

## **GB** Forced draught gas burners

Progressive two-stage or modulating operation



CODE	MODEL	TYPE
20169244	RS 25/M BLU	876 T
20169245	RS 25/M BLU	876 T
20169247	RS 35/M BLU	877 T
20168390	RS 35/M BLU	877 T



**Translation of the original instructions**

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# 1 Declarations

## Declaration of conformity in accordance with ISO / IEC 17050-1

Manufacturer: RIELLO S.p.A.  
 Address: Via Pilade Riello, 7  
 37045 Legnago (VR)  
 Product: Forced draught gas burners  
 Model: RS 25/M BLU  
 RS 35/M BLU  
 These products are in compliance with the following Technical Standards:  
 EN 676  
 EN 12100  
 and according to the European Directives:  
 GAR 2016/426/EU Gas Devices Regulation  
 MD 2006/42/CE Machine Directive  
 LVD 2014/35/EU Low Voltage Directive  
 EMC 2014/30/EU Electromagnetic Compatibility  
 Such products are marked as indicated below:



CE-0085BR0379

The quality is guaranteed by a quality and management system certified in accordance with ISO 9001:2015.

Legnago, 03.05.2021

Research & Development Director  
 RIELLO S.p.A. - Burner Department

Mr. F. Maltempi

## Declaration of Conformity A.R. 8/1/2004 & 17/7/2009 – Belgium

Manufacturer: RIELLO S.p.A.  
 37045 Legnago (VR) Italy  
 Tel. ++39.0442630111  
 www.riello.com  
 Distributed by: VAN MARCKE HQ  
 LAR Blok Z 5,  
 B-8511 Kortrijk (Aalbeke) Belgium  
 Tel. +32 56 23 7511  
 e-mail: riello@vanmarcke.be  
 URL. www.vanmarcke.com

This document certifies that the series of devices specified below is in compliance with the model described in the EC Declaration of Conformity and has been manufactured and distributed in compliance with the requirements defined in the Legislative Decree of January 8th 2004 and July 17th 2009.

Type of product: Forced draught gas burners  
 Model: RS 25/M BLU  
 RS 35/M BLU  
 Regulation applied: EN 676 and A.R. of January 8th 2004 - July -17th 2009  
 TÜV Industrie Service GmbH  
 TÜV SÜD Gruppe  
 Controlling organisation: Ridlerstrasse, 65  
 80339 München DEUTSCHLAND  
 Values measured: RS 25/M BLU RS 35/M BLU  
 CO max: 14 mg/kWh CO max: 1 mg/kWh  
 NOx max: 72 mg/kWh NOx max: 56 mg/kWh

**Manufacturer's Declaration**

**RIELLO S.p.A.** declares that the following products comply with the NOx emission limits specified by German standard "1. BImSchV revision 26.01.2010".

Product	Type	Model	Output
Forced draught gas burners	876 T	RS 25/M BLU	45 - 370 kW
	877 T	RS 35/M BLU	70 - 480 kW

## 2 Information and general warnings

### 2.1 Information about the instruction manual

#### 2.1.1 Introduction

The instruction manual supplied with the burner:

- is an integral and essential part of the product and must not be separated from it; it must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. If the manual is lost or damaged, another copy must be requested from the Technical Assistance Centre of the area;
- is designed for use by qualified personnel;
- offers important indications and instructions relating to the installation safety, start-up, use and maintenance of the burner.

#### Symbols used in the manual

In some parts of the manual you will see triangular DANGER signs. Pay great attention to these, as they indicate a situation of potential danger.

#### 2.1.2 General dangers

The **dangers** can be of **3 levels**, as indicated below.



**DANGER**

Maximum danger level!

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



**ATTENTION**

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



**CAUTION**

This symbol indicates operations which, if not carried out correctly, may cause damage to the machine and/or injury to people.

#### 2.1.3 Other symbols



**DANGER**

#### **DANGER: LIVE COMPONENTS**

This symbol indicates operations which, if not carried out correctly, lead to electric shocks with lethal consequences.



#### **DANGER: FLAMMABLE MATERIAL**

This symbol indicates the presence of flammable materials.



#### **DANGER: BURNING**

This symbol indicates the risks of burns due to high temperatures.



#### **DANGER: CRUSHING OF LIMBS**

This symbol indicates the presence of moving parts: danger of crushing of limbs.



#### **WARNING: MOVING PARTS**

This symbol indicates that you must keep limbs away from moving mechanical parts; danger of crushing.



#### **DANGER: EXPLOSION**

This symbol signals places where an explosive atmosphere may be present. An explosive atmosphere is defined as a mixture - under atmospheric conditions - of air and flammable substances in the form of gases, vapours, mist or dust in which, after ignition has occurred, combustion spreads to the entire unburned mixture.



#### **PERSONAL PROTECTION EQUIPMENT**

These symbols indicate the equipment that must be worn and kept by the operator for protection against threats against safety and/or health while at work.



#### **OBLIGATION TO ASSEMBLE THE COVER AND ALL THE SAFETY AND PROTECTION DEVICES**

This symbol signals the obligation to reassemble the cover and all the safety and protection devices of the burner after any maintenance, cleaning or checking operations.



#### **ENVIRONMENTAL PROTECTION**

This symbol gives indications for the use of the machine with respect for the environment.



#### **IMPORTANT INFORMATION**

This symbol indicates important information that you must bear in mind.



**IMPORTANT**

This symbol indicates important information that you must bear in mind.



This symbol indicates a list.

#### **Abbreviations used**

Ch.	Chapter
Fig.	Figure
Page	Page
Sec.	Section
Tab.	Table

### 2.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

- the instruction manual is delivered to the user by the system manufacturer, with the recommendation to keep it in the room where the heat generator is to be installed.

- The instruction manual shows:
  - the serial number of the burner;

.....

- the address and telephone number of the nearest Assistance Centre;

.....  
 .....  
 .....

- The system supplier must carefully inform the user about:
  - the use of the system;
  - any further tests that may be required before activating the system;
  - maintenance, and the need to have the system checked at least once a year by a representative of the manufacturer or another specialised technician.
 To ensure a periodic check, the manufacturer recommends the drawing up of a Maintenance Contract.

### 2.2 Guarantee and responsibility

The manufacturer guarantees its new products from the date of installation, in accordance with the regulations in force and/or the sales contract. At the moment of the first start-up, check that the burner is integral and complete.



**ATTENTION**

Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.

In particular, the rights to the guarantee and the responsibility will no longer be valid, in the event of damage to things or injury to people, if such damage/injury was due to any of the following causes:

- incorrect installation, start-up, use and maintenance of the burner;
- improper, incorrect or unreasonable use of the burner;
- intervention of unqualified personnel;
- carrying out of unauthorised modifications on the equipment;
- use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
- installation of untested supplementary components on the burner;
- powering of the burner with unsuitable fuels;
- faults in the fuel supply system;
- continuation of use of the burner when a fault has occurred;
- repairs and/or overhauls incorrectly carried out;
- modification of the combustion chamber with inserts that prevent the regular development of the structurally established flame;
- insufficient and inappropriate surveillance and care of those burner components most likely to be subject to wear and tear;
- use of non-original components, including spare parts, kits, accessories and optional;
- force majeure.

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

## 3 Safety and prevention

### 3.1 Introduction

The burners have been designed and built in compliance with current regulations and directives, applying the known technical safety rules and envisaging all the potential danger situations.

It is necessary, however, to bear in mind that the imprudent and clumsy use of the equipment may lead to situations of death risk for the user or third parties, as well as the damaging of the burner or other items. Inattention, thoughtlessness and excessive confidence often cause accidents; the same applies to tiredness and sleepiness.

It is a good idea to remember the following:

- The burner must only be used as expressly described. Any other use should be considered improper and therefore dangerous.

Specifically:

it can be applied to boilers operating with water, steam, diathermic oil, and to other uses expressly named by the manufacturer; the type and pressure of the fuel, the voltage and

frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the ambient temperature must all be within the values indicated in the instruction manual.

- Modification of the burner to alter its performance and destinations is not allowed.
- The burner must be used in exemplary technical safety conditions. Any disturbances that could compromise safety must be quickly eliminated.
- Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.
- Only those parts envisaged by the manufacturer can be replaced.



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

### 3.2 Personnel training

The user is the person, body or company that has acquired the machine and intends to use it for the specific purpose. He is responsible for the machine and for the training of the people working around it.

The user:

- undertakes to entrust the machine exclusively to suitably trained and qualified personnel;
- undertakes to inform his personnel in a suitable way about the application and observance of the safety instructions. With that aim, he undertakes to ensure that everyone knows the use and safety instructions for his own duties;
- Personnel must observe all the danger and caution indications shown on the machine.
- Personnel must not carry out, on their own initiative, operations or interventions that are not within their province.
- Personnel must inform their superiors of every problem or dangerous situation that may arise.
- The assembly of parts of other makes, or any modifications, can alter the characteristics of the machine and hence compromise operating safety. The manufacturer therefore declines any and every responsibility for any damage that may be caused by the use of non-original parts.

In addition:



- must take all the measures necessary to prevent unauthorised people gaining access to the machine;
- the user must inform the manufacturer if faults or malfunctioning of the accident prevention systems are noticed, along with any presumed danger situation;
- personnel must always use the personal protective equipment envisaged by legislation and follow the indications given in this manual.

### 4 Technical description of the burner

#### 4.1 Burner designation

Series: R									
Fuel:		S	Natural gas						
		L	Light oil						
		LS	Light oil / Natural gas						
		N	Heavy oil						
Size									
Adjustment:		E	Electronic cam						
		EV	Electronic cam and variable speed (with Inverter)						
		M	Mechanical cam						
		P	Proportional air/gas valve						
Emission:		...	Class 1 EN676						
		MZ	Class 2 EN676						
		BLU	Class 3 EN676						
		MX	Class 3 EN676						
Head:		TC	Standard head						
		TL	Extended head						
Flame control system:									
		FS1	Standard (1 stop every 24 h)						
		FS2	Continuous operation only with the use of a flame detection electrode (ionisation)						
Electrical supply of the system:									
		3/400/50	3N / 400V / 50Hz						
		3/230/50	3 / 230V / 50Hz						
		3/400-230/50	3N / 400V-230V / 50Hz						
Voltage of auxiliaries:									
		230/50/60	230V / 50-60Hz						
		110/50/60	110V / 50-60Hz						
R	S	25	M	BLU	TC	FS2	1/230/50/60	230/50/60	
BASIC DESIGNATION									
EXTENDED DESIGNATION									

#### 4.2 Models available

Designation		Power supply voltage	Start-up	Code
RS 25/M BLU	TC	1N ~ 230V - 50/60Hz	Direct	20169244
RS 25/M BLU	TL	1N ~ 230V - 50/60Hz	Direct	20169245
RS 35/M BLU	TC	1N ~ 230V - 50/60Hz	Direct	20169247
RS 35/M BLU	TL	1N ~ 230V - 50/60Hz	Direct	20168390

Tab. A

### 4.3 Burner categories

Country of destination	Gas category
BE	I2E(R)
LV	I2H
CY, MT	I3B/P
BE	I3P
LU, PL	II2E3B/P
DE	II2ELL3B/P
FR	II2Er3P
AT, CH, CZ, DK, EE, FI, GR, HU, IS, IT, LT, NO, RO, SE, SI, SK, TR	II2H3B/P
ES, GB, IE, PT	II2H3P
NL	II2EK3B/P

Tab. B

### 4.4 Technical data

Model			RS 25/M BLU	RS 35/M BLU
Output <sup>(1)</sup>	Max.	kW Mcal/h	125 ÷ 370 108 ÷ 320	202 ÷ 480 174 ÷ 413
	Min.	kW Mcal/h	45 39	70 60
Fuel			Natural gas: G20 - G25	
Pressione gas alla potenza max. <sup>(2)</sup> Gas: G20 / G25		mbar	15.6 / 21.8	15.6 / 23.3
Operation			<ul style="list-style-type: none"> <li>Continuous (min. 1 stop in 72 hours).</li> <li>This burner is also suitable for intermittent operation, only with the use of the UV flame sensor kit.</li> </ul>	
Standard applications			Boilers: water, steam, diathermic oil	
Ambient temperature		°C	0 - 40	
Combustion air temperature		°C max	60	
Noise levels <sup>(3)</sup>	Sound pressure	dB(A)	68	70
	Sound power		79	81

Tab. C

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

### 4.5 Electrical data

Model		RS 25/M BLU	RS 35/M BLU
Main electrical supply		230V ~ +/-10% 50/60Hz single phase	230V ~ +/-10% 50/60Hz single phase
Fan motor	rpm	2800	2800
	V	230	230
	W	300	420
Acceleration current	A	14.9	16
Operating current	A	2.4	2.6
Motor capacitor	µF	12.5/260	12.5/420
Ignition transformer	V1 - V2	230 V - 1 x 15 kV	230 V - 1 x 15 kV
	I1 - I2	1 A - 25 mA	1 A - 25 mA
Absorbed electrical power	W max	720	820
Protection level		IP 40	

Tab. D

4.6 Maximum dimensions

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

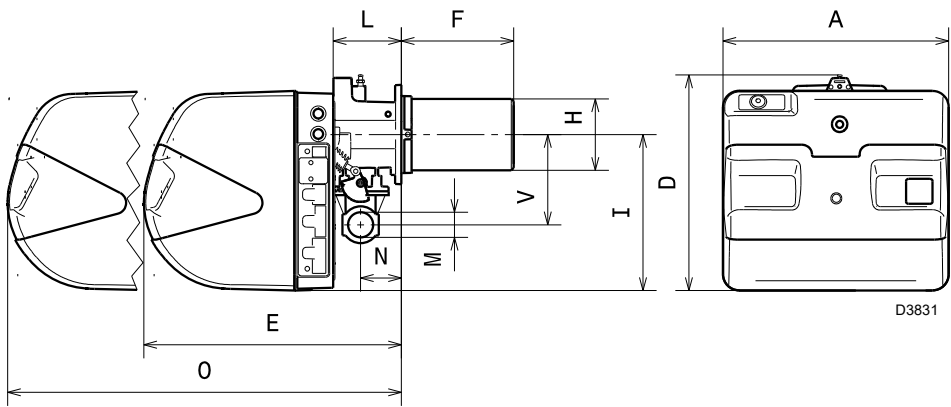


Fig. 1

mm	A	D	E	F <sup>(1)</sup>	H	I	L	O	N	V	M
RS 25/M BLU	442	422	508	230-365	140	305	138	780	84	177	1"1/2
RS 35/M BLU	442	422	508	230-365	152	305	138	780	84	177	1"1/2

