GB

Forced draught gas burners

Progressive two-stage operation

CODE	MODEL
20189931	RS 70
20189932	RS 100
20189933	RS 130

20190124 (1) - 11/2021

Translation of the original instructions

1 Information and general warnings ... 3
1.1 Information about the instruction manual ... 3
1.1.1 Introduction ... 3
1.1.2 General dangers ... 3
1.1.3 Other symbols ... 3
1.1.4 Delivery of the system and the instruction manual ... 4
1.2 Guarantee and responsibility ... 4

2 Safety and prevention ... 5
2.1 Background ... 5
2.2 Personnel training ... 5

3 Technical description of the burner ... 6
3.1 Burner designation ... 6
3.2 Models available ... 6
3.3 Technical data ... 7
3.4 Electrical data ... 7
3.5 Maximum dimensions ... 8
3.6 Burner equipment ... 8
3.7 Firing rates ... 9
3.8 Test boiler ... 9
3.8.1 Commercial boilers ... 10
3.9 Burner description ... 11
3.10 Electrical panel description ... 12
3.11 Control box RMG88 ... 13
3.12 Servomotor (SQN73.4B4A20) ... 14

4 Installation ... 15
4.1 Notes on safety for the installation ... 15
4.2 Handling ... 15
4.3 Preliminary checks ... 15
4.4 Operating position ... 16
4.5 Preparing the boiler ... 16
4.5.1 Boring the boiler plate ... 16
4.5.2 Blast tube length ... 16
4.5.3 Securing the burner to the boiler ... 16
4.6 Access to head internal part ... 17
4.7 Positioning the probe - electrode ... 17
4.8 Combustion head adjustment ... 18
4.9 Setting the combustion head ... 18
4.10 Gas feeding ... 20
4.10.1 Gas feeding line ... 20
4.10.2 Gas train ... 21
4.10.3 Gas train installation ... 21
4.10.4 Gas pressure ... 21
4.11 Electrical wiring ... 23
4.11.1 Supply cables and external connections passage ... 23
4.12 Calibration of the thermal relay ... 24
4.13 Measuring the ionisation current ... 24

5 Start-up, calibration and operation of the burner ... 25
5.1 Notes on safety for the first start-up ... 25
5.2 Adjustments before first firing ... 25
5.3 Burner start-up ... 25
5.4 Servomotor adjustment ... 26
5.5 Burner ignition ... 27

5.6 Adjusting the burner 27
5.6.1 Ignition output 27
5.6.2 Output in 2nd stage 27
5.6.3 Output in 1st stage 28
5.6.4 Air pressure switch 29
5.6.5 Minimum gas pressure switch 29
5.7 Operation sequence of the burner 30
5.7.1 Burner start-up 30
5.7.2 Operation 30
5.7.3 Ignition failure 30
5.7.4 Burner flame goes out during operation 30
5.8 Stopping of the burner 31
5.9 Final checks (with burner operating) 31
5.9.1 Checking the air and gas pressure on the combustion head 31

6 Maintenance 32
6.1 Notes on safety for the maintenance 32
6.2 Maintenance programme 32
6.2.1 Maintenance frequency 32
6.2.2 Safety test - with gas feeding closed 32
6.2.3 Checking and cleaning 32
6.2.4 Combustion control (gas) 33
6.2.5 Safety components 33
6.3 Opening the burner 34
6.4 Closing the burner 34

7 Faults - Possible causes - Solutions 35

A Appendix - Accessories 37

B Appendix - Electrical panel layout 38

1 Information and general warnings

1.1 Information about the instruction manual

1.1.1 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.

1.1.2 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.

1.1.3 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 a list.

Abbreviations used

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

1.1.4 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.

1.2 Guarantee and responsibility

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

WARNING

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 appliance;
➤ 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;
➤ use of the burner even following an error and/or an irregularity;
➤ 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 optionals;
➤ force majeure.

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

2 Safety and prevention

2.1 Background

The burners have been designed and built in compliance with current regulations and directives, applying the known technical rules of safety 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.

Namely:

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.

WARNING

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

2.2 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 follow 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 are obliged to 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 manufacturing company therefore accepts no responsibility whatsoever for any which may result from the use of non-original parts.

In addition:

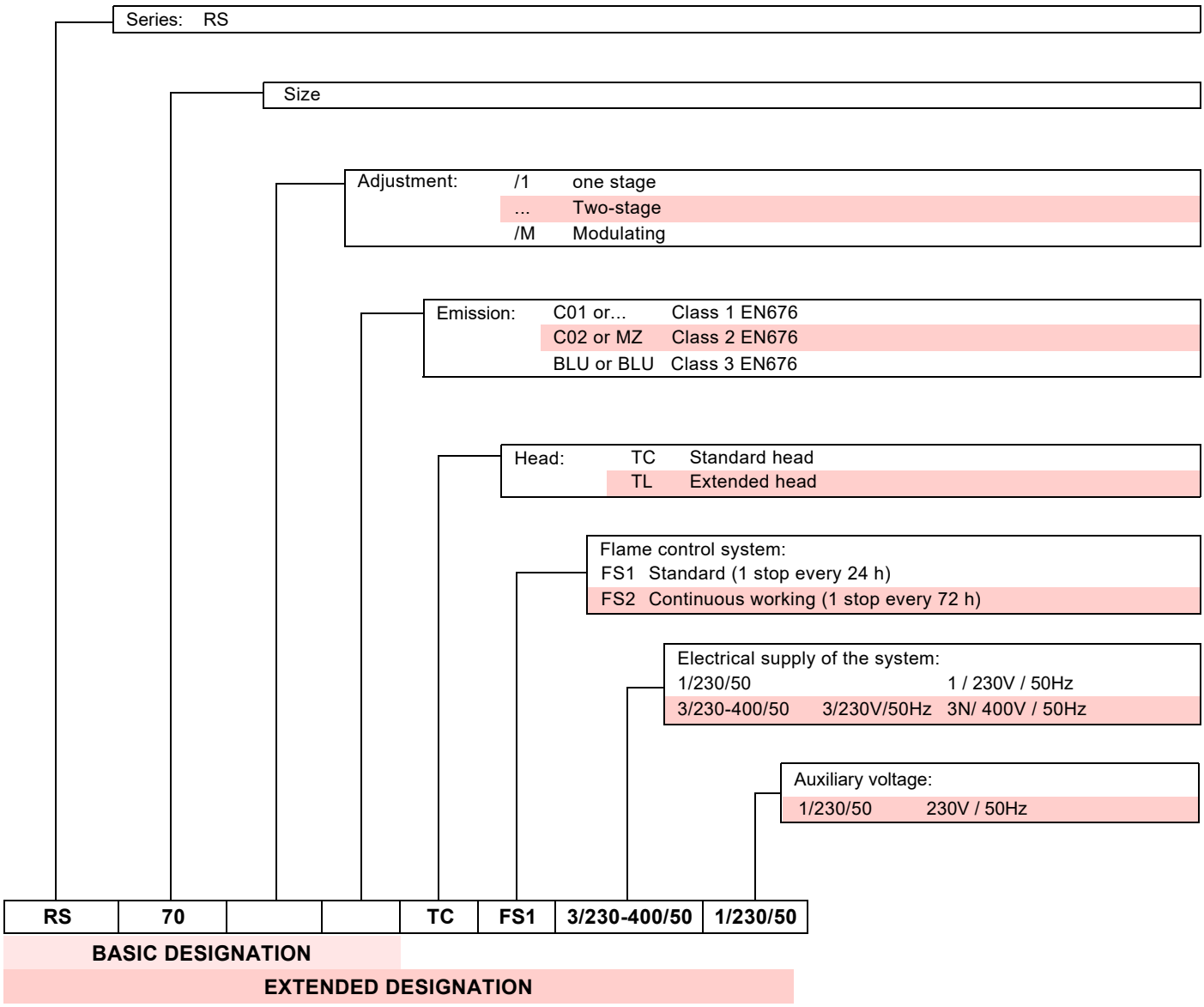
➤ the user must take all the measures necessary to prevent unauthorised people gaining access to the machine;

➤ 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.

3 Technical description of the burner

3.1 Burner designation



3.2 Models available

Designation			Voltage	Start-up	Code
RS 70	FS1	TC	3/230-400/50	Direct	20189931
RS 100	FS1	TC	3/230-400/50	Direct	20189932
RS 130	FS1	TC	3/230-400/50	Direct	20189933

3.3 Technical data

Model			RS 70		RS 100		RS 130	
POWER (1)	2nd stage	kW	465 - 814		698 - 1163		930 -1512	
		Mcal/h	400 - 700		600 - 1000		800 - 1300	
	min. 1st stage	kW	192		232		372	
		Mcal/h	165		200		320	
FUEL			NATURAL GAS: G20 - G25					
			G20	G25	G20	G25	G20	G25
- net calorific value		kWh/Nm3	10	8,6	10	8,6	10	8,6
		Mcal/Nm3	8,6	7,4	8,6	7,4	8,6	7,4
- absolute density		kg/Nm3	0,71	0,78	0,71	0,78	0.71	0.78
- max delivery		Nm3/h	81	94	116	135	151	175
- pressure at maximum delivery (2)		mbar	10.3	15.2	9.3	13.7	8.6	12.7
Operation			• Intermittent (1 stop min each 24 hours). • Two-stage (high and low flame) and one-stage (all - nothing)					
Standard applications			Boilers: water, steam, diathermic oil					
Ambient temperature		°C	0 - 40					
Combustion air temperature		°C max	60					
Noise levels (3)	Sound Pressure Sound Output	dB(A)	75 86		77 88		78.5 89.5	

Tab. A

(1) Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m a.s.l.
(2) Pressure at test point 16)(Fig. 5) with zero pressure in combustion chamber and at maximum burner output.
(3) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output. The sound power is measured with the “Free Field” method, as per EN 15036, and according to an accurate “Accuracy: Category 3” measurement, as described in EN ISO 3746.

3.4 Electrical data

Model		RS 70	RS 100	RS 130
Main electrical supply		3 ~ 230 - 400V +/-10% 50 Hz		
Auxiliary circuit electrical supply		1N ~ 230V 50 Hz		
Fan motor IE3	rpm W V A	2880 1100 220/240 - 380/415 4.3 - 2.5	2890 1500 220/240 - 380/415 5.9 - 3.4	2890 2200 220/240 - 380/415 8 - 4.6
Ignition transformer	V1 - V2 I1 - I2	230 V - 1 x 8 kV 1 A - 20 mA		
Absorbed electric power	W max	1400	1800	2600
Protection level		IP 44		

Tab. B

3.5 Maximum dimensions

The maximum dimensions of the burner are given in Fig. 1.

Note that to inspect the combustion head the burner must be moved backward and turned upward. The maximum dimension of the open burner, without cover, is given by measurement I.

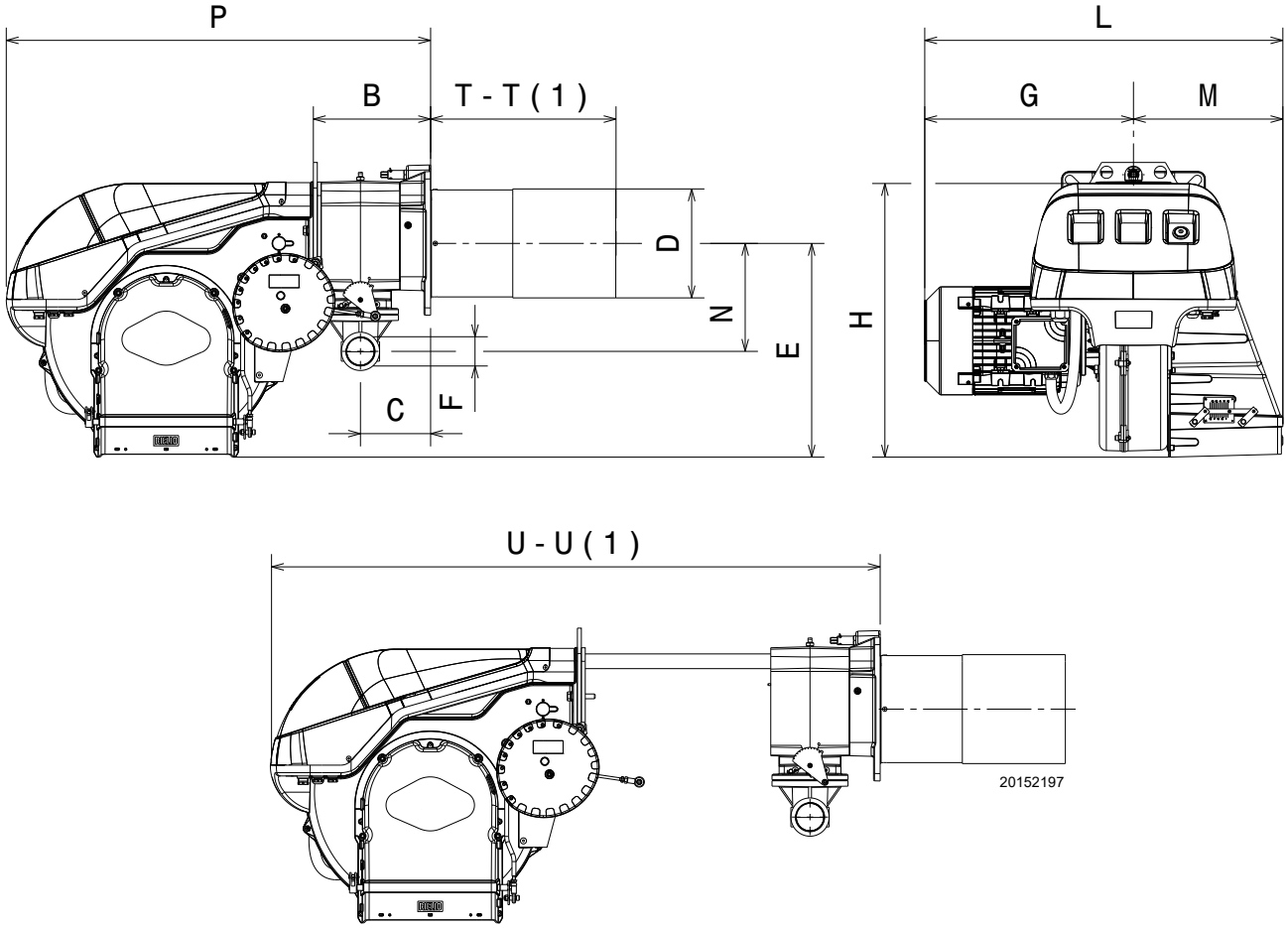


Fig. 1

mm	B	C	D	E	F	G	H	L	M	N	P	T-T(1)	U-U(1)
RS 70	212	131	179	425	2”	295	550	511	216	220	837	250 - 385	1221 - 1356
RS 100	212	131	179	425	2”	312	550	528	216	220	837	250 - 385	1221 - 1356
RS 130	212	131	189	425	2”	337	550	553	216	220	837	280 - 415	1221 - 1356

Tab. C

(1) Blast tube: short-long

3.6 Burner equipment

Flange for gas train . . . . . No. 1
Gasket for flange . . . . . No. 1
Flange fixing screws M 10 x 35 . . . . . No. 4
Thermal insulation screen . . . . . No. 1
Screws to fix the burner flange to the boiler:
M 12 x 35 . . . . . No. 4
Instruction booklet . . . . . No. 1
Spare parts list. . . . . No. 1

3.7 Firing rates

The burners can operate in two modes: one-stage or two-stage.
MAXIMUM OUTPUT must be selected in area A.
In order to utilize also area B (RS 130) it is necessary to perform the calibration of the combustion head as explained on page 6.
MINIMUM OUTPUT must not be lower than the minimum limit shown in the diagram.
RS 70 = 192 kW
RS 100 = 232 kW
RS 130 = 372 kW

WARNING

The firing rate value (Fig. 2) has been obtained considering an ambient temperature of 20 °C, an atmospheric pressure of 1013 mbar (approx. 0 m a.s.l.), and with the combustion head adjusted as shown on page 18.

