GB

Dual fuel light oil/ gas burner

Progressive two-stage or modulating operation

CODE	MODEL	TYPE
20147802	RLS 800/M MX	1301 T

20148124 (4) - 01/2022

Translation of the original instructions

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) Italy	
Product:	Dual fuel light oil/gas burners	
Model and type:	RLS 800/M MX	1301 T
These products are in compliance with the following Technical Standards:		
EN 676		
EN 267		
EN 12100		
and according to the European Directives:		
GAR	2016/426/EU	Gas Devices Regulation
MD	2006/42/EC	Machine Directive
LVD	2014/35/UE	Low Voltage Directive
EMC	2014/30/EU	Electromagnetic Compatibility
PED	2014/68/EU (FS2 only)	Pressure Equipment Directive
Such products are marked as indicated below:		
CE	CE-0085CL0422 Class 3 (EN 676) - Class 2 (EN 267)	

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

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
Dual fuel light oil/gas burners	1301 T	RLS 800/M MX	1750 - 8000 kW

Legnago, 03.05.2021

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

2 Information and general warnings

2.1 Information about the instruction manual

2.1.1 Introduction

The instruction manual supplied with the burner:

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

Symbols used in the manual

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

2.1.2 General dangers

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

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

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

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

2.1.3 Other symbols

DANGER: LIVE COMPONENTS

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

DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.

DANGER: BURNING

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

DANGER: CRUSHING OF LIMBS

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

WARNING: MOVING PARTS

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

DANGER: EXPLOSION

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

PERSONAL PROTECTION EQUIPMENT

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

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

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

ENVIRONMENTAL PROTECTION

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

IMPORTANT INFORMATION

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

➤ This symbol indicates a list.

Abbreviations used

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

2.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

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

➤ The instruction manual shows:
–the serial number of the burner;

.....

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

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

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

2.2 Guarantee and responsibility

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

ATTENTION

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

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

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

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

3 Safety and prevention

3.1 Introduction

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

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

It is a good idea to remember the following:

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

Specifically:

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

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

➤ Modification of the burner to alter its performance and destinations is not allowed.

➤ The burner must be used in exemplary technical safety conditions. Any disturbances that could compromise safety must be quickly eliminated.

➤ Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.

➤ Only those parts envisaged by the manufacturer can be replaced.

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

3.2 Personnel training

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

The user:

➤ undertakes to entrust the machine exclusively to suitably trained and qualified personnel;

➤ undertakes to inform his personnel in a suitable way about the application and observance of the safety instructions. With that aim, the user undertakes to ensure that everyone knows the use and safety instructions for his own duties;

➤ Personnel must observe all the danger and caution indications shown on the machine.

➤ Personnel must not carry out, on their own initiative, operations or interventions that are not within their province.

➤ Personnel must inform their superiors of every problem or dangerous situation that may arise.

➤ The assembly of parts of other makes, or any modifications, can alter the characteristics of the machine and hence compromise operating safety. The manufacturer therefore declines any and every responsibility for any damage that may be caused by the use of non-original parts.

In addition:

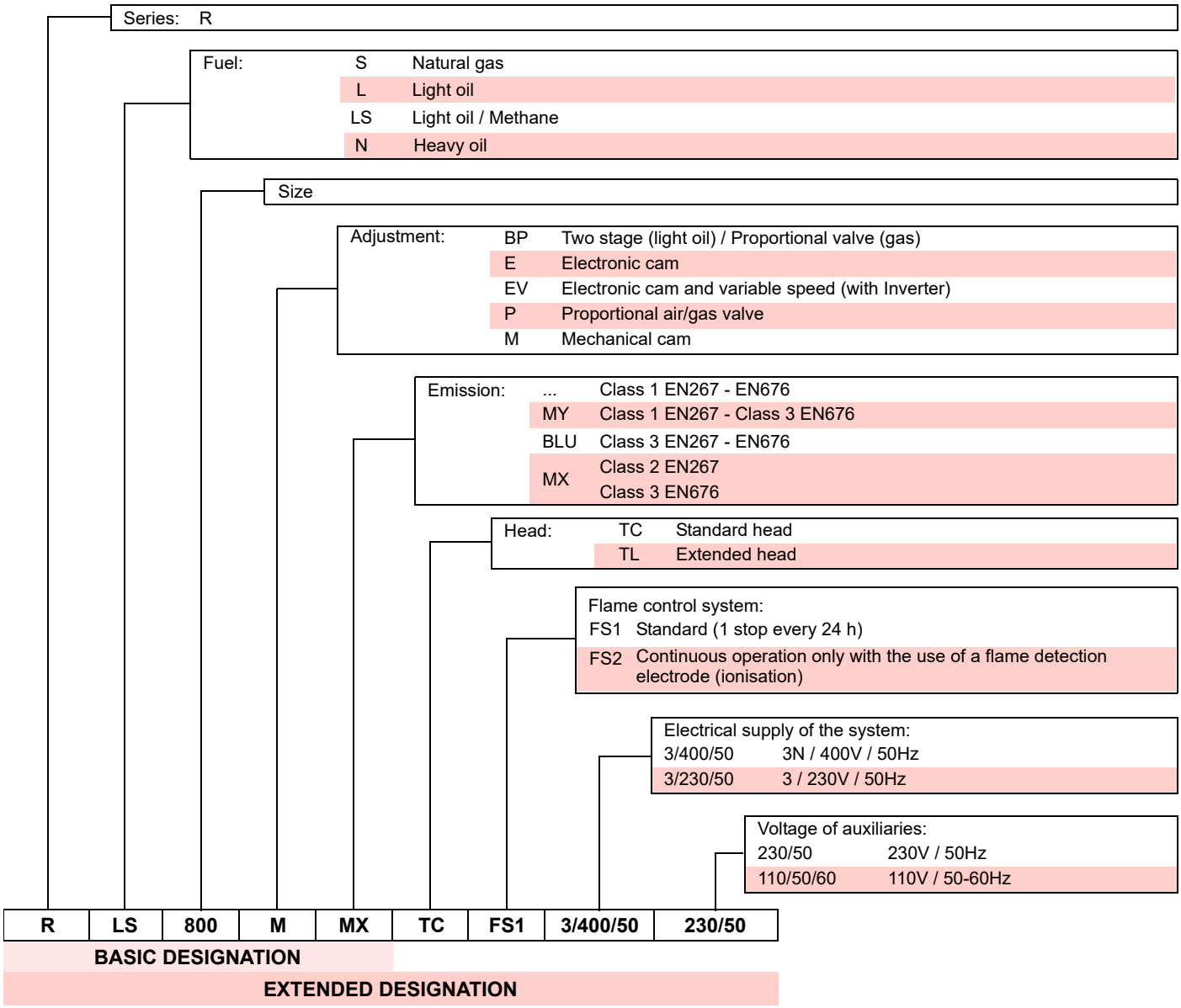
➤ must take all the measures necessary to prevent unauthorised people gaining access to the machine;

➤ the user must inform the manufacturer if faults or malfunctioning of the accident prevention systems are noticed, along with any presumed danger situation;

➤ personnel must always use the personal protective equipment envisaged by legislation and follow the indications given in this manual.

4 Technical description of the burner

4.1 Burner designation



4.2 Models available

Designation	Voltage	Start-up	Code
RLS 800/M MX	3/400/50	Star/Triangle	20147802

Tab. A

4.3 Burner categories - Countries of destination

Country of destination	Gas category
SE - FI - AT - GR - DK - ES - GB - IT - IE - PT - IS - CH - NO	I_{2H}
DE	I_{2ELL}
NL	I_{2L} - I_{2E} - I_2 (43.46 ÷ 45.3 MJ/m^3 (0°C))
FR	I_{2Er}
BE	$I_{2E(R)B}$
LU - PL	I_{2E}

Tab. B

4.4 Technical data

Model			RLS 800/M MX TC FS1
Type			1301 T
Output (1) Delivery (1)	min - max	kW kg/h	1750/3500 ÷ 8000 147/295 ÷ 674
Fuels			- LIGHT OIL, max. viscosity at 20 °C: 6 mm^2/s (1.5 °E - 6 cSt) - NATURAL GAS: G20 (methane gas) - G21 - G22 - G23 - G25 - LPG: G31 - NCV 26 kWh/Nm^3
Gas pressure at max. output (2) - Gas: G20/G25		mbar	50.6 / 75.4
Operation			- Intermittent (min. 1 stop in 24 hours) - Progressive two-stage or modulating by kit (see accessories)
Pump	Output at 16.5 bar Pressure range Fuel temperature	kg/h bar °c max	560 6 - 30 140
Nozzles		number	1
Standard applications			Boilers: water, steam, diathermic oil
Ambient temperature		°C	0 - 50
Combustion air temperature		°C max	60
Noise levels (3)	Sound pressure Sound power	dB(A)	89.6 100.6
Weight		kg	320

Tab. C

(1) Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m a.s.l.
(2) Pressure at test point 5)(Fig. 4) 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 output. The sound power is measured using the "Free Field" method, required by EN 15036 standard, and according to an “Accuracy: Category 3” measurement, as described in EN ISO 3746.

4.5 Electrical data

Model			RLS 800/M MX TC FS1
Electrical power supply			3N ~ 400V +/-10% 50 Hz
Fan motor IE3		rpm V kW A	2950 400/690 22 39.4/22.7
Pump motor IE3		rpm V kW A	2890 220-240/380-415 1.5 5.9/3.4
Ignition transformer		V1 - V2 I1 - I2	230 V - 1 x 8 kV 1 A - 20 mA
Electrical power consumption	Light oil Gas	kW max	26.2 24.5
Protection level			IP 54

Tab. D

4.6 Maximum dimensions

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

Bear in mind that inspection of the combustion head requires the burner to be opened and the rear part 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.

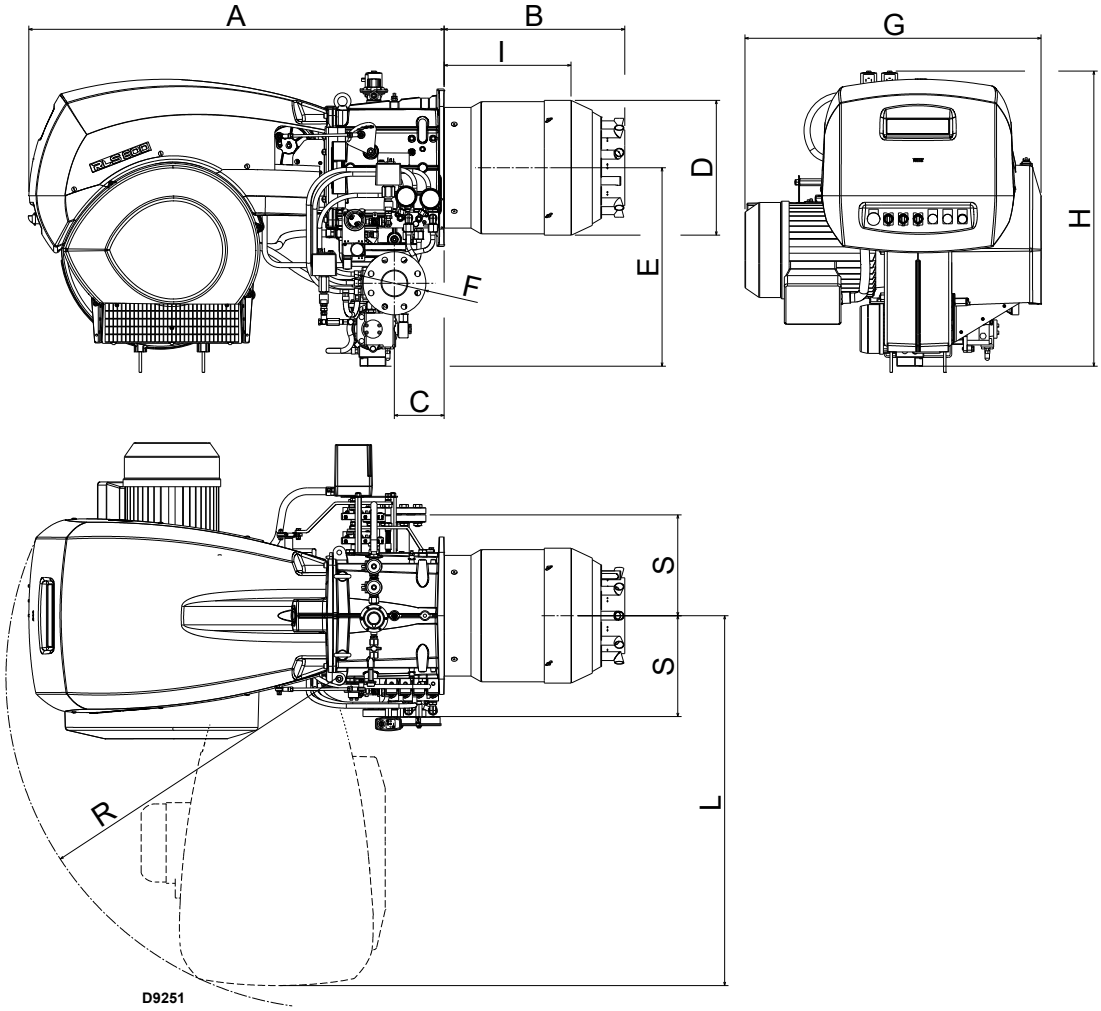


Fig. 1

mm	A	B	C	D	E	F	G	H	I	L	R	S
RLS 800/M MX	1333	558	173	428	626	DN80	972	988	388	1187	1061	349

Tab. E

4.7 Firing rates

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

The **MINIMUM OUTPUT** must not be lower than the minimum limit of the diagram:
RLS 800/M MX = 1750 kW

ATTENTION

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 19.

