

- GB** Blown type gas burners
- E** Quemadores de gas de aire soplado
- P** Queimadores a gás com ar insuflado

Progressive two-stage operation  
Funcionamiento a dos llamas progresivas  
Funcionamento a duas chamas progressivo



CODE - CÓDIGO	MODEL - MODELO	TYPE - TIPO
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

## DECLARATION OF CONFORMITY A.R. 8/1/2004 – Belgium

Producer: RIELLO S.p.A.  
I - 37045 Legnago (VR)  
Tel. +39.0442.630111  
<http://www.rielloburners.com>

Distributed by: RIELLO NV  
Ninovesteenweg 198  
9320 Erembodegem  
Tel. (053) 769 030  
Fax. (053) 789 440  
e-mail. [info@riello.be](mailto:info@riello.be)  
URL. [www.riello.be](http://www.riello.be)

This document certifies that the series of devices specified below is in compliance with the model as described in the EC Declaration of Conformity, and has been manufactured and distributed in compliance with the requirements defined in the Legislative Decree of 8 January 2004.

Type of product: Blown type gas burners

		Model	
		883 T	884 T
		RS 34 MZ	RS 44 MZ
Values measured *	average NOx (mg/kWh)	97	95
	max CO (mg/kWh)	10	2.9

\* Natural gas operation (Fam. 2)

Regulation applied: EN 676 and A.R. of 8 January 2004

Controlling organisation: TÜV Industrie Service GmbH  
TÜV SÜD Gruppe  
Ridlerstrasse, 65  
80339 Munchen DEUTSCHLAND

Date: 01/12/2006

RIELLO S.p.A.



- ▶ The burner **has EC marking** and conforms to the basic requisites of the following Directives:
  - EC Reg. N.: **0085BR0381** in accordance with 90/396/EEC;
  - Electromagnetic Compatibility Directive 89/336/EEC;
  - Low voltage directive 73/23/EEC;
  - Machine Directive 98/37/EEC;
  - Yield Directive 92/42/EEC.
- ▶ 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.

<b>TECHNICAL DATA</b> .....	page 2
Variants .....	2
Accessories .....	2
Burner description .....	3
Packaging - Weight .....	3
Overall dimensions .....	3
Standard equipment .....	3
Firing rates .....	4
Test boiler .....	4
Commercial boilers .....	4
Gas pressure .....	5
<b>INSTALLATION</b> .....	<b>6</b>
Operation position .....	6
Boiler plate .....	6
Blast tube length .....	6
Securing the burner to the boiler .....	6
Setting the combustion head .....	7
Gas feeding line .....	8
Adjustment prior to firing .....	9
Servomotor .....	9
Burner start-up .....	9
Burner firing .....	9
Burner calibration: .....	10
Determination of output upon firing (minimum) .....	10
1 - 2nd stage burner output .....	10
2 - 1st stage burner output .....	11
3 - Intermediate outputs .....	11
4 - Air pressure switch .....	12
5 - Minimum gas pressure switch .....	12
Flame presence check .....	12
Burner operation .....	13
Final checks .....	14
Maintenance .....	14
Switchboard maintenance .....	15
Fault - Probable cause - Suggested remedy .....	17
<b>Appendix</b> .....	<b>18</b>
Electrical panel layout .....	19

**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, page number 3.

**NOTE:** In conformity with Efficiency Directive 92/42/EEC the application of the burner on the boiler, adjustment and testing must be carried out observing the instruction manual of the boiler, including verification of the CO and CO<sub>2</sub> concentration in the flue gases, their temperatures and the average temperature of the water in the boiler.

MODEL			RS 34 MZ		RS 44 MZ		RS 44 MZ	
TYPE			883 T		884 T		884 T	
OUTPUT (1)	2nd stage	kW	125 - 390		200 - 550		200 - 550	
		Mcal/h	108 - 336		172 - 473		172 - 473	
	min. 1st stage	kW	70		100		100	
		Mcal/h	60		86		86	
FUEL			NATURAL GAS: G20 - G21 - G22 - G23 - G25					
			G20	G25	G20	G25	G20	G25
- net calorific value		kWh/Sm <sup>3</sup>	9.45	8.13	9.45	8.13	9.45	8.13
		Mcal/Sm <sup>3</sup>	8.2	7.0	8.2	7.0	8.2	7.0
- absolute density		kg/Sm <sup>3</sup>	0.71	0.78	0.71	0.78	0.71	0.78
- max delivery		Sm <sup>3</sup> /h	41	48	58	67.6	58	67.6
- pressure at max. delivery (2)		mbar	7.1	10.7	9	13.5	9	13.5
OPERATION			<ul style="list-style-type: none"> <li>Intermittent (min. 1 stop in 24 hours)</li> <li>Two-stage (high and low flame) and one-stage (all - nothing)</li> </ul>					
STANDARD APPLICATION			Boilers: water, steam, diathermic oil					
AMBIENT TEMPERATURE		°C	0 - 40					
COMBUSTIVE AIR TEMPERATURE		°C max	60					
ELECTRICAL SUPPLY		V	230 ~ +/-10%				230 - 400 with neutral ~ +/-10%	
		Hz	50/60 - single-phase				50/60 - three-phase	
ELECTRICAL MOTOR		rpm	2800/3400		2820/3400		2820/3400	
		W	300		420		450	
		V	220 - 240		220 - 240		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	
ELECTRICAL PROTECTION			IP40					
IN CONFORMITY WITH EEC DIRECTIVES			90/396 - 89/336 - 73/23 - 92/42					
NOISE (3)		dBA	70		72		72	
APPROVAL			CE 0085BR0381					

(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.3 with zero pressure in the combustion chamber.

(3) Sound pressure measured in the manufacturer's combustion laboratory, with burner operating on the test boiler at maximum output and measured from one metre away at the frequency of 50Hz.

**VARIANTS**

MODEL	POWER SUPPLY	LENGTH BLAST TUBE mm
RS 34 MZ	single-phase	216
	single-phase	351
RS 44 MZ	single-phase	216
	single-phase	351
	three-phase	216
	three-phase	351

**GAS CATEGORY**

COUNTRY	CATEGORY
IT - AT - GR - DK - FI - SE	II <sub>2</sub> H3B / P
ES - GB - IE - PT	II <sub>2</sub> H3P
NL	II <sub>2</sub> L3B / P
FR	II <sub>2</sub> Er3P
DE	II <sub>2</sub> ELL3B / P
BE	I <sub>2</sub> E(R)B, I <sub>3</sub> P
LU	II <sub>2</sub> E 3B/P

**ACCESSORIES (optional):**

• **KIT LONG HEAD**

BURNER	RS 34 MZ	RS 44 MZ
Code	3010428	3010429

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

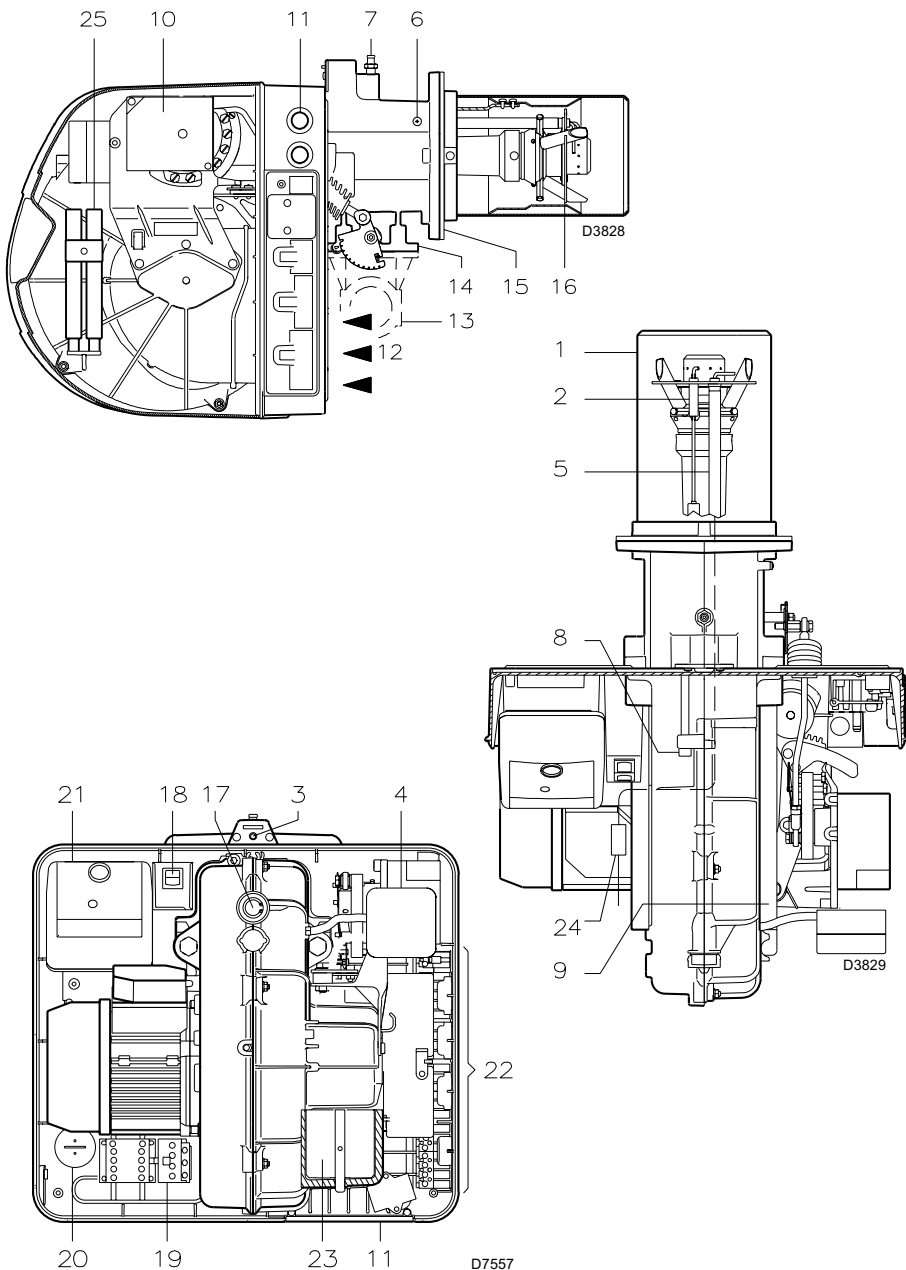
BURNER	RS 34 MZ	RS 44 MZ
Output kW	in progress	100/200 - 530kW
Blast tube length mm	216 - 351	216 - 351
Code	3010423	3010424

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

• **MAXIMUM GAS PRESSURE SWITCH** cod. 3010418

• **CLEAN CONTACTS KIT** cod. 3010419

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



### 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 of 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)
- 20 Motor capacitor (RS 34 MZ)
- 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 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).

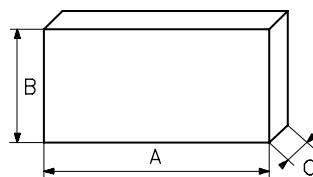
### OVERALL DIMENSIONS (C)

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.