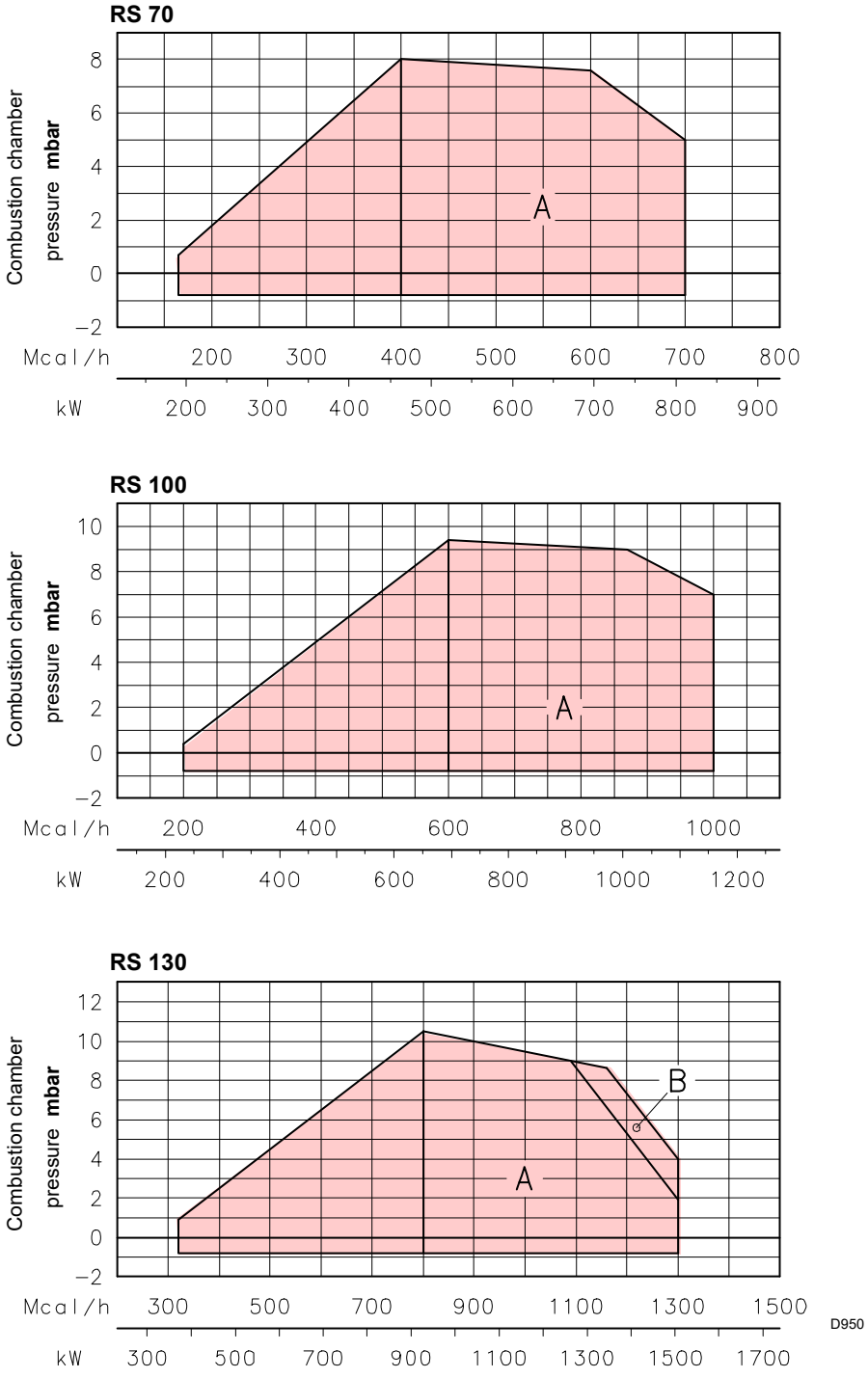


Fig. 2

3.8 Test boiler

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

In Fig. 3 you can see the diameter and length of the test combustion chamber.

Example: Output 756 kW: diameter = 60 cm; length = 2 m.

3.8.1 Commercial boilers

The burner/boiler combination does not pose any problems if the boiler is EC approved and its combustion chamber dimensions are similar to those indicated in the diagram (Fig. 3).

If the burner must be combined with a boiler that has not been EC approved and/or its combustion chamber dimensions are clearly smaller than those indicated in the diagram (Fig. 3), consult the manufacturer.

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 (Fig. 4), it is advisable to perform preliminary tests.

*** The maximum depth of the boiler door is referred to dimension "l". (Fig. 1 on page 8).**

NOTE:

For flame inversion boilers, a kit is available to reduce CO emissions if required. The kit includes 5 gas pipes, identical to the other 5 already fitted to the burner head. In standard conditions, the burner head is fitted with a second group of pipes, with gas outlet in a different direction with respect to the others. With this Kit, the second group of pipes is replaced, so that all the pipes are the same. After fitting the kit, ensure they work correctly by measuring the CO and flue gases emissions.

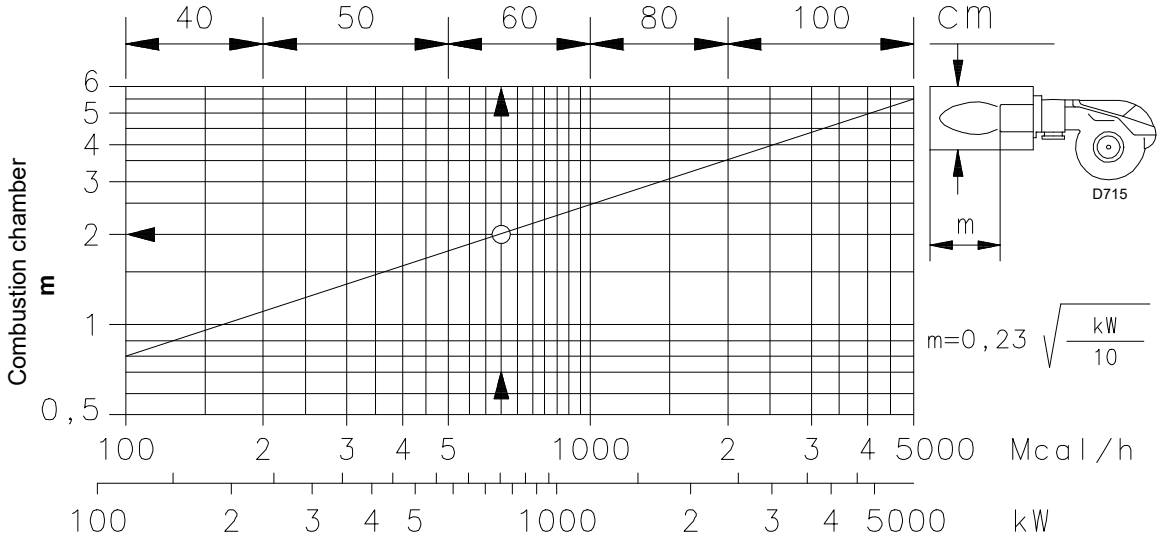


Fig. 3

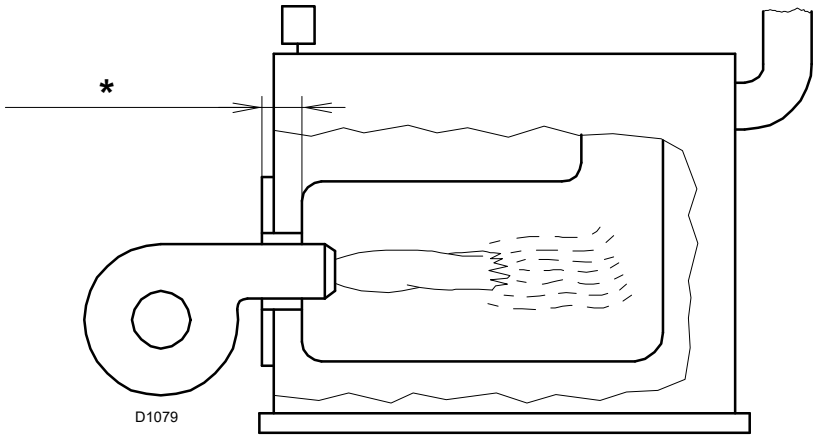


Fig. 4

3.9 Burner description

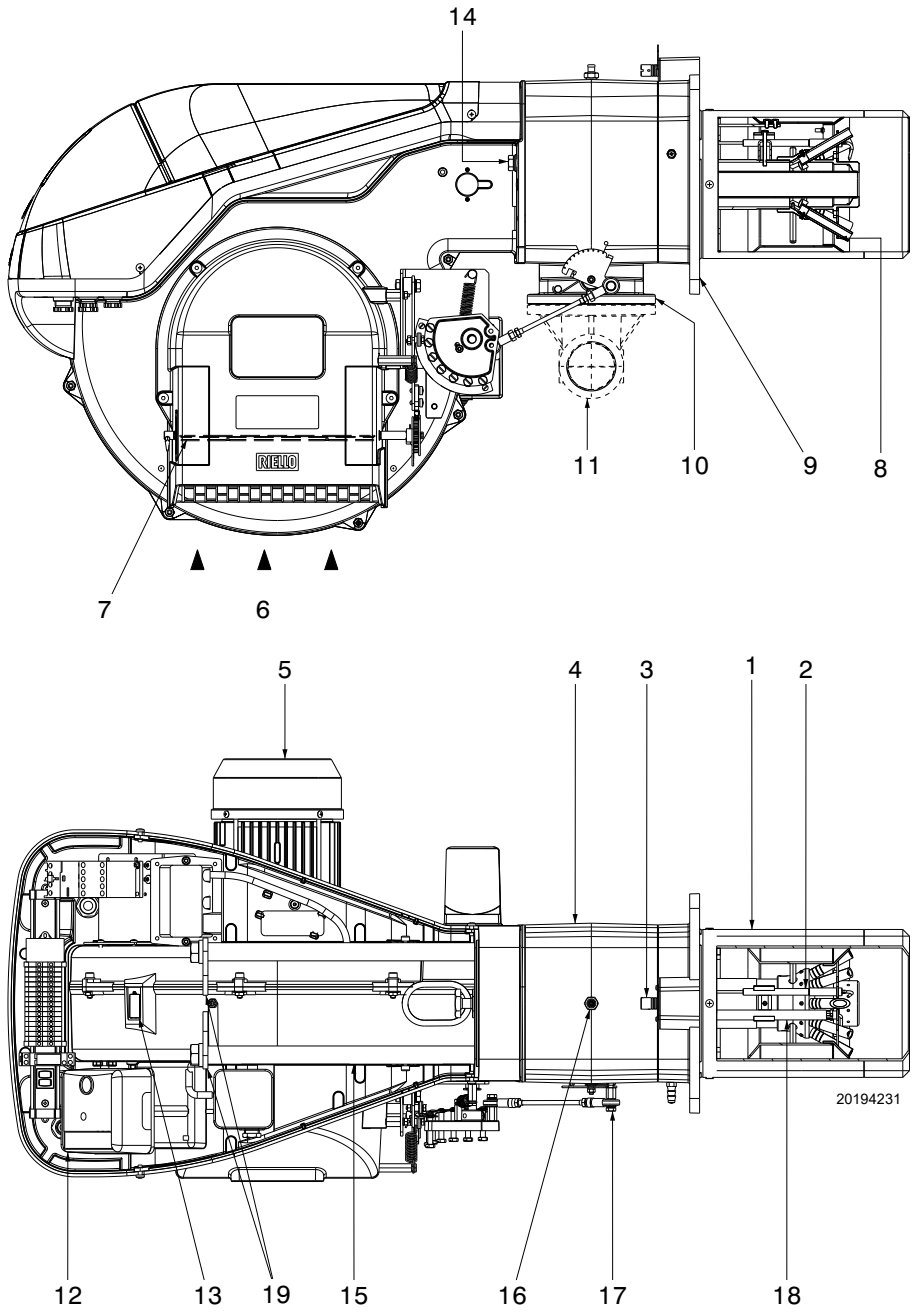


Fig. 5

1 Combustion head
2 Ignition electrode
3 Screw for combustion head adjustment
4 Pipe coupling
5 Fan motor
6 Fan air inlet
7 Air damper
8 Flame stability disc
9 Boiler fixing flange
10 Gas butterfly valve
11 Gas input pipe
12 Control box with lockout pilot light and lockout reset button
13 Flame inspection window
14 Screw securing fan to pipe coupling
15 Slide bars for opening the burner and inspecting the combustion head
16 Gas pressure test point and head fixing screw
17 Air pressure test point
18 Flame sensor probe
19 Lifting rings

Two types of burner failure may occur:

CONTROL BOX LOCKOUT:

if the control box button 12)(**red led**)(Fig. 5) lights up, it indicates that the burner is in lockout.

To reset, hold the button down for between 1 and 3 seconds.

MOTOR LOCKOUT:

to release press the button on the thermal relay.

3.10 Electrical panel description

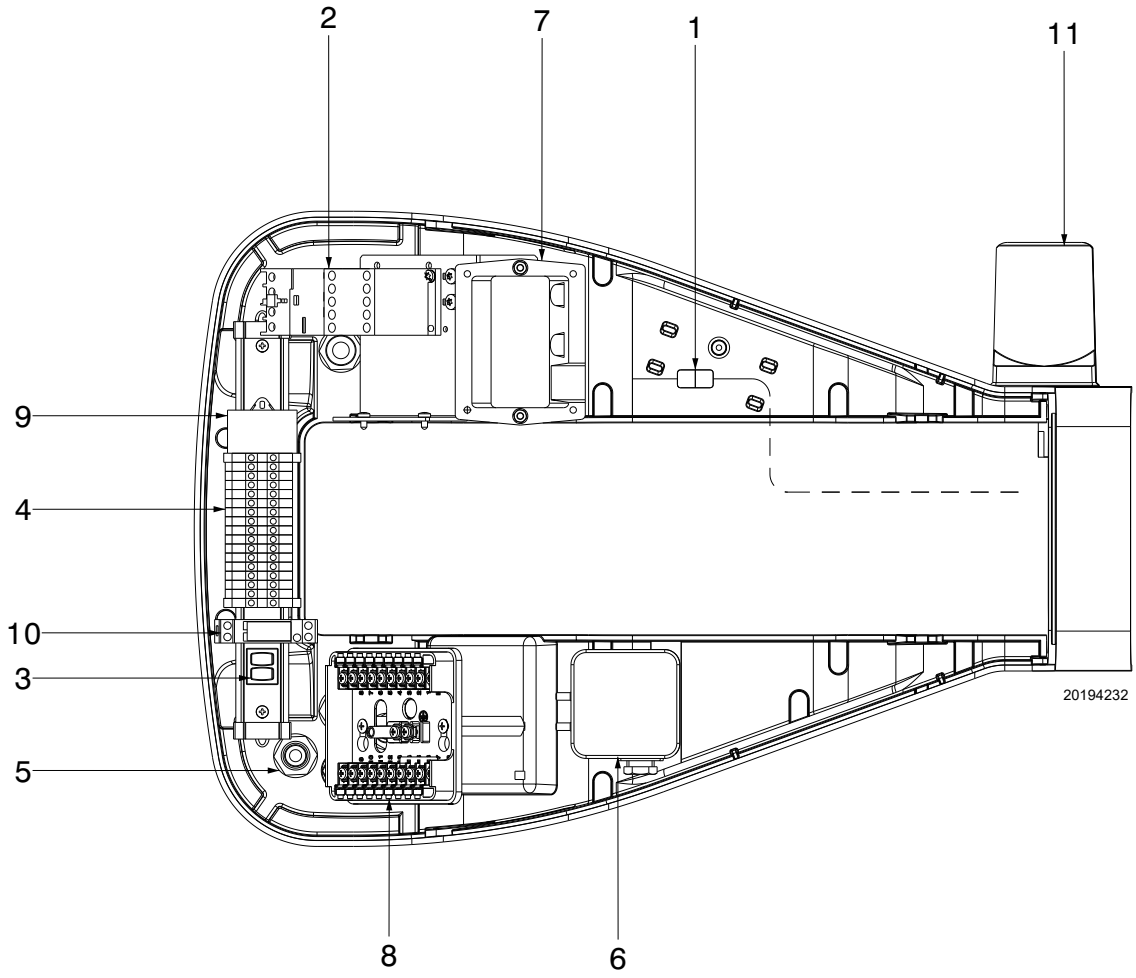


Fig. 6

1 Plug-socket on ionisation probe cable
2 Motor contactor and thermal relay with reset button
3 Two switches:
- one for “on - off burner”
- one for “1st - 2nd stage”
4 Terminal board for electric connection
5 Cable grommets for electrical wiring (to be carried out by the installer)
6 Minimum air pressure switch (differential type)
7 Ignition transformer
8 Control box base
9 Filter to protect against radio disturbance
10 Relay
11 Servomotor

3.11 Control box RMG88...

Important notes

WARNING

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

The control box RMG88... is a safety device! Avoid opening or modifying it, or forcing its operation. Riello S.p.A. cannot assume any responsibility for damage resulting from unauthorised interventions!