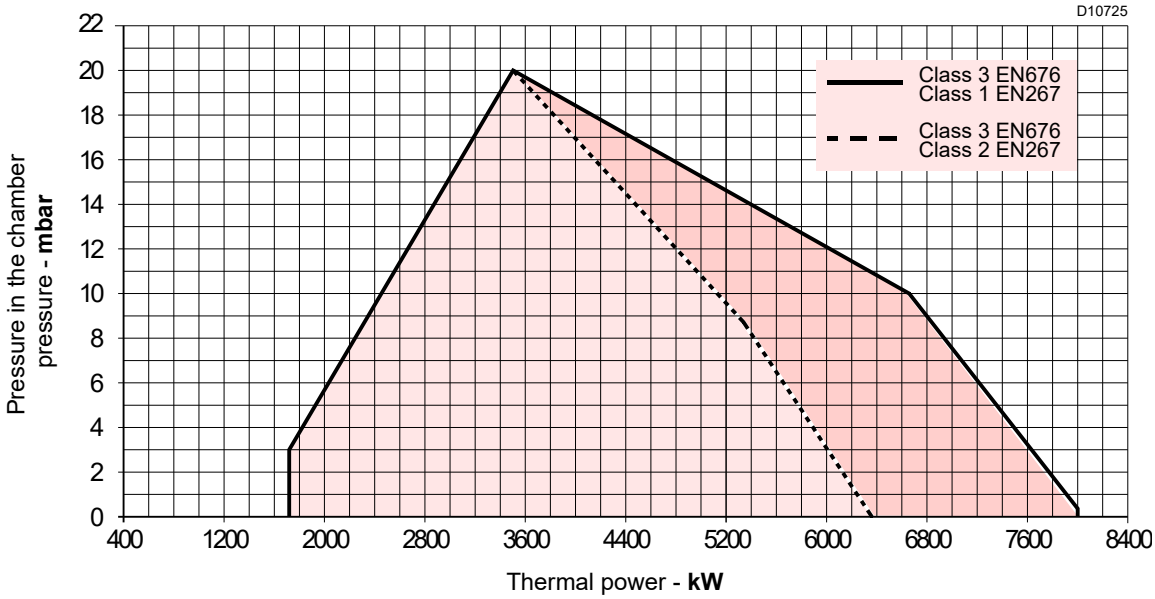


Fig. 2

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 (Fig. 3), consult the manufacturer.

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

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 the test boilers, according to the standard (EN 676 for gas, EN 267 for light oil), is 2.5: 1.

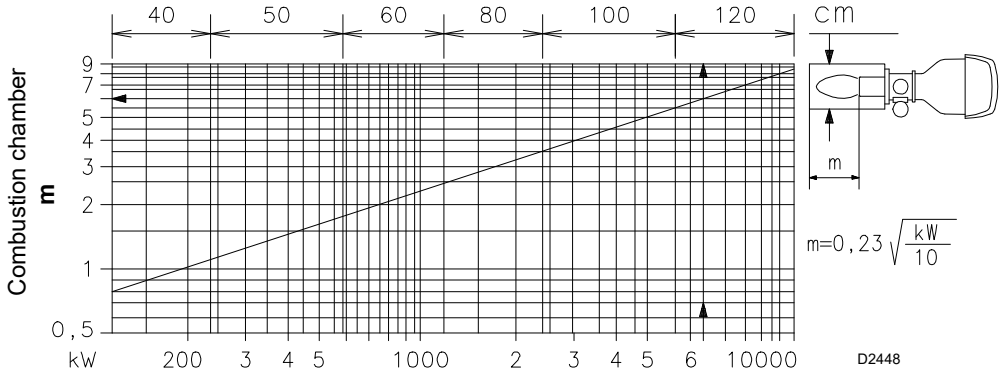


Fig. 3

4.9 Burner description

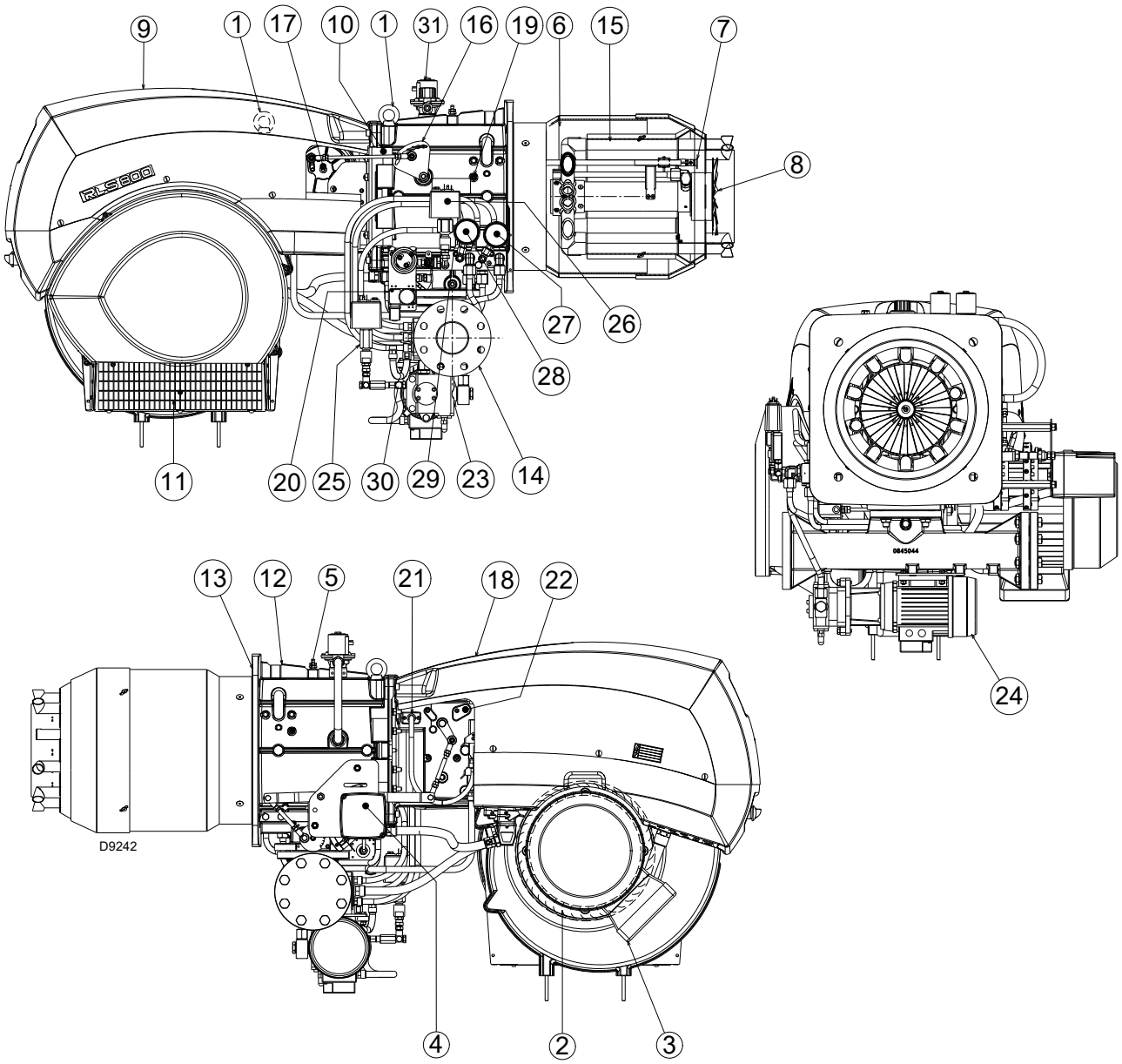


Fig. 4

1 Lifting rings
2 Fan
3 Fan motor
4 Servomotor
5 Combustion head gas pressure test point
6 Combustion head
7 Ignition pilot
8 Flame stability disc
9 Electrical panel casing
10 Hinge for opening the burner
11 Fan air inlet
12 Pipe coupling
13 Gasket for boiler fixing
14 Gas train flange
15 Shutter
16 Combustion head movement lever
17 Air damper movement gears
18 Air pressure switch (differential type)
19 Combustion head air pressure test point
20 Maximum gas pressure switch with pressure test point
21 Flame sensor
22 Pressure test point for air pressure switch “+”
23 Pump
24 Pump motor
25 Minimum oil pressure switch
26 Maximum oil pressure switch
27 Nozzle return pressure gauge
28 Nozzle delivery pressure gauge
29 Oil modulator
30 Pressure gauge connection
31 Pilot gas train

CAUTION

The burner can be opened to the right or to the left without links to the fuel supply side.

When the burner is closed, the hinge can be refitted on the opposite side.

4.10 Electrical panel description

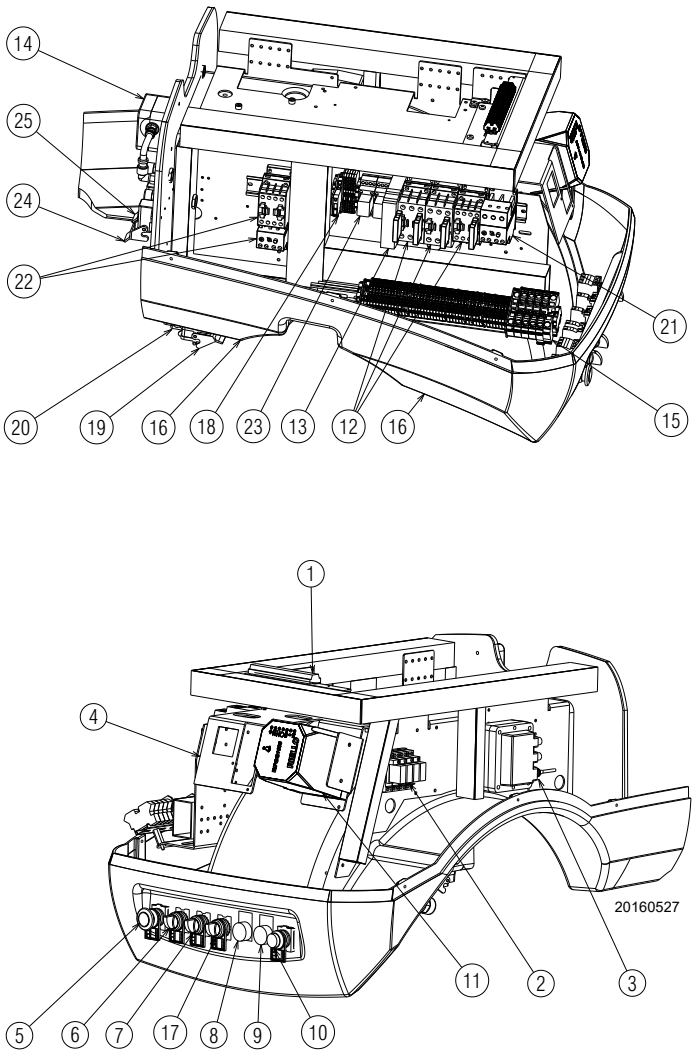


Fig. 5

1 Terminal board for kits
2 Dry contact relay output
3 Ignition transformer
4 Bracket to apply the RWF output regulator kit
5 Stop push-button
6 OFF-automatic-manual selector
7 Power increase - power reduction selector
8 Light signalling burner on
9 Light signalling of motor thermal relay operation
10 Burner lockout warning lamp and reset switch
11 Electrical control box
12 Star/triangle starter
13 Timer
14 Air pressure switch
15 Main terminal supply board
16 Supply cables and external connections passage
17 Fuel selector and enable signal to remote fuel selector
18 Auxiliary circuits fuse
19 Plug/socket servomotor
20 Plug/socket valves/motor
21 Fan motor thermal relay
22 Pump motor contactor and thermal relay
23 Oil/Gas selection relay
24 Plug/socket maximum gas pressure switch
25 Flame sensor plug/sensor socket

NOTE

Two types of burner lockout may occur:

➤ **Control box lockout:** if the button (**red LED**) of control box 11)(Fig. 5) and signal button 10)(Fig. 5) light up, the burner is locked out.
Release by pressing button 10)(Fig. 5).

➤ **Motor lockout:** release by pressing the button on thermal relay.

4.11 Burner equipment

Gasket for gas train flange . . . . . No. 1
Gas flange fixing screws, M 16 x 50 . . . . . No. 8
Thermal flange gasket . . . . . No. 1
Spacers (see Fig. 17) . . . . . No. 2
Screws to fix the burner flange to the boiler:
M 18 x 70 . . . . . No. 4
Instruction . . . . . No. 1
Spare parts list . . . . . No. 1

4.12 Control box RFGO-A22

Important notes

ATTENTION

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

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

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

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

Use

The control box is a control and supervision system of medium and large capacity forced draught burners.
If used with the flame detection electrode the system can operate continuously whereas, with the use of UV sensors it operates intermittently with stop and restart request at least once every 24h.

Installation notes

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

Fig. 6

Technical data

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

Tab. F

Electrical wiring of the flame detector

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

4.13 Servomotor (SQM10.1....)

Important notes

ATTENTION

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

Avoid opening, modifying or forcing the actuators.

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ Before modifying the wiring in the connection area of the servomotor, fully disconnect the burner control device from the power supply (omnipolar separation).
- ➤ To avoid the risk of electrocution, protect the connection terminals in a suitable manner and correctly fix the cover.
- ➤ Check the wiring is in order.
- ➤ Falls and collisions can negatively affect the safety functions. In this case, the servomotor must not be operated, even if it displays no evident damage.

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. 7

Technical data

Operating voltage	AC 220...240V, 50 Hz –15 % / +10 % AC 220 V, 60 Hz –15 % / +10 %
Switching capacity of auxiliary devices and limit switches	10 (3) A, AC 24...250 V
Angle positioning	up to 160° (full scale)
Assembly position	option
Protection level	IP 54, DIN 40050
Safety class	I
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. G

5 Installation

5.1 Notes on safety for the installation

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

DANGER

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

ATTENTION

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

DANGER

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

5.2 Handling

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

ATTENTION

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

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

CAUTION

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

5.3 Preliminary checks

Checking the consignment

CAUTION

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

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

Checking the characteristics of the burner

Check the identification label of the burner, showing:
- ➤ the model (**A**)(Fig. 8) and type of burner (**B**);
- ➤ the year of manufacture, in cryptographic form (**C**);
- ➤ the serial number (**D**);
- ➤ the data for electrical supply and the protection level (**E**);
- ➤ the absorbed electrical power (**F**);
- ➤ the types of gas used and the relative supply pressures (**G**);
- ➤ the data of the burner's minimum and maximum output possibilities (**H**) (see Firing rate)
  Warning. The burner output must be within the firing rate of the boiler;
- ➤ the category of the appliance/countries of destination (**I**).
- ➤ light oil maximum viscosity (**L**).

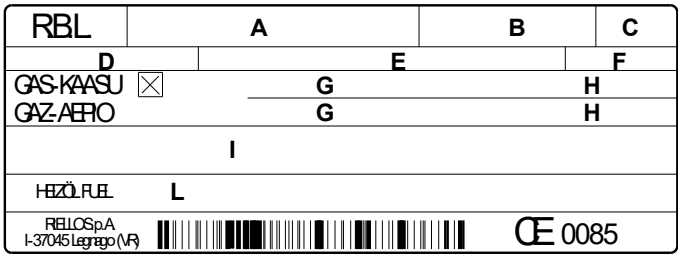


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Fig. 8

ATTENTION

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

5.4 Operating position

The burner is designed to operate only in positions **1**, **2**, **3 and 4**.

Installation **1** is preferable, as it is the only one that allows the maintenance operations as described in this manual.

Installations **2**, **3 and 4** permit operation but make maintenance and inspection of the combustion head more difficult.

Any other position could compromise the correct operation of the appliance.

The installation **5** is prohibited for safety reasons.