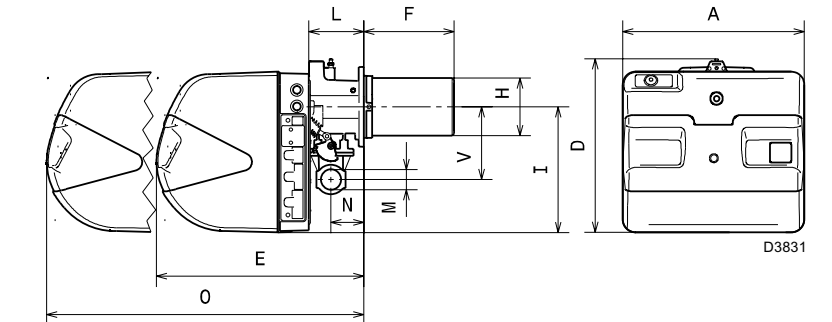
### STANDARD EQUIPMENT

- 1 - Gas train flange
- 1 - Flange gasket
- 4 - Flange fixing screws M 8 x 25
- 1 - Thermal insulation screen
- 4 - Screws to secure the burner flange to the boiler: M 8 x 25
- 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

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



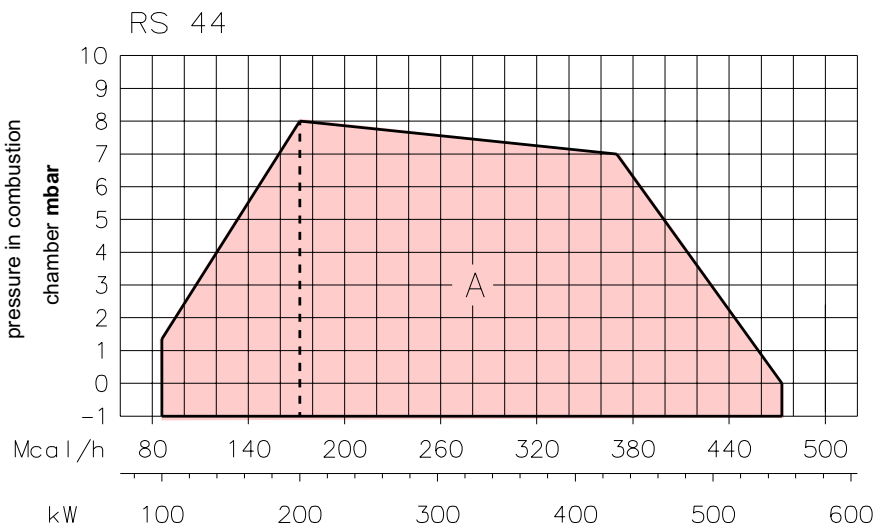
(B)



(C)

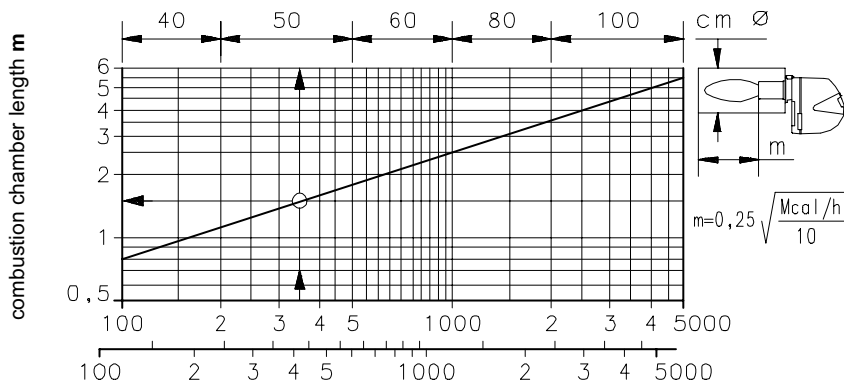
mm	A	D	E	F (1)	H	I	L	O	N	V	M
RS 34 MZ	442	422	508	216-351	140	305	138	780	84	177	1"1/2
RS 44 MZ	442	422	508	216-351	152	305	138	780	84	177	1"1/2

(1) Blast tube: short - long



(A)

D7558



(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 = 70 kW  
RS 44 MZ = 100 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**

$\Delta p$  (mbar)

kW	1	2	3					
			MB405 3970500	MB407 3970553	MB410 3970554	MB412 3970144	MB415 3970180	MB420 3970181 3970182
125	0.3	0.1	14.7	8.0	4.2	2.2	3.2	3.2
150	0.9	0.1	20.6	11.3	5.7	2.9	3.2	3.2
200	2.0	0.1	32.8	18.2	9.1	4.5	3.2	3.2
250	3.1	0.2	46.8	26.4	13.2	6.5	3.8	3.2
300	4.3	0.3		36.9	18.1	8.7	4.9	3.4
350	5.9	0.4		48.2	23.0	11.3	6.1	4.3
390	7.1	0.6		57.5	27.1	13.5	7.1	5.0

**RS 44 MZ**

$\Delta p$  (mbar)

kW	1	2	3				
			MB 407 3970553	MB 410 3970554	MB 412 3970144	MB 415 3970180	MB 420 3970181 3970182
200	0.8	0.1	18.2	9.1	4.5	3.2	3.2
250	1.8	0.2	26.4	13.2	6.5	3.8	3.2
300	2.8	0.3	36.9	18.1	8.7	4.9	3.4
350	3.9	0.4	48.2	23.0	11.3	6.1	4.3
400	4.9	0.6		28.3	14.1	7.4	5.2
450	6.1	0.7		34.0	16.9	8.7	6.1
500	7.5	0.9		40.0	19.9	10.1	7.0
550	9.0	1.1		45.9	23.2	11.6	8.2

**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°.

Column 3

Pressure loss of gas train 3)(B) includes: adjustment valve VR, safety valve VS (both fully open), pressure governor R, filter F.

The values shown in the various tables refer to: natural gas G 20 PCI 9.45 kWh/Sm<sup>3</sup> (8.2 Mcal/Sm<sup>3</sup>)

With:

natural gas G 25 PCI 8.13 kWh/Sm<sup>3</sup> (7.0 Mcal/Sm<sup>3</sup>)

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<sup>3</sup>
  - Gas pressure at test point 1)(B) = 5.1 mbar
  - Pressure in combustion chamber = 2 mbar
- $5.1 - 2 = 3.1 \text{ mbar}$

A pressure of 3.1 mbar (column 1) corresponds in the table RS 34 MZ to an output of 250 kW.

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

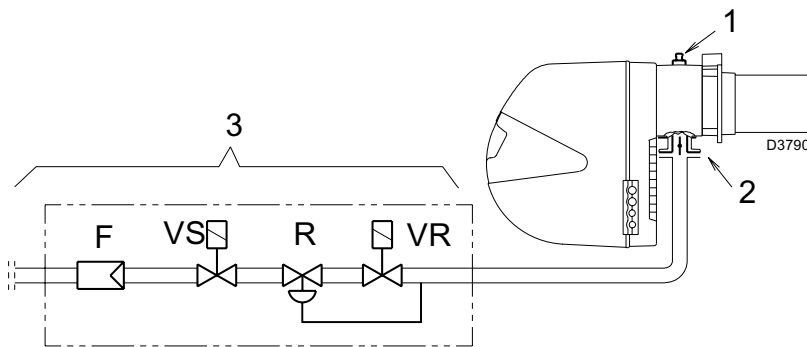
To calculate the required gas pressure at test point 1)(B), set the maximum output required from the burner operation:

- 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:**

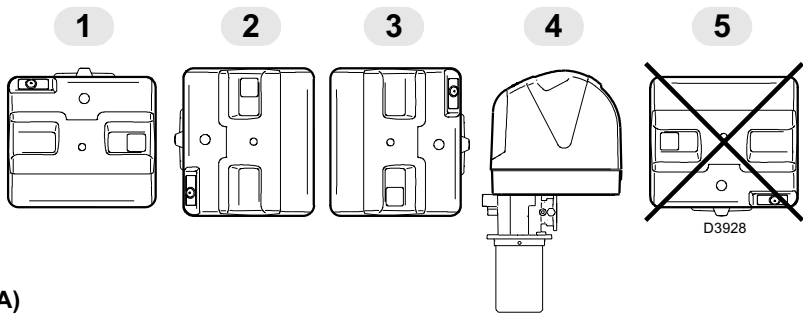
- Required burner maximum output operation: 250 kW
  - Natural gas G 20 PCI 9.45 kWh/Sm<sup>3</sup>
  - Pressure of the gas at an output of 250 kW, from the table RS 34 MZ, column 1 = 3.1 mbar
  - Pressure in combustion chamber = 2 mbar
- $3.1 + 2 = 5.1 \text{ mbar}$
- pressure required at test point 1)(B).

(A)



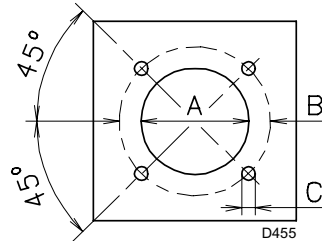
(B)



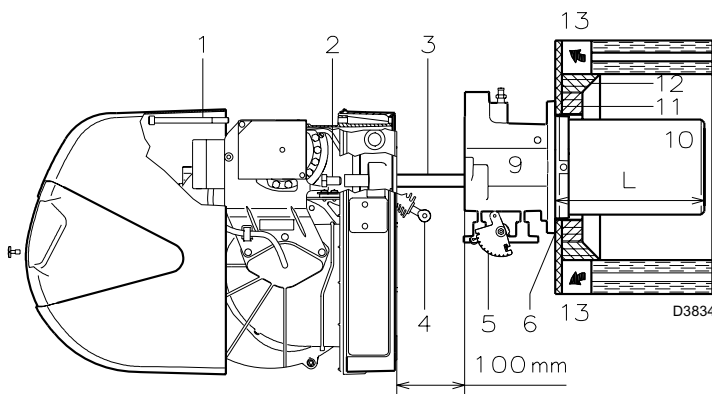


(A)

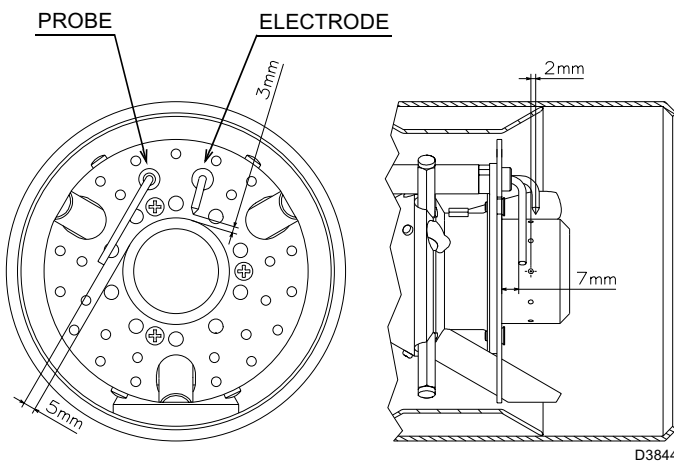
mm	A	B	C
RS 34 MZ	160	224	M 8
RS 44 MZ	160	224	M 8



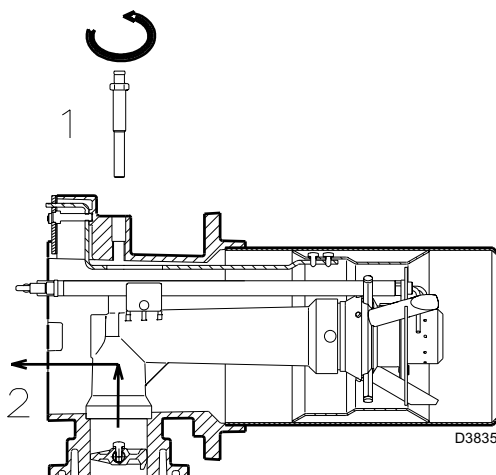
(B)



(C)



(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 page 14.