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ Before modifying the wiring in the control box connection area, fully disconnect the system from the power supply (omnipolar separation). Check the system is not powered and cannot be accidentally reconnected. Failure to do this will lead to the risk of electrocution.
- ➤ Protection against electrocution from the control box and all connected electric components is obtained with the correct assembly.
- ➤ Before any intervention (assembly and installation operations, assistance, etc.), ensure the wiring is in order and that the parameters are correctly set, then make the safety checks.
- ➤ Falls and collisions can negatively affect the safety functions.
  In this case, the control box must not be operated, even if it displays no evident damage.
- ➤ Press the reset button of the burner lockout command or the reset button (by applying a force of not more than 10 N), without the aid of tools or sharp objects.

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

S8906

Fig. 7

Technical data

Mains voltage	AC 220...240 V +10 % / -15 %
Mains frequency	50 / 60 Hz ±6%
Power absorption	20 VA
Protection level	IP20
Safety class	I
Weight	approx. 260g
Cable length	
Thermostat cable	Max. 20 m at 100 pF/m
Air pressure switch	Max. 1 m at 100 pF/m
Gas pressure switch	Max. 20 m at 100 pF/m
Remote reset	Max. 20 m at 100 pF/m
CPI	Max. 1 m at 100 pF/m
Environmental conditions:	
Operation	DIN EN 60721-3-3
Climatic conditions	Class 3K3
Mechanical conditions	Class 3M3
Temperature range	-20...+60°C
Humidity	< 95 % r.h.

Mechanical structure

The control box is made of plastic to resist knocks, heat and flame propagation.
The control box contains the following components:

- a microprocessor that controls the program sequence, and a relay for controlling the load;
- an electronic flame signal amplifier;
- a built-in reset button with 3 signalling colours (LED) for status and error messages.

3.12 Servomotor (SQN73.4B4A20)

Warnings

WARNING

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. 8

Technical data

Operating voltage	AC 230 V -15% / +10%
Mains frequency	50/60 Hz ±6%
Energy consumption	6 VA
Angular positioning	Max. 160°, extension of the scale 0-130 °
Assembly position	Any
Protection level	IP 54, in accordance with DIN 40050
Switching voltage	24...250V AC
Type of motor	Synchronous
Environmental conditions Storage Climatic conditions Mechanical conditions Temperature range Humidity	 DIN EN 60721-3-1 Class 1K3 Class 1M2 -20...+60°C < 95% RH
Connection of the cable	Two grafting seats for the connection terminals Type CUM / Stelvio manufacturer for connector: - type CUF 5-4 (grafting seat X1) - type CUF 5-5 (grafting seat X2) Recommended section for cable braided min. 0.5 mm² and max. 1.5mm².

Tab. D

4 Installation

4.1 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.

WARNING

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

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.

4.2 Handling

The packaging of the burner includes a wooden platform, so it is possible to move the burner (still packaged) with a transpallet truck or fork lift truck.

WARNING

The handling operations for the burner can be highly dangerous if not carried out with the greatest attention: keep any unauthorised people at a distance; check the integrity and suitableness of the available means of handling.
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).
When handling, keep the load at not 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.

4.3 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.

Checking the characteristics of the burner

Check the identification label of the burner (Fig. 9), 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 relative supply pressures;
H the data of the burner's possible minimum and maximum output (see Firing rate).
Warning: The burner output must be within the boiler's firing rate;
I the category of the appliance/countries of destination.

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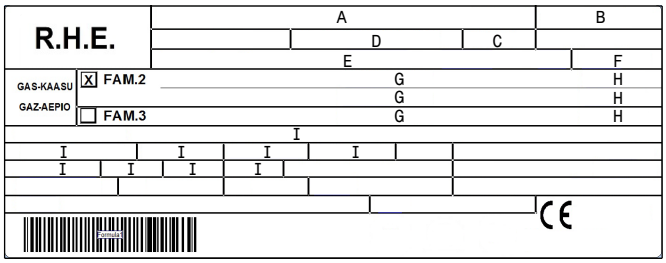


Fig. 9

WARNING

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

4.4 Operating position

WARNING

- ➤ The burner is designed to work only in positions **1, 2, 3** and **4** (Fig. 10).
- ➤ 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** is prohibited for safety reasons.

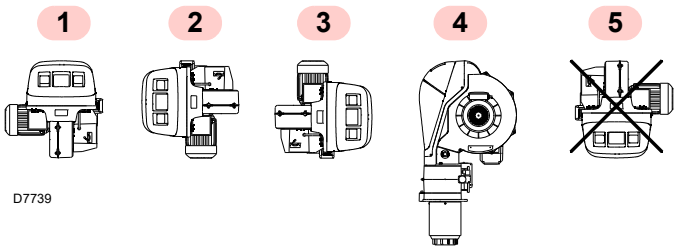


Fig. 10

4.5 Preparing the boiler

4.5.1 Boring the boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 11.

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

mm	D1	DF	∅
RS 70-100	185	275-325	M12
RS 130	195	275-325	M12

Tab. E

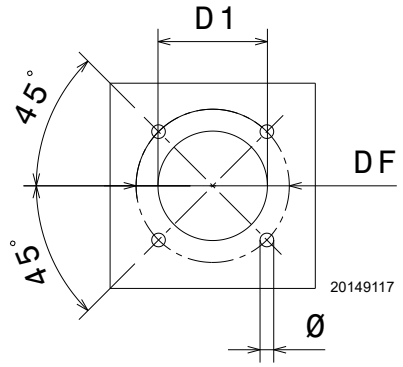


Fig. 11

4.5.2 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 lengths available, L, is as follows:

mm	RS 70-100	RS 130
Standard	250	280
Long	385	415

Tab. F

For boilers with front flue passes 15) or flame inversion chamber, a protection in refractory material 13) must be inserted between the boiler fettling 14) and the blast tube 12).

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

For boilers with a water-cooled front piece, a refractory lining 13)-14)(Fig. 12) is not necessary, unless expressly requested by the boiler manufacturer.

4.5.3 Securing the burner to the boiler

Provide an adequate lifting system.

- ➤ Separate the combustion head from the rest of the burner (Fig. 12):
- ➤ loosen the 4 screws 3) and remove the hood 1)
- ➤ disengage the articulated coupling 7) from the graduated sector 8)
- ➤ remove the screws 2) from the two slide bars 5)
- ➤ remove the two screws 4) and pull the burner back on the slide bars 5) by about 100 mm.
- ➤ disconnect the electrode cables, then completely unthread the burner from the slide bars.

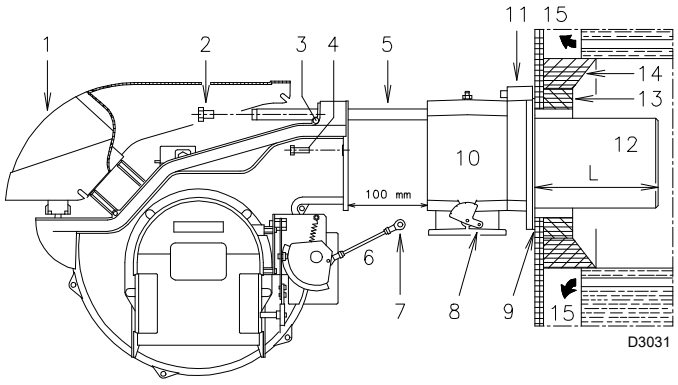


Fig. 12

WARNING

The seal between burner and boiler must be airtight.

4.6 Access to head internal part

In order to reach inside the combustion head (Fig. 13) proceed as follows:

➤ remove the screw 1) and take out the internal part 2).

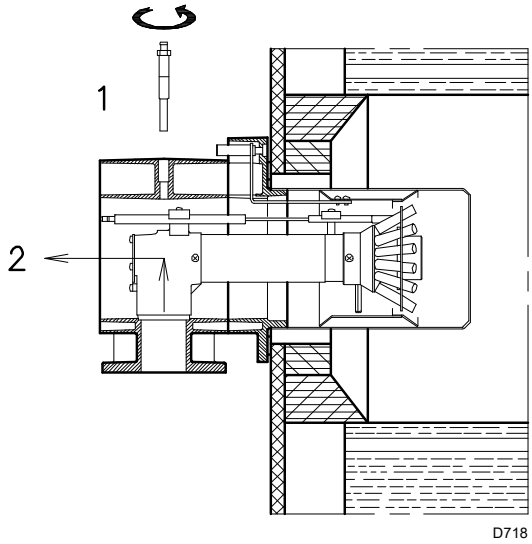


Fig. 13

4.7 Positioning the probe - electrode

WARNING

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.

WARNING

Do not rotate the probe: leave it as in Fig. 14 since if it is located too close to the ignition electrode, the control box amplifier may be damaged.

WARNING

Respect the dimensions shown in Fig. 14.

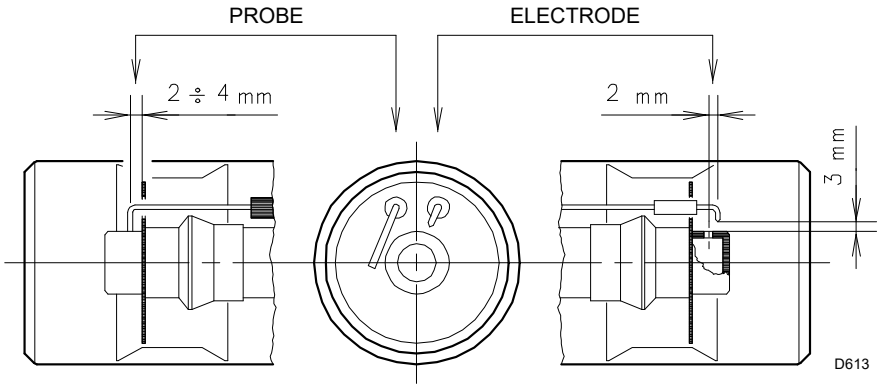


Fig. 14

4.8 Combustion head adjustment

At this point check, for model RS 130, whether the maximum delivery of the burner in 2nd stage operation is contained in area A or in area B of the firing rate Fig. 2 on page 9.

If it is in area A then no operation is required.

If, on the other hand, it is in area B, see Fig. 15:
– unscrew the screws 1) and disassemble the blast tube 2).
– Move the fixing of the rod 3) from position A to position B, thereby causing the shutter 4) to retract.
– Now refit the blast tube 2) and the screws 1).

Once this operation has been carried out (if it was required), secure the flange 11)(Fig. 12) to the boiler plate, interposing the thermal insulating screen 9)(Fig. 12) supplied with the burner.

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

The seal between burner and boiler must be airtight.

If you noticed any irregularities in positions of the probe or ignition electrode during the check mentioned above, remove screw 1)(Fig. 13), extract the internal part 2)(Fig. 13) of the head and proceed to set up the two components correctly.

Do not attempt to turn the probe.
Leave it in the position shown in (Fig. 14) since if it is located too close to the ignition electrode the control box amplifier may be damaged.

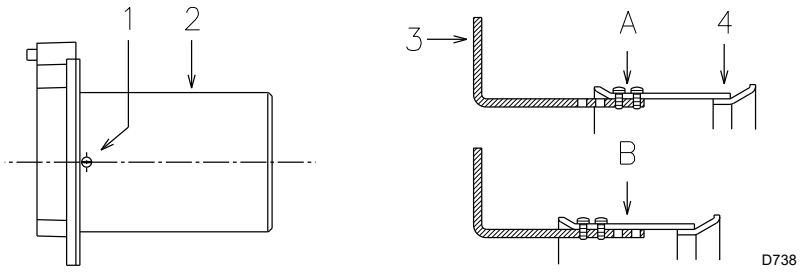


Fig. 15

4.9 Setting the combustion head

Installation operations are now at the stage where the blast tube and sleeve are secured to the boiler as shown in Fig. 16.
It is now a very simple matter to set up the combustion head, as this depends solely on the output developed by the burner in 2nd stage operation.

It is therefore essential to establish this value before proceeding to set up the combustion head.

There are two adjustments to make on the head:

air and gas deliveries.

In diagram (Fig. 17) find the notch to use for adjusting the air and the gas, and then proceed as follows:

Air adjustment

Turn screw 4)(Fig. 16) until the notch identified is aligned with the front surface 5)(Fig. 16) of the flange.

Gas adjustment

Loosen the 3 screws 1)(Fig. 16) and turn ring 2)(Fig. 16) until the notch identified is aligned with index 3)(Fig. 16).
Tighten the 3 screws 1)(Fig. 16) fully down.

Example RS 70: burner output = 581 kW (500 Mcal/h).

If we consult diagram (Fig. 17) we find that for this output, air and gas must be adjusted using notch 3, as shown in (Fig. 16).

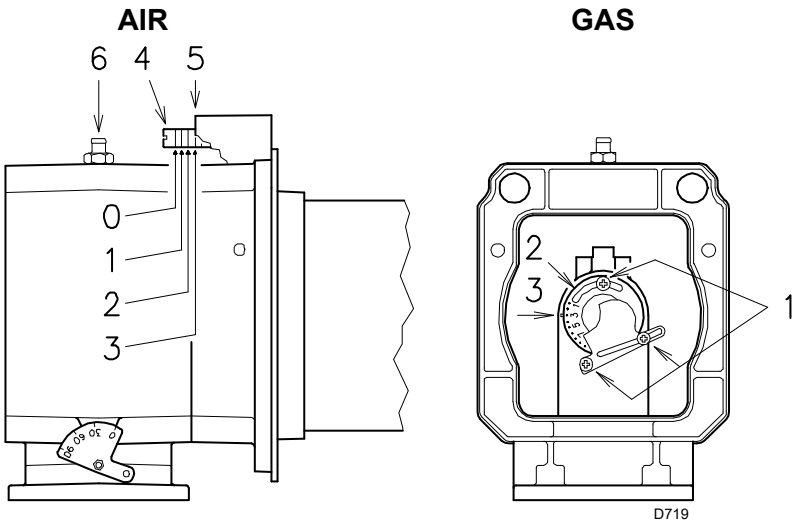


Fig. 16

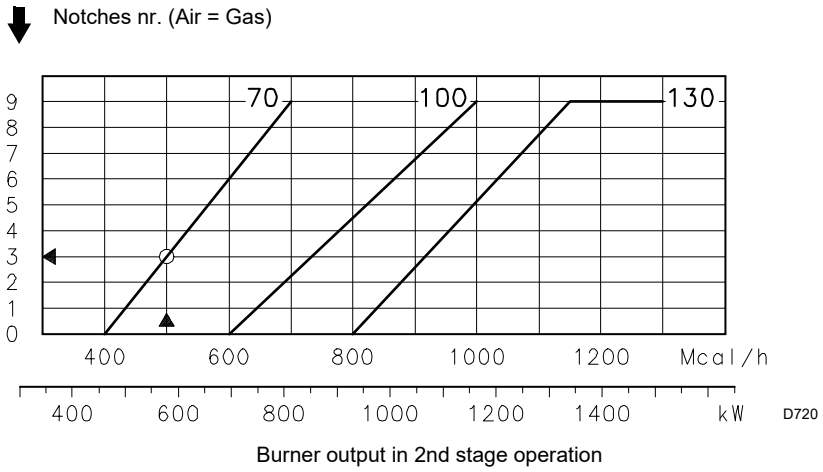


Fig. 17

Diagram (Fig. 17) shows the ideal settings for the combustion head. If the gas mains pressure is too low to reach the 2nd stage operation pressure indicated on Tab. G, and if the ring 2)(Fig. 16) is not fully open, it can be opened wider by 1 or 2 notches.

Continuing with the previous example, page 21 indicates that for burner RS 70 with output of 581 kW (500 Mcal/h) a pressure of approximately 6 mbar is necessary at test point 6)(Fig. 16).
If this pressure cannot be reached, open the ring 2)(Fig. 16) to notch 4 or 5.

Make sure that the combustion characteristics are satisfactory and free of pulsations.

Once you have finished setting up the head, refit the burner to the slide bars 3)(Fig. 18) at approximately 100 mm from the sleeve 4)(Fig. 18) - burner positioned as shown in Fig. 12 - insert the flame detection probe cable and the ignition electrode cable and then slide the burner up to the sleeve so that it is positioned as shown in Fig. 18.

