

GB **Forced draught gas burners**

Progressive two-stage or modulating operation



CODE	MODEL	TYPE
20061873	RS 1000/M C01	1139 T
20061850	RS 1200/M C01	1140 T



Translation of the original instructions

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1 Declarations

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

Manufacturer: RIELLO S.p.A.
 Address: Via Pilade Riello, 7
 37045 Legnago (VR)
 Product: Forced draught gas burners
 Model: RS 1000/M C01
 RS 1200/M C01

These products are in compliance with the following Technical Standards:

EN 676

EN 12100

and according to the European Directives:

GAD	2009/142/EC	Gas Devices Directive
MD	2006/42/EC	Machine Directive
LVD	2006/95/EC	Low Voltage Directive
EMC	2004/108/EC	Electromagnetic Compatibility

Such products are marked as follows:



CE- in progress Class 1 (EN 676)

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

Manufacturer's Declaration

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

Product	Type	Model	Output
Forced draught gas burners	1139 T	RS 1000/M C01	1100 - 10100 kW
	1140 T	RS 1200/M C01	1500 - 11100 kW

Legnago, 03.09.2014

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

Mr. R. Cattaneo

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 Service 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 HOOD AND ALL THE SAFETY AND PROTECTION DEVICES
This symbol signals the obligation to reassemble the hood 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

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 installation date, 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 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;
- 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;
- the use of non-original components, including spare parts, kits, accessories and optional;
- force majeure.

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

3 Safety and prevention

3.1 Introduction

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

In particular:

it can be applied to boilers operating with water, steam, diathermic oil, and to other users 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 room temperature must all be within the values indicated in the instruction manual.

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



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

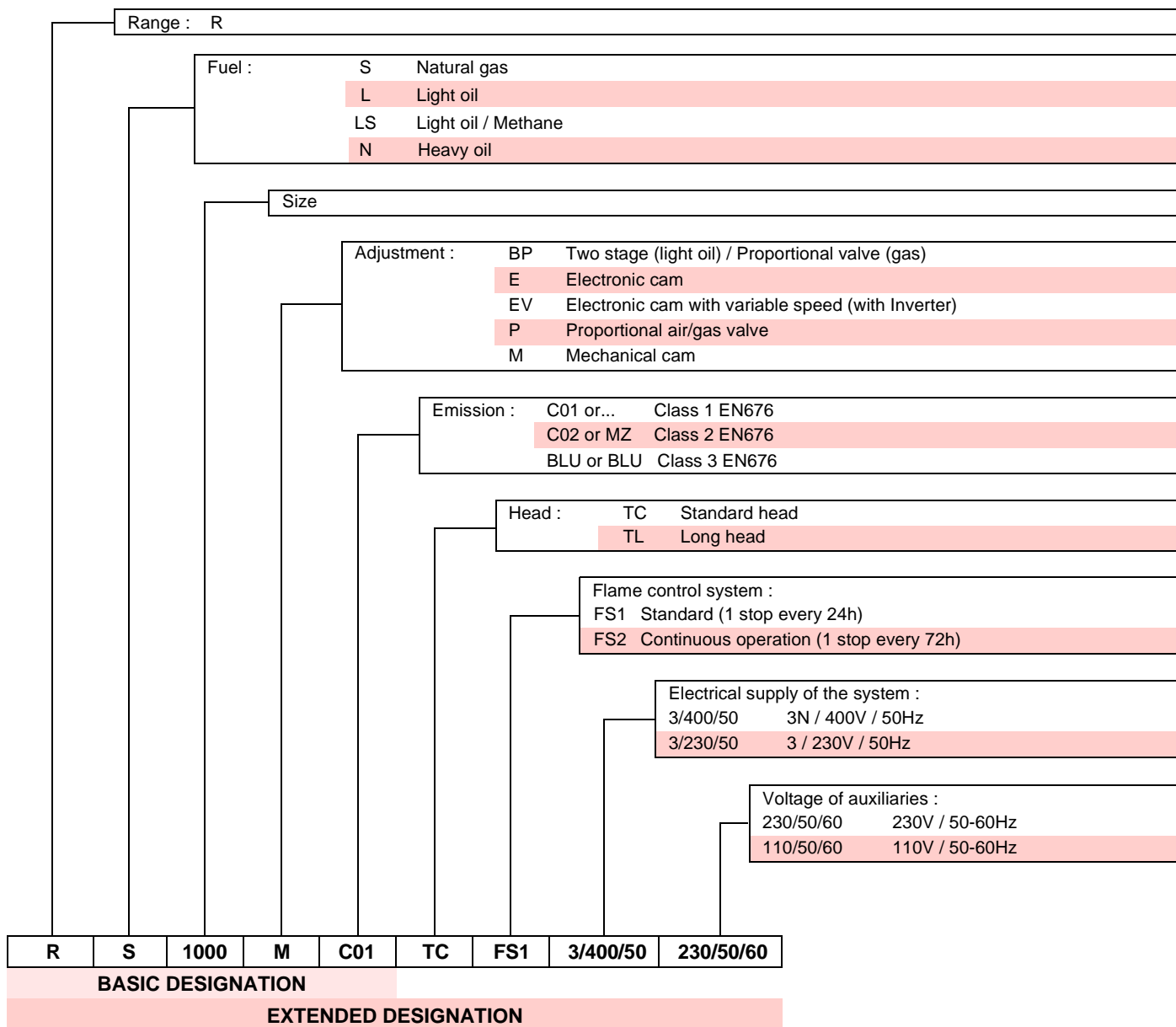
In addition:



- 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.

4 Technical description of the burner

4.1 Burner designation



4.2 Models available

Designation		Voltage	Start-up	Code
RS 1000/M C01	TC	3/400/50	Star/Triangle	20061873
RS 1200/M C01	TC	3/400/50	Star/Triangle	20061850

Tab. A

4.3 Technical data

Model			RS 1000/M C01	RS 1200/M C01
Type			1139 T	1140 T
Output (1)	min - max	kW	1100/4000 - 10100	1500/5500 - 11100
Fuels			Natural gas: G20 (methane gas) - G21 - G22 - G23 - G25	
Gas pressure at max. output (2) - Gas: G20/G25		mbar	67.1/101.2	97.2/145
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 - 50	
Combustion air temperature		°C max	60	
Noise levels (3)	Sound pressure	dB(A)	85	89.3
	Sound power		99	99.7
Weight		Kg	460	500

Tab. B

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

(2) Pressure on the socket 5)(Fig. 4) with zero pressure in the combustion chamber and at maximum burner output.

(3) Noise emission tests carried out as per Directive EN 15036-1, with measurement accuracy $\delta = \pm 1.5$ dB, in the manufacturer's combustion lab with burner operating on test boiler at maximum output.

4.4 Electrical data

Model			RS 1000/M C01	RS 1200/M C01
Electrical supply			3N ~ 400V \pm 10% 50 Hz	
Fan motor IE2	rpm		2935	2920
	V		400/690	400/690
	kW		22	25
	A		38.6/22.3	44.1/25.5
Ignition transformer		V1 - V2 I1 - I2	230 V - 1 x 8 kV 1 A - 20 mA	
Absorbed electrical power		kW max	24	27
Protection level			IP 55	

Tab. C

Model			RS 1000/M C01	RS 1200/M C01
Electrical supply			3N ~ 400V \pm 10% 50 Hz	
Fan motor IE3	rpm		2880	2880
	V		400/690	400/690
	kW		22	25
	A		38.2/22.3	43.4/25.1
Ignition transformer		V1 - V2 I1 - I2	230 V - 1 x 8 kV 1 A - 20 mA	
Absorbed electrical power		kW max	24	27.2
Protection level			IP 55	

Tab. D

4.5 Burner categories - Countries of destination

Destination country	Gas category
SE - FI - AT - GR - DK - ES - GB - IT - IE - PT - IS - CH - NO	I _{2H}
DE	I _{2ELL}
NL	I _{2L}
FR	I _{2Er}
BE	I _{2E(R)B}
LU - PL	I _{2E}

Tab. E

4.6 Maximum dimensions

The maximum dimensions of the burner are shown in Fig. 1. Bear in mind that inspection of the combustion head requires the burner to be opened and the rear part turned on the hinge.

The maximum dimensions of the open burner are indicated by the L and R positions.

The I position is reference for the refractory thickness of the boiler door.

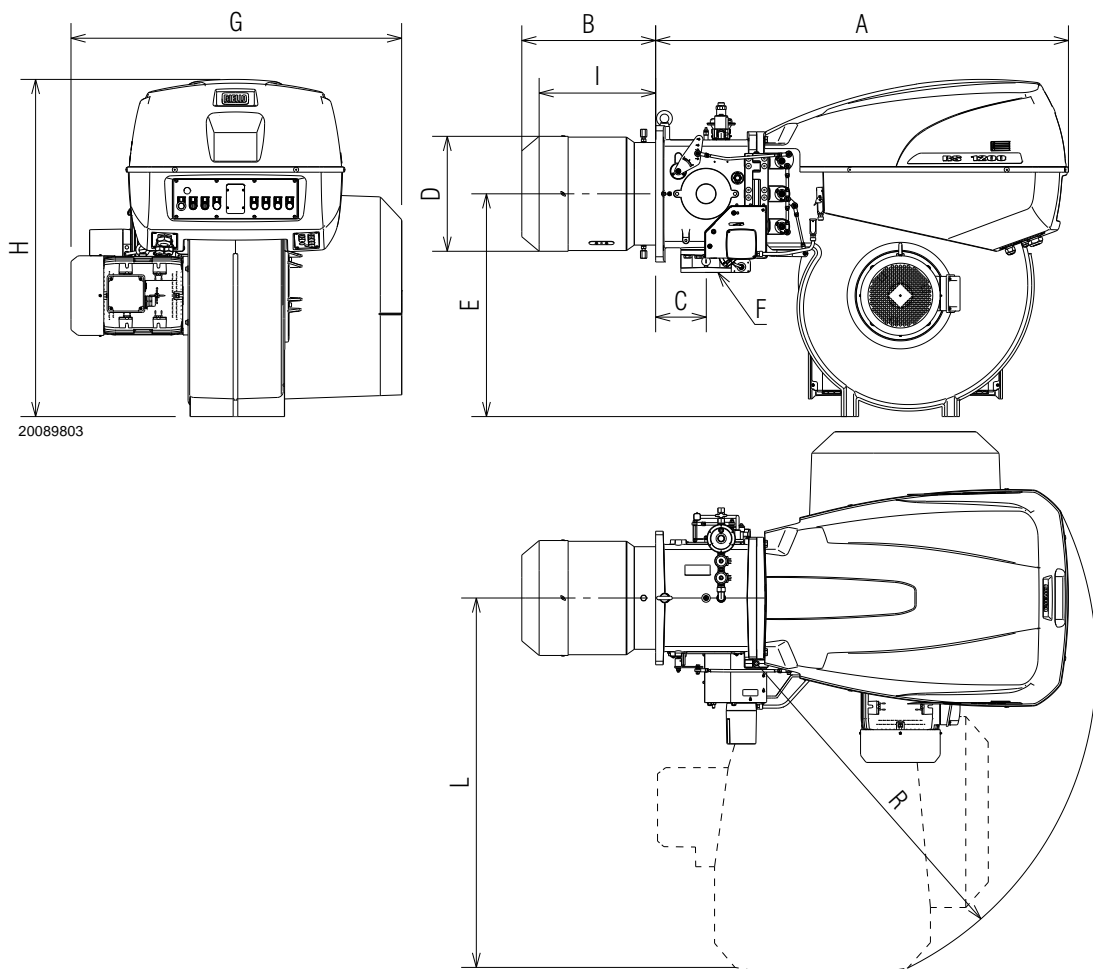


Fig. 1

mm	A	B	C	D	E	F	G	H	I	L	R
RS 1000/M C01	1637	538	200	413	885	DN80	1206	1338	485	1493	1350
RS 1200/M C01	1637	539	200	456	885	DN80	1250	1338	485	1493	1350

Tab. F

4.7 Firing rates

The **MAXIMUM OUTPUT** is chosen from within the continuous diagram area (Fig. 2).

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

- RS 1000/M C01 = 4000 kW
- RS 1200/M C01 = 5500 kW



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

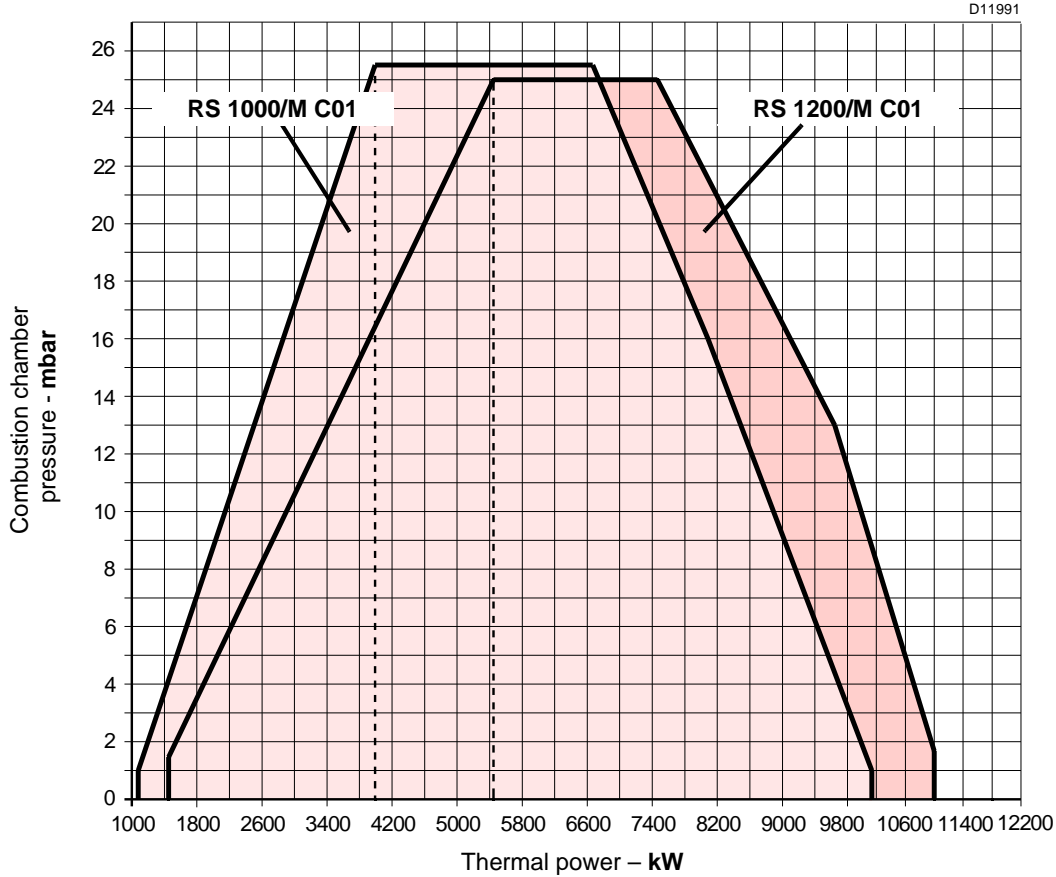


Fig. 2

4.8 Test boiler

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, consult the manufacturer.

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

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

Example:

Output 7000 kW - diameter 120 cm - length 6 m.

MODULATING RATIO

The modulating ratio, obtained in test boilers in accordance with standard EN 676, is 2.5:1.