**⊖** 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)

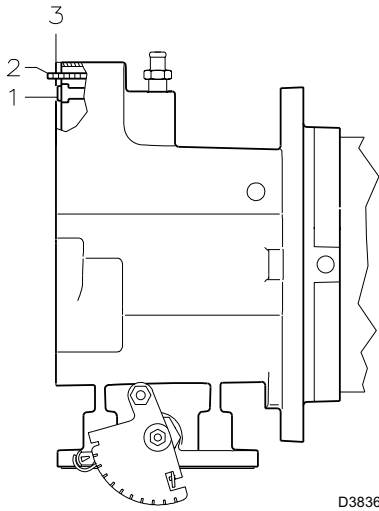
Before fixing the burner to the boiler, check (from the opening of the blast tube) that the probe and the electrode are correctly positioned, as in (D).

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.



(A)

D3836

### 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)

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 5.

#### 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).

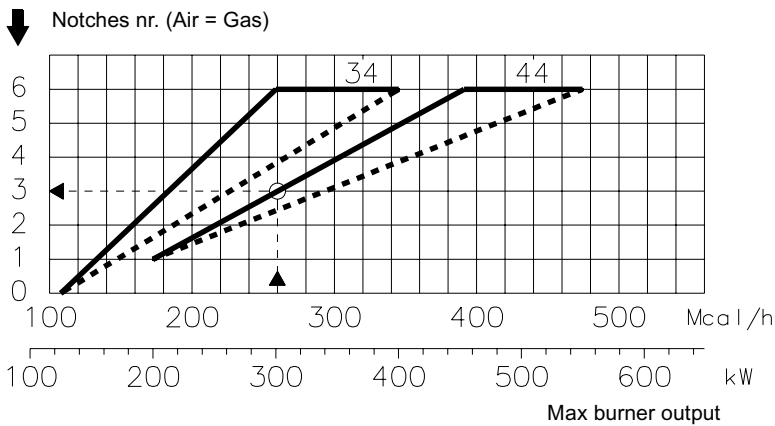
Once you have finished adjusting the head, reassemble the burner 4)(C) on the guides 3)(C) at about 100mm from the pipe coupling 5)(C) - burner in the position shown in fig. (C)p. 6 - insert the cable of the probe and the cable of the electrode, then slide the burner as far as the pipe coupling, burner in the position shown in fig. (C).

Refit screws 2) on guides 3).

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

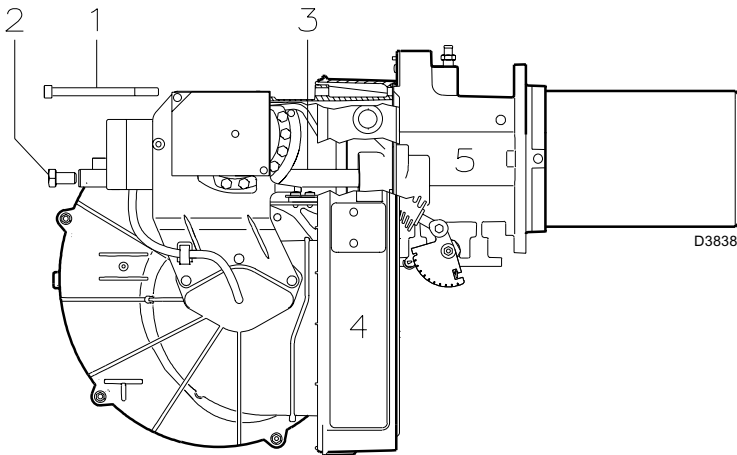
#### Attention

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.



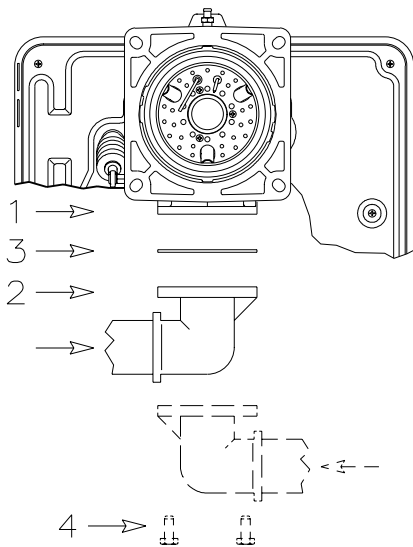
(B)

D3837



(C)

D3838



(A)

D3839

**GAS FEEDING LINE**

- 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.
- Make sure that the pressure governor calibration range (colour of the spring) comprises the pressure required by the burner.

**GAS TRAIN (B)**

Approved, together with the burner, according to the regulation EN 676, and supplied separately from the burner, with the code indicated in the table (C).

**KEY TO LAYOUT(B)**

- 1 - Gas input pipe
- 2 - Manual valve
- 3 - Vibration damping joint
- 4 - Pressure gauge with pushbutton cock
- 5 - Multibloc, including:
  - filter (replaceable)
  - operation valve
  - pressure adjuster
- 6 - Minimum gas pressure switch
- 7 - Valve seal checking device.
  - In accordance with EN 676 Standards, gas valve leak detection control devices are compulsory for burners with maximum outputs of more than 1200 kW.
- 8 - Gasket
- 9 - Gas adjustment butterfly valve
- 10 - Max gas pressure switch (accessory)
- 11 - Gas train/burner adaptor

P1 - Pressure at combustion head  
 P2 - Up-line pressure of valves/adjuster  
 P3 - Up-line pressure of the filter

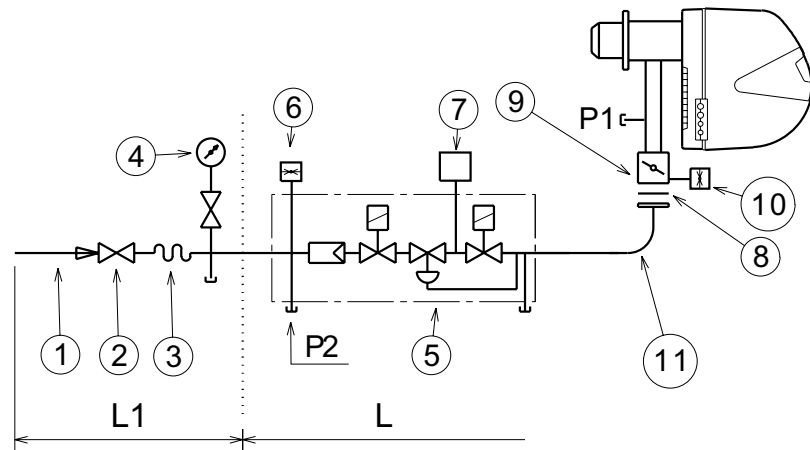
L - Gas train supplied separately with the code indicated in table (C)  
 L1 - The responsibility of the installer

**KEY TO TABLE (C)**

- C.T.= Checking device for gas valves seal:
- = Gas train without gas valve leak detection control device; device that can be ordered separately and assembled subsequently (see Column 7).
  - ◆ = Gas train with assembled VPS valve leak detection control device.
- 7 = VPS valve leak detection control device. Supplied separately from gas train on request.
- 11 = Gas train/burner adaptor. Supplied separately from gas train on request.

**Note**

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



(B)

D3791

**BURNERS AND RELATIVE GAS TRAINS APPROVED ACCORDING TO REGULATION EN 676**

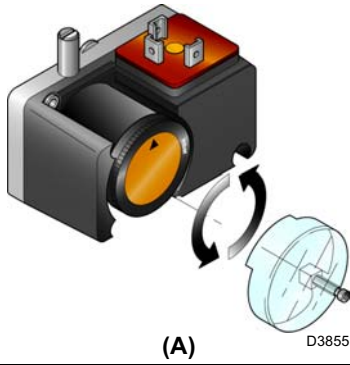
GAS TRAINS L				BURNER		7	11
Code	Model	Ø	C.T.	RS 34 MZ	RS 44 MZ	Code	Code
3970500**	MB-DLE 405	3/4"	-	•	-	3010123	3000824
3970553 3970229*	MB-DLE 407	3/4"	-	•	•	3010123	3000824
3970554 3970230*	MB-DLE 410	1"	-	•	•	3010123	3000824
3970144 3970231*	MB-DLE 412	1"1/4	-	•	•	3010123	-
3970180 3970232*	MB-DLE 415	1"1/2	-	•	•	3010123	-
3970181 3970233* 3970182 3970234*	MB-DLE 420	2"	- - ◆ ◆	•	•	3010123 3010123 - -	3000822

\* Trains complete with 6-pin plug for connection to burner.

\*\* Replace the 6-pin plug with the one supplied with the burner, in accordance with the wiring diagram on page 25.

(C)

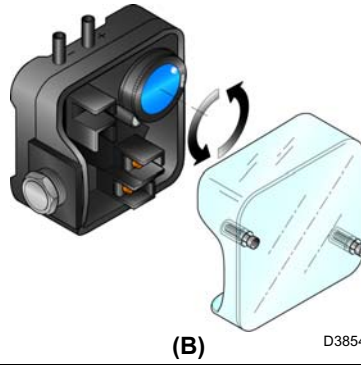
MIN GAS PRESSURE SWITCH



(A)

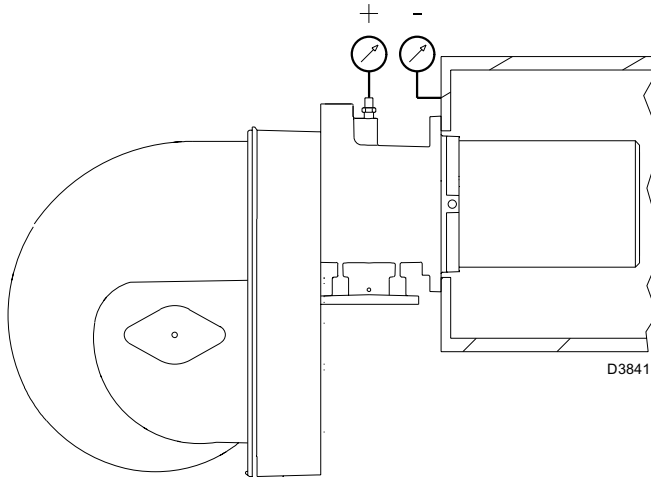
D3855

AIR PRESSURE SWITCH



(B)

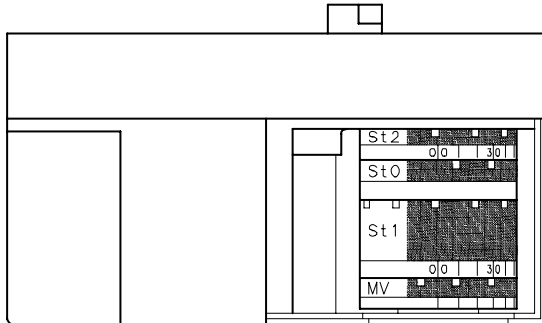
D3854



D3841

(C)

SERVOMOTOR



D517

(D)

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 7. 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 5.
- 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:

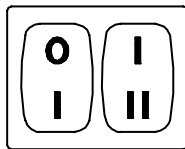
- switch 1)(E) to "Burner ON" position
- switch 2)(E) to "1st STAGE" position.

