GB

Forced draught gas burners

Progressive two-stage or modulating operation

CODE	MODEL	TYPE
3788006	RS 160/M BLU	843T
3788007	RS 160/M BLU	843T
20011709	RS 160/M BLU	843T
20214681	RS 200/M BLU	1106T
20214697	RS 200/M BLU	1106T
20215045	RS 200/M BLU	1106T80

20216152 (5) - 03/2026

Translation of the original instructions

1 Declarations

Declaration of Conformity A.R. 8/1/2004 & 17/7/2009 – Belgium	
Manufacturer: Distributed by:	RIELLO S.p.A. 37045 Legnago (VR) Italy Tel. ++39.0442630111 www.riello.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 burner
Model:	RS 200/M BLU
Regulation applied:	EN 676 and A.R. of January 8th 2004 - July 17th 2009
Controlling organisation:	Kiwa Cermet Italia S.p.A. Via Treviso 32-34 I-31020 San Vendemiano (TV) Italy
Values measured:	Max. CO: 5 mg/kWh Max. NOx: 61 mg/kWh

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.

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

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

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: LIVE COMPONENTS

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

DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.

DANGER: BURNING

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

DANGER: CRUSHING OF LIMBS

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

WARNING: MOVING PARTS

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

DANGER: EXPLOSION

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

PERSONAL PROTECTION EQUIPMENT

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

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

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

ENVIRONMENTAL PROTECTION

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

IMPORTANT INFORMATION

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

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

➤ This symbol indicates a list.

Abbreviations used

Ch.	Chapter
Fig.	Figure
Page	Page
Sec.	Section
Table	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 sale 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 safety technical 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.


ATTENTION

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

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, the user 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

Range: R

Fuel:		
	S	Natural gas
	L	Light Oil
	LS	Light Oil/Natural gas
	N	Heavy Oil

Size:

Adjustment:		
	BP	Two stage (light oil / proportional valve (gas)
	M	Mechanical cam
	E	Electronic Cam
	EV	Electronic cam and variable speed (with Inverter)
	EVi	Electronic cam with integrated Inverter
	E O_2	Electronic cam and suitable for Oxygen Control (O_2)
	EV O_2	Electronic cam and variable speed (with Inverter) and suitable for Oxygen Control O_2
	P	Proportional air/gas valve

Emissions:			
...	-	C01	Class 1 EN676
MZ	-	C02	Class 2 EN676
MX	-	C03	Class 3 EN676
BLU	-	C03	Class 3 EN676
FGR			Ultra low NOx - Flue Gas Recirculation
ULX			Ultra low NOx - Flue Internal Recirculation

Head:		
	TC	Standard combustion head
	TL	Long combustion head

Flame control system:	
FS1	Intermittent operation (1 stop every 24 h)
FS2	Continuous operation (1 stop every 72 h)

Electrical supply of the system:	
3/400/50	3N / 400V / 50Hz
3/230/50	3/230V / 50 Hz

Voltage of auxiliaries:	
230/50/60	230V / 50-60Hz
110/50/60	110V / 50-60Hz

R	S	160	M	BLU	TC	FS1	3/400/50	230/50/60

BASIC DESIGNATION

EXTENDED DESIGNATION

4.2 Models available

Designation			Power supply voltage	Start-up	Code
RS 160/M BLU	TC	FS1	3 /400V - 50Hz	Direct	3788006
RS 160/M BLU	TL	FS1	3 /400V - 50Hz	Direct	3788007
RS 160/M BLU	TC	FS1	3 /230V - 50Hz	Direct	20011709
RS 200/M BLU	TC	FS1	3 /400V - 50Hz	Direct	20214681
RS 200/M BLU	TL	FS1	3 /400V - 50Hz	Direct	20214697
RS 200/M BLU	TL	FS1	3 /220-380V - 60Hz	Direct	20215045

Tab. A

4.3 Burner categories

Gas category	Country of destination
I2H	AT, BG, CH, CZ, DK, EE, ES, FI, GB, GR, HU, IE, IS, IT, LT, LV, NO, PT, RO, SE, SI, SK, TR
I2E(R)	BE
I2E	LU, PL
I2ELL	DE
I2EK	NL
I2Er	FR

Tab. B

4.4 Technical data

Model			RS 160/M BLU	RS 200/M BLU	RS 200/M BLU
Type			843T	1106T	1106T80
Output (1)	Max.	kW Mcal/h	930 ÷ 1860 800 ÷ 1600	1380 ÷ 2400 1187 ÷ 2064	
	Min.	kW Mcal/h	300 258	300 258	
Fuel			Natural gas: G20 (methane) - G25	Natural gas: G20 (methane) - G25 - G31	
Operation			– Intermittent (min. 1 stop in 24 hours) – Progressive two-stage or modulating by kit (see ACCESSORIES).		
Standard applications			Boilers: water, steam, diathermic oil		
Ambient temperature		°C	0 - 40		
Combustion air temperature		°C max	60		
Noise levels (2)					
	Sound pressure	dB(A)	80.5		
	Sound power		91.5		
CE			CE-0476DP3335		

Tab. C

(1) Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m a.s.l.

(2) 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 the EN 15036 standard, and according to an “Accuracy: Category 3” measurement, as described in EN ISO 3746.

4.5 Electrical data

Model		RS 160/M BLU	RS 160/M BLU
Type		843T	843T
Main electrical supply		3 ~ 400V +/-10% 50Hz	3 ~ 230V +/-10% 50Hz
Auxiliary circuit electrical supply		1N ~ 230V +/-10% 50Hz	1N ~ 230V +/-10% 50Hz
Absorbed electric power	kW max	4.5	
Protection level		IP 44	

Model		RS 200/M BLU	RS 200/M BLU
Type		1106T	1106T80
Main electrical supply		3 ~ 400V +/-10% 50Hz	3 ~ 380V +/-10% 60Hz
Auxiliary circuit electrical supply		1N ~ 230V +/-10% 50Hz	1N ~ 220V +/-10% 60Hz
Absorbed electric power	kW max	5.5	
Protection level		IP 44	

Tab. D

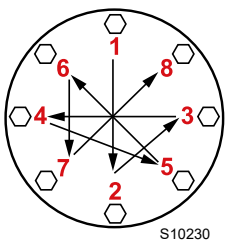
4.6 Burner equipment

The burner is supplied complete with:

Flange for gas train . . . . . No. 1
Seal for flange . . . . . No. 1
Flange fixing screws M10 x 40 . . . . . No. 4
Thermal flange gasket . . . . . No. 1
Stud bolts to fix the burner flange to the boiler: M16x40 (for burners RS 160/M BLU). . . . . No. 4
Stud bolts to fix the burner flange to the boiler: M16x50 (for burners RS 200/M BLU). . . . . No. 4
Fair leads . . . . . No. 2
Extensions for slide bars 16)(Fig. 7 on page 14) (models having a long blast tube) . . . . . No. 2
Instructions . . . . . No. 1
Spare Parts List . . . . . No. 1

ATTENTION

It is recommended to tighten the screws of the gas flange with a tightening torque of **30** Nm ±10%.



S10230

Tighten the nuts gradually (first to 30%, then to 60% up to 100%) according to the cross pattern shown in the figure.

4.7 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 maximum dimensions of the open burner are indicated by the value U-U.

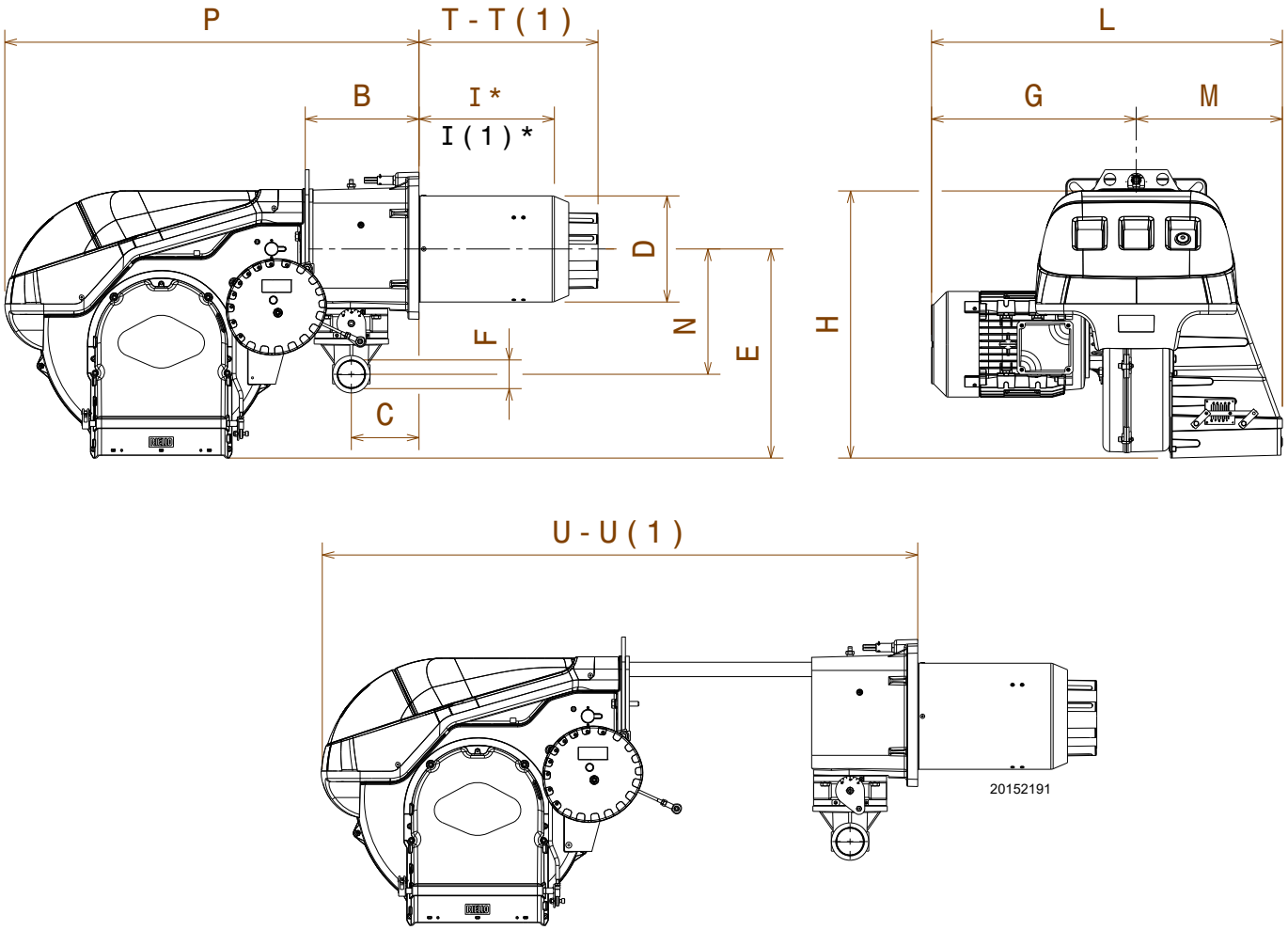


Fig. 1

mm	B	C	D	E	F	G	H	I	L	M	N	P	T-T (1)	U-U (1)
RS 160/M BLU	237	141	221	436	2”	366	555	272	671	305	261	872	373 - 503	1442 - 1587
RS 200/M BLU	237	141	221	436	2”	410	555	270	715	305	261	872	373 - 503	1442 - 1587

Tab. E

(1) Blast tube: short-long

(*) Maximum depth of the boiler door including the depth of the burner flange insulating gasket.

4.8 Firing rates

The **maximum output** is to be chosen within area A of the diagram (Fig. 2 - Fig. 3).

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

CAUTION

Model RS 200/M BLU firing rate (Fig. 3) refers to operation on G20 - G25.

If using G31, the minimum output goes from 300 to 630 kW.

ATTENTION

The firing rate value (Fig. 2 - Fig. 3) 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.

RS 160/M BLU

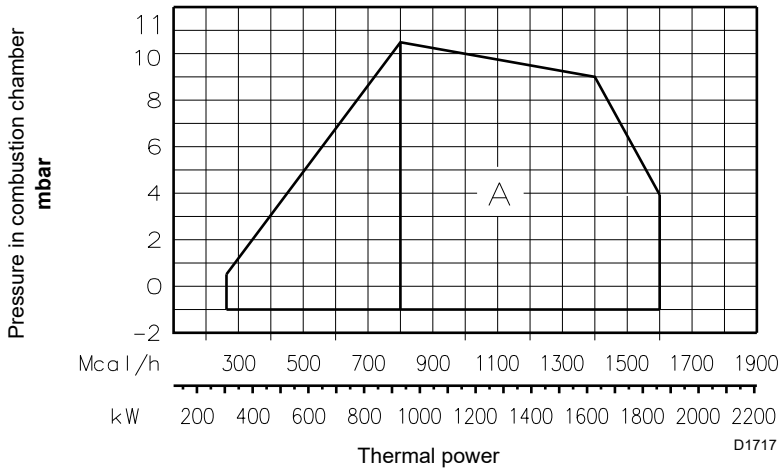


Fig. 2

RS 200/M BLU

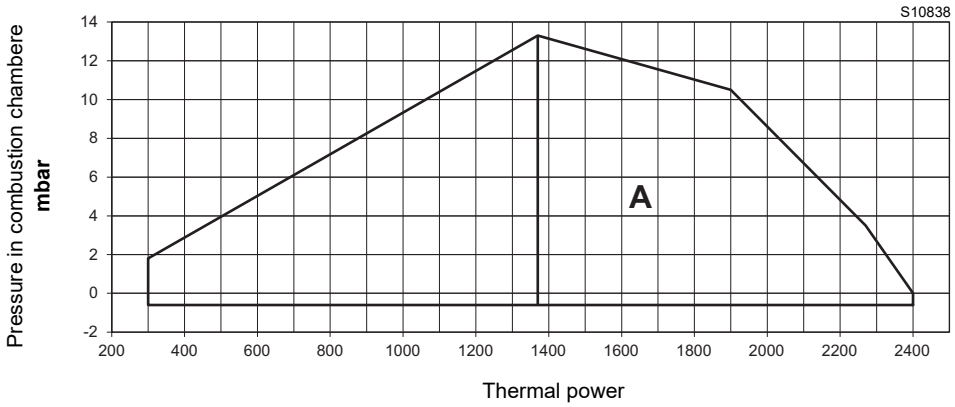


Fig. 3

4.9 Test boiler

The firing rates were obtained in special test boilers, according to standard EN 676.

In Fig. 4 you can see the diameter and length of the test combustion chamber.

Example:
Output 756 kW (650 Mcal/h) - diameter 60 cm, length 2 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. 4.

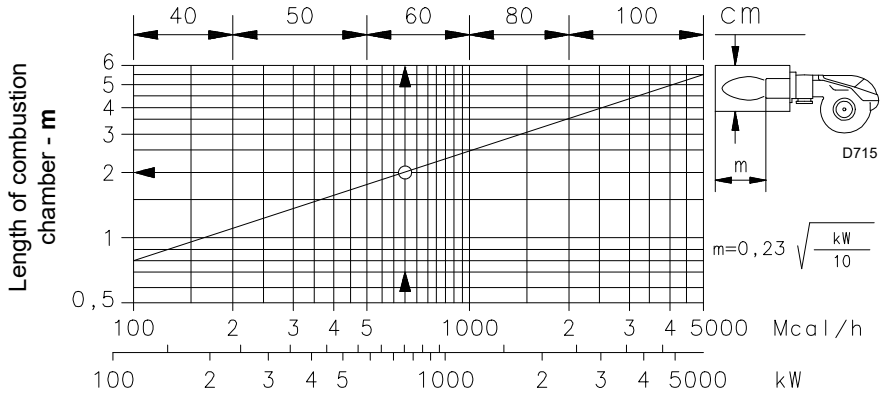


Fig. 4

4.9.1 Commercial boilers

The burners are suitable for operation on either flame-inversion boilers or boilers with combustion chambers featuring flow from the base (three flue passes) on which the best results are obtained in terms of low NOx emissions.

The burner-boiler match is assured where the boiler is EC type-approved; for boilers and furnaces with combustion chambers featuring dimensions differing considerably from those given in the diagram, it is advisable to perform preliminary tests.

* The maximum depth of the boiler door is referred to dimension “l” (Fig. 1 on page 10).