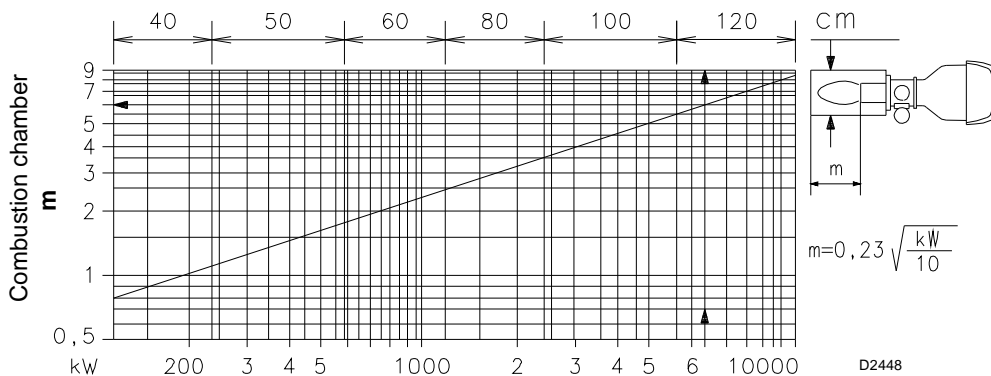
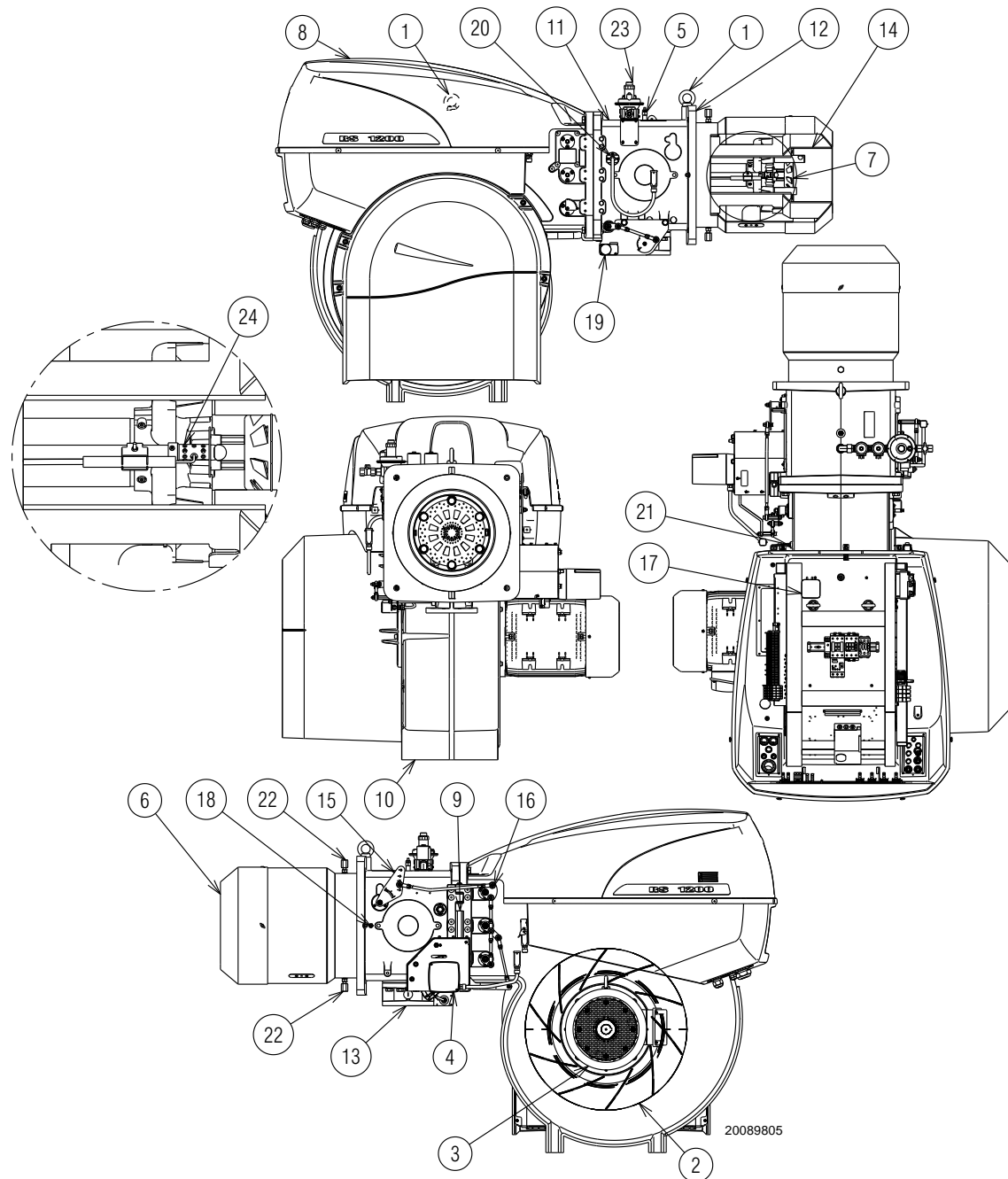


Fig. 3

4.9 Burner description



- | | |
|--|--|
| 1 Lifting rings | 18 Combustion head air pressure test point |
| 2 Fan | 19 Maximum gas pressure switch with pressure test point |
| 3 Fan motor | 20 UV cell |
| 4 Servomotor | 21 Pressure test point for air pressure switch “+” |
| 5 Combustion head gas pressure test point | 22 Locking screws of the shutter during the transport (replace them with the screws M12x25 supplied with the burner) |
| 6 Combustion head | 23 Pilot gas train |
| 7 Flame stability disc | 24 Ignition pilot |
| 8 Electrical panel casing | |
| 9 Hinge for opening the burner | |
| 10 Fan air inlet | |
| 11 Pipe coupling | |
| 12 Gasket for boiler fixing | |
| 13 Gas train flange | |
| 14 Shutter | |
| 15 Combustion head movement lever | |
| 16 Air damper movement leverage | |
| 17 Air pressure switch (differential operating type) | |

Fig. 4

4.10 Electrical panel description

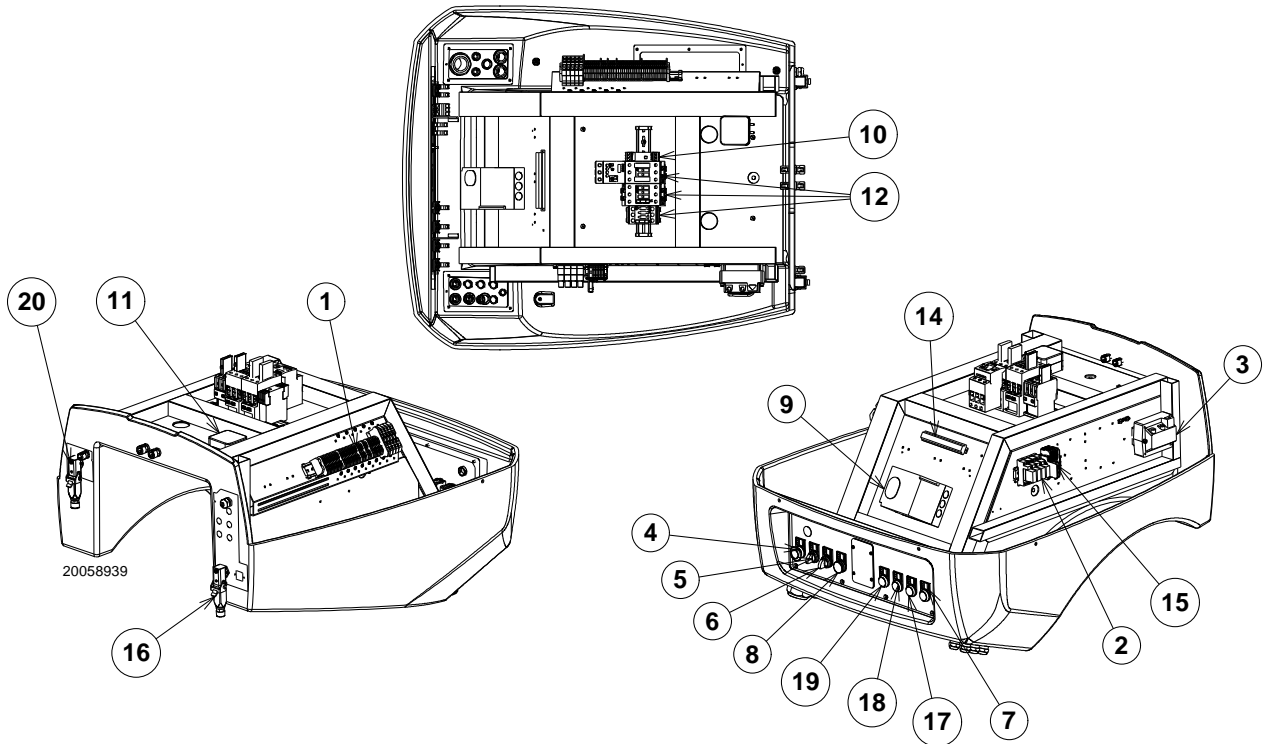


Fig. 5

- 1 Main terminal supply board
- 2 Clean contacts output relay
- 3 Ignition transformer
- 4 Stop push-button
- 5 OFF-automatic-manual selector
- 6 Power increase - power reduction selector
- 7 Light signalling of motor - fan thermal relay operation
- 8 Light signalling of burner lockout and reset switch
- 9 Electrical control box
- 10 Timer
- 11 Air pressure switch
- 12 Fan motor contactor and thermal relay, star-triangle starter
- 13 Supply cables, external connections and kits
- 14 Terminal board for kit RWF40
- 15 Auxiliary circuits fuse

- 16 Plug/socket servomotor
- 17 Light signalling of main fuel valve open
- 18 Heat request light signalling
- 19 Light signalling of mains live state
- 20 Flame sensor plug/sensor socket

NOTE

Two types of burner lockout may occur:

- **Control box lockout:** if the pushbutton (red led) of the control box 9)(Fig. 5) and the pushbutton with light 8) light up, this indicates that the burner is in lockout. Release by pressing the pushbutton 8).
- **Motors lockout:** release by pressing the button on the relevant thermal relay.

4.11 Burner equipment

Gasket for gas train flange	No. 1
Thermal insulation screen	No. 1
Screws M12x25	No. 2
Gas flange fixing screws M16x70	No. 8
Screws M20x70 to secure the burner flange to the boiler ..	No. 4
Instructions	No. 1
Spare parts list	No. 1

4.12 Control box (LFL1.333RL)

Warnings



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

The LFL1 333RL control box 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 LFL1333RL control box connection area, fully disconnect the system from the power supply (omnipolar separation).
- Protection against electrocution from the control box and all connected electric components is obtained with the correct assembly.
- Before any intervention (assembly and installation operations, assistance, etc.), ensure the wiring is in order and that the parameters are correctly set, then make the safety checks.
- Falls and collisions can negatively affect the safety functions. In this case, the control box must not be operated, even if it displays no evident damage.



Do not press the reset button or the remote reset button of the control box for more than 10 seconds because this will damage the internal relay.

For the safety and reliability of the system, comply with the following instructions also:

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

Use

The LFL1.333RL control box is a control and supervision system of medium and large capacity forced draft burners for intermittent operation (at least one controlled shutdown every 24 hours).

Installation notes

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

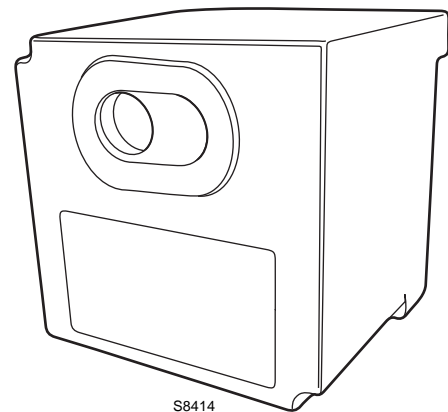


Fig. 6

Technical data

Mains voltage	AC 230V -15% / +10%
Mains frequency	50 / 60 Hz ±6 %
Fuse (Internal)	T6.3H250V
Primary fuse (external)	max. 10 A
Weight	approx. 1 kg
Power absorption	approx. AC 3.5 VA
Protection level	IP40
Safety class	II
Input current at terminal 1	max. 5 A continuous (peaks of 20 A / 20 ms)
Load on the control terminal	max. 4 A continuous (peaks of 20 A / 20 ms)
Environmental conditions	
Operation	DIN EN 60721-3-1
Climatic conditions	Class 1K3
Mechanical conditions	Class 1M2
Temperature range	-20...+60°C
Humidity	< 95% RH

Tab. G

Electrical wiring of the flame detector

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

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

4.13 Servomotor (SQM10.1....)

Warnings



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.

Assembly notes

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



Fig. 7

Technical data

Operating voltage	AC 220...240V, 50 Hz -15 % / +10 % AC 220 V, 60 Hz -15 % / +10 %
Auxiliary and limit switches switching capacity	10 (3) A, AC 24...250 V
Angular positioning	up to 160 ° (base scale)
Assembly position	optional
Protection level	IP 54, DIN 40050
Safety class	GB
Weight	approx. 1.7 kg
Actuator motor	synchronous motor
Power absorption	9 VA
Environmental conditions:	
Operation	DIN EN 60 721-3-1
Climatic conditions	Class 1K3
Mechanical conditions	Class 1M2
Temperature range	-20...+70°C
Humidity	< 95% RH

Tab. H

5 Installation

5.1 Notes on safety for the installation

After carefully cleaning all around the area where the burner will be installed, and arranging the correct lighting of the environment, proceed with the installation operations.



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



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



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 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.



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 suitability 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.



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

5.3 Preliminary checks


Checking the consignment



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



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

RBL	A	B	C
D	E		F
GAS-KAASU	<input checked="" type="checkbox"/>	G	H
GAZ-AERIO		G	H
I			RIELLO SpA I-37046 Legnago (VR)
			CE

D10411

Fig. 8

Checking the characteristics of the burner

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

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



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.

5.4 Operating position



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



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

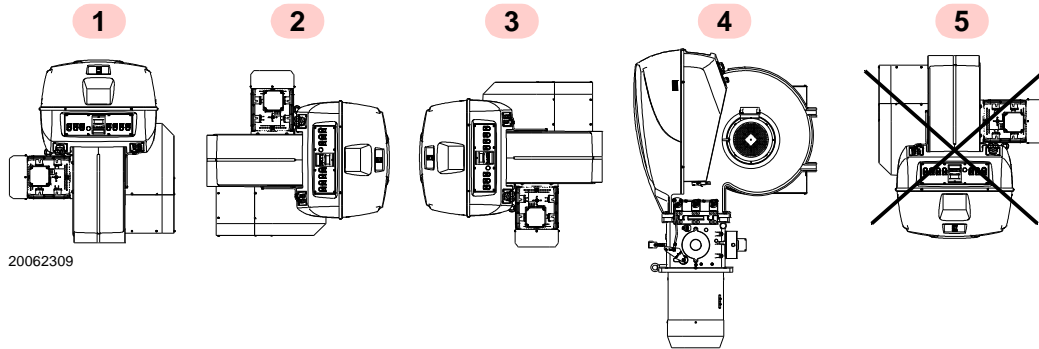


Fig. 9

5.5 Removal of the locking screws from the shutter



Remove the screws and the nuts 1)- 2)(Fig. 10), before installing the burner on the boiler.
Replace them with the screws 3) M12x25 supplied with the burner.

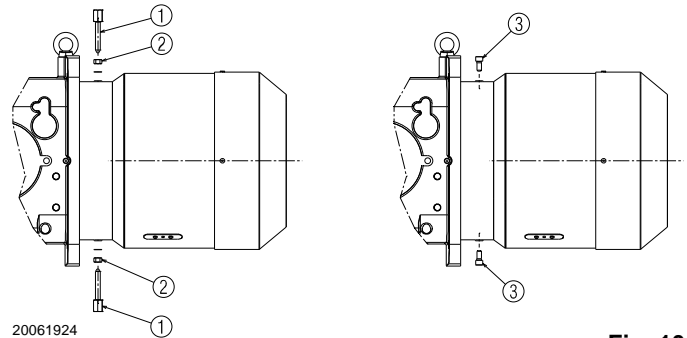


Fig. 10

5.6 Preparing the boiler

5.6.1 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.