Refit screws 2)(Fig. 18) on slide bars 3)(Fig. 18).

Secure the burner to the sleeve by tightening screw 1)(Fig. 18).

Reconnect the articulation 7)(Fig. 18) to the graduated sector 6)(Fig. 18).

WARNING

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

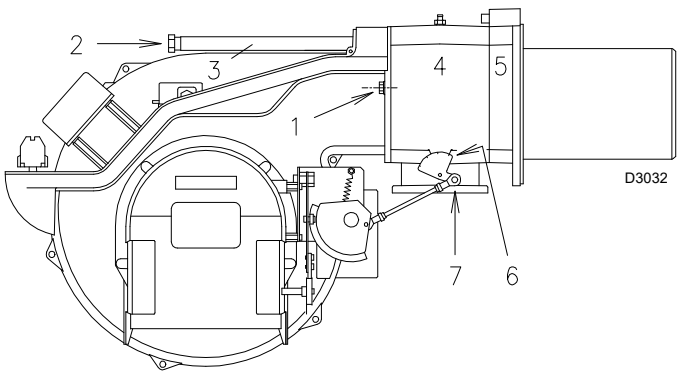


Fig. 18

4.10 Gas feeding

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

Precautions: avoid knocking, attrition, sparks and heat.

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

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

4.10.1 Gas feeding line

Key (Fig. 19 - Fig. 20 - Fig. 21 - Fig. 22)

1 Gas input pipe
2 Manual valve
3 Vibration damping joint
4 Pressure gauge with push-button cock
5 Filter
6A Includes:
- filter
- working valve
- safety valve
- pressure adjuster

6B Includes:
- working valve
- safety valve
- pressure adjuster

6C Includes:
- safety valve
- working valve

6D Includes:
- safety valve
- working valve

7 Minimum gas pressure switch
8 Leak detection control, provided as an accessory or integrated, based on the gas train code. In compliance with the EN 676 standard, the leak detection control is compulsory for burners with maximum outputs over 1200 kW.
9 Gasket, for “flanged” versions only
10 Pressure adjuster
11 Train-Burner adaptor, supplied separately
P2 Upstream pressure of valves/adjuster
P3 Upstream pressure of the filter
L Gas train, supplied separately
L1 The responsibility of the installer

MBC “threaded”

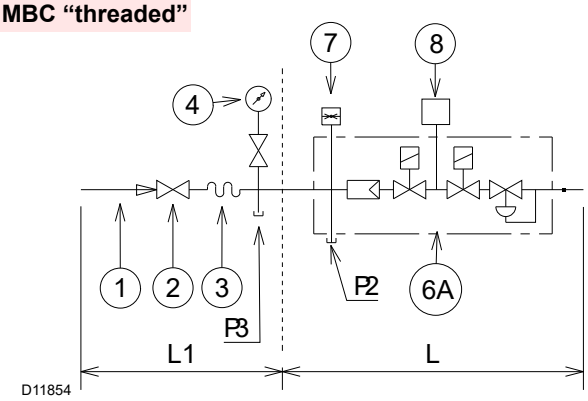


Fig. 19

MBC “flanged” - VGD

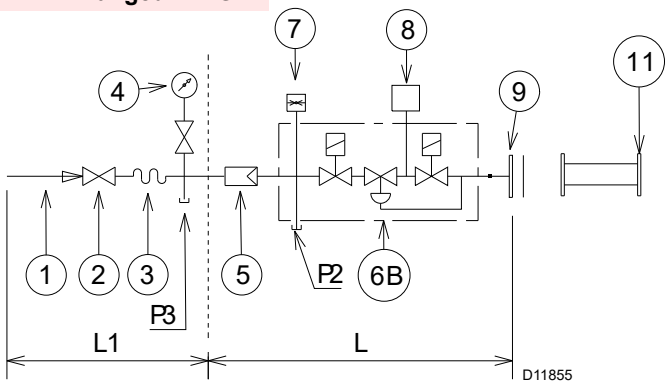


Fig. 20

DMV “flanged or threaded”

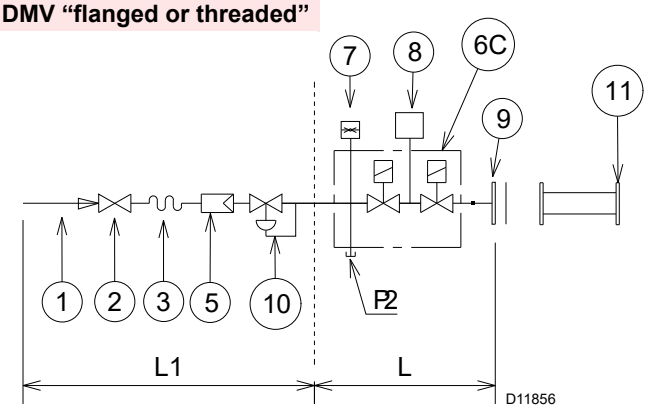


Fig. 21

CB “flanged or threaded”

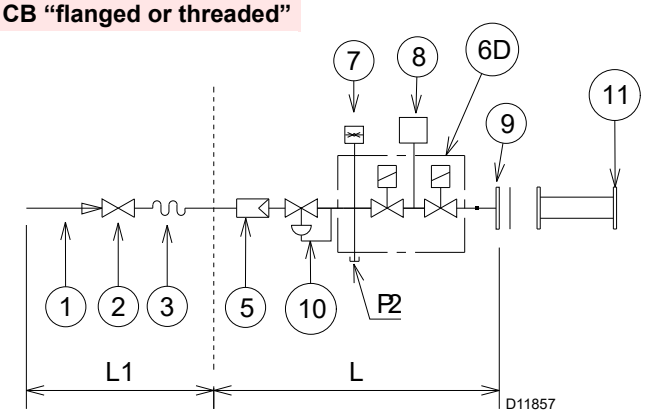


Fig. 22

4.10.2 Gas train

Approved according to standard EN 676 and provided separately from the burner.

4.10.3 Gas train installation

Disconnect the electrical power using the 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 gas train must be connected to the gas connection 1)(Fig. 23), using the flange 2), the gasket 3) and the screws 4) supplied with the burner.

The train can enter the burner from the right or left side, depending on which is the most convenient, see Fig. 23.

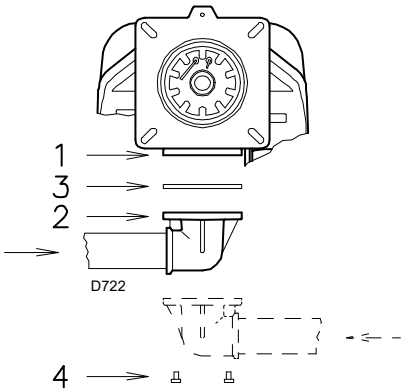


Fig. 23

4.10.4 Gas pressure

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

Model	kW	Δp (mbar)	
		1	2
RS 70	465	4.2	0.2
	515	4.8	0.2
	565	5.6	0.3
	615	6.4	0.3
	665	7.3	0.3
	715	8.3	0.4
	765	9.3	0.4
	814	10.3	0.4
RS 100	6.95	3.7	0.4
	760	4.2	0.4
	825	5.0	0.5
	890	5.8	0.5
	955	6.5	0.6
	1020	7.3	0.7
	1085	8.3	0.8
	1163	9.3	0.8
RS 130	930	3.8	1.0
	1010	4.5	1.1
	1090	5.1	1.3
	1170	5.8	1.5
	1250	6.5	1.7
	1330	7.2	1.8
	1410	7.9	1.9
	1512	8.6	2.0

Tab. G

The heat output and gas pressure data in the head refer to operation with gas butterfly valve fully open (90°).

The values shown in Tab. G refer to:
– Natural gas G 20 NCV 10 kWh/Sm^3 (8.6 Mcal/Sm^3).

Column 1

Pressure loss at combustion head.

Gas pressure measured at test point 1)(Fig. 24), with:

- Combustion chamber at 0 mbar
- Burner operating in 2nd stage
- Gas ring 2)(Fig. 16) adjusted as indicated in diagram (Fig. 17).

Column 2

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

To calculate the approximate output at which the burner operates in the 2nd stage:

– subtract the combustion chamber pressure from the gas pressure measured at test point 1)(Fig. 24).
– Find, in Tab. G related to the burner concerned, the pressure value closest to the result of the subtraction.
– Read the corresponding output on the left.

Example - RS 100:

2nd stage operation

Natural gas G 20 NCV 10 kWh/Nm^3

Gas ring nut 2)(Fig. 16 on page 18) adjusted as in the diagram (Fig. 17 on page 19).

Gas pressure at test point 1)(Fig. 24)	=	8.0 mbar
Pressure in combustion chamber	=	3.0 mbar
8.0 - 3.0	=	5.0 mbar

A pressure of 5.0 mbar, column 1, corresponds in the table RS 100 to an output in the 2nd stage of 825 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. 24), set the maximum modulating output required from the burner operation:

– find the nearest output value in Tab. G for the burner in question.
– read, on the right (column 1), the pressure at the test point 1) (Fig. 24).
– Add this value to the estimated pressure in combustion chamber.

Example - RS 100:

Desired output in 2nd stage: 825 kW

Natural gas G 20 NCV 10 kWh/Nm3

Gas ring nut 2)(Fig. 16 on page 18) adjusted as in the diagram (Fig. 17 on page 19).

Gas pressure at an output of 825 kW	=	5.0 mbar
Pressure in combustion chamber	=	3.0 mbar
5.0 + 3.0	=	8.0 mbar

pressure required at test point 1)(Fig. 24).

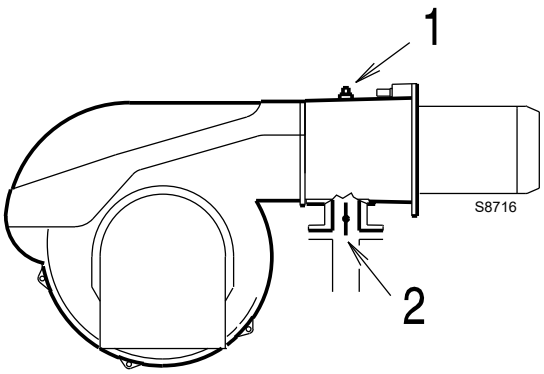


Fig. 24

4.11 Electrical wiring

Notes on safety for the electrical wiring

DANGER

- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be made in accordance with the regulations currently in force in the country of destination and by qualified personnel. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- The burner has been type-approved for intermittent use.
  This means they should compulsorily be stopped at least once every 24 hours to enable the control box to perform checks of its own start-up efficiency. Normally, burner stopping is guaranteed by the boiler's thermostat/pressure switch.
- If this is not the case, a time switch should be fitted in series to TL to stop the burner at least once every 24 hours. Refer to the wiring diagrams.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel. Do not use the gas tubes as an earthing system for electrical devices.
- The electrical system must be suitable for the maximum power absorption of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for that level of power absorption.
- For the main power supply of the device from the electricity mains:
  - do not use adapters, multiple sockets or extensions;
  - 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:

DANGER

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

DANGER

Close the fuel interception tap.

DANGER

Avoid condensate, ice and water leaks from forming.

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

Use flexible cables in compliance with the EN 60 335-1 standard.

4.11.1 Supply cables and external connections passage

All the cables to be connected to the terminal board 10)(Fig. 25) of the burner must be threaded through cable grommets.

The use of the cable grommets and the pre-blanked holes can be done in different manners; by way of example we indicate the following mode (Fig. 25):

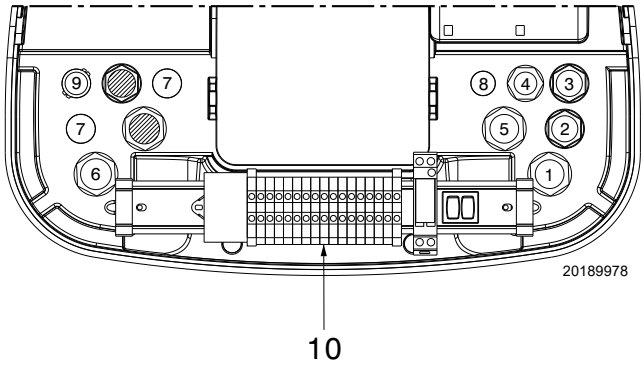


Fig. 25

Key to layout (Fig. 25)

1	Pg 13.5	Three-phase power supply
2	Pg 11	Single-phase power supply
3	Pg 11	Remote control device TL
4	Pg 9	Remote control TR
5	Pg 13.5	Gas valves
6	Pg 13.5	Gas pressure switch or gas valve leak detection control device
7	Pg 11	Open the hole, if a pipe union is to be added
8	Pg 9	Open the hole, if a pipe union is to be added
9	Pg 11	Available

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

4.12 Calibration of the thermal relay

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

For the calibration, act on the wiper 2)(Fig. 26) by referring to the wiring diagram.

In case of burner lock-out, due to the thermal relay, press the button 1)(Fig. 26).

WARNING

The automatic reset can be dangerous.

This operation is not foreseen in the burner operation.

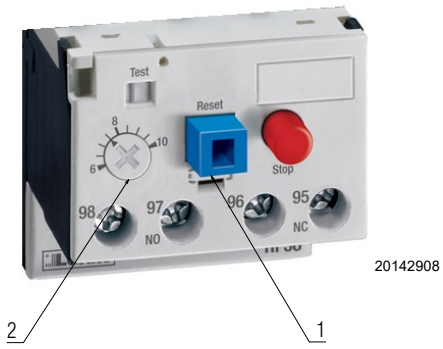


Fig. 26

4.13 Measuring the ionisation current

The burner is fitted with an ionisation system to check that a flame is present. The minimum current for control box operation is 6 µA.

The burner provides a much higher current, so controls are not normally required.

If it is necessary, however, to measure the ionisation current, disconnect the plug-socket 2)(Fig. 27) on the ionisation probe cable and insert a direct current microammeter 1)(Fig. 27) with a base scale of 100 µA.

WARNING

Carefully check the polarities!

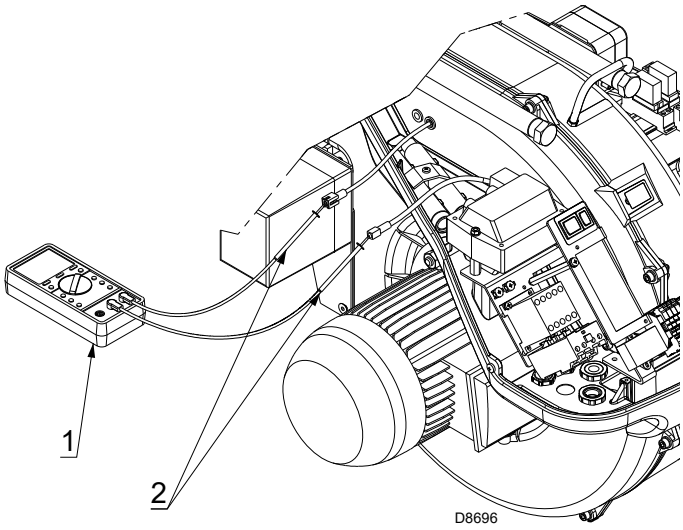


Fig. 27

5 Start-up, calibration and operation of the burner

5.1 Notes on safety for the first start-up

WARNING

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.

WARNING

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

WARNING

Refer to paragraph “Safety test - with gas feeding closed” on page 32 before the first start-up.

5.2 Adjustments before first firing

WARNING

Ensure that the gas supply company has carried out the supply line vent operations, eliminating air or inert gases from the piping.

Adjustment of the combustion head, and air and gas deliveries has been illustrated in the paragraph “Setting the combustion head” on page 18.

In addition, the following adjustments must also be made:

- ➤ open manual valves up-line from the gas train.
- ➤ Adjust the minimum gas pressure switch to the start of the scale (Fig. 36).
- ➤ Adjust the air pressure switch to the zero position of the scale (Fig. 35).
- ➤ Purge the air from the gas line.
- ➤ Continue to purge the air (we recommend using a plastic tube routed outside the building) until gas is smelt.
- ➤ Fit a U-type manometer (Fig. 28) to the gas pressure test point on the sleeve.
- ➤ The manometer readings are used to calculate the 2nd stage operation burner power using the Tab. G.
- ➤ Connect two lamps or testers to the two gas line solenoid valves VR and VS to check the exact moment at which voltage is supplied.
- ➤ This operation is unnecessary if each of the two solenoid valves is equipped with a pilot light that signals voltage passing through.

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.