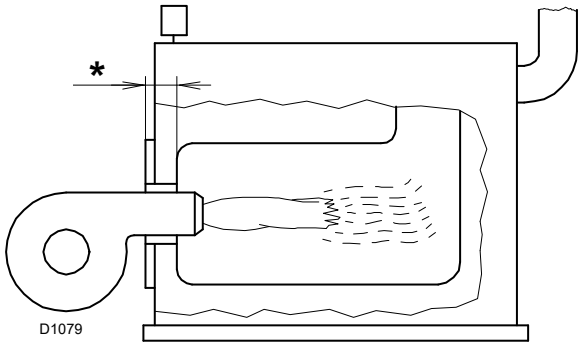


Fig. 5

4.9.2 Firing rate according to air density

The burner firing rate specified in the manual applies for an ambient temperature of 20 °C and an altitude of 0 m a.s.l. (barometric pressure of approx. 1013 mbar).

The burner may have to operate at a higher altitude and/or with combustion air at a higher temperature.

Both air heating and increased altitude cause air volume expansion, i.e. air density is reduced.

Burner fan flow rate remains basically the same but oxygen content per cu. m of air is reduced as well as the fan push (head).

Therefore, it is important to know whether burner required maximum output at a certain pressure in the combustion chamber remains within the burner firing rate also under different temperature and altitude conditions.

To check this, proceed as follows:

1 find the correction factor F concerning air temperature and altitude for the system in Tab. F.
2 Divide output Q requested from the burner by F to obtain the equivalent output Qe:

Qe = Q : F (kW)

3 Within burner firing rate, mark the point identified by:
Qe = equivalent output
H1= pressure in combustion chamber
point A that must remain within the firing rate.
4 Draw a vertical line from point A)(Fig. 6), and calculate the maximum pressure H2 of the firing rate.
5 Multiply H2 by F to obtain the reduced maximum pressure H3 of the firing rate:

H3 = H2 x F (mbar)

If H3 is higher than H1)(Fig. 6), the burner can output the requested flow rate.

If H3 is lower than H1, burner output must be reduced. Output reduction is also combined with a reduction of the pressure in the combustion chamber:
Qr = reduced output
H1r = reduced pressure

$$H1r = H1 \times \left(\frac{Qr}{Q}\right)^2$$

Example, 5% output reduction:

Qr = Q x 0.95
H1r = H1 x (0.95)2

Using the new Qr and H1r values, repeat steps 2-5.

ATTENTION

The combustion head must be adjusted according to equivalent output Qe.

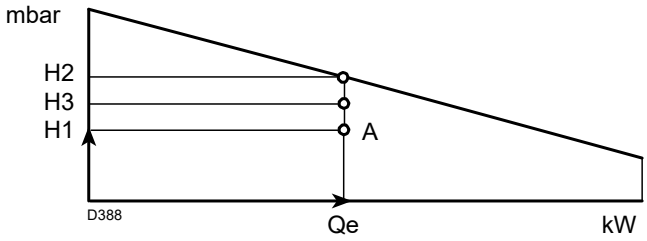


Fig. 6

Altitude	Average barometric pressure	F							
		Air temperature °C							
m a.s.l.	mbar	0	5	10	15	20	25	30	40
0	1013	1.087	1.068	1.049	1.031	1.013	0.996	0.980	0.948
100	1000	1.073	1.054	1.035	1.017	1.000	0.983	0.967	0.936
200	989	1.061	1.042	1.024	1.006	0.989	0.972	0.956	0.926
300	978	1.050	1.031	1.013	0.995	0.978	0.962	0.946	0.916
400	966	1.037	1.018	1.000	0.983	0.966	0.950	0.934	0.904
500	955	1.025	1.007	0.989	0.972	0.955	0.939	0.923	0.894
600	944	1.013	0.995	0.977	0.960	0.944	0.928	0.913	0.884
700	932	1.000	0.982	0.965	0.948	0.932	0.916	0.901	0.872
800	921	0.988	0.971	0.954	0.937	0.921	0.906	0.891	0.862
900	910	0.977	0.959	0.942	0.926	0.910	0.895	0.880	0.852
1000	898	0.964	0.946	0.930	0.914	0.898	0.883	0.868	0.841
1200	878	0.942	0.925	0.909	0.893	0.878	0.863	0.849	0.822
1400	856	0.919	0.902	0.886	0.871	0.856	0.842	0.828	0.801
1600	836	0.897	0.881	0.866	0.851	0.836	0.822	0.808	0.783
1800	815	0.875	0.859	0.844	0.829	0.815	0.801	0.788	0.763
2000	794	0.852	0.837	0.822	0.808	0.794	0.781	0.768	0.743
2400	755	0.810	0.796	0.782	0.768	0.755	0.742	0.730	0.707
2800	714	0.766	0.753	0.739	0.726	0.714	0.702	0.690	0.668
3200	675	0.724	0.711	0.699	0.687	0.675	0.664	0.653	0.632
3600	635	0.682	0.669	0.657	0.646	0.635	0.624	0.614	0.594
4000	616	0.661	0.649	0.638	0.627	0.616	0.606	0.596	0.577

Tab. F

4.10 Burner description

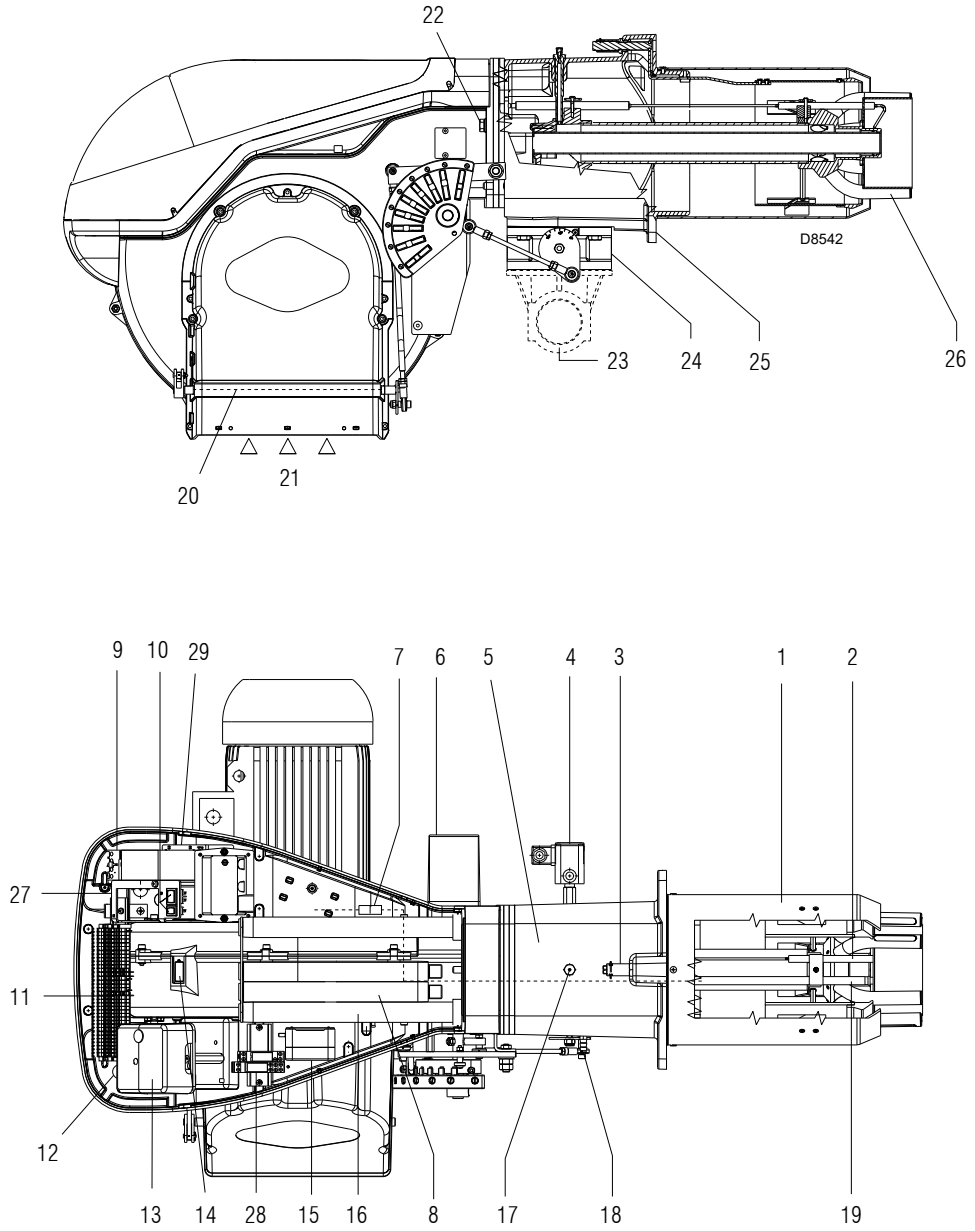


Fig. 7

1 Combustion head
2 Ignition electrode
3 Screw for combustion head adjustment
4 Maximum gas pressure switch
5 Sleeve
6 Servomotor controlling the gas butterfly valve and of air gate valve (by means of a variable profile cam mechanism).
When the burner is not operating the air gate valve 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,
7 Plug-socket on ionisation probe cable
8 Extensions for slide bars 16)
9 Motor contactor and thermal cut-out with reset button
10 Power switch for different operations:
automatic - manual - off
Button for:
Power increase - power reduction
11 Terminal strip
12 Fairleads for electrical connections by installer
13 Flame control with lock-out pilot light and lock-out reset button
14 Flame inspection window
15 Minimum air pressure switch (differential operating type)
16 Slide bars for opening the burner and inspecting the combustion head
17 Gas pressure test point and head fixing screw
18 Air pressure test point
19 Flame sensor probe
20 Air gate valve
21 Air inlet to fan
22 Screws securing fan to sleeve
23 Gas input pipework
24 Gas butterfly valve
25 Boiler mounting flange
26 Flame stability disk
27 Bracket for mounting the modulating operation kit
28 Clean contact relay
29 Plug for connection of modulating operation kit

Two types of burner failure may occur:

Flame control Lock-out: if the flame control 13)(Fig. 7) push-button lights up. it indicates that the burner is in lock-out. To reset, press the push-button.

Motor trip: release by pressing the push-button on thermal relay 9)(Fig. 7).

4.11 Electrical panel description

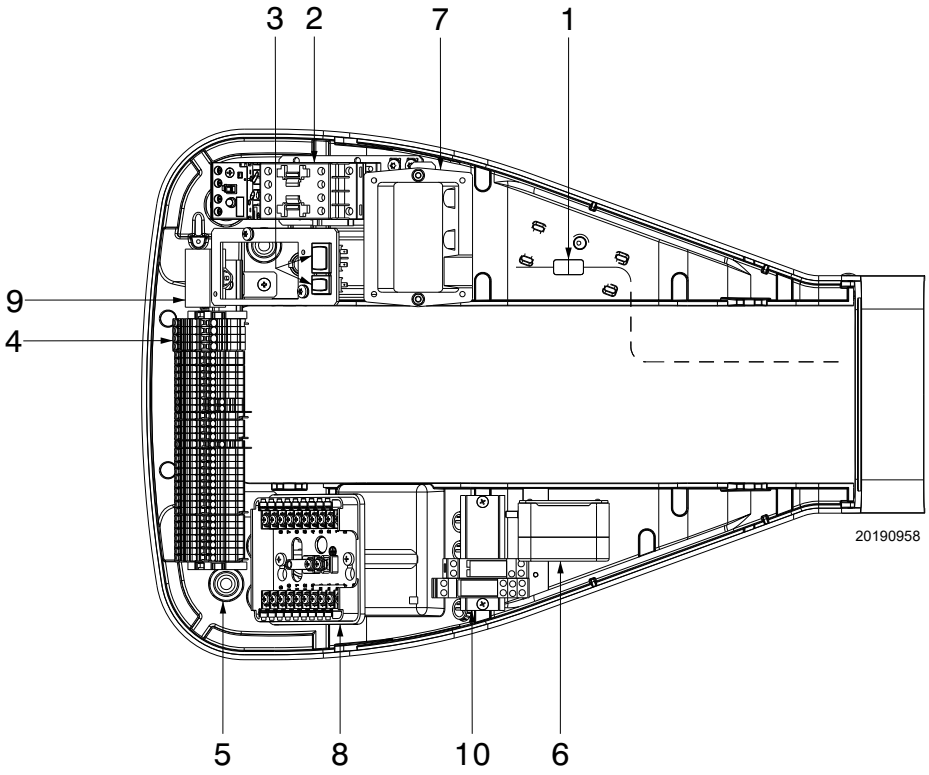


Fig. 8

1 Plug-socket on ionisation probe cable
2 Motor contactor and thermal relay with reset button
3 Switch for different operations:
automatic - manual - off
Button for:
output increase - decrease
4 Terminal board for electric connection
5 Cable grommets for electrical wiring (to be carried out by the installer)
6 Air pressure switch (differential type)
7 Ignition transformer
8 Flame control base
9 Filter to protect against radio disturbance
10 Relay

4.12 Servomotor (SQN31...)

Important notes

ATTENTION

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

Avoid opening, modifying or forcing the actuators.

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ Before modifying the wiring in the connection area of the servomotor, fully disconnect the burner control device from the power supply (omnipolar separation).
- ➤ To avoid the risk of electrocution, protect the connection terminals in a suitable manner and correctly fix the cover.
- ➤ Check the wiring is in order.
- ➤ 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.

The servomotor contains electric and electronic components that must not be disposed of with normal domestic waste.

Respect all current local legislation.

Assembly notes

- Check the relevant national safety standards are respected.
- When assembling the servomotor and connecting the damper, the gears can be disengaged by means of a lever, allowing the drive shaft to be easily adjusted in both directions of rotation.

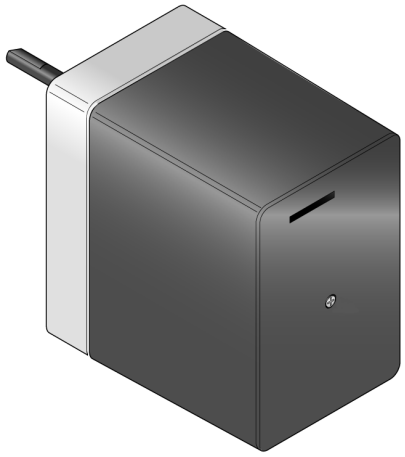


Fig. 9

Technical data

Operating voltage	AC 220 V -15 %...AC 240 V +10 % AC 100 V -15 %...AC 110 V +10 %
Mains frequency	50/60 Hz ±6%
Energy consumption	6.5 VA
Angular positioning	up to 160° (base scale)
Assembly position	optional
Protection level	IP 40, in accordance with DIN 40050
Switching voltage	24...250V AC
Type of motor	synchronous
Environmental conditions:	
Operation	DIN EN 60 721-3-3
Climatic conditions	Class 3K3
Mechanical conditions	Class 3M3
Temperature range	-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.

DANGER

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

ATTENTION

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.

DANGER

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 packaging includes a wooden platform, it is therefore possible to handle the burner (still packaged) with a pallet truck or fork lift truck.

ATTENTION

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.

CAUTION

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

CAUTION

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.

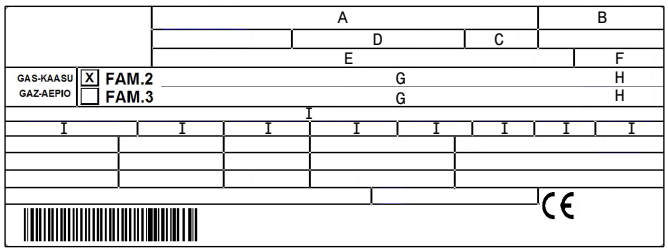


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Fig. 10

Checking the characteristics of the burner

Check the identification label of the burner (Fig. 10), 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.

ATTENTION

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. 11).
- 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** permit operation but make maintenance and inspection of the combustion head more difficult.

DANGER

- Any other position could compromise the correct operation of the appliance.
- Installation **5** are forbidden for safety reasons.