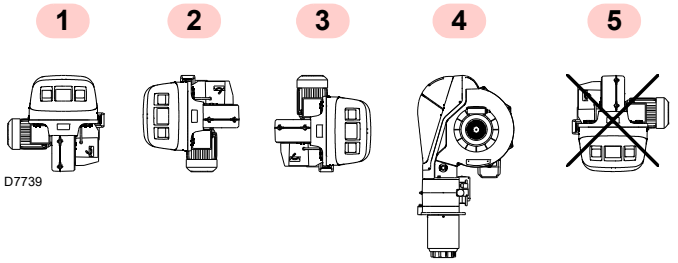


Fig. 9

5.5 Removing the shutter lockout screws

ATTENTION

Remove the screws 1)-2) and nuts before fitting the burner onto the boiler (Fig. 10).

Replace with the screws 3) M12 x25 supplied as standard.

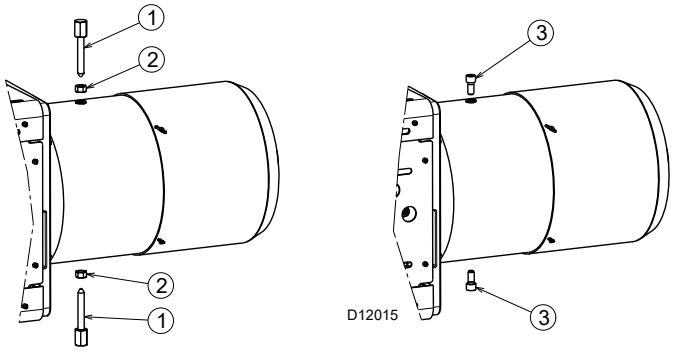


Fig. 10

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 fettling.

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 front piece, a refractory lining 2)-5)(Fig. 12) is not necessary, unless expressly requested by the boiler manufacturer.

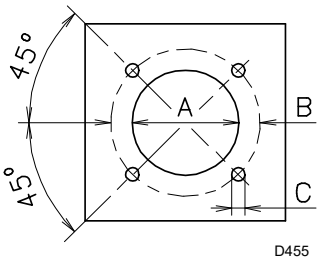


Fig. 11

mm	A	B	C
RLS 800/M MX	440	495	M 18

Tab. H

5.7 Securing the burner to the boiler

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

- ➤ Fit the heat insulation supplied onto the blast tube 4) (Fig. 12).
- ➤ Fit the entire burner onto the boiler hole prepared previously, as in Fig. 11, and fasten with the screws supplied.

ATTENTION

The seal between burner and boiler must be airtight.

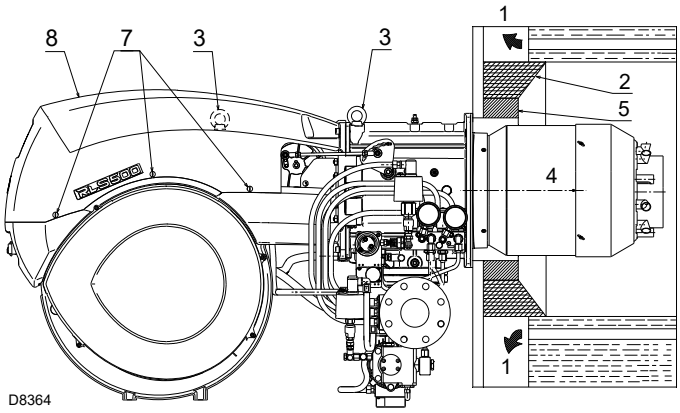


Fig. 12

5.8 Access to head internal part

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

- ➤ disconnect the electrical wiring related to oil pump/ servomotor, air servomotor and gas pressure switch;
- ➤ disconnect the leverages related to air damper and head movement;
- ➤ undo the 4 fixing screws 1);
- ➤ disconnect the electrode cable 2);
- ➤ disconnect the light oil pipes unscrewing the two pipe fittings 3).

ATTENTION

Be careful as some drops of fuel may leak out during this phase.

- ➤ Release the ignition pilot retainer;
- ➤ remove the gas pressure screw/test point 6) of the head;
- ➤ disconnect the lower part of the elbow until it is released from its housing;
- ➤ remove the internal part of the head 5).

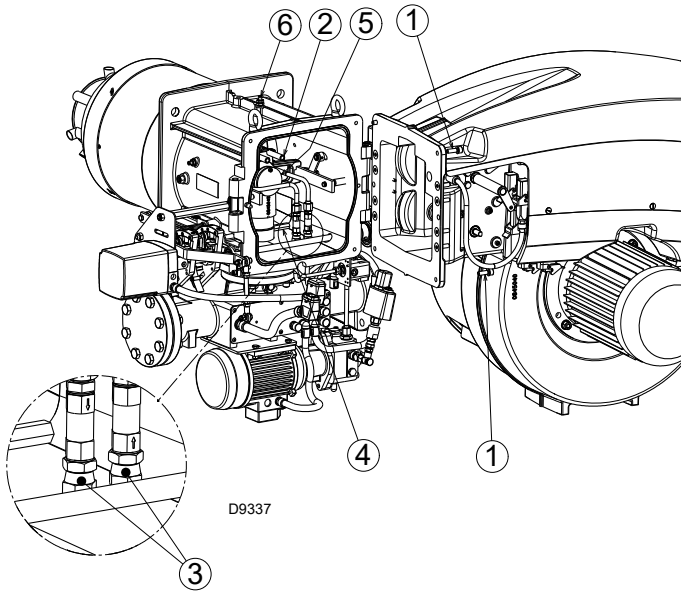


Fig. 13

5.9 Electrode position

ATTENTION

Position the electrode on ignition pilot according to the dimensions shown in Fig. 14.

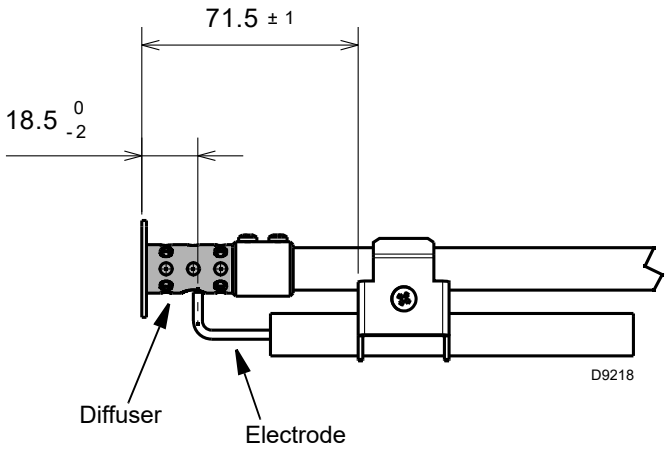


Fig. 14

5.10 Nozzle installation

The burner complies with the emission requirements of the EN 267 standard. In order to guarantee that emissions do not vary, recommended and/or alternative nozzles specified by Riello in the Instruction and warning booklet should be used.

ATTENTION

It is advisable to replace the nozzle once a year during periodical maintenance.

CAUTION

The use of nozzles other than those specified by Riello S.p.A. and inadequate regular maintenance may result into emission limits non-conforming to the values set forth by the regulations in force, and in extremely serious cases, into potential hazards to people and objects.

The manufacturing Company shall not be liable for any such damage arising from non-observance of the requirements contained in this manual.

Fit the nozzle with a pipe wrench (24 mm), passing through the central opening of the flame stability disc (Fig. 15).

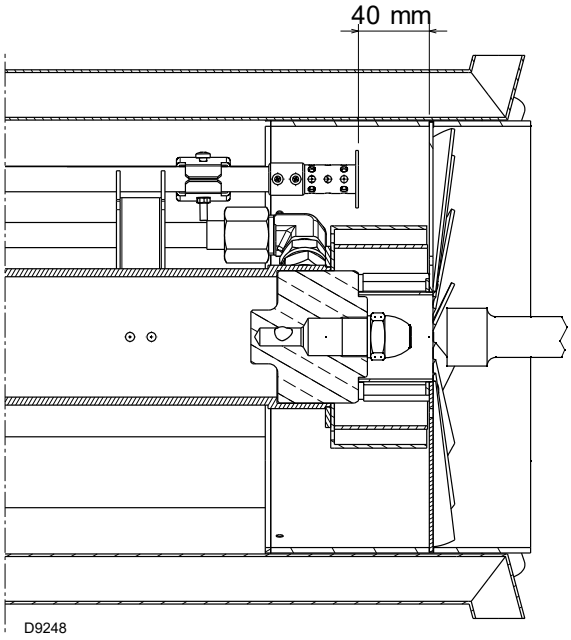


Fig. 15

Fit the nozzles on the nozzle holder without the fuel interception rod.
To calibrate the flow rate range within which the nozzle should operate, it is necessary to adjust the fuel pressure on the nozzle return line, according to Tab. I and Tab. J.

ATTENTION

- ➤ Do not use any sealing products such as: gaskets, tape or sealants.
- ➤ Be careful to avoid damaging the nozzle sealing seat.
- ➤ The nozzle must be screwed into place tightly but not to the maximum torque value provided by the wrench.

5.10.1 Recommended nozzle

- **Bergonzo type B5 45°**
- **Fluidics type N4 45°**

For intermediate delivery levels, choose the nozzle with delivery slightly higher than that effectively required.

Complete range of nozzles:

➤ **Bergonzo type B5 45°**
350 - 375 - 400 - 425 - 450 - 475 - 500 - 525 - 550 - 575 - 600 - 650 - 700 - 750. Normally, atomisation angles of 45° are recommended.

kg/h	Delivery pressure bar	Return pressure bar	kg/h	kW
375	20	11.5	147	1750
	20	17	295	3500
550	20	10	170	2000
	20	17	421	5000
650	20	8	180	2150
	20	16.5	565	6650
750	25	11.5	227	2700
	25	20.5	675	8000

Tab. I

➤ **Fluidics type N4 45°:**
375 - 400 - 450 - 500 - 550 - 600 - 650 - 700 - 750. Normally, atomisation angles of 45° are recommended.

kg/h	Delivery pressure bar	Return pressure bar	kg/h	kW
375	20	12	147	1750
	20	18.5	295	3500
550	20	7	170	2000
	20	16	421	5000
650	20	6	180	2150
	20	17	565	6650
750	25	17	227	2700
	25	22	675	8000

Tab. J

5.11 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.

With the same servomotor rotation, it is possible to vary the opening of the combustion head moving the tie-rod on the holes (1-2-3), (Fig. 16).

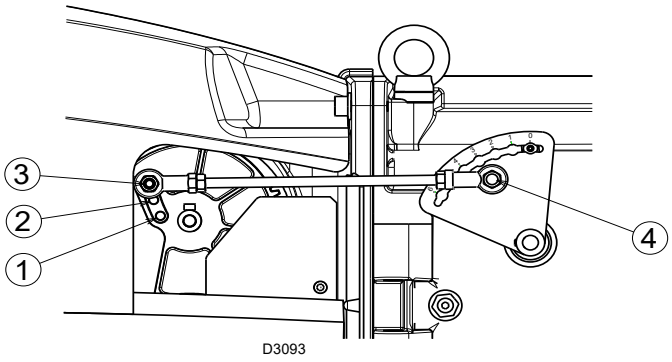


Fig. 16

The choice of the hole (1-2-3) to be used is based on diagram (Fig. 18) according to the maximum output required.

In the factory, the hole is adjusted for the maximum stroke (hole 3, Fig. 16).

If, for combustion reasons, it is necessary to move the spacer 1)(Fig. 17) onto the 1st and 2nd hole of the gear, while the hinge is positioned to the right, the spacers 4)(Fig. 17) supplied as standard must be mounted.

Proceed as follows (Fig. 17):

➤ unscrew the nuts 2) and remove the tie-rod 3);
➤ unscrew the spacer 1) and place it on the hole that you want;
➤ tighten the spacers 4) to spacer 1) and screw 5) respectively;
➤ mount the tie-rod and the nuts again.

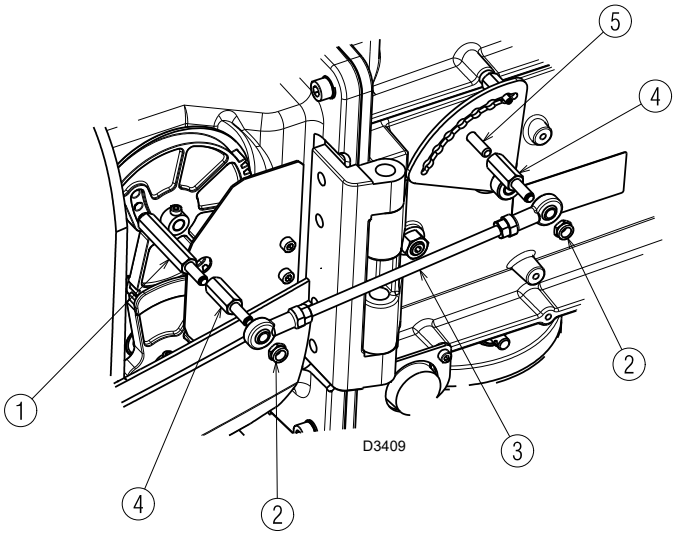


Fig. 17

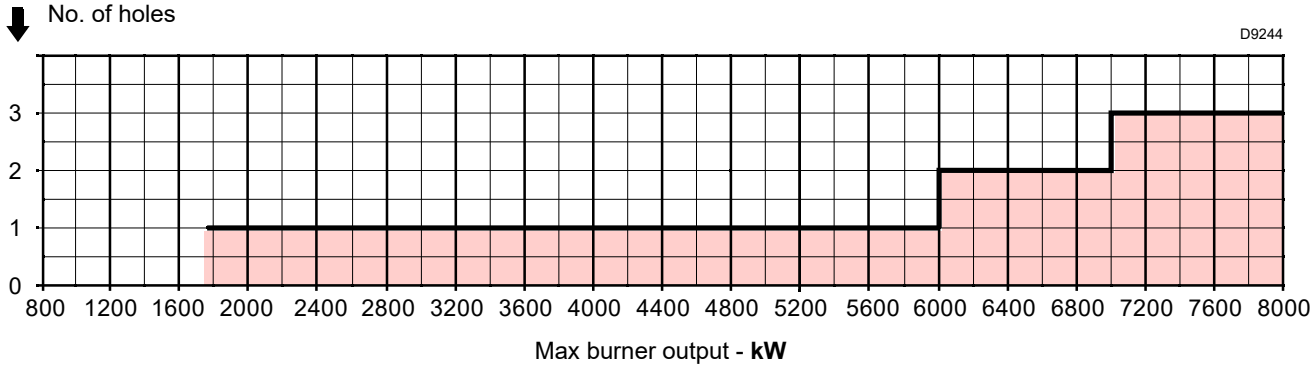


Fig. 18

5.12 Light oil supply

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

Precautions: avoid knocking, attrition, sparks and heat.

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

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

ATTENTION

5.12.1 Double-pipe circuit

The burner is equipped with a self-priming pump which is capable of feeding itself within the limits listed in the table at the side.