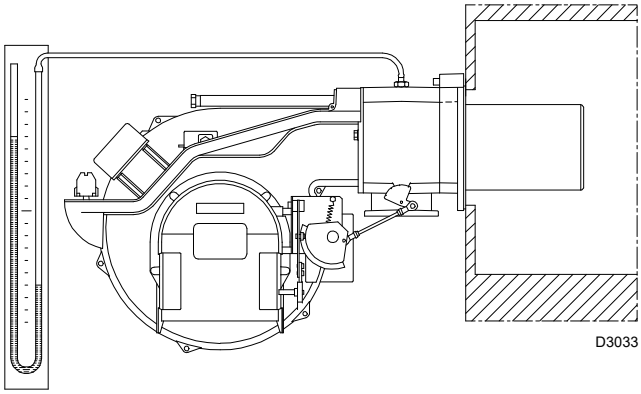


Fig. 28

5.3 Burner start-up

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

Close the remote controls and turn:

– switch 1)(Fig. 29) to the “Burner ON” position;
– switch 2)(Fig. 29) to the “1st stage” position.

WARNING

As soon as the burner starts up:

– check the fan rotation direction through the flame inspection window 13) Fig. 5 on page 11.
– check the fan motor rotation direction, as shown in Fig. 30.

DANGER

Make sure that the lights or testers connected to the solenoids, or the pilot lights on the solenoids themselves, indicate that no voltage is present.

If voltage is present, stop the burner **immediately** and check the electrical wiring.

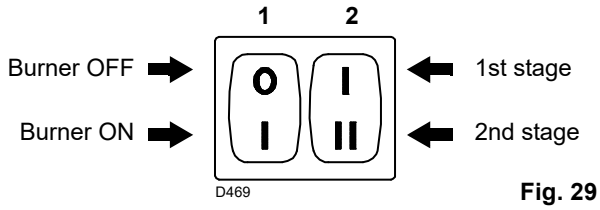


Fig. 29

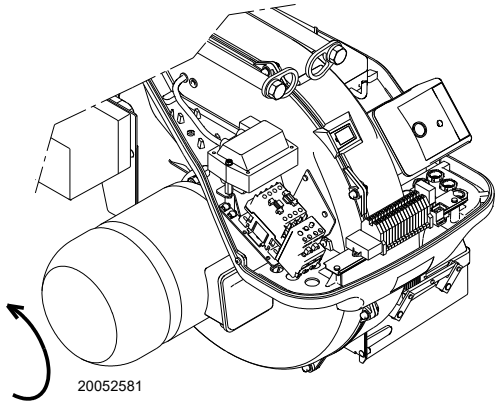


Fig. 30

5.4 Servomotor adjustment

The servomotor (Fig. 31) simultaneously adjusts the air damper (by means of the variable profile cam) and the gas butterfly valve. The servomotor rotates by 90° in 12 seconds.

WARNING

Do not alter the factory setting for the 4 cams; check only that they are as shown below.

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

Cam II: **0°**
Limits rotation toward minimum position.
When the burner is shut down, the air damper and gas butterfly valve must be closed: 0°.

Cam III: **30°**
Adjusts the firing and output position in 1st stage.

Cam IV: **85°**
Output signal for 2nd stage and/or hour counter.

NOTE:
The servomotor follows the adjustment of the black and orange lever when the angle of the cam is reduced.

- ➤ If the angle needs to be increased, pass to the 2nd stage and increase the angle, then return to the 1st stage to check the effect of the adjustment.
- ➤ For any necessary adjustment of cam III, use the screwdriver 11)(Fig. 33).
- ➤ For any necessary adjustment of cam IV, use the specific key 10)(Fig. 32) place inside the servomotor.

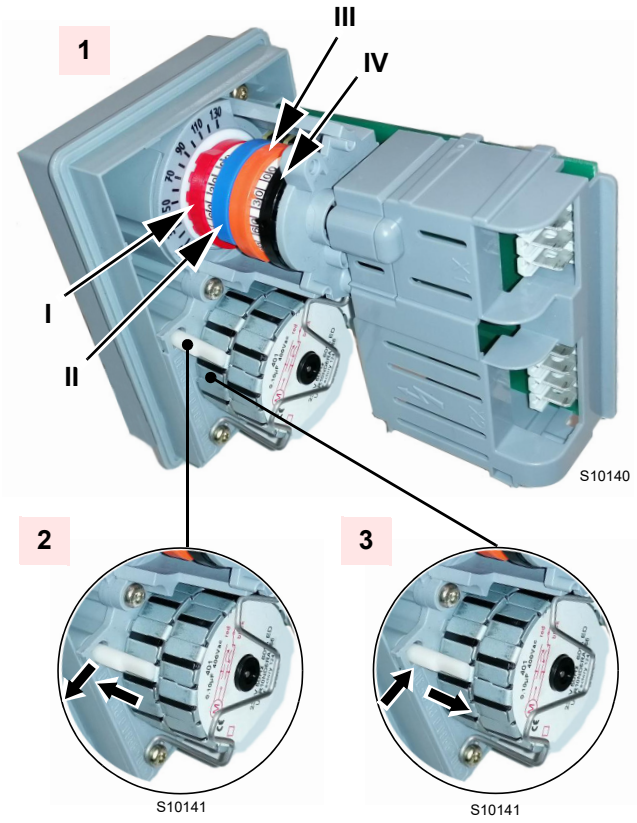


Fig. 31

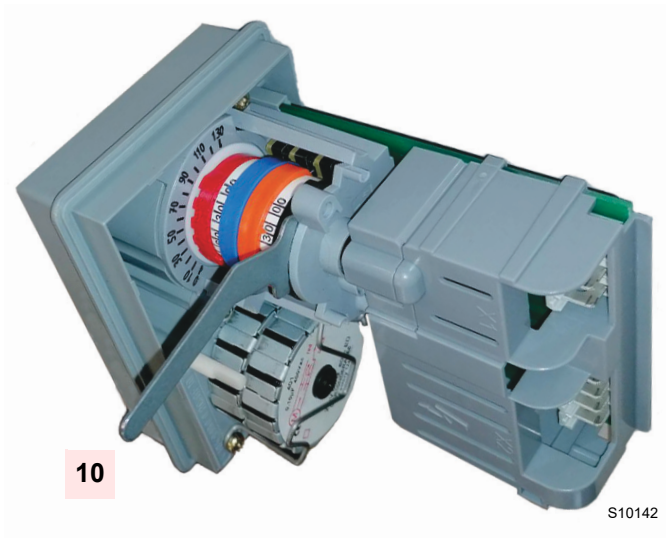


Fig. 32

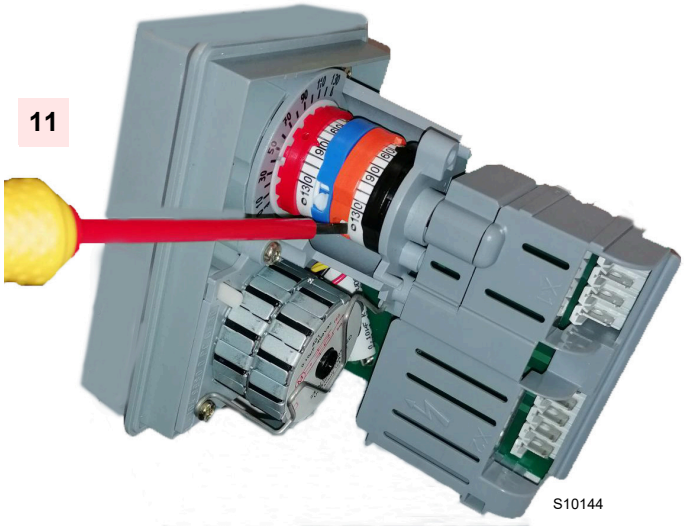


Fig. 33

Key
1 Servomotor
2 Servomotor 1) - cam 4): constrained
3 Servomotor 1) - cam 4): released
10 Spanner for adjusting cam IV (Fig. 32)
11 Screw driver for adjusting cam III (Fig. 33)

5.5 Burner ignition

Having completed the checks indicated in the previous heading, ignition of the burner should be achieved.

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

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

The arrival of gas to the pipe coupling is shown by the pressure gauge.

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

5.6 Adjusting the burner

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

Adjust in sequence:
1 Burner output in 2nd stage
2 Burner output in 1st stage
3 Ignition output
4 Air pressure switch
5 Minimum gas pressure switch

5.6.1 Ignition output

According to EN 676:

Burners with MAX output up to 120 kW

Ignition can occur at the maximum operation output level. Example:

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

Burners with MAX output above 120 kW

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

If ignition output does not exceed 120 kW, no calculations are required. If ignition output exceeds 120 kW, the regulatory standard sets that the value be defined according to the control box safety time “ts”:
– for “ts” = 2s, ignition output must be equal to or lower than 1/2 of max. operation output;
– for “ts” = 3s, ignition output must be equal to or less than 1/3 of the max. operation output.

Example:

MAX operation output of 600 kW.

Ignition output must be equal to or lower than:

- 300 kW con ts = 2s
- 200 kW con ts = 3s

In order to measure the ignition output:
– Remove the UV sensor 29)(Fig. 5 on page 11)(the burner comes on and goes into lockout after the safety time).
– Perform 10 ignitions with consecutive lockouts.
– Read the quantity of gas burned on the meter.
This quantity must be equal to or lower than the quantity given by the formula:

$$\frac{\textbf{Nm}^3\textbf{/h}\ \text{(max. burner delivery)}}{\textbf{360}}$$

Example for G 20 gas (10 kWh/Nm^3):

Max operation output, 600 kW

corresponding to 60 Nm^3/h.

After 10 ignitions with their lockouts, the delivery indicated on the meter must be equal to or less than:

60 : 360 = 0.166 Nm^3.

5.6.2 Output in 2nd stage

The output in the 2nd stage must be selected from within the firing rate range shown on page 9.

In the above description, we left the burner running, operating in the 1st stage.
Turn switch 2)(Fig. 29) to the 2nd stage position: the servomotor will open the air damper and, at the same time, also the gas butterfly valve opens at 90.

Adjustment of gas delivery

Measure the gas delivery on the gas meter.

A rough indication can be obtained from the tables on page 5, just read the gas pressure on the U-shaped pressure gauge, see Fig. 28 on page 25), and follow the instructions on page 21.

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

If delivery needs to be increased, increase outlet gas pressure.

Air adjustment

Progressively adjust the end profile of cam 3)(Fig. 34) by turning the screws 5).

Turn the screws clockwise to increase air delivery.

Turn the screws anticlockwise to reduce air delivery.

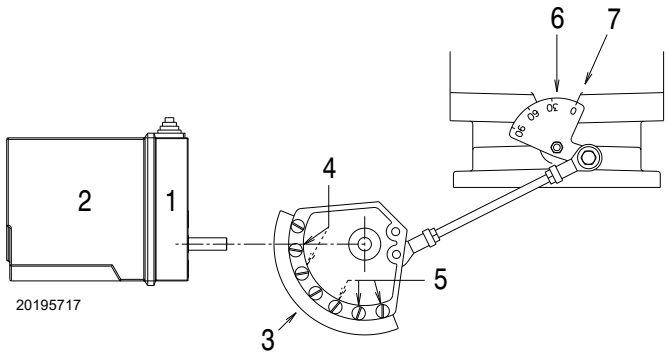


Fig. 34

1 Servomotor
2 Cam cover
3 Variable profile cam
4 Screws for adjusting the adjustable profile
5 Screws for adjusting the end profile
6 Graduated sector for gas butterfly valve
7 Index for graduated sector 6

5.6.3 Output in 1st stage

The 1st stage output must be selected from within the firing rate range shown on page 4.

Turn the switch 2)(Fig. 29 on page 25) to the 1st stage position: the servomotor 1)(Fig. 34) will close the air damper and, at the same time, also the gas butterfly valve closes to 15°, i.e. to the factory setting.

Adjustment of gas delivery

Measure the gas delivery on the gas meter.

– If it is necessary to decrease it, slightly decrease the angle of the orange lever (Fig. 33 on page 26) namely from angle 15° to 13° - 11°....
– If it is necessary to increase it, pass to 2nd stage by activating the switch 2)(Fig. 29 on page 25) and slightly increase the angle of the orange lever with small, regular movements, i.e. bring it from an angle of 15° to 17° - 19°....
  Now return to the 1st stage and measure the gas output.

NOTE:

The servomotor only follows the adjustment of the orange lever when the angle of the cam is reduced.
If the angle needs to be increased, pass to the 2nd stage, increase the angle and then return to the 1st stage to check the effects of the adjustment.

Adjustment of air delivery

Progressively adjust the initial profile of the cam 3)(Fig. 34) by turning the screws 4).
It is preferable not to turn the first screw since this is used to set the air damper to its fully closed position.

5.6.4 Air pressure switch

Adjust the air pressure switch after performing all other burner adjustments with the air pressure switch set to the start of the scale (Fig. 35).

With the burner operating in the 1st stage, increase adjustment pressure by slowly turning the relative knob clockwise until the burner locks out.

Then turn the knob anti-clockwise by about 20% of the set point and repeat burner starting to ensure it is correct.

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

WARNING

In conformity with the standard, the air pressure switch must prevent the CO in the flue gases from exceeding 1% (10,000 ppm).
To check this, insert a combustion analyser into the chimney, slowly close the fan suction inlet (for example with cardboard) and check that the burner locks out, before the CO in the fumes exceeds 1%.

The incorporated air pressure switch can work in a 'differential' mode if connected with two pipes. If a negative pressure in the combustion chamber during pre-purging prevents the air pressure switch from switching.
Switching may be obtained by fitting a second pipe between the air pressure switch and the suction inlet of the fan. In such a manner the air pressure switch operates as differential pressure switch.

WARNING

The use of the air pressure switch with differential operation is allowed only in industrial applications and where rules enable the air pressure switch to control only fan operation without any reference to CO limit.

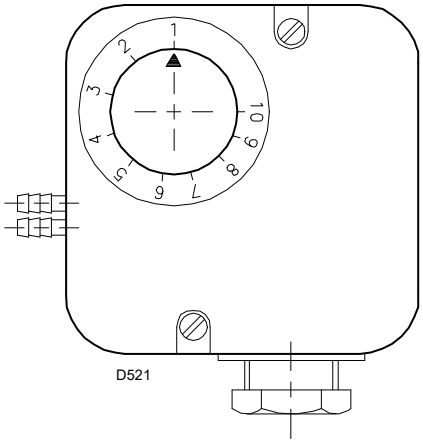


Fig. 35

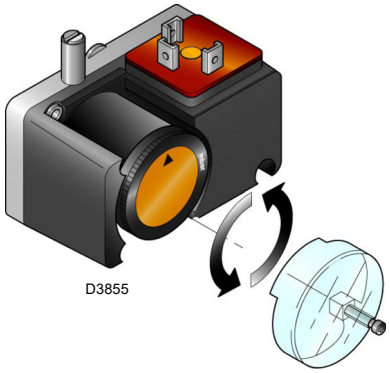


Fig. 36

5.6.5 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. 36) 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.

WARNING

1 kPa = 10 mbar

5.7 Operation sequence of the burner

5.7.1 Burner start-up

Control remote control TL closes (Fig. 37).

Servomotor starts: turn to the right, as far as the angle set on the cam with the orange lever.

After about 3s:

0 s The control box program starts up.

2 s The fan motor starts up.

3 s The servomotor starts up: turn to the right, until the contact intervenes on the cam with the red lever.
The air damper goes to 2nd stage output.
Pre-purging phase with air flow rate at 2nd stage output level. Duration 25 s.

28 s The servomotor starts up: turn to the left, as far as the angle set on the cam with the orange lever.

36 s The ignition electrode strikes a spark.
The air damper and gas butterfly valve are at 1st stage output level.
The safety valve VS opens, along with the adjustment valve VR, quick opening. The flame ignites with a small output - point A. The output gradually increases, and the valve slowly opens, until 1st stage output is reached - point B.

38 s The spark goes out.

46 s If the TR remote control is closed or replace with a jumper, the servomotor goes on rotating until the cam intervenes with the red lever, bring the air damper and gas butterfly valve to the 2nd stage - tract C-D.

The control box starting cycle ends. When heat demand (TL) is satisfied, the post-purging phase (*20s) starts.

5.7.2 Operation

System equipped with TR remote control (Fig. 37)

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

➤ When the temperature or pressure increases and opens the TR, the servomotor closes the gas butterfly valve and air damper, and the burner goes from the 2nd to the 1st operating stage - tract E/F.