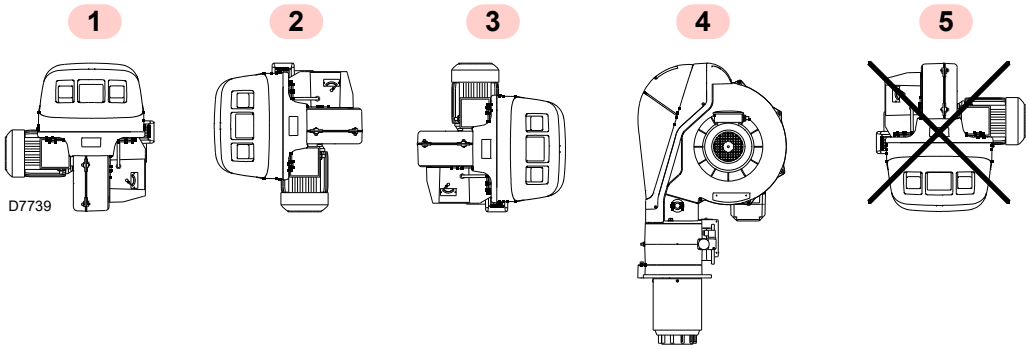


Fig. 11

5.5 Preparing the boiler

5.5.1 Boring the boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 12.

The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

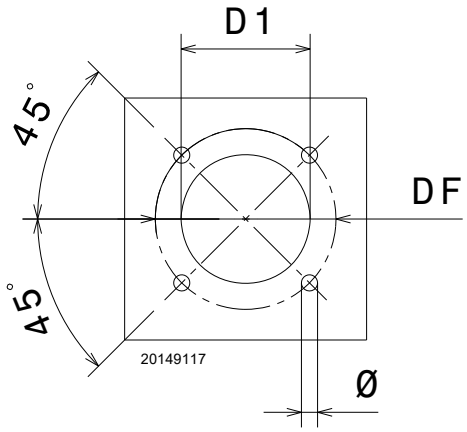


Fig. 12

mm	D1	DF	∅
RS 160-200/M BLU	230	325-368	M 16

Tab. H

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 160-200/M BLU	373	503

Tab. I

For boilers with front flue passes 13)(Fig. 15) or flame inversion chambers, a protection in heat-resistant 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.

5.6 Positioning the probe - electrode

ATTENTION

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. 14.

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

- ➤ remove the screw 1)(Fig. 13)
- ➤ take out the inner part 2)(Fig. 13) of the head and then calibrate them.

ATTENTION

Do not rotate the probe but leave it as in Fig. 14; if it is too close to the ignition electrode, it could damage the flame control amplifier.

ATTENTION

Respect the dimensions shown in Fig. 14.

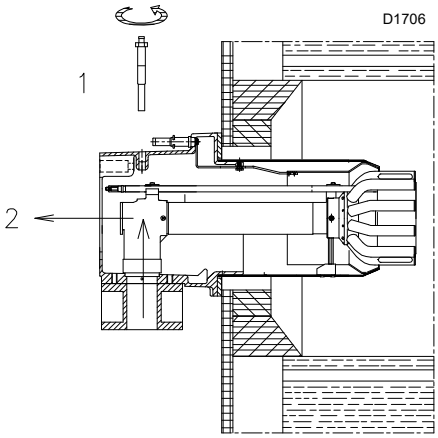


Fig. 13

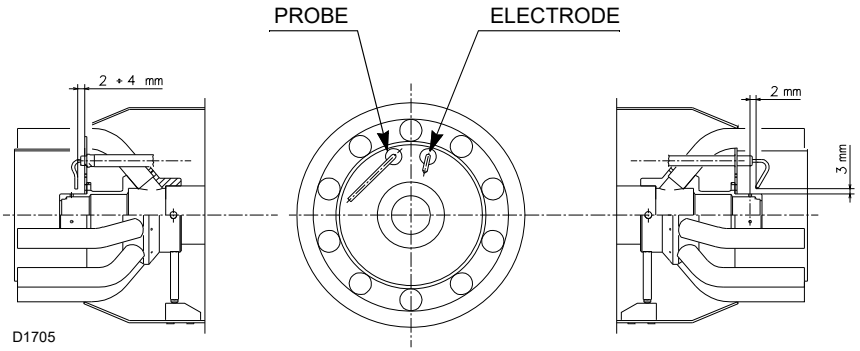


Fig. 14

5.7 Securing the burner to the boiler

Provide an adequate lifting system of the burner.

Divide the combustion head from the rest of the burner, as shown in Fig. 15; you have to:
- ➤ loosen the 4 screws 3) and remove the cover 1);
- ➤ disengage the articulated coupling 7) from the graduated sector 8);
- ➤ remove screws 2) from the two slide bars 5);
- ➤ remove the 2 screws 4);
- ➤ draw the burner back on the slide bars 5) by about 100 mm;
- ➤ disconnect the probe and electrode cables, then completely unthread the burner from the slide bars.

ATTENTION

Before fastening the burner to the boiler, check whether the maximum output for the model concerned is included in area A of the firing rate (Fig. 2 - Fig. 3).

As soon as this operation is completed (if necessary):
- ➤ fix the flange 9) to the plate of the boiler interposing the insulating flange gasket 8) supplied with the unit.
- ➤ Use the 4 screws supplied, with a tightening torque of 35-40 Nm, after protecting their thread with anti-seizing products.

ATTENTION

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

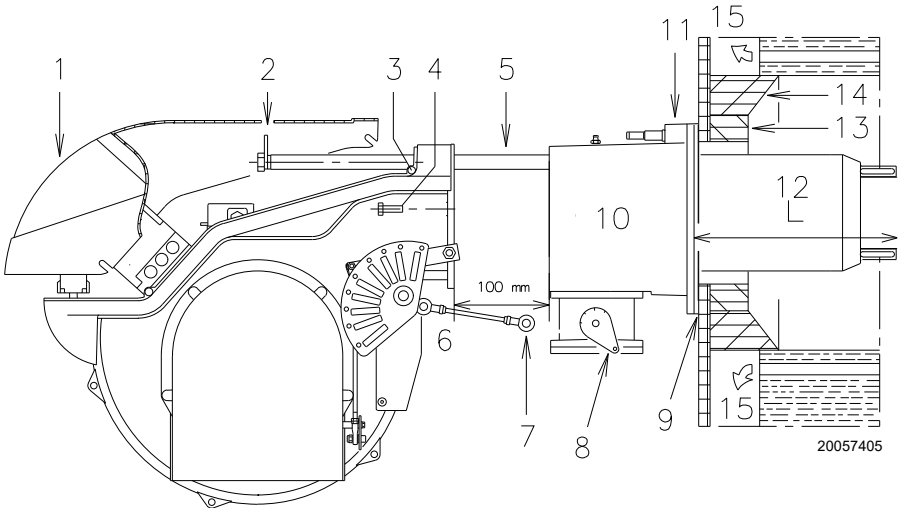


Fig. 15

5.8 Combustion head adjustment

At this point of the installation, the combustion head is fixed to the boiler as shown in Fig. 15.
It is therefore especially easy to adjust, and this adjustment depends only on the maximum output of the burner.

Two combustion head adjustments are available:
- – external air R1
- – central gas/air R2 (for RS 160/M BLU)
- – central air R3 (for RS 200/M BLU)

In the diagram of Fig. 16, find the notch at which both air and central gas/air should be adjusted.

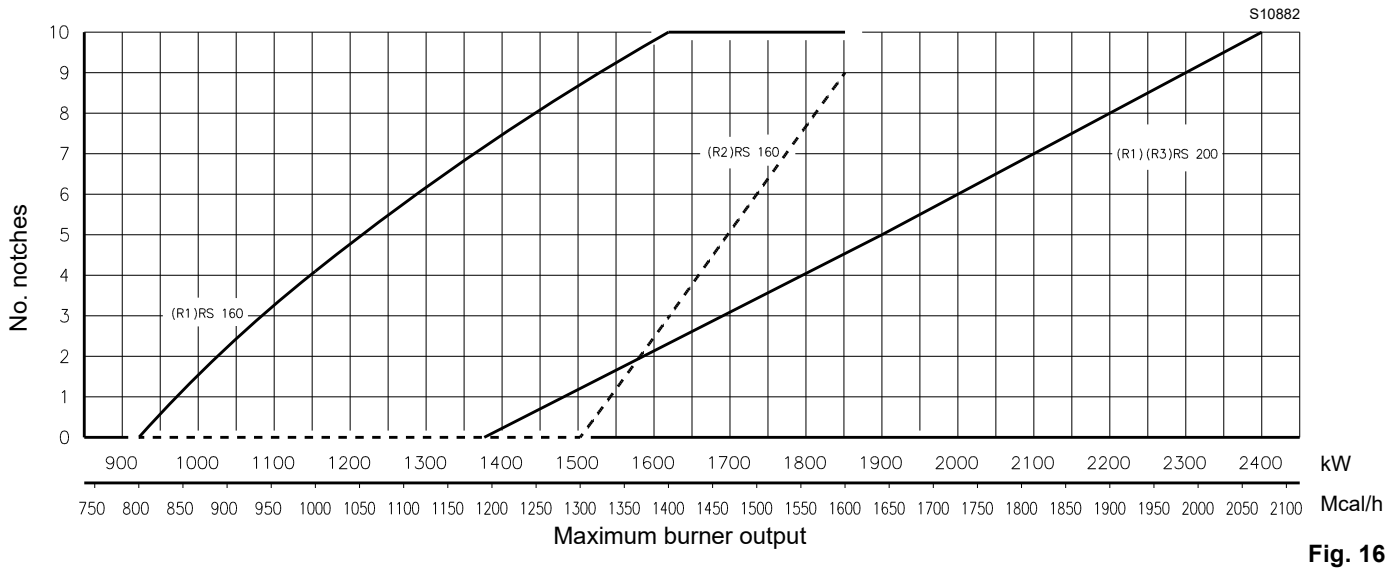


Fig. 16

External air R1 adjustment

➤ Turn the screw 4)(Fig. 17) until the notch found lines up with the front surface 5) of the flange.

ATTENTION

To facilitate the adjustment, loosen the screw 6), adjust, then block.

Central gas/air R2 adjustment (for RS 160/M BLU)

➤ Loosen the 3 screws 1)(Fig. 16) and rotate the ring nut 2) until the notch you have found corresponds with the indicator 3).

➤ Block the 3 screws 1).

Example:

RS 160/M BLU, burner output = 1700 kW.

The diagram (Fig. 16) shows that for this output the settings are:

– air R1 = notch 10

– central gas/air R2 = notch 5

Central air R3 adjustment (for RS 200/M BLU)

➤ Loosen the 2 screws 1)(Fig. 16) and rotate the ring nut 2) until the notch you have found corresponds with the screw 1).

➤ Block the 2 screws 1).

ATTENTION

The burner RS 200/M BLU leaves the factory with the ring nut 3) set to notch 0.

Do not change this value.

NOTE:

the diagram (Fig. 16 on page 20) indicates the optimum adjustment for a type of boiler according to Fig. 4 on page 12.

ATTENTION

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

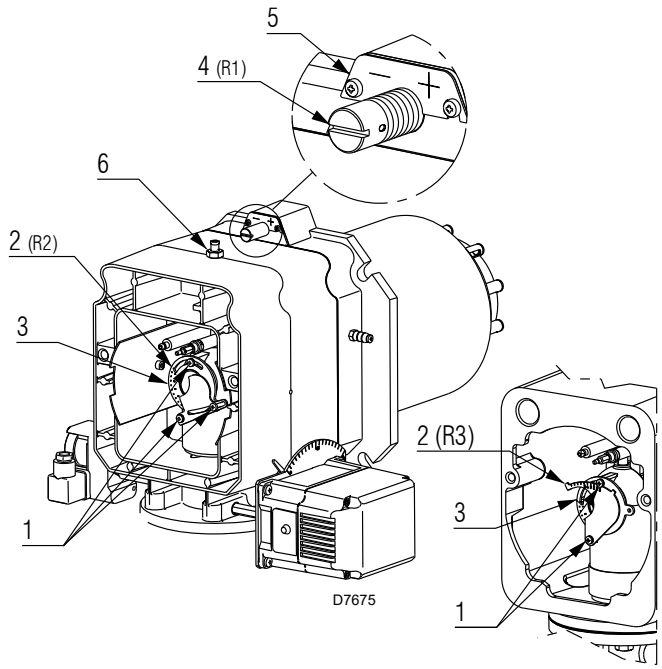


Fig. 17

5.9 Closing the burner

Once the combustion head adjustment is completed:

➤ reassemble the burner on the slide bars 3)(Fig. 18) at about 100 mm from the pipe coupling 4);

➤ insert the cables of the probe and electrode, then slide the burner as far as the pipe coupling, the burner in the position indicated in Fig. 18;

➤ for burners featuring a long blast tube, remove slide bar extensions;

➤ refit the screws 2) on the slide bars 3);

➤ fix the burner to the pipe coupling with the screw 1);

➤ reconnect the articulated coupling 7) to the graduated sector 6).

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.

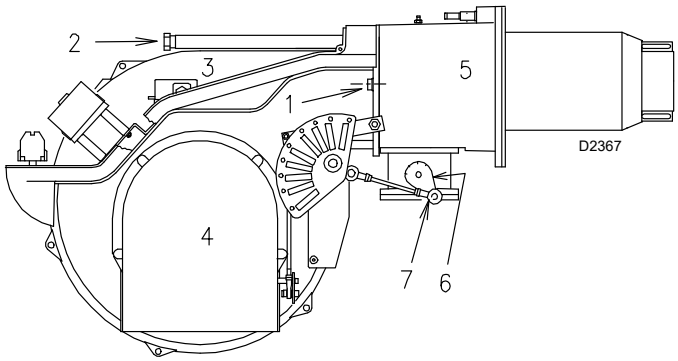


Fig. 18

5.10 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.

5.10.1 Gas feeding line (Example) - Please refer to the gas train documentation for more information

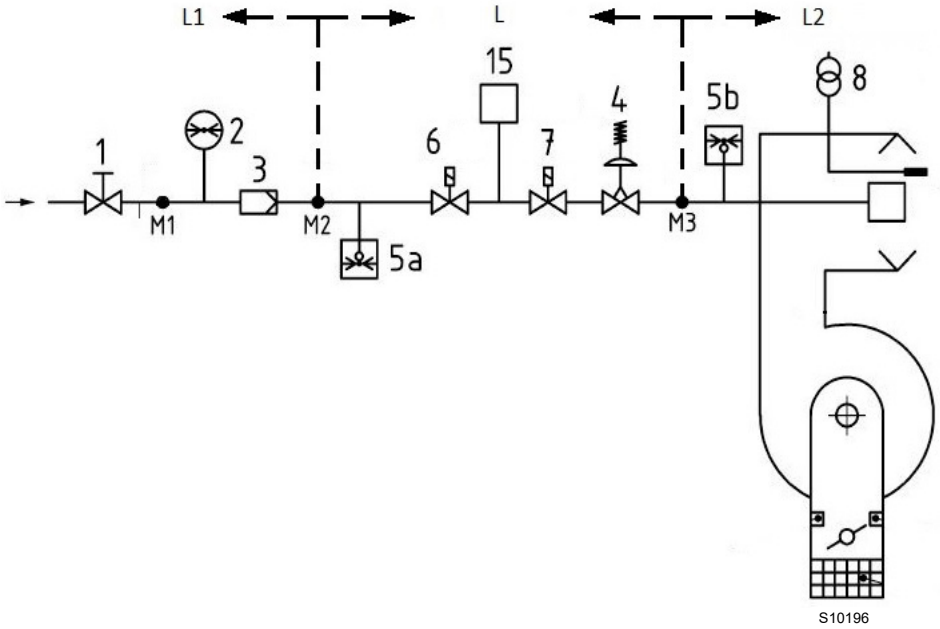


Fig. 19

Key (Fig. 19)

1	Manually operated shut-off valve
2	Pressure gauge
3	Filter
4	Governor
5a	Low pressure protection device
5b	Maximum gas pressure switch
6	1st safety shut-off device
7	2nd safety shut-off device
8	Ignition device
15	Valve leak detection control system
L	Gas train (supplied separately)
L1	Responsibility of the installer
L2	Burner
M1	Pressure test point
M2	Pressure test point
M3	Pressure test point

5.10.2 Gas train

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

5.10.3 Gas train installation


DANGER

Disconnect the electrical 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. 20.

The gas train must be connected to the gas connection 1)(Fig. 20), using the flange 2), seal 3) and screws 4) supplied with the burner.


ATTENTION

The gas solenoid valves 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 the maximum pressure necessary for the burner is included in the calibration range of the pressure regulator.

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

5.10.4 Gas pressure

Tab. J indicates the pressure drops of the combustion head and gas butterfly valve, on the basis of the burner operating output.

	kW	1 Δp (mbar)		2 Δp (mbar)	
		G 20	G 25	G 20	G 25
RS 160/M BLU	930	5.6	8.4	0.0	0.0
	1100	7.5	11.2	0.0	0.0
	1300	9.7	14.5	0.8	1.2
	1600	13.0	19.4	3.0	4.5
	1860	17.7	26.4	3.8	5.7
RS 200/M BLU	1383	9.0	13.4	3.1	4.7
	1500	10.7	16.0	3.7	5.5
	1800	14.7	21.9	5.3	7.9
	2100	20.3	30.3	7.2	10.7
	2400	28.0	41.8	9.4	14.0

Tab. J


ATTENTION

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

The values shown in Tab. J refer to:
– Natural gas G 20 NCV 9.45 kWh/Sm^3 (8.2 Mcal/Sm^3)
– Natural gas G 25 NCV 8.13 kWh/Sm^3 (7.0 Mcal/Sm^3)
– LPG G31 NCV 26.3 kWh/Sm^3 (22.6 Mcal/Nm^3)

Column 1

Combustion head pressure drop.
Gas pressure measured at test point 1)(Fig. 21 on page 24), with:
- combustion chamber at 0 mbar
- burner working at maximum output

Column 2

Pressure loss at gas butterfly valve 2)(Fig. 21 on page 24) with maximum opening: 90°.