Tank higher than burner A (Fig. 19)
Distance P must not exceed 10 meters in order to avoid straining the pump's seal; distance V must not exceed 4 meters in order to allow the self-priming of the pump even when the tank is almost empty.

Tank lower than burner B (Fig. 19)
The pump depression value must not exceed 0.45 bar (35 cm Hg). Because at higher levels gas is released from the fuel; the pump becomes noisy and its lifetime is shortened.
It is good practice to ensure that the return and suction lines enter the burner from the same height; the suction line is more difficult to disconnect.

5.12.2 Loop circuit

The loop circuit is composed of a duct starting from the tank and going back to it, in which an auxiliary pump makes the pressurised fuel flow.

A branch from the loop supplies the burner.

This circuit is extremely useful whenever the burner pump does not succeed in self-priming because the tank distance and/or height difference are higher than the values listed in the table.

H (m)	L (m)			
	Ø (mm)			
	10	12	14	16
4	14	30	55	95
3.5	13	28	52	89
3	12	26	48	82
2.5	11	24	44	76
2	10	22	41	70
1.5	9	20	37	63
1	8	18	33	57
0.5	7	16	29	51
0	6	14	26	44
-0.5	5	12	22	38
-1	4	10	18	32
-1.5	3	8	15	25
-2		6	11	19
-2.5		4	7	13
-3			4	7

Tab. K

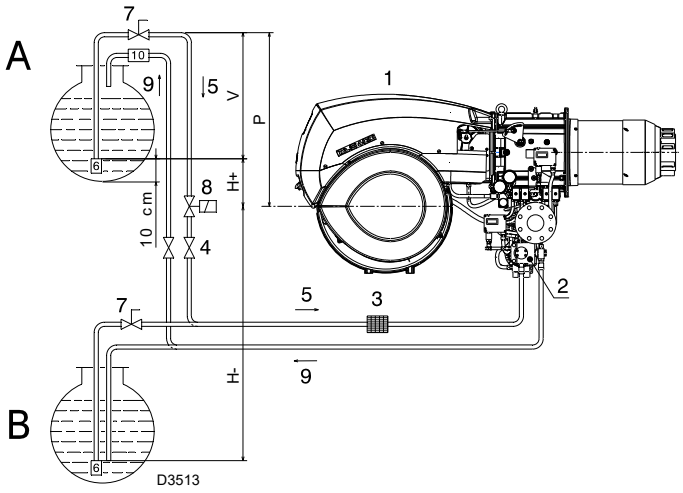


Fig. 19

Key (Fig. 19)

H = Pump/Foot valve height difference
L = Piping length
Ø = Inside pipe diameter
1 = Burner
2 = Pump
3 = Filter
4 = Manual on/off valve
5 = Suction line
6 = Foot valve
7 = Quick closing manual valve with remote control (Italy only)
8 = On/off solenoid valve (Italy only). See electrical layout. Connections to be carried out by the installer (SV).
9 = Return line
10 = Check valve (Italy only)

5.12.3 Hydraulic connections

The pumps are equipped with a by-pass that connects return line with suction line.
They are installed on the burner with the by-pass closed by screw 6)(Fig. 22).
It is therefore necessary to connect both hoses to the pump.
The pump will break down immediately if it is run with the return line closed and the by-pass screw inserted.
Remove plugs from suction and return connectors of the pump.
Insert the hose connections with the supplied seals into the connections and screw them down.
During the installation, hoses must not be stressed with twisting.
Position hoses so that they cannot be stepped on or get into contact with hot parts of the boiler and so that they allow burner opening.
Connect, finally, the other end of the flexible hoses to the suction and return lines using nipples supplied with the equipment.

5.12.4 Pressure variator

Calibration pressure on return line

With a servomotor position of 20°, the nut and the corresponding lock nut 6)(Fig. 20), are fixed in contact with the eccentric 8).

During the rotation towards 130° of the servomotor, the eccentric will push the modulator shaft, taking the pressure, read on the pressure gauge 3)(Fig. 20), to the desired value.

To calibrate the eccentric, proceed as follows:

- ➤ loosen the screws 7), turn the screw 4) until the desired eccentricity is reached.
- ➤ By turning screw 4) to the right (+) the eccentricity increases, thereby increasing the difference between the maximum and minimum capacity of the nozzle.
- ➤ By turning screw 4) to the left (-) the eccentricity decreases, thereby decreasing the difference between the maximum and minimum capacity of the nozzle.

Calibration pressure on delivery line

To adjust the delivery pressure, operate on the pump as described on page 22.

Example:
if you use a 650 kg/h nozzle and you want to obtain an output of 6650 kW, the pressure read on the pressure gauge 3)(Fig. 20) (max. pressure on return circuit) must be approx. 16.5 bar.
The relevant delivery pressure read on the pressure gauge 2), must be 20 bar (see Tab. I on page 18).

IMPORTANT

- ➤ For a correct calibration, the eccentric 8) must operate on the entire range of travel of the servomotor (20° ÷ 130°): a pressure variation must correspond to each servomotor variation.
- ➤ Never drive the variator piston fully home: the stop ring 5) determines the maximum stroke.
- ➤ To check the nozzle delivery flow rate, proceed as follows: open the burner according to the instructions of page 17, position the nozzle, simulate start-up and then weigh at maximum and minimum pressures.
- ➤ If at the maximum delivery of the nozzle (maximum pressure on the return line) pressure oscillations can be seen on the pressure gauge 3), slightly reduce the pressure until they disappear.

NOTE:
The burner is factory calibrated with maximum pressure on the return line of approximately 16.5 bar and delivery pressure of approximately 20 bar.

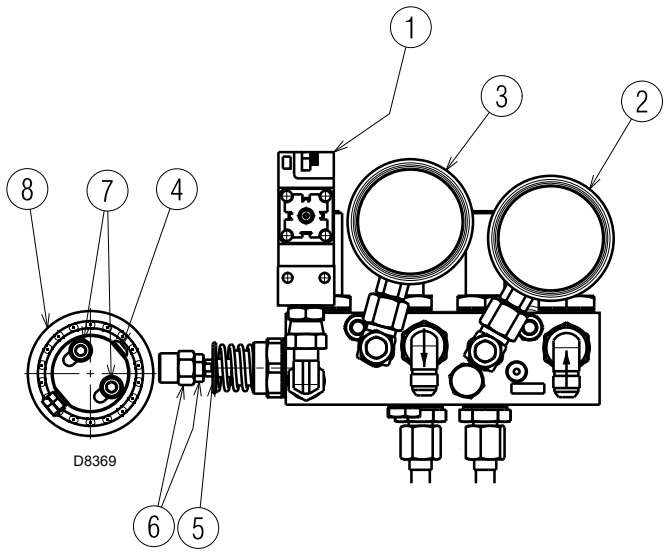


Fig. 20

Key (Fig. 20)
1 Maximum oil pressure switch
2 Delivery pressure gauge
3 Return pressure gauge
4 Eccentric adjustment screw
5 Piston stop ring
6 Piston calibration nut and lock nut
7 Eccentric locking screws
8 Variable eccentric

5.12.5 Hydraulic circuit diagram

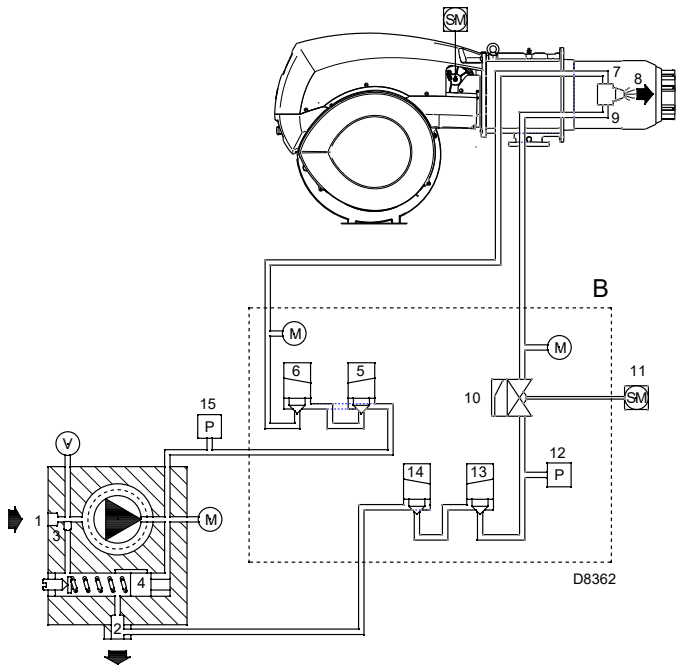


Fig. 21

Key (Fig. 21)

1 Pump suction line
2 Pump return line and nozzle return line
3 Pump by-pass screw
4 Pump pressure regulator
5 Safety valve
6 Safety valve
7 Nozzle delivery line
8 Nozzle without interception rod
9 Nozzle return line
10 Pressure adjuster on nozzle return line
11 Servomotor
12 Pressure switch on nozzle return line
13 Safety valve on nozzle return line
14 Safety valve on nozzle return line
15 Pressure switch on pump delivery line
B Oil valve unit and pressure variator
M Pressure gauges
V Vacuometer connection

OPERATION

Pre-purging phase:
valves 5), 6), 13) and 14) closed.

Ignition and operation phase:
valves 5), 6), 13) and 14) open.

Stop: all valves closed.

5.12.6 Priming pump

ATTENTION

Before starting the burner, make sure that the tank return line is not clogged.

Obstructions in the line could cause the sealing organ located on the pump shaft to break.

➤ In order for the pump (Fig. 22) to self-prime, it is vital that the screw 4) of the pump be loosened to vent the air contained in the suction line.
➤ Start the burner by closing the remote controls.
As soon as the burner starts, check the direction of rotation of the fan blade.
➤ The pump can be considered to be primed when the light oil starts coming out of the screw 4). Close the burner and undo the screws 4).

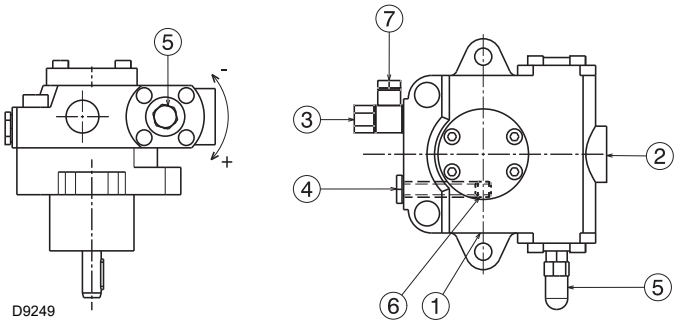


Fig. 22

Key (Fig. 22)

1	Suction line	G 1/2"
2	Return line	G 1/2”
3	Pressure switch connection	G 1/4”
4	Vacuometer connection	G 1/4”
5	Pressure adjuster	
6	By-pass screw	
7	Pressure gauge connection	G 1/4"

SUNTEC TA5 PUMP

Min. delivery rate at 16.5 bar pressure	560 kg/h
Delivery pressure range	6 - 30 bar
Max. suction depression	0.45 bar
Viscosity range	4 - 800 cSt
Max. light oil temperature	140 °C
Max. suction and return pressure	5 bar
Pressure calibration in the factory	22-20 bar

The time required for this operation depends upon the diameter and length of the suction tubing. If the pump fails to prime at first start-up and the burner locks out, wait approx. 15 seconds, reset the burner, and then repeat the start-up operation.
And so on. After 5 or 6 starting operations allow 2 or 3 minutes for the transformer to cool.
Do not light the sensor in order to prevent the burner lockout; the burner locks out in any case about ten seconds after its start.

ATTENTION

The above-mentioned operation is possible because the pump is already full of fuel when it leaves the factory.
If the pump has been drained, fill it with fuel through the opening on the vacuometer 4)(Fig. 22) prior to starting; otherwise, the pump will seize.

Whenever the length of the suction piping exceeds 20-30 meters, the supply line must be filled using a separate pump.

5.13 Gas supply

DANGER

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

Precautions: avoid knocking, attrition, sparks and heat.

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

ATTENTION

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

5.13.1 Gas feeding line

Key (Fig. 23 - Fig. 24 - Fig. 25 - Fig. 26)

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

ATTENTION

For applications compliant with Pressure Equipment Directive PED 2014/68/EU, the installer must provide for the use of:

- devices suitable for drain and ventilation, as set out in clause K.10 of standard DIN EN 676;

- leak detection control devices, as set out in clause K.14.4 of standard DIN EN 676.

MBC “threaded”

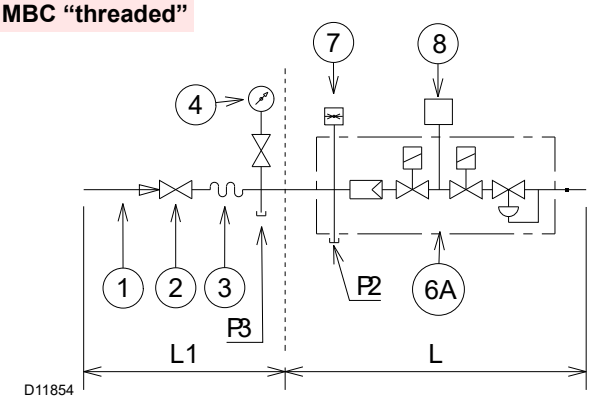


Fig. 23

MBC “flanged”-VGD

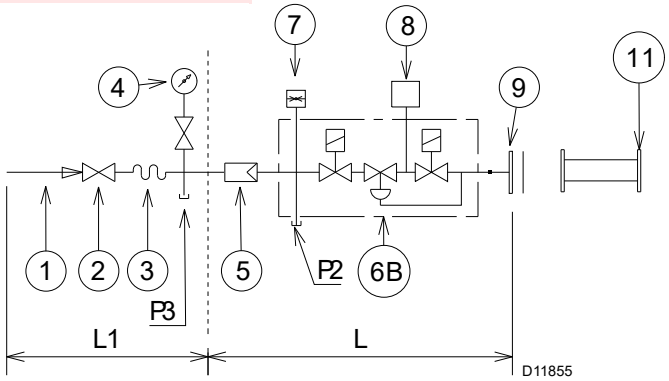


Fig. 24

DMV “flanged or threaded”

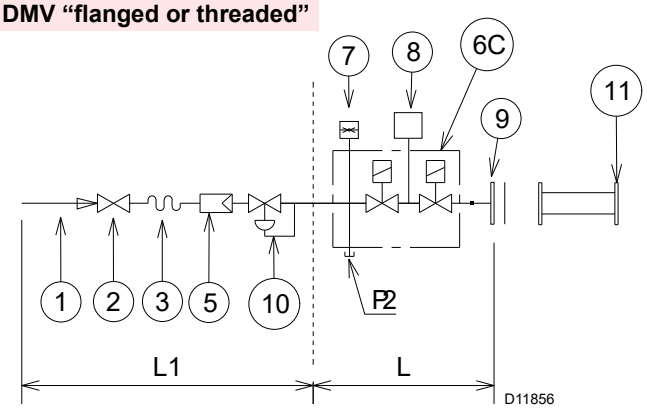


Fig. 25

CB “flanged or threaded”

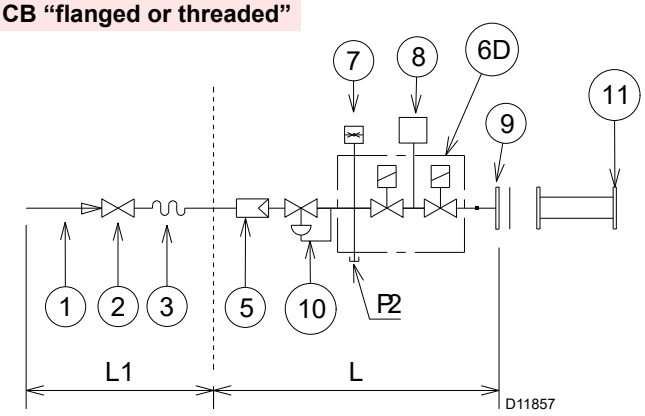


Fig. 26

5.13.2 Gas train

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

5.13.3 Gas train installation

Disconnect the power supply using the system main switch.