As soon as the burner starts check the direction of rotation of the fan blade, looking through the flame inspection window 18)(A)p.3. 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.

Burner off



1st stage

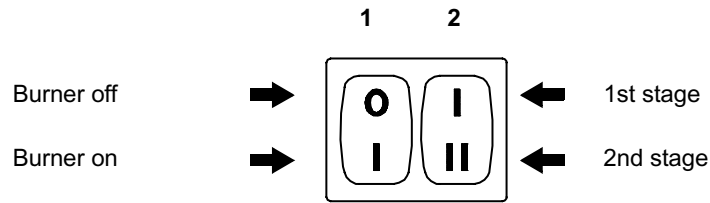
Burner on



2nd stage

(E)

D469



(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.3 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:

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

**V<sub>g</sub>**: volume supplied upon firings carried out (Sm<sup>3</sup>)

**Q<sub>a</sub>**: firing output (Sm<sup>3</sup>/h)

**n**: number of firings (10)

**t<sub>s</sub>**: safety time (sec)

**Example** for gas G 20 (9.45 kWh/Sm<sup>3</sup>):

firing output 150 kW

corresponding to 15.87 Sm<sup>3</sup>/h.

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

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

## 1 - 2ND STAGE BURNER OUTPUT

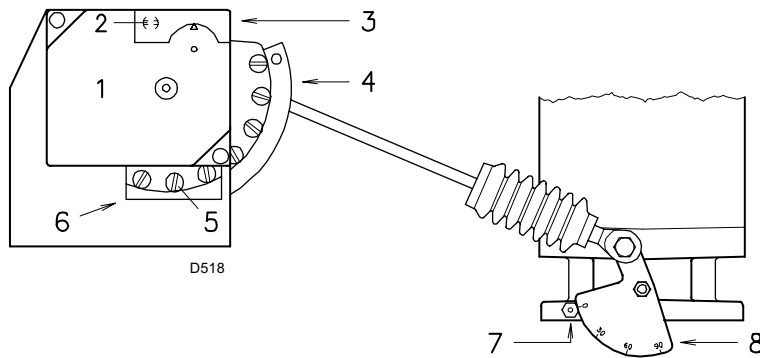
2nd stage output of the burner must be set within the firing rate range shown on page 4.

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

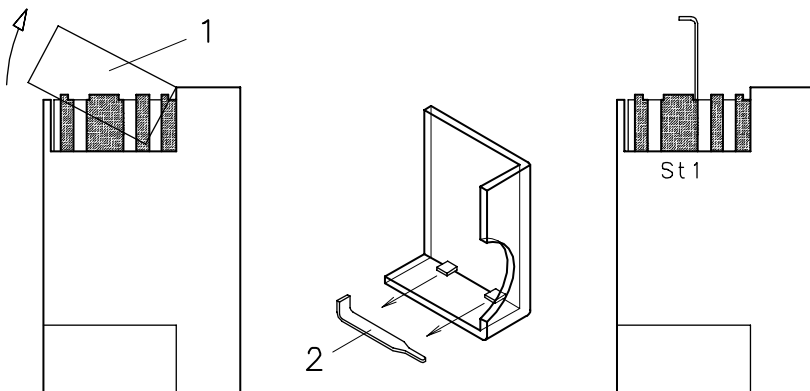
Measure the delivery of gas from the gas meter. A guideline indication can be calculated from the tables on page 5, simply read off the gas pressure on the U-type manometer, see fig.(C) on page 12, and follow the instructions on page 5.

- 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  $\ominus$  engaged/  $\oplus$  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)

D520

#### 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 4.

Set the switch 2)(A)p.13 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.13 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.

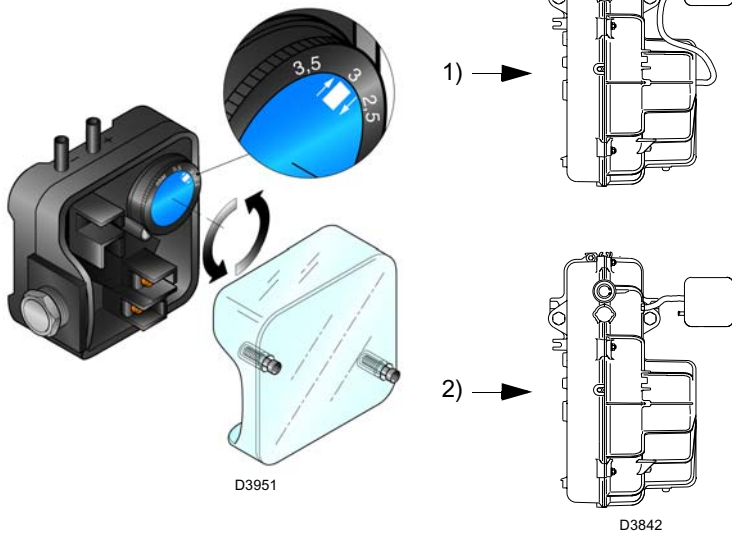
##### Adjustment of air delivery

Switch off the burner using switch 1)(A)p.13, 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.

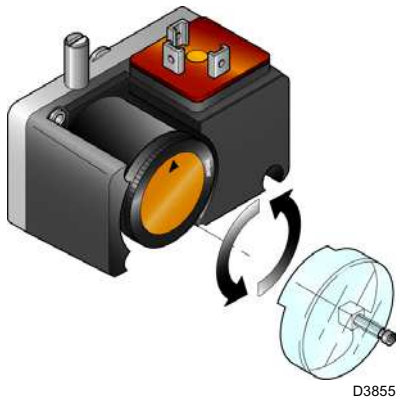
#### **NOTE**

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.

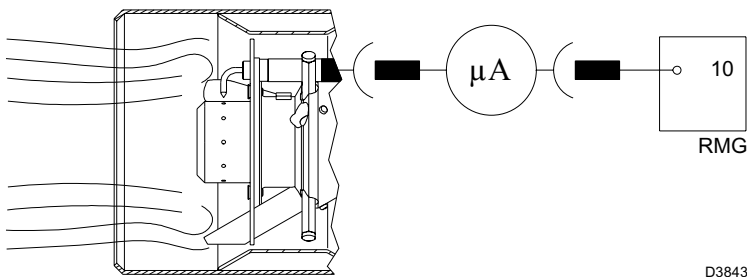


(A)

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.

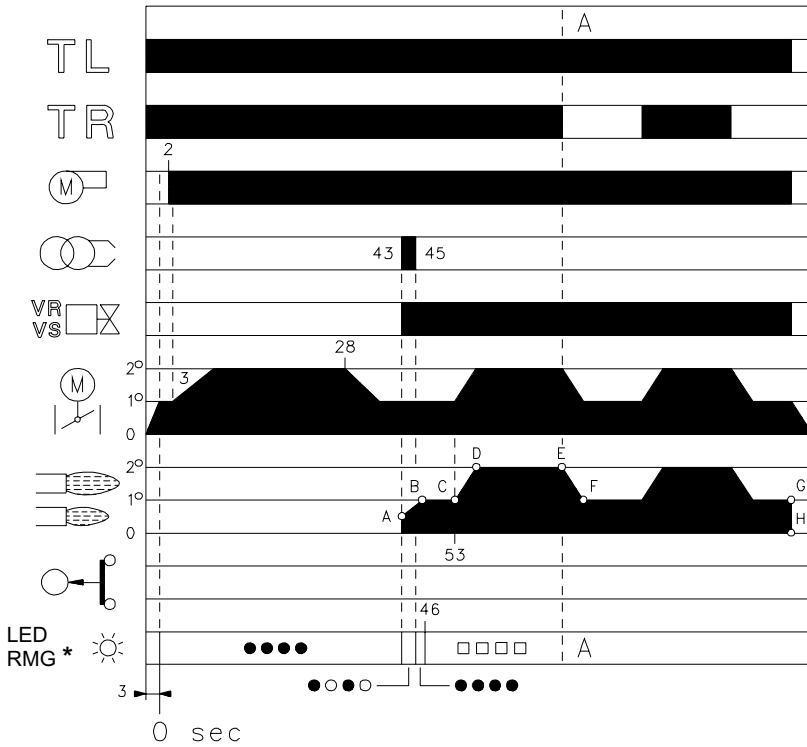
Then turn the knob anticlockwise by 2 mbar and repeat burner starting to ensure it is uniform.

If the burner locks out again, turn the knob anticlockwise again by 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  $\mu$ A. 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.3 on the ionisation probe cable and insert a direct current microammeter with a base scale of 100  $\mu$ A. Carefully check polarities!

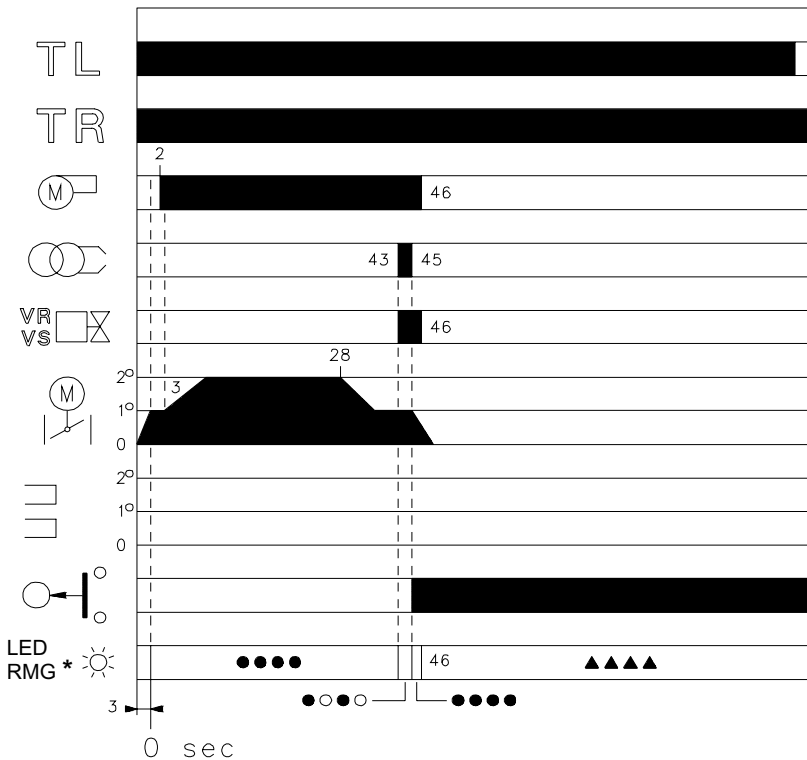
**NORMAL FIRING**  
(n° = seconds from instant 0)



\* ○ Off ● Yellow □ Green ▲ Red  
For further details see page 16.