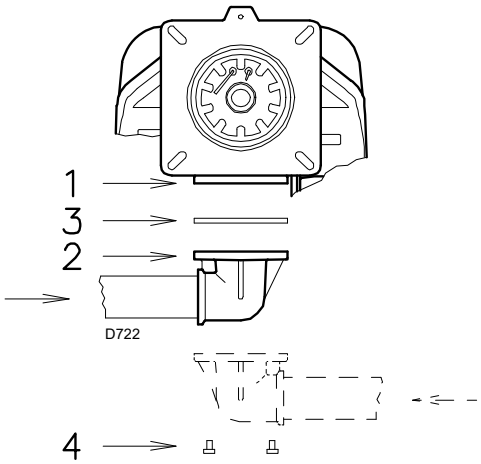


Fig. 20

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. 21).
– Find in Tab. J on page 23 related to the burner concerned, the pressure value closest to the result of the subtraction.
– Read the corresponding output on the left.

Example RS 200/M BLU with natural gas G 20 for:
Maximum output operation

Gas pressure at test point 1)(Fig. 21)	=	17.7 mbar
Pressure in combustion chamber	=	3.0 mbar
17,7 - 3,0	=	14.7 mbar

A pressure of 14.7 mbar, column 1, corresponds in Tab. J to an output of 1800 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. 21), set the maximum modulating output required from the burner operation:
– find the nearest output value in Tab. J on page 23 for the burner in question.
– Read, on the right (column 1), the pressure at the test point 1)(Fig. 21).
– Add this value to the estimated pressure in combustion chamber.

Example RS 200/M BLU with natural gas G 20 for:
Operating at the desired maximum output: 1800 kW

Gas pressure at an output of 1800 kW	=	14.7 mbar
Pressure in combustion chamber	=	3.0 mbar
14.7 + 3.0	=	17.7 mbar

pressure required at test point 1)(Fig. 21).

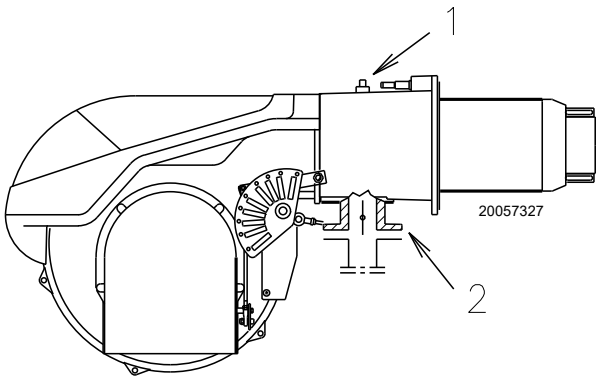


Fig. 21

5.11 Electrical connections

Notes on safety for the electrical wiring

- ➤ The electrical wiring must be carried out with the electrical supply disconnected.
- ➤ Electrical wiring must be made in accordance with the regulations currently in force in the country of destination and by qualified personnel. Refer to the wiring diagrams.
- ➤ The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- ➤ Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- ➤ The burners have been set for intermittent operation. This means it should compulsorily be stopped at least once every 24 hours to enable the flame control to check its own efficiency at start-up. Normally the boiler's thermostat/pressure switch ensures that the burner stops. If this is not the case, a time switch (IN) should be fitted in series to provide for burner shut-down at least once every 24 hours. Refer to the wiring diagrams.
- ➤ The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel. Do not use the gas tubes as an earthing system for electrical devices.
- ➤ The electrical system must be suitable for the maximum power absorption of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for that level of power absorption.
- ➤ For the main power supply of the device from the electricity mains:
  - do not use adapters, multiple sockets or extensions;
  - use a multiple pole switch with at least a 3 mm gap between the contacts (overvoltage category III), as envisaged by the present safety standards.
- ➤ Do not touch the device with wet or damp body parts and/or in bare feet.
- ➤ Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:

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

Close the fuel shut-off valve.

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 standard EN 60 335-1.

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

5.11.1 Supply cables and external connections passage

All the cables to be connected to the burner should be passed through cable grommets, as shown in Fig. 22.

The use of the cable grommets and the pre-blanked holes can be done in different manners; for example:

Key (Fig. 22)

1 Servomotor
2 Motor
3 Maximum gas pressure switch
4 Three-phase power supply 400V
5 One-phase power supply 230V
6 Ø 19 plug
7 Ø 21 plug
8 M20, adjusting and safety valves
9 M20, thermostats e consents
10 M20, leak detection control and minimum gas pressure switch
11 M20
12 Ø16 plug

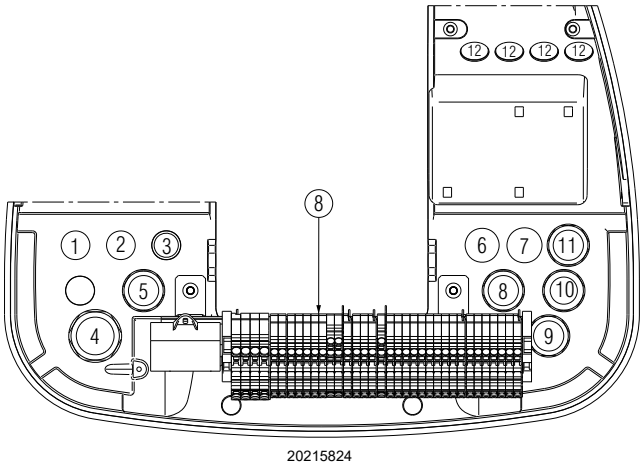


Fig. 22

5.12 Calibration of the thermal relay

The thermal relay (Fig. 23) serves to avoid damage to the motor due to an excessive absorption increase or if a phase is missing.

For calibration 2), refer to the table indicated in the electrical layout (electrical wiring by the installer).

To reset, in case of thermal relay activation, press the "RESET" button 1).

The button “STOP” 3) opens the NC contact (95-96) and stops the motor.

Insert a screwdriver in the window “TEST/TRIP” 4) and move it in the arrow direction (to the right) to carry out the thermal relay test.

ATTENTION

The automatic reset can be dangerous.

This operation is not foreseen in the burner operation.

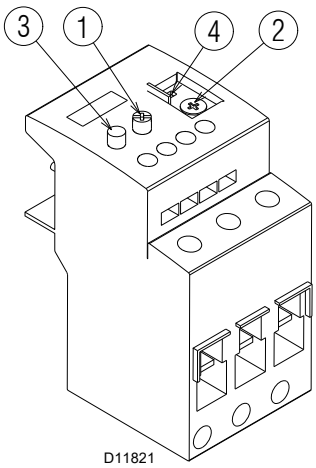


Fig. 23

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 33.

6.2 Adjustments prior to ignition

The following adjustments must be carried out:

- ensure that the gas supply company has carried out the supply line vent operations, eliminating air or inert gases from the piping.
- Slowly open the manual valves situated upstream from the gas train.
- Adjust the minimum gas pressure switch (Fig. 33 on page 32) to the start of the scale.
- Adjust the maximum gas pressure switch (Fig. 32 on page 31) to the end of the scale.
- Adjust the air pressure switch (Fig. 30 on page 31) to the start of the scale.
- Bleed the air from the piping of the gas train, connecting a plastic tube to the pressure test point of the minimum gas pressure switch. Take the vent tube outside the building so you can notice the smell of gas.
- Fit a U-type pressure gauge (Fig. 24) to the gas pressure test point on the pipe coupling. It is used to calculate approximate MAX burner output using the Tab. J on page 23.
- Connect two lamps or testers to the two gas line solenoid valves to check the exact moment in 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.

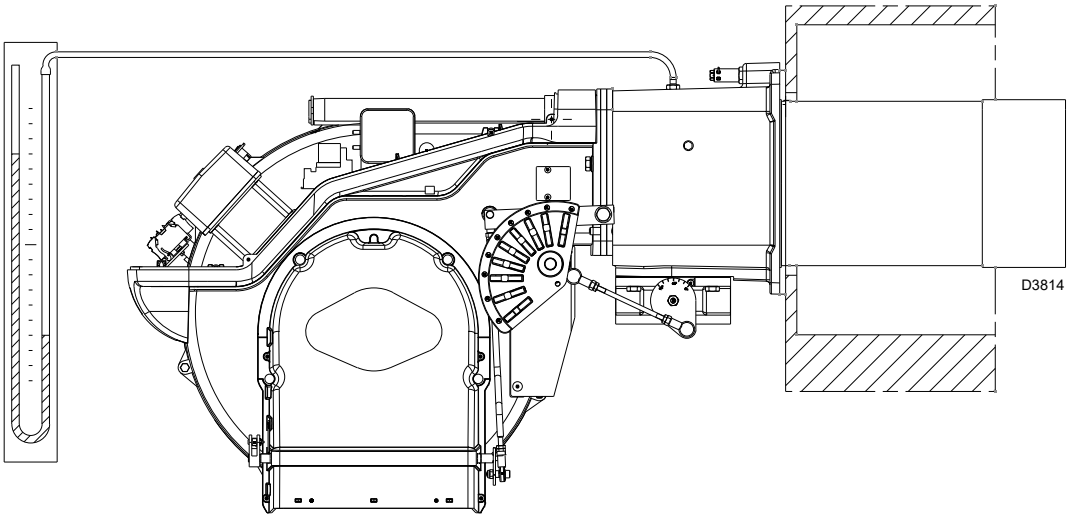


Fig. 24

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 servomotor rotates by 130° in 42 s.

ATTENTION

Do not alter the factory setting for the 5 cams; just check that they are as specified below:

Cam I: **130°**. Limits rotation toward maximum position. When the burner is operating at MAX output, the gas butterfly valve must be fully open: 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: **30°**. Adjusts the ignition position and the MIN output.

Cams IV *(if present)* **and V:** these are auxiliary cams, for their functionality, refer to the wiring diagram of this manual.

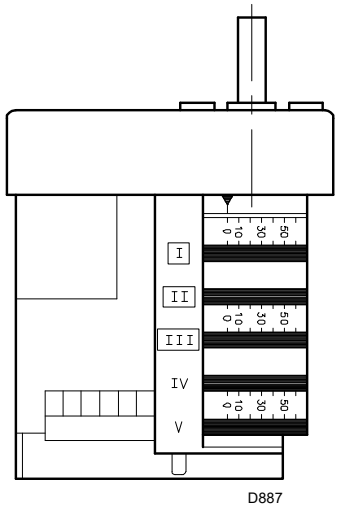


Fig. 25

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 in Fig. 26 to position "**MAN**".

DANGER

Check that the lamps or the 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.

As soon as burner starts, check the fan rotation direction through the flame inspection window.

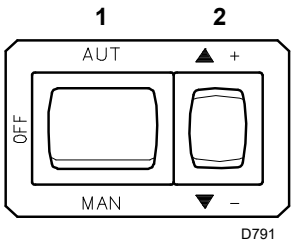


Fig. 26

6.5 Burner ignition

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

If ignition is still not achieved, it may be that gas is not reaching the combustion head within the safety time period of 3 seconds. In this case, increase gas ignition delivery.

The arrival of gas to the sleeve is indicated by the U-type pressure gauge (Fig. 24 on page 27).

Once ignition has taken place, proceed with burner global calibration operations.

6.6 Adjusting the burner

The optimum adjustment of the burner requires an analysis of flue gases at the boiler outlet.
Adjust in sequence:
- ➤ Ignition output
- ➤ Maximum output
- ➤ Minimum output
- ➤ Intermediate outputs between the two
- ➤ Air pressure switch
- ➤ Maximum gas pressure switch
- ➤ Minimum gas pressure switch

6.6.1 Ignition output

ATTENTION

For safety purposes and correct product operation, the ignition output, if it is adjustable, must be carried out by authorized personnel and in compliance with the standards and regulations of the laws in force.

6.6.2 Maximum output

Maximum output must be selected within the firing rate range shown on page 11.
In the above instructions we left the burner running at the MIN output.

Now press the “increase output” button 2)(Fig. 27), and keep it pressed until the servomotor has opened the air damper and the gas butterfly valve.

Adjustment of gas delivery

Measure the gas delivery on the meter.

A rough indication can be obtained from table Tab. F on page 13; just read the gas pressure on the pressure gauge (see Fig. 31 on page 31) and follow the indications given on page 13.
- – If it needs to be reduced, decrease outlet gas pressure; if it is already very low, slightly close the VR adjustment valve.
- – If it needs to be increased, increase the regulator outlet gas pressure.

Adjustment of air delivery

Progressively adjust the end profile of cam 4)(Fig. 28 on page 30) by turning the screws 7).

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

6.6.3 Minimum output

MIN output must be selected within the firing rate range shown on page 11. Press and hold the “output reduction” button 2)(Fig. 27) until the servomotor closes the air damper and the gas butterfly valve are at:
30° for burners RS 160/M BLU (factory setting);
65° for burners RS 200/M BLU (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. 25 on page 28) with small, regular movements, i.e. bring it from an angle of:
  RS 160/M BLU 30° to 28° - 26°...
  RS 200/M BLU 65° to 63° - 61°...
- – If it is necessary to increase it, lightly press the “output increase” button 2)(Fig. 27) (open the gas butterfly valve by 10-15°), and increase cam III angle (Fig. 25 on page 28) with a series of small movements, i.e. move from angle:
  RS 160/M BLU 30° to 32° - 34°...
  RS 200/M BLU 65° to 67° - 69°....
  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.
For any necessary adjustment of cam III, especially for small movements, use the specific key 10).

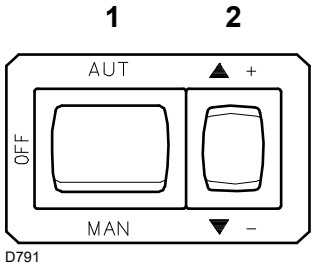


Fig. 27

Adjustment of air delivery

Progressively adjust the initial profile of cam 4) by turning the screws 5)(Fig. 28). If possible, do not turn the first screw, since this is used to set the air damper to its fully closed position.

Key (Fig. 28 - Fig. 29)
1 Servomotor
2 Servomotor 1) - cam 4): fastened
3 Servomotor 1) - cam 4): unfastened
4 Variable profile cam
5 Screws for adjusting the adjustable profile
6 Screws for fixing adjustment
7 Screws for adjusting the end profile
8 Gas butterfly valve graduated sector
9 Index of graduated sector 8
10 Spanner to adjust cam III

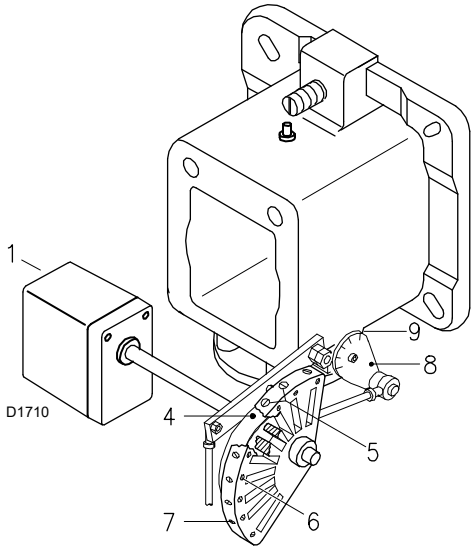


Fig. 28

6.6.4 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. 29) so the servomotor rotates by about 15°. Adjust the screws 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. 27), OFF position. Release cam 4)(Fig. 28) from the servomotor by pressing and shifting button 3)(Fig. 29) to the right, and check several times that by rotating cam 4)(Fig. 28) forwards and backwards by hand, the movement is soft and smooth, without jamming.

Engage cam 4)(Fig. 28) to the servomotor again by shifting button 2)(Fig. 29) to the left.

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.

Once optimum adjustment has been reached, fix it with the screws 6)(Fig. 28).

NOTE:
Once adjustment of “MAX - MIN - INTERMEDIATE” outputs has been completed, 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.