➤ When the temperature or pressure falls and closes the TR, the servomotor opens the gas butterfly valve and air damper, and the burner goes from the 1st to the 2nd operating stage. The sequence repeats endlessly.

➤ The burner stops when the heat request is less than the amount of heat delivered by the burner in the 1st stage, tract G-H.
The TL remote control opens, and the servomotor returns to the 0° angle (limited by the cam with the light blue lever). The air damper closes completely to reduce heat losses to a minimum.

System not equipped with TR (replaced with jumper) (Fig. 37)

The burner is fired as described above. If the temperature or pressure increases until the TL opens, the burner shuts down (tract A-A in diagram Fig. 37).

NORMAL IGNITION
(n° = seconds from instant 0)

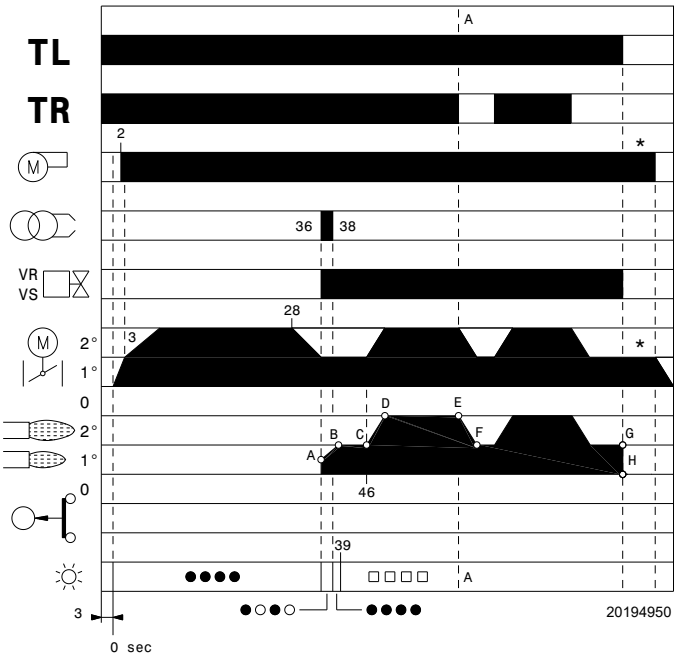


Fig. 37

RMG LED

Off
Yellow
Green
Red

5.7.3 Ignition failure

If the burner does not fire, it goes into lockout within 3s of the opening of the gas valve and within 42s of the closure of the TL remote control (Fig. 38). The red LED of the control box comes on.

NO IGNITION

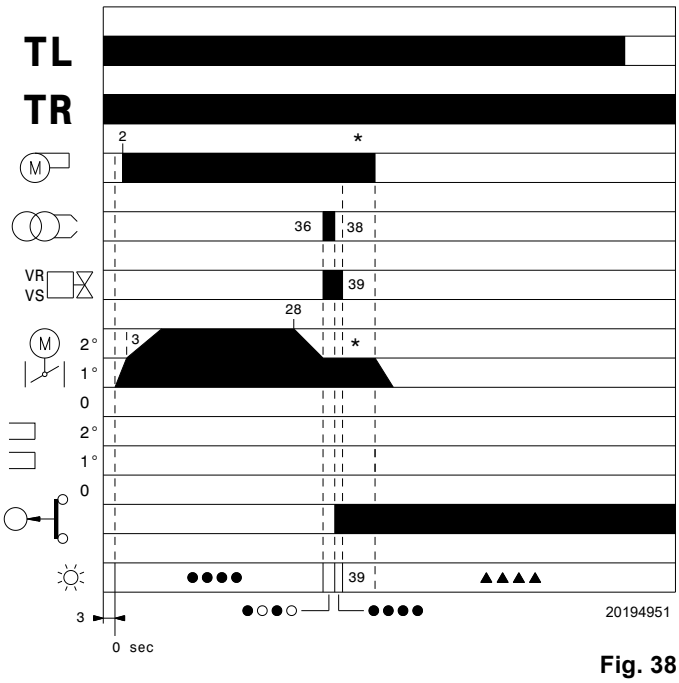


Fig. 38

5.7.4 Burner flame goes out during operation

If the flame accidentally goes out during operation, the burner will go into lockout within 1s.

5.8 Stopping of the burner

The burner can be stopped by:
- ➤ intervening on the disconnecting switch of the electrical supply line, located on the boiler panel;
- ➤ removing the casing and intervening on the switch Fig. 29 on page 25.

Carry out all the operations, then reassemble the hood and all the burner safety and protection devices.

5.9 Final checks (with burner operating)

➤ Open the thermostat/pressure switch TL ➤ Open the thermostat/pressure switch TS	⇨	The burner must stop
➤ Turn the air pressure switch to the maximum end of scale position	⇨	The burner must stop in lockout
➤ Turn off the burner and cut off the power ➤ Disconnect the minimum gas pressure switch connector	⇨	The burner must not start
➤ Disconnect the wire of the ionisation probe	⇨	The burner must stop in lockout due to ignition failure

Tab. H

WARNING

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

5.9.1 Checking the air and gas pressure on the combustion head

To check the air and gas pressure on the burner pipe coupling, install the relative pressure gauges as shown in Fig. 39.

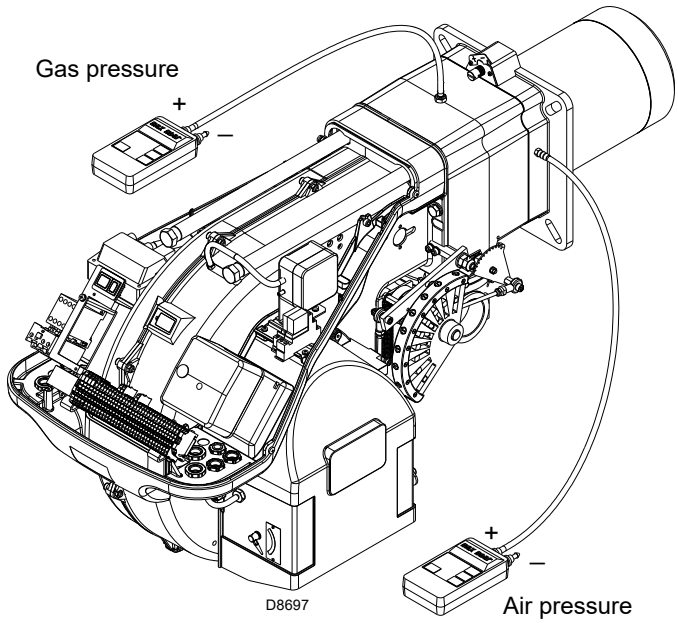


Fig. 39

6 Maintenance

6.1 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 main system switch.


DANGER

Close the fuel interception tap.

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

6.2 Maintenance programme

6.2.1 Maintenance frequency

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

6.2.2 Safety test - with gas feeding closed

For its safe commissioning it is very important to make sure that the electrical wiring has been carried out correctly between the gas valves and the burner.

To this end, after checking that the connections have been made in conformity with the burner's wiring diagram, a starting cycle should be carried out with the gas tap closed (dry test).

1 The manual gas valve should be closed with the locking/releasing device (“lock-out / tag out” procedure).
2 Make sure the limit electric contacts of the burner close
3 Make sure the contact of the minimum gas pressure switch closes
4 Proceed with a tentative start up of the burner.

The starting cycle should occur with the following phases:

– Starting the fan motor for pre-purging
– Carrying out the gas valve leak detection control, if applicable
– Completing the pre-purging
– Reaching the ignition point
– Power supply of the ignition transformer
– Power supply the gas valves.

Since the gas is closed, the burner will not be able to start and its control box will stop or go into a safety lockout.

The effective supplying of the gas valves can be checked with the insertion of a tester; some valves are fitted with light signals (or closure/opening position indicators) that are activated when the electrical supply arrives.


WARNING

IF THE ELECTRICAL SUPPLY OF THE GAS VALVES OCCURS AT AN UNEXPECTED MOMENT, DO NOT OPEN THE MANUAL VALVE, DISCONNECT THE ELECTRICAL SUPPLY, CHECK THE WIRING; CORRECT THE ERRORS AND CARRY OUT THE ENTIRE TEST AGAIN.

6.2.3 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 and correctly positioned.

Gas filter

Change the gas filter when it is dirty.

Burner

Check that there are not excess wear or loosen screws. The screws securing the electrical leads in the burner plugs should also be fully tightened.
Clean the outside of the burner.
Clean and grease the adjustable profile of the cams.

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.

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.

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

Flame inspection window
Clean the glass of the flame inspection window.

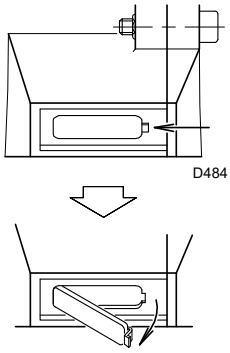


Fig. 40

6.2.4 Combustion control (gas)

The optimum calibration of the burner requires an analysis of the flue gases.
Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.
In case the combustion values found at the beginning of the intervention do not respect the standards in force or, in any case, do not correspond to a proper combustion, contact the Technical Assistance Centre in order to carry out 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

Tab. I

CO_2
It is advisable to adjust the burner with a CO_2 not greater than about 10% (gas con Ncv 8600 kcal/m^3). In this way it is avoided that a small decalibration (for example a variation in the tension) could cause a combustion with an air defect and with the subsequent formation of CO.

CO
It should not exceed 100 mg/kWh.

6.2.5 Safety components

The safety components should be replaced at the end of their life cycle indicated in Tab. J.
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
Hoses (if present)	5 years or 30,000 pressurised cycles
Fan impeller	10 years or 500,000 start-ups

Tab. J

6.3 Opening the burner

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

Close the fuel interception tap.

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

- ➤ Loosen the screws 1) and remove the hood 2).
- ➤ Disengage the articulated coupling 7) from the graduated sector 8).
- ➤ 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 it is possible to extract the gas distributor 5) after having removed the screw 6)(Fig. 41).

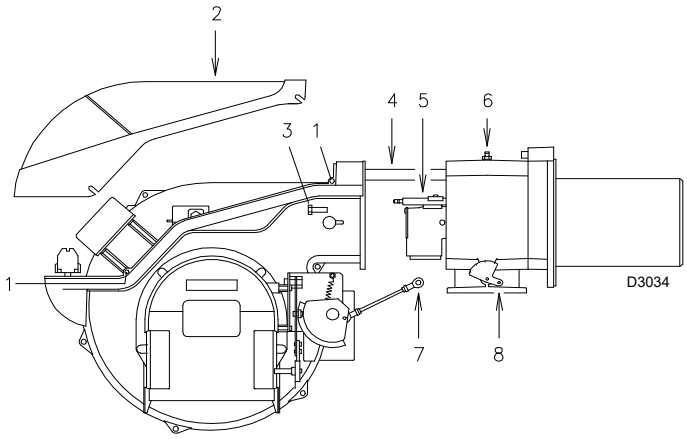


Fig. 41

6.4 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) and carefully pull the probe and electrode cables outwards until they are slightly taut.
- ➤ Reconnect the articulated coupling 7) to the graduated sector 8).

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

7 Faults - Possible causes - Solutions


WARNING

In the event the burner stops, in order to prevent any damage to the installation, do not unblock the burner more than twice in a row. If the burner locks out for a third time, contact the customer service.


DANGER

In the event there are further lockouts or faults with the burner, the maintenance interventions 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.

Signal	Problem	Possible cause	Recommended remedy
2 blinks ●●	Once the pre-purging phase and safety time have passed, the burner goes into lockout without the appearance of the flame.	The operation solenoid lets little gas through.	Increase
		One of the two solenoid valves does not open	Replace
		Gas pressure too low	Increase pressure at governor
		Ignition electrode incorrectly adjusted	Adjust it
		Electrode grounded due to broken insulation	Replace
		High voltage cable defective	Replace
		High voltage cable deformed by high temperature	Replace and protect
		Ignition transformer defective	Replace
		Incorrect valve or transformer electrical wiring	Check
		Defective control box	Replace
		A closed valve upline the gas train	Open
		Air in pipework	Bleed air
		Gas valves unconnected or with interrupted coil	Check connections or replace coil
3x flashes ●●●	The burner does not switch on, and the lockout appears	Air pressure switch in operating position	Adjust or replace
	The burner switches on, but then stops in lockout	Air pressure switch does not switch owing to lack of air pressure:	
		Air pressure switch poorly adjusted	Adjust or replace
		Pressure switch pressure point pipe blocked	Clean
		Poorly adjusted head	Adjust
		High pressure in the furnace	Connect air pressure switch to fan suction line
	Lockout during pre-purging phase	Defective motor control contactor (only three-phase version)	Replace
		Defective electrical motor	Replace
		Motor lockout (only three-phase version)	Replace
4 blinks ●●●●	The burner switches on, but then stops in lockout	Flame simulation	Replace the control box
	Lockout when burner stops	Permanent flame in the combustion head or flame simulation	Eliminate persistence of flame or replace control box
6 blinks ●●●●●●	The burner switches on, but then stops in lockout	Defective or incorrectly adjusted servomotor	Adjust or replace
7 blinks ●●●●●●●	The burner goes into lockout immediately following the appearance of the flame	The operation solenoid lets little gas through	Increase
		Ionisation probe incorrectly adjusted	Adjust
		Insufficient ionisation (less than 5 A)	Check probe position
		Earth probe	Withdraw or replace cable
		Burner poorly earthed	Check earthing
		Phase and neutral connections inverted	Invert them
		Defective flame detection circuit	Replace the control box
	Burner locks out when shifting from minimum to maximum output and vice versa	Too much air or too little gas	Adjust air and gas
	Burner goes into lockout during operation	Probe or ionisation cable grounded	Replace worn parts

Signal	Problem	Possible cause	Recommended remedy
10 blinks ●●●●● ●●●●●	The burner does not switch on, and the lock-out appears	Incorrect electrical wiring	Check
	The burner goes into lockout	Defective control box	Replace
		Presence of electromagnetic disturbances in the thermostat lines	Filter or eliminate
		Presence of electromagnetic disturbance	Use the radio disturbance protection kit
No blink	The burner does not start	No electrical power supply	Check connections
		A limiter or safety control device is open	Adjust or replace
		Line fuse blocked	Replace
		Defective control box	Replace
		No gas supply	Open the manual valves between contactor and train
		Mains gas pressure insufficient	Contact your gas company
		Minimum gas pressure switch fails to close	Adjust or replace
		Servomotor fails to move to min. ignition position	Replace
	The burner continues to repeat the start-up cycle, without lockout	The gas pressure in the gas mains lies very close to the value to which the gas pressure switch has been set. The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner comes to a halt. Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. And so on	Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge.
	Ignition with pulsations	Poorly adjusted head	Adjust
		Ignition electrode incorrectly adjusted	Adjust it
		Incorrectly adjusted fan air damper: too much air	Adjust
		Output during ignition phase is too high	Reduce
	Burner does not reach maximum output	Remote control device TR fails to close	Adjust or replace
		Defective control box	Replace
		Defective servomotor	Replace
	Burner stops with air damper open	Defective servomotor	Replace

Tab. K

A Appendix - Accessories

Kit for LPG operation

Burner	RS 70	RS 100	RS 130
Code	20008175 - 20008176	20008177 - 20008178	20008179 - 20008180

Vibration reduction kit

Burner	RS 70	RS 100	RS 130
Code	3010201	3010202	3010373 - 3010374

Town gas kit

Burner	RS 70	RS 100	RS 130
Code	3010286	30100287	30100288

Extended head kit

Burner	RS 70	RS 100	RS 130
Code	3010117	3010118	3010119

Spacer kit

Burner	RS 70-100-130
Code	3010129

Sound proofing box kit

Burner	RS 70-100-130
Code	3010404

Continuous purging kit

Burner	RS 70-100-130
Code	3010094

Differential circuit breaker kit

Burner	RS 70-100-130
Code	3010329

Maximum gas pressure switch kit

Burner	RS 70-100-130
Code	3010493

PC interface kit

Burner	RS 70-100-130
Code	3002719

Clean contacts kit

Burner	RS 70-100-130
Code	20123294

DN 80 flange kit

Burner	RS 70-100-130
Code	3010439

Radio disturbance protection kit

If the burner is installed in places particularly subject to radio disturbance (emission of signals exceeding 10 V/m) owing to the presence of an INVERTER, or in applications where the length of the thermostat connections exceeds 20 metres, a protection kit is available as an interface between the control box and the burner.