Tab. E

(1) Blast tube: short-long

## 4.7 Firing rates

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

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

RS 25/M BLU = 42 kW

RS 35/M BLU = 70 kW



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

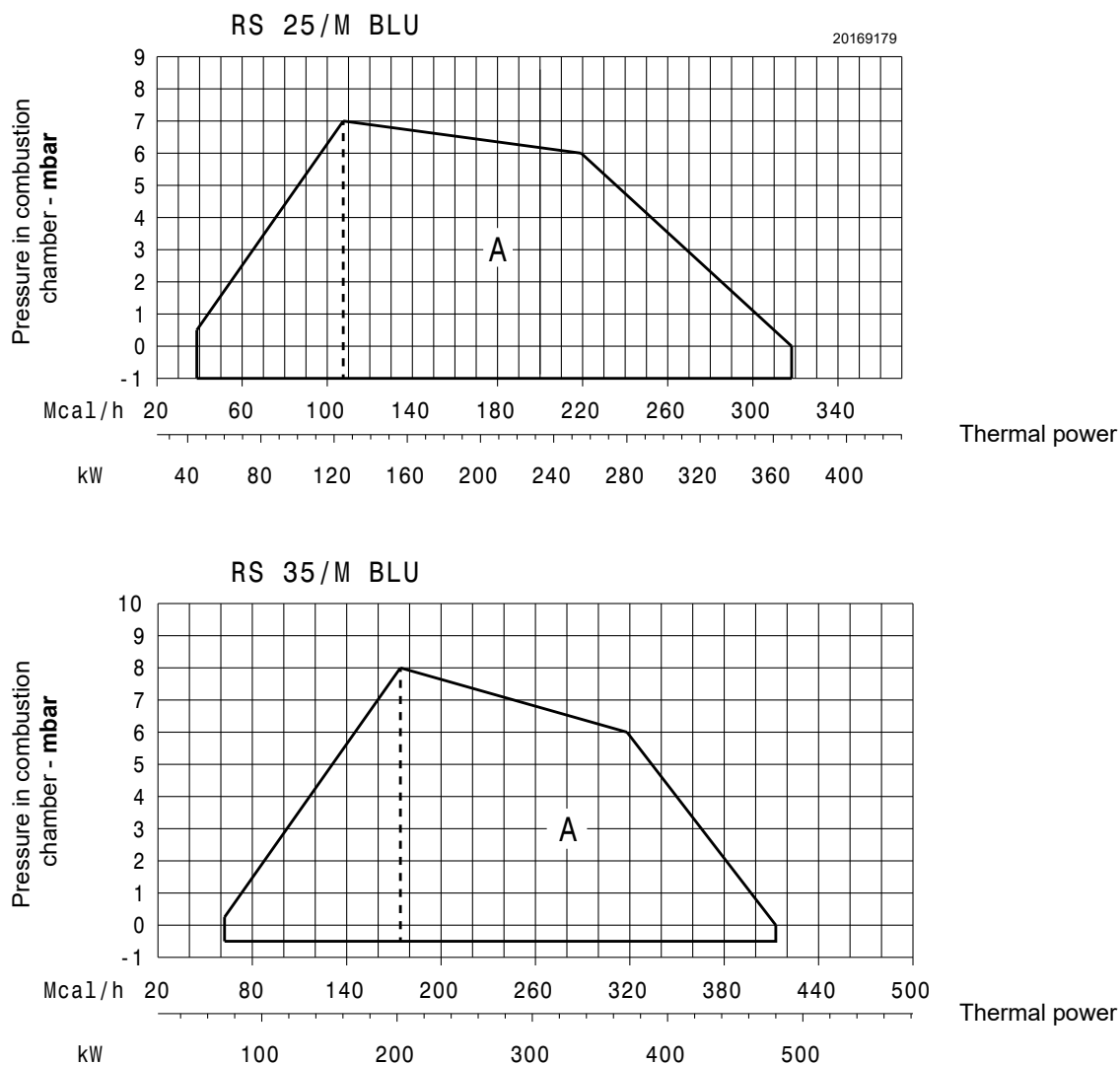


Fig. 2

4.8 Test boiler

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

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

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

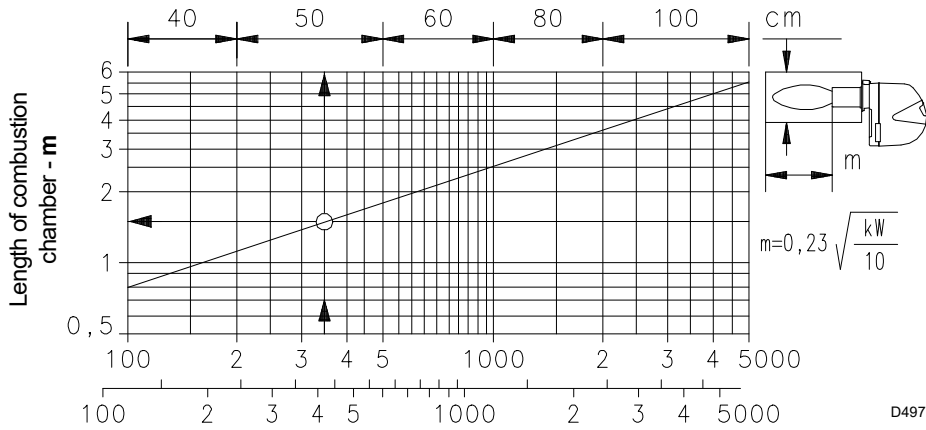


Fig. 3

4.9 Burner equipment

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

## 4.10 Burner description

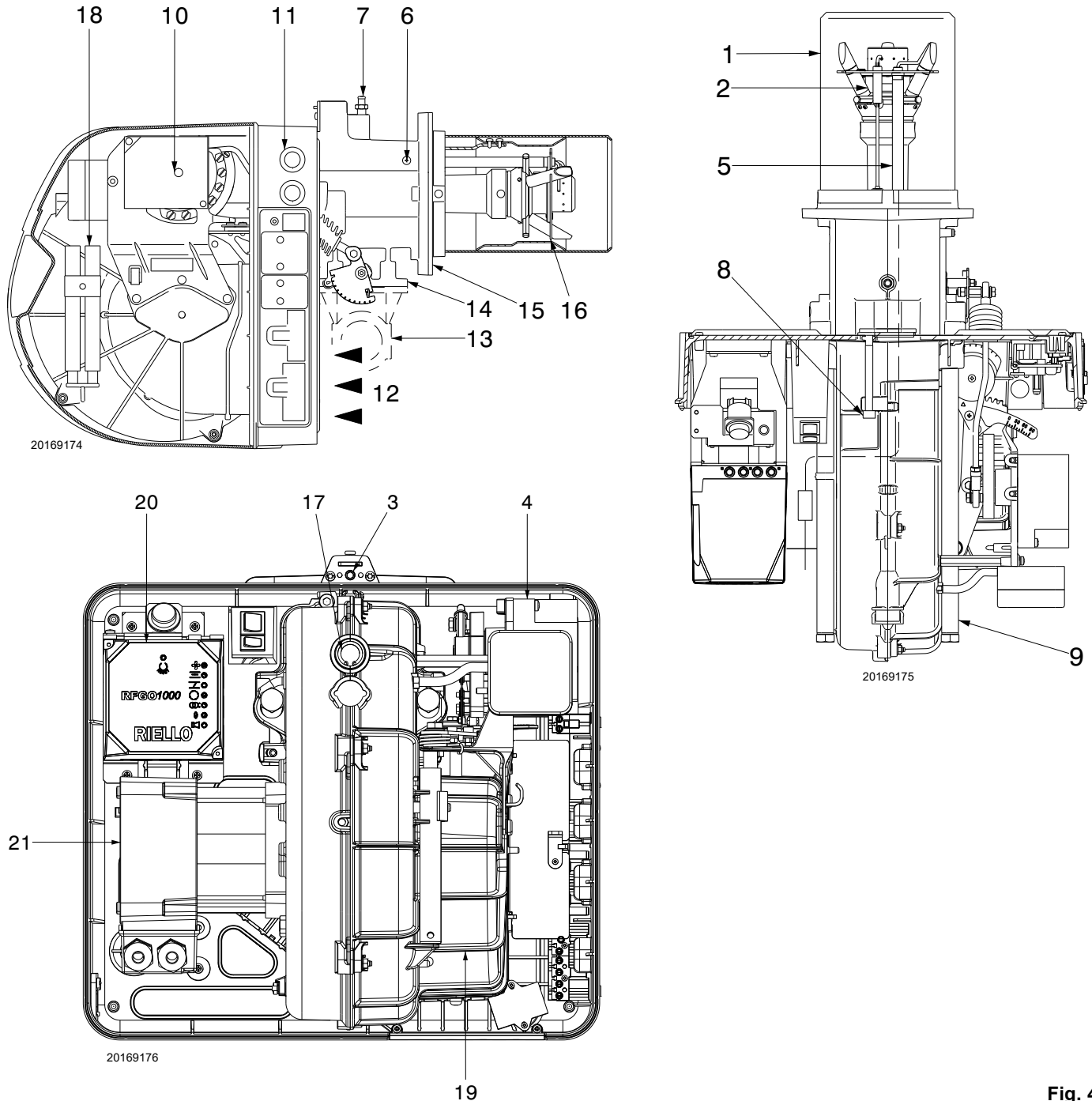


Fig. 4

- |                                                                                                                                                                                        |                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| 1 Combustion head                                                                                                                                                                      | 14 Gas butterfly valve                              |
| 2 Ignition electrode                                                                                                                                                                   | 15 Boiler fixing flange                             |
| 3 Screw for combustion head adjustment                                                                                                                                                 | 16 Flame stability disc                             |
| 4 Air pressure switch (differential type)                                                                                                                                              | 17 Flame inspection window                          |
| 5 Flame sensor probe                                                                                                                                                                   | 18 Extensions for slide bars (only for TL versions) |
| 6 Air pressure test point                                                                                                                                                              | 19 Air damper                                       |
| 7 Gas pressure test point and head fixing screw                                                                                                                                        | 20 Electrical control box                           |
| 8 Screws to secure fan to pipe coupling                                                                                                                                                | 21 Fan motor                                        |
| 9 Slide bars for opening the burner and inspecting the combustion head                                                                                                                 |                                                     |
| 10 The servomotor controls the gas butterfly valve and the air damper through the variable profile cam                                                                                 |                                                     |
| When the burner is not operating the air damper is fully closed in order to reduce heat dispersion from the boiler due to the flue draught, which draws air from the fan suction inlet |                                                     |
| 11 Areas for passage of electric cables                                                                                                                                                |                                                     |
| 12 Air inlet to fan                                                                                                                                                                    |                                                     |
| 13 Gas input pipe                                                                                                                                                                      |                                                     |

Burner lockout may occur:

### CONTROL BOX LOCKOUT:

if the control box button 4)(Fig. 5) lights up, it indicates that the burner is in lockout.  
Press the push-button to reset.

## 4.11 Electrical panel description

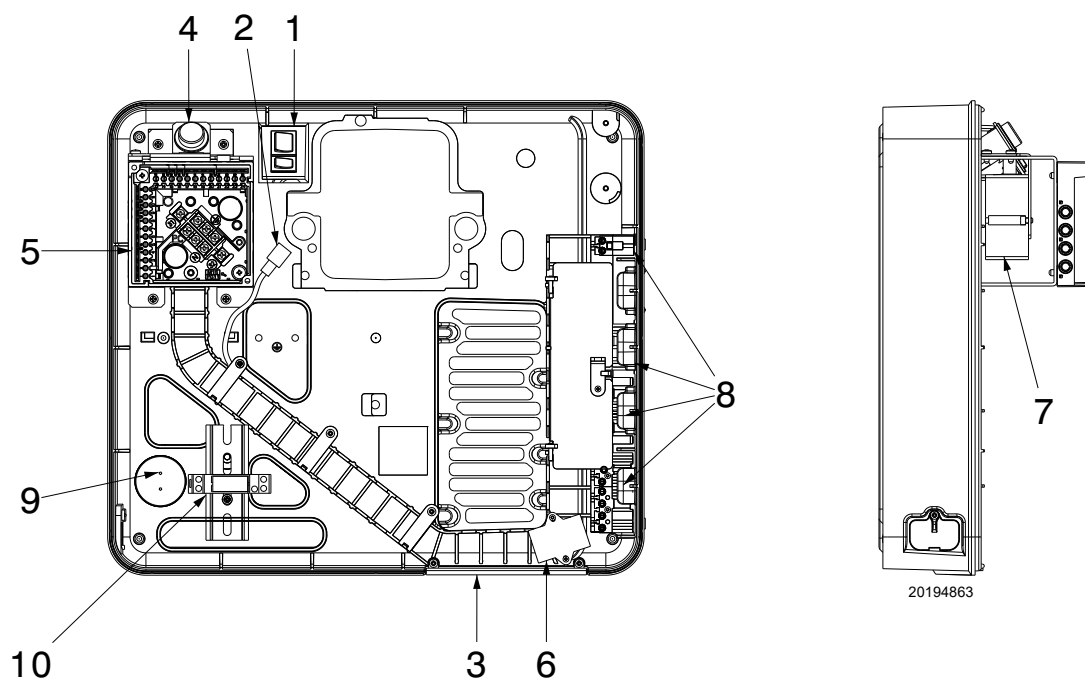


Fig. 5

- 1 Power switch for:  
automatic - manual - off operation  
A button for: output increase - decrease
- 2 Ionisation probe connector
- 3 Areas for passage of electric cables
- 4 Light reset button
- 5 Control box base
- 6 Filter to protect against radio disturbance
- 7 Ignition transformer
- 8 Sockets for electrical connection
- 9 Capacitor (only for RS 25/M)
- 10 Relay

## 4.12 Control box RFGO-A22

### Important notes



**ATTENTION**

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

The control box is a safety device! Avoid opening or modifying it, or forcing its operation. The Manufacturer cannot assume any responsibility for damage resulting from unauthorised work!

- All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- Before modifying the wiring in the control box connection area, fully disconnect the system from the power supply (omnipolar separation).
- Protection against electrocution from the control box and all connected electric components is obtained with the correct assembly.
- Before any intervention (assembly and installation operations, assistance, etc.), ensure the wiring is in order and that the parameters are correctly set, then make the safety checks.
- Falls and collisions can negatively affect the safety functions. In this case, the control box must not be operated, even if it displays no evident damage.

For safety and reliability, comply with the following instructions:

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

### Use

The control box is a control and supervision system of medium and large capacity forced draught burners.

If used with the flame detection electrode the system can operate continuously whereas, with the use of UV sensors it operates intermittently with stop and restart request at least once every 24h.

### Installation notes

- Make sure that the electrical wiring inside the boiler complies with national and local safety regulations.
- Do not confuse the powered conductors with the neutral ones.
- Ensure that spliced wires cannot get into contact with neighbouring terminals. Use adequate ferrules.
- Arrange the H.V. ignition cables separately, as far as possible from the control box and the other cables.
- When wiring the unit, make sure that AC 230 V mains voltage cables are run strictly separate from extra low-voltage cables to avoid risks of electrical shock hazard.



