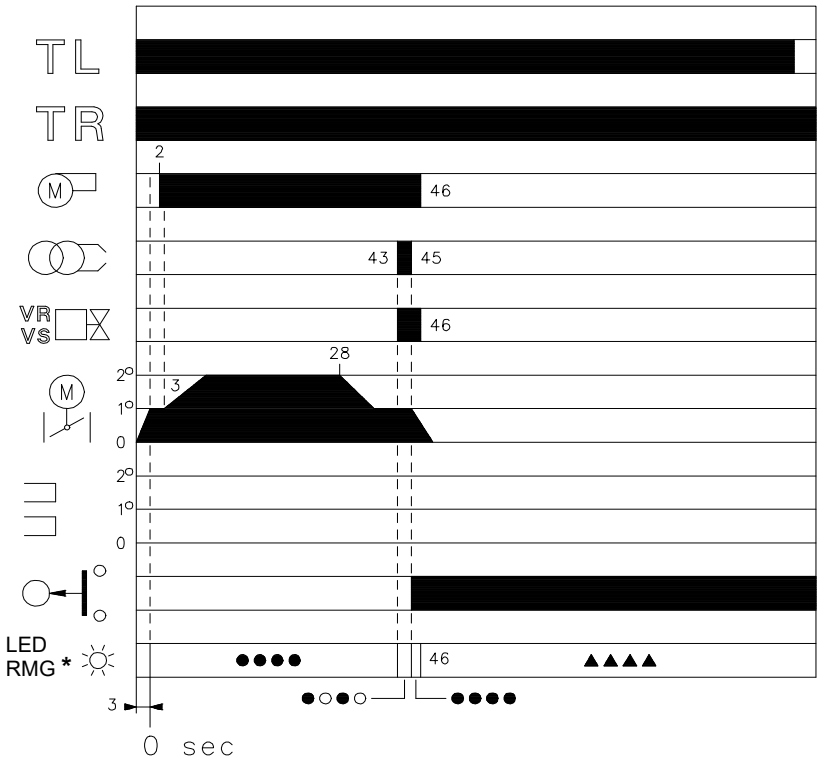
NORMAL FIRING
(n° = seconds from instant 0)



* ○ Off ● Yellow □ Green ▲ Red
For further details see page 17.

(A) D3028

NO FIRING



* ○ Off ● Yellow ▲ Red
For further details see page 17.

(B) D3029

BURNER OPERATION

BURNER START UP (A)

- : 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.

STEADY STATE OPERATION (A)

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).

FIRING FAILURE (B)

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.

SAFETY TEST - WITH GAS BALL VALVE CLOSED

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

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

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

The start-up cycle must be as follows:

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

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

The actual electrical supply of the solenoid gas valves can be verified by inserting a tester.

Some valves are equipped with light signals (or close/open position indicator) that turn on at the same time as their power supply.

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

SAFETY COMPONENTS

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

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 adduction 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 that there are no gas leaks on the pipework 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.11, rotating by 90° the notch 2)(A) p.11, and manually check that it rotates smoothly backwards and forwards. Constrain the cam again 4).

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.

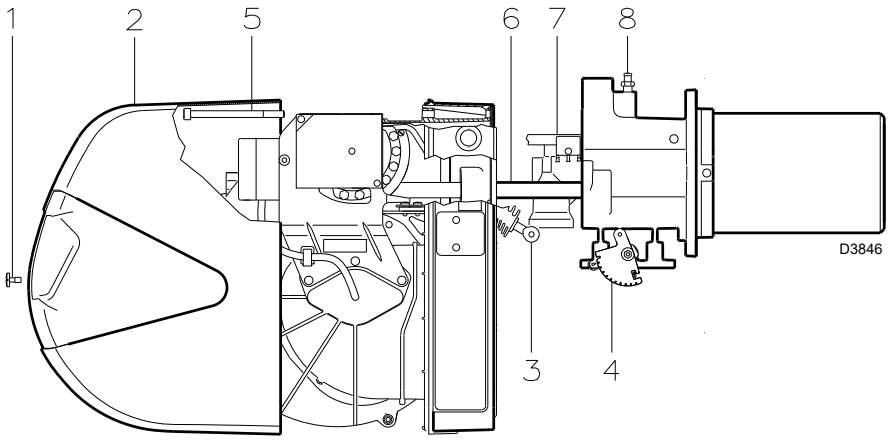
Clean the outside of the burner, taking special care with the transmission joints and cam 4)(A) p.11.