5.6.2 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 refractory.

For boilers with front flue passes 1)(Fig. 12) or flame inversion chamber, a protection in refractory material 5) must be inserted between the boiler fettling 2) and the blast tube 4).

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

For boilers with a water-cooled frontpiece, a refractory lining 2)-5)(Fig. 12) is not necessary, unless expressly requested by the boiler manufacturer.

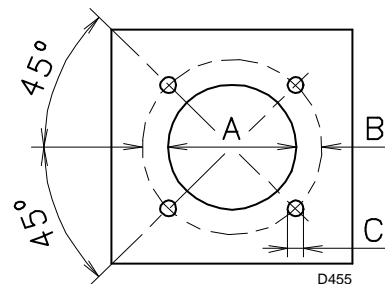


Fig. 11

mm	A	B	C
RS 1000/M C01	460	608	M 20
RS 1200/M C01	500	608	M 20

Tab. I

5.7 Securing the burner to the boiler



Prepare a suitable lifting system using rings 3)(Fig. 12).



The seal between burner and boiler must be airtight.

WARNING

- Insert the thermal protection supplied with the blast tube 4).
- Insert the entire burner on the boiler hole, previously fitted, as in Fig. 11, and fix it with the screws supplied.

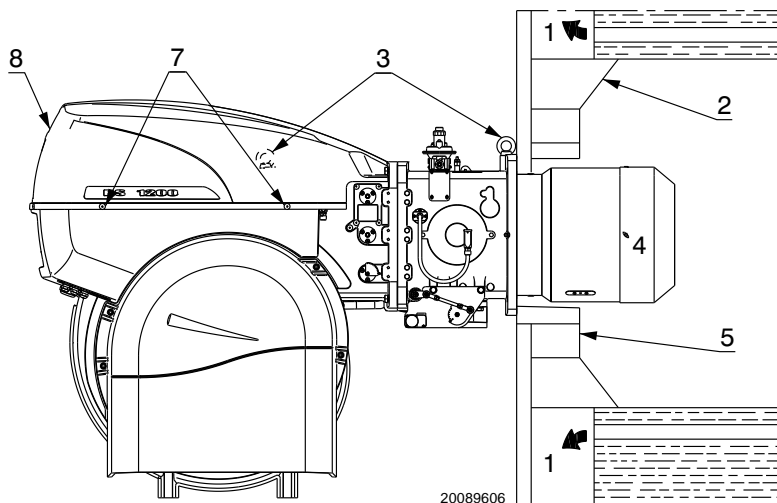


Fig. 12

5.8 Access to head internal part

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

- disconnect the electrical wiring from the servomotor;
- disconnect the leverage 3) of the cam and movement of the head 12);
- unscrew the 4 fixing screws 1) and open the burner on the hinge;
- disconnect the cables 14) from the electrodes 2);
- remove the screw/gas pressure socket 6) of the head;
- pull out the inner part of the head 5).

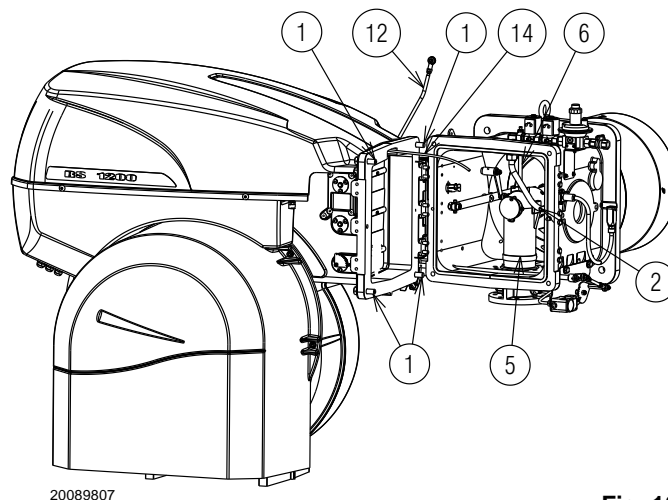


Fig. 13

5.9 Electrode position



Place the electrode on the ignition pilot observing the dimensions specified in Fig. 14.

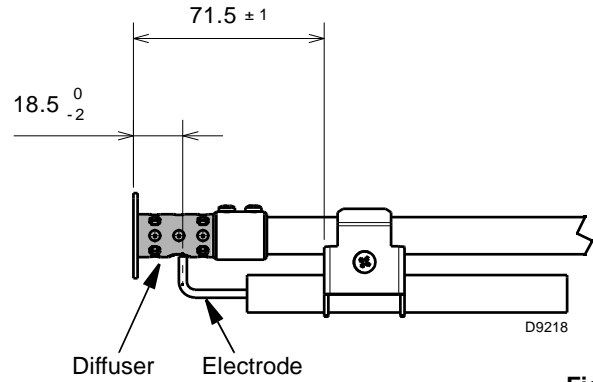


Fig. 14

5.10 Combustion head adjustment

The air damper servomotor 4)(Fig. 4), beyond varying the air output according to the output demand, through a leverage varies the combustion head adjustment.

This system allows an optimum adjustment also at minimum firing rate. Similarly to servomotor rotation, it is possible to vary the opening of the combustion head moving the tie-rod on the holes (5-6-7-8-10)(Fig. 15).

The selection of the hole to be used is determined based on the maximum output requested, as illustrated in Tab. J.

In the factory, the adjustment is adjusted for the maximum stroke (hole 10, Fig. 15).

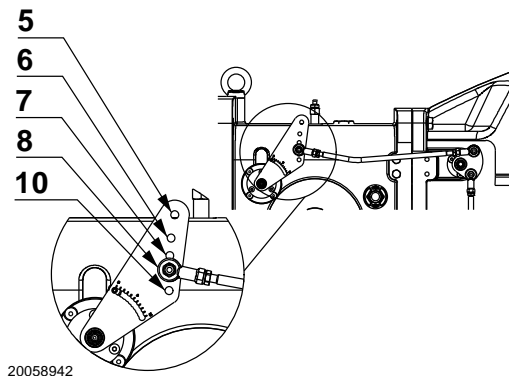


Fig. 15

	Leverage hole	Output (kW)	
		From	A
RS 1000	5	1200	3750
	5	3750	6700
	8	6700	8600
	8	8600	10600
RS 1200	5	1500	5500
	5	5500	7500
	6	7500	9600
	10	9600	11500

Tab. J

5.11 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.



WARNING

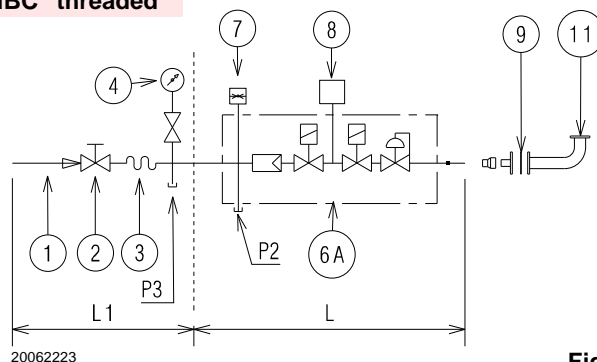
The fuel supply line must be installed by qualified personnel, in compliance with current standards and laws.

5.11.1 Gas feeding line

Key (Fig. 16 - Fig. 17 - Fig. 18 - Fig. 19)

- 1 Gas input pipe
- 2 Manual valve
- 3 Vibration damping joint
- 4 Pressure gauge with pushbutton cock
- 5 Filter
- 6A Includes:
 - filter
 - working valve
 - safety valve
 - pressure adjuster
- 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 device, supplied as an accessory or incorporated, based on the gas train code. In compliance with the EN 676 standard, the leak detection control is compulsory for burners with maximum outputs over 1200 kW.
- 9 Gasket
- 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

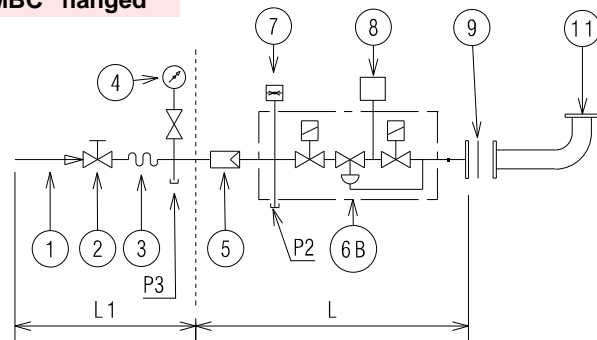
MBC "threaded"



20062223

Fig. 16

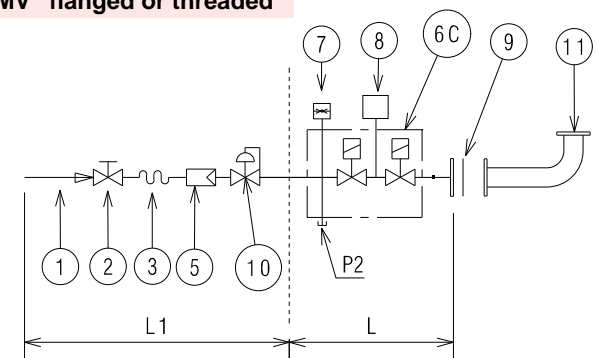
MBC "flanged"



20062225

Fig. 17

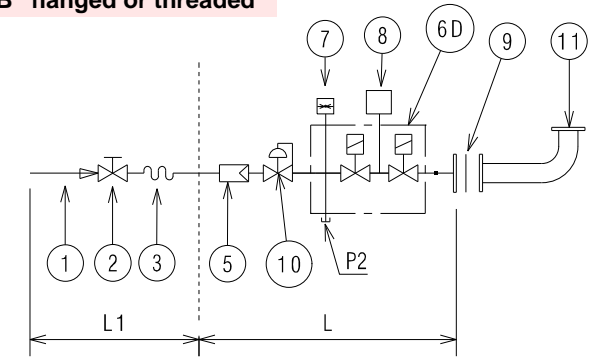
DMV "flanged or threaded"



20062227

Fig. 18

CB "flanged or threaded"



20062228

Fig. 19

5.11.2 Gas train

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

To select the correct model of the gas train, refer to the "burner-gas train combination" manual supplied.

5.11.3 Gas train installation



Disconnect the electrical supply by means of the system's main switch.



Make sure 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 is prearranged to be connected to the burner with the flange 1 (Fig. 20).

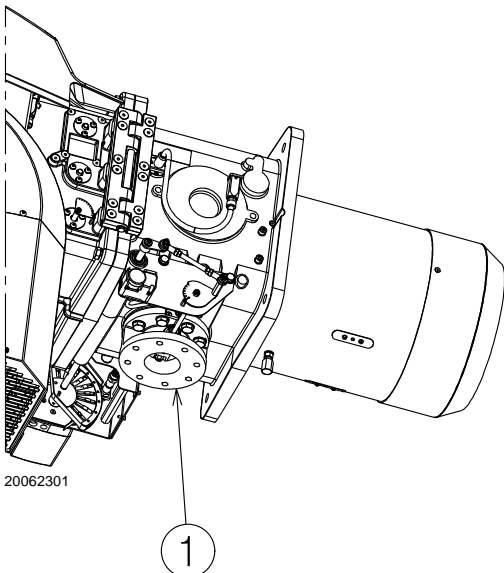


Fig. 20

5.11.4 Gas pressure

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

	kW	1 Δp (mbar)		2 Δp (mbar)	
		G 20	G 25	G 20	G 25
RS 1000/M C01	3750	9.2	13.7	1.0	1.4
	4000	10.8	16.0	1.1	1.6
	4500	13.9	20.7	1.4	2.1
	5000	17.0	25.4	1.7	2.5
	5500	20.2	30.1	2.1	3.1
	6000	23.3	34.8	2.4	3.7
	6500	26.4	39.4	2.9	4.3
	7000	30.4	45.3	3.3	5.0
	7500	34.8	51.9	3.8	5.7
	8000	39.2	58.5	4.4	6.5
	8500	43.6	65.1	4.9	7.3
RS 1200/M C01	9000	49.2	73.3	5.5	8.2
	9500	55.0	82.0	6.1	9.2
	10000	60.8	90.7	6.8	10.1
	10600	67.8	101.1	7.6	11.4
	5500	23.1	34.5	2.1	3.1
	6000	27.9	41.6	2.4	3.7
	6500	32.6	48.7	2.9	4.3
	7000	37.4	55.7	3.3	5.0
	7500	42.1	62.8	3.8	5.7
	8000	48.3	72.1	4.4	6.5
	8500	54.5	81.3	4.9	7.3
9000	60.7	90.6	5.5	8.2	
9500	67.0	99.8	6.1	9.2	
10000	74.3	110.8	6.8	10.2	
10500	81.9	122.2	7.5	11.2	
11000	89.6	133.6	8.2	12.3	
11500	97.2	145.0	9.0	13.4	

Tab. K

The values shown in Tab. K refer to:

- Natural gas G 20 NCV 9.45 kWh/Sm³ (8.2 Mcal/Sm³)
- Natural gas G 25 NCV 8.13 kWh/Sm³ (7.0 Mcal/Sm³)

Column 1

Pressure drop on combustion head.

Gas pressure measured at the test point 1) (Fig. 21), with:

- combustion chamber at 0 mbar;
- burner working at maximum modulating output;
- combustion head adjusted as in page 18.

Column 2

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

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 the table Tab. K related to the burner concerned, the pressure value closest to the result of the subtraction.
- Read off the corresponding output on the left.

Example RS 1000/M C01 with natural gas G20:

Maximum modulating output operation

Gas pressure at test point 1) (Fig. 21) = 44.2 mbar

Pressure in combustion chamber = 5 mbar

44.2 - 5 = 39.2 mbar

A pressure of 39.2 mbar, column 1, corresponds in the table Tab. K to an output of 8000 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 the table Tab. K 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 the combustion chamber.

Example RS 1000/M C01 with natural gas G20:

Maximum modulating output operation

Gas pressure at an output of 8000 kW = 39.2 mbar

Pressure in combustion chamber = 5 mbar

39.2 + 5 = 44.2 mbar

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

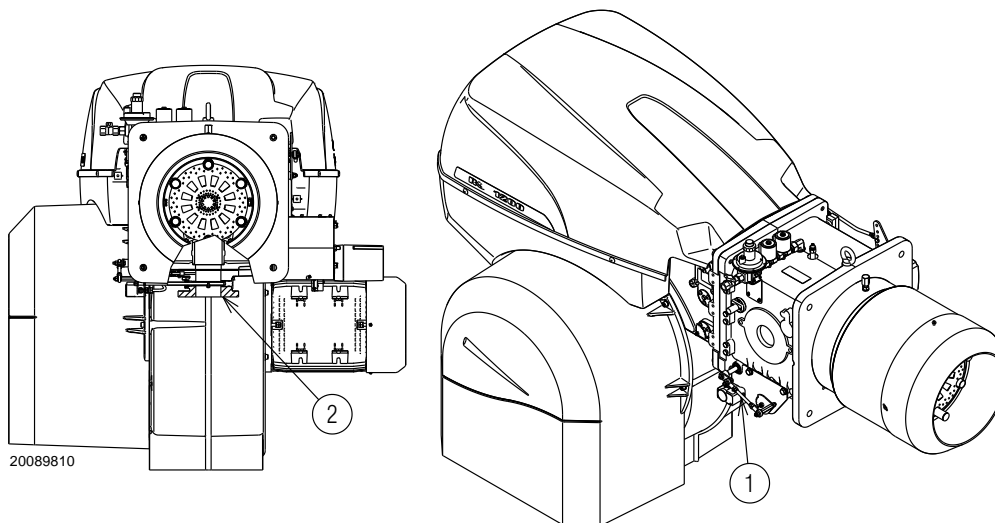


Fig. 21

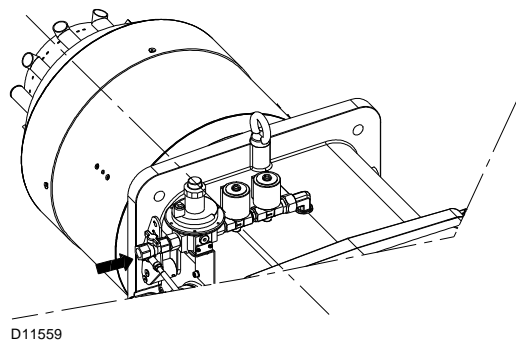
5.11.5 Pilot - gas train connection

The burner is fitted with a dedicated gas train that is fixed to the pipe coupling.