Burner	RS 70-100-130
Code	3010386

Gas trains in compliance with EN 676

Please refer to manual.

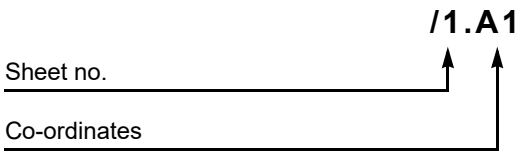
WARNING

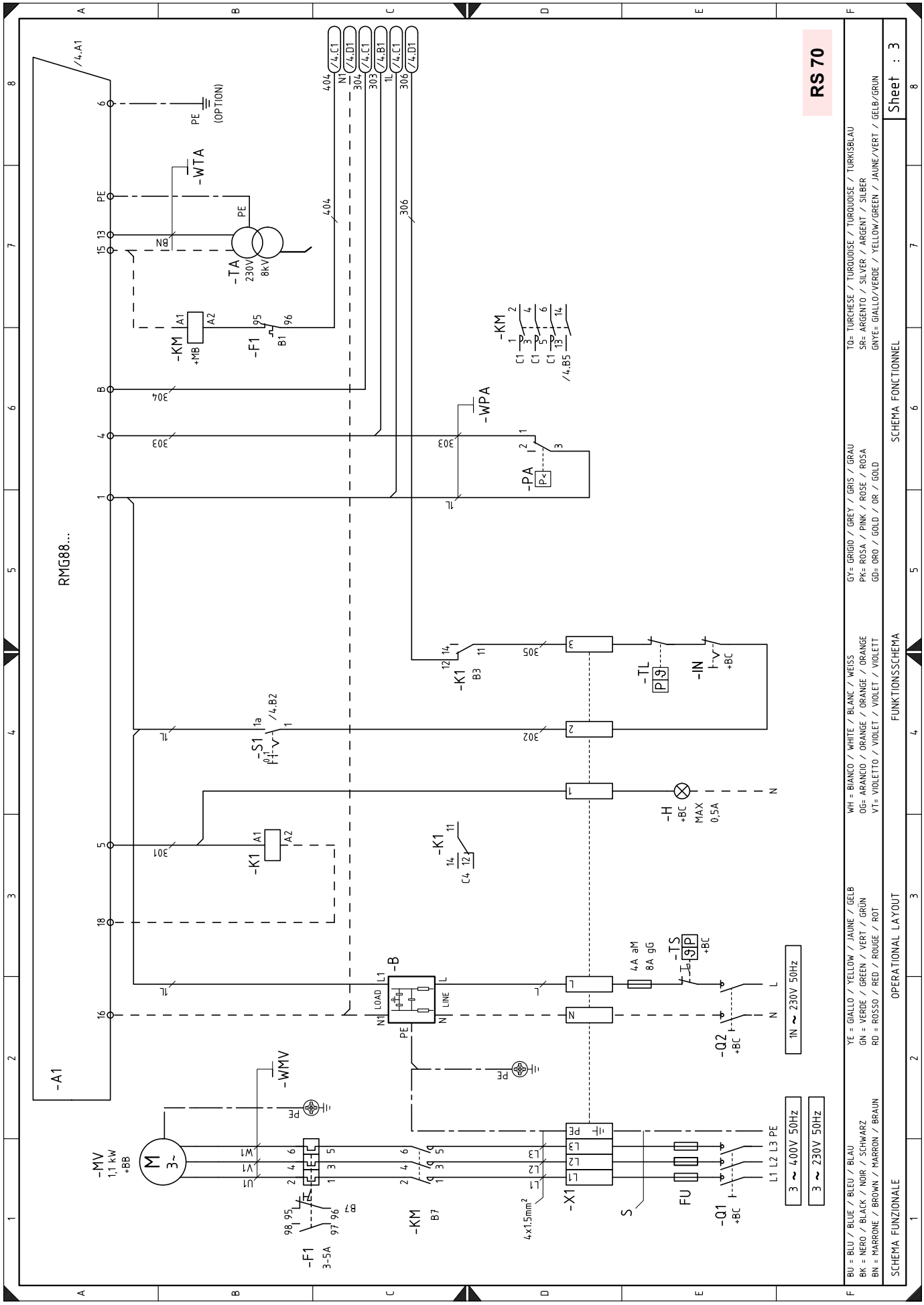
The installer is responsible for the addition of any safety device not foreseen in this manual.

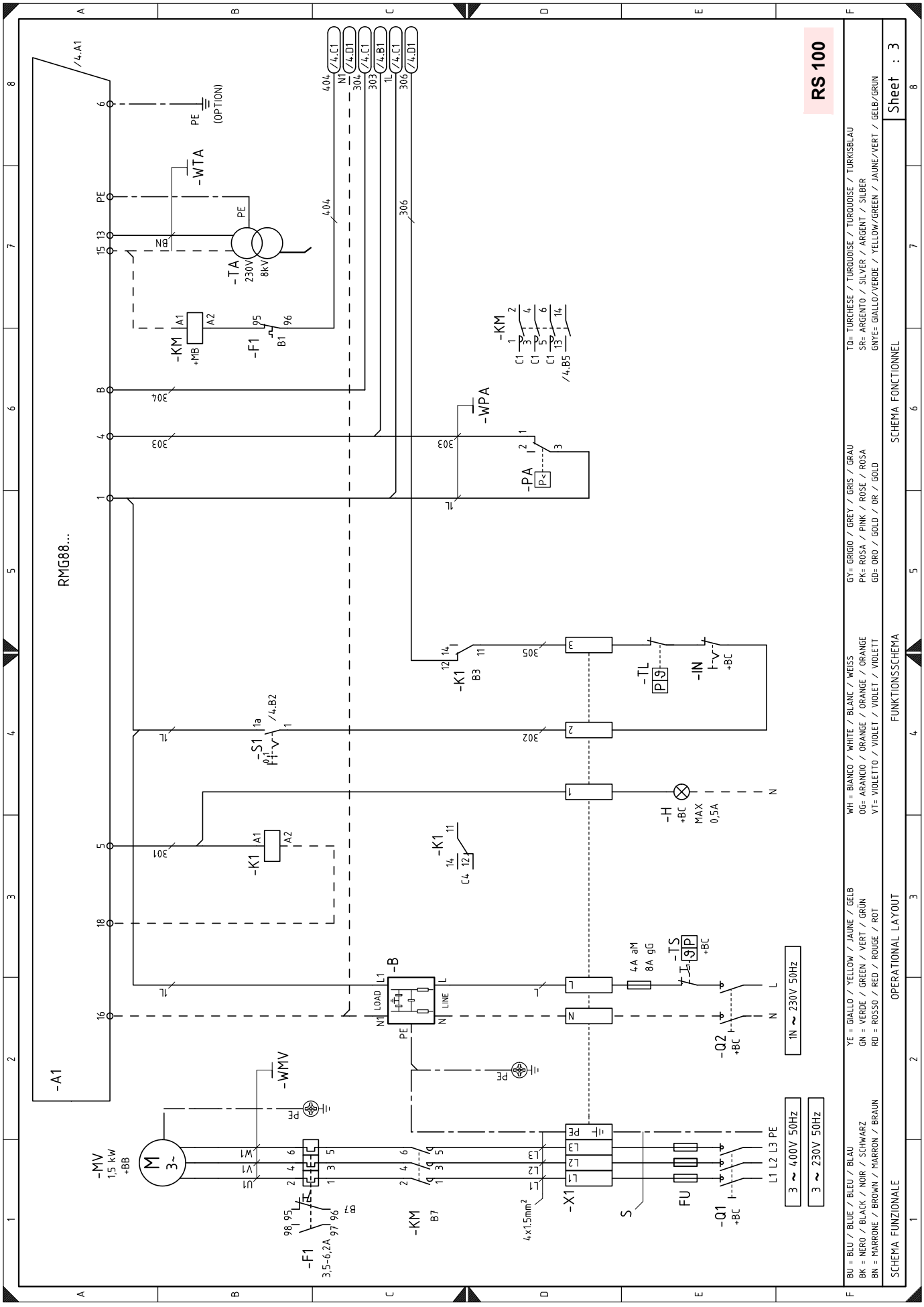
B Appendix - Electrical panel layout

1	**Index of layouts**
2	Indication of references
3	Operational layout RS 70 Operational layout RS 100 Operational layout RS 130
4	Operational layout
5	Electrical connections set by installer RS 70 Electrical connections set by installer RS 100 Electrical connections set by installer RS 130

2 Indication of references




RS 70
RMG88...
-A1
-MV
1,1 kW
+BB
-WMV
-WTA
-TA
230V
8kV
-F1
3-5A
-KM
+MB
-K1
-S1
-B
LOAD
LINE
-WPA
-PA
-TL
-IN
-H
MAX
0,5A
-TS
-Q2
-Q1
-X1
FU
S
4x1.5mm²
1N ~ 230V 50Hz
3 ~ 400V 50Hz
3 ~ 230V 50Hz
L1 L2 L3 PE
(OPTION)
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
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


RS 100
RMG88...
-A1
-MV
1,5 kW
+BB
-WMV
-F1
3,5-6,2A
-KM
B7
-X1
4x1.5mm²
S
FU
-Q1
+BC
-Q2
+BC
-B
LOAD
LINE
-TS
4A aM
8A gG
-H
+BC
MAX
0,5A
-IN
+BC
-TL
-K1
B3
-S1
-WPA
-PA
-KM
+MB
-F1
-TA
230V
8kV
-WTA
(OPTION)
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
L1 L2 L3 PE
N
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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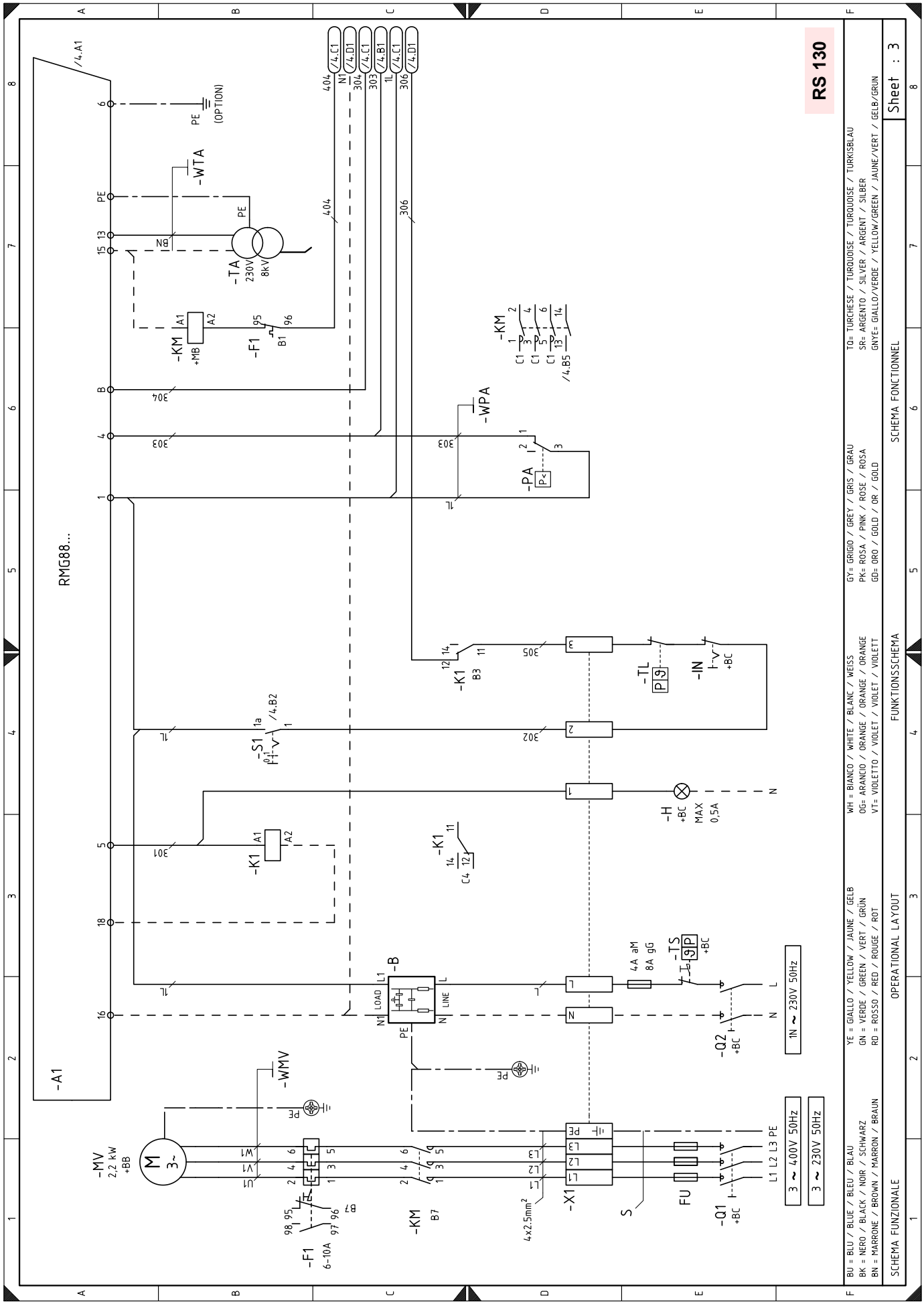
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