Combustion

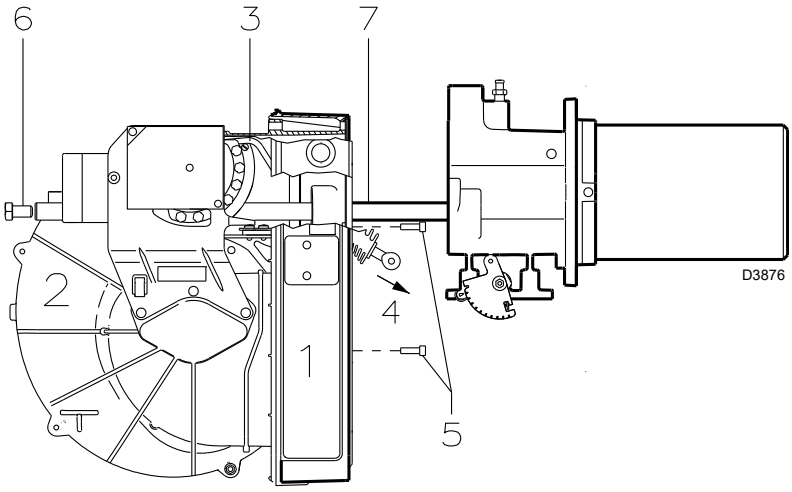
Adjust the burner if the combustion values found at the beginning of the operation do not comply with the regulations in force, or at any rate, do not correspond to good combustion.

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

OPENING THE BURNER



(A)



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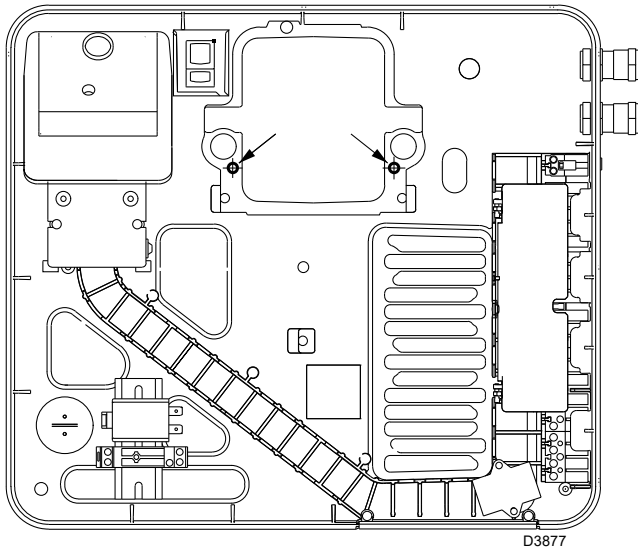


(C)

TO OPEN THE BURNER (A):

- Switch off the electrical power.
- Remove screw 1) and withdraw casing 2).
- Disengage the articulated coupling 3) from the graduated sector 4).
- Remove screw 5) only if the models have a long head, retract the burner on guides 6) for around 100 mm. Remove the probe cables and then retract the whole burner.

Now extract the gas distributor 7) after having removed the screw 8).
Remove the screws 2)(C) p. 7 and tighten the two extensions 25)(A) p.4 supplied with the burner.
Retighten the two screws 2)(C) 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 ÷ 6 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 casing 2) and lock 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 fasten the electrical switchboard to the pipe coupling, in the points indicated in fig.(C), and then carry out the maintenance operations.

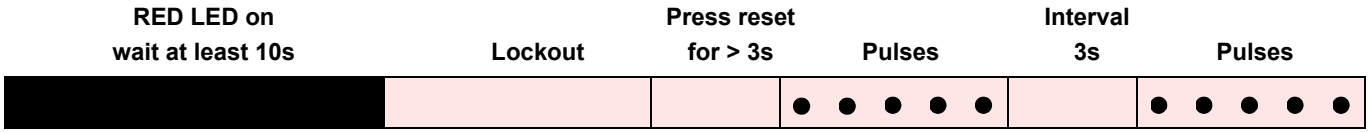
BURNER START-UP CYCLE DIAGNOSTICS

During start-up, indication is according to the following table:

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

RESETTING THE CONTROL BOX AND USING DIAGNOSTICS

The control box features a diagnostics function through which any causes of malfunctioning are easily identified (indicator: **RED LED**).
To use this function, you must wait at least 10 seconds once it has entered the safety condition (**lockout**), and then press the reset button.
The control box generates a sequence of pulses (1 second apart), which is repeated at constant 3-second intervals.
Once you have seen how many times the light pulses and identified the possible cause, the system must be reset by holding the button down for between 1 and 3 seconds.



The methods that can be used to reset the control box and use diagnostics are given below.

RESETTING THE CONTROL BOX

To reset the control box, proceed as follows:
- Hold the button down for between 1 and 3 seconds.
  The burner restarts after a 2-second pause once the button is released.
  If the burner does not restart, you must make sure the limit thermostat is closed.

VISUAL DIAGNOSTICS

Indicates the type of burner malfunction causing lockout.
To view diagnostics, proceed as follows:
- Hold the button down for more than 3 seconds once the red LED (burner lockout) remains steadily lit.
  A yellow light pulses to tell you the operation is done.
  Release the button once the light pulses. The number of times it pulses tells you the cause of the malfunction, according to the coding system indicated in the table on page 18.

SOFTWARE DIAGNOSTICS

Reports burner life by means of an optical link with the PC, indicating hours of operation, number and type of lockouts, serial number of control box etc ...
To view diagnostics, proceed as follows:
- Hold the button down for more than 3 seconds once the red LED (burner lockout) remains steadily lit.
  A yellow light pulses to tell you the operation is done.
  Release the button for 1 second and then press again for over 3 seconds until the yellow light pulses again.
  Once the button is released, the red LED will flash intermittently with a higher frequency: only now can the optical link be activated.