- It should be connected to the main train downstream the filter or the pressure adjuster (depending on configuration).



Supply pressure 68 ÷ 500 mbar.



5.11.6 Ignition pilot burner

For proper operation, adjust gas pressure (measured at pressure test point 1)(Fig. 22) as follows:

Model	Gas	mbar	Sm ³ /h
RS 1000/M C01	G20	1.5	12.3
RS 1200/M C01	G20	40	14.3

Tab. L



Check pilot flame stability before starting up the main burner.

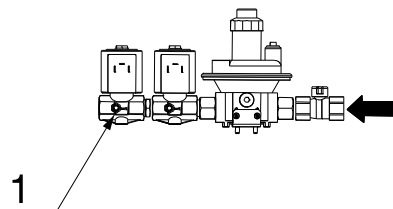


Fig. 22

In the case of ignition problems check:

- correct positioning of the ignition electrode;
- the gas pressure, according to indications.

5.12 Electrical wiring

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 burner has been type-approved for intermittent use (FS1). 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:



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



Close the fuel interception tap.



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.

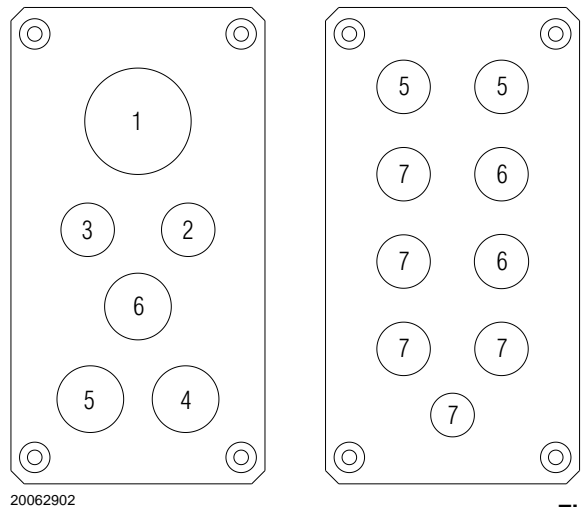
Use flexible cables in compliance with the EN 60 335-1 standard.

5.12.1 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. 23.



To guarantee the protection level of the burner, it is necessary to close any holes that are still free, using the plugs supplied.



20062902

Fig. 23

Key (Fig. 23)

- 1 Electrical supply
- 2 minimum gas pressure switch
- 3 Pressure switch for VPS gas valve leak detection
- 4 Gas train
- 5 Consents/Safety
- 6 Available
- 7 Plug



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

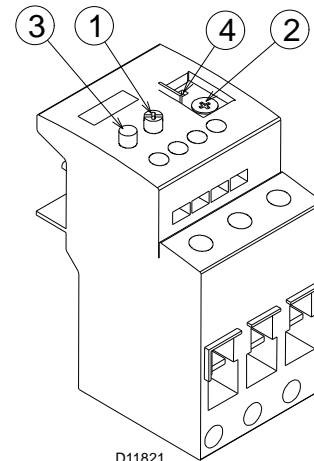
5.13 Calibration of the thermal relay

The thermal relay (Fig. 24) 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 in charge of the installer).

To reset, in case of an intervention of the thermal relay, press button "RESET" 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.



D11821

Fig. 24



WARNING

The automatic reset can be dangerous. This operation is not foreseen in the burner operation.

5.14 Motor rotation

As the burner is not fitted with a phase sequence checking device, the motor rotation may be incorrect.



WARNING

As soon as the burner starts up, go in front of the fan motor cooling fan and check it is rotating anti-clockwise (Fig. 25).

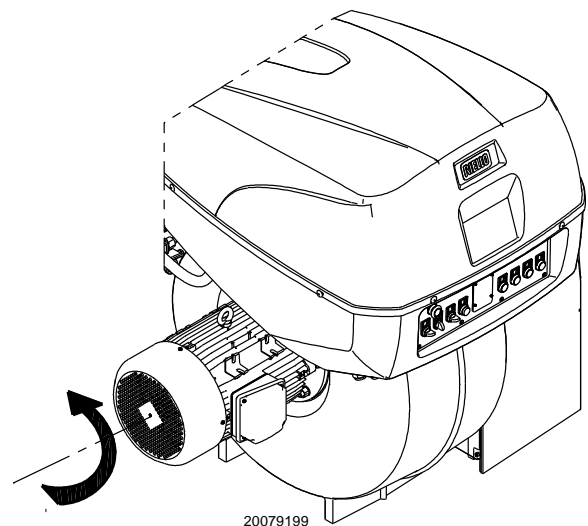
If this is not the case:

- turn the burner switch to position "0" (OFF) and wait for the control box to carry out the switch-off phase;
- disconnect the power supply to the main panel;
- invert the phases on the three-phase power supply.



DANGER

This operation must be carried out with the electrical supply disconnected.



20079199

Fig. 25

6 Start-up, calibration and operation of the burner

6.1 Notes on safety for the first start-up



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.



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

6.2 Adjustments prior to ignition

The adjustments to be carried out are:

- Slowly open the manual valves situated upstream from the gas train.
- Adjust the minimum gas pressure switch (Fig. 33) to the start of the scale.
- Adjust the maximum gas pressure switch (Fig. 32) to the end of the scale.
- Adjust the air pressure switch (Fig. 31) to the start of the scale.
- Purge the air from the gas line.
We recommend using a plastic tube routed outside the building and to purge air until gas is smelt.
- Fit a U-type pressure gauge or a differential pressure gauge (Fig. 26), with socket (+) on the gas pressure of the pipe coupling and (-) in the combustion chamber.
Used to approximately calculate the MAX burner output.
- Connect two lamps or testers to the two gas line solenoids to check the exact moment in 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.

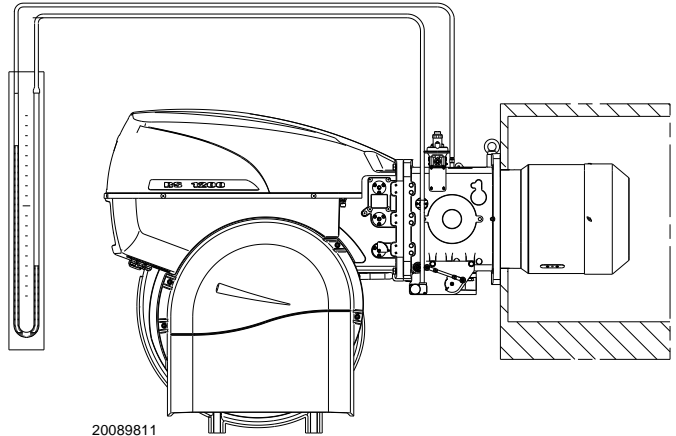


Fig. 26



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.

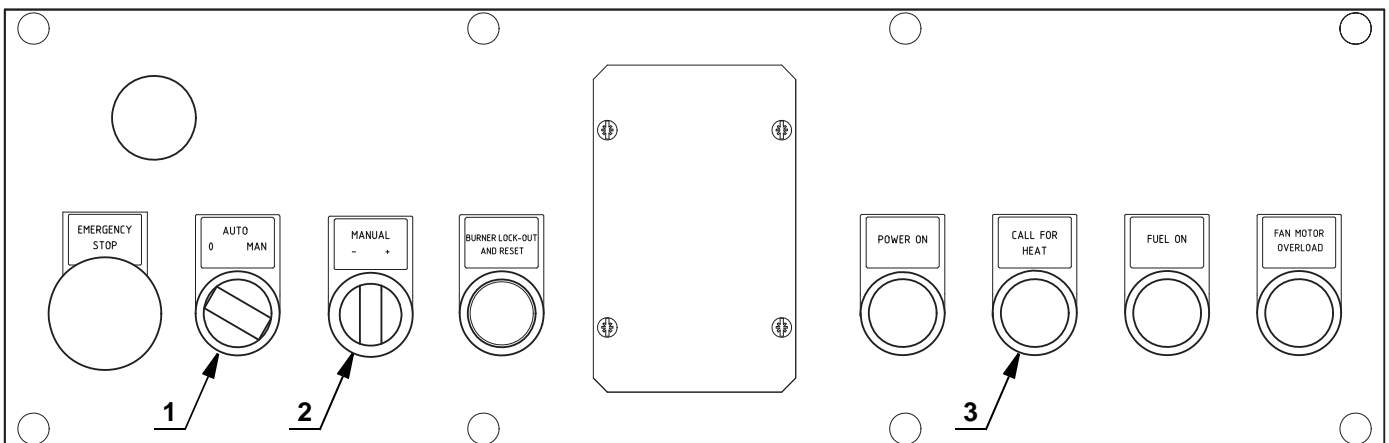
6.3 Burner start-up

Close the remote controls and position the selector 1)(Fig. 27) to "AUTO".

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 connections.

When the limit thermostat (TL) is closed, the "HEAT REQUEST" 3)(Fig. 27) signal must be on and the burner starts the starting cycle.



S8428

Fig. 27

6.4 Burner ignition

Once the above steps are complete, the burner should light.

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

If ignition does not occur, it may be that the gas is not reaching the combustion head within the safety time of 3 seconds; therefore, the gas ignition delivery must be increased.

The arrival of gas at the pipe coupling is indicated by the U-type pressure gauge (Fig. 26).

If lockout of the burner occurs again, see chapter 'Faults - Probable causes - Solutions' a pag. 32.



In the event of a burner lockout, more than two consecutive burner reset operations could cause damage to the installation. On the third lockout, contact the Aftersales Service.



If further lockouts or burner faults occur, interventions must only be made by qualified, authorised personnel (as indicated in this manual, and in compliance with the laws and regulations currently in force).

Once the burner has ignited, proceed with the global adjustment of the burner.

6.5 Servomotor adjustment

The servomotor (Fig. 28) adjusts simultaneously, by cross-referencing, the flow rate and pressure of the air and flow rate of the fuel in use.

It is equipped with adjustable cams which operate the same number of switches.

- Cam I:** not used
- Cam II:** limits the limit switch of the servomotor on position 0. With the burner off, the air damper is completely closed.
- Cam III:** not used
- Cam IV:** limits the limit switch of the servomotor on position max (approx. 130°).
- Cam V:** regulates the minimum modulation output; factory set at 45°.
- Remaining cam:** not used
- Lever 7:** servomotor reset

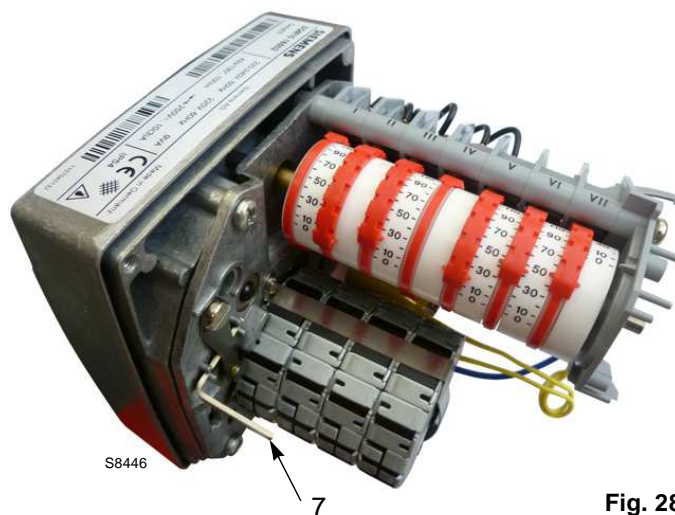


Fig. 28

6.6 Burner adjustment and output modulation

6.6.1 Maximum output

The servomotor (Fig. 28) must be adjusted to the maximum opening so that the air dampers are completely open.

6.6.2 Minimum output

The MIN output must be set within the firing rate indicated on page 10.

Turn the selector 2)(Fig. 27) "output reduction", and keep it turned to - until the servomotor has closed the air damper and the gas butterfly valve at 45° (adjustment made in the factory).

Air adjustment

The starting profile of cam 1)(Fig. 29) must be progressively adjusted by turning screws 2)(Fig. 29).



It is preferable not to turn the first screw since this is used to set the air damper to its fully closed position.

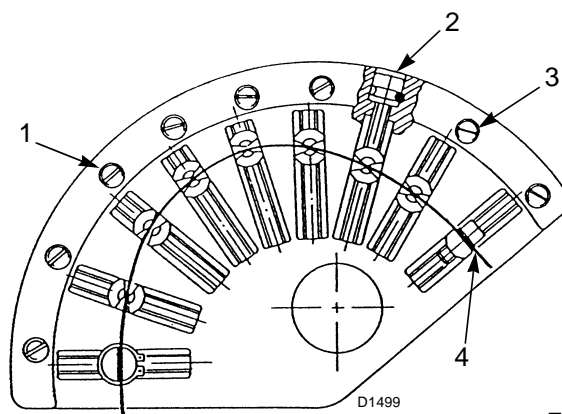


Fig. 29

- Key (Fig. 29)
- 1 Cam
 - 2 Adjustment screws
 - 3 Locking screws
 - 4 Adjustable profile

6.6.3 Intermediate outputs

After adjusting the maximum and minimum output of the burner, carry out air and gas adjustment on other intermediate positions of the servomotor.

The passage from one position to the next one is obtained by pressing the selector 2)(Fig. 27) on the symbol + or -.

For better adjustment repeatability, take care to stop the rotation of the cam unit when the upper bearing that slides on the profile 4)(Fig. 29) is aligned with one of the adjustment screws 2).

Screw or unscrew the preset screw 2) to increase or decrease the air output so as to adjust it to the corresponding gas output.



After output adjustment (maximum, minimum and intermediate), it is important to lock all the air adjustment screws 2) by the locking screws 3) so as to avoid possible movements from the position of air - gas calibration.

6.7 Combustion air adjustment

The air/fuel synchronisation is carried out by means of a servomotor 1)(Fig. 30) that, connected to a variable profile cam 2), operates on the delivery air dampers and, through proper leverage, on the combustion head and on the gas butterfly valve.



WARNING!
MOVING PARTS



WARNING!
DANGER: CRUSHING OF LIMBS

It is advisable, to reduce the loss and for a wide calibration field, to adjust the servomotor to the maximum of the output used, the nearest possible to the maximum opening (130°).

On the gas butterfly valve, fuel step according to the burner output required, with servomotor completely open, is carried out by the pressure stabilizer placed on the train.

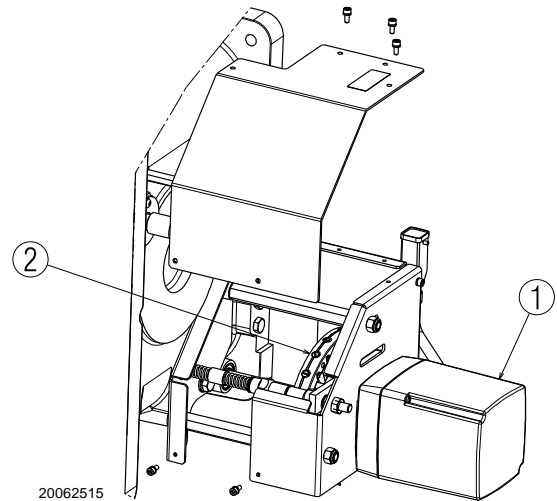


Fig. 30

The values in the Tab. M can be useful as reference for a good fuel calibration.