**Fig. 6**

### Technical data

Mains voltage	AC 230 V -15 % / +10 %
Mains frequency	50 / 60 Hz
Primary fuse (external)	Refer to the electric system
Weight	approx. 1.1 kg
Power absorption	approx. AC 7 VA
Protection level	IP40
Safety class	II
Environmental conditions	
Operation	DIN EN 60721-3-1
Climatic conditions	Class 1K2
Mechanical conditions	Class 1M2
Temperature range	-40...+60°C
Humidity	< 90% RH (non-condensing)

**Tab. F**

### Electrical wiring of the flame detector

It is important for signal transmission to be almost totally free of any disturbances or loss:

- Always separate the detector cables from the other cables:
  - The capacitive reactance of the line reduces the size of the flame signal.
  - Use a separate cable.
- Respect the allowed cable lengths.
- The ionisation probe is not protected against the risk of electrocution. When connected to the electricity supply, the ionisation probe must be protected against any accidental contact.
- Position the ignition electrode and the ionisation probe so that the ignition spark cannot form an arc on the probe (risk of electric overcharge).

### 4.13 Servomotor (SQN90...)

#### Important notes

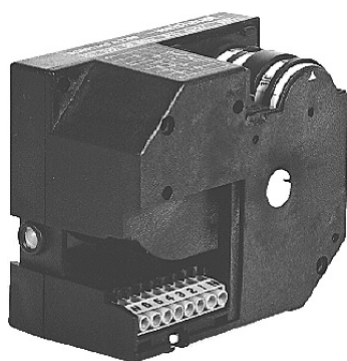


ATTENTION

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

Avoid opening, modifying or forcing the servomotor.

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



20162744

Fig. 7

#### Technical data

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

Tab. G

## 5 Installation

### 5.1 Notes on safety for the installation

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



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



The installation of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards and regulations of the laws in force.



The combustion air inside the boiler must be free from hazardous mixes (e.g.: chloride, fluoride, halogen); if present, it is highly recommended to carry out cleaning and maintenance more frequently.

### 5.2 Handling

The burner is shipped in cardboard packaging, so it is possible to move it when it is still packaged with a transpallet or fork lift truck.



Burner handling operations can be highly dangerous if not carried out with the greatest attention: distance unauthorised personnel, check integrity and suitability of the means available. Check also that the area in which you are working is empty and that there is an adequate escape area (i.e. a free, safe area to which you can quickly move if the burner should fall). During handling, keep the load at no more than 20-25 cm from the ground.



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



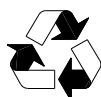
Before proceeding with the installation operations, carefully clean all around the area where the burner will be installed.

### 5.3 Preliminary checks

#### Checking the consignment



After removing all the packaging, check the integrity of the contents. In the event of doubt, do not use the burner; contact the supplier.



The packaging elements (wooden cage or cardboard box, nails, clips, plastic bags, etc.) must not be abandoned as they are potential sources of danger and pollution; they should be collected and disposed of in the appropriate places.

RBL	A	B	C
D	E	F	
GAS-KASU <input checked="" type="checkbox"/>	G	H	
GAZ-AEIO	G	H	
I	RIELLOSpA I-37045 Legnago (VR)		
			CE 0085

D7738

Fig. 8

#### Checking the characteristics of the burner

Check the identification label of the burner (Fig. 8), showing:

- A the burner model
  - B the burner type
  - C the cryptographic year of manufacture
  - D the serial number
  - E the data for electrical supply and the protection level
  - F the electrical power consumption
  - G the types of gas used and the relevant supply pressures
  - H the data of the burner possible minimum and maximum output (see Firing rate).
- Warning.** The burner output must be within the firing rate of the boiler;
- I the category of the appliance/countries of destination.



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

### 5.4 Operating position



ATTENTION

- The burner is designed to operate only in positions 1, 2, 3 and 4 (Fig. 9).
- Installation 1 is preferable, as it is the only one that allows the maintenance operations as described in this manual.
- Installations 2, 3 and 4 allow operation but make maintenance and inspection of the combustion head more difficult.



DANGER

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

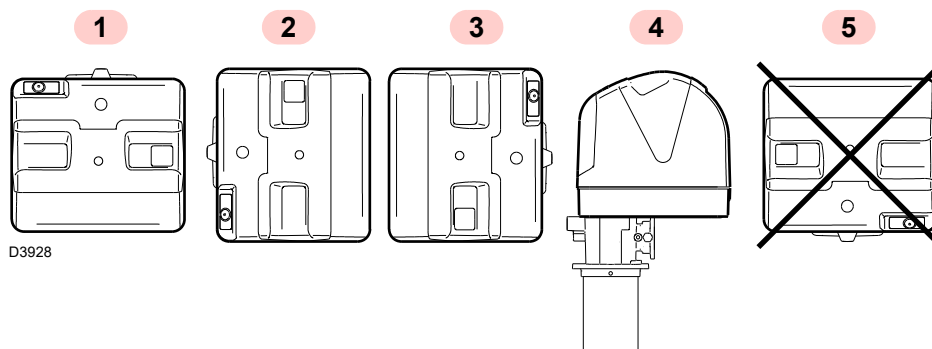


Fig. 9

### 5.5 Preparing the boiler

#### 5.5.1 Boring the boiler plate

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

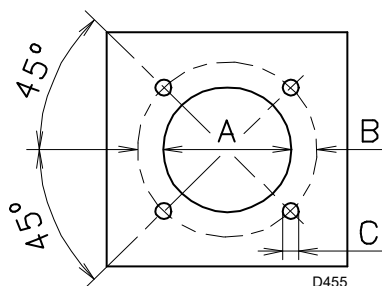


Fig. 10

mm	A	B	C
RS 25-35/M BLU	160	224	M 8

#### 5.5.2 Blast tube length

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

The range of available lengths L, is as follows:

Blast tube	Short (mm)	Long (mm)
RS 25-35/M BLU	230	365

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

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

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

#### 5.5.3 Securing the burner to the boiler

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



Provide an adequate lifting system.

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

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

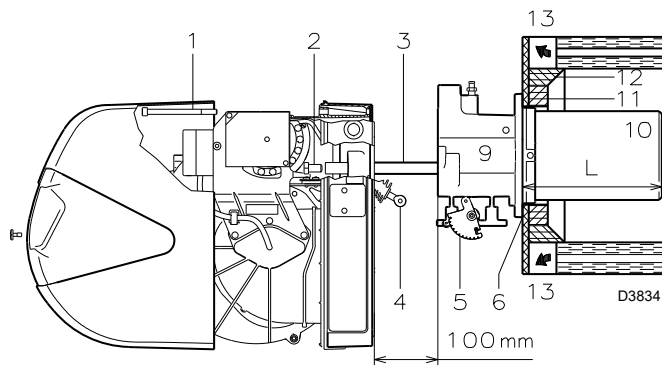


Fig. 11

Fix the unit 9)(Fig. 11) to the boiler plate, inserting the supplied insulating gasket 6)(Fig. 11).

Use the 4 screws, also supplied, after protecting their thread with an anti-locking product.

## 5.6 Access to head internal part

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

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



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

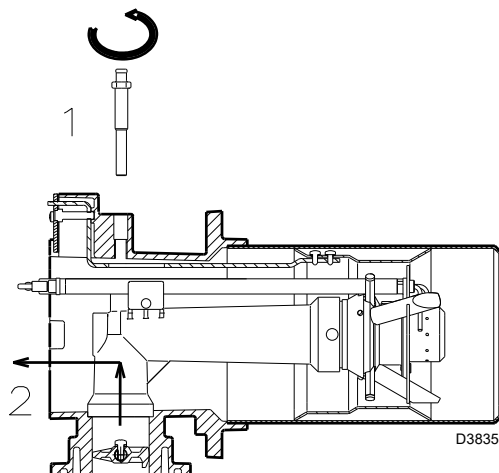


Fig. 12

## 5.7 Positioning the probe - electrode



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

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

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



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



Respect the dimensions shown in Fig. 13.

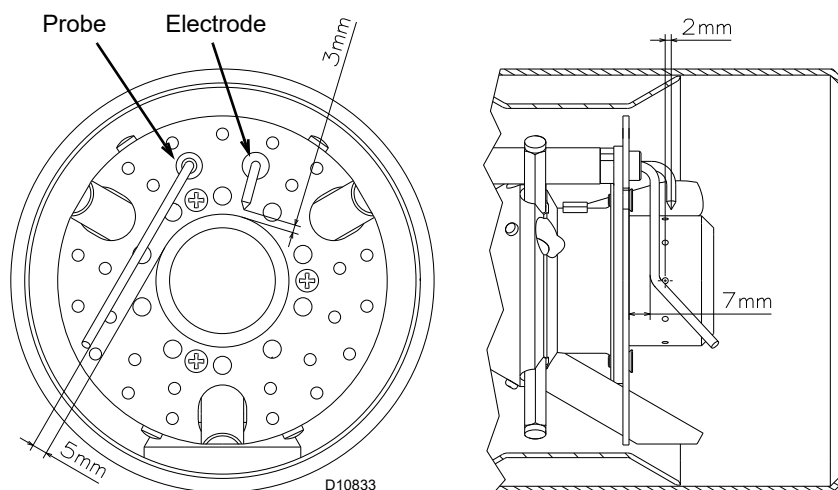


Fig. 13

### 5.8 Combustion head adjustment

At this point of the installation, the combustion head is fixed to the boiler as shown in Fig. 16.

It is therefore especially easy to adjust, and this adjustment depends only on the maximum output of the burner.

In the diagram of (Fig. 14), find the notch at which the combustion head should be adjusted.

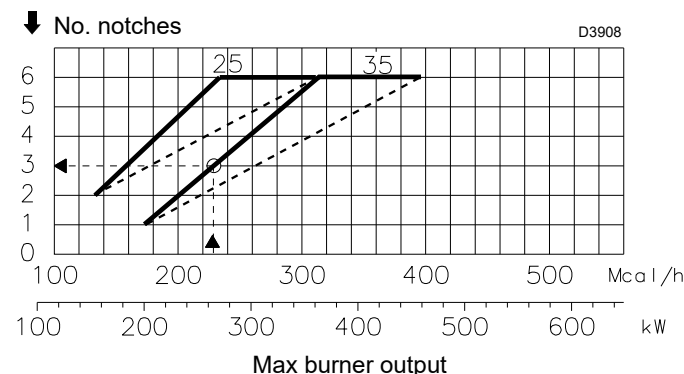


Fig. 14

#### Air adjustment

Rotate screw 1)(Fig. 16) until the notch on the lamina 2)(Fig. 16) matches the surface of plate 3)(Fig. 16).

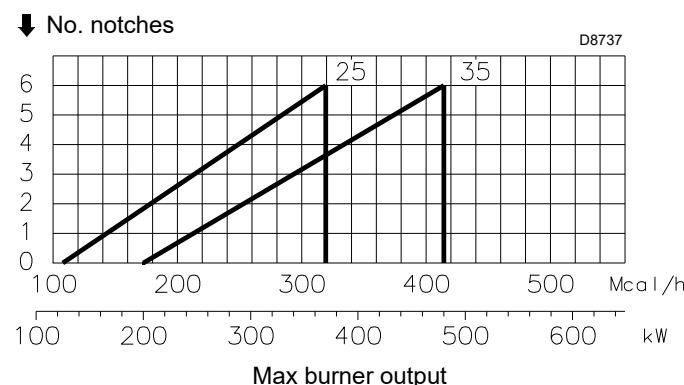


Fig. 15



To facilitate the adjustment, loosen the screw 5) (Fig. 16), adjust, then block.

#### Example:

RS 35/M BLU, burner output = 270 kW.

From diagram (Fig. 14) you can see that for this output the air should be adjusted at notch 3, subtracted from the value of the pressure in the chamber.



If the pressure in the chamber is equal to 0 mbar, the air must be adjusted with reference to the hatched line on the diagram (Fig. 14).

#### Central air adjustment

In the event that the specific application requires a particular adjustment, it is possible to change the central air flow rate moving the ring nut 4)(Fig. 16) until it reaches the notch indicated by the diagram (Fig. 15).

To carry out this operation, loosen the screws 5)(Fig. 16) and lift the ring nut 4).

When finished, lock the screws 5) again.

#### NOTE:

The adjustments indicated can be modified during the initial start-up.

Once you have finished adjusting the head, reassemble the burner 4)(Fig. 17) on the slide bars 3)(Fig. 17) at about 100mm from the pipe coupling 5)(Fig. 17) - burner in the position shown in 4)(Fig. 11) - insert the cable of the probe and the cable of the electrode, then slide the burner as far as the pipe coupling, burner in the position shown in Fig. 17.

Refit screws 2) on slide bars 3)(Fig. 17).

Fix the burner to the pipe coupling with the screw 1)(Fig. 17).



ATTENTION

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

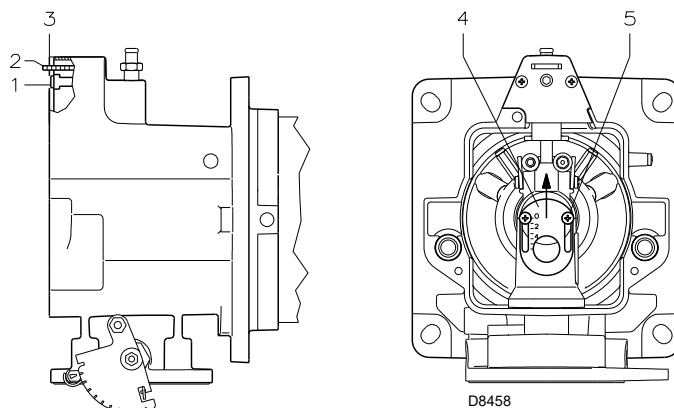


Fig. 16



ATTENTION

The adjustments indicated can be modified during the initial start-up.

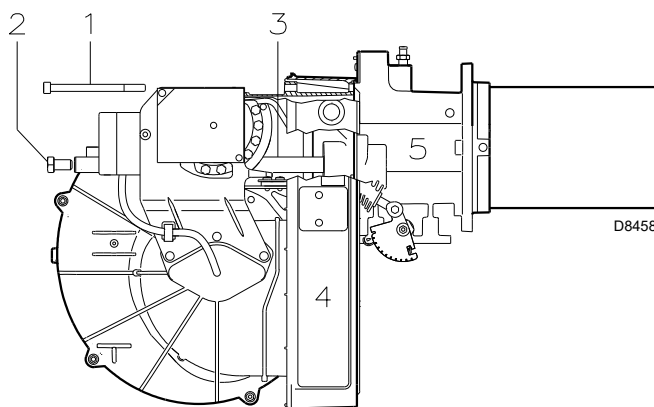


Fig. 17

## 5.9 Gas supply



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

Precautions: avoid knocking, attrition, sparks and heat.