Once the operations are done, the control box's initial state must be restored using the resetting procedure described above.

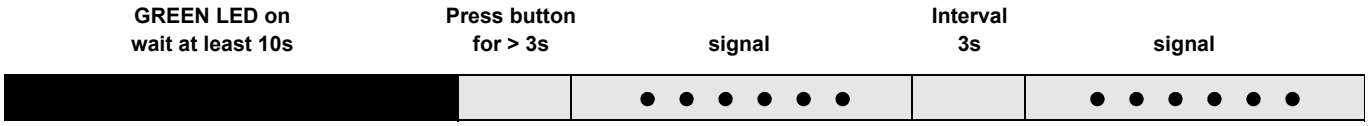
BUTTON PRESSED FOR	CONTROL BOX STATUS
Between 1 and 3 seconds	Control box reset without viewing visual diagnostics.
More than 3 seconds	Visual diagnostics of lockout condition: (LED pulses at 1-second intervals).
More than 3 seconds starting from the visual diagnostics condition	Software diagnostics by means of optical interface and PC (hours of operation, malfunctions etc. can be viewed)

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



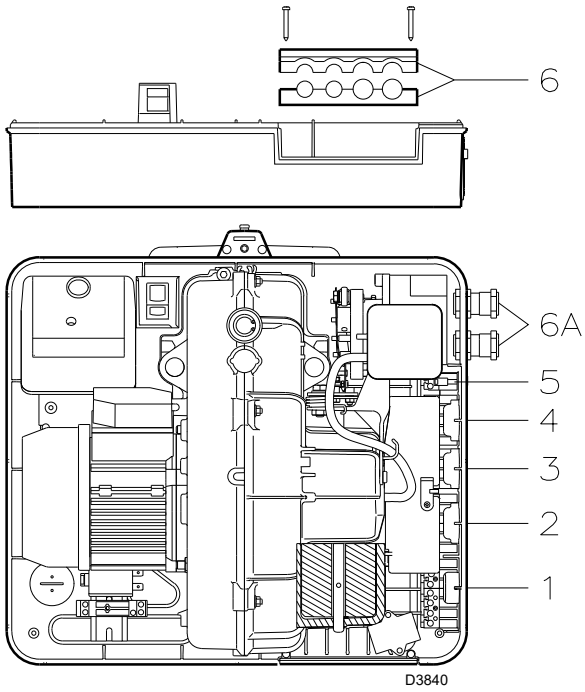
The pulses of the LED constitute a signal spaced by approximately 3 seconds.
The number of pulses will measure the probe DETECTION TIME since the opening of gas valves, according to the following table:

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**

APPENDIX



Electrical connections

NOTES

The electrical wiring 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.

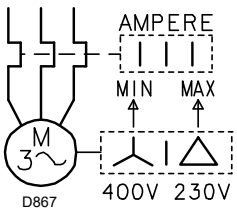
The use of cable grommets can take various forms; the following lists show one possible solution:

RS 34-44 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
4-	5-pole socket, not used
5-	2-pole socket for accessory min. gas pressure switch
6 - 6A	Fittings for pipe unions (Pierce, if it is necessary to use the pipe unions 6A)

RS 44 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
4-	5-pole socket for three-phase power supply
5-	2-pole socket for accessory min. gas pressure switch
6 - 6A	Fittings for pipe unions (Pierce, if it is necessary to use the pipe unions 6A)



ADJUSTMENT OF THERMAL RELAY (RS 44 MZ THREE PHASE)

This is required to avoid motor burnout in the event of a significant increase in power absorption caused by a missing phase.