Check that there are no gas leaks.

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

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

The operator must use the required equipment during installation.

The gas train is prearranged to be connected to the burner by the flange 1)(Fig. 27).

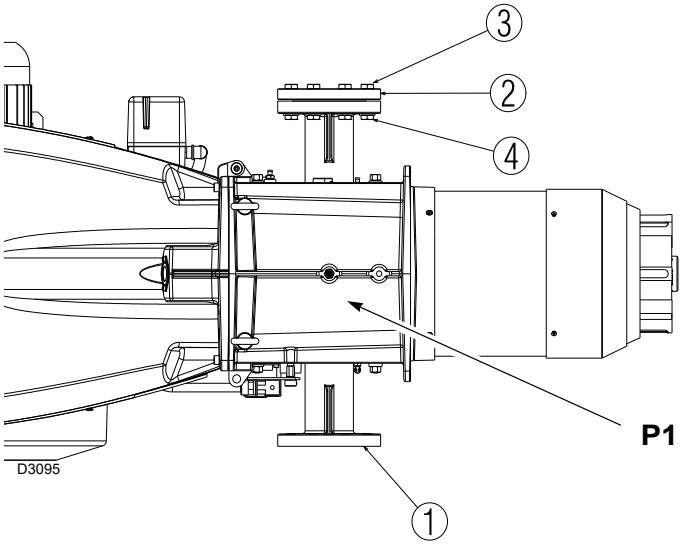


Fig. 27

5.13.4 Gas pressure

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

kW	**1** Δp (mbar)		**2** Δp (mbar)	
	G 20	G 25	G 20	G 25
3500	11.5	16.5	2.7	3.5
4000	15.2	22.3	3.6	4.6
4500	19.0	28.1	4.5	5.8
5000	22.7	33.9	5.5	7.2
5500	26.4	39.7	6.7	8.7
6000	30.2	45.5	8.0	10.3
6500	35.4	51.3	9.4	12.1
7000	38.9	57.9	10.9	14.0
7500	44.8	66.6	12.5	16.1
8000	50.6	75.4	14.2	18.3

Tab. L

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

Column 1

Combustion head pressure drop.
Gas pressure measured at test point P1)(Fig. 27), with:
- combustion chamber at 0 mbar;
- burner working at maximum modulating output;
- combustion head adjusted as in page 19.

Column 2

Pressure loss at gas butterfly valve P2)(Fig. 28) with maximum opening: 90°.

To calculate the approximate output at which the burner operates:
– subtract the pressure in the combustion chamber from the pressure of the gas at test point P1)(Fig. 28).
– Find in Tab. L related to the burner concerned, the pressure value closest to the result of the subtraction.

Read the corresponding output on the left.

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

Example with natural gas G20:
Operation at maximum modulating output
Gas pressure at test point 1) (Fig. 28) = 35.2 mbar
Pressure in combustion chamber = 5 mbar
35.2 - 5 = 30.2 mbar

A pressure of 30.2 mbar, column 1, corresponds in the table Tab. L to an output of 6000 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 P1) (Fig. 28), set the maximum modulating output required from the burner operation:
– find the nearest output value in the table Tab. L for the burner in question.
– Read, on the right (column 1), the pressure at the test point P1)(Fig. 28).
– Add this value to the estimated pressure in combustion chamber.

Example with natural gas G20:
Operation at maximum modulating output
Gas pressure at an output of 6000 kW = 30.2 mbar
Pressure in combustion chamber = 5 mbar
30.2 + 5 = 35.2 mbar
pressure required at test point P1)(Fig. 28).

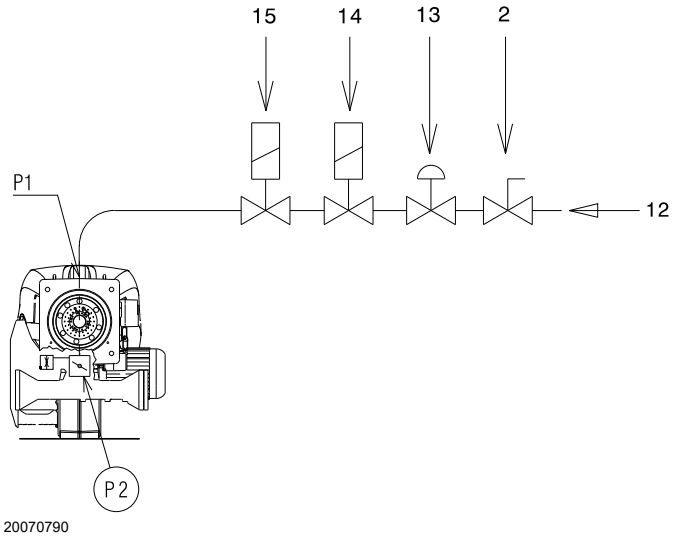


Fig. 28

Key (Fig. 28)
P1 Head gas pressure test point
P2 Butterfly valve gas pressure test point
2 Manual valve
12 Gas inlet for pilot
13 Pilot line pressure adjuster
14 Safety valve
15 Operating valve

5.13.5 Pilot - gas train connection

The burner is equipped with a dedicated gas train fixed to the sleeve.
➤ Connect it to the main gas train, downstream of the filter or pressure adjuster (according to the configuration).

Oil burners (with LPG pilot) can be directly connected to the LPG cylinder.

ATTENTION
Supply pressure 68 ÷ 500 mbar.

5.13.6 Ignition pilot

For proper operation, adjust gas pressure (measured at pressure test point 1)(Fig. 29) as follows: 16 mbar (7.3 Nm^3/h).

ATTENTION
Check the stability of the pilot flame before igniting the main burner.

In case of ignition problems, check:
➤ the correct positioning of the ignition electrode;
➤ the gas pressure, according to the specifications.

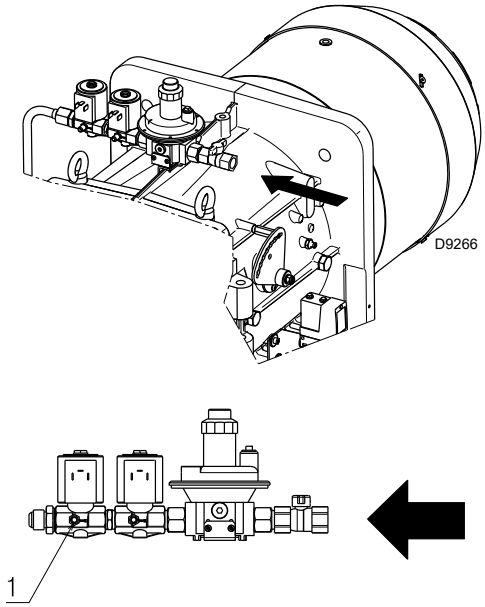


Fig. 29

5.14 Electrical connections

Notes on safety for the electrical wiring

DANGER

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

DANGER

Close the fuel shut-off valve.

DANGER

Avoid condensate, ice and water leaks from forming.

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

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

5.14.1 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. 30.

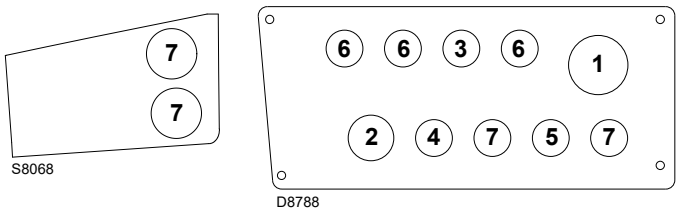


Fig. 30

Key (Fig. 30)
1 Electrical power supply
2 Fan motor
3 Minimum gas pressure switch
4 Pressure switch kit for VPS gas valve leak detection
5 Gas train
6 Enabling signals / Safety devices
7 Available

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

5.15 Calibration of the thermal relay

The thermal relay (Fig. 31) serves to avoid damage to the motor due to an excessive absorption increase or if a phase is missing.

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

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

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

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

ATTENTION

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

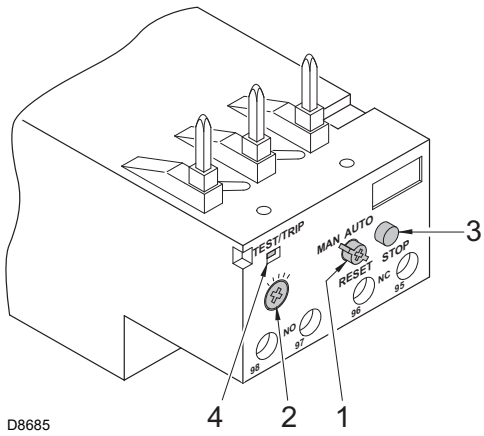


Fig. 31

5.16 Motor rotation

As soon as the burner starts, place yourself in front of the cooling fan of the fan motor and check that it turns anticlockwise (Fig. 32).

If this is not the case:

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

DANGER

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

➤ Invert the phases on the three-phase motor power supply.

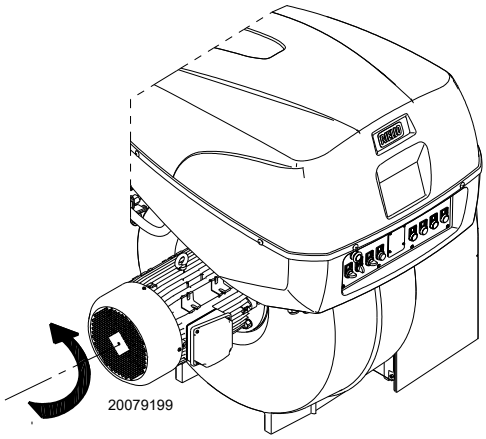


Fig. 32

6 Start-up, calibration and operation of the burner

6.1 Notes on safety for the first start-up

ATTENTION

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

ATTENTION

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

ATTENTION

Before starting up the burner, refer to section "Safety test - with no gas supply" on page 36.

6.2 Burner adjustment

It is recommended to adjust first the light oil burner and then the gas burner.

ATTENTION

Carry out the fuel change with burner off.

The optimum calibration of the burner requires an analysis of the flue gases at the boiler outlet and interventions on the following points.

- **Nozzles**
  See information on page 18.
- **Combustion head**
  The adjustment of the head that has already been carried out as on page 19 does not require any modifications unless the burner output in the 2nd stage is changed.
- **Pump pressure:**
  In order to change pump pressure, act on screw 5)(Fig. 22).
  See information on page 18.
- **Fan damper**
  See servomotor adjustment on. page 32

6.3 Adjustments prior to ignition

Combustion head adjustment is already described on page 19.

In addition, the following adjustments must also be made:

– slowly open the manual valves situated upstream of the gas train.
– Adjust the minimum gas pressure switch to the start of the scale.
– Adjust the maximum gas pressure switch to the end of the scale.
– Adjust the air pressure switch 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. 33), with socket (+) on the gas pressure of the pipe coupling and (-) in the combustion chamber.
  Used to derive the approximate MAX output of the burner using the table on page 24.
– Connect two lamps or testers to the two gas line solenoid valves to check the exact moment in which voltage is supplied. This operation is not required if each of the two solenoid valves is equipped with a pilot light that signals voltage passing through.

CAUTION

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

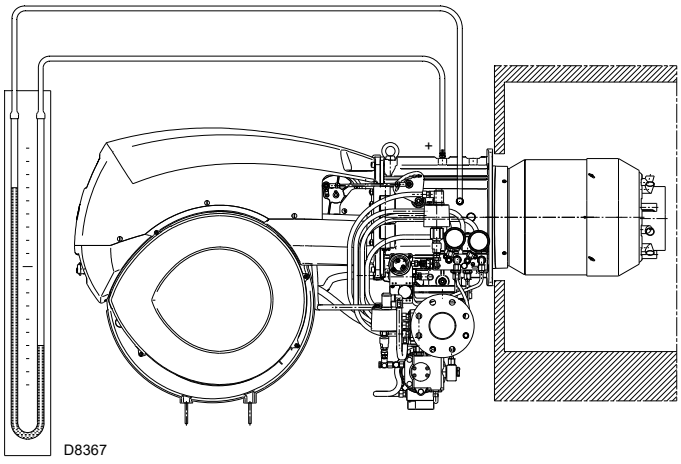


Fig. 33

6.4 Burner start-up

Turn off the remote controls and set the switch 1)(Fig. 34) to “MAN”.

Check that the lamps or testers connected to the solenoid valves, or the pilot lights on the solenoid valves, indicate that no voltage is present. If they indicate the presence of voltage, stop the burner immediately and check the electric connections.

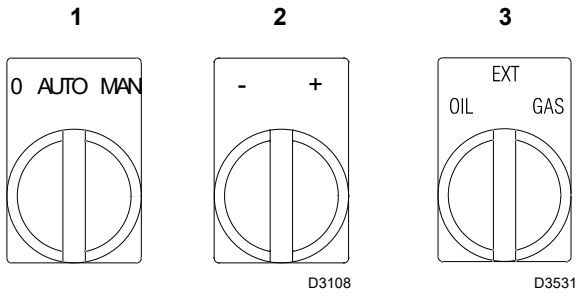


Fig. 34

6.5 Burner ignition

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

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

In this case increase gas ignition flow rate.

The arrival of gas to the sleeve is indicated by the U-type pressure gauge (Fig. 33).

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

6.6 Change of fuel

There are two change of fuel options:

1 with selector 3)(Fig. 34);
2 with a remote selector connected to the main terminal board.

Placing the selector 3)(Fig. 34) on EXT the function for selecting the fuel remotely is active.

In this position, if there is no remote selector, the display shows the priority fuel.