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



ATTENTION

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

### 5.9.1 Gas feeding line

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

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

**MB**

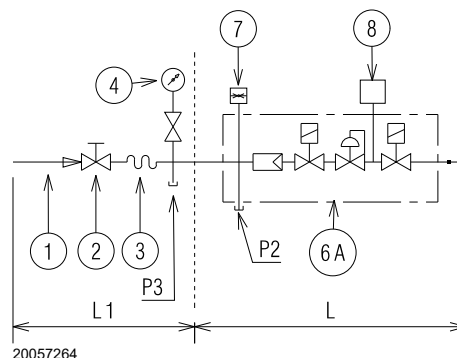


Fig. 18

**MBC - VGD**

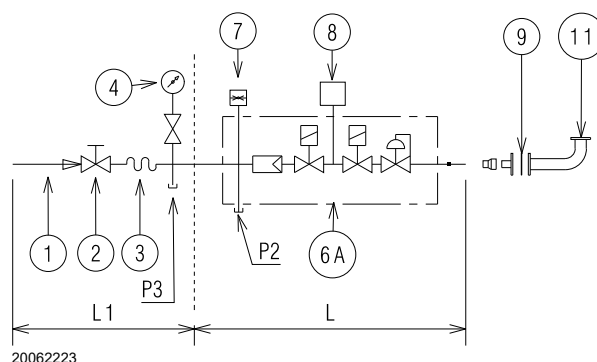


Fig. 19

**DMV**

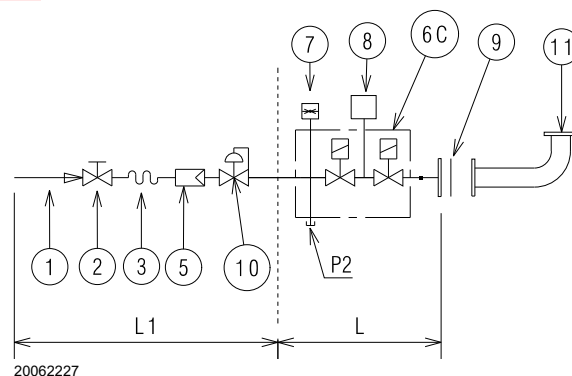


Fig. 20

**CB**

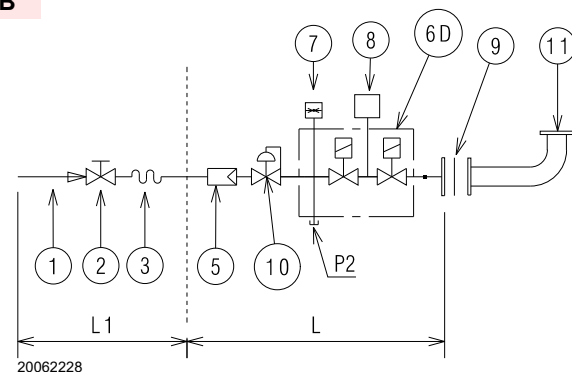


Fig. 21

### 5.9.2 Gas train

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

### 5.9.3 Gas train installation



Disconnect the power supply using the system main switch.



Check that there are no gas leaks.



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



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



The operator must use the required equipment during installation.

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

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



ATTENTION

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

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

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



ATTENTION

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

The values shown in refer to:

- Natural gas G 20 NCV 9.45 kWh/Sm<sup>3</sup> (8.2 Mcal/Sm<sup>3</sup>)
- Natural gas G 25 NCV 8.13 kWh/Sm<sup>3</sup> (7.0 Mcal/Sm<sup>3</sup>)

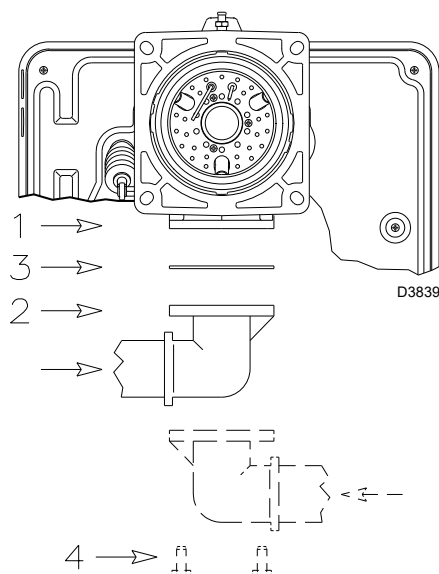


Fig. 22

### 5.9.4 Gas pressure

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

	kW	1 $\Delta p$ (mbar)	2 $\Delta p$ (mbar)
		G 20	G 20
RS 25/M BLU	125	1.8	0.1
	140	2.6	0.1
	160	3.8	0.1
	180	4.9	0.2
	200	6.0	0.2
	220	7.2	0.2
	240	8.3	0.3
	260	9.4	0.3
	280	10.5	0.4
	300	11.7	0.5
	320	12.8	0.5
	340	13.9	0.6
	360	15.0	0.7
RS 35/M BLU	370	15.6	0.7
	200	2.8	0.2
	220	3.6	0.2
	240	4.4	0.3
	260	5.2	0.3
	280	6.0	0.4
	300	6.8	0.4
	320	7.6	0.5
	340	8.5	0.6
	360	9.3	0.6
	380	10.1	0.7
	400	10.9	0.8
	420	11.7	0.8
	440	12.5	0.9
	460	13.3	1.0
	480	14.1	1.1

Tab. H

## Column 1

Combustion head pressure drop.

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

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

## Column 2

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

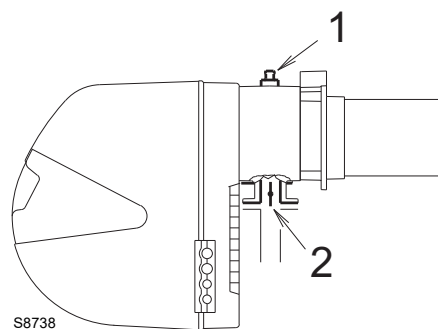


Fig. 23

To calculate the approximate output at which the burner operates:

- subtract the combustion chamber pressure from the gas pressure measured at test point 1) (Fig. 23).
- Find in related to the burner concerned, the pressure value closest to the result of the subtraction.
- Read the corresponding output on the left.

### Example with natural gas G 20 for RS 35/M BLU:

Maximum output operation

Gas pressure at test point 1) (Fig. 23)	=	11.3 mbar
Pressure in combustion chamber	=	2.0 mbar
$11.3 - 2.0$	=	9.3 mbar

A pressure of 9.3 mbar, column 1, corresponds in the table to an output of 360 kW.

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

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

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

### Example with natural gas G 20 for RS 35/M BLU:

Operating at the desired maximum output: 360 kW

Gas pressure at an output of 360 kW	=	9.3 mbar
Pressure in combustion chamber	=	2.0 mbar
$9.3 + 2.0$	=	11.3 mbar

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

### 5.10 Electrical connections

#### Notes on safety for the electrical wiring



**DANGER**

- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be made in accordance with the regulations currently in force in the country of destination and by qualified personnel. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- Burners have been type-approved for continuous operation (FS2). Burner FS1 operation has also been approved only with the use of the UV flame sensor kit.
- The RFGO safety device features two built-in flame amplifiers which allow using it for applications with UV sensor only, FR sensor only or with both sensors (UV+FR). The FR amplifier circuit is subject to constant auto-control, which allows to use it for applications requiring a burner operating cycle longer than 24 hours. When it is used as a UV control, the system is considered as non-permanent, requiring one burner recycle every 24 hours. Normally, burner stopping is guaranteed by the boiler's thermostat/pressure switch. If this is not the case, a time switch must be applied to L-N in series, to stop the burner at least once every 24 hours. Refer to the wiring diagrams.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel. Do not use the gas tubes as an earthing system for electrical devices.
- The electrical system must be suitable for the maximum power absorption of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for that level of power absorption.
- For the main power supply of the device from the electricity mains:
  - do not use adapters, multiple sockets or extensions;
  - make provisions for an omnipolar switch with a gap between the contacts of at least 3 mm (over-voltage category III), as required by current safety regulations.
- Do not touch the device with wet or damp body parts and/or in bare feet.
- Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:



**DANGER**

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



**DANGER**

Close the fuel shut-off valve.



**DANGER**

Avoid condensate, ice and water leaks from forming.

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

Use flexible cables according to EN 60 335-1 standard.

### 5.10.1 Supply cables and external connections passage

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

Cable grommets can be used in different manners; for example:

#### RS 25-35/M BLU single phase

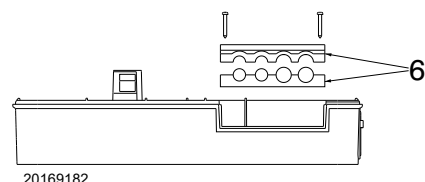
- 1 7-pole socket for single phase power supply, TL thermostat/pressure switch
- 2 6-pole socket for gas valves, gas pressure switch or the valve leak detection device
- 3 4-pole socket for TR thermostat/pressure switch (with removable cover)
- 4 5-pole socket not used
- 5 2-pole socket for maximum gas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



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

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

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



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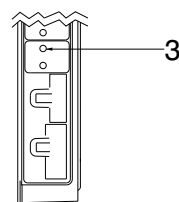
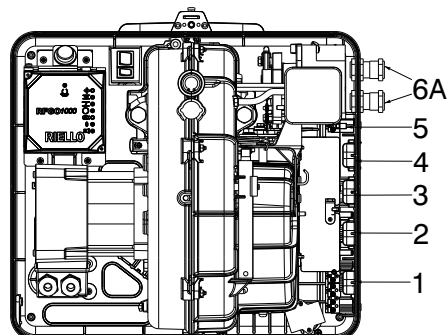


Fig. 24



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

### 5.11 Motor rotation

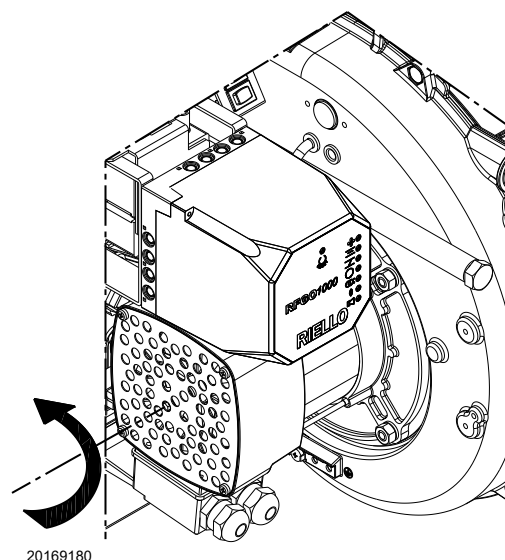
As soon as the burner starts, place yourself in front of the cooling fan of the fan motor and check that it turns anticlockwise.

If this is not the case:

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



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



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Fig. 25

### 6 Start-up, calibration and operation of the burner

#### 6.1 Notes on safety for the first start-up



ATTENTION

The first start-up of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards and regulations of the laws in force.



ATTENTION

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



ATTENTION

Before starting up the burner, refer to section "Safety test - with no gas supply" on page 32.

#### 6.2 Adjustments prior to ignition

The following adjustments must be carried out:

- open the manual valves upstream of the gas train.
- Adjust the minimum gas pressure switch to the start of the scale (Fig. 33).
- Adjust the air pressure switch to the start of the scale (Fig. 32).
- Purge the air from the gas line.  
We recommend using a plastic tube routed outside the building and to purge air until gas is smelt.
- Assemble a pressure gauge (Fig. 26) on the gas pressure test point of the pipe coupling.  
The manometer readings are used to calculate MAX burner output using the .
- Connect two lamps or testers parallel to the two gas line solenoid valves VR and VS in order to check the exact moment at which voltage is supplied.  
This operation is not required if each of the two solenoid valves is equipped with a pilot light that signals voltage passing through.



CAUTION

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



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

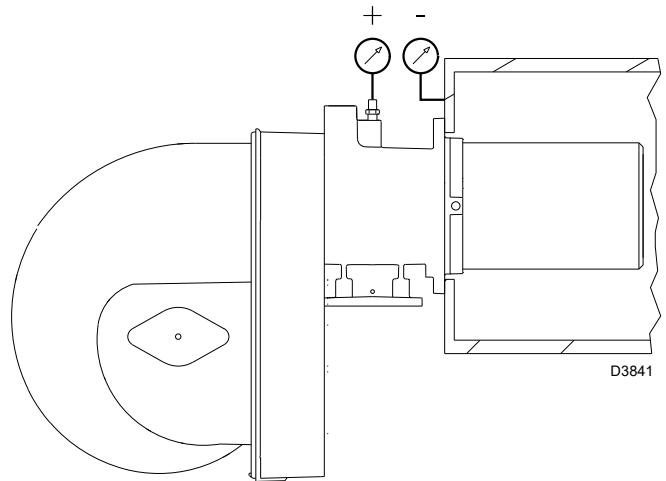


Fig. 26

#### 6.3 Servomotor adjustment

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

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

The servomotor rotates by 90° in 24 seconds.

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



ATTENTION

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

**Cam I:**

**90°.** Limits rotation toward maximum position.

When the burner is at MAX output, the gas butterfly valve must be fully opened: 90°.

**Cam II:**

**0°.** Limits rotation toward minimum position.

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

**Cam III:**

**15°.** Adjusts the ignition position and the MIN output.

**Cam IV:**

Integrated with cam III.



D790

Fig. 27

## 6.4 Burner start-up

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

Close the thermostats/pressure switches and turn the switch of Fig. 28 to position "1".



Check that the lamps or testers connected to the solenoid valves, or the pilot lights on the solenoid valves, indicate that no voltage is present.

If they indicate the presence of voltage, stop the burner immediately and check the electric connections.

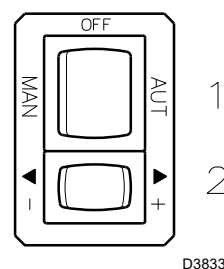


Fig. 28

## 6.5 Adjusting the burner

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

Adjust in sequence:

- 1 Ignition output (minimum)
- 2 MAX output
- 3 Intermediate outputs between the two
- 4 Air pressure switch
- 5 Minimum gas pressure switch

### Example for gas G20 (9.45 kWh/Sm<sup>3</sup>):

ignition output 150 kW corresponding to 15.87 Sm<sup>3</sup>/h.

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

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

### 6.5.1 Ignition output

According to EN 676.

#### Burners with MAX output up to 120 kW

Ignition can occur at the maximum operation output level.

Example:

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

#### Burners with MAX output above 120 kW

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

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

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

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

Example:

MAX operation output of 450 kW.

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

In order to measure the ignition output:

- disconnect the plug-socket 6)(Fig. 4 on page 13) on the ionisation probe cable (the burner will fire and then go into lockout after the safety time has elapsed);
- perform 10 consecutive ignitions with lockouts;
- read the quantity of burned gas on the meter: this quantity must be equal to, or lower than, the quantity given by the formula, for ts = 3 s:

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

**V<sub>g</sub>** volume supplied in ignitions carried out (Sm<sup>3</sup>)

**Q<sub>a</sub>** ignition delivery (Sm<sup>3</sup>/h)

**n** number of ignitions (10)

**ts** safety time (sec)

### 6.5.2 Ignition output (minimum)

The MIN output must be set within the firing rate (Fig. 2 on page 11).