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	≤ 1000
G 25	11.5	9.5	8.8	≤ 1000
G 30	14.0	11.6	10.7	≤ 1000
G 31	13.7	11.4	10.5	≤ 1000

Tab. M

6.8 Air / fuel adjustment

During the calibration of the air / fuel ratio the following adjustments must be performed:

- **Air cam:**
turn the adjustment screws 2)(Fig. 29) after having loosened the screws 3).
- **Gas cam:**
turn the adjustment screws 2)(Fig. 29) after having loosened the screws 3).

6.8.1 Burner calibration procedure

After making a first ignition, verify the correct operation at the desired output. If this is not so, calibrate the gas cam.

With the optimal adjustment obtained, remember to lock the adjustment screws of the cam profiles by means of screws 3)(Fig. 29).



During the calibration of the cam, do not exceed the travel limits of the servomotor 0 ÷ 130 to avoid sticking.

Check, again with a manual operation 0-130 of the cam, there are no mechanical stops before the activation of the micro-switches 1-2 of the servomotor.

6.9 Pressure switch adjustment

6.9.1 Air pressure switch - check CO

Adjust the air pressure switch after performing all other burner adjustments with the air pressure switch set to the start of the scale (Fig. 31).

With the burner operating at MIN output, increase adjustment pressure by slowly turning the relative knob clockwise until the burner locks out.

Then turn the knob anticlockwise by about 20% of the set point and repeat burner start-up to ensure it is correct.

If the burner locks out again, turn the knob anticlockwise a little bit more.



In conformity with the standard, the air pressure switch must prevent the air pressure falling below 80% of the adjusted value and the CO in the flue gases 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 air pressure switch is installed in "absolute" position, that is connected only to the pressure test point "+" 22)(Fig. 4).



Fig. 31

6.9.2 Maximum gas pressure switch

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

With the burner operating at maximum output, lower the adjustment pressure by slowly turning the relative knob anticlockwise until the burner locks out.

Now turn the knob clockwise by 2 mbar and repeat the start-up of the burner.

If the burner locks out again, turn the knob clockwise again by 1 mbar.

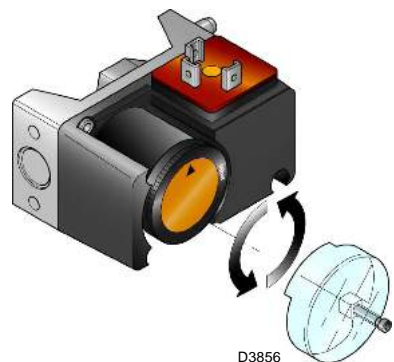


Fig. 32

6.9.3 Minimum gas pressure switch

Adjust the minimum gas pressure switch after performing all the other burner adjustments with the pressure switch set to the start of the scale (Fig. 33).

With the burner operating at maximum output, increase adjustment pressure by slowly turning the relative knob clockwise until the burner stops.

Now turn the knob anticlockwise by 2 mbar and repeat burner start-up to ensure it is uniform.

If the burner locks out again, turn the knob anticlockwise again by 1 mbar.

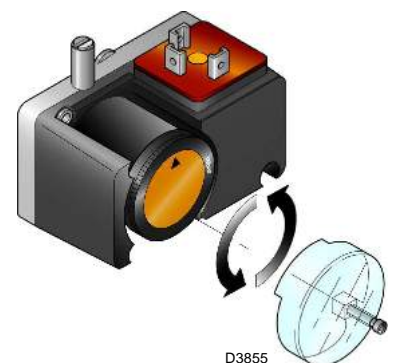


Fig. 33

6.10 Operation sequence of the burner

6.10.1 Burner start-up

- 0s TL thermostat/pressure switch closes.
- 6s Fan motor starts up. Servomotor starts: 130 rotation to the right, until contact is made on cam 4).
- 48s The air damper is positioned to MAX output.
- 48s Pre-purging stage with MAX output air delivery. Duration 32 seconds.
- 80s The servomotor rotates to the left up to the angle set on the cam 2).
- 112s The air damper and the gas butterfly valve adopt the MIN output position (with cam 2).
- 113s Ignition electrode strikes a spark.
- 130s The safety valve VS opens, along with the adjustment valve VR (quick opening).
The flame is ignited at a low output level, point A (Fig. 34). Output is then progressively increased, with the valve opening slowly up to MIN output, point B (Fig. 34).
- 122s The spark goes out.
- 143s The control box start-up cycle ends.

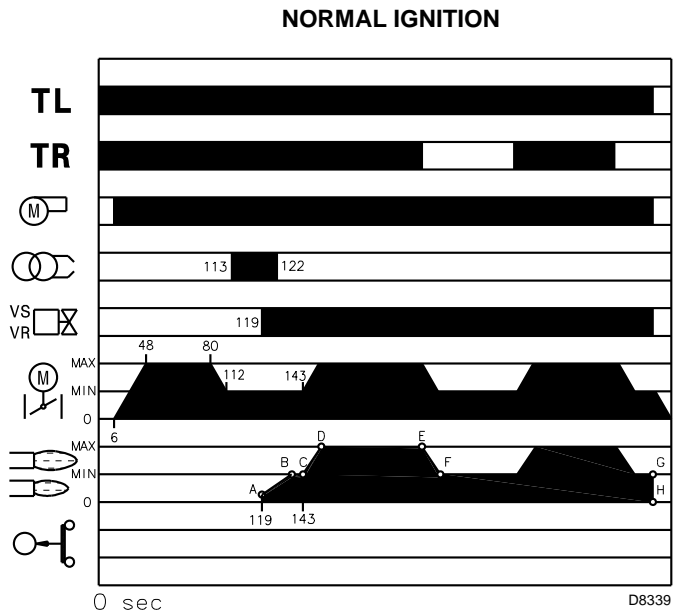


Fig. 34

6.10.2 Operation

Burner without the output power regulator RWF40

Once the start-up cycle is completed, the servomotor command moves on to the TR thermostat/pressure switch that controls the pressure or the temperature in the boiler, point C (Fig. 34). (The electrical control box continues to check the presence of the flame and the correct position of the air and gas maximum pressure switches).

- If the temperature or the pressure is low so the thermostat/pressure switch TR is closed, the burner progressively increases the output up to the MAX value (section C-D).
- If subsequently the temperature or pressure increases until TR opens, the burner progressively decreases its output to the MIN. value (section E-F). The sequence repeats endlessly.
- 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 thermostat/pressure switch opens, and the servomotor returns to angle 0 limited by the contact of the cam 2). The air damper closes completely to reduce heat losses to a minimum.

For every change of output, the servomotor will automatically change the gas flow rate (butterfly valve), the airflow (fan damper) and the air pressure (2 shutters in the combustion head).

Burner with the output power regulator RWF40

See manual enclosed with the adjuster.

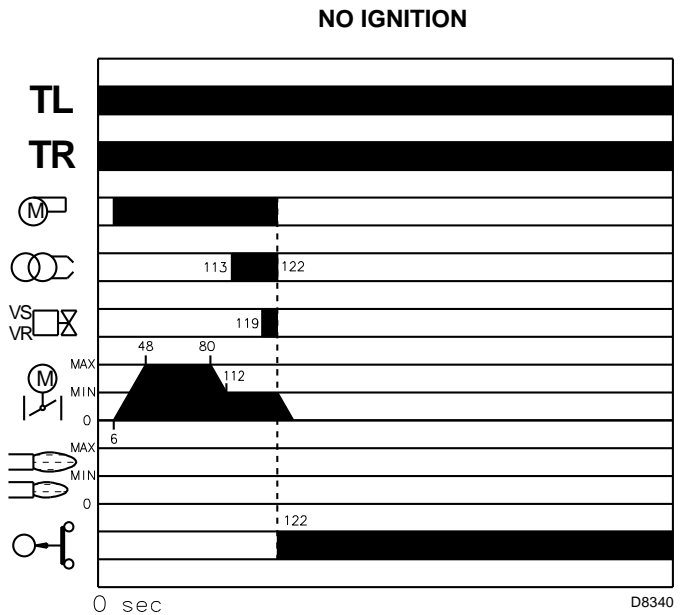


Fig. 35





6.10.3 Burner flame goes out during operation

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

6.10.4 Ignition failure

If the burner does not fire (Fig. 35), it goes into lockout within 3 sec. after the gas valve opens and 122 seconds after the control device TL closes.

6.11 Final checks (with burner operating)

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

Tab. N



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.



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

Before carrying out any maintenance, cleaning or checking operations:



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



Close the fuel interception tap.



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 Checking and cleaning



The operator must use the required equipment during maintenance.

Combustion

Carry out an analysis of the combustion discharge gases. Significant differences with respect to the previous check indicate the points where more care should be exercised during maintenance.

Combustion head

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

Burner

Check that there are not excess wear or loose screws, especially on the cam 3)(Fig. 29).
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 blades, as this condition will cause a reduction in the air flow rate and provoke polluting combustion.

Electrical current to UV cell (Fig. 36)

Clean the glass cover from any dust that may have accumulated. To remove the photocell, pull out outwards; it is only pressed in. Minimum value for correct operation: 70 µA.

If the value is lower, it could be due to:

- exhausted photocell
- low voltage (lower than 187 V)
- bad regulation of the burner

In order to measure the current, use a microammeter of 100 mA c.c., connected in series to the photocell, as in the scheme, with a capacitor of 100 mF - 1V c.c. at the same level of the instrument.

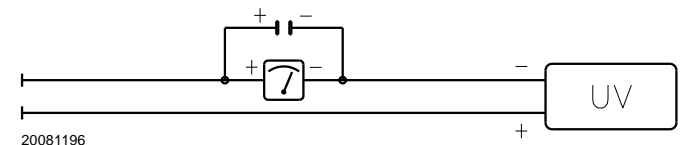


Fig. 36

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 pipes between the gas meter and the burner.

Gas filter

Replace the gas filter when it is dirty.

Combustion

If the combustion values found at the start of the intervention do not satisfy current standards or anyway indicate a poor state of combustion (consult the table below), contact the Technical Assistance Service for 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	≤ 1000
G 25	11.5	9.5	8.8	≤ 1000
G 30	14.0	11.6	10.7	≤ 1000
G 31	13.7	11.4	10.5	≤ 1000

Tab. O

7.3 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.

- Remove the tie-rods 1) and 4)(Fig. 37) of the head movement and damper opening lever, loosening the nuts 2);
- disconnect the socket 3) of the servomotor;
- remove the screws 5).
- At this point, it is possible to open the burner on the hinge.

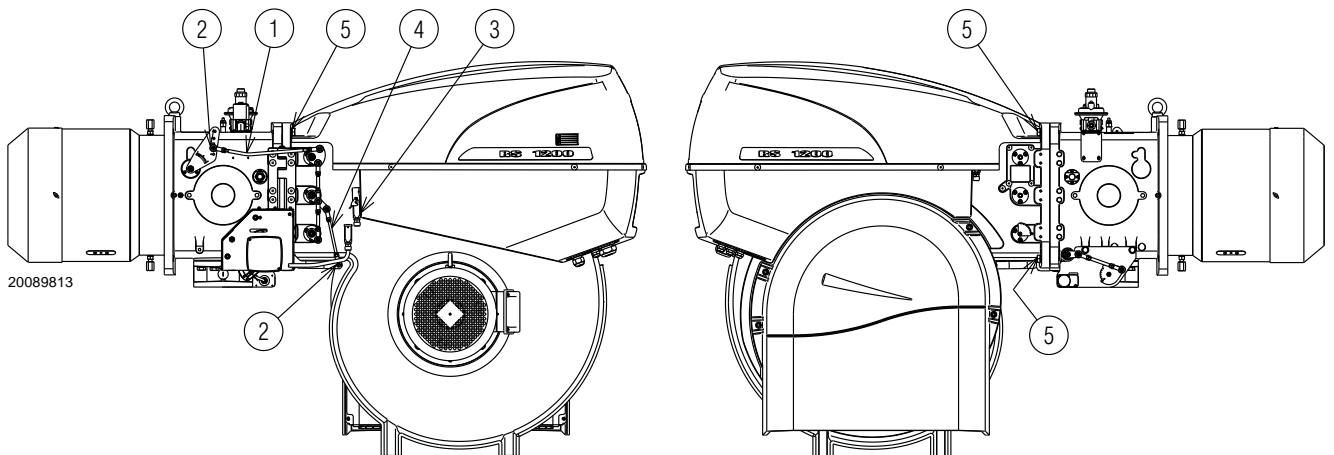


Fig. 37

7.4 Closing the burner

Refit following the steps described but in reverse order; refit all burner components as they were originally assembled.



Carry out all maintenance work and mount the casing again.

8 Faults - Probable causes - Solutions

The LFL1.333RL control box is equipped with a lockout indicator (Fig. 38) that turns during the start-up programme, and is visible from the small lockout window.

When the burner does not start or stops, due to a failure, the symbol that appears on the indicator indicates the type of interruption. The positions of the lockout indicator are shown in Fig. 39.



Lockout indicator

- a-b Start-up sequence
- b-b' Idle stages (without contact confirmation)
- b(b')-a Post-purging programme

Fig. 38

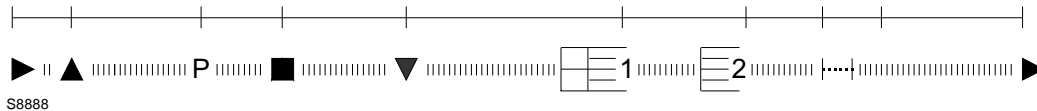


Fig. 39

Fuse replacement

The fuse 2)(Fig. 40) is in the rear part of the control box. A spare fuse 1) is also available: it can be extracted after breaking the panel tab A) that houses it. In the event that fuse 2) has been tripped, replace it as shown in Fig. 40.

Find a list of faults, causes and possible solutions for a set of failures that may occur and result in irregular burner operation or no functioning at all.

If a burner malfunction is detected, first of all:

- check that the electrical wiring is adequately connected;
- check whether fuel is delivered;
- check that every adjustment parameter is adequately set.



WARNING

In the event of a burner lockout, more than two consecutive burner reset operations could cause damage to the installation. On the third lockout, contact the Aftersales Service.



DANGER

If further lockouts or burner faults occur, interventions must only be made by qualified, authorised personnel (as indicated in this manual, and in compliance with the laws and regulations currently in force).