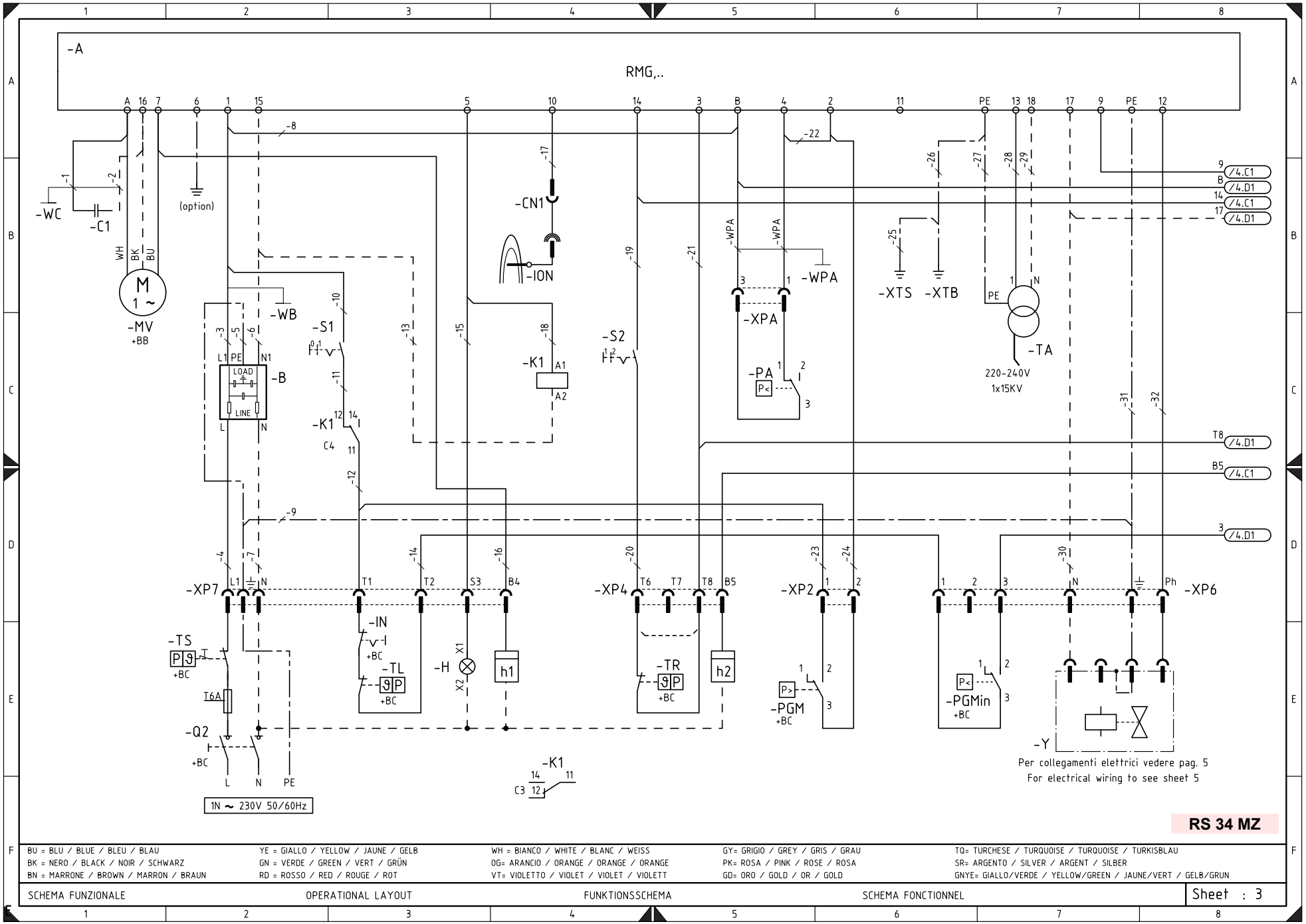
- If the motor is star-driven, **400V**, the cursor must be positioned on “MIN”.
- If it is delta-driven, **230V**, the cursor is positioned on “MAX”.

If the scale of the thermal cut-out does not include the absorption of rating of the motor at 400V, the protection is guaranteed anyway.

NOTES

- The RS 44 MZ three-phase model leaves the factory with provision for a **400V** power supply. If **230V** power supply is used, change the motor connection from star to delta and change the setting of the thermal cut-out as well.
- The RS 34 -44 MZ -burners have been type-approved for intermittent operation. This means they should compulsorily be stopped at least once every 24 hours to enable the control box to check 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 shutdown at least once every 24 hours.
- The burners RS 34-44 MZ leave the factory ready for two-stage operation and must therefore be connected to the thermostat/pressure switch TR. 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 - T8 of the plug X4.