RS 130
RMG88...
-A1
-MV
2,2 kW
+BB
-WMV
-WTA
-TA
230V
8kV
-KM
+MB
-F1
6-10A
-K1
-S1
-WPA
-PA
-TL
-IN
+BC
-H
MAX
0,5A
-B
LOAD
LINE
-TS
4A aM
8A gG
-Q2
-Q1
-X1
FU
S
4x2.5mm²
1N ~ 230V 50Hz
3 ~ 400V 50Hz
3 ~ 230V 50Hz
L1 L2 L3 PE
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
BU = BLU / BLUE / BLEU / BLAU
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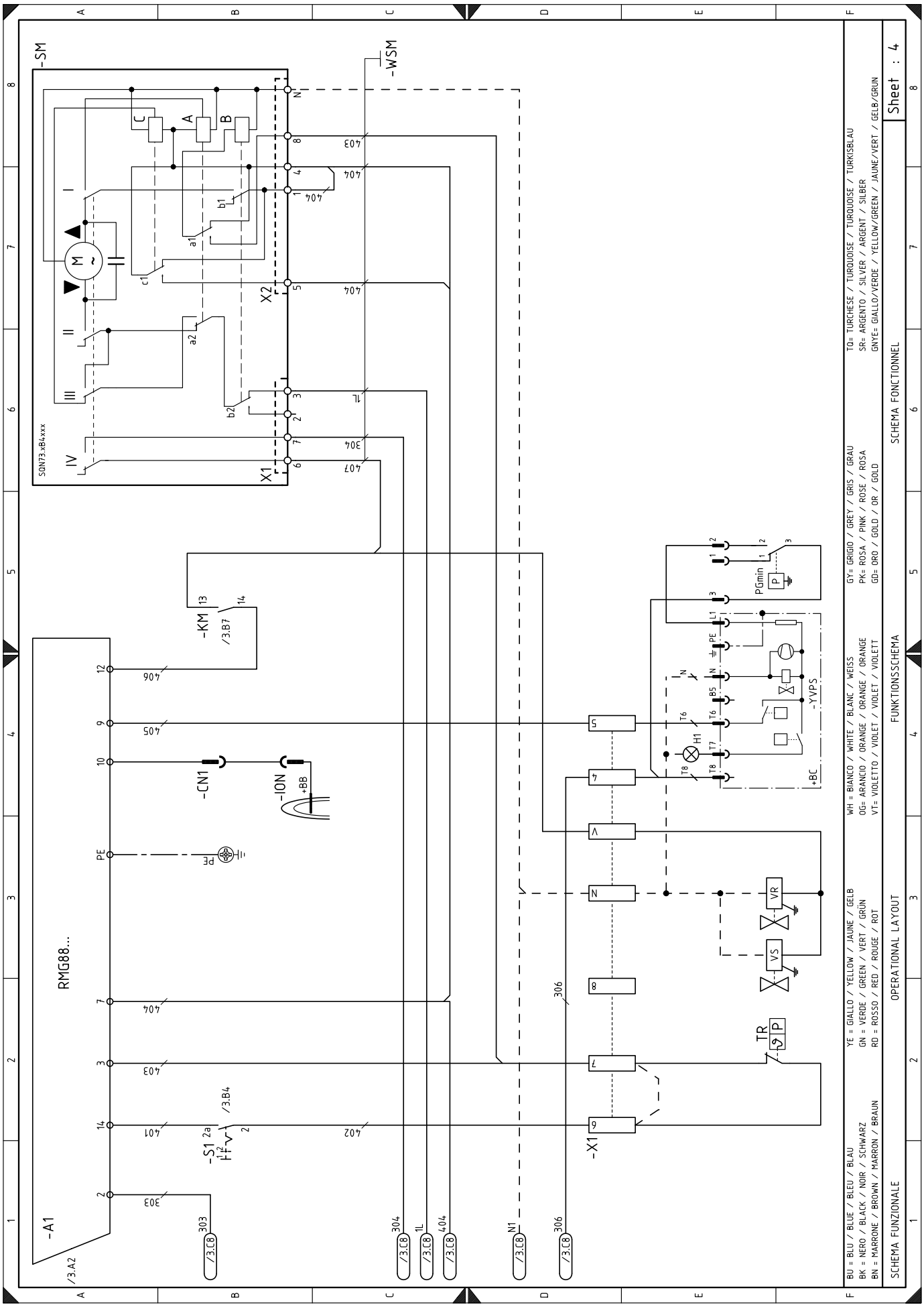
-SM
-WSM
SQN73.xB4xxx
X1
X2
-KM
/3.B7
-CN1
-ION
+BB
-A1
RMG88...
/3.A2
-S1
/3.B4
-X1
-YVPS
+BC
PGmin
TR
VR
VS
H1
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 4
BU = BLU / BLUE / BLEU / BLAU
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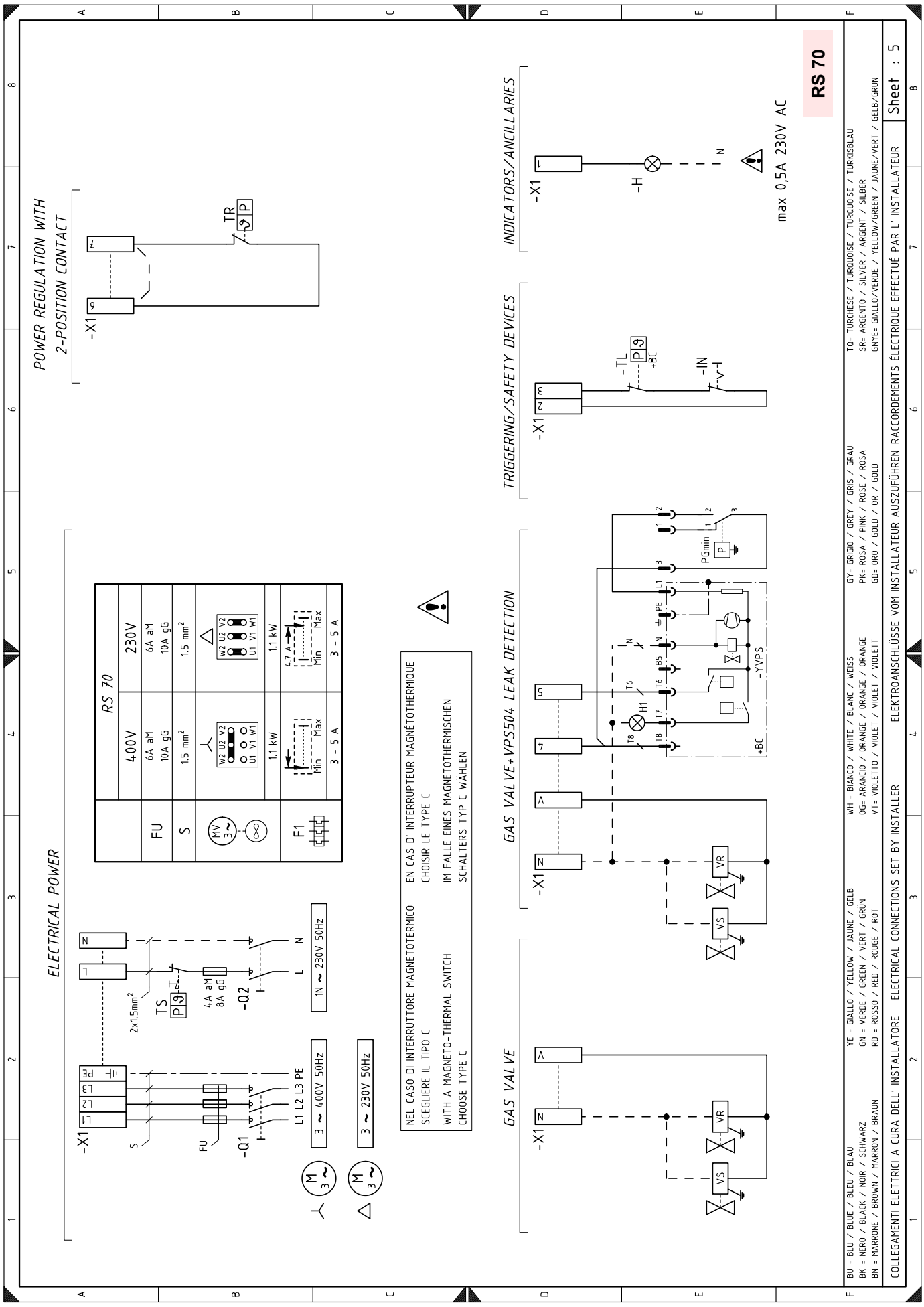
POWER REGULATION WITH
2-POSITION CONTACT
-X1
TR
INDICATORS/ANCILLARIES
-H
max 0,5A 230V AC
TRIGGERING/SAFETY DEVICES
-TL
+BC
-IN
GAS VALVE+VPS504 LEAK DETECTION
GAS VALVE
ELECTRICAL POWER
-Q1
-Q2
TS
FU
S
F1
RS 70
400V
230V
6A aM
10A gG
1.5 mm²
1.1 kW
Min
Max
3 - 5 A
4-7 A
2x1.5mm²
4A aM
8A gG
L1 L2 L3 PE
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
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
-YVPS
PGmin
VR
VS
H1
RS 70
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
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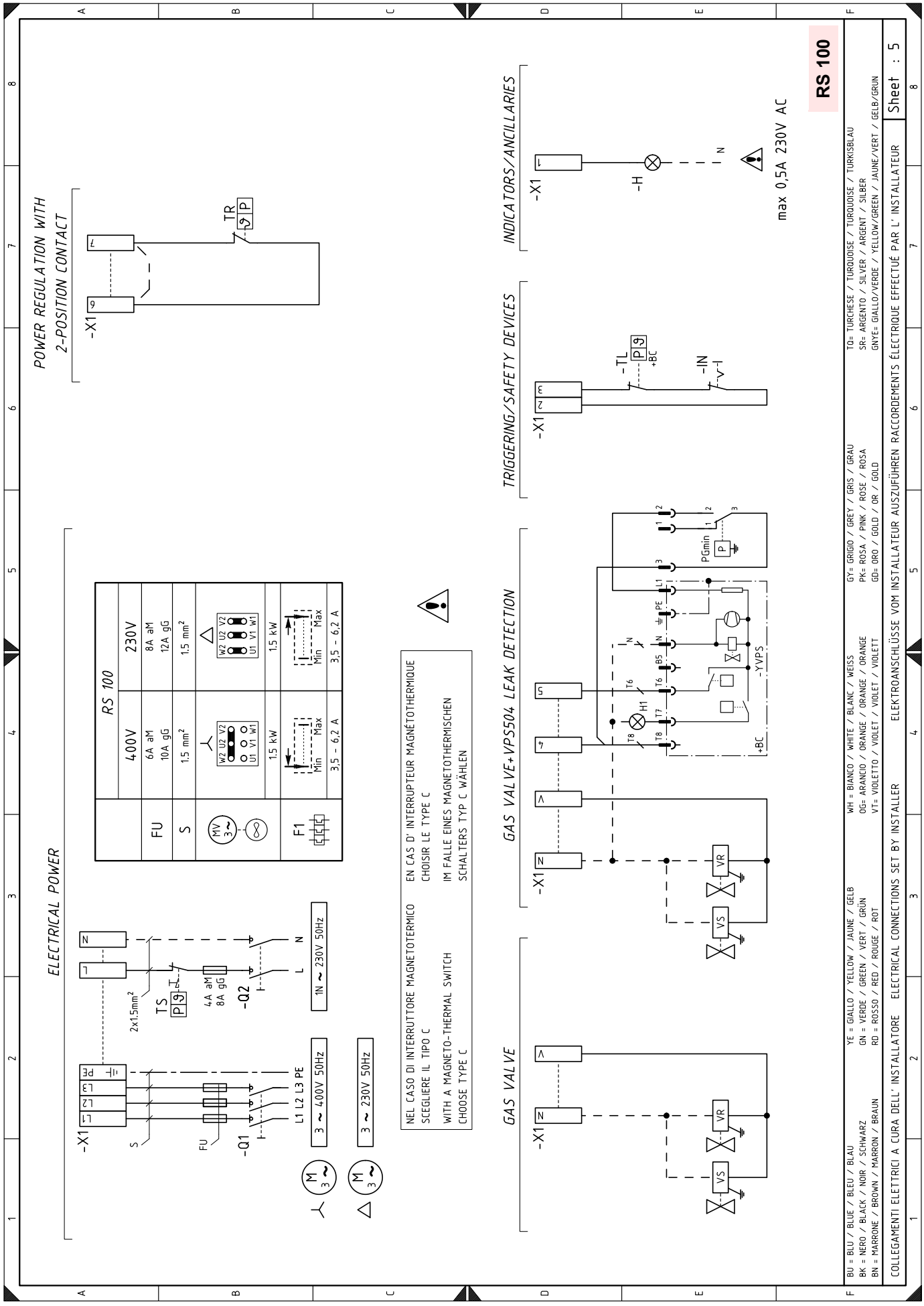
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TÜRKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN
RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


POWER REGULATION WITH
2-POSITION CONTACT
-X1
TR
INDICATORS/ANCILLARIES
max 0,5A 230V AC
-H
TRIGGERING/SAFETY DEVICES
-TL
-IN
GAS VALVE+VPS504 LEAK DETECTION
GAS VALVE
ELECTRICAL POWER
RS 100
400V
230V
FU
S
F1
6A aM
10A gG
8A aM
12A gG
1.5 mm²
1.5 kW
3,5 - 6,2 A
Min Max
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
-Q1
-Q2
TS
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
L1 L2 L3 PE
2x1.5mm²
4A aM
8A gG
-YVPS
PGmin
RS 100
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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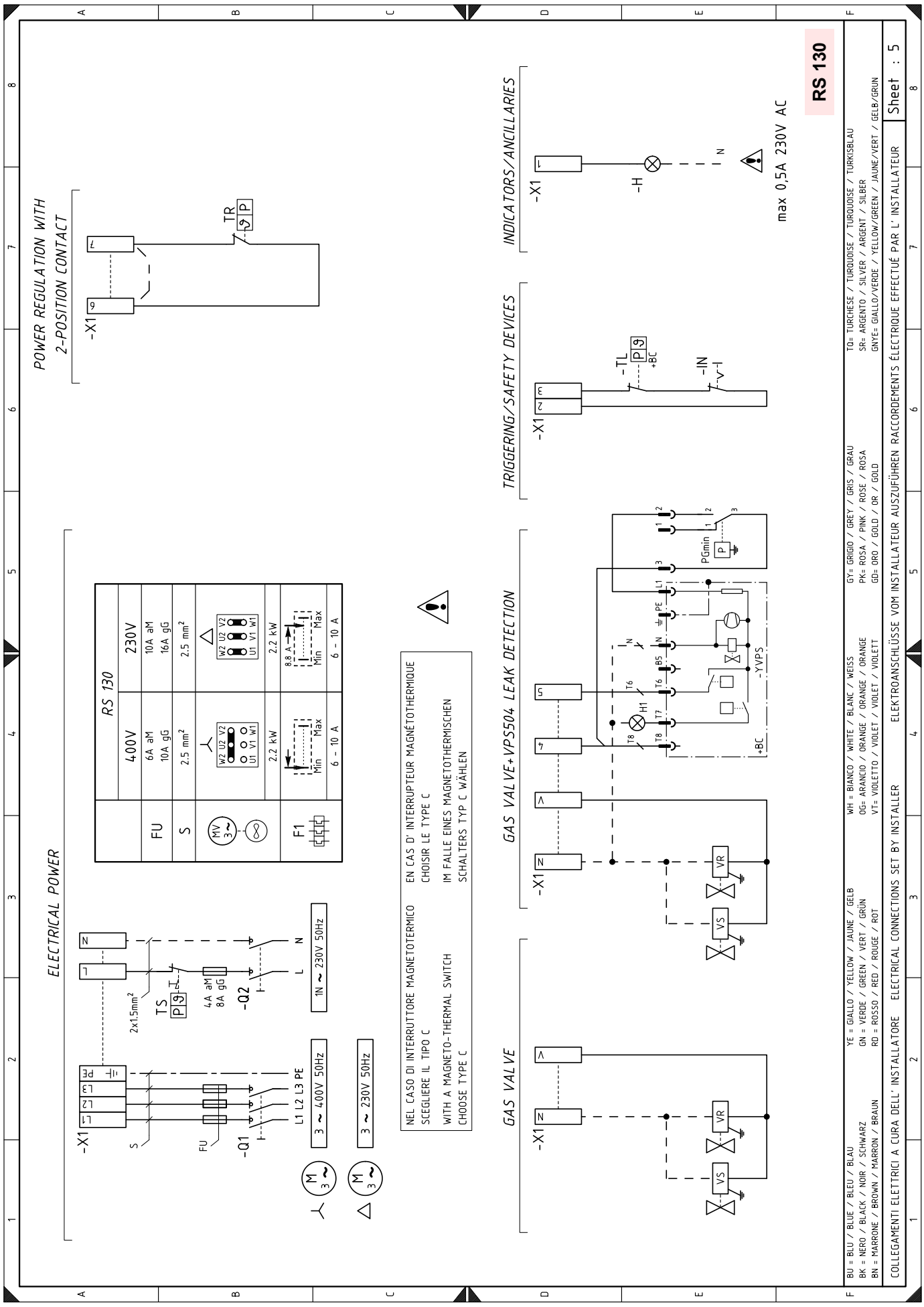
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


POWER REGULATION WITH
2-POSITION CONTACT
-X1
TR
INDICATORS/ANCILLARIES
-H
max 0,5A 230V AC
TRIGGERING/SAFETY DEVICES
-TL
+BC
-IN
ELECTRICAL POWER
RS 130
400V
230V
FU
S
F1
6A aM
10A gG
10A aM
16A gG
2.5 mm²
2.2 kW
6 - 10 A
Min
Max
-Q1
-Q2
TS
2x1.5mm²
4A aM
8A gG
L1 L2 L3 PE
3 ~ 400V 50Hz
1N ~ 230V 50Hz
3 ~ 230V 50Hz
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
GAS VALVE
GAS VALVE+VPS504 LEAK DETECTION
VR
VS
-YVPS
PGmin
H1
RS 130
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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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

Wiring layout key

A1	Control box
B	Filter to protect against radio disturbance
CN1	Ionisation probe connector
FU	Fuse
F1	Thermal relay
H	Lockout signal lamp
H1	Valve leak detection device lockout signal lamp
K1	Relay
KM	Motor contactor
IN	Burner manual stop switch
ION	Ionisation probe
MV	Fan motor
PA	Air pressure switch
PGmin	Minimum gas pressure switch
Q1	Three-phase line switch/disconnecting switch
Q2	Single-phase line disconnecting switch
S1	“On-Off” and “1st - 2nd stage”
SM	Servomotor
TA	Ignition transformer
TL	Limit pressure switch/thermostat
TR	Adjustment thermostat/pressure switch
TS	Safety pressure switch/thermostat
VR	Regulation valve
VS	Safety valve
X1	Burner terminal strip
YVPS	Valve leak detection device

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I-37045 Legnago (VR)
Tel.: +39.0442.630111
http:// www.riello.it
http:// www.riello.com

Manufacturing site:
Riello Heating Equipment (Shanghai) CO., LTD
No. 388, Jinbai Road - Jinshan Industrial Zone
201506 - Shanghai
CHINA

生产场所 :
Riello Heating Equipment (Shanghai) CO., LTD
利雅路热能设备 (上海) 有限公司
上海市金山工业区金百路 388 号