6.7 Combustion air adjustment

The fuel/combustion synchronization is made by means of a servomotor connected to two variable profile cams, which act on the outlet air damper 1)(Fig. 35) and the gas damper 2)(Fig. 35) and, using special levers, on the combustion head.

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 stabiliser placed on the train.

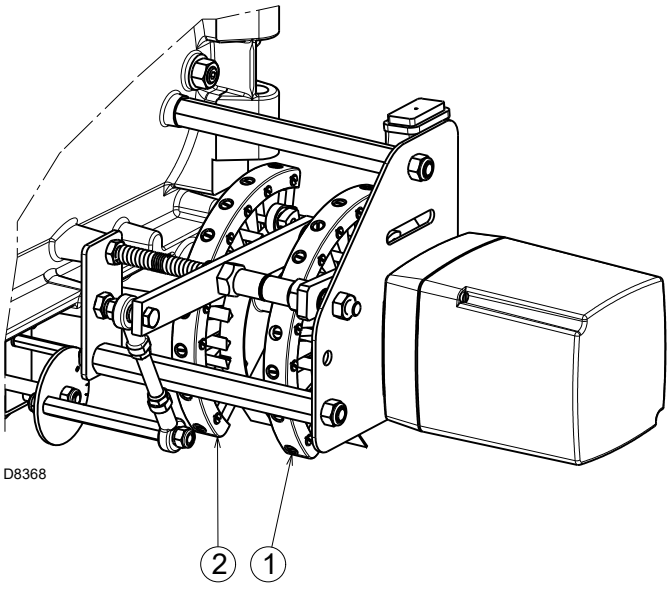


Fig. 35

The values in the table can be useful as reference for good fuel calibration.

EN 676		Air excess		
		Max. output $\lambda \leq 1.2$		Min. output $\lambda \leq 1.3$
GAS	Theoretical max CO_2 0 % O_2	CO_2 % Calibration		CO mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$	
G 20	11.7	9.7	9.0	≤ 100
G 25	11.5	9.5	8.8	≤ 100
G 30	14.0	11.6	10.7	≤ 100
G 31	13.7	11.4	10.5	≤ 100

EN 267	Air excess		
	Max. output $\lambda \leq 1.2$		Min. output $\lambda \leq 1.3$
Theoretical max CO_2 0 % O_2	CO_2 % Calibration		CO mg/kWh
	$\lambda = 1.2$	$\lambda = 1.3$	
15.2	12.6	11.5	≤ 100

6.7.1 Maximum output

Adjust the servomotor to maximum opening so that the air dampers are entirely open.

6.7.2 Minimum output

MIN output must be selected within the firing rate range indicated on page 10.

Turn the selector 2)(Fig. 34) “output reduction”, and keep “-” pressed until the servomotor has closed the air damper and the gas butterfly valve at 35° (adjustment made in the factory).

Air adjustment
Progressively adjust the end profile of cam 1)(Fig. 36) by turning the cam adjustment screws 2)(Fig. 36).
If possible, do not turn the first screw, since this is used to set the air damper to its fully closed position.

6.7.3 Intermediate outputs

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

The passage from one position to the next one is obtained by pressing the selector 2)(Fig. 36) 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. 36) is aligned with one of the adjustment screws 2)(Fig. 36).

Screw or unscrew the pre-set screw 2)(Fig. 36) 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)(Fig. 36) by the locking screws 3)(Fig. 36) so as to avoid possible movements from the position of air - gas calibration.

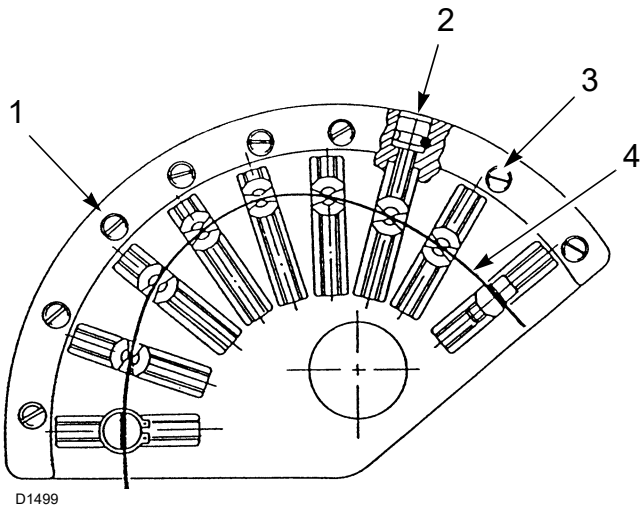


Fig. 36

Key (Fig. 36)
1 Cam
2 Adjustment screws
3 Locking screws
4 Adjustable profile

6.8 Air / fuel adjustment

During the operations for calibrating the air/fuel ratio for oil burners, the following adjustments need to be made:

A **Oil pump delivery pressure:**
act on the screw 5)(Fig. 22) located on the pump.

B **Air cam:**
act on the adjustment screws 2)(Fig. 36) after having loosened the screws 3)(Fig. 36).

C **Gas cam:**
act on the adjustment screws 2)(Fig. 36) after having loosened the screws 3)(Fig. 36).

D **Oil cam:**
modify the eccentricity by acting on the screw 4)(Fig. 37) after having loosened the screws 7)(Fig. 37).
By tightening the screw 4)(Fig. 37) the eccentricity increases, thereby increasing the difference between the maximum and minimum return pressure returning from the nozzle.

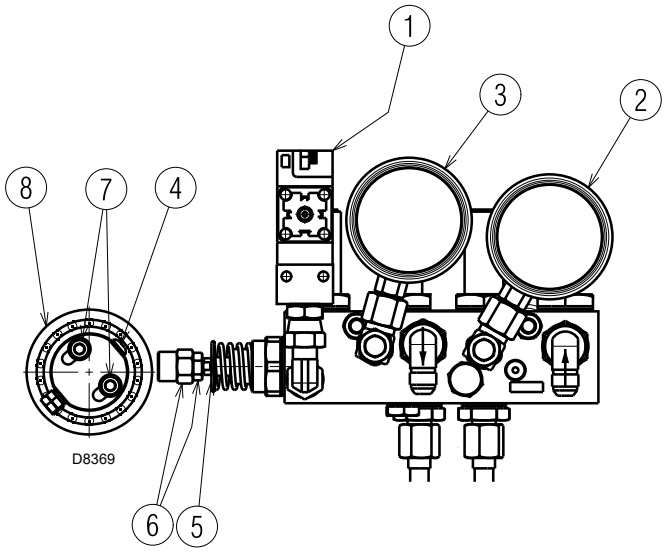


Fig. 37

Key (Fig. 37)
1 Maximum oil pressure switch
2 Delivery pressure gauge
3 Return pressure gauge
4 Eccentric adjustment screw
5 Piston stop ring
6 Piston calibration nut and lock nut
7 Eccentric locking screws
8 Variable eccentric

Burner calibration procedure

➤ Install the nozzle suitable to achieve the maximum desired output.

➤ Verify that the eccentricity of the oil cam is such to make a travel of about 8 mm on the shaft of oil modulator.
Normally, with a shaft stroke of 8 mm, the pressure variation needed for the modulation of the minimum to maximum output is obtained.
To verify this, manually rotate the cam after having released the servomotor with the lever 7)(Fig. 38), so that the travel of the shaft is not exaggerated or insufficient. Remember to block the servomotor after the verification.

➤ Switch on the burner, with the selector on the control panel on manual 1)(Fig. 34).
At this point, after the pre-purging phase, the servomotor stops at about 20°.

➤ Adjust the outlet pressure of the pump as shown in point **A (oil pump outlet pressure)** to obtain an outlet pressure to the nozzle of 24 - 25 bar.

➤ Adjust the minimum return pressure to approx. 6 bar.
To do so, the length of the shaft 5)(Fig. 37) must be varied by means of nut 6)(Fig. 37).

➤ Calibrate the air delivery by adjusting the variable profile cam with the screws 2)(Fig. 36).

➤ Having performed this first adjustment, increase the output supplied via the automatic return selector on the control panel. Pause after a 15° rotation of the servomotor and perform another adjustment by means of the variable profile cam of the air.
It is recommended to perform a calibration that will prevent the formation of a smoky flame and arrive as soon as possible to the maximum output (maximum stroke of the servomotor 130°); on the eccentric (screw 4, Fig. 37), calibrate the pressure on the return line to obtain the output desired and requested by the nozzle, and then go back to calibrate the intermediate points.

➤ Then recheck the values of the combustion parameters at the various modulation outputs and if necessary make the necessary adjustments.

➤ At this point shift the selector 3)(Fig. 34), to **GAS** and check that the gas operation is operating correctly at the desired output.
If this is not so, calibrate the gas cam as in point **C (Gas Cam)** mentioned above.

➤ With the optimal adjustment achieved, remember to lock the adjustment screws of the cam profiles by means of screws 3)(Fig. 36).

ATTENTION

When calibrating the cams, never go beyond the travel limits of the servomotor 0° - 130° to avoid any sticking. Carrying out a manual travel 0 -130° of the cams, check that there are no mechanical stops before the micro-switches 1-2 of the servomotor are activated.

6.9 Servomotor

The servomotor (Fig. 38) simultaneously adjusts, through driving gears, the output and pressure of the air, and the flow rate of the fuel being used.

It is equipped with adjustable cams which operate as many switches.

Cam 1: limits the limit switch of the servomotor on position max (approx. 130°).
(Operating with oil).

Cam 2: limits the servomotor limit switch at the 0° position. With the burner off, the air damper is completely closed.
(Operating with oil and gas).

Cam 3: regulates the minimum modulating output.
It is factory set at 30°.
(Operating with minimum oil).

Cam 4: limits the limit switch of the servomotor on position max (approx. 130°).
(Operating with gas).

Cam 5: regulates the minimum modulating output.
It is factory set at 30°.
(Operating with gas).

Remaining cams: not used.

Lever 7: Servomotor release.

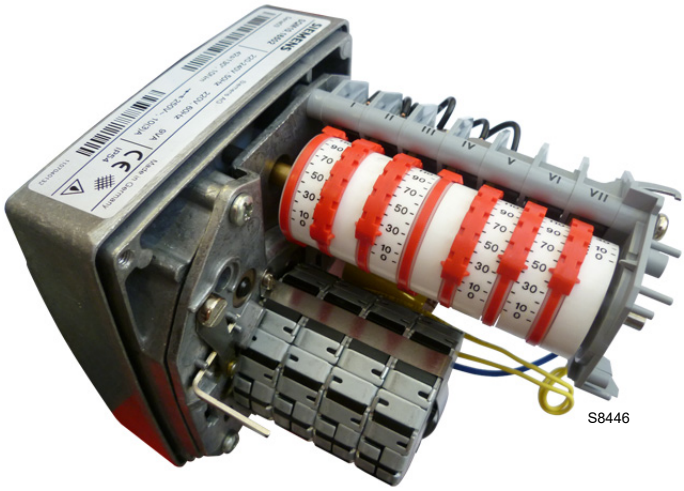


Fig. 38

6.10 Pressure switch adjustment

6.10.1 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. 39).

With the burner operating at MIN output, increase adjustment pressure by slowly turning the relevant 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 slightly anticlockwise.

ATTENTION

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 in the flue, slowly reduce the burner air setting (for example with a piece of cardboard) and verify that the burner locks out before the CO value in the flue gases exceeds 1%.

The air pressure switch is installed in the "absolute" position, i.e. it is connected only to the pressure test point “+” 22)(Fig. 4).

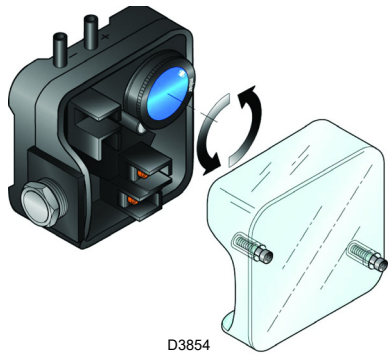


Fig. 39

6.10.2 Maximum gas pressure switch

Adjust the maximum gas pressure switch (Fig. 40) after making all other burner adjustments with the maximum gas pressure switch set to the end of the scale.

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

The maximum gas pressure switch must be regulated to a value no higher than 30% of the measurement read on the gauge when the burner is working at maximum output.
After making the adjustment, remove the pressure gauge and close the tap.

6.10.3 Minimum gas pressure switch

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

Adjust the minimum gas pressure switch (Fig. 41) 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.

ATTENTION

1 kPa = 10 mbar

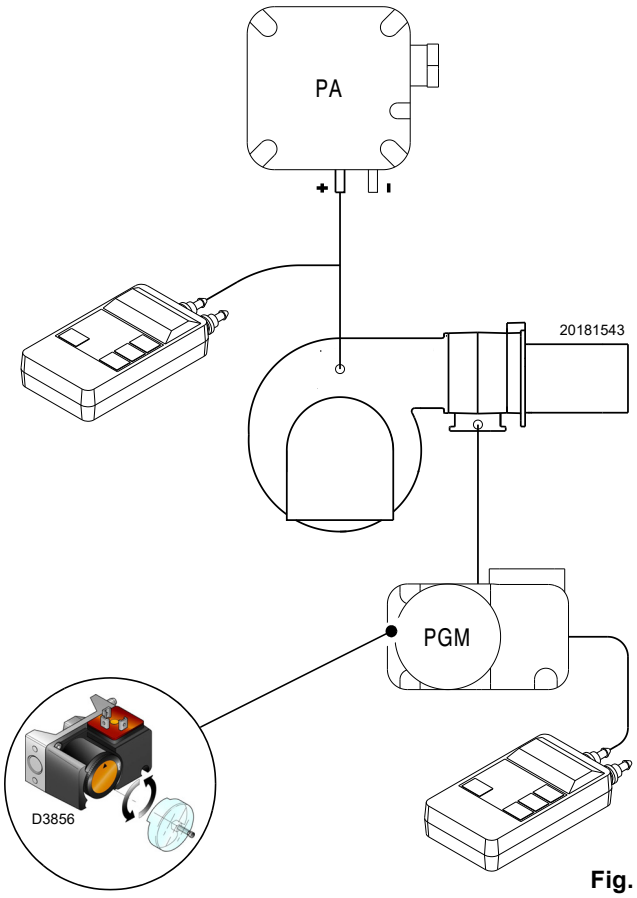


Fig. 40

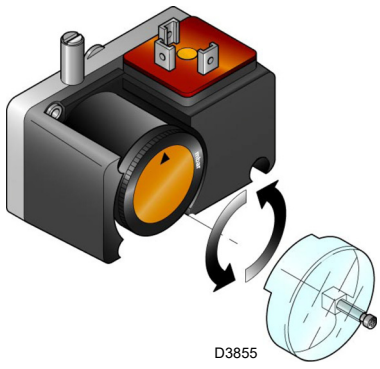


Fig. 41

6.11 Operation sequence of the burner

6.11.1 Burner start-up

- 0s TL thermostat/pressure switch closure.
  Fan motor start-up.
- 6s Servomotor start-up: rotate to the right by 130°, i.e. until the contact intervenes on the cam 1).
  If it's operating with oil or cam 4) if it's operating with gas.
- 48s The air damper is positioned to MAX output.
  Pre-purging stage with MAX output air delivery.
- 80s The servomotor rotates towards the left until the angle set on the cam 3).
  If it's operating with oil or cam 5) if it's operating with gas.
- 109s The air damper and the gas butterfly valve adopt the MIN output position.
- 113s Ignition electrode strikes a spark.
- 116s The pilot valves VP1 and VP2 open.
  The flame is ignited at a low output level, point A (Fig. 42).
- 119s The spark goes out.
- 130s The safety valve VS opens, along with the adjustment valve VR (quick opening).
  The output is then progressively increased, with the valve opening slowly up to MIN output, point B (Fig. 42).
- 143s The start-up cycle ends.