Press and hold the "output reduction" button 2)(Fig. 31) until the servomotor closes the air damper and the gas butterfly valve is at 15° (factory setting).

#### Adjustment of gas delivery

Measure the gas delivery on the meter.

- If it is necessary to reduce it, slightly decrease the angle of cam III (Fig. 30) with small, regular movements, i.e. bring it from an angle of 15° to 13° - 11°...
- If it is necessary to increase it, lightly press the "output increase" button 2)(Fig. 31) (open the gas butterfly valve by 10-15°), and increase cam III angle (Fig. 30) with a series of small movements, i.e. move from angle 15° to 17° - 19°...  
Now press the "power reduction" button until the servomotor returns to the minimum opening position, and measure the gas delivery.

#### NOTE:

**The servomotor follows the adjustment of cam III only when the angle of the cam is reduced.**

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

If it is necessary to adjust cam III, remove the cover 1)(Fig. 29) inserted with a trigger catch, as indicated in (Fig. 30), extract the special key 2)(Fig. 30) from inside, and insert it in the notch of cam III.

### Adjustment of air delivery

Progressively adjust the beginning profile of cam 4)(Fig. 29) by turning the screws of the cam that appear inside the opening 6)(Fig. 29).

If possible, do not turn the first screw, since this is used to set the air damper to its fully closed position.

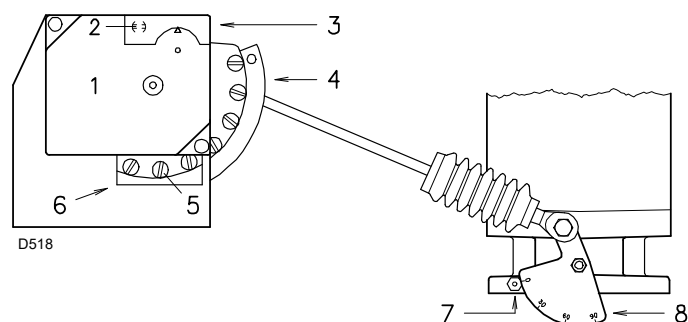


Fig. 29

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

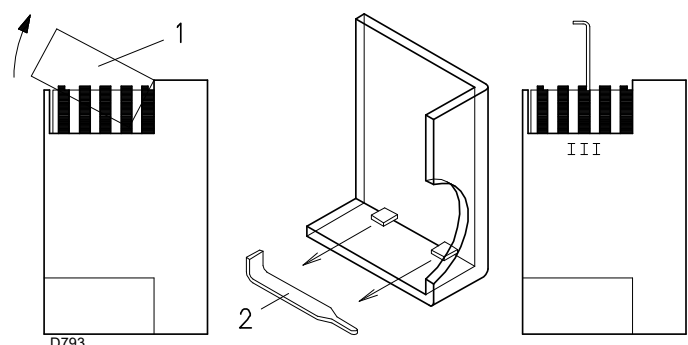


Fig. 30

### 6.5.3 Maximum output

The MAX output must be set within the firing rate (Fig. 2 on page 11).

In the above instructions we left the burner running at the MIN output.

Now press the "increase output" button 2)(Fig. 31), and keep it pressed until the servomotor has opened the air damper and the gas butterfly valve to 90°.

### Adjustment of gas delivery

Measure the gas delivery on the meter.

As an indicative guide it can be taken from on page 22, just read the gas pressure on the pressure gauge (shown in Fig. 26 on page 26) and follow the instructions given on page 22.

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

### Air adjustment

Progressively adjust the end profile of cam 4)(Fig. 29) by turning the screws of the cam that appear inside the opening 6)(Fig. 29).

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

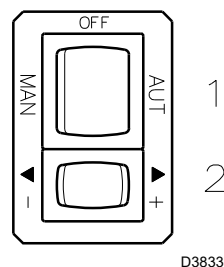


Fig. 31

### 6.5.4 Intermediate outputs

#### Adjustment of gas delivery

No adjustment of gas delivery is required.

#### Adjustment of air delivery

Lightly press the "increase output" button 2)(Fig. 31) so that a new screw 5)(Fig. 29) appears inside the opening 6)(Fig. 29), adjust it until optimal combustion is obtained.

Proceed in the same way with the other screws.

Take care that the cam profile variation is progressive.

Switch the burner off with switch 1)(Fig. 31), OFF position, release the adjustable profile cam by setting the servomotor slot 2)(Fig. 29) in a vertical position and check several times that by rotating the cam forwards and backwards by hand, the movement is soft and smooth, without any hindrance.

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

#### NOTE:

Once MAX - MIN - INTERMEDIATE outputs have been adjusted, recheck the ignition: its noise must be equal to the one of the following operation. If you notice any sign of pulsations, reduce the ignition stage delivery.

## 6.6 Final adjustment of the pressure switches

### 6.6.1 Air pressure switch

Adjust the air pressure switch (Fig. 32) after performing all other burner adjustments with the air pressure switch set to the start of the scale.

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

Then slowly turn the appropriate knob clockwise until the burner goes into lockout.

Check the indication of the arrow pointing upwards on the graduated scale.

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

Now check the correct start-up of the burner. If the burner locks out again, turn the knob anticlockwise a little bit more.

During these operations it may be useful to measure the air pressure with a pressure gauge.

The connection of the pressure gauge is shown in Fig. 26.

The standard configuration is that with the air pressure switch connected in absolute mode.

Note the presence of a "T" connection, not supplied.

In certain applications in strong depression situations, the connection of the pressure switch does not allow it to change over.

In this case it is necessary to connect the pressure switch in differential mode, applying a second tube between the air pressure switch and the fan suction line mouth.

In this case also, the pressure gauge must be connected in differential mode, as shown in Fig. 26.

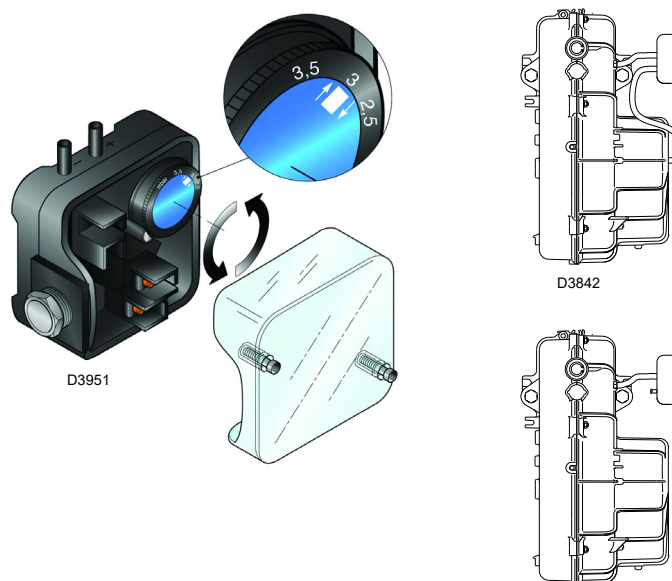


Fig. 32

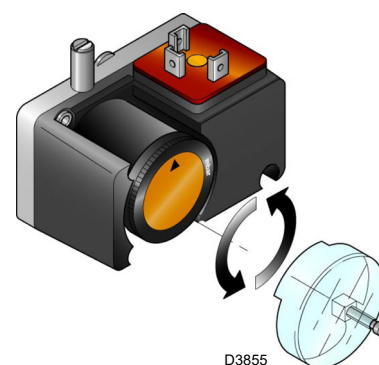


Fig. 33

### 6.6.2 Minimum gas pressure switch

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

Adjust the minimum gas pressure switch (Fig. 33) after having adjusted the burner, the gas valves and the gas train stabiliser. With the burner operating at maximum output:

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



1 kPa = 10 mbar

ATTENTION

### 6.6.3 Flame presence check

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

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

However, if it is necessary to measure the ionisation current, disconnect the plug-socket 2)(Fig. 5 on page 14) on the ionisation probe cable and insert a direct current microammeter with a base scale of 100  $\mu$ A.

Carefully check polarities.

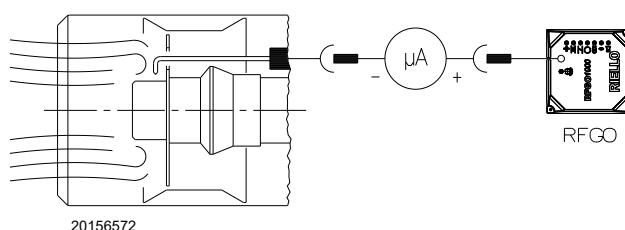
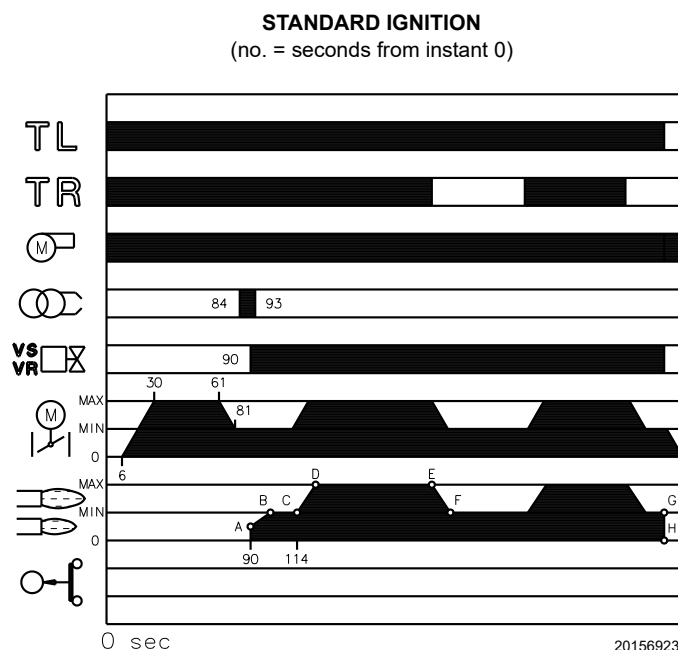


Fig. 34

## 6.7 Burner operation

### 6.7.1 Burner start-up

- 0 s** Control remote control TL closes.  
Fan motor start-up.
- 6 s** Servomotor start-up: turn to the right by 90°, i.e. until the contact intervenes on cam I (Fig. 27).  
The air damper is positioned to MAX output.
- 30 s** Pre-purging stage with MAX output air delivery. Duration 31 s.
- 61 s** The servomotor turns to the left to reach the angle set on cam III (Fig. 27) for the MIN output.
- 81 s** The air damper and gas butterfly valve assume the MIN output position with cam III (Fig. 27) at 15°.
- 84 s** Ignition electrode strikes a spark.
- 90 s** The safety valve VS opens, along with the adjustment valve VR, quick opening.  
The flame ignites with a small output - point A.  
The output gradually increases, and the valve slowly opens, until MIN output is reached - point B.
- 93 s** The spark goes out.
- 114 s** The start-up cycle ends.


**Fig. 35**

### 6.7.2 Steady state operation

#### Burner without output regulator

At the end of the start-up cycle, the servomotor control switches to TR remote control that controls the pressure or temperature in the boiler, point C. (The electric control box carries on checking the presence of the flame and the correct position of the air and gas maximum pressure switches).

- If the temperature or pressure is low (so the TR remote control is closed), the burner progressively increases the output up to the MAX value (line C-D).
- If the temperature or pressure then increases until the TR opens, the burner progressively decreases its output to the MIN value (section E-F). And so on.
- The burner locks out when the heat request is less than the heat supplied by the burner at MIN output, (section G-H). The TL remote control opens, the servomotor returns to angle 0° limited by the contact of cam II (Fig. 27).  
The air damper closes completely to reduce heat losses to a minimum.

With each change of output, the servomotor automatically modifies the gas output (butterfly valve) and the air flow rate (fan damper).

#### Burner with output regulator

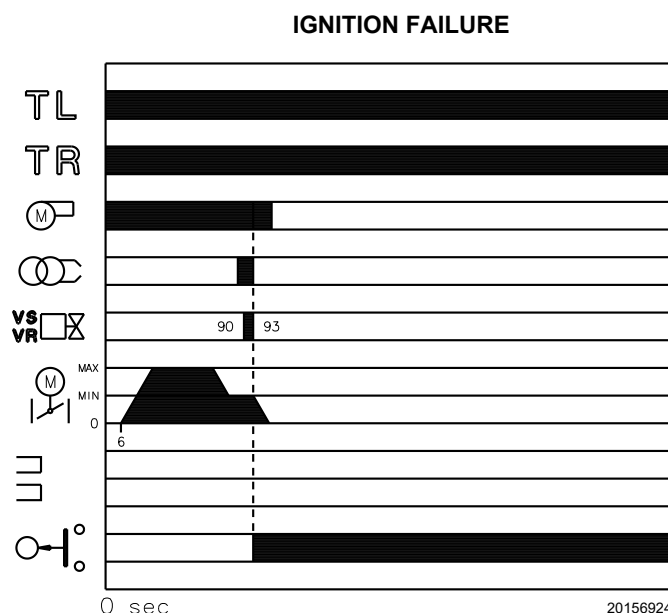
See the manual supplied with the regulator.

### 6.7.3 Ignition failure





If the burner does not ignite, it locks out within 3s after the gas valve opens and 93s after the closure of the TL remote control the post-purging phase starts lasting 18s.

#### Burner flame goes out during operation

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


**Fig. 36**

## 6.8 Final checks (with burner operating)

<ul style="list-style-type: none"> <li>➤ Open the thermostat/pressure switch TL</li> <li>➤ Open the thermostat/pressure switch TS</li> </ul>		The burner must stop
<ul style="list-style-type: none"> <li>➤ Turn the gas maximum pressure switch knob to the minimum end of scale position</li> <li>➤ Turn the air pressure switch knob to the maximum end of scale position</li> </ul>		The burner must stop in lockout
<ul style="list-style-type: none"> <li>➤ Turn off the burner and cut off the power</li> <li>➤ Disconnect the minimum gas pressure switch connector</li> </ul>		The burner must not start
<ul style="list-style-type: none"> <li>➤ Disconnect the wire of the ionisation probe</li> </ul>		The burner must stop in lockout due to ignition failure

Tab. I

## 7 Maintenance

### 7.1 Notes on safety for the maintenance

The periodic maintenance is essential for the good operation, safety, yield and duration of the burner.

It allows you to reduce consumption and polluting emissions and to keep the product in a reliable state over time.



The maintenance interventions and the calibration of the burner must only be carried out by qualified, authorised personnel, in accordance with the contents of this manual and in compliance with the standards and regulations of current laws.

Before carrying out any maintenance, cleaning or checking operations:



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



Close the fuel shut-off valve.



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

### 7.2 Maintenance programme

#### 7.2.1 Maintenance frequency



The gas combustion system should be checked at least once a year by a representative of the manufacturer or another specialised technician.