(A) D3028

**NO FIRING**



\* ○ Off ● Yellow ▲ Red  
For further details see page 16.

(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.




#### **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)p.11.

#### **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.

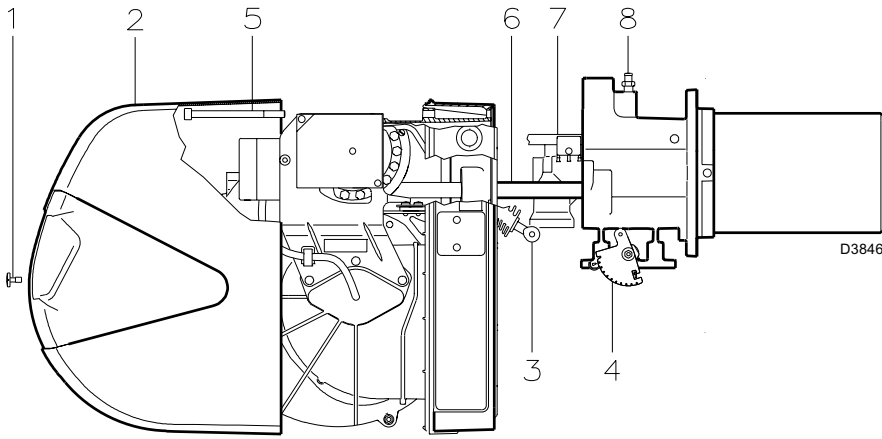
Clean the outside of the burner, taking special care with the transmission joints and cam 4)(A)p.11.

#### **Combustion**

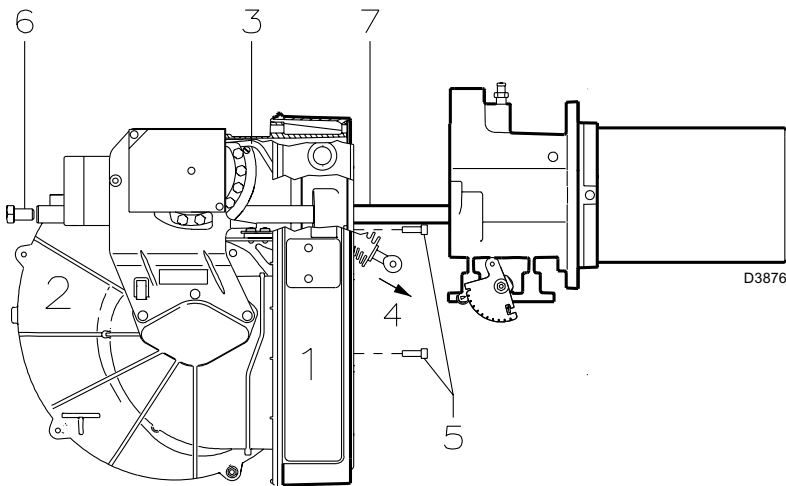
Adjust the burner if the combustion values found at the beginning of the operation do not comply with the regulations in force, or at any rate, do not correspond to good combustion.

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

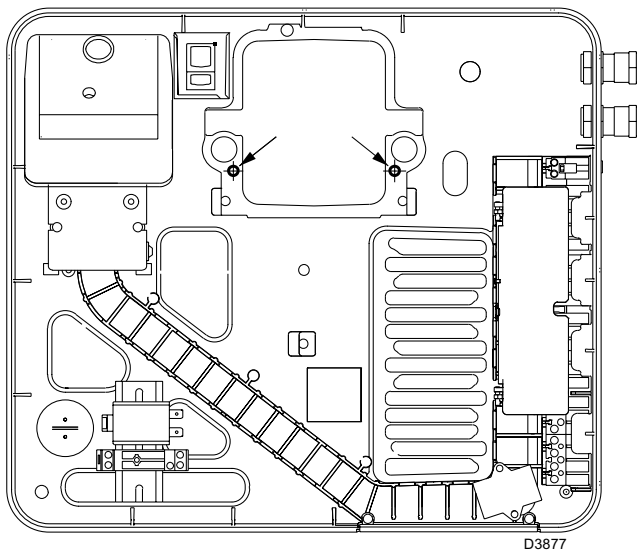
## OPENING THE BURNER



(A)



(B)



(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)(B)p. 6 and tighten the two extensions 25)(A)p.3 supplied with the burner.

Retighten the two screws 2)(B)p.6 on the terminal of the extensions.

### 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.6.
- 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.

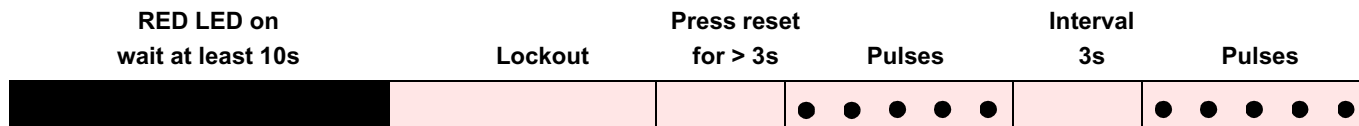
**BURNER START-UP CYCLE DIAGNOSTICS**

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	▲□▲□▲□▲□▲□
<b>Key to layout:</b> ○ 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 19.

**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.

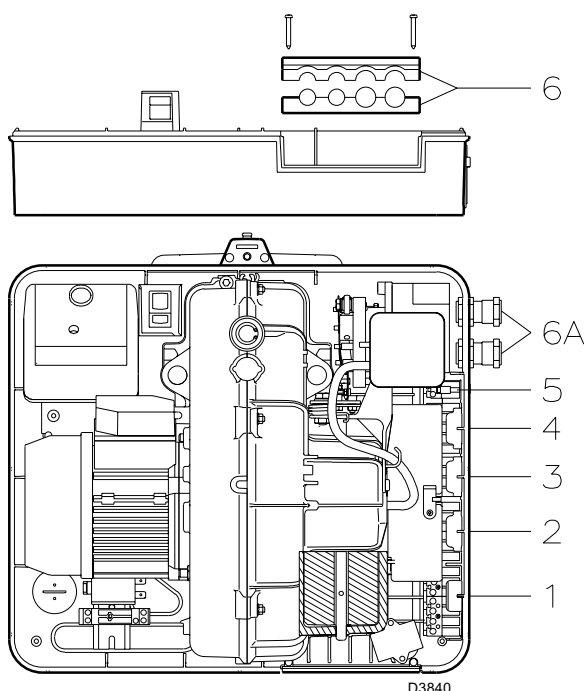
BUTTON PRESSED FOR	CONTROL BOX STATUS
Between 1 and 3 seconds	Control box reset without viewing visual diagnostics.
More than 3 seconds	Visual diagnostics of lockout condition: (LED pulses at 1-second intervals).
More than 3 seconds starting from the visual diagnostics condition	Software diagnostics 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 19.

SIGNAL	FAULT	PROBABLE CAUSE	SUGGESTED REMEDY
2x blinks ● ●	After pre-purge and safety time, the burner locks out and the flame does not appear	1 - The solenoid VR allows little gas through 2 - Solenoid valves VR or VS fail to open 3 - Gas pressure too low 4 - Firing electrode wrongly adjusted 5 - Electrode grounded due to broken insulation 6 - High voltage cable defective 7 - High voltage cable deformed by high temperature 8 - Firing transformer defective 9 - Erroneous valve or transformer electrical connections 10 - Defective control box. 11 - A cock down-line of the gas train is closed 12 - Air in pipework. 13 - VS and VR gas valves unconnected or with interrupted coil.	Increase Replace coil or rectifier panel Increase pressure at governor Adjust, see fig. (C)p. 6 Replace Replace Replace and protect Replace Open Bleed air Check connections or replace coil
3x blinks ● ● ●	The burner does not start and lockout warning appears	14 - Air pressure switch in operating position.	Adjust or replace
	The burner starts and then locks out	Air pressure switch inoperative due to insufficient air pressure: 15 - Air pressure switch adjusted badly 16 - Pressure switch pressure point pipe blocked 17 - Head wrongly adjusted 18 - High depression in the furnace.	Adjust or replace Clean Adjust Connect air pressure switch to fan suction line
	Lockout during pre-purging	19 - Defective capacitor (RS 34 - 44 single-phase) 20 - Defective motor remote control switch (RS 44 three-phase). 21 - Defective electrical motor 22 - Motor lockout (RS 44 three-phase)	Replace Replace Replace Reset thermal cut-out when third phases reconnected
4x blinks ● ● ● ●	The burner starts and then locks out	23 - Flame simulation	Replace control box
	Lock out when burner stops	24 - Flame remains in combustion head or flame simulation	Eliminate persistence of flame or replace control box
7x blinks ● ● ● ● ● ● ●	The burner goes to lock-out right after flame appearance	25 - The solenoid VR allows little gas through 26 - Ionisation probe wrongly adjusted. 27 - Insufficient ionisation (less than 5 mA) 28 - Probe grounded 29 - Burner poorly grounded 30 - Phase and neutral wires inverted 31 - Flame detection circuit failure	Increase Adjust, see fig. (C)p. 6 Check probe position Withdraw or replace cable Check grounding Correct by intervening Replace control box
	Burner locks out at transition between 1st and 2nd stage or between 2nd and 1st stage	32 - Too much air or too little gas	Adjust air and gas
	During operation, the burner locks out	33 - Probe or ionisation cable grounded 34 - Fault on air pressure switch	Replace worn parts Replace
10x blinks ● ● ● ● ● ● ● ●	The burner does not start and lockout warning appears	35 - Erroneous electrical connections	Check connections
	The burner locks out	36 - Defective control box.	Replace
No blink	The burner does not start	37 - No electrical power supply 38 - A limiter or safety remote control is open 39 - Control box fuses blown 40 - Defective control box. 41 - No gas supply  42 - Mains gas pressure insufficient. 43 - Minimum gas pressure switch fails to close 44 - Servomotor fails to move to St1 position.	Close all switches - Check connections Adjust or replace Replace Replace Open the manual valves between meter and train Contact your GAS COMPANY Adjust or replace Replace
	The burner repeats the starting cycle without lock-out	45 - Mains gas pressure is near the value on which the min. gas pressure switch gas is adjusted. The sudden drop of pressure switch operation which follows 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 firing cycle is repeated. The sequence repeats endlessly.	Reduce operating pressure min. gas Replace gas filter cartridge.
	Firing with pulsation	46 - Poorly adjusted head 47 - Firing electrode wrongly adjusted 48 - Poorly adjusted fan air damper: too much air 49 - Output during firing phase is too high	Adjust, see p. 7 Adjust, see fig. (C)p. 6 Adjust Reduce
	The burner does not pass to 2nd stage	50 - Remote control device TR does not close 51 - Defective control box. 52 - Servomotor faulty	Adjust or replace Replace Replace
	Burner stops with air damper open	53 - Servomotor faulty	Replace

## APPENDIX

### Electrical connections



#### N.B.

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.