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



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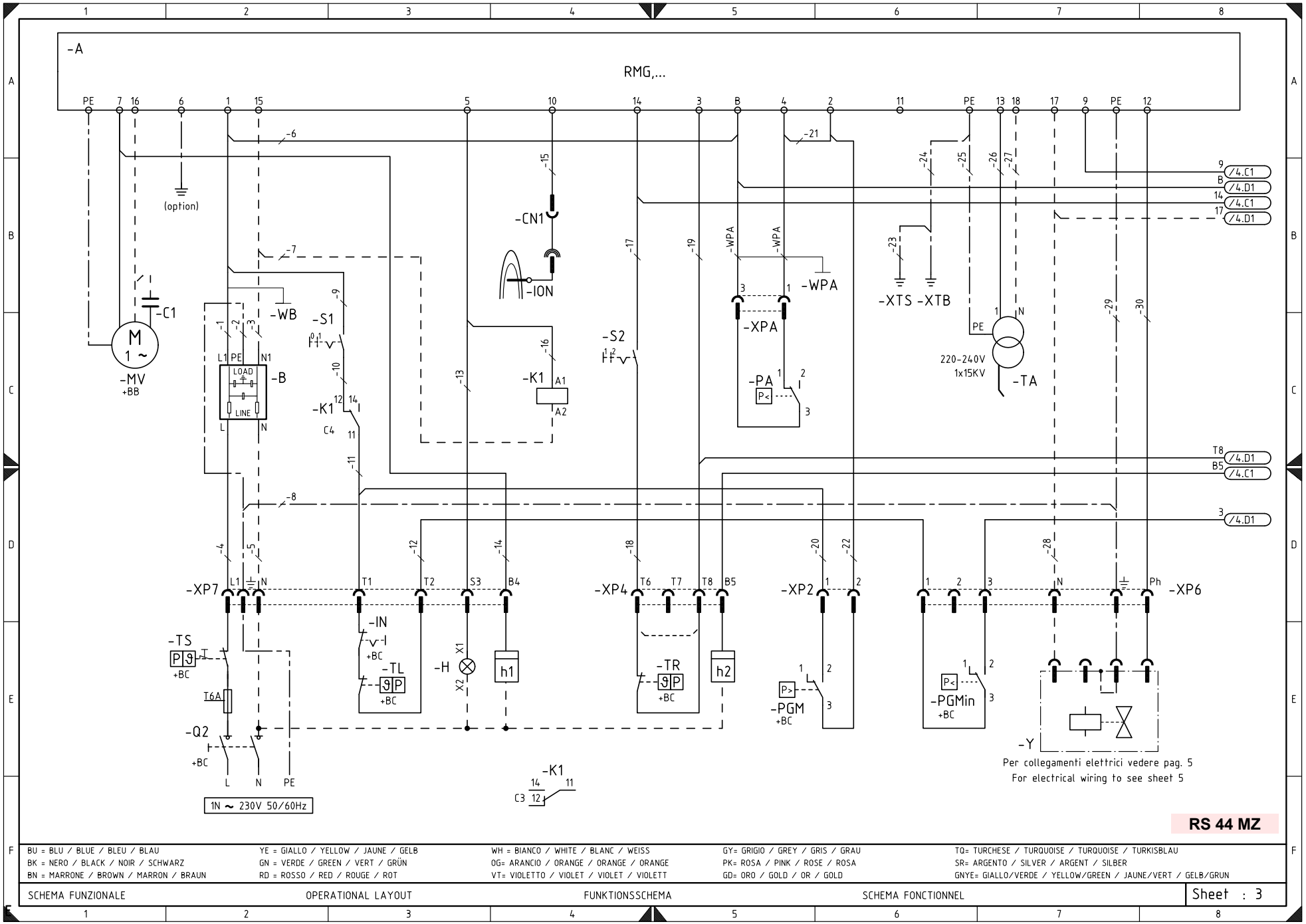
BK = NERO / BLACK / NOIR / SCHWARZ	GN = VERDE / GREEN / VERT / GRÜN	OG= ARANCIO / ORANGE / ORANGE / ORANGE	PK= ROSA / PINK / ROSE / ROSA	SR= ARGENTO / SILVER / ARGENT / SILBER
BN = MARRONE / BROWN / MARRON / BRAUN	RD = ROSSO / RED / ROUGE / ROT	VT= VIOLETTO / VIOLET / VIOLET / VIOLETT	GD= ORO / GOLD / OR / GOLD	GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN

SCHEMA FUNZIONALE	OPERATIONAL LAYOUT	FUNKTIONSSCHEMA	SCHEMA FONCTIONNEL	Sheet : 3


-A
RMG,...
PE 7 16 6 1 15 5 10 14 3 B 4 2 11 PE 13 18 17 9 PE 12
(option)
-C1
M
1 ~
-MV
+BB
-WB
-S1
L1 PE N1
LOAD
LINE
-B
L N
-K1
C4
-CN1
-ION
-K1
A1
A2
-S2
-WPA
-XPA
-PA
P<
-XTS -XTB
PE
220-240V
1x15KV
-TA
9 /4.C1
B /4.D1
14 /4.C1
17 /4.D1
T8 /4.D1
B5 /4.C1
3 /4.D1
-XP7 L1 N T1 T2 S3 B4
-XP4 T6 T7 T8 B5
-XP2 1 2
1 2 3 N Ph -XP6
-IN
+BC
-TL
+BC
-H
X1
X2
h1
-TR
+BC
h2
-TS
+BC
T6A
-Q2
+BC
L N PE
1N ~ 230V 50/60Hz
-PGM
+BC
P>
-PGMin
+BC
P<
-Y
-K1
14 11
C3 12
Per collegamenti elettrici vedere pag. 5
For electrical wiring to see sheet 5
RS 44 MZ
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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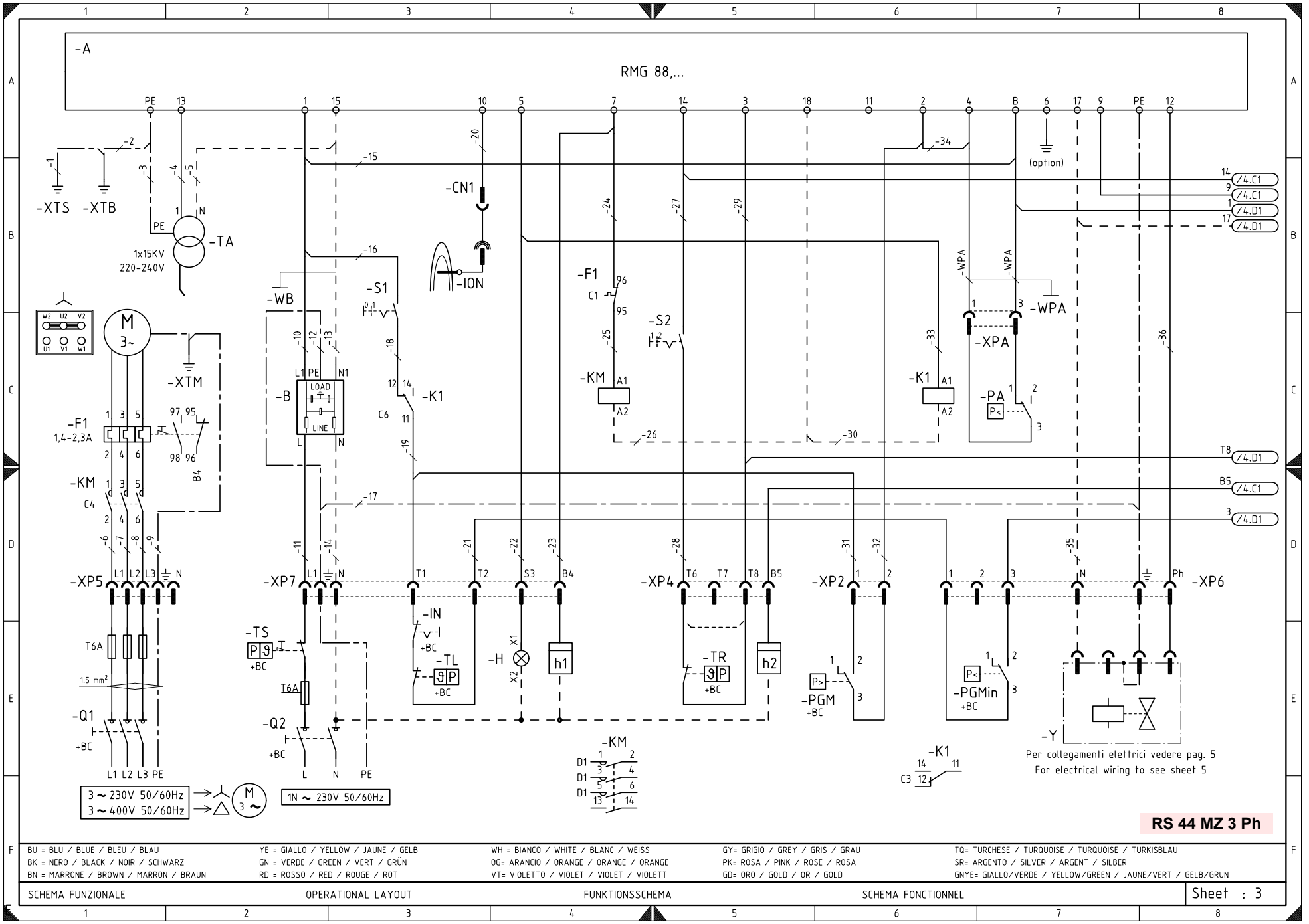
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3