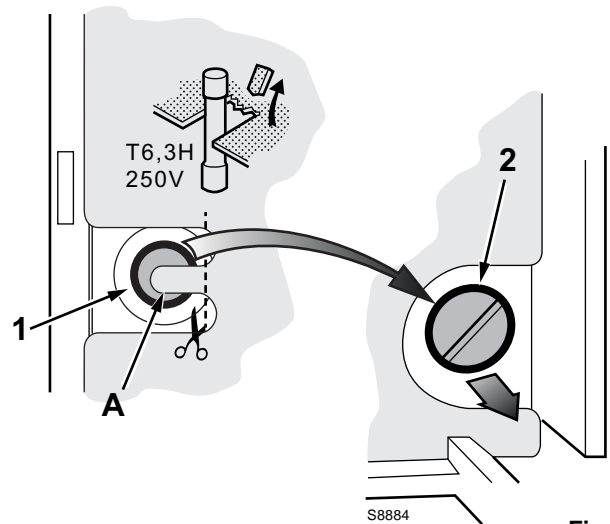


Fig. 40

Symbol ⁽¹⁾	Problem	Possible cause	Recommended remedy
◀	The burner does not start	No electrical power supply	Close all switches and check connections
		A limit or safety thermostat/pressure switch open	Adjust or replace
		Control box lockout	Release the control box
		Control box fuse interrupted	Replace it ⁽²⁾
		Incorrect electrical wiring	Check
		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
		Air pressure switch in operating position	Adjust or replace
	The burner does not switch on, and the lock-out appears	The servomotor contact does not intervene (closure cam 0°)	Adjust the closure cam 0° or replace the servomotor
		Flame simulation	Replace the control box
		Faulty motor remote control switch	Replace
		Defective electrical motor	Replace
▲	The burner starts up but stops at the damper maximum opening	Motor lockout	Release the thermal relay
		Do not intervene the servomotor contact (maximum cam opening)	Cam adjustment (maximum opening) or replace the servomotor
P	The burner switches on, but then stops in lockout	Air pressure switch does not switch owing to lack of air pressure.	
		Air pressure switch incorrectly adjusted.	Adjust or replace
		Pressure switch pressure test point pipe blocked	Clean
		Poorly adjusted head	Adjust
		Dirty fan	Clean
		High depression in the furnace	Contact our Technical Department
■	The burner turns on and then remains in lockout mode	Failure to the flame detection circuit	Replace the control box
▼	The burner remains in the pre-purge phase.	Do not intervene the servomotor contact (cam minimum)	Cam adjustment (minimum) or replace the servomotor
1	Once the pre-purging and the safety time has elapsed the burner goes into lockout without the flame appearing	Gas pressure too low	Increase pressure at governor
		Ignition electrode incorrectly adjusted	Adjust it
		Electrode grounded due to broken insulation	Replace
		Faulty or grounded high voltage cable	Replace
		High voltage cable deformed by high temperature	Replace and protect
		Faulty ignition transformer	Replace
		Incorrect valve or ignition transformer connections	Redo them
		Defective control box	Replace
		A closed valve upline the gas train	Open
		The VP1 or VP2 solenoid does not open	Replace the coil or the rectifier panel
		The VP1 solenoid let too little gas through	Increase
		Air in pipework	Bleed air
		Lockout with flame appearing	The VS or VR solenoids let too little gas through
	Dirty flame sensor		Check, replace flame sensor
	Faulty connection		Check, replace flame sensor
	Insufficient detection current (min. 70 µA)		Measure current, replace the flame sensor
	Flame sensor exhausted, faulty		Replace
	Maximum gas pressure switch intervention		Adjust or replace
	Defective control box		Replace

Symbol (1)	Problem	Possible cause	Recommended remedy
	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 minimum gas pressure switch has been set. The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner comes to a halt. Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. The sequence repeats endlessly.	Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge
	Lockout without symbol indication	Flame simulation	Replace the control box
	Burner goes into lockout during operation	Faulty flame sensor	Replace worn parts
		Air pressure switch faulty	Replace
		Maximum gas pressure switch intervention	Adjust or replace
◀	Lockout when the burner stops	Permanent flame in the combustion head or flame simulation	Eliminate permanency of flame or replace the control box
	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

Tab. P

A Appendix - Accessories**Output power regulator kit for modulating operation**

With the modulating operation, the burner continually adapts the power to the request for heat, ensuring great stability for the parameter controlled: temperature or pressure.

Two components should be ordered:

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

Parameter to be checked		Probe		Output regulator	
	Adjustment field	Type	Code	Type	Code
Temperature	- 100...+ 500°C	PT 100	3010110	RWF40 BASIC RWF40 HIGH	3010356
Pressure	0...2.5 bar	Output probe 4...20 mA	3010213		3010357
	0...16 bar		3010214		

Output power regulator with signal 4-20 mA, 0-10V

Two components should be ordered:

- the analogue signal converter;
- the Potentiometer

Burner	Potentiometer		Analogue Signal Converter	
	Type	Code	Type	Code
RS 1000/M C01	ASZ...	3013532	E5202	3010390
RS 1200/M C01				

Continuous purging kit

Burner	Code
RS 1000/M C01	20086519
RS 1200/M C01	

Soundproofing box kit

Burner	Code
RS 1000/M C01	3010401
RS 1200/M C01	

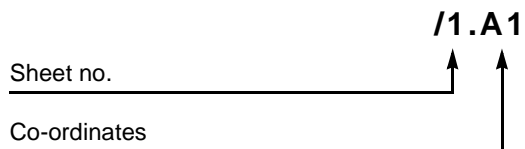
Gas trains in compliance with EN 676

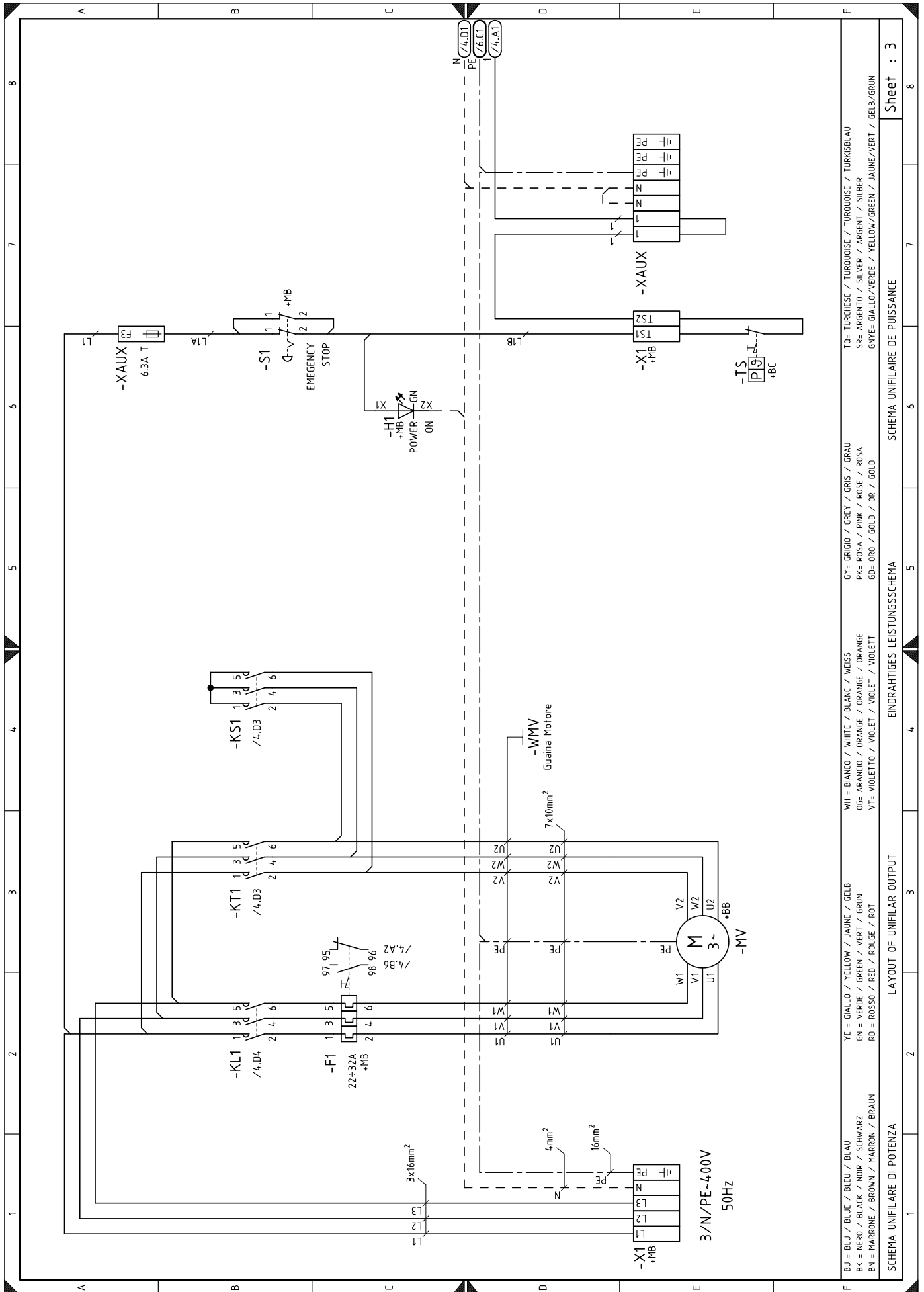
Please refer to manual.

B Appendix - Electrical panel layout

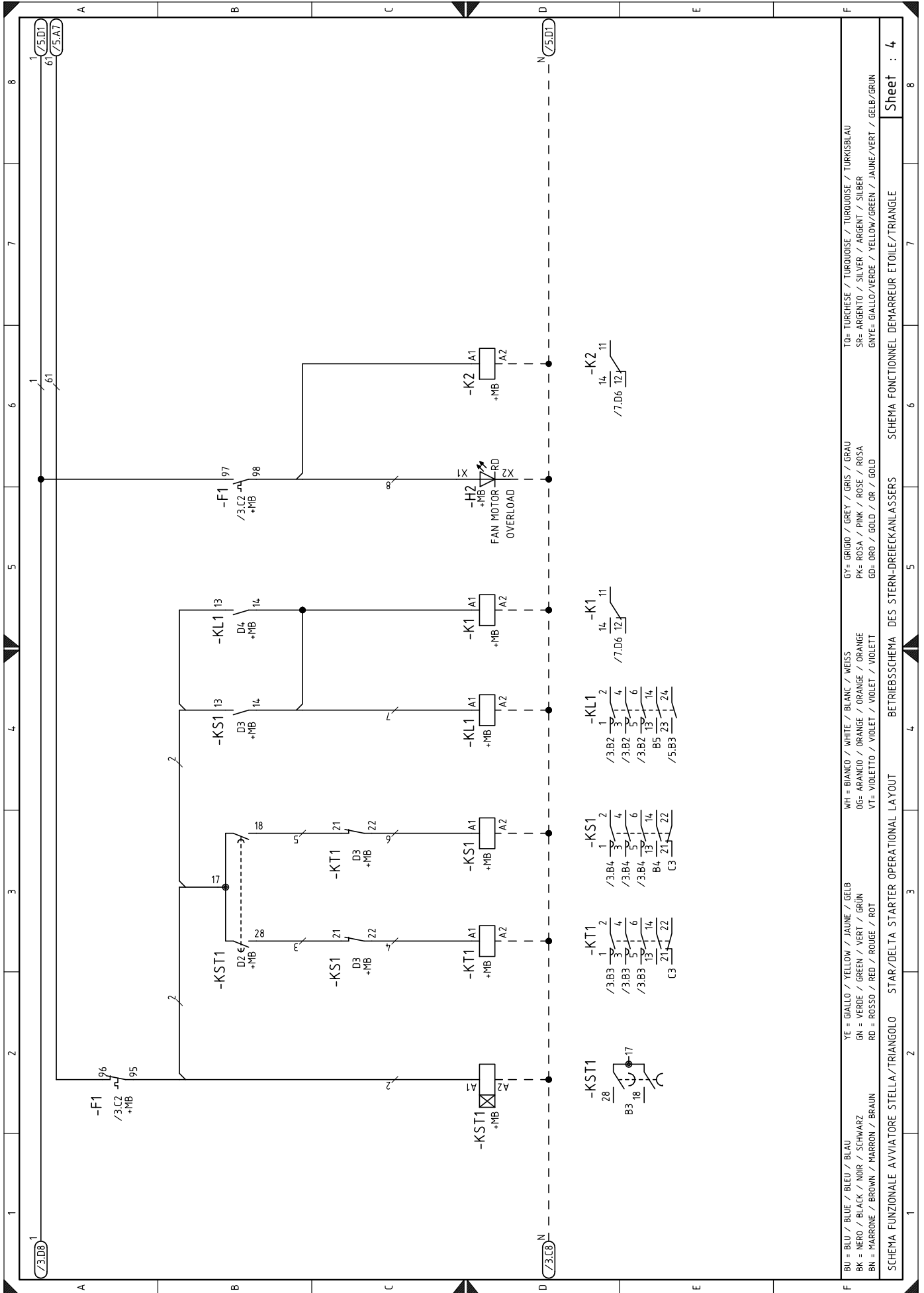
1	Index of layouts
2	Indication of references
3	Single-wire output layout
4	Functional layout star/triangle starter
5	Functional layout LFL 1...
6	Functional layout LFL 1...
7	Functional layout LFL 1...
8	Functional layout LFL 1...
9	Functional diagram
10	Electrical wiring that the installer is responsible for
11	Electrical wiring that the installer is responsible for
12	Electrical wiring kit RWF40 internal
13	Electrical wiring kit RWF40 external