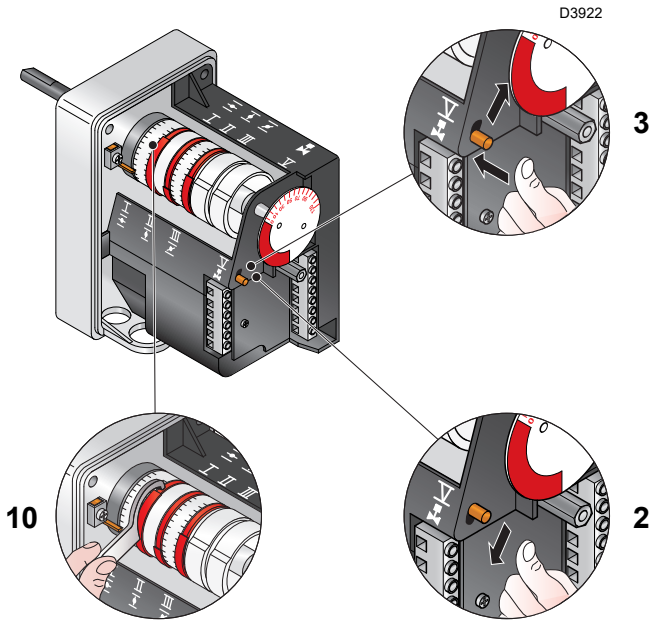


Fig. 29

6.7 Final adjustment of the pressure switches

6.7.1 Air pressure switch

Adjust the air pressure switch (Fig. 30) 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. 30. 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. 30.

Fig. 30

ATTENTION

Connecting the air pressure switch in differential mode, the burner will no longer be certified according to the EN 676 standard.

6.7.2 Maximum gas pressure switch

Adjust the maximum gas pressure switch (Fig. 31) after making all other burner adjustments with the maximum gas pressure switch set to the end of the scale.

To calibrate the maximum gas pressure switch, open the tap and then connect a pressure gauge to its pressure test point.

The maximum gas pressure switch must be regulated to a value no higher than 30% of the measurement read on the gauge when the burner is working at maximum output.

After making the adjustment, remove the pressure gauge and close the tap.

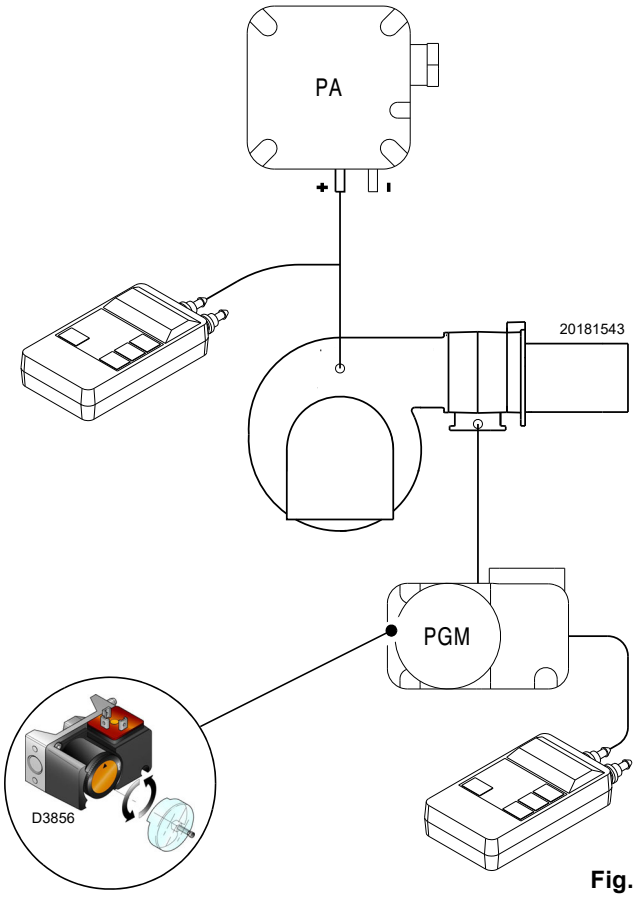


Fig. 31

6.7.3 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. 32) 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.

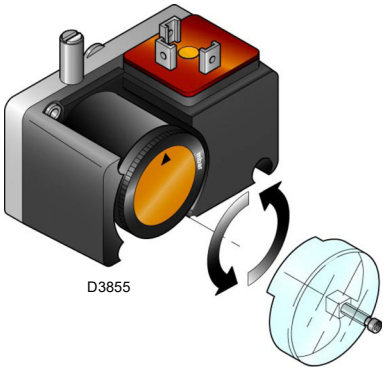


Fig. 32

ATTENTION

1 kPa = 10 mbar

6.8 Burner operation

6.8.1 Burner start-up

0 s. TL closes.

5 s. The flame control starting cycle starts. Servomotor starts: 130° rotation to right, until contact is made on cam I (Fig. 25 on page 28)

35 s. The air gate valve is positioned to maximum output. Fan motor starts. Start of the pre-purging phase.

75 s. Servomotor rotates to left up to the angle set on cam III (Fig. 25 on page 28) p.20 for MIN, output.

95 s. The air gate valve and the gas butterfly are positioned to MIN, output (with cam III)((Fig. 25 on page 28) at 65°.

105 s. Ignition electrode strikes a spark. Safety valve VS and adjustment valve VR (rapid opening) open. The flame is ignited at a low output level, point A. Output is then progressively increased, with the valve VR opening slowly up to MIN, output, point B.

108 s. The spark goes out.

115 s. The flame control starting cycle ends.

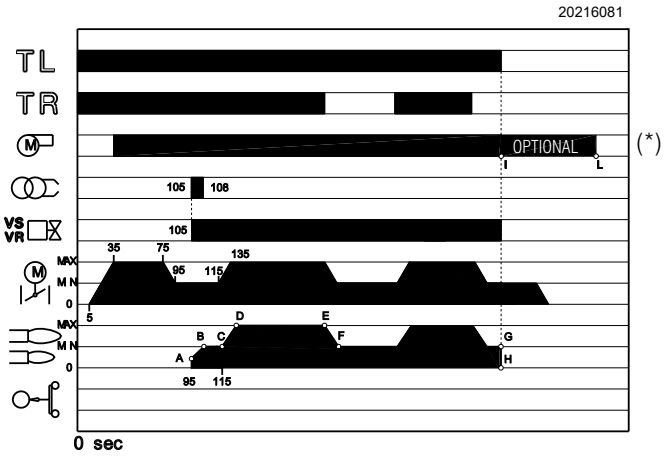


Fig. 33

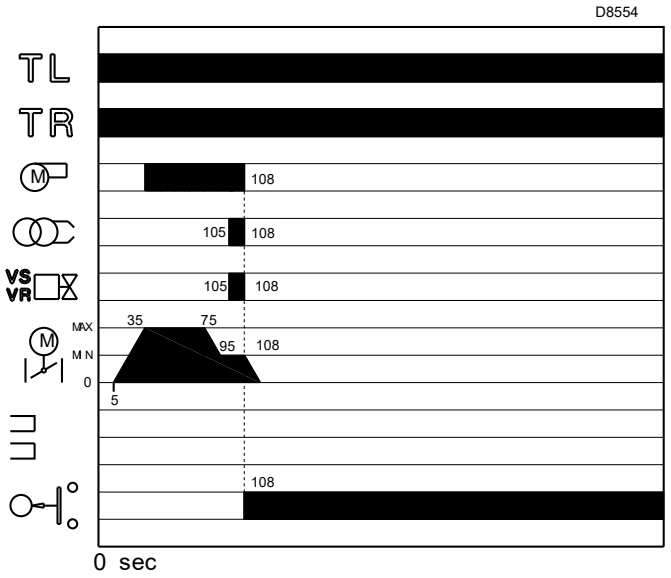


Fig. 34

6.8.2 Steady state operation

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 flame control 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 (section 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, and the servomotor returns to angle 0° limited by the contact of cam II (Fig. 25 on page 28). 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).

6.8.3 Ignition failure

If the burner does not fire, it goes into lock-out within 3 s of the opening of the gas solenoid valve and 108 s after the closing of control device TL.

Burner flame goes out during operation

If the flame goes out during operation, the burner will lock out within 1s.

ATTENTION

(*) The burner leaves the factory without the post-purging function. If necessary, the function must be activated by the installer at the first burner start-up.

6.8.4 Final checks (with burner operating)

- Disconnect a wire of the minimum gas pressure switch:
- Open TL remote control:
- Open TS remote control:

the burner must stop

- Disconnect the P shared wire of the maximum gas pressure switch:
- Disconnect the P shared wire of the air pressure switch:
- Disconnect the electrical connections of the ionisation probe:

the burner must stop in lockout

ATTENTION

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

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.


DANGER

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:


DANGER

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


DANGER

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 flame control 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.


ATTENTION

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 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.

Make sure the gas outlet holes for the ignition phase (in the distributor of the combustion head) are free of impurities or rust. If in doubt, remove 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.

Burner
Clean the outside of the burner.

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

Gas filter
Change the gas filter when it is dirty.

Flame inspection window
Clean the glass of the flame inspection window (Fig. 35).

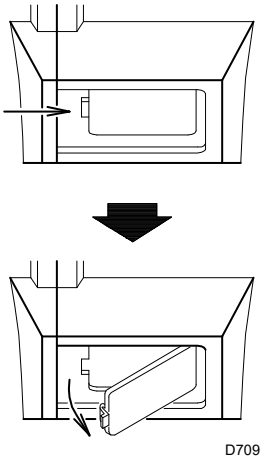


Fig. 35

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

The burner is fitted with an ionisation system to check that a flame is present (Fig. 36). The minimum current for flame control operation is 6 µA.
The burner provides a much higher current, so controls are not normally required. However, if it is necessary to measure the ionisation current, disconnect the plug-socket on the ionisation probe cable and insert a direct current microammeter with a base scale of 100 µA.

ATTENTION Carefully check polarities!

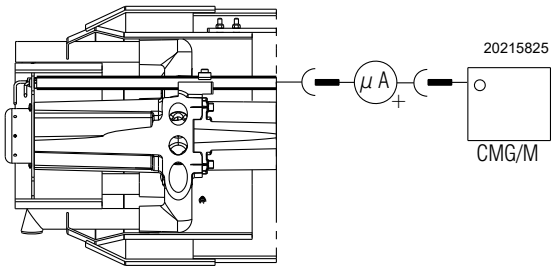


Fig. 36

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

EN 676		Air excess		CO
		Max. output $\lambda \leq 1.2$	Max. output $\lambda \leq 1.3$	
GAS	Theoretical max CO_2 0 % O_2	CO_2 % Calibration		mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$	
G 20	11.7	9.7	9	≤ 100
G 25	11.5	9.5	8.8	≤ 100
G 30	14.0	11.6	10.7	≤ 100
G 31	13.7	11.4	10.5	≤ 100

Tab. K

7.2.4 Safety components

The safety components must be replaced at the end of their life cycle indicated in Tab. L. 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
Fan impeller	10 years or 500,000 start-ups

Tab. L

7.3 Opening the burner

DANGER

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

DANGER

Close the fuel shut-off valve.

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

- ➤ Loosen the 4 screws 1)(Fig. 37) and remove the cover 2).
- ➤ Disengage the articulated coupling 7) from the graduated sector 8).
- ➤ Install the two supplied extensions to the slide bars 4) (models with 390 mm blast tube).
- ➤ Turn upwards the lifting rings fastened to the end of slide bars 4).
- ➤ Remove the screws 3) and move the burner backwards by about 100 mm on the slide bars 4). Disconnect the probe and electrode leads and then pull the burner fully back.

Now extract the gas distributor 5) after having removed the screw 6).

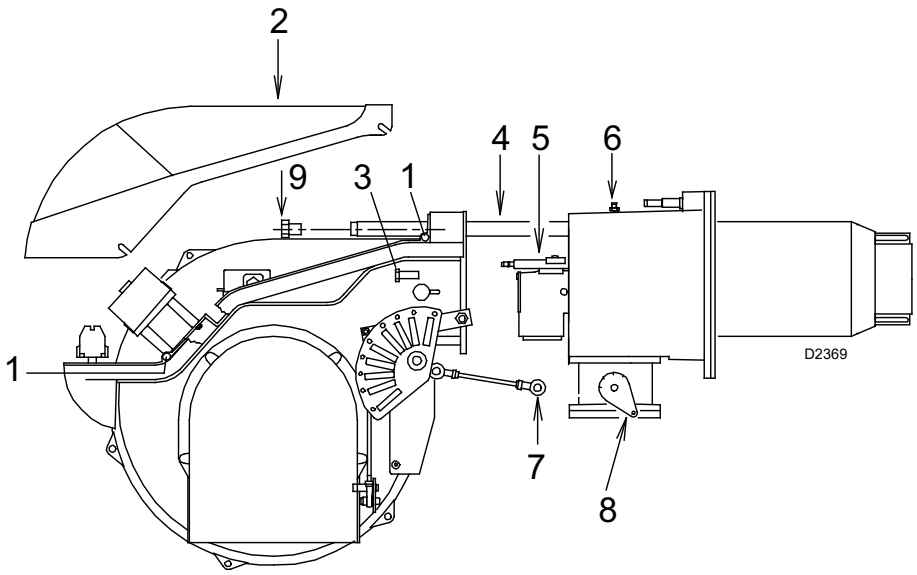


Fig. 37

7.4 Closing the burner

- ➤ Push the burner to approximately 100 mm from the pipe coupling.
- ➤ Reconnect the cables and slide in the burner until it comes to a stop.
- ➤ Replace the screws 3)(Fig. 37) and carefully pull the probe and electrode cables outwards until they are slightly taut.
- ➤ Reconnect the articulated coupling 7) to the graduated sector 8).
- ➤ Remove the two extensions from the slide bars 4).
- ➤ Connect the power plug, the signal and adjustment plug and the gas train plug that were previously disconnected.

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

A Appendix - Accessories

Output regulator 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 controlled		Probe		Output regulator	
	Adjustment field	Type	Code	Type	Code
Temperature	- 100 ÷ 500° C	PT 100	3010110	RWF50 RWF55	20099869 20099905
Pressure	0 ÷ 2,5 bar	4 ÷ 20 mA	3010213		
	0 ÷ 16 bar	4 ÷ 20 mA	3010214		
	0 ÷ 25 bar	4 ÷ 20 mA	3090873		

Soundproofing box kit

Burner	Type	dB(A)	Code
RS 160-200/M BLU	C4/5	10	3010404

Extended head kit

Burner	Standard head length (mm)	Extended head length (mm)	Code
RS 160/M BLU	373	503	3010442 *
RS 200/M BLU	373	503	3010474

* The kit, code **3010442**, can only be used for the burners produced with a registration number ≥ **02426xxxxxx.**

The kit, code **3010193**, can only be used for the burners produced with a registration number ≤ **02425xxxxxx.**

Spacer kit

Burner	Thickness (mm)	Code
RS 160-200/M BLU	102	3000722

Continuous purging kit

Burner	Code
RS 160-200/M BLU	3010094

Signal converter kit

Burner	Code
RS 160-200/M BLU	3010415

Kit potentiometer

Burner	Code
RS 160-200/M BLU	3010416

Differential circuit breaker kit

Burner	Code
RS 160-200/M BLU	3010329

Gas flange kit DN80

Burner	Code
RS 160-200/M BLU	3010439

Relay interface kit

Burner	Code
RS 160-200/M BLU	3010386

PC interface kit

Burner	Code
RS 160-200/M BLU	3002719

LPG Kit

Burner	Code
RS 160/M BLU	20008971
RS 200/M BLU	3010491

Head kit for boilers with flame inversion

Burner	Code
RS 160/M BLU	3010249
RS 200/M BLU	20035848

Gas trains in compliance with EN 676

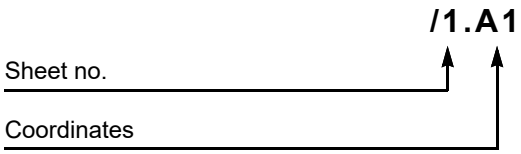
Please refer to manual.