#### 7.2.2 Safety test - with no gas supply

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

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

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

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

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

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



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

#### 7.2.3 Checking and cleaning



The operator must use the required equipment during maintenance.

##### Combustion

Carry out an analysis of the combustion flue gases.

Significant differences with respect to the previous measurements indicate the points where most care should be exercised during maintenance.

##### Combustion head

Open the burner and make sure that all components of the combustion head are in good condition, not deformed by the high temperatures, free of impurities from the surroundings, free of material corrosion and correctly positioned.

If in doubt, disassemble the elbow.

##### Fan

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

##### Servomotor

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

Engage cam 4)(Fig. 29) again.

##### Burner

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

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

##### Gas leaks

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

**Boiler**

Clean the boiler as indicated in its accompanying instructions in order to maintain all the original combustion characteristics intact, especially: the flue gas temperature and combustion chamber pressure.

**Flame presence check**

Check the level of the flame detection signal with the "Check mode" function from the flame control: LEDs from 2 to 6 indicate the flame signal level, respectively.

**Check Mode**

With burner flame on:

- hold the reset button on the flame control pressed for at least 3 sec.;
- the button colour will change from green to yellow;
- each operating status signalling LED will be compared to 20% of the maximum brightness;
- press the reset button again (<0.5sec) to reset the standard operation of the signalling LEDs.

**Combustion**

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

EN 676		Air excess		CO
		Max. output $\lambda \leq 1.2$	Max. output $\lambda \leq 1.3$	
GAS	Theoretical max CO <sub>2</sub> 0 % O <sub>2</sub>	CO <sub>2</sub> % Calibration		mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$	
G 20	11.7	9.7	9	≤ 100
G 25	11.5	9.5	8.8	≤ 100
G 30	14.0	11.6	10.7	≤ 100
G 31	13.7	11.4	10.5	≤ 100

Tab. J

**7.2.4 Safety components**

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

The specified life cycles do not refer to the warranty terms indicated in the delivery or payment conditions.

Safety component	Life cycle
Flame control	10 years or 250.000 operation cycles
Flame sensor	10 years or 250.000 operation cycles
Gas valves (solenoid)	10 years or 250.000 operation cycles
Pressure switches	10 years or 250.000 operation cycles
Pressure adjuster	15 years
Servomotor (electronic cam) (if present)	10 years or 250.000 operation cycles
Oil valve (solenoid)(if present)	10 years or 250.000 operation cycles
Oil regulator (if present)	10 years or 250.000 operation cycles
Oil pipes/ couplings (metallic) (if present)	10 years
Flexible hoses (if present)	5 years or 30.000 pressurised cycles
Fan impeller	10 years or 500.000 start-ups

Tab. K

### 7.3 Opening the burner



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



Close the fuel shut-off valve.



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

- Loosen the screw 1)(Fig. 37) and remove the hood 2).
- Disengage the articulated coupling 3) from the graduated sector 4)(Fig. 37).
- Remove the screw 5)(Fig. 37) only with the long head models; pull the burner back on the slide bars 6)(Fig. 37) for about 100mm.
- Disconnect the probe and electrode leads and then pull the burner fully back.
- Now extract the gas distributor 7)(Fig. 37) after having removed the screw 8)(Fig. 37).

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



ATTENTION

Assemble the inner part of the combustion head by tightening the screw 8)(Fig. 37) to a tightening torque of  $4 \div 6 \text{ Nm}$

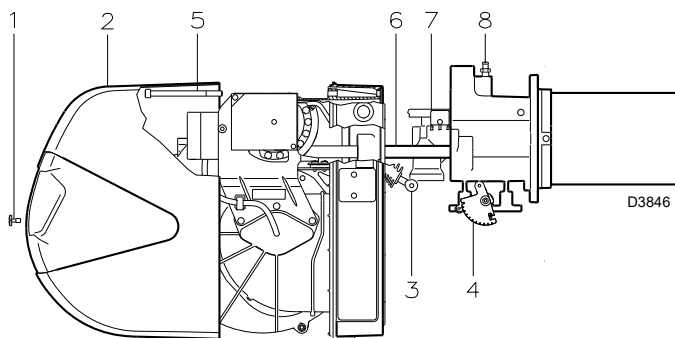


Fig. 37

### 7.4 Closing the burner

- Push the burner to approximately 100 mm from the pipe coupling.
- Reconnect the previously disconnected cables and slide in the burner until it comes to a stop.
- Replace the screw 5)(Fig. 37) and carefully pull the probe and electrode cables outwards until they are slightly taut.
- Reconnect the articulated coupling 3) to the graduated sector 4).

- In extended head models, unscrew the extensions and reposition them in the appropriate space; tighten the screws 2)(Fig. 11) on the slide bars.
- Reposition the cover 2)(Fig. 37) and fix with the screw 1)(Fig. 37).



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

### 7.5 Electrical panel maintenance

If it is necessary to carry out maintenance on the electrical panel 1)(Fig. 38), it is possible to remove only the fan unit 2)(Fig. 38), to allow improved access to the electrical components.

With the burner open as in Fig. 37, unhook the tie-rod 3)(Fig. 38), removing the screw on the adjustable profile cam, and extract it from the tip 4)(Fig. 38).

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

Remove the 3 screws 5)(Fig. 38) positioned on the protective cover.

Removing the 2 screws 6)(Fig. 38), it is possible to unthread the fan unit 2)(Fig. 38) from the slide bars 7)(Fig. 38).

Finally, you can use 2 of the 3 screws 5)(Fig. 38) to fix the electrical panel to the pipe coupling, in the points indicated in Fig. 39, and then carry out the maintenance operations.

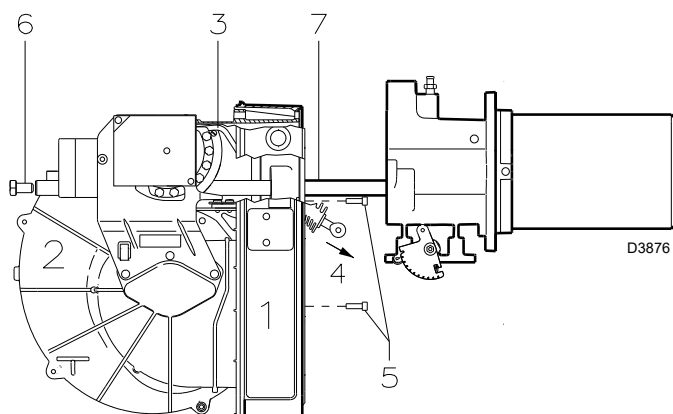


Fig. 38

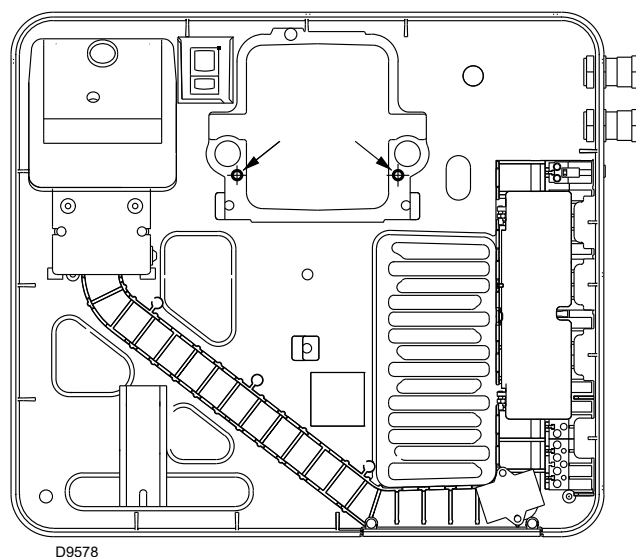

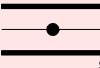
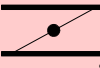

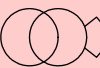




Fig. 39

## 8 LED indicator and special function

### 8.1 Description of LED lamps

 S9740	Fan	It turns on when the fan motor is powered (T6) and blinks when RUN/CHECK switch is set to "CHECK" during damper movement phases, PTFI AND MTFI.
 S9741	Damper open	It blinks when the air damper is moving towards the maximum opening position until the position-reached feedback sent by the servomotor is received, then it stays steadily on for the time set by the flame control.
 S9742	Damper closed	It blinks when the air damper is moving towards the minimum opening position until the position-reached feedback sent by the servomotor is received, then it stays steadily on until the end of the pre-purging time.
 S9743	Auto	It indicates that the burner is ready for the output modulation.
 S9744	Ignition	It blinks during the ignition phase (1st safety time) and stays steadily on during the MTFI.
	Flame	It blinks during the first safety time and stays steadily on if the flame detection has been correctly performed.
 S9746	Alarm	It turns on in red when a lock-out condition occurs. Together with the other indicators, it indicates the type of fault during the lock-out phase. Together with the other LEDs, it indicates the operating status during the normal cycle.

Tab. L

T = Terminal  
PTFI = Pilot ignition attempt  
MTFI = Ignition attempt with main fuel valve

### 8.2 Check mode function

By means of the reset button on-board the flame control, it is possible to use a control function during start-up phases. (pre-purging, ignition, 1st safety time and 2nd safety time).

This function, indicated as CHECK MODE, is designed to facilitate checking the phases of the burner and of the safety devices monitored by the flame control.

This function is particularly useful during the burner first commissioning or during maintenance.

To enable the check mode function:

- keep the reset button pressed, see chapter 8 for more details, for at least 3 seconds, the status LED changes from green to yellow to signal that the control device is in check mode;
- the control device locks out during pre-purging, after a timeout of max 30 minutes the flame control will automatically exit the check mode function;


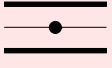
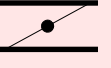

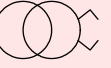


- check mode has a 2 minute timeout during the 2nd safety time. When it ends, the flame control goes back to the normal operating status;
- check mode has a 2 minute timeout during the MTFI status. When it ends, the flame control goes back to the normal operating status;
- during the check mode 1st or 2nd safety time, the flame signal level can be indicated by the 5 central LEDs on the flame control central panel, which turn on proportionally. Each lit LED (starting from the flame LED) represents 20% of the signal power.  
To exit the check mode function, press the reset button; the flame control will go back to the normal operating mode.

### 8.3 Flame control lock-out or emergency stop condition

The RFGO control device can be locked out (emergency stop) at any time during the operating cycle and unlocked when already locked (lock-out) by simply pressing the key on the front panel or by means of the terminal T21 on the support base.

### 8.4 LED lamps: burner operating status

#### OPERATING STATUSES INDICATED BY LEDS DURING NORMAL OPERATION AND CHECK MODE

Operation LED ● = ON	Fan	Damper open	Damper closed	Modulation	Ignition	Flame	Status
Icon	 S9740	 S9741	 S9742	 S9743	 S9744	 S9745	 S9746
Power OFF/ON							OFF
Not ready/ Diagnostics							Green
Standby			●				Green
Servomotor movement (Note 3)	●	OFF Flashing ●	Flashing OFF ●				Green
Waiting for closing	Green blinking						Green
OPEN (before ignition)	●	●					Green
Minimum (before ignition)	●		●				Green
Ignition	●		●		●		Green
PTFI	●		●		●	Green blinking	Green
MTFI	●		●			●	Green
Active modulation	●			●		●	Green
Minimum output position	●		●			●	Green
With flame present	●	●				●	Green
Economy mode	●		●				Green
Check during maximum opening phase	Flashing	●					Yellow
Check during minimum closing phase	Flashing		●				Yellow
Check during ignition phase with pilot PTFI	Flashing	● Note 1	● Note 1	● Note 1	● Note 1	● Note 1	Yellow
Check during ignition phase with main fuel valve MTFI	Flashing	● Note 1	● Note 1	● Note 1	● Note 1	● Note 1	Yellow
Fault/lock-out	● Note 2	● Note 2	● Note 2	● Note 2	● Note 2	● Note 2	Red
End of the cycle	●		●	●			Green

Tab. M

1. LEDs form a progress bar which indicates the Flame Signal Power in order to orientate the sensors during commissioning (LEDs "Grow" upwards, moving away from the Status at 20% intervals of flame power.)
2. LEDs indicate the error or lock-out code for troubleshooting.
3. LEDs change from ON to BLINKING to OFF showing the servomotor movement control until the position-reached feedback is received.  
see paragraph "Problems - Causes - Remedies signalled by LED indicators" on page 37".

## 9 Problems - Causes - Remedies signalled by LED indicators

When an emergency stop occurs, the control device LEDs indicate the cause of the stop.

The terminal T3 is not powered.

The device operating status is internally memorised in case of any lack of power supply.

The device lock-out condition can be caused by pressing (<1sec.) the reset button on the flame control front side or through the remote reset - terminal T21 on the base.

Since the reset button is very sensitive, do not press it strongly during the reset operation.

### Unlocking the control device

The RFGO control device can be reset in two ways: reset button and remote reset terminal.

The remote reset must be a normally open connected button between T21 and flame control power supply voltage (see illustrative diagrams):

- the reset is performed when a faulty condition is detected by the flame control.
- Press the reset button to reset the system after a lock-out.
- Pressing the reset button during operation will cause an emergency stop.
- The reset or emergency stop condition can be obtained also by using the remote reset with the same modalities.
- The number of reset attempts is limited to a maximum of 5 within 15 minutes.

### Error / RFGO LED lock-out Codes

During an alarm condition, the status LED becomes steady red. The remaining LEDs turn on according to a coded sequence which identifies the lock-out cause.

The following table shows the different LED Lock-out codes.



ATTENTION

The device described in this manual can cause material problems, severe injuries or death.

It is the owner or user's responsibility to make sure that the equipment described is installed, used and commissioned in compliance with the requirements provided both by national and local law. The lock-out condition indicates the presence of a fault which occurred during the operating cycle or during stand-by mode.

Before performing an unlock attempt, it is necessary to restore the original optimal operating conditions.



ATTENTION

Thermal unit's operation, maintenance and troubleshooting interventions must be carried out by trained personnel.

The persons who solve lock-out problems or reset the control device must observe the error codes to solve the problems described in this product technical data sheet.

It is not admitted to tamper with or act on the system or control in a way that could compromise the product safety or warranty.

Any tests on safety devices or on loads, such as fan motor, valves, igniter, flame sensors, must be performed with the shut-off valves closed and by qualified personnel.

Do not by-pass nor exclude the safety devices connected to the flame control.

Failure to observe these guidelines will exclude any liability.



ATTENTION

The regulation prohibits the system from allowing more than 5 remote reset attempts within a 15 minute time window.

If more than 5 attempts are performed without solving the lock-out, the system will prevent the user to perform further remote resets and force him/her to wait for the 15 minutes to elapse.

The remote reset operation will be restored at the end of the waiting time.

It is recommended that qualified personnel evaluate the lock-out condition and implement the solution which is suitable for the fault to be solved.