-A
RMG 88,...
-XTS
-XTB
-TA
1x15KV
220-240V
-CN1
-ION
-WB
-S1
-F1
1,4-2,3A
-XTM
-KM
-B
LOAD
LINE
-K1
-S2
-XPA
-WPA
-PA
-XP5
-XP7
-XP4
-XP2
-XP6
-IN
-TL
-TS
-H
-TR
-PGM
-PGMin
-Y
-Q1
-Q2
T6A
1.5 mm²
(option)
3 ~ 230V 50/60Hz
3 ~ 400V 50/60Hz
1N ~ 230V 50/60Hz
Per collegamenti elettrici vedere pag. 5
For electrical wiring to see sheet 5
RS 44 MZ 3 Ph
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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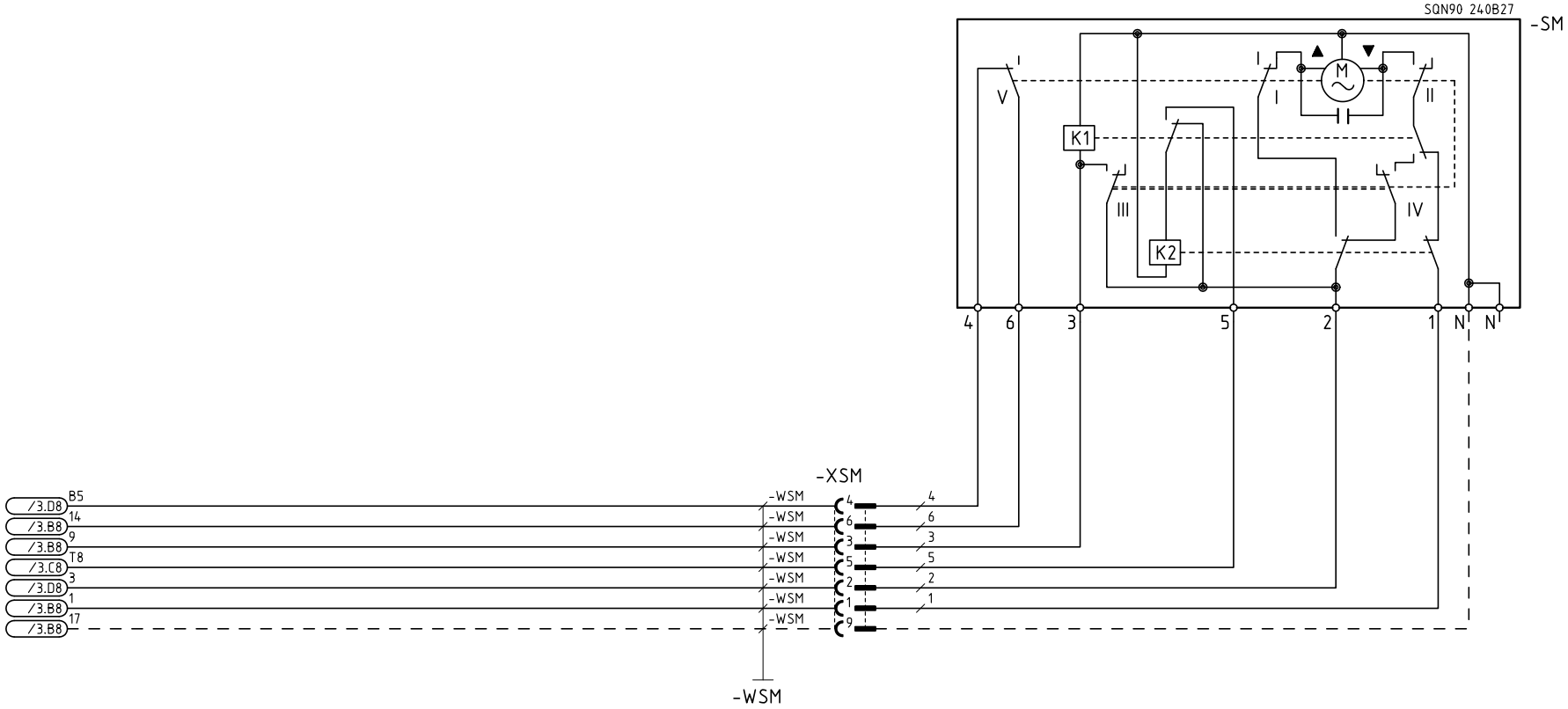
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3



BU = BLU / BLUE / BLEU / BLAU	YE = GIALLO / YELLOW / JAUNE / GELB	WH = BIANCO / WHITE / BLANC / WEISS	GY= GRIGIO / GREY / GRIS / GRAU	TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
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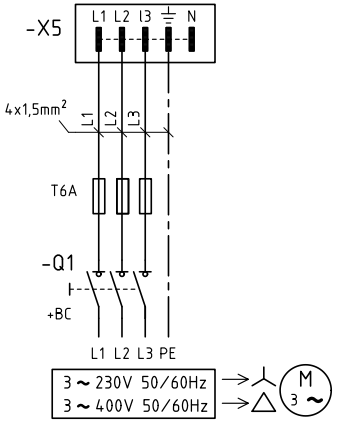
SCHEMA FUNZIONALE	OPERATIONAL LAYOUT	FUNKTIONSSCHEMA	SCHEMA FONCTIONNEL	Sheet : 4