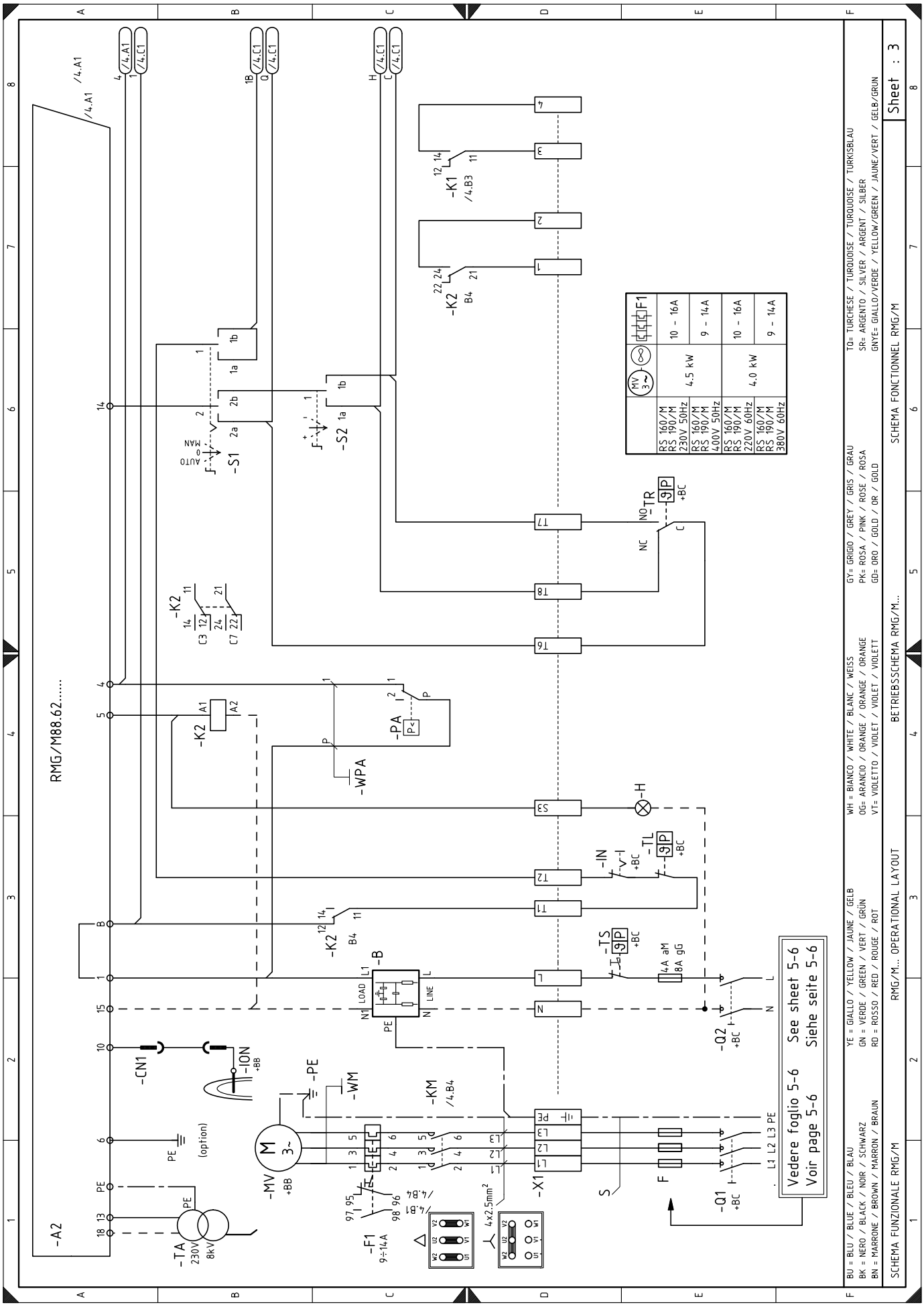
The installer is responsible for the addition of any safety device not foreseen in this manual.

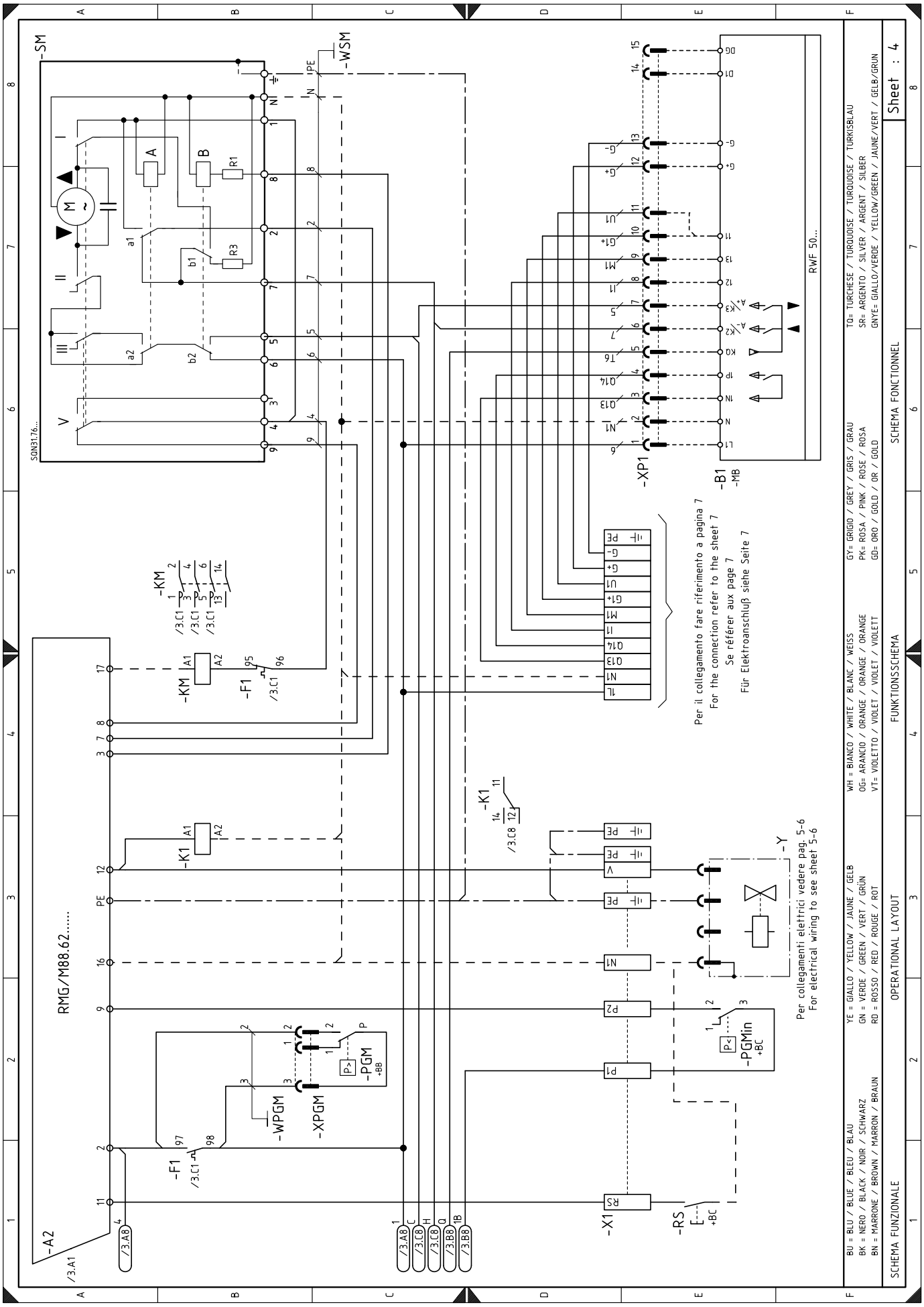
B Appendix - RS 160/M BLU electrical panel layout

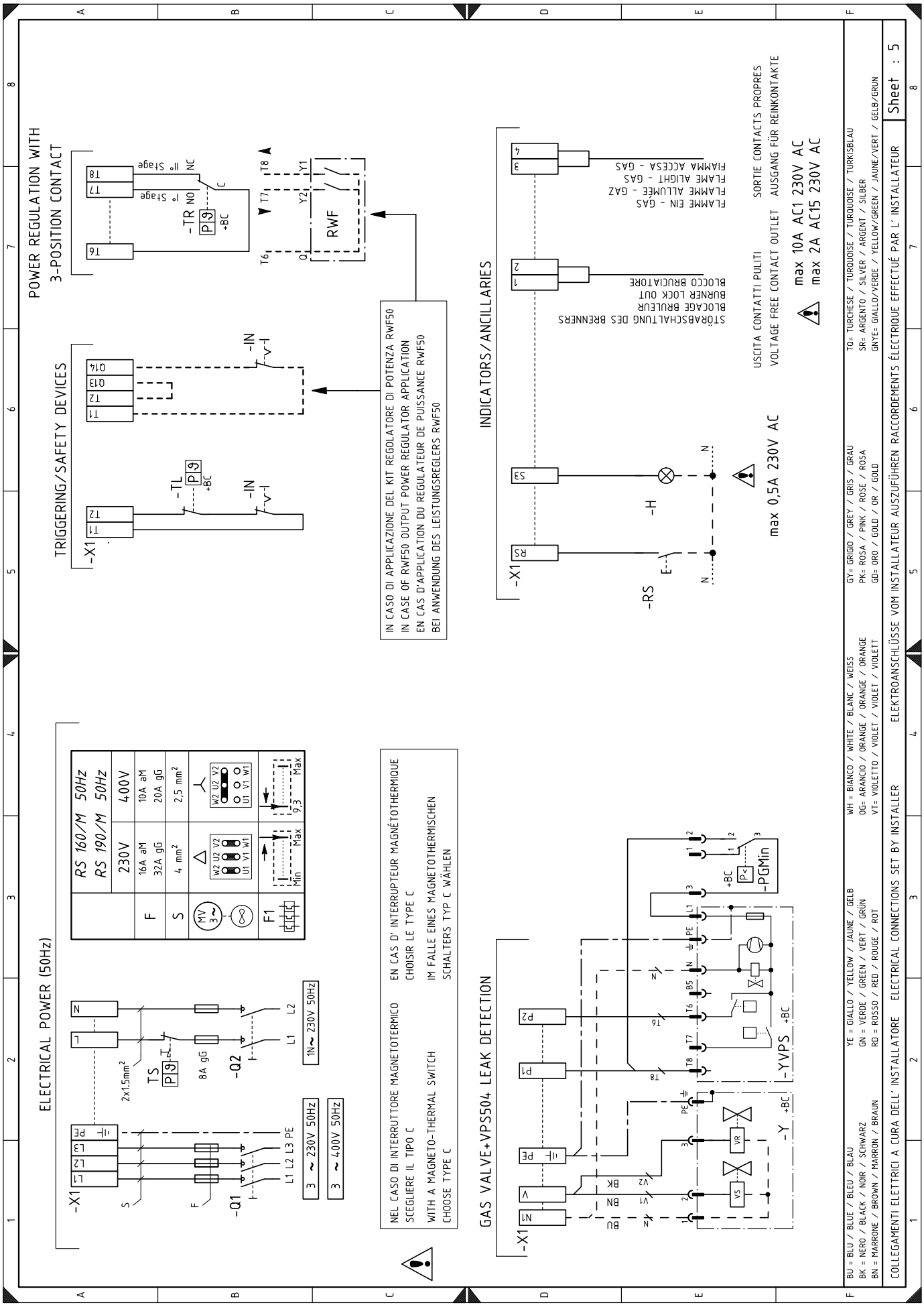
1	**Index of layouts**
2	Indication of references
3	Indication of references
4	Indication of references
5	Electrical wiring that the installer is responsible for (50Hz)
6	Electrical wiring that the installer is responsible for (60Hz)
7	RWF... functional layout