STANDARD IGNITION

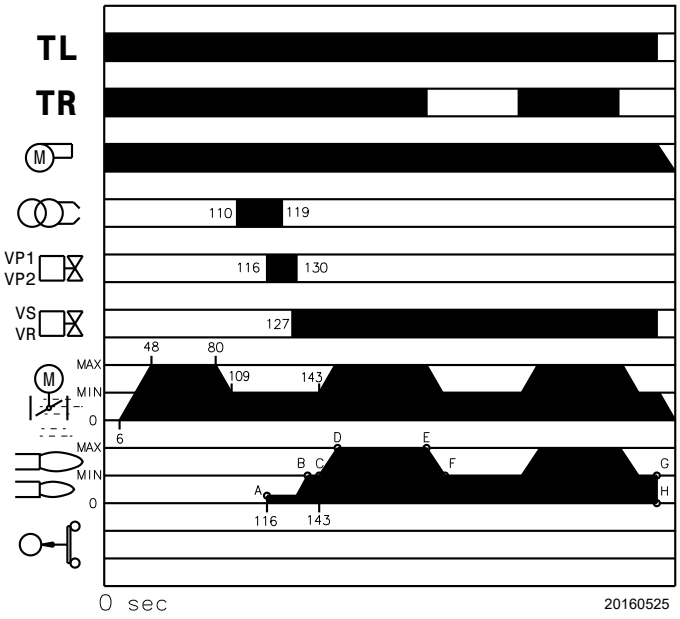


Fig. 42

6.11.2 Steady state operation

➤ Burner without output regulator RWF

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. 42).
(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).
– Then if the temperature or pressure increases until the TR opens, the burner progressively decreases its output to the MIN value (section E-F). And so on.
– The burner locks out when the heat request is less than the heat supplied by the burner at MIN output, (section G-H).
  The TL thermostat/pressure switch opens, and the servomotor returns to angle 0° limited by the contact of 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 output regulator RWF

See the manual supplied with the regulator.

6.11.3 Burner flame goes out during operation

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

6.11.4 Ignition failure

If the burner does not ignite (Fig. 43), it locks out within 3 s after the gas valve opens, 119 s after the TL closes and the post-purging phase starts lasting 17s.

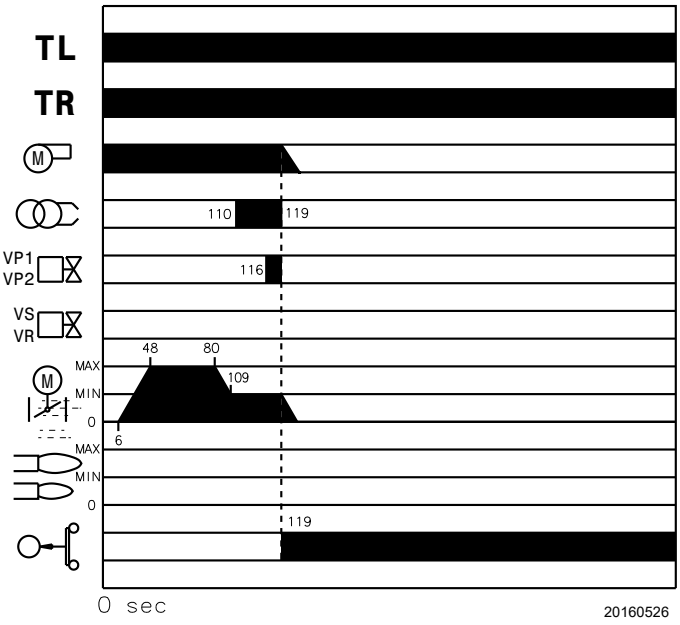


Fig. 43

6.12 Final checks (with burner operating)

➤ Open the thermostat/pressure switch TL ➤ Open the thermostat/pressure switch TS	⇨	The burner must stop
➤ Turn the knob of the gas maximum pressure switch to the minimum end of scale position ➤ Turn the air pressure switch knob 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 flame detection sensor electrical connections	⇨	The burner must stop in lockout due to ignition failure

Tab. M

ATTENTION

Make sure that the mechanical locking systems on the 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 system main switch.

Close the fuel shut-off valve.

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

7.2 Maintenance programme

7.2.1 Maintenance frequency

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

7.2.2 Safety test - with no gas supply

To perform commissioning in safety conditions, it is very important to check correct wiring between gas valves and burner.

For this purpose, after checking that connections comply with the burner wiring diagrams, it is necessary to carry out a start-up cycle with gas cock closed (dry test).

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

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

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

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

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

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

7.2.3 Checking and cleaning

The operator must use the required equipment during maintenance.

Combustion
Carry out an analysis of the combustion flue gases.
Significant differences with respect to the previous measurements indicate the points where most care should be exercised during maintenance.

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

Burner
Check that there is no excess wear or loosen screws, especially on cams 3)(Fig. 38).
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.

Check Mode

With burner flame on:

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

7.2.4 Safety components

The safety components should be replaced at the end of their life cycle indicated in the following table.

ATTENTION

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 any)	10 years or 250.000 operation cycles
Oil valve (solenoid)(if any)	10 years or 250.000 operation cycles
Oil regulator (if present)	10 years or 250.000 operation cycles
Oil pipes/ couplings (metallic) (if present)	10 years
Flexible hoses (if present)	5 years or 30,000 pressurised cycles
Fan impeller	10 years or 500.000 start-ups

Tab. N

LIGHT OIL OPERATION

Filters (Fig. 44)
Check the filtering baskets on line 1) and at nozzle 2) present in the system.
Clean or replace if necessary.
If rust or other impurities are observed inside the pump, use a separate pump to lift any water and other impurities that may have deposited on the bottom of the tank.

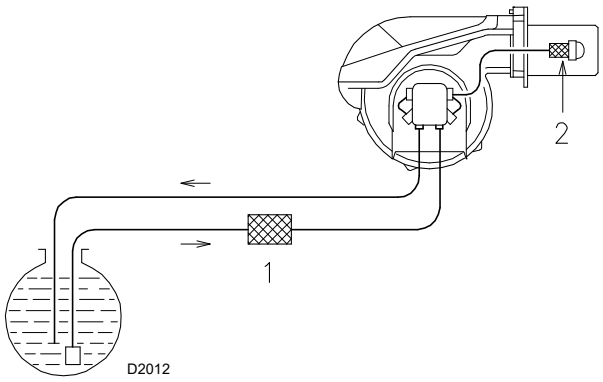


Fig. 44

Pump
The delivery pressure must comply with the table on page 18.
The depression must be less than 0.45 bar.
Unusual noise must not be evident during pump operation.
If the pressure is unstable, or the pump runs noisily, the flexible hose must be detached from the line filter and the fuel must be sucked from a tank located near the burner. This measure permits the cause of the anomaly to be traced to either the suction piping or the pump.
If the problem lies in the suction line, check the filter is clean and that air is not entering the piping.

Nozzles
It is advisable to replace nozzles once a year during periodical maintenance.
Do not clean the nozzle openings.

Flexible hoses
Check to make sure that the hoses are still in good condition.

Fuel tank
Approximately every 5 years, suck any water on the bottom of the tank using a separate pump.

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

EN 267	Air excess		
	Max. output $\lambda \leq 1.2$		Min. output $\lambda \leq 1.3$
Theoretical max CO_2 0 % O_2	CO_2 % Calibration		CO mg/kWh
	$\lambda = 1.2$	$\lambda = 1.3$	
15.2	12.6	11.5	≤ 100

Tab. O

GAS OPERATION

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

Gas filter
Change the gas filter when it is dirty.

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

EN 676		Air excess		
		Max. output $\lambda \leq 1.2$		Min. output $\lambda \leq 1.3$
GAS	Theoretical max CO_2 0 % O_2	Calibration CO_2 %		CO mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$	
G 20	11.7	9.7	9.0	≤ 100
G 25	11.5	9.5	8.8	≤ 100
G 30	14.0	11.6	10.7	≤ 100
G 31	13.7	11.4	10.5	≤ 100

Tab. P

7.3 Opening the burner

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

Close the fuel shut-off valve.

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

➤ Remove the tie-rods 1) and 6)(Fig. 45) of the lever for moving the head and opening the dampers, loosening the nuts 2).
➤ Disconnect the socket 3) of the servomotor.
➤ Disconnect the socket 7) of the derivation unit.
➤ Disconnect the socket 4) of the gas pressure switch.
➤ Remove the screws 5).

At this point, it is possible to open the burner on the hinge.

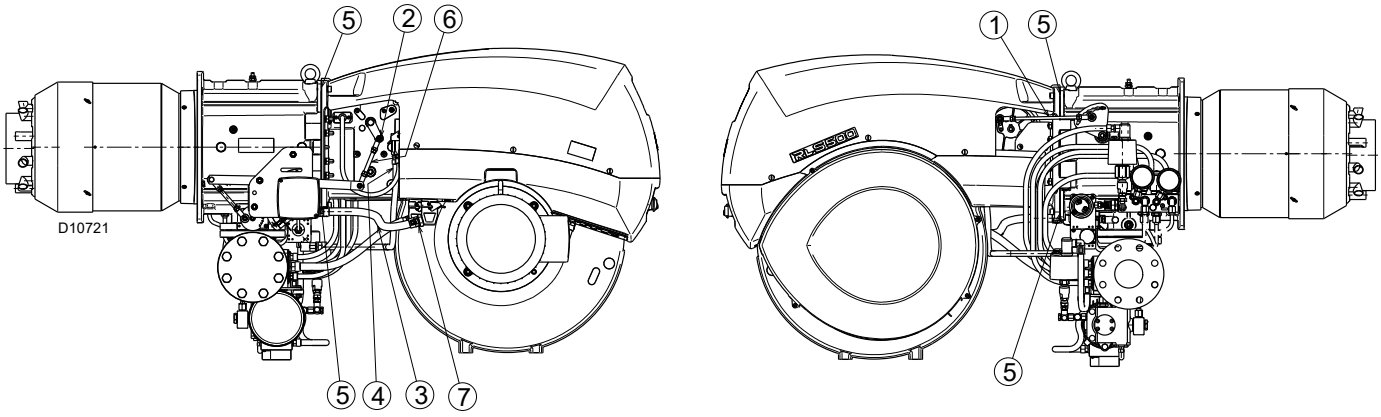


Fig. 45

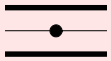
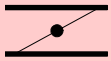
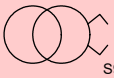
7.4 Closing the burner

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

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

8 LED indicator and special function

8.1 Description of LED lamps

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

Tab. Q

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

8.2 Check mode function

By means of the reset button on-board the flame control, it is possible to use a control function during start-up phases. (pre-purging, ignition, 1st safety time and 2nd safety time).
This function, indicated as CHECK MODE, is designed to facilitate checking the phases of the burner and of the safety devices monitored by the flame control.
This function is particularly useful during the burner first commissioning or during maintenance.

To enable the check mode function:

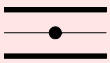
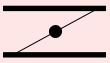
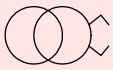
- keep the reset button pressed, see “LED lamps: burner operating status” on page 41, for more details, for at least 3 seconds, the status LED changes from green to yellow to signal that the control device is in check mode;
- the control device locks out during pre-purging, after a time-out of max 30 minutes the flame control will automatically exit the check mode function;
- check mode has a 2 minute timeout during the 2nd safety time. When it ends, the flame control goes back to the normal operating status;
- check mode has a 2 minute timeout during the MTFI status. When it ends, the flame control goes back to the normal operating status;
- during the check mode 1st or 2nd safety time, the flame signal level can be indicated by the 5 central LEDS on the flame control central panel, which turn on proportionally.
  Each lit LED (starting from the flame LED) represents 20% of the signal power.
  To exit the check mode function, press the reset button; the flame control will go back to the normal operating mode.

8.3 Flame control lock-out or emergency stop condition

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

8.4 LED lamps: burner operating status

OPERATING STATUSES INDICATED BY LEDS DURING NORMAL OPERATION AND CHECK MODE

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

Tab. R

1. LEDs form a progress bar which indicates the Flame Signal Power in order to orientate the sensors during commissioning (LEDs “Grow” upwards, moving away from the Status at 20% intervals of flame power.)
2. LEDs indicate the error or lock-out code for troubleshooting.
3. LEDs change from ON to BLINKING to OFF showing the servomotor movement control until the position-reached feedback is received see “Problems - Causes - Remedies signalled by LED indicators” on page 42“.

9 Problems - Causes - Remedies signalled by LED indicators

When an emergency stop occurs, the control device LEDs indicate the cause of the stop.
The terminal T3 is not powered.
The device operating status is internally memorised in case of any lack of power supply.

The device lock-out condition can be caused by pressing (<1sec.) the reset button on the flame control front side or through the remote reset - terminal T21 on the base.
Since the reset button is very sensitive, do not press it strongly during the reset operation.

Unlocking the control device

The RFGO control device can be reset in two ways: reset button and remote reset terminal.
The remote reset must be a normally open connected button between T21 and flame control power supply voltage (see illustrative diagrams):

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

Error / RFGO LED lock-out Codes

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

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

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

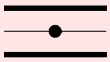
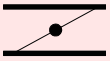
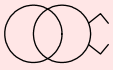
Thermal unit's operation, maintenance and troubleshooting interventions must be carried out by trained personnel.
The persons who solve lock-out problems or reset the control device must observe the error codes to solve the problems described in this product technical data sheet.

It is not admitted to tamper with or act on the system or control in a way that could compromise the product safety or warranty.
Any tests on safety devices or on loads, such as fan motor, valves, igniter, flame sensors, must be performed with the shut-off valves closed and by qualified personnel.

Do not by-pass nor exclude the safety devices connected to the flame control.
Failure to observe these guidelines will exclude any liability.