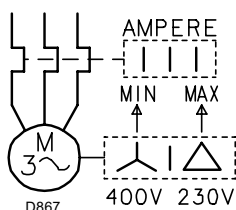
The use of cable grommets can take various forms; the following lists show one possible solution:

#### 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)



#### THERMAL RELAY CALIBRATION (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.

#### N.B.

- 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.



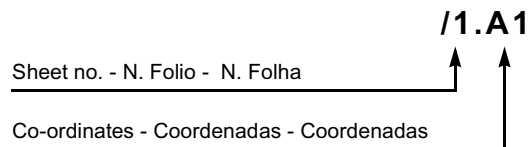
#### Warning:

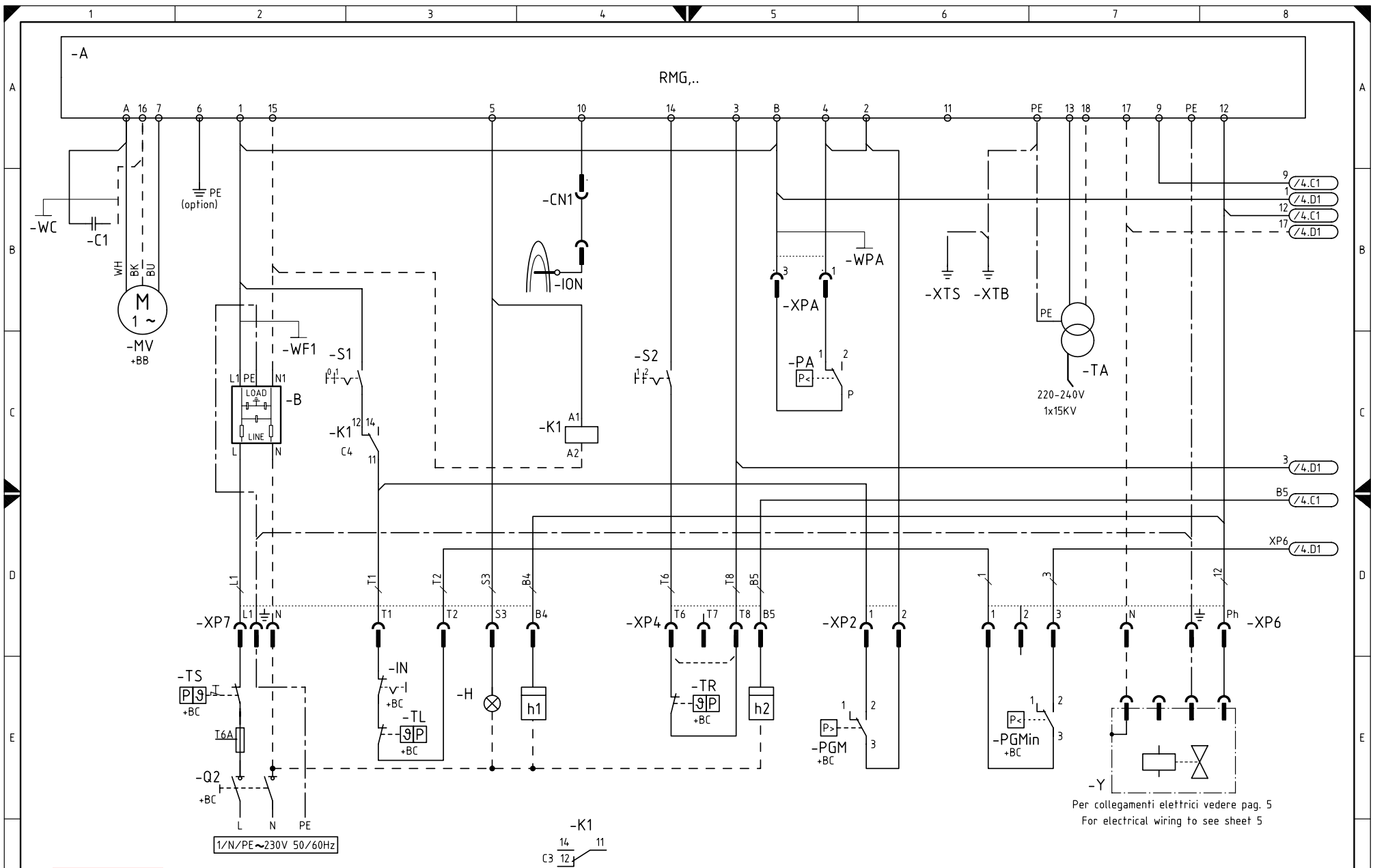
- Do not invert the neutral with the phase in the electrical supply line. An inversion would lead to lockout due to firing failure.
- Replace the components only with original spare parts.

**Electrical panel layout - Esquema cuadro eléctrico**  
**Esquema quadro eléctrico**

<b>1</b>		<b>INDEX - ÍNDICE - ÍNDICE</b>
<b>2</b>		Indication of references - Indicación referencias Indicação das referências
<b>3</b>	<b>RS 34 MZ</b> <b>RS 44 MZ</b>	Functional layout - Esquema funcional Esquema funcional
<b>4</b>	<b>RS 34 MZ</b> <b>RS 44 MZ</b>	Functional layout - Esquema funcional Esquema funcional
<b>5</b>	<b>RS 34 MZ</b> <b>RS 44 MZ</b>	Electrical wiring is the responsibility of the installation engineer - Conexiones eléctricas a cargo del instalador - Ligações eléctricas pelo instalador

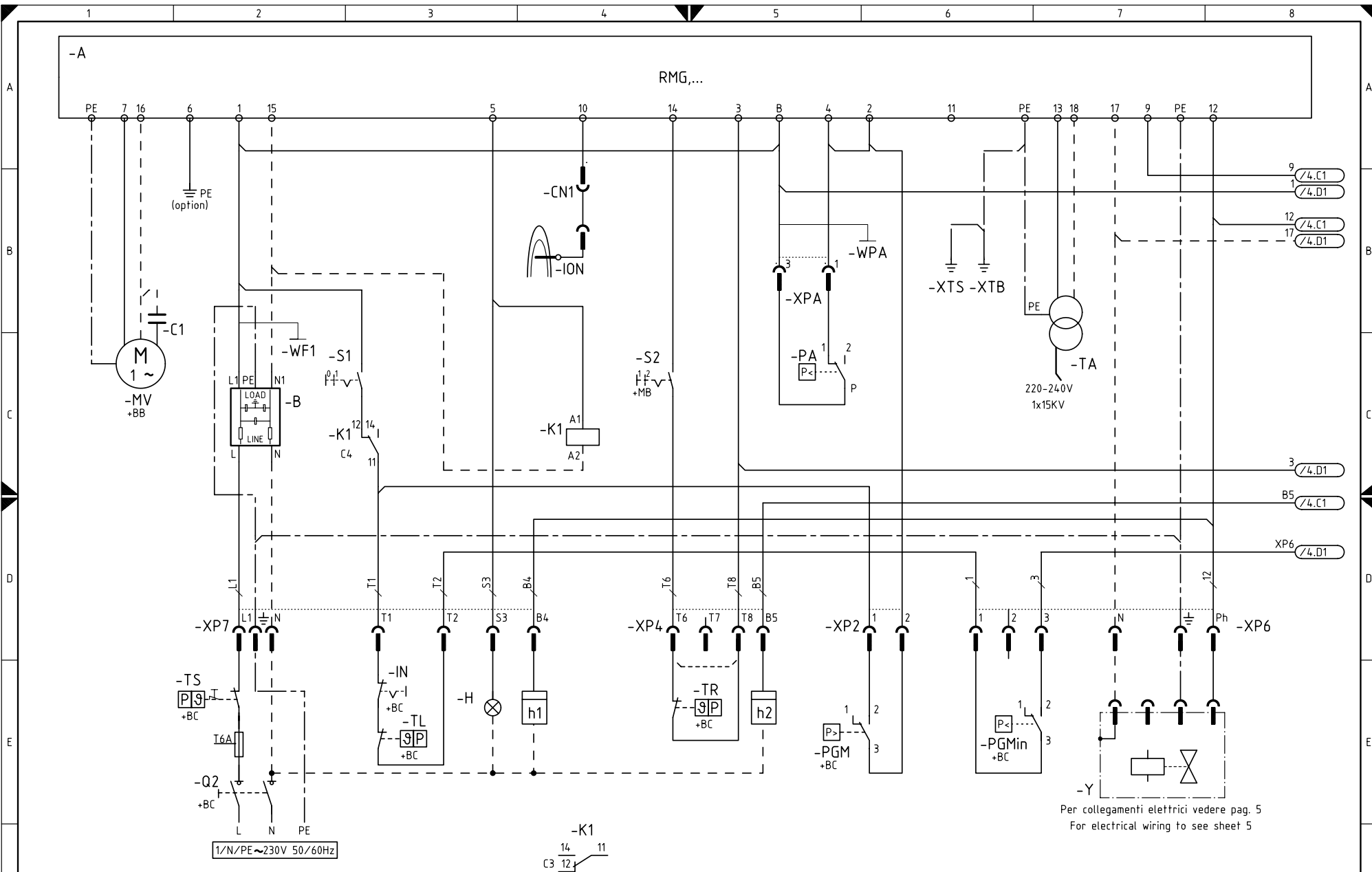
**2** **Indication of references - Indicación referencias - Indicação das referências**