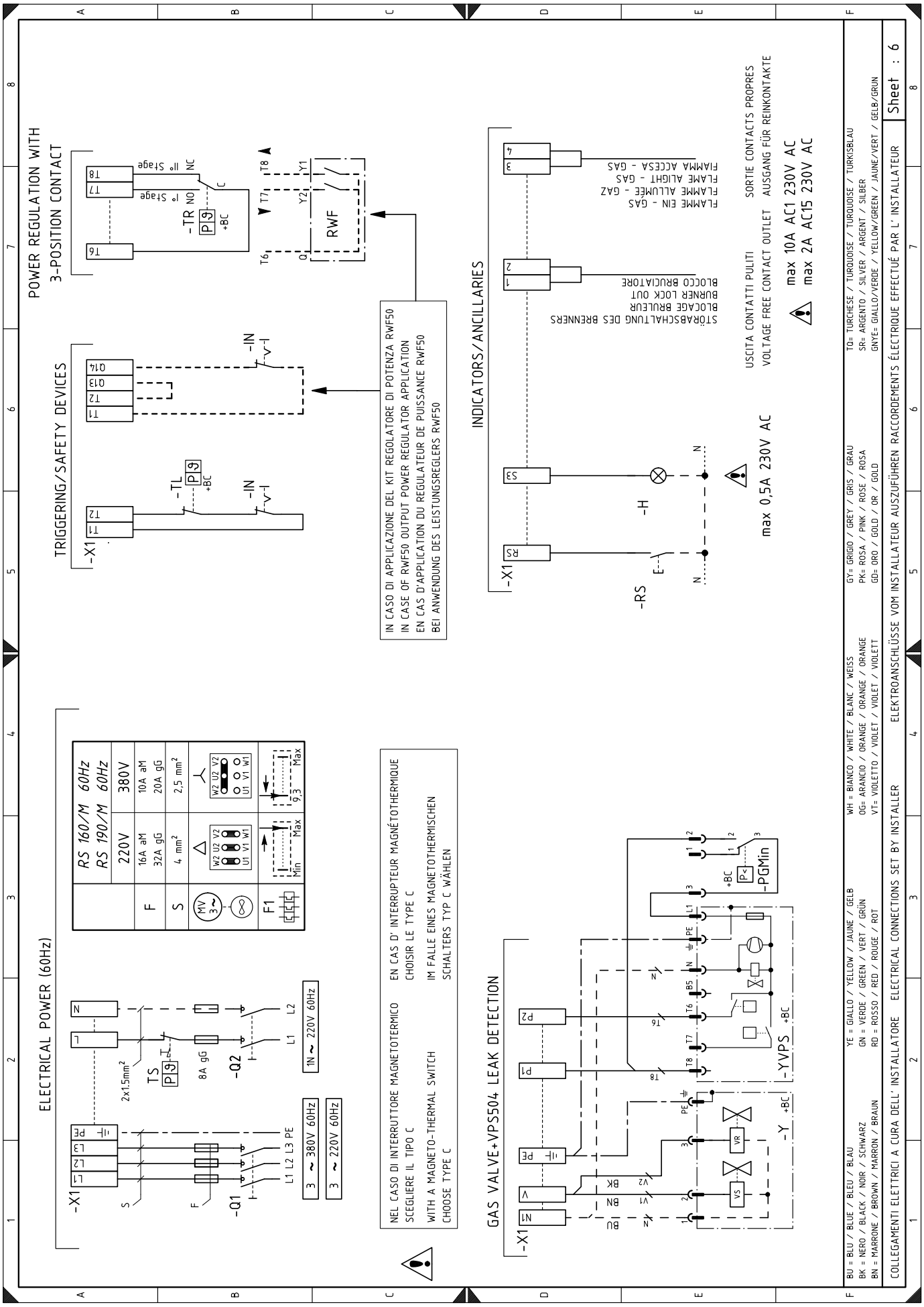
2 Indication of references

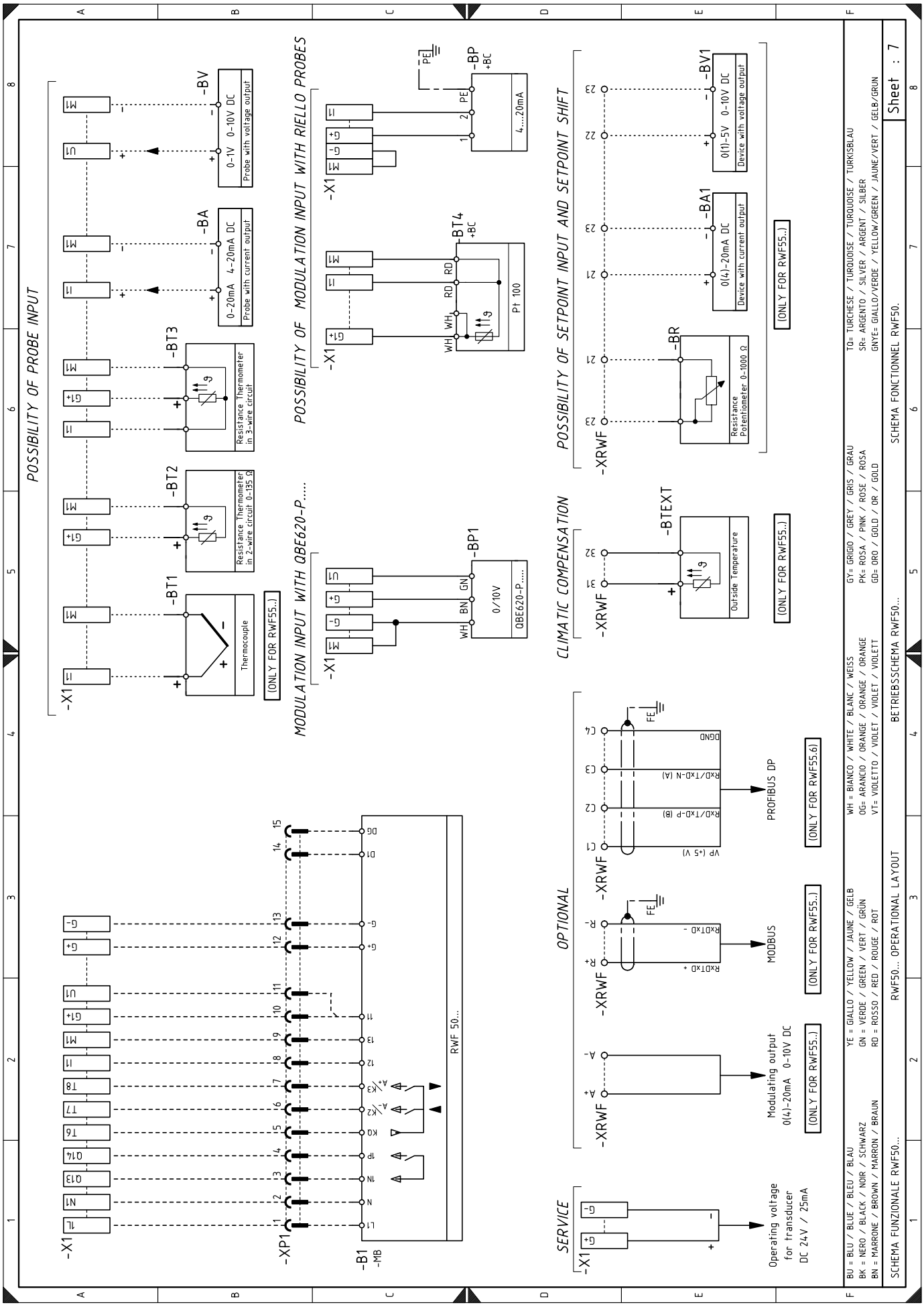



RMG/M88.62.....
-A2
-TA
230V
8kV
-CN1
-ION
+BB
-PE
-WM
-MV
+BB
-KM
/4.B4
-F1
9÷14A
-B
-K2
-K1
/4.B3
-S1
-S2
-WPA
-PA
-TR
-H
-IN
-TL
-TS
-Q2
-Q1
-X1
F
S
(option)
Vedere foglio 5-6 See sheet 5-6
Voir page 5-6 Siehe seite 5-6
SCHEMA FUNZIONALE RMG/M
RMG/M... OPERATIONAL LAYOUT
BETRIEBSSCHEMA RMG/M...
SCHEMA FONCTIONNEL RMG/M
Sheet : 3


-SM
-WSM
SQN31.76...
RWF 50...
-XP1
-B1
-MB
-KM
-K1
-F1
-PGM
-WPGM
-XPGM
-PGMin
-Y
-RS
-X1
-A2
RMG/M88.62.....
Per il collegamento fare riferimento a pagina 7
For the connection refer to the sheet 7
Se référer aux page 7
Für Elektroanschluß siehe Seite 7
Per collegamenti elettrici vedere pag. 5-6
For electrical wiring to see sheet 5-6
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 4

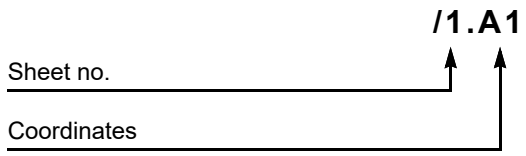

POWER REGULATION WITH
3-POSITION CONTACT
TRIGGERING/SAFETY DEVICES
INDICATORS/ANCILLARIES
ELECTRICAL POWER (50Hz)
GAS VALVE+VPS504 LEAK DETECTION
RS 160/M 50Hz
RS 190/M 50Hz
230V
400V
16A aM
32A gG
10A aM
20A gG
4 mm²
2,5 mm²
Min
Max
9,3
-TR
-TL
-IN
-RS
-H
-Q1
-Q2
-Y
-YVPS
-PGMin
TS
RWF
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50
IN CASE OF RWF50 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50
NEL CASO DI INTERRUTTORE MAGNETOTERMICO
SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH
CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN
SCHALTERS TYP C WÄHLEN
STÖRABSCHALTUNG DES BRENNERS
BLOCAGE BRULEUR
BURNER LOCK OUT
BLOCCO BRUCIATORE
FLAMME EIN - GAS
FLAMME ALLUMÉE - GAZ
FLAME ALIGHT - GAS
FIAMMA ACCESA - GAS
USCITA CONTATTI PULITI
VOLTAGE FREE CONTACT OUTLET
SORTIE CONTACTS PROPRES
AUSGANG FÜR REINKONTAKTE
max 0,5A 230V AC
max 10A AC1 230V AC
max 2A AC15 230V AC
3 ~ 230V 50Hz
3 ~ 400V 50Hz
1N~ 230V 50Hz
2x1.5mm²
8A gG
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TÜRKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= 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

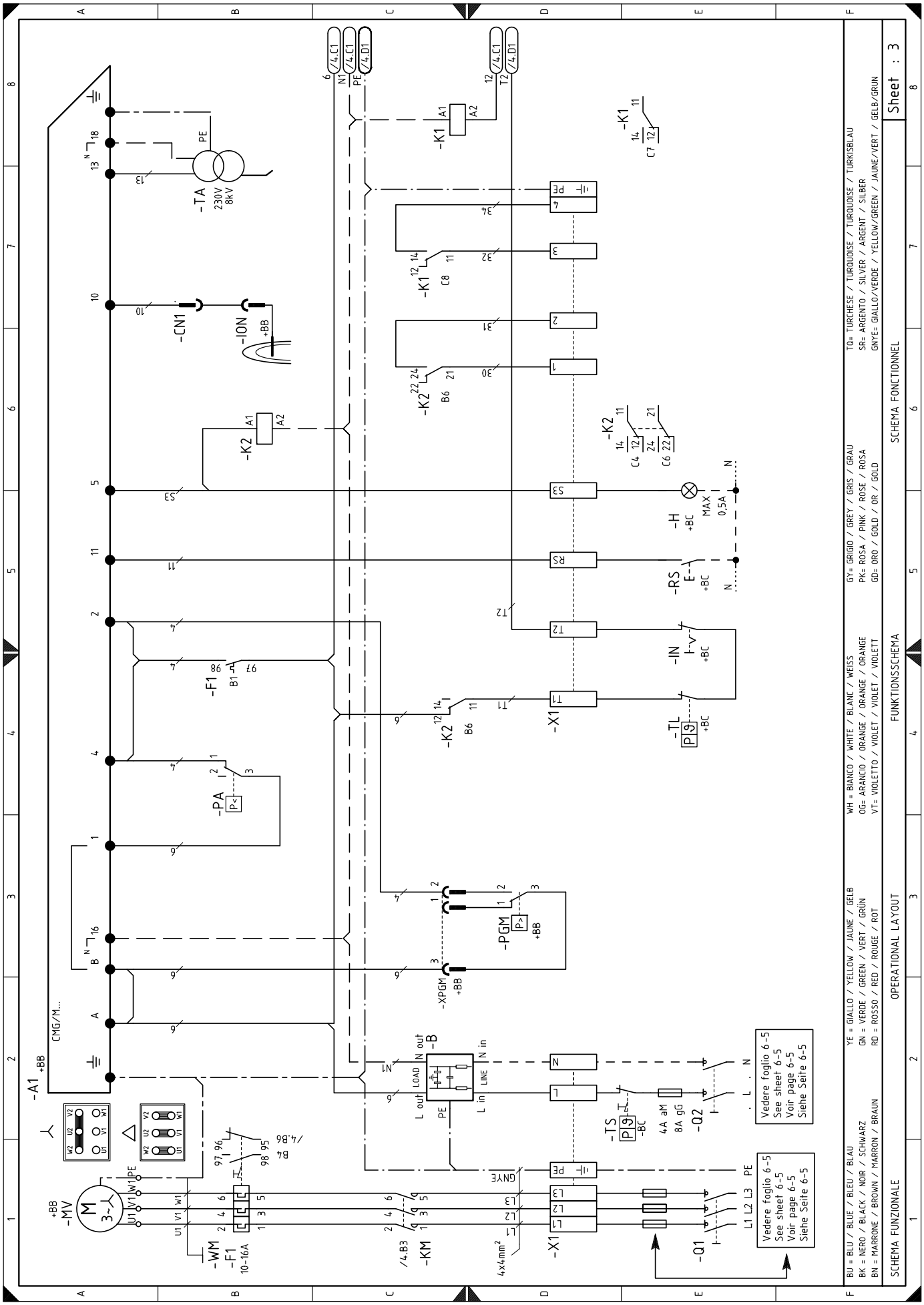

POWER REGULATION WITH
3-POSITION CONTACT
TRIGGERING/SAFETY DEVICES
INDICATORS/ANCILLARIES
ELECTRICAL POWER (60Hz)
GAS VALVE+VPS504 LEAK DETECTION
RS 160/M 60Hz
RS 190/M 60Hz
220V
380V
16A aM
32A gG
10A aM
20A gG
4 mm²
2,5 mm²
9,3
Min
Max
-X1
-TR
-TL
-IN
-H
-RS
-Q1
-Q2
-Y
-YVPS
-PGMin
TS
RWF
8A gG
2x1.5mm²
3 ~ 380V 60Hz
3 ~ 220V 60Hz
1N ~ 220V 60Hz
L1 L2 L3 PE
NEL CASO DI INTERRUTTORE MAGNETOTERMICO
SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH
CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN
SCHALTERS TYP C WÄHLEN
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50
IN CASE OF RWF50 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50
USCITA CONTATTI PULITI
VOLTAGE FREE CONTACT OUTLET
SORTIE CONTACTS PROPRES
AUSGANG FÜR REINKONTAKTE
max 0,5A 230V AC
max 10A AC1 230V AC
max 2A AC15 230V AC
FLAMME EIN - GAS
FLAME ALLUMÉE - GAZ
FLAME ALIGHT - GAS
FIAMMA ACCESA - GAS
STÖRABSCHALTUNG DES BRENNERS
BLOCAGE BRULEUR
BURNER LOCK OUT
BLOCCO BRUCIATORE
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TÜRKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= 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 : 6

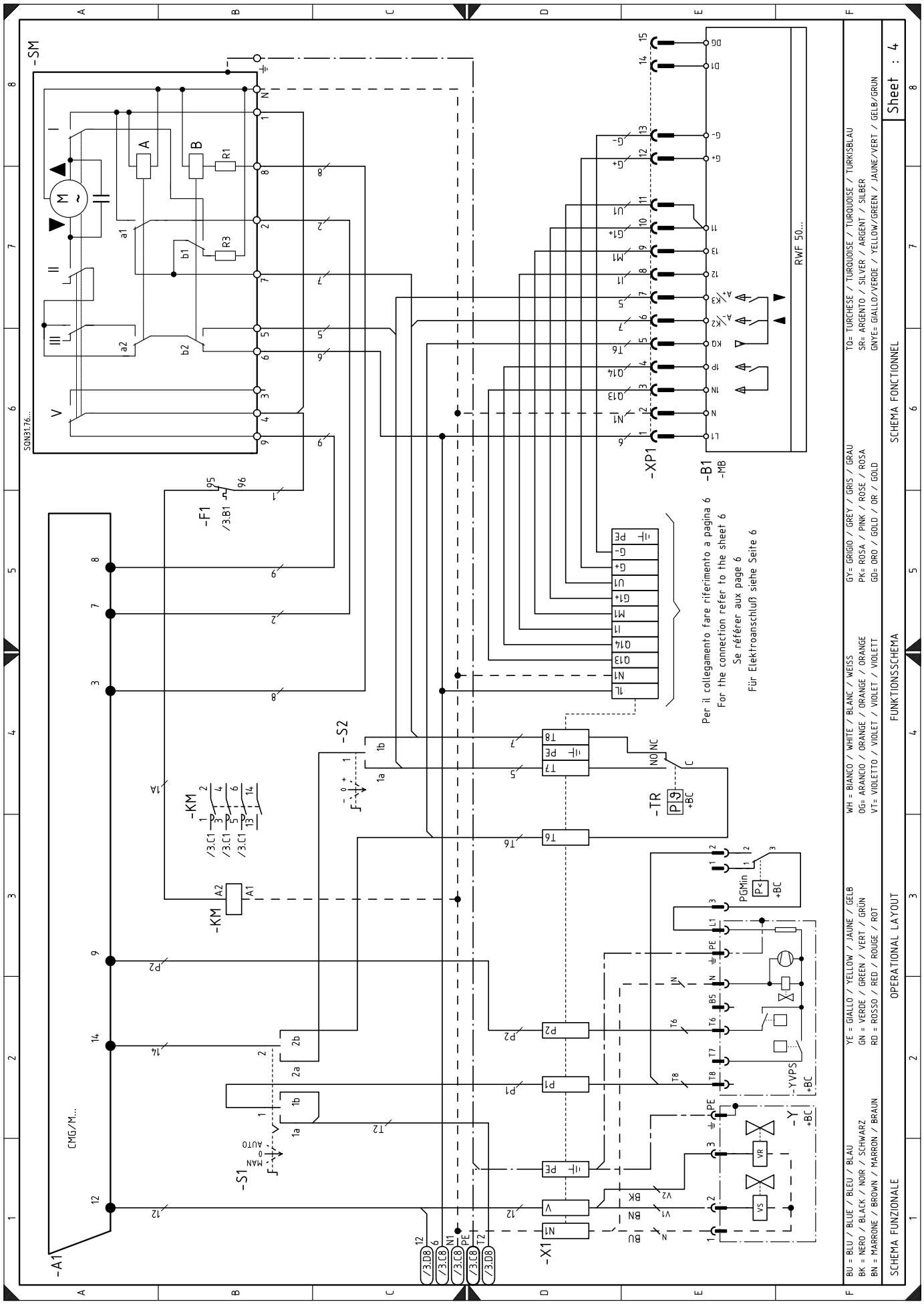

POSSIBILITY OF PROBE INPUT
-X1
-BT1
Thermocouple
(ONLY FOR RWF55..)
-BT2
Resistance Thermometer in 2-wire circuit 0-135 Ω
-BT3
Resistance Thermometer in 3-wire circuit
-BA
0-20mA 4-20mA DC
Probe with current output
-BV
0-1V 0-10V DC
Probe with voltage output
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-X1
-BT4
Pt 100
-BP
4....20mA
MODULATION INPUT WITH QBE620-P.....
-BP1
0/10V
QBE620-P.....
CLIMATIC COMPENSATION
-XRWF
-BTEXT
Outside Temperature
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-BR
Resistance Potentiometer 0-1000 Ω
-BA1
0(4)-20mA DC
Device with current output
-BV1
0(1)-5V 0-10V DC
Device with voltage output
OPTIONAL
-XRWF
PROFIBUS DP
MODBUS
Modulating output
0(4)-20mA 0-10V DC
SERVICE
Operating voltage for transducer DC 24V / 25mA
-B1 -MB
RWF 50...
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE RWF50...
RWF50... OPERATIONAL LAYOUT
BETRIEBSSCHEMA RWF50...
SCHEMA FONCTIONNEL RWF50.
Sheet : 7