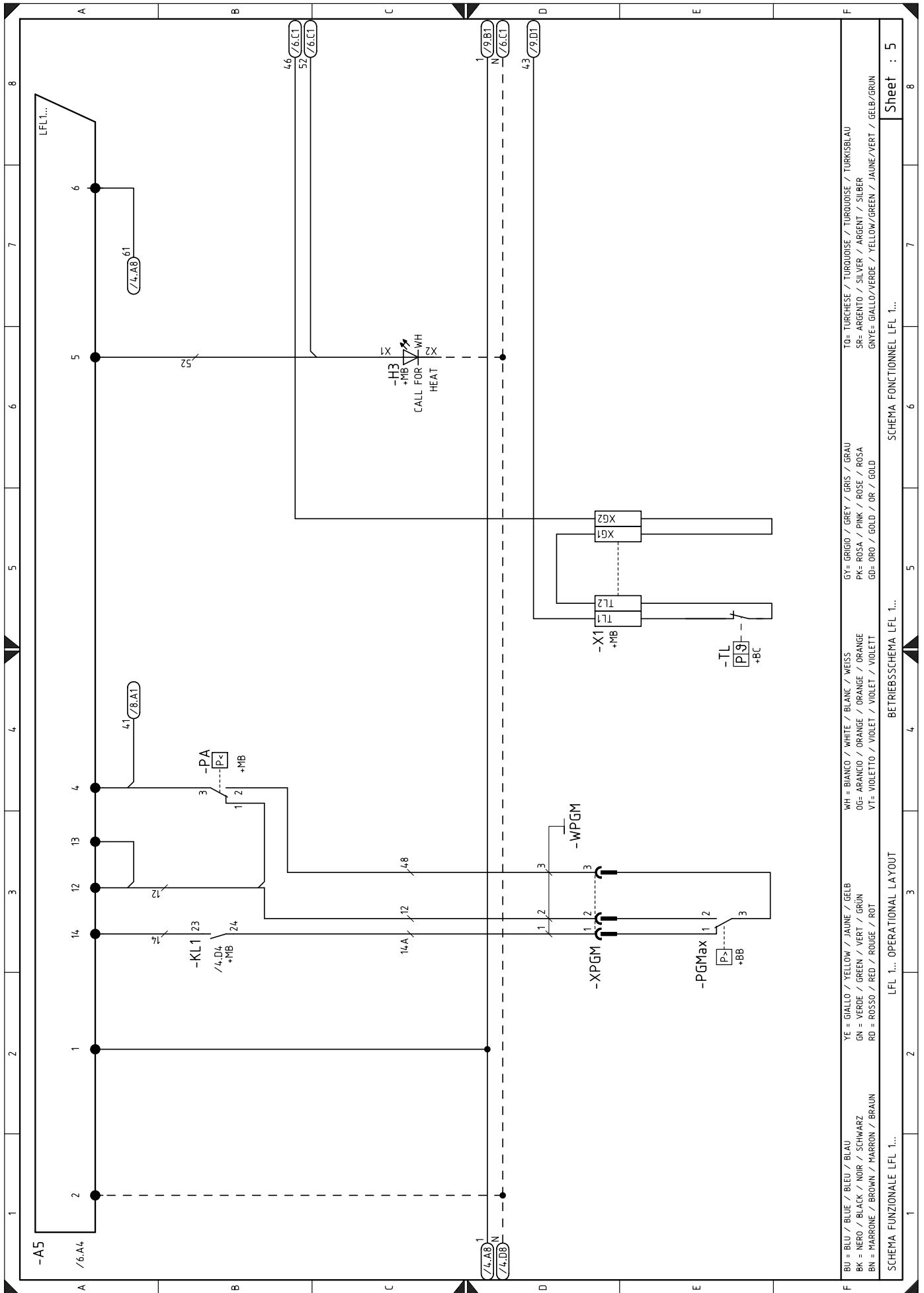
2 Indication of references



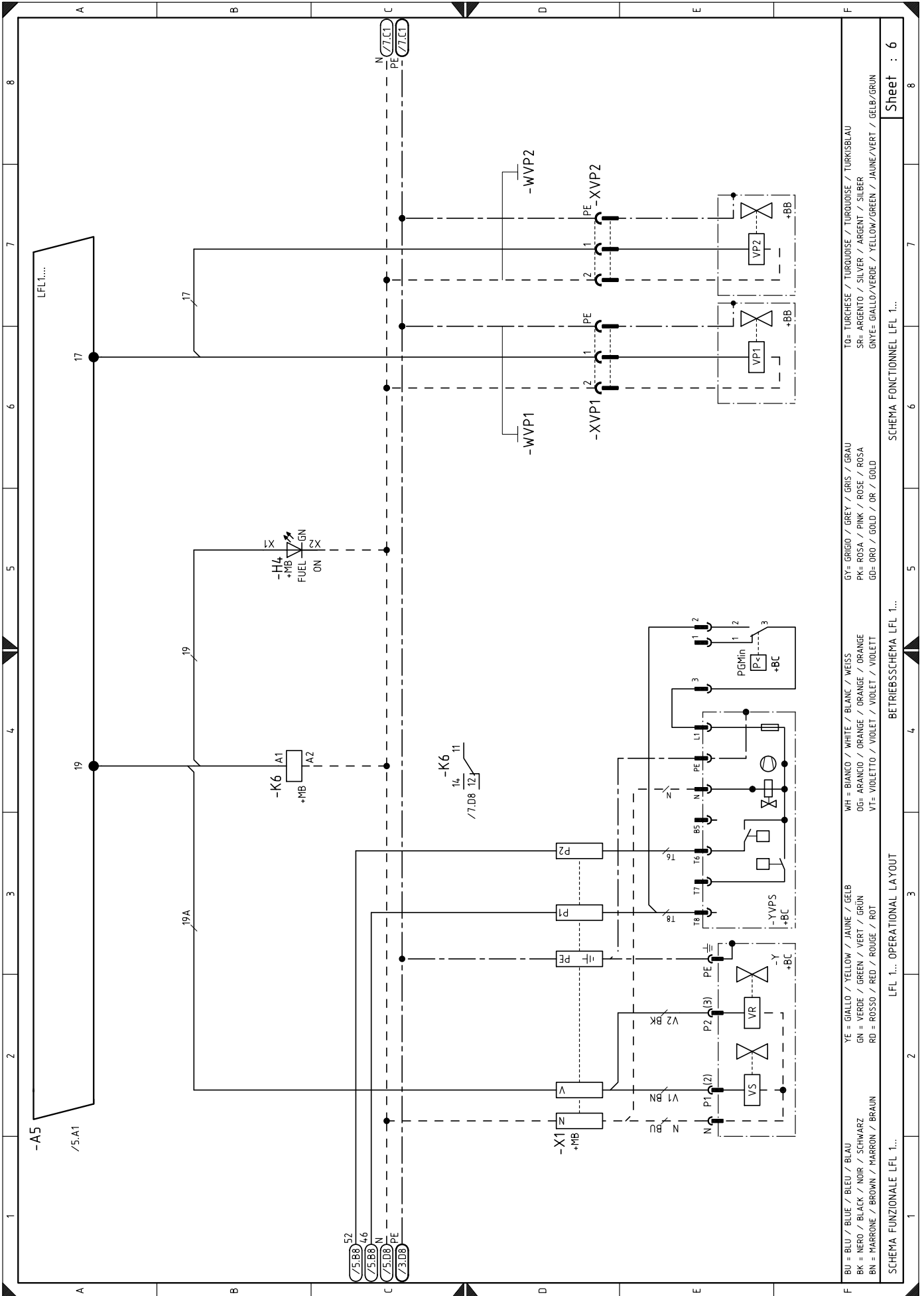


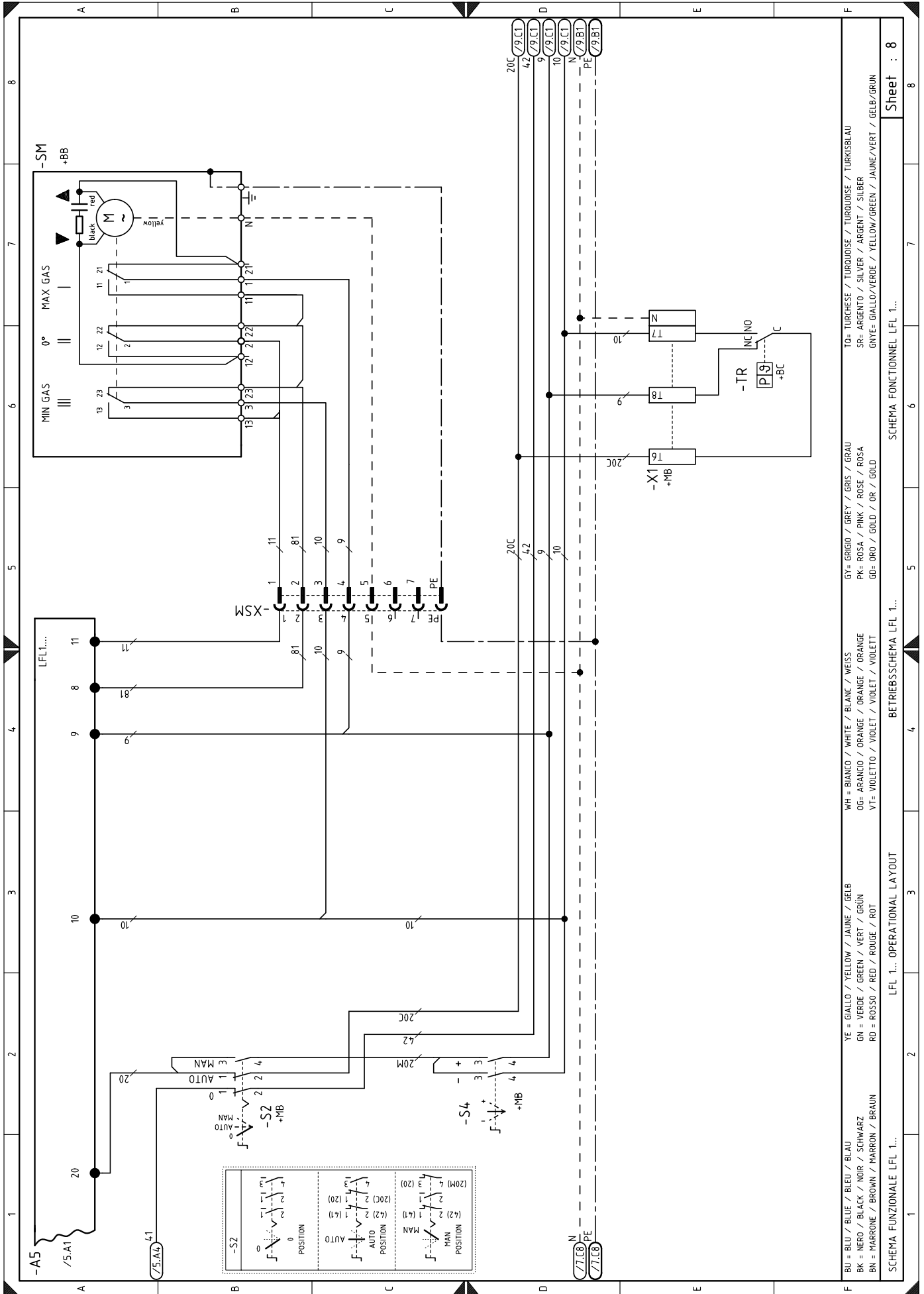
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BK = NERO / BLACK / NOIR / SCHWARZ	GN = VERDE / GREEN / VERT / GRÜN	OG = ARANCIO / ORANGE / ORANGE / ORANGE	PK = ROSA / PINK / ROSE / ROSA	SR = ARGENTO / SILVER / ARGENT / SILBER
BN = MARRONE / BROWN / MARRON / BRAUN	RD = ROSSO / RED / ROUGE / ROT	VT = VIOLETTO / VIOLET / VIOLET / VIOLETT	GD = ORO / GOLD / OR / GOLD	GNVE = GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
SCHEMA UNIFILARE DI POTENZA			SCHEMA UNIFILARE DE PUISSANCE	
LAYOUT OF UNIFILAR OUTPUT			EINDRAHTIGES LEISTUNGSSCHEMA	
Sheet : 3			Sheet : 3	





BU = BLU / BLUE / BLEU / BLAU	YE = GIALLO / YELLOW / JAUNE / GELB	WH = BIANCO / WHITE / BLANK / WEISS	GY = GRIGIO / GREY / GRIS / GRAU	TO= TURCHESE / TURQUOISE / TURKOISE / TURKSBLAU
BK = NERO / BLACK / NDR / SCHWARZ	GN = VERDE / GREEN / VERT / GRÜN	OG= ARANCIO / ORANGE / ORANGE / ROSA	PA= ROSA / PINK / ROSE / ROSA	SR= ARGENTO / SILVER / ARGENT / SILBER
BN = MARRONE / BROWN / MARRON / BRAUN	RD = ROSSO / RED / ROUGE / ROT	VT= VIOLETTA / VIOLET / VIOLET / VIOLETT	GD= ORO / GOLD / OR / GOLD	GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
SCHEMA FUNZIONALE LFL 1... LFL 1... OPERATIONAL LAYOUT BETRIEBSSCHEMA LFL 1... SCHEMA FONCTIONNEL LFL 1...				
				Sheet : 5





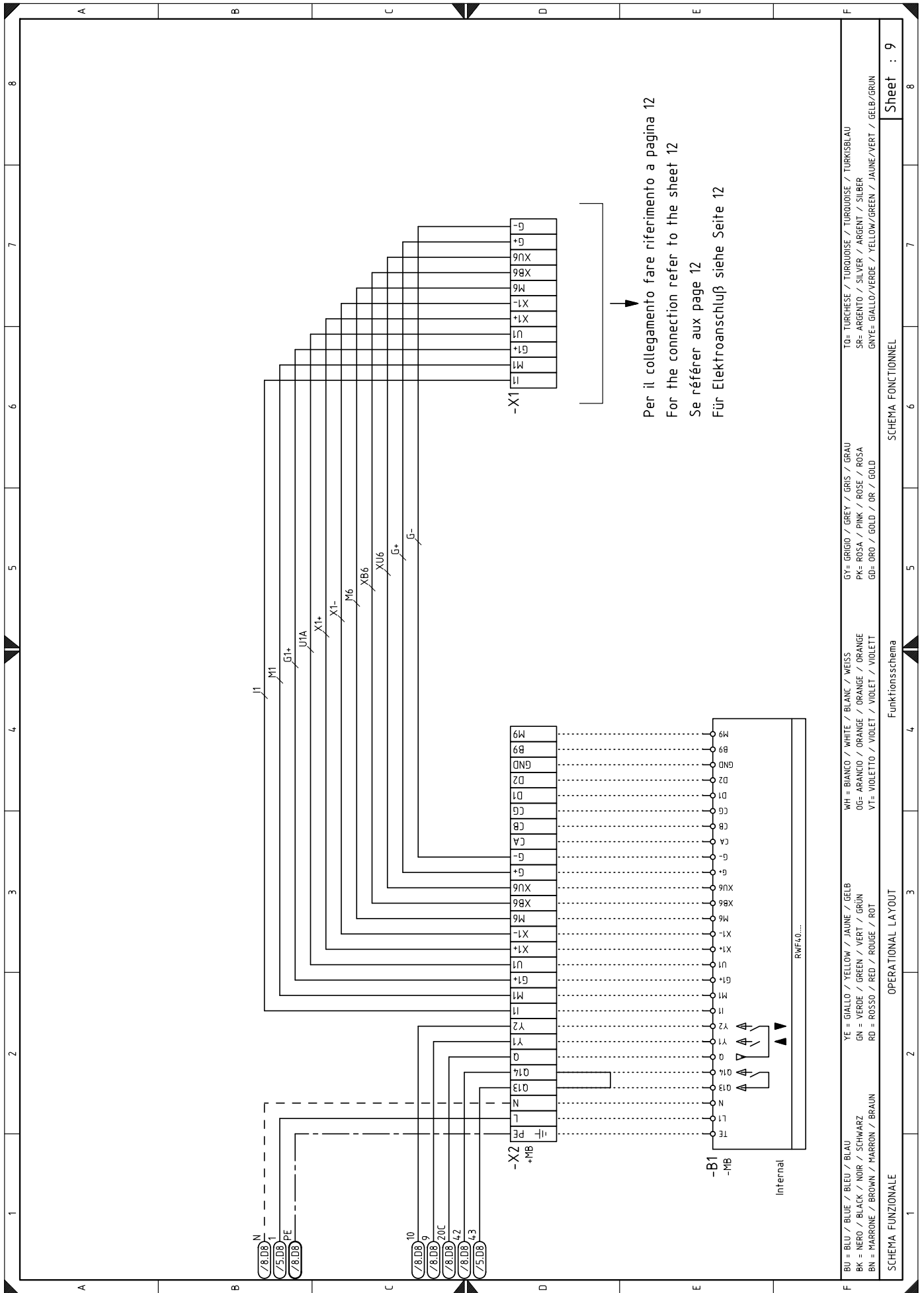
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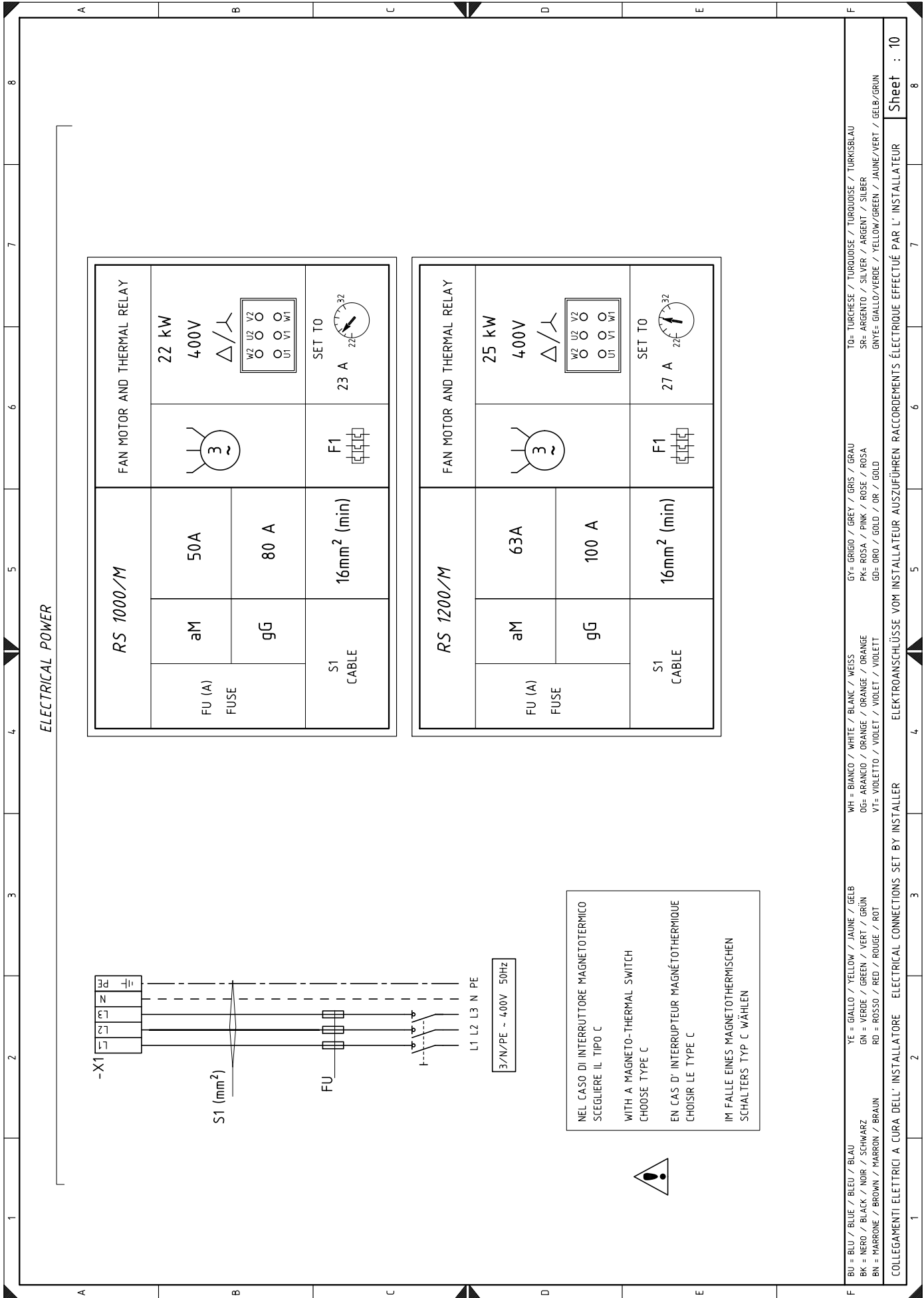
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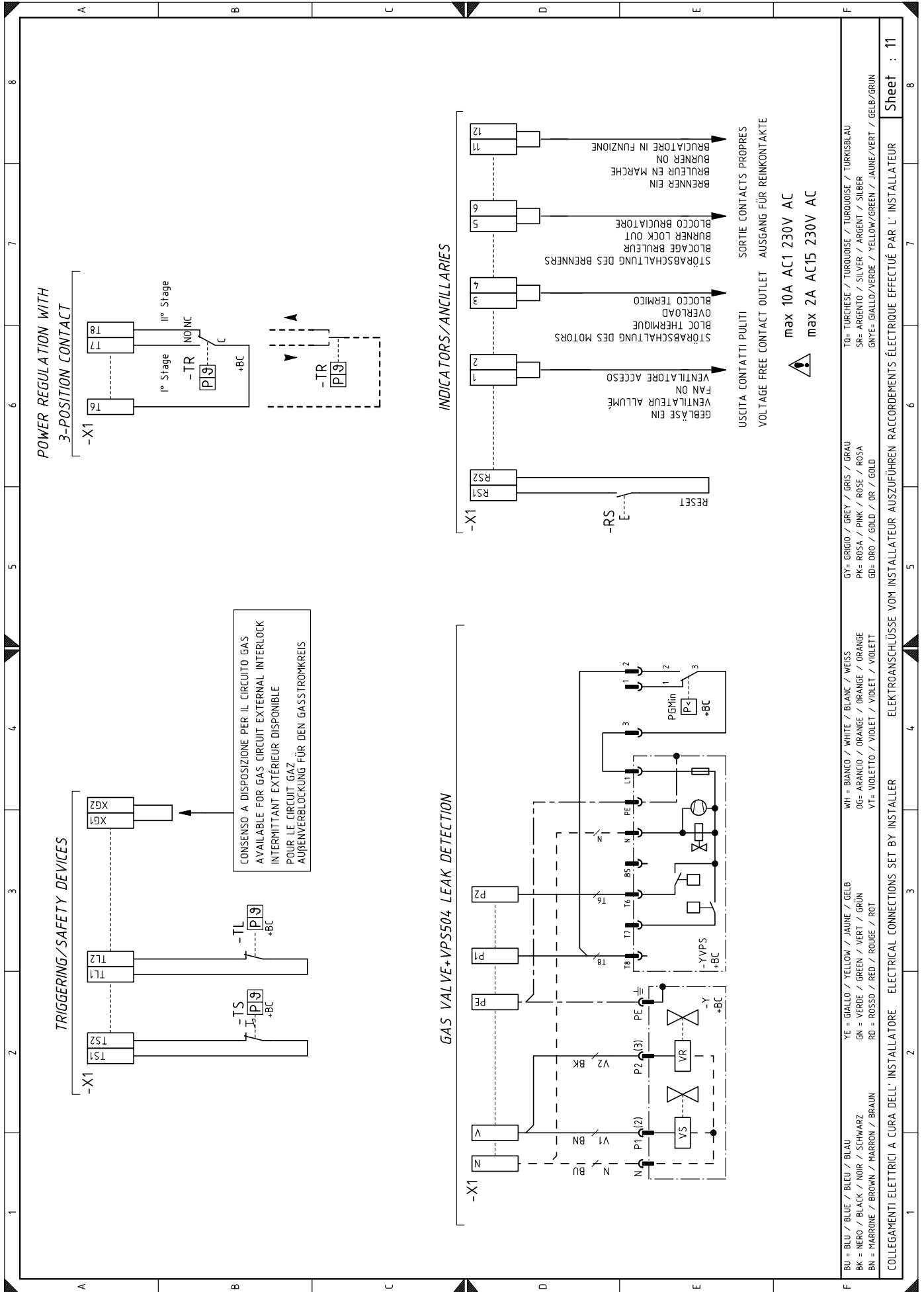
BETRIEBSSCHEMA LFL 1...