### Error / RFGO LED lock-out codes

No.	Faults	LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7
	Operation LED ● = ON	Fan	Open damper	Closed damper	Auto	Ignition	Flame	Status
	Icon	 S9740	 S9741	 S9742	 S9743	 S9744	 S9745	 S9746
1	Post-diagnostics fault	●						Red
2	Local reset		●					Red
3	Combustion air fan fault	●	●					Red
4	Supervisor processor diagnostics fault			●				Red
5	FR- NO Flame at the end of the 2 <sup>nd</sup> safety time (MTFI)	●		●				Red
6	FR: internal circuit fault		●	●				Red
7	Internal communication fault	●	●	●				Red
8	Remote reset				●			Red
9	FR: internal fault	●			●			Red
10	Main processor fault		●		●			Red
11	Data memory test fault	●	●		●			Red
12	Data memory test fault			●	●			Red
13	Mains voltage or frequent fault	●		●	●			Red
14	Internal processor fault		●	●	●			Red
15	Internal processor fault	●	●	●	●			Red
16	No flame: 1 <sup>st</sup> safety time (PTFI)	●				●		Red
17	Wiring fault		●			●		Red
18	Safety relay fault	●	●			●		Red
19	Combustion airflow switch fault in the rest position			●		●		Red
20	UV: no flame at the end of the 2 <sup>nd</sup> safety time (MTFI)	●		●		●		Red
21	Safety relay fault		●	●		●		Red
22	Supervisor processor fault	●	●	●		●		Red
23	Supervisor memory test fault				●	●		Red
24	Flame loss during the operation (AUTO)	●			●	●		Red
25	Supervisor processor data memory fault		●		●	●		Red
26	Supervisor processor internal fault	●	●		●	●		Red
27	Not used							
28	Not used							
29	Operating temperature out of range		●	●	●	●		Red
30	Code memory fault	●	●	●	●	●		Red
31	FR: external short circuit						●	Red
32	Check mode timeout (manual)	●					●	Red
33	False flame in stand-by mode		●				●	Red
34	Not used							
35	Internal processor timeout			●			●	Red
36	Internal processor timeout	●		●			●	Red
37	Combustion air check timeout		●	●			●	Red
38	Internal processor timeout	●	●	●			●	Red
39	Internal processor timeout				●		●	Red
40	Internal hardware fault	●			●		●	Red
41	Internal hardware fault		●		●		●	Red
42	Main processor fault	●	●		●		●	Red
43	Supervisor processor fault			●	●		●	Red
44	Supervisor processor timeout	●		●	●		●	Red
45	Off-specification mains voltage		●	●	●		●	Red
46	Off-specification mains voltage	●	●	●	●		●	Red

No.	Faults	LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7
47	UV: Internal fault					•	•	Red
48	Supervisor processor fault	•				•	•	Red
49	Main processor fault		•			•	•	Red
50	Ignition feedback fault	•	•			•	•	Red
51	Pilot feedback fault			•		•	•	Red
52	Piloted valve feedback fault	•		•		•	•	Red
53	Actuator feedback waiting time expired		•	•		•	•	Red
54	Direct ignition valve feedback fault	•	•	•		•	•	Red
55	Internal processor fault				•	•	•	Red
56	UV: false flame during operation			•	•	•	•	Red
57	FR: false flame during operation	•		•	•	•	•	Red
58	T8 inlet fault		•	•	•	•	•	Red
59	Internal hardware fault	•			•	•	•	Red
60	Local reset fault	•	•	•	•	•	•	Red
61	Open POC fault		•		•	•	•	Red
62	UV: strong UV flame fault	•	•		•	•	•	Red
63	Internal hardware fault					•		Red

Tab. N

## Fault explanation

No.	Faults	Cause	Solution
1	Post-diagnostics fault	Initial power diagnostics fault Make sure that the status of inlets and outlets is correct upon ignition	Check T12, T13 and T14
2	Local reset	The user started the manual reset or the reset switch is faulty	Check T21 inlet or reset for normal operation
3	Combustion air fan fault	No Air Check signal (T14) during the bleed cycle or Air Check signal loss during the burner operation	Check the fan or the air pressure switch
4	Supervisor processor diagnostics fault	The system detected the presence of voltage on T16, T17, T18 or T19 at the wrong moment or there is no voltage when necessary	Check the wiring and make sure that the system is operating on a single-phase line (50/60Hz)
5	FR- No flame at the end of the 2 <sup>nd</sup> safety time (MTFI)	No flame at the end of the second safety time	Inspect the system, check the gas pressure, inspect the flame detection electrode, check the wiring, etc.
6	FR: internal circuit fault	Internal fault	Replace the control device
7	Internal communication fault	Internal fault	Replace the control device
8	Remote reset	The user pressed the remote reset button or the reset switch is discontinuous/dynamic	Check the remote switch
9	FR: internal fault	Internal fault	Replace the control device
10	Main processor fault	Internal fault	Replace the control device
11	Data memory test fault	Internal fault	Replace the control device
12	Data memory test fault	Internal fault	Replace the control device
13	Mains voltage or frequent fault	Off-specification power supply voltage and/or frequency	Check the input power supply
14	Internal processor fault	Internal fault	Replace the control device
15	Internal processor fault	Internal fault	Replace the control device
16	No flame: 1 <sup>st</sup> safety time (PTFI)	No flame at the end of the first safety time	Inspect the system, check the gas pressure, check the UV scanner, check the wiring, etc.
17	Wiring fault	The system detected the presence of voltage on critical terminals (T16, T17, T18 or T19) at the wrong moment or there is no voltage when necessary	Inspect the wiring and make sure that the system is operating on a single-phase line (50/60Hz)
18	Safety relay fault	Internal fault	Replace the control device
19	Combustion airflow switch fault in the rest position	Open the circuit upon T13 start-up	Check the wiring for the air pressure switch

No.	Faults	Cause	Solution
20	UV: no flame at the end of the 2 <sup>nd</sup> safety time (MTFI)	No flame at the end of the 2 <sup>nd</sup> safety time	Inspect the system, check the gas pressure, check the UV scanner, check the wiring, etc.
21	Safety relay fault	Internal fault	Replace the control device
22	Supervisor processor fault	Internal fault	Replace the control device
23	Supervisor memory test fault	Internal fault	Replace the control device
24	Flame loss during the operation (AUTO)	Loss of flame	Check the scanner or the fuel flow line
25	Supervisor processor data memory fault	Internal fault	Replace the control device
26	Supervisor processor internal fault	Internal fault	Replace the control device
27	Not used		
28	Not used		
29	Operating temperature out of range	Operating temperature below -40°C or above 70°C	Bring the control device within the specified temperature nominal values
30	Code memory fault	Internal fault	Replace the control device
31	FR: external short circuit	External short circuit between T24 and EARTH	Inspect the flame detection electrode
32	Check mode timeout (manual)	The interval for the manual mode (30 minutes) to end has elapsed	Exit the manual mode correctly to avoid timeout
33	False flame in stand-by mode	Unexpected flame (false or parasitic flame) detected during the Stand-by status	Check scanner or interference
34	Not used		
35	Internal processor timeout	Internal fault	Replace the control device
36	Internal processor timeout	Internal fault	Replace the control device
37	Combustion air check timeout	The system could not perform verification tests of the combustion air during the burner sequence	Check the wiring or the air pressure switch
38	Internal processor timeout	Internal fault	Replace the control device
39	Internal processor timeout	Internal fault	Replace the control device
40	Internal hardware fault	Internal fault	Replace the control device
41	Internal hardware fault	Internal fault	Replace the control device
42	Main processor fault	Internal fault	Replace the control device
43	Supervisor processor fault	Internal fault	Replace the control device
44	Supervisor processor timeout	Internal fault	Replace the control device
45	Off-specification mains voltage	Off-specification mains voltage/frequency	Check the mains voltage level or the frequency. Contact the factory if the problem persists
46	Off-specification mains voltage	Off-specification mains voltage/frequency	Check the mains voltage level or the frequency. Contact the factory if the problem persists
47	UV: Internal fault	Internal fault	Replace the control device
48	Supervisor processor fault	Internal fault	Replace the control device
49	Main processor fault	Internal fault	Replace the control device
50	Ignition feedback fault	The system detected the presence of voltage on T16 at the wrong moment or there is no voltage when necessary	Check the wiring and make sure that the earthing is appropriate If the problem persists, contact the distributor/factory
51	Pilot feedback fault	The system detected the presence of voltage on T17 at the wrong moment or there is no voltage when necessary	Check the wiring and make sure that the earthing is appropriate. If the problem persists, contact the distributor/factory
52	Piloted valve feedback fault	The system detected the presence of voltage on T19 at the wrong moment or there is no voltage when necessary	Check the wiring and make sure that the earthing is appropriate If the problem persists, contact the distributor/factory
53	Actuator feedback waiting time expired	No actuator feedback on T8 for more than 10 minutes	Check the wiring Check the modulation equipment
54	Direct ignition valve feedback fault	The system detected the presence of voltage on T18 at the wrong moment or there is no voltage when necessary	Check the wiring and make sure that the earthing is appropriate. If the problem persists, contact the distributor/factory
55	Internal processor fault	Internal fault	Replace the control device

No.	Faults	Cause	Solution
56	UV: false flame during operation	False flame detected before ignition	Check the scanner
57	FR: false flame during operation	False flame detected before ignition	Check the wiring Check the scanner Make sure that earthing is appropriate
58	T8 inlet fault	The system detected the presence of voltage on T8 at the wrong moment or there is no voltage when necessary	Check the wiring Check the actuator
59	Internal hardware fault	Internal fault	Replace the control device
60	Local reset fault	Local reset button pressed for more than 10 seconds or reset button locked	If the problem persists, replace the control device
61	Open POC fault	The fuel valve is open at the wrong moment	Check the wiring
62	UV: strong UV flame fault	The scanner is too close to the flame	Increase the distance between the scanner and the flame OR use an orifice to reduce the view field
63	Internal hardware fault	Internal fault	Replace the control device

Tab. O

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

With modulating operation, the burner continuously adjusts its output to the heat request, thereby ensuring a great stability of the controlled parameter: temperature or pressure.

The parts to be ordered are two:

- output regulator to be installed to the burner;
- probe to be installed to heat generator.

Parameter to be checked		Probe		Adjustment field	
	Adjustment field	Typ	Code	Typ	Code
Temperature	- 100 ÷ 500° C	PT 100	3010110	RWF50.2 RWF55.5	20083339
Pressure	0 ÷ 2.5 bar 0 ÷ 16 bar	Probe with outlet 4 - 20 mA	3010213 3010214		20098541

**Kit for LPG operation**

Burner	Output kW	Blast tube length (mm)	Code
RS 25/M BLU	120/200 - 470	230 - 365	3010423
RS 35/M BLU	120/200 - 470	230 - 365	3010424

**Control analogue signal converter kit**

Burner	Type	Code
RS 25-35/M BLU	E5202	3010410

**Maximum gas pressure switch Kit**

Burner	Code
RS 25-35/M BLU	3010418

**Potentiometer kit**

Burner	Code
RS 25-35/M BLU	3010420

**Differential circuit breaker kit**

Burner	Code
RS 25-35/M BLU	3010448

**Spacer kit**

Burner	Code
RS 25-35/M BLU	3010095

**Continuous purging kit**

Burner	Code
RS 25-35/M BLU	3010449

**Soundproofing box kit**

Burner	Code
RS 25-35/M BLU	3010403

**Hour counter kit**

Burner	Code
RS 25-35/M BLU	3010450

**Post-purging kit**

Burner	Code
RS 25-35/M BLU	3010451

**Clean contacts kit**

Burner	Code
RS 25-35/M BLU	3010419

**Electromagnetic interference protection kit**

Burner	Code
RS 25-35/M BLU	3010386

**Extended head kit**

Burner	Code
RS 25/M BLU	3010430
RS 35/M BLU	3010431

**UV sensor kit**

Burner	Code
RS 25-35/M BLU	20144943

**Gas trains in compliance with EN 676**

Please refer to manual.

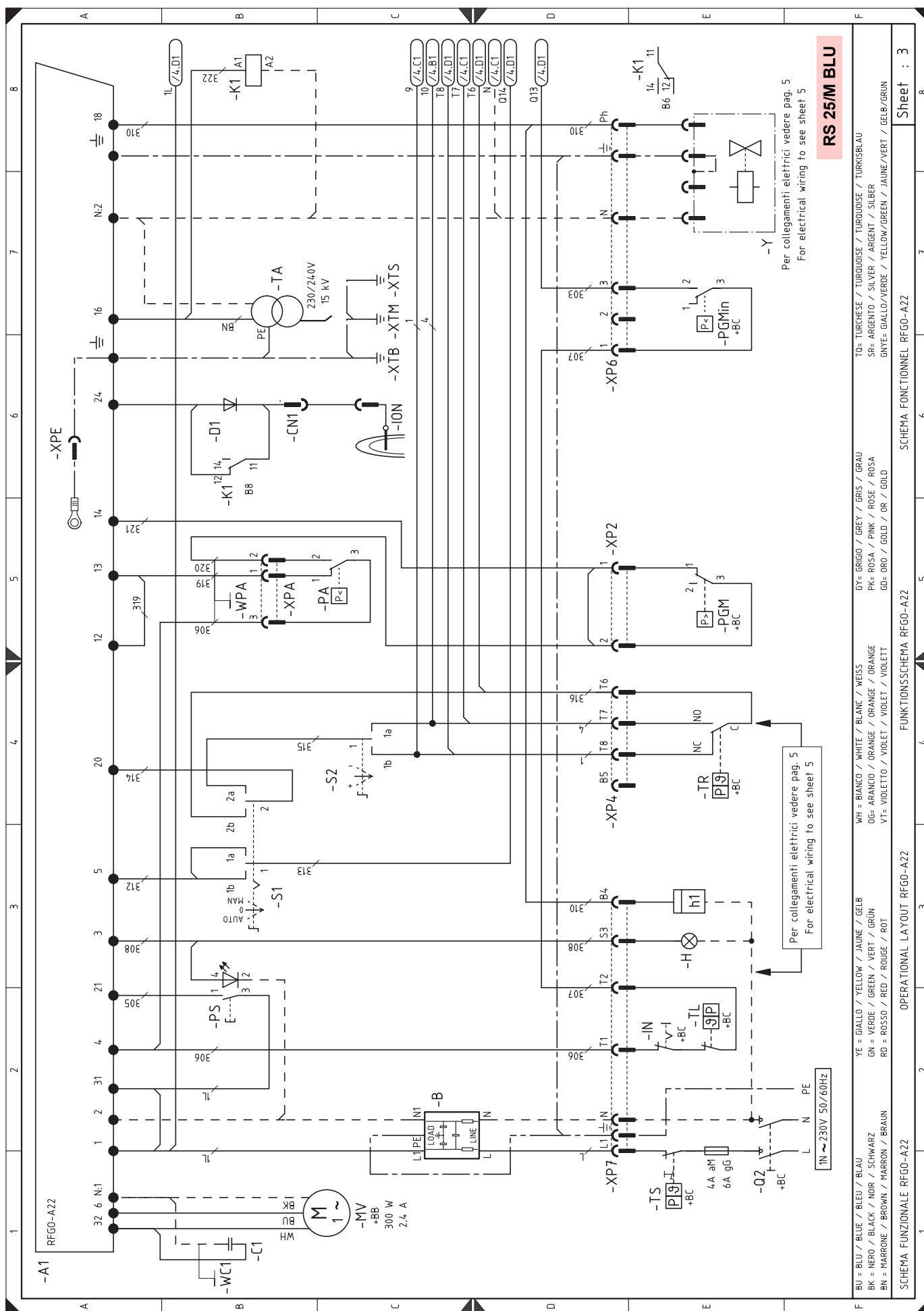
**B Appendix - Electrical panel layout**