SOLO PER LA VERSIONE TRIFASE/ONLY FOR THE THREE PHASE VERSION

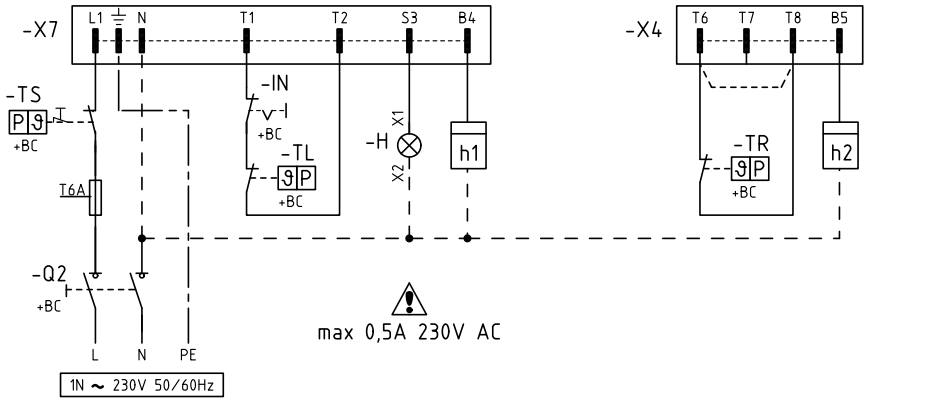


NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C

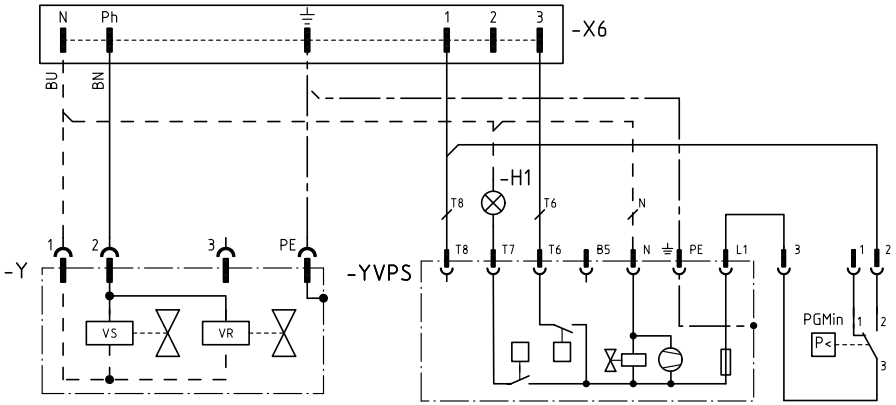
WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C

EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE CHOISIR LE TYPE C

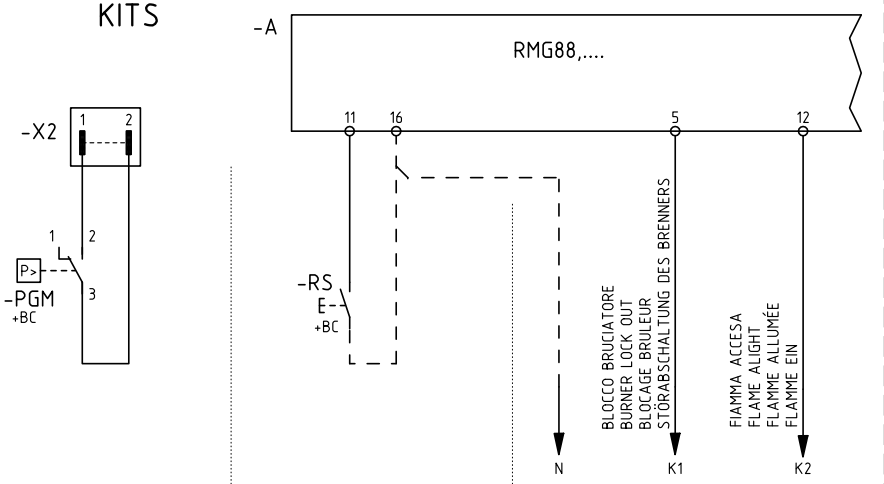
IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN



CONTROLLO TENUTA VPS 504 - VPS 504 GAS LEAKAGE DETECTOR
VPS 504 CONTROLE D' ETANCHEITE GAZ - VPS 504 DICHTHEITSKONTROLLE



KITS



PRESSOSTATO GAS DI MASSIMA
MAXIMUN GAS PRESSURE SWITCH
PRESSOSTAT GAZ MAXI
HÖCHSTGASDRUCKWÄCHTER

PULSANTE DI SBLOCCO A DISTANZA
REMOTE RESET BUTTON
BOUTON DE DEPLOCAGE A DISTANCE
FERNETSTORUNGSTASTE

USCITA PER KIT RELE' CONTATTI PULITI
OUTPUT FOR VOLTAGE FREE CONTACTS KIT
SORTIE POUR KIT RELAIS CONTACTS PROPRES
AUSGANG FÜR REINKONTAKTE-KIT

max 10A AC1 230V AC
max 2A AC15 230V AC

BU = BLU / BLUE / BLEU / BLAU
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GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN

COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR

Sheet : 5

KEY TO ELECTRICAL LAYOUT

A – Electrical control box
B – Radio noise filter
+BB – Components on burners
+BC – Components on boiler
C1 – Capacitor
CN1 – Ionisation probe connector
F1 – Fan motor thermal relay
H – Remote lockout signalling
H1 – Lockout YVPS
IN – Manual burner stop switch
ION – Ionisation probe
h1 – Hour counter
h2 – Hour counter 2nd stage
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 – Selector: burner off - on
S2 – Selector: 1st - 2nd stage operation
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
XP2 – Maximum gas pressure switch connector
XP4 – 4-pole socket
XP5 – 5-pole socket
XP6 – 6-pole socket
XP7 – 7-pole socket
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

LEYENDA ESQUEMAS ELÉCTRICOS

A – Caja de control eléctrica
B – Filtro antiinterferencias radio
+BB – Componentes a bordo de los quemadores
+BC – Componentes a bordo de la caldera
C1 – Condensador
CN1 – Conector para sonda de ionización
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
h2 – Cuentahoras 2ª llama
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: marcha - paro
S2 – Selector: 1.ª - 2.ª llama
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
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
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

LEGENDA ESQUEMAS ELÉCTRICOS

A – Caixa de controlo eléctrica
B – Filtro contra radio-interferências
+BB – Componentes bordo queimadores
+BC – Componentes bordo caldeira
C1 – Condensador
CN1 – Conector sonda de ionização
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
h2 – Conta-horas 2ª chama
K1 – Relé
KM – Contactor 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: arranque - paragem
S2 – Selector: 1ª - 2ª chama
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
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
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