LFL 1... OPERATIONAL LAYOUT

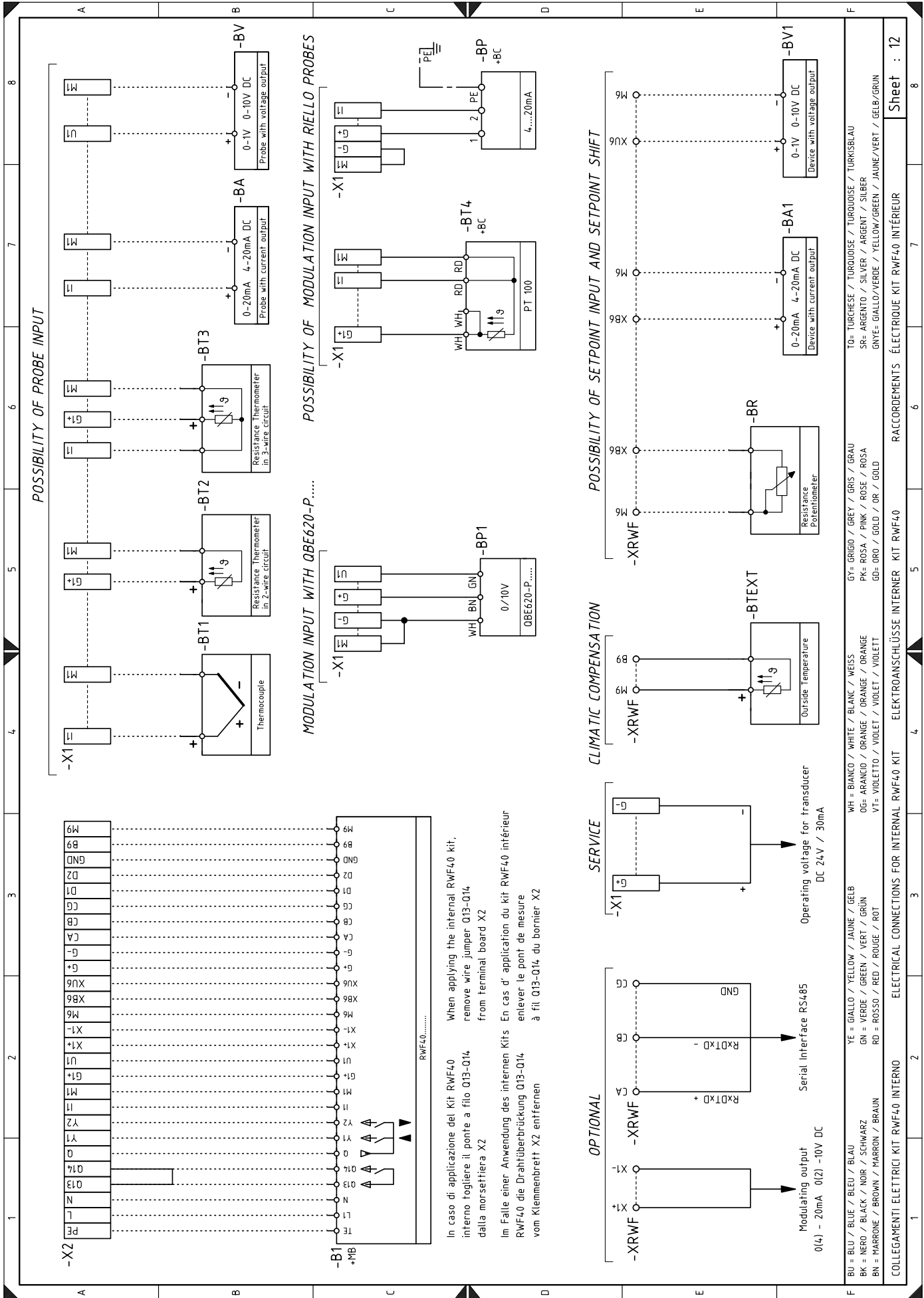
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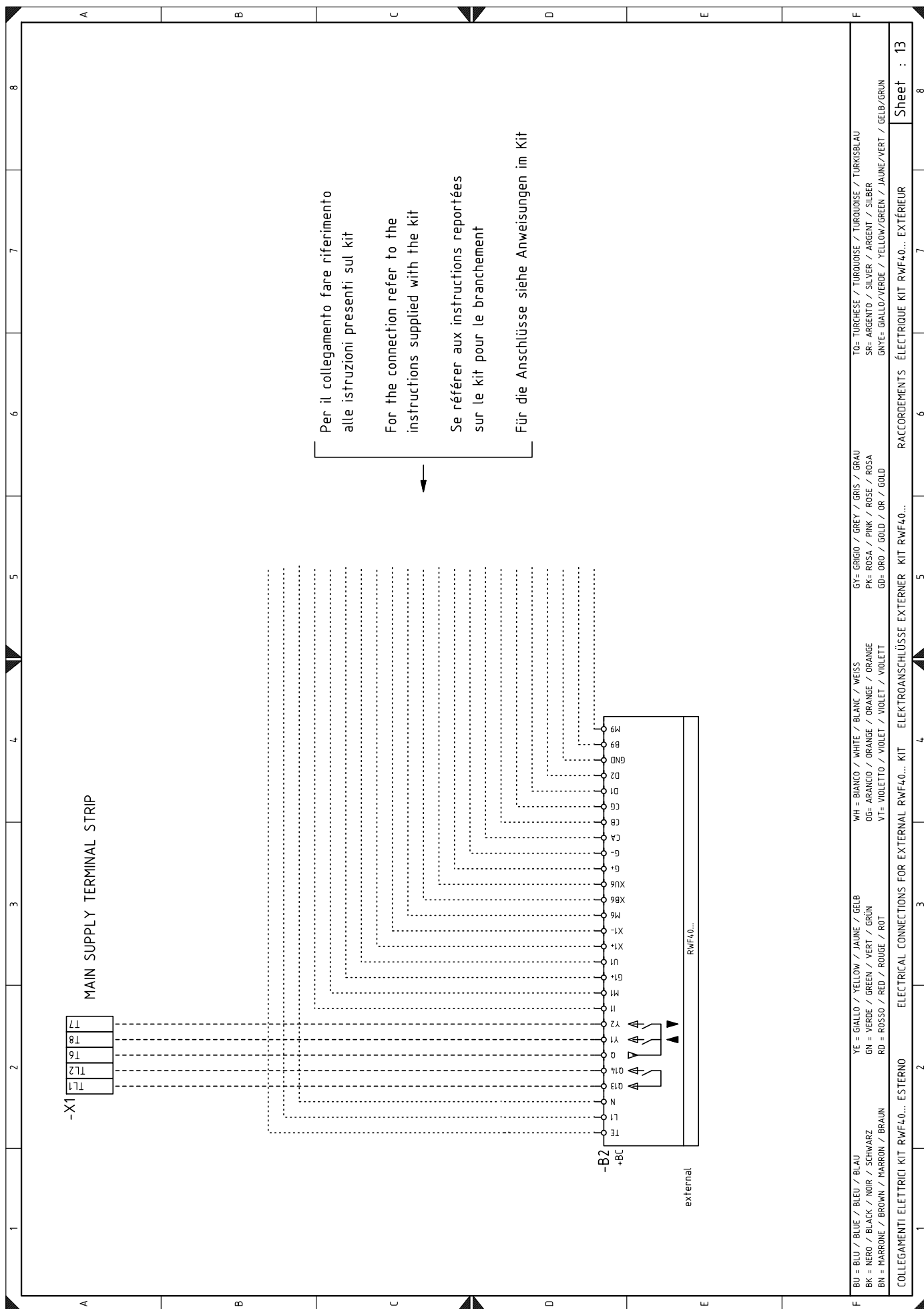






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BK = NERO / BLACK / NOIR / SCHWARZ	GN = VERDE / GREEN / VERT / GRÜN	OG = ARANCIO / ORANGE / ORANGE / ROSA	PA = ROSA / PINK / ROSE / ROSA	SR = ARGENTO / SILVER / ARGENT / SILBER
BN = MARRONE / BROWN / MARRON / BRAUN	RD = ROSSO / RED / ROUGE / ROT	VT = VIOLETTA / VIOLET / VIOLET / VIOLETT	GO = ORO / GOLD / OR / GOLD	GNVE = GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
COLLEGAMENTI ELETTRICI A CURA DELL'INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L'INSTALLATEUR				
				max 10A AC1 230V AC
				max 2A AC15 230V AC





Wiring layout key

A5	Control box	XS	Flame sensors connector
B1	Output regulator RWF40 internal	XSM	Servomotor connector
B2	Output regulator RWF40 external	XVP1	VP1 connector
BA	Output probe in current	XVP2	VP2 connector
BA1	Output device in current to modify remote setpoint	Y	Gas adjustment valve + gas safety valve
BP	Pressure probe	YVPS	Valve leak detection device
BP1	Pressure probe		
BR	Remote setpoint potentiometer		
BT1	Thermocouple probe		
BT2	Probe Pt100, 2 wires		
BT3	Probe Pt100, 3 wires		
BT4	Probe Pt100, 3 wires		
BTEXT	External probe for climatic compensation of the setpoint		
BV	Output probe in voltage		
BV1	Output device in voltage to modify remote setpoint		
F1	Fan motor thermal relay		
F2	Pump motor thermal relay		
F3	Auxiliary fuse		
H1	Light signalling burner on		
H2	Light signalling fan motor lockout and pump motor		
H3	Heat request lighting signal		
H4	Gas supply light signalling		
KL1	Star/triangle starter line contactor and direct start-up		
KT1	Star/triangle starter triangle contactor		
KS1	Start/triangle starter star contactor		
KST1	Star/triangle starter timer		
K1	Clean contacts output relay with fan motor working		
K2	Clean contacts output relay motor lockout		
K3	Clean contacts output relay for burner lockout		
K6	Clean contacts output relay burner switched on		
MV	Fan motor		
PA	Air pressure switch		
PE	Burner earth		
PGMax	Maximum gas pressure switch		
PGMin	Minimum gas pressure switch		
RS	Remote burner reset button		
S1	Emergency stop button		
S2	Off / automatic / manual selector		
S4	Power increase / power reduction selector		
SH3	Burner reset button and lock-out signal		
SM	Servomotor		
TA	Ignition transformer		
TL	Limit thermostat/pressure switch		
TR	Adjustment thermostat/pressure switch		
TS	Safety thermostat/pressure switch		
UV	Flame sensor		
VP1	Pilot valve 1		
VP2	Pilot valve 2		
X1	Main terminal supply board		
X2	Terminal board for kit RWF40		
XAUX	Auxiliary terminal board		
XPGM	Maximum gas pressure switch connector		

RIELLO

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