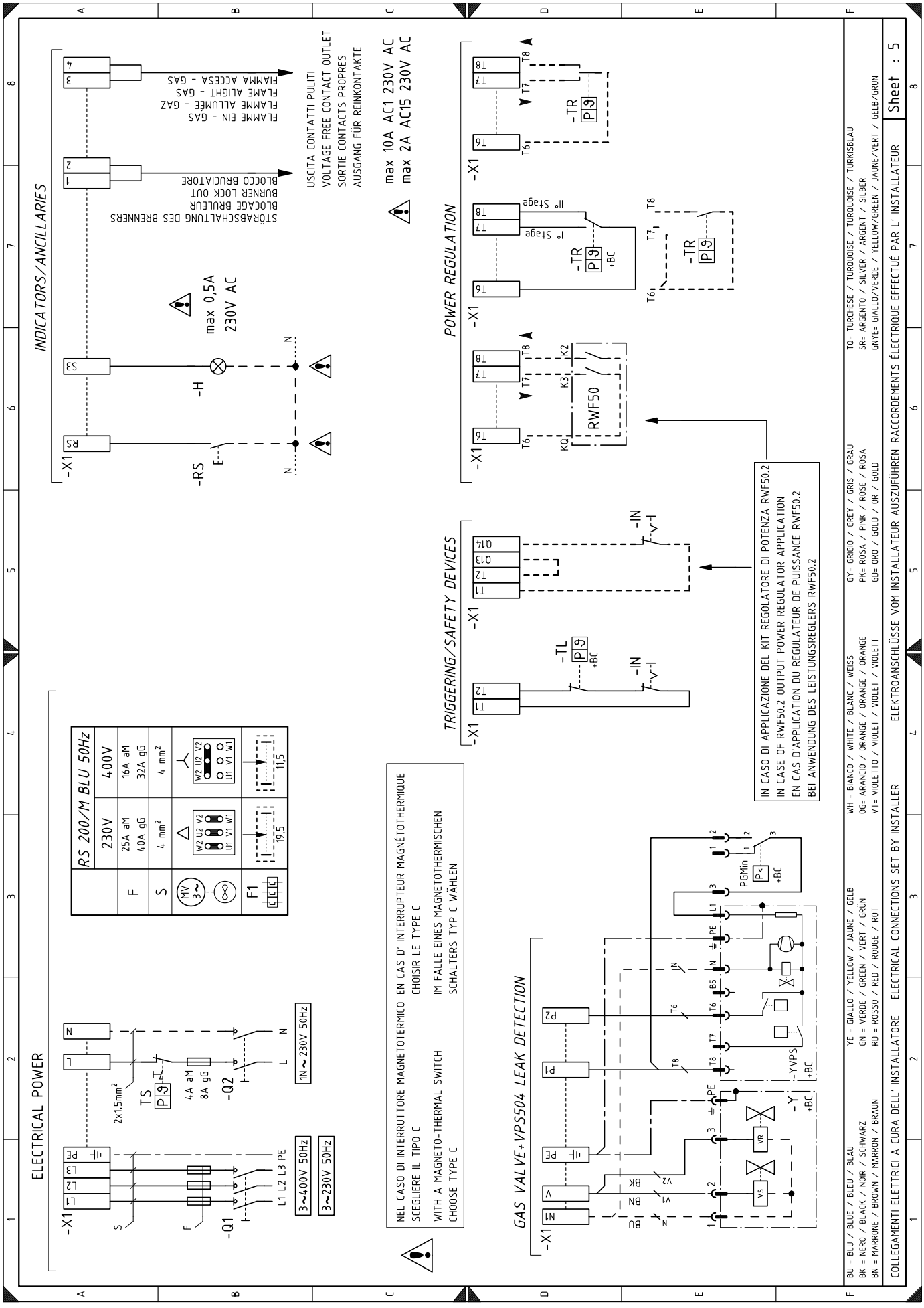
C Appendix - RS 200/M BLU electrical panel layout

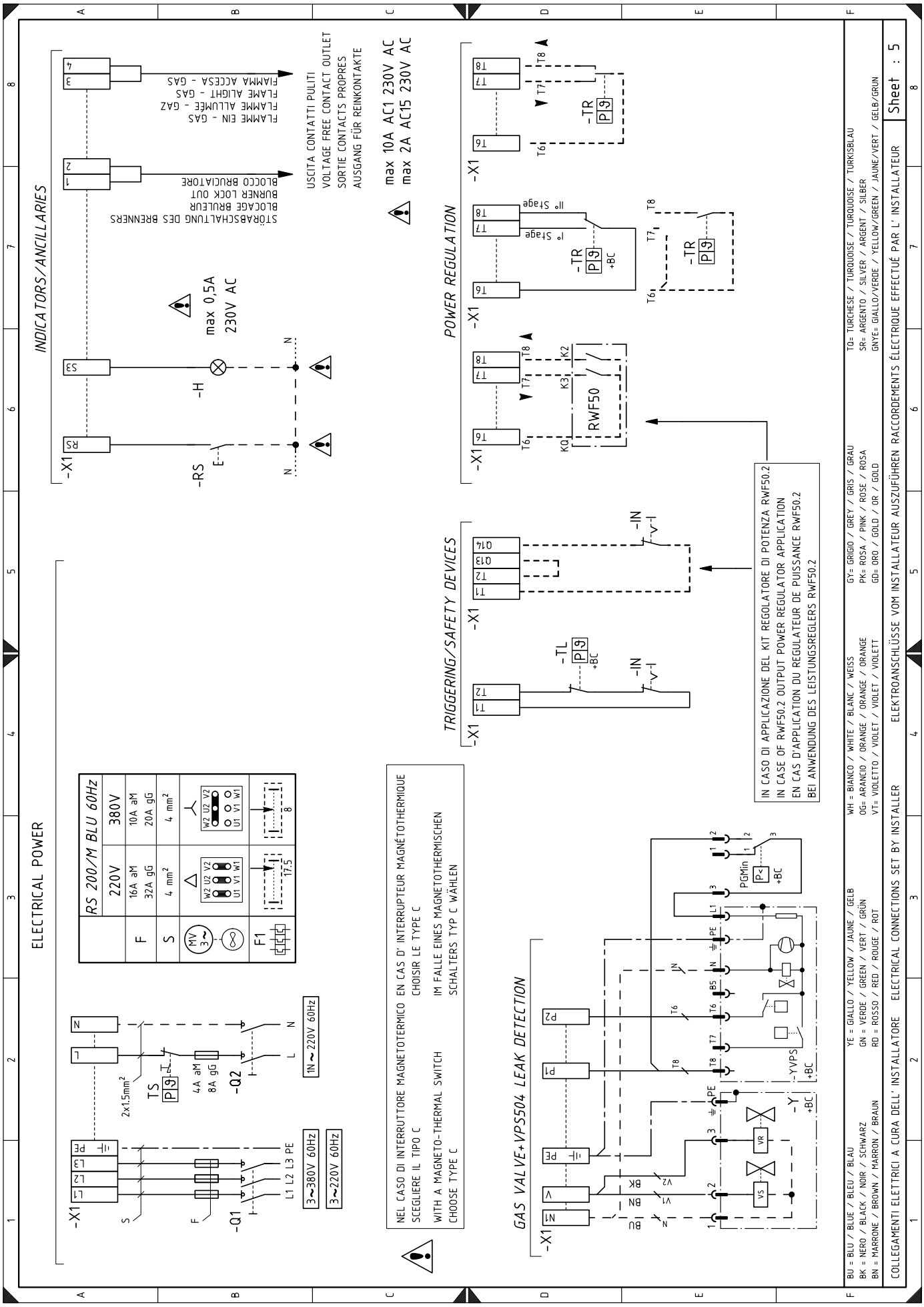
2 Indication of references

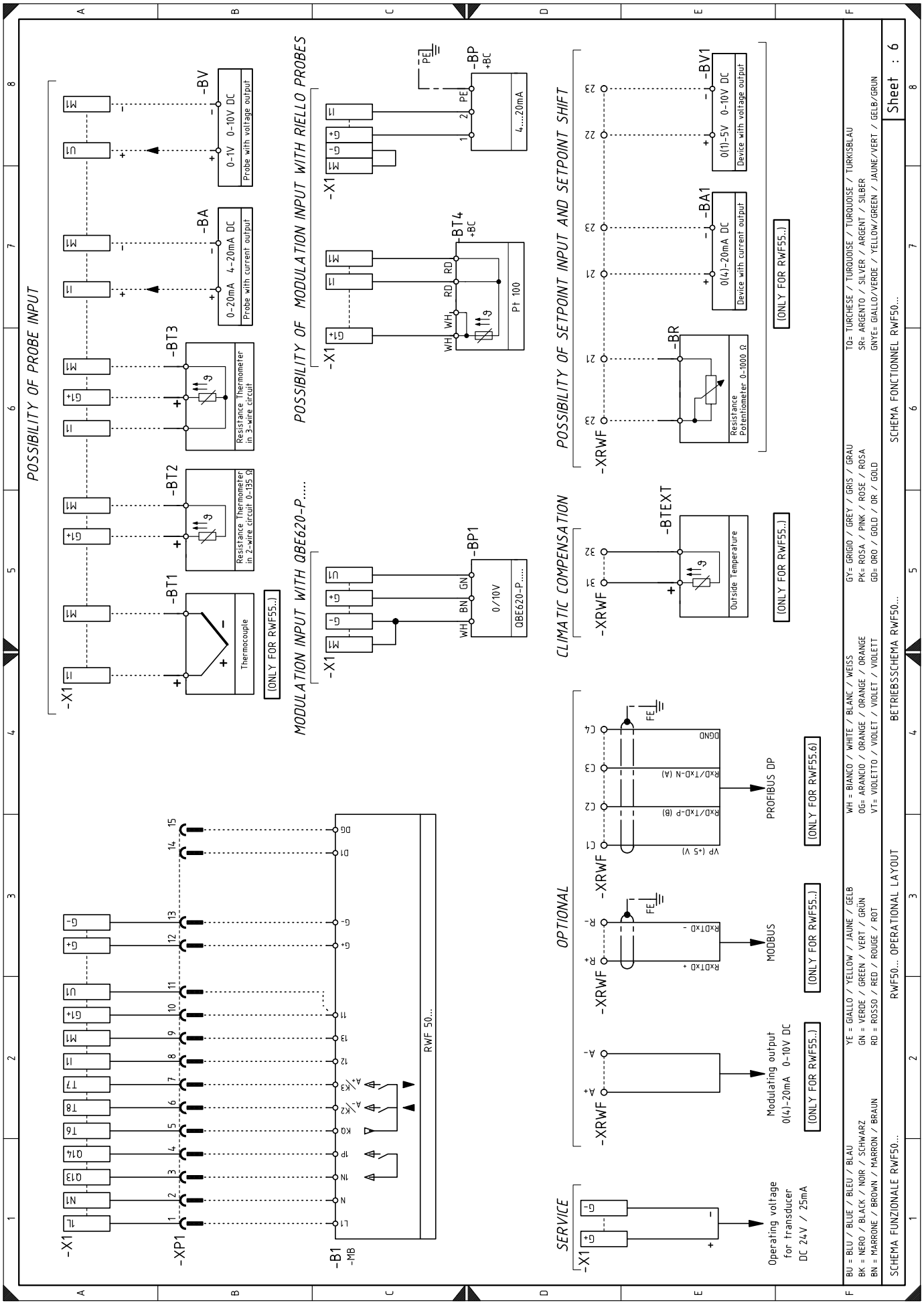



SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
-A1
-TA
-CN1
-ION
-K1
-K2
-F1
-PA
-PGM
-XPGM
-B
-IN
-TL
-RS
-H
-TS
-Q2
-Q1
-MV
-WM
-KM
-X1
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
Vedere foglio 6-5
See sheet 6-5
Voir page 6-5
Siehe Seite 6-5


SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 4
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
-SM
SQN31.76...
-F1
/3.B1
-A1
CMG/M...
-KM
-S1
-S2
-TR
-X1
-XP1
-B1
-MB
RWF 50...
-Y
-YVPS
PGMin
Per il collegamento fare riferimento a pagina 6
For the connection refer to the sheet 6
Se référer aux page 6
Für Elektroanschluß siehe Seite 6


INDICATORS/ANCILLARIES
STÖRABSCHALTUNG DES BRENNERS
BLOCAGE BRULEUR
BURNER LOCK OUT
BLOCCO BRUCIATORE
FLAMME EIN - GAS
FLAMME ALLUMÉE - GAZ
FLAME ALIGHT - GAS
FIAMMA ACCESA - GAS
USCITA CONTATTI PULITI
VOLTAGE FREE CONTACT OUTLET
SORTIE CONTACTS PROPRES
AUSGANG FÜR REINKONTAKTE
max 10A AC1 230V AC
max 2A AC15 230V AC
max 0,5A
230V AC
-H
-RS
-X1
POWER REGULATION
RWF50
-TR
-TL
-IN
TRIGGERING/SAFETY DEVICES
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50.2
IN CASE OF RWF50.2 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50.2
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50.2
ELECTRICAL POWER
RS 200/M BLU 50Hz
230V
400V
NEL CASO DI INTERRUTTORE MAGNETOTERMICO EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
SCEGLIERE IL TIPO C CHOISIR LE TYPE C
WITH A MAGNETO-THERMAL SWITCH IM FALLE EINES MAGNETOTHERMISCHEN
CHOOSE TYPE C SCHALTERS TYP C WÄHLEN
3~400V 50Hz
3~230V 50Hz
1N~230V 50Hz
-Q1
-Q2
TS
GAS VALVE+VPS504 LEAK DETECTION
PGMin
-Y
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= 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


ELECTRICAL POWER
INDICATORS/ANCILLARIES
POWER REGULATION
TRIGGERING/SAFETY DEVICES
GAS VALVE+VPS504 LEAK DETECTION
RS 200/M BLU 60Hz
220V
380V
16A aM
32A gG
10A aM
20A gG
4 mm²
F1
17.5
-X1
-Q1
-Q2
-H
-RS
-TS
-TR
-TL
-IN
-Y
-YVPS
RWF50
max 0,5A
230V AC
max 10A AC1 230V AC
max 2A AC15 230V AC
USCITA CONTATTI PULITI
VOLTAGE FREE CONTACT OUTLET
SORTIE CONTACTS PROPRES
AUSGANG FÜR REINKONTAKTE
STÖRABSCHALTUNG DES BRENNERS
BLOCAGE BRULEUR
BURNER LOCK OUT
BLOCCO BRUCIATORE
FLAMME EIN - GAS
FLAMME ALLUMÉE - GAZ
FLAME ALIGHT - GAS
FIAMMA ACCESA - GAS
1° Stage
II° Stage
3~380V 60Hz
3~220V 60Hz
1N~220V 60Hz
NEL CASO DI INTERRUTTORE MAGNETOTERMICO EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
SCEGLIERE IL TIPO C
CHOISIR LE TYPE C
WITH A MAGNETO-THERMAL SWITCH
IM FALLE EINES MAGNETOTHERMISCHEN
CHOOSE TYPE C
SCHALTERS TYP C WÄHLEN
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50.2
IN CASE OF RWF50.2 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50.2
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50.2
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VI= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


POSSIBILITY OF PROBE INPUT
-BT1
Thermocouple
(ONLY FOR RWF55...)
-BT2
Resistance Thermometer in 2-wire circuit 0-135 Ω
-BT3
Resistance Thermometer in 3-wire circuit
-BA
0-20mA 4-20mA DC
Probe with current output
-BV
0-1V 0-10V DC
Probe with voltage output
MODULATION INPUT WITH QBE620-P.....
-BP1
0/10V
QBE620-P.....
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-BP
4....20mA
-BT4
Pt 100
CLIMATIC COMPENSATION
-BTEXT
Outside Temperature
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-BR
Resistance Potentiometer 0-1000 Ω
-BA1
0(4)-20mA DC
Device with current output
-BV1
0(1)-5V 0-10V DC
Device with voltage output
OPTIONAL
PROFIBUS DP
MODBUS
Modulating output 0(4)-20mA 0-10V DC
SERVICE
Operating voltage for transducer DC 24V / 25mA
-XP1
-B1
-MB
RWF 50...
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE RWF50...
RWF50... OPERATIONAL LAYOUT
BETRIEBSSCHEMA RWF50...
SCHEMA FONCTIONNEL RWF50...
Sheet : 6

Wiring layout key RS 160-200/M BLU

A1/A2	Flame control
B	Suppressor
B1	Output power regulator internal
BA	Input in current DC 0...20 mA, 4...20 mA
BA1	Input in current DC 0...20 mA, 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...1 V, 0...10 V
BV1	Input in voltage DC 0...1 V, 0...10 V to modify remote setpoint
+BB	Components on burners
+BC	Components on boiler
CN1	Ionisation probe connector
F1	Fan motor thermal relay
H	lockout signalling
IN	Burner manual stop electric switch
ION	Ionisation probe
KM	Motor contact maker
K1	Clean contacts output relay burner operating
K2	Clean contacts output relay burner lockout
MV	Fan motor
PA	Air pressure switch
PE	Burner earth
PGMin	Minimum gas pressure switch
PGM	Maximum gas pressure switch
RS	Remote reset switch
S1	Off / automatic / manual selector
S2	Power increase / power reduction selector
SM	Servomotor
TA	Ignition transformer
TL	Limit thermostat/pressure switch
TR	Adjustment thermostat/pressure switch
TS	Safety thermostat/pressure switch
Y	Gas adjustment valve + gas safety valve
YVPS	Valve leak detection device
X1	Main terminal supply board
XP1	Connector for RWF output power regulator kit ... or signal converter
XPGM	Maximum gas pressure switch connector
XRWF	Terminal board for output power regulator RWF ...

RIELLO S.p.A.
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http:// www.riello.it
http:// www.riello.com