<b>1</b>	<b>Index of layouts</b>	
<b>2</b>	Indication of references	
<b>3</b>	Functional layout RFGO-A22	RS 25/M BLU RS 35/M BLU
<b>4</b>	Functional layout RFGO-A22	RS 25/M BLU RS 35/M BLU
<b>5</b>	Electrical wiring that is the responsibility of the installer	RS 25/M BLU RS 35/M BLU
<b>6</b>	Electrical wiring kit	
<b>7</b>	Functional layout RWF50	

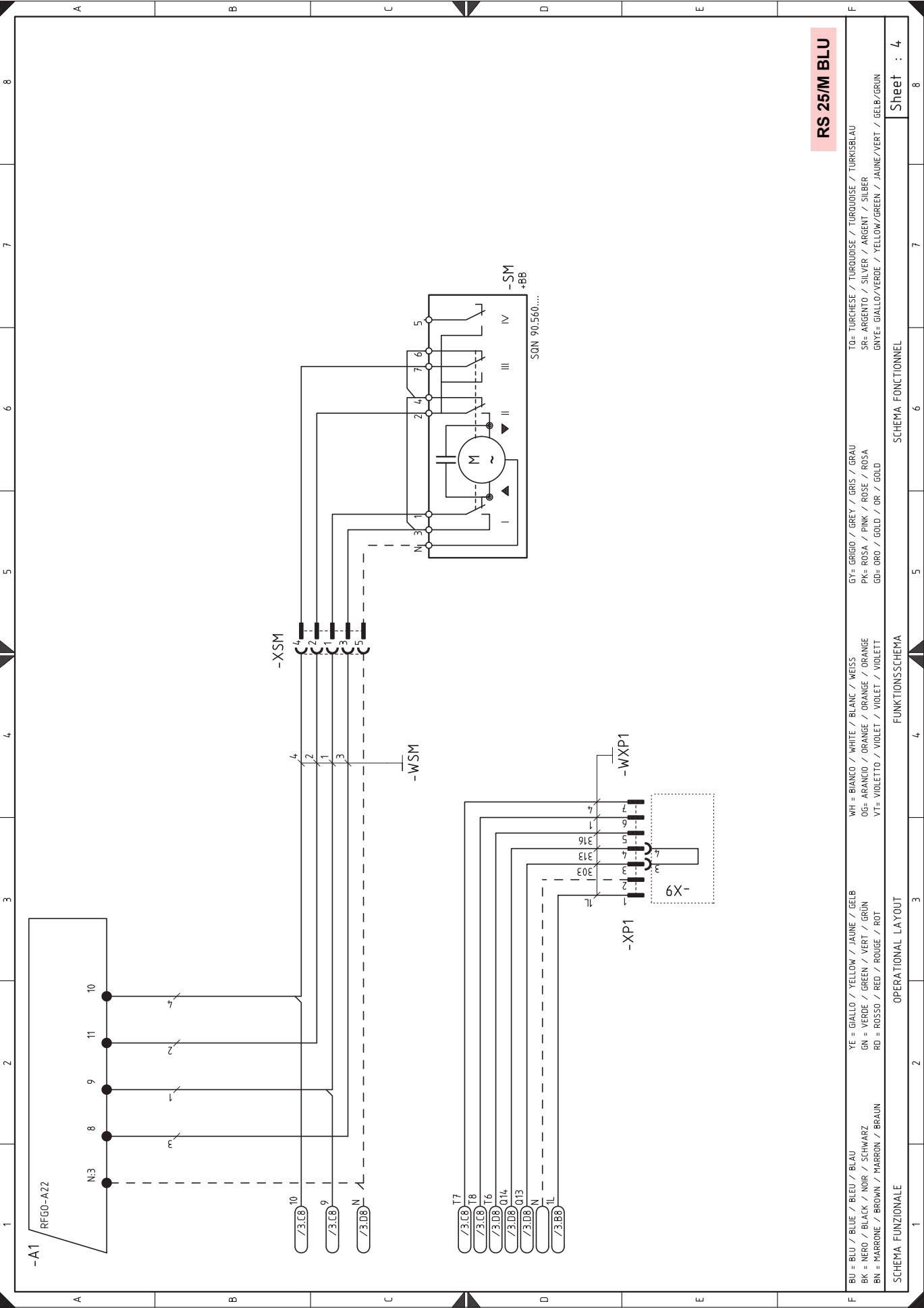
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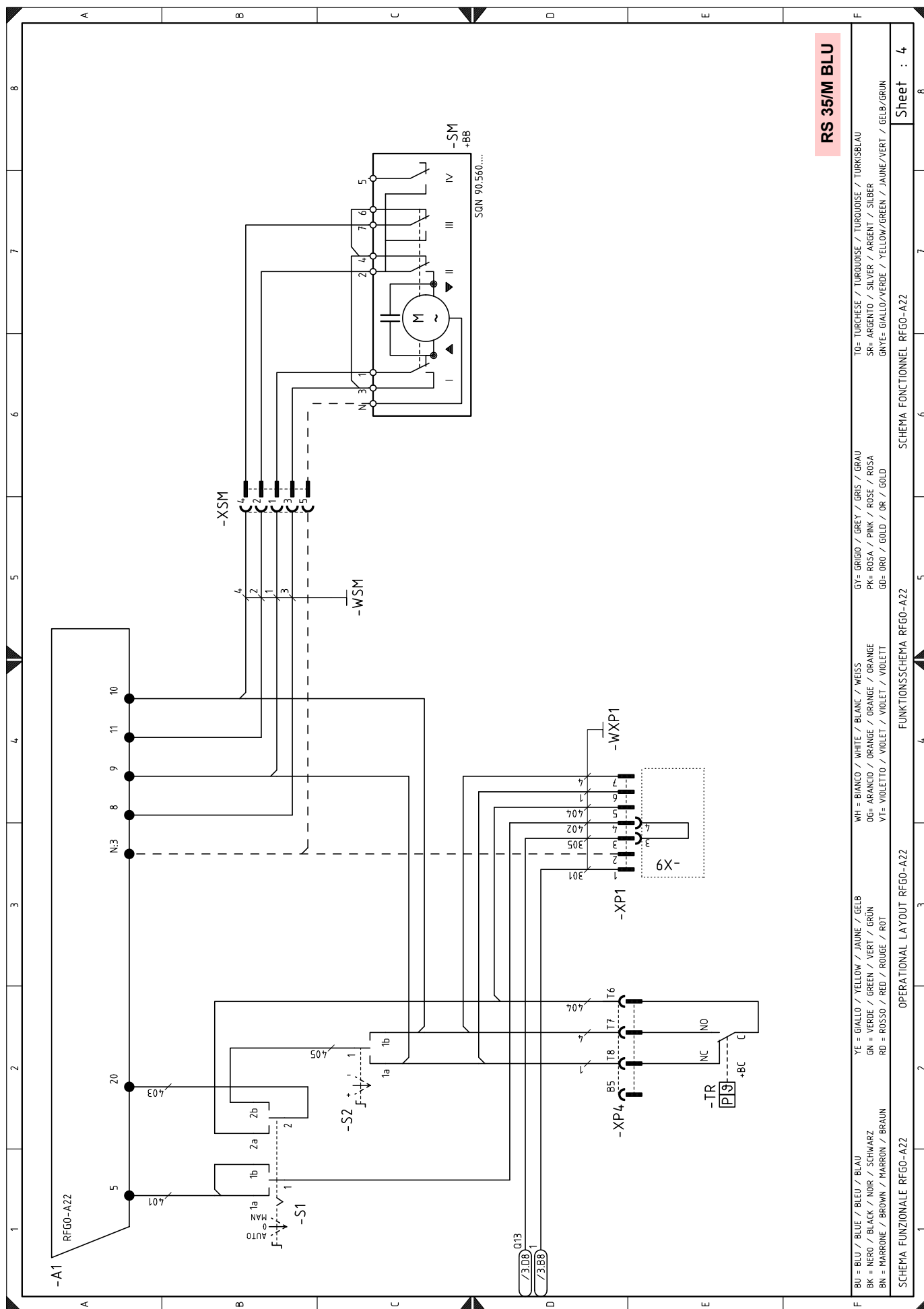
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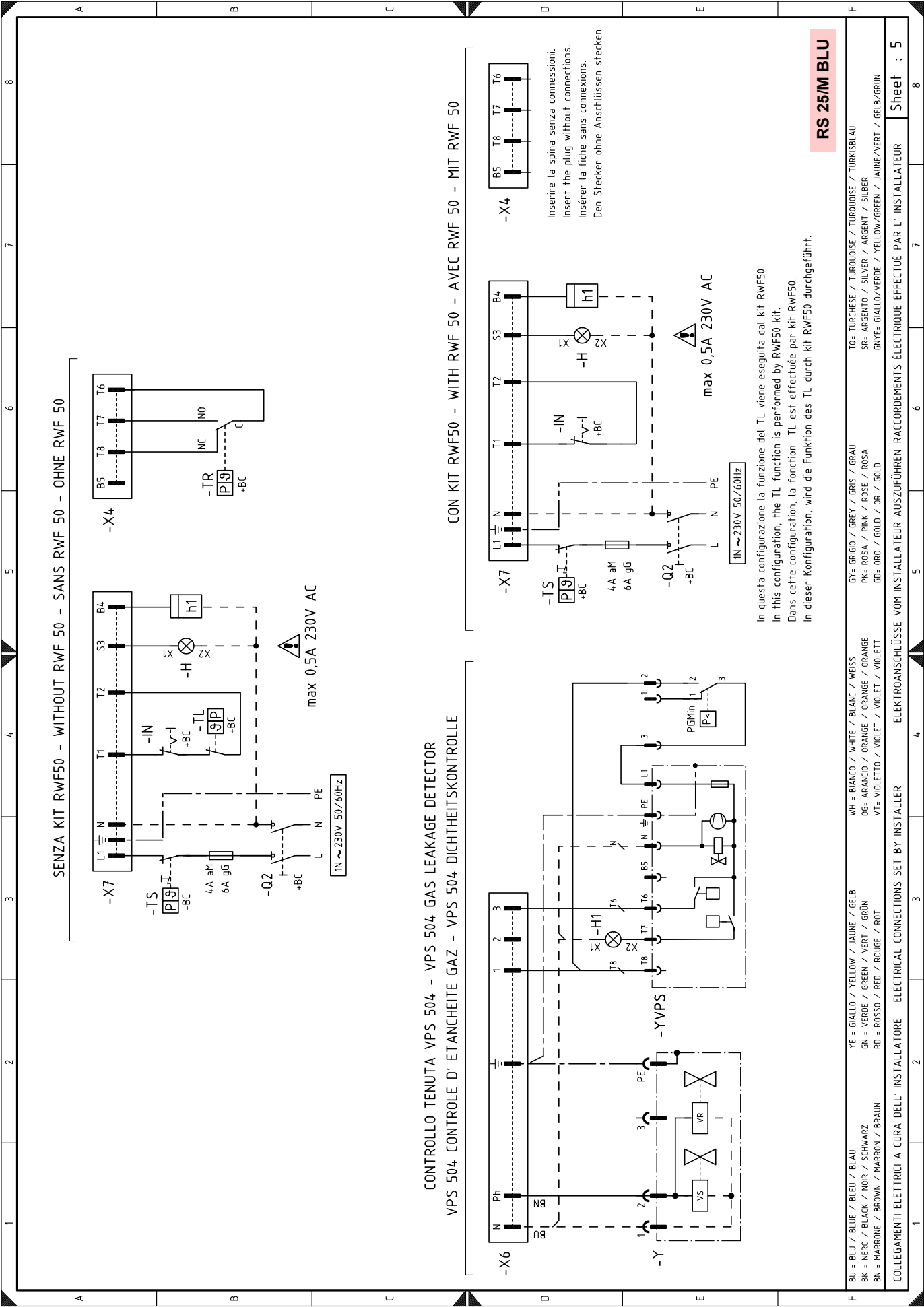
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RS 25/M BLU

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

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

Sheet : 5

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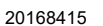
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**Wiring layout key**

A1	Electrical control box	XTB	Shelf earth
B	Filter to protect against radio disturbance	XTM	Fan unit earth
+BB	Burner components	XTM	Servomotor unit earth
+BC	Boiler components	Y	Gas adjustment valve + gas safety valve
B1	RWF Output power regulator	YVPS	Gas valve leak detection device
BA	Input in current DC 4...20 mA		
BA1	Input in current DC 4...20 mA to modify remote setpoint		
BP	Pressure probe		
BP1	Pressure probe		
BR	Remote setpoint potentiometer		
BT1	Thermocouple probe		
BT2	Probe Pt100, 2 wires		
BT3	Probe Pt100, 3 wires		
BT4	Probe Pt100, 4 wires		
BTEXT	External probe for climatic compensation of the setpoint		
BV	Input in voltage DC 0...10V		
BV1	Input in voltage DC 0...10V to modify remote setpoint		
C1	Capacitor		
CN1	Ionisation probe connector		
D1	Diode		
H	Remote lockout signalling		
H1	Lockout YVPS		
h1	Hour counter		
ION	Ionisation probe		
IN	Burner manual stop switch		
K1	Relay		
MV	Fan motor		
PA	Air pressure switch		
PGM	Maximum gas pressure switch		
PGMin	Minimum gas pressure switch		
PS	Reset button with light signal		
Q2	Single-phase disconnecting switch		
RS	Remote burner reset button		
S1	Off / automatic / manual selector		
S2	Output increase / decrease selector		
SM	Servomotor		
TA	Ignition transformer		
TL	Limit thermostat/pressure switch		
TR	Adjustment thermostat/pressure switch		
TS	Safety thermostat/pressure switch		
X2	2-pin plug		
X4	4-pin plug		
X6	6-pin plug		
X7	7-pin plug		
X9	9-pin plug		
XPA	Air pressure switch connector		
XP1	Socket for modulation kit		
XP2	Maximum gas pressure switch connector		
XP4	4-pole socket		
XP6	6-pole socket		
XP7	7-pole socket		
XPE	Control box earth		
XRWF	Terminal board for output power regulator RWF		
XSM	Servomotor connector		



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The logo consists of the word "RIELLO" in a bold, red, sans-serif typeface.

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