**RS 34 MZ**

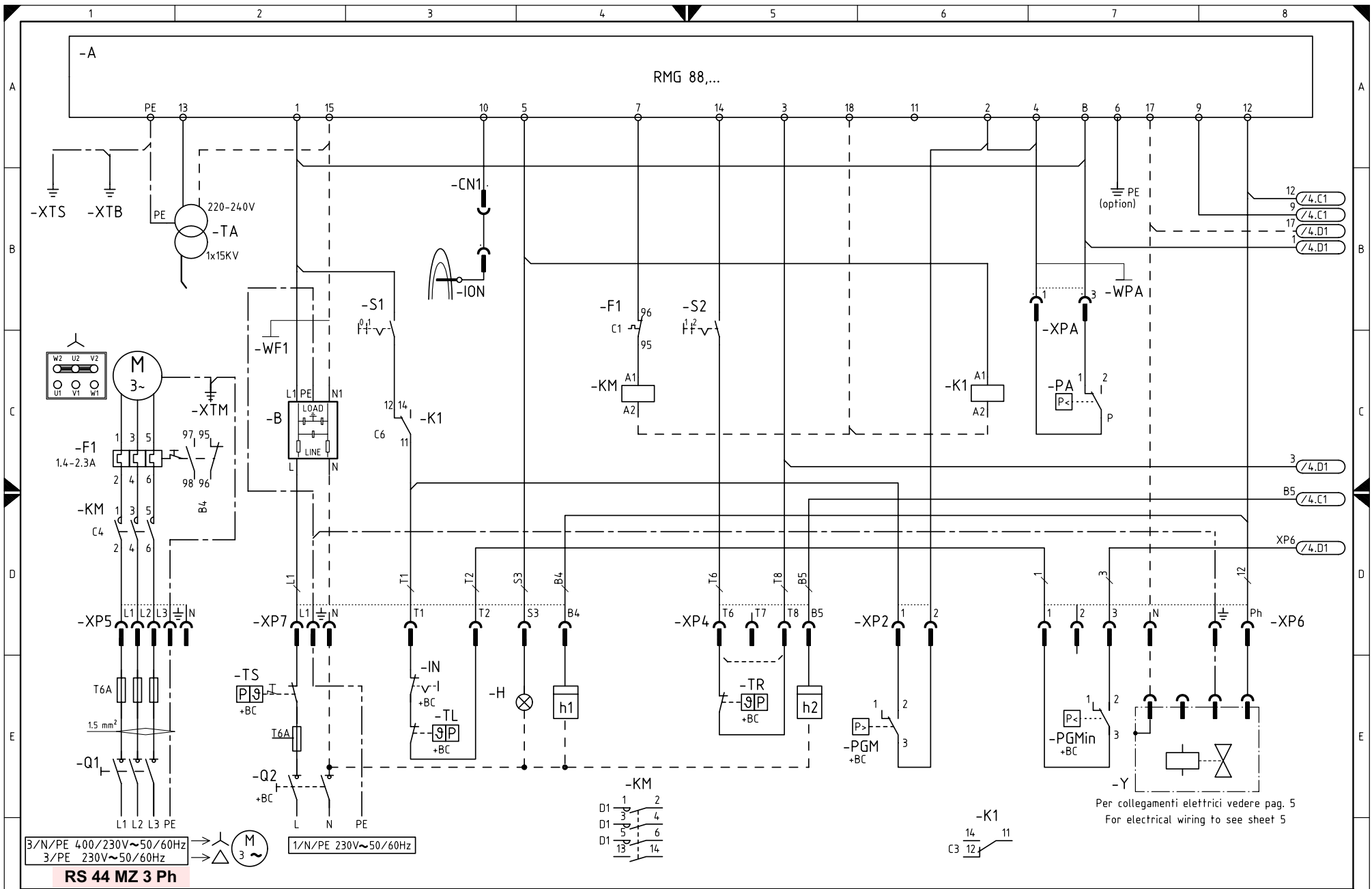
BU = BLU / BLUE / BLEU / BLAU	YE = GIALLO / YELLOW / JAUNE / GELB	WH = BIANCO / WHITE / BLANC / WEISS	GY= GRIGIO / GREY / GRIS / GRAU	TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
BK = NERO / BLACK / NOIR / SCHWARZ	GN = VERDE / GREEN / VERT / GRÜN	OG= ARANCIO / ORANGE / ORANGE / ORANGE	PK= ROSA / PINK / ROSE / ROSA	SR= ARGENTO / SILVER / ARGENT / SILBER
BN = MARRONE / BROWN / MARRON / BRAUN	RD = ROSSO / RED / ROUGE / ROT	VT= VIOLETTA / VIOLET / VIOLET / VIOLETT	GD= ORO / GOLD / OR / GOLD	GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN



**RS 44 MZ**

BU = BLU / BLUE / BLEU / BLAU	YE = GIALLO / YELLOW / JAUNE / GELB	WH = BIANCO / WHITE / BLANC / WEISS	GY = GRIGIO / GREY / GRIS / GRAU	TO = TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
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	GYE = GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN





3/N/PE 400/230V~50/60Hz  
 3/PE 230V~50/60Hz → M 3~  
 1/N/PE 230V~50/60Hz

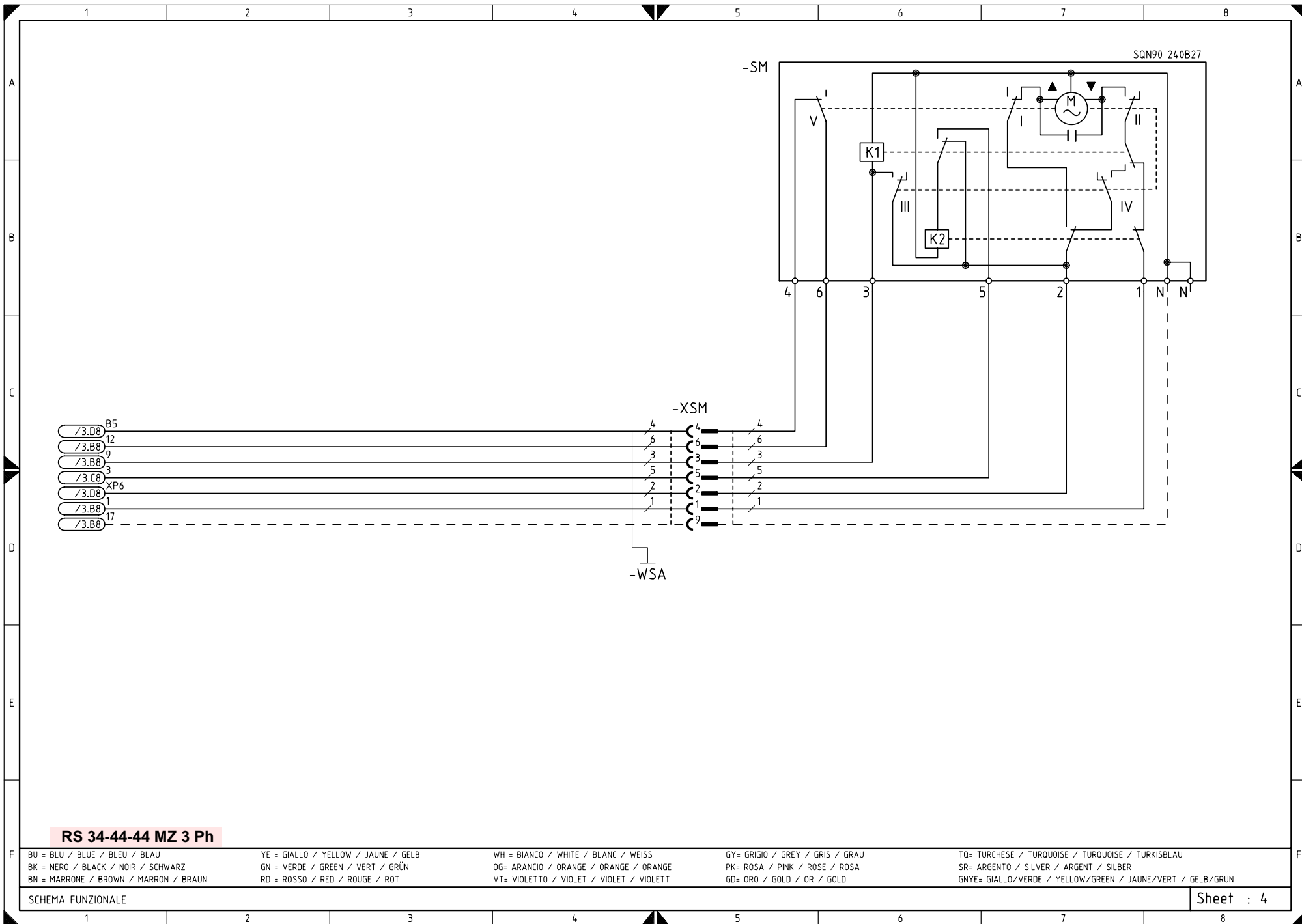
**RS 44 MZ 3 Ph**

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
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/GRÜN

SCHEMA FUNZIONALE

Sheet : 3

Per collegamenti elettrici vedere pag. 5  
 For electrical wiring to see sheet 5

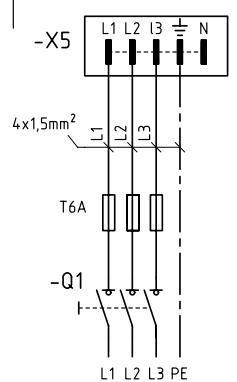


**RS 34-44-44 MZ 3 Ph**

BU = BLU / BLUE / BLEU / BLAU	YE = GIALLO / YELLOW / JAUNE / GELB	WH = BIANCO / WHITE / BLANC / WEISS	GY= GRIGIO / GREY / GRIS / GRAU	TO= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
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= VIOLETTA / VIOLET / VIOLET / VIOLETT	GD= ORO / GOLD / OR / GOLD	GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN

SCHEMA FUNZIONALE

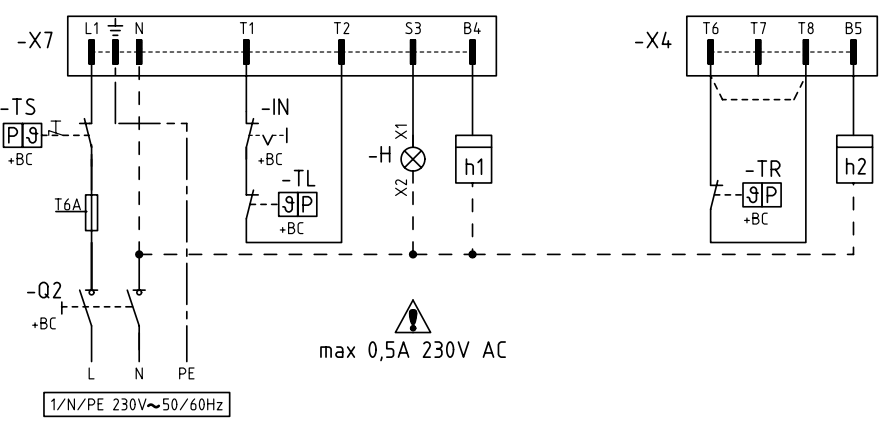
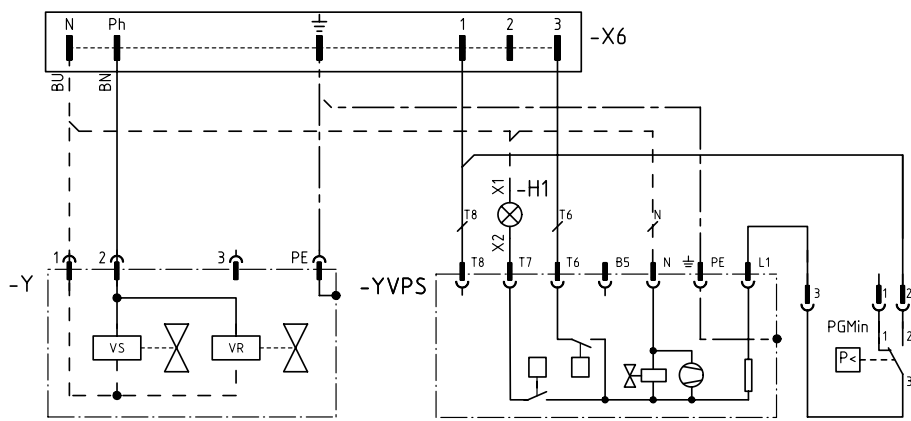
SOLO PER LA VERSIONE TRIFASE/ONLY FOR THE THREE PHASE VERSION



NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C  
 WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C  
 EN CAS D'INTERRUPTEUR MAGNÉOTHERMIQUE CHOISIR LE TYPE C  
 IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN

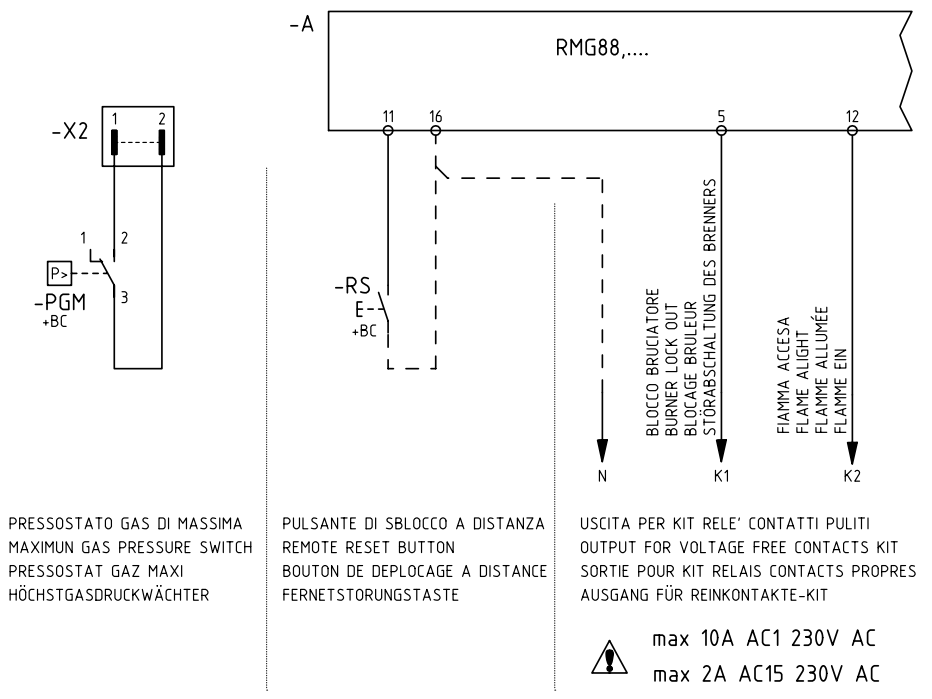
3/N/PE 400/230V~50/60Hz → M  
 3/PE 230V~50/60Hz →

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



max 0,5A 230V AC

KITS



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

PULSANTE DI SBLOCCO A DISTANZA  
 REMOTE RESET BUTTON  
 BOUTON DE DEPLOCEMENT A DISTANCE  
 FERNSTORUNGSTASTE

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

RS 34-44-44 MZ 3 Ph

BU = BLU / BLUE / BLEU / BLAU	YE = GIALLO / YELLOW / JAUNE / GELB	WH = BIANCO / WHITE / BLANC / WEISS	GY= GRIGIO / GREY / GRIS / GRAU	TO= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
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= VIOLETTA / VIOLET / VIOLET / VIOLETT	GD= ORO / GOLD / OR / GOLD	GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN

**KEY TO ELECTRICAL LAYOUT**

<b>A</b>	- Electrical control box
<b>B</b>	- Radio noise filter
<b>+BB</b>	- Components on burners
<b>+BC</b>	- Components on boiler
<b>C1</b>	- Capacitor
<b>CN1</b>	- Ionisation probe connector
<b>F1</b>	- Fan motor thermal relay
<b>H</b>	- Remote lockout signalling
<b>H1</b>	- Lockout YVPS
<b>IN</b>	- Manual burner stop switch
<b>ION</b>	- Ionisation probe
<b>h1</b>	- Hour counter
<b>h2</b>	- Hour counter 2 <sup>nd</sup> stage
<b>K1</b>	- Relay
<b>KM</b>	- Motor contact maker
<b>MV</b>	- Fan motor
<b>PA</b>	- Air pressure switch
<b>PGM</b>	- Maximum gas pressure switch
<b>PGMin</b>	- Low gas pressure switch
<b>Q1</b>	- Three phase knife switch
<b>Q2</b>	- Single-phase knife switch
<b>RS</b>	- Remote reset button
<b>S1</b>	- Selector: burner off - on
<b>S2</b>	- Selector: 1st - 2nd stage operation
<b>SM</b>	- Servomotor
<b>TA</b>	- Ignition transformer
<b>TL</b>	- Limit thermostat/pressure switch
<b>TR</b>	- Adjustment thermostat/pressure switch
<b>TS</b>	- Safety thermostat/pressure switch
<b>Y</b>	- Gas regulation valve + gas safety valve
<b>YVPS</b>	- Gas valve leak detection control device
<b>XPA</b>	- Air pressure switch connector
<b>XP2</b>	- Maximum gas pressure switch connector
<b>XP4</b>	- 4-pole socket
<b>XP5</b>	- 5-pole socket
<b>XP6</b>	- 6-pole socket
<b>XP7</b>	- 7-pole socket
<b>XSM</b>	- Servomotor connector
<b>XTB</b>	- Shelf earth
<b>XTM</b>	- Fan assembly earth
<b>XTS</b>	- Servomotor assembly earth
<b>X2</b>	- 2-pin plug
<b>X4</b>	- 4-pin plug
<b>X5</b>	- 5-pin plug
<b>X6</b>	- 6-pin plug
<b>X7</b>	- 7-pin plug

**LEYENDA ESQUEMAS ELÉCTRICOS**

<b>A</b>	- Caja de control eléctrica
<b>B</b>	- Filtro antiinterferencias radio
<b>+BB</b>	- Componentes a bordo de los quemadores
<b>+BC</b>	- Componentes a bordo de la caldera
<b>C1</b>	- Condensador
<b>CN1</b>	- Conector para sonda de ionización
<b>F1</b>	- Relé térmico motor ventilador
<b>H</b>	- Señalización de bloqueo a distancia
<b>H1</b>	- Bloqueo YVPS
<b>IN</b>	- Interruptor parada manual del quemador
<b>ION</b>	- Sonda de ionización
<b>h1</b>	- Cuentahoras
<b>h2</b>	- Cuentahoras 2 <sup>a</sup> llama
<b>K1</b>	- Relé
<b>KM</b>	- Contador motor
<b>MV</b>	- Motor ventilador
<b>PA</b>	- Presostato aire
<b>PGM</b>	- Presostato gas de máxima
<b>PGMin</b>	- Presostato gas de mínima
<b>Q1</b>	- Interruptor seccionador trifásico
<b>Q2</b>	- Interruptor seccionador monofásico
<b>RS</b>	- Botón de desbloqueo quemador a distancia
<b>S1</b>	- Selector: marcha - paro
<b>S2</b>	- Selector: 1. <sup>a</sup> - 2. <sup>a</sup> llama
<b>SM</b>	- Servomotor
<b>TA</b>	- Transformador de encendido
<b>TL</b>	- Termostato/presostato de límite
<b>TR</b>	- Termostato/presostato de regulación
<b>TS</b>	- Termostato/presostato de seguridad
<b>Y</b>	- Válvula de regulación gas + válvula de seguridad gas
<b>YVPS</b>	- Dispositivo de control de estanqueidad válvula gas
<b>XPA</b>	- Conector presostato aire
<b>XP2</b>	- Conector presostato gas de máxima
<b>XP4</b>	- Conector hembra de 4 contactos
<b>XP5</b>	- Conector hembra de 5 contactos
<b>XP6</b>	- Conector hembra de 6 contactos
<b>XP7</b>	- Conector hembra de 7 contactos
<b>XSM</b>	- Conector servomotor
<b>XTB</b>	- Tierra ménsula
<b>XTM</b>	- Tierra grupo ventilador
<b>XTS</b>	- Tierra grupo servomotor
<b>X2</b>	- Conector macho de 2 contactos
<b>X4</b>	- Conector macho de 4 contactos
<b>X5</b>	- Conector macho de 5 contactos
<b>X6</b>	- Conector macho de 6 contactos
<b>X7</b>	- Conector macho de 7 contactos

## LEGENDA ESQUEMAS ELÉCTRICOS

<b>A</b>	- Caixa de controlo eléctrica
<b>B</b>	- Filtro contra radio-interferências
<b>+BB</b>	- Componentes bordo queimadores
<b>+BC</b>	- Componentes bordo caldeira
<b>C1</b>	- Condensador
<b>CN1</b>	- Conector sonda de ionização
<b>F1</b>	- Relé térmico motor ventilador
<b>H</b>	- Sinalização de bloqueio remoto
<b>H1</b>	- Bloqueio YVPS
<b>IN</b>	- Interruptor paragem manual queimador
<b>ION</b>	- Sonda de ionização
<b>h1</b>	- Conta-horas
<b>h2</b>	- Conta-horas 2ª chama
<b>K1</b>	- Relé
<b>KM</b>	- Contactador motor
<b>MV</b>	- Motor ventilador
<b>PA</b>	- Pressostato de ar
<b>PGM</b>	- Pressostato gás de máxima
<b>PGMin</b>	- Pressostato de gás de mínima
<b>Q1</b>	- Interruptor seccionador trifásico
<b>Q2</b>	- Interruptor seccionador monofásico
<b>RS</b>	- Botão de desbloqueio queimador a distância
<b>S1</b>	- Selector: arranque - paragem
<b>S2</b>	- Selector: 1ª - 2ª chama
<b>SM</b>	- Servomotor
<b>TA</b>	- Transformador de acendimento
<b>TL</b>	- Termóstato/pressostato de limite
<b>TR</b>	- Termóstato/pressostato de regulação
<b>TS</b>	- Termóstato/pressostato de segurança
<b>Y</b>	- Válvula de regulação gás + válvula de segurança gás
<b>YVPS</b>	- Dispositivo de controlo da estanquidade das válvulas gás
<b>XPA</b>	- Conector pressostato de ar
<b>XP2</b>	- Conector pressostato gás de máxima
<b>XP4</b>	- Tomada de 4 pólos
<b>XP5</b>	- Tomada de 5 pólos
<b>XP6</b>	- Tomada de 6 pólos
<b>XP7</b>	- Tomada de 7 pólos
<b>XSM</b>	- Conector servomotor
<b>XTB</b>	- Terra consola
<b>XTM</b>	- Terra grupo ventilador
<b>XTS</b>	- Terra grupo servomotor
<b>X2</b>	- Ficha de 2 pólos
<b>X4</b>	- Ficha de 4 pólos
<b>X5</b>	- Ficha de 5 pólos
<b>X6</b>	- Ficha de 6 pólos
<b>X7</b>	- Ficha de 7 pólos







RIELLO S.p.A.  
I – 37045 Legnago (VR)  
Tel.: +39.0442.630111  
[http:// www.rielloburners.com](http://www.rielloburners.com)