The regulation prohibits the system from allowing more than 5 remote reset attempts within a 15 minute time window.
If more than 5 attempts are performed without solving the lock-out, the system will prevent the user to perform further remote resets and force him/her to wait for the 15 minutes to elapse.
The remote reset operation will be restored at the end of the waiting time.
It is recommended that qualified personnel evaluate the lock-out condition and implement the solution which is suitable for the fault to be solved.

Error / RFGO LED lock-out codes

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

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

Tab. S

Fault explanation

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

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

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

Tab. T

A Appendix - Accessories

Output regulator kit for modulating operation

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

The parts to be ordered are two:
- output regulator to be installed to the burner;
- probe to be installed to heat generator.

Parameter to be controlled		Probe		Output regulator	
	Adjustment field	Type	Code	Type	Code
Temperature	- 100...+ 500°C	PT 100	3010110	RWF50.2 RWF50.5	20101190 20101191
Pressure	0...2.5 bar 0...16 bar	Output probe 4...20 mA	3010213 3010214		

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

The parts to be ordered are two:
- the analogue signal converter;
- the potentiometer

Burner	Potentiometer		Analogue Signal Converter	
RLS 800/M MX	Type	Code	Type	Code
	ASZ...	3010402	E5202	3010390

Spacer kit

Burner	Thickness (mm)	Code
RLS 800/M MX	180	20008903

Potentiometer kit for load position indication

Burner	Code
RLS 800/M MX	3010402

Soundproofing box kit

Burner	Code
RLS 800/M MX	3010376

Kit for the remote selection of the fuel

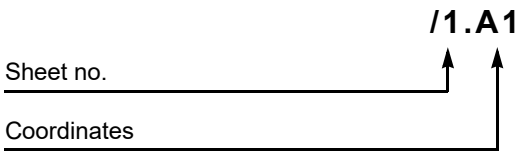
Burner	Code
RLS 800/M MX	3010372

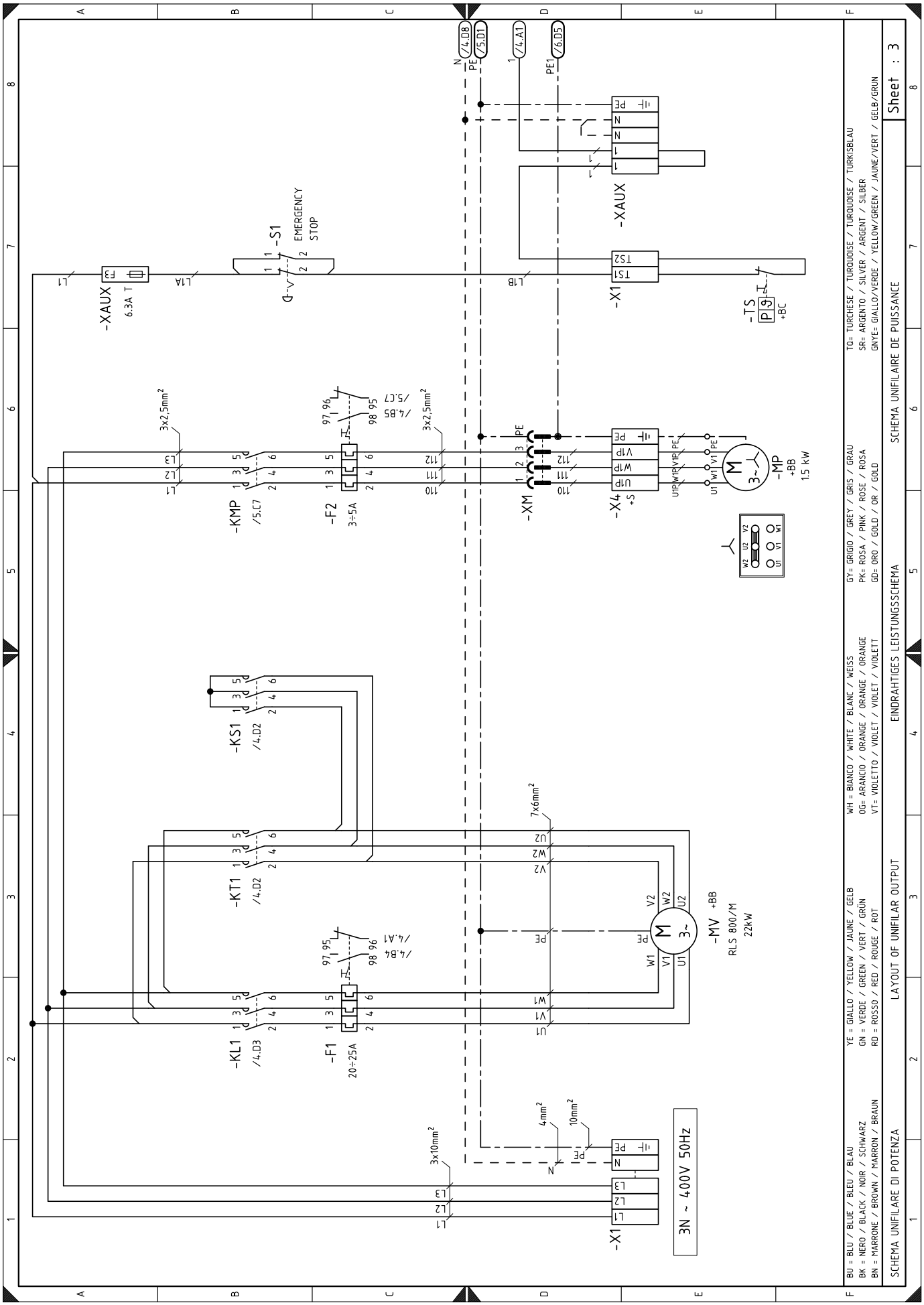
Gas trains in compliance with EN 676

Please refer to manual.

B Appendix - Electrical panel layout

2 Indication of references




-XAUX
6.3A T
-S1
EMERGENCY
STOP
-XAUX
-X1
-TS
-KMP
/5.C7
-F2
3÷5A
-XM
-X4
-MP
+BB
1.5 kW
-KS1
/4.D2
-KT1
/4.D2
-KL1
/4.D3
-F1
20÷25A
-MV +BB
RLS 800/M
22kW
3N ~ 400V 50Hz
-X1
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
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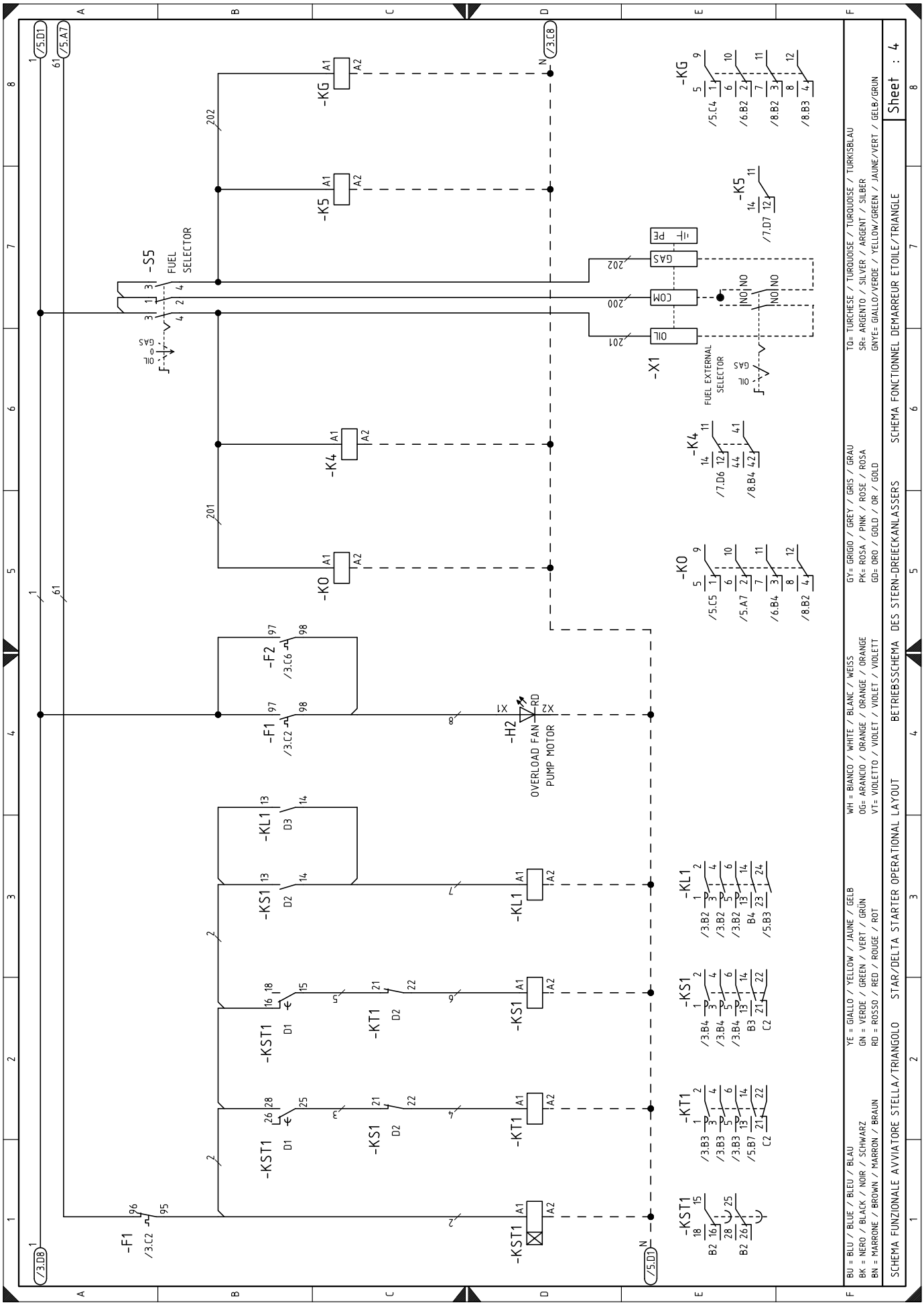
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA UNIFILARE DI POTENZA
LAYOUT OF UNIFILAR OUTPUT
EINDRAHTIGES LEISTUNGSSCHEMA
SCHEMA UNIFILAIRE DE PUISSANCE
Sheet : 3


SCHEMA FUNZIONALE AVVIATORE STELLA/TRIANGOLO STAR/DELTA STARTER OPERATIONAL LAYOUT BETRIEBSSCHEMA DES STERN-DREIECKANLASSERS SCHEMA FONCTIONNEL DEMARREUR ETOILE/TRIANGLE
Sheet : 4
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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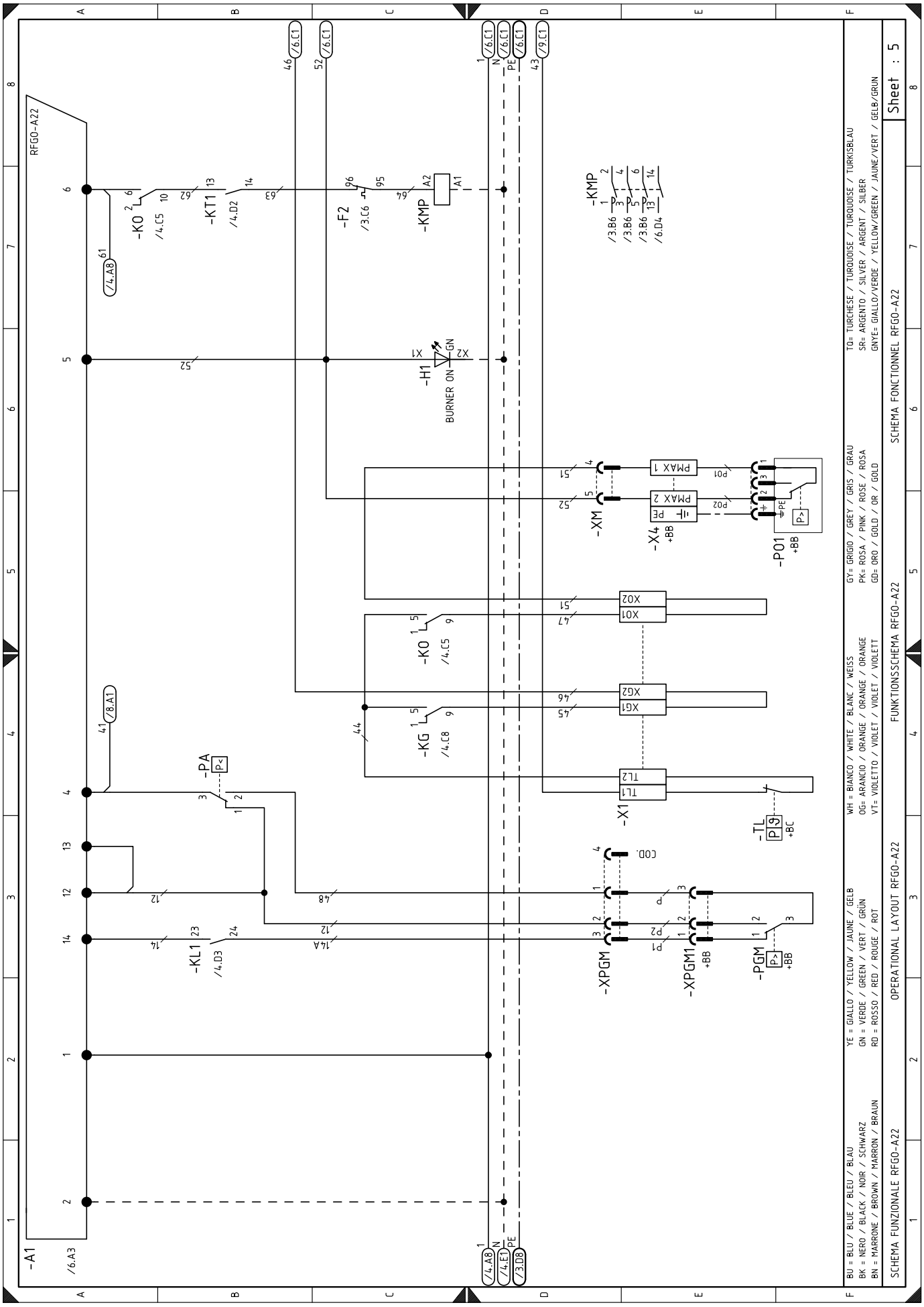
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
-S5 FUEL SELECTOR
-X1
FUEL EXTERNAL SELECTOR
-H2 OVERLOAD FAN PUMP MOTOR
-F1 -F2 -KG -K5 -K4 -KO -KL1 -KS1 -KT1 -KST1


RFGO-A22
-A1
-KO
-KT1
-F2
-KMP
-H1
BURNER ON
-XM
-X4
-P01
-X1
-KG
-PA
-KL1
-XPGM
-XPGM1
-PGM
-TL
-KMP
SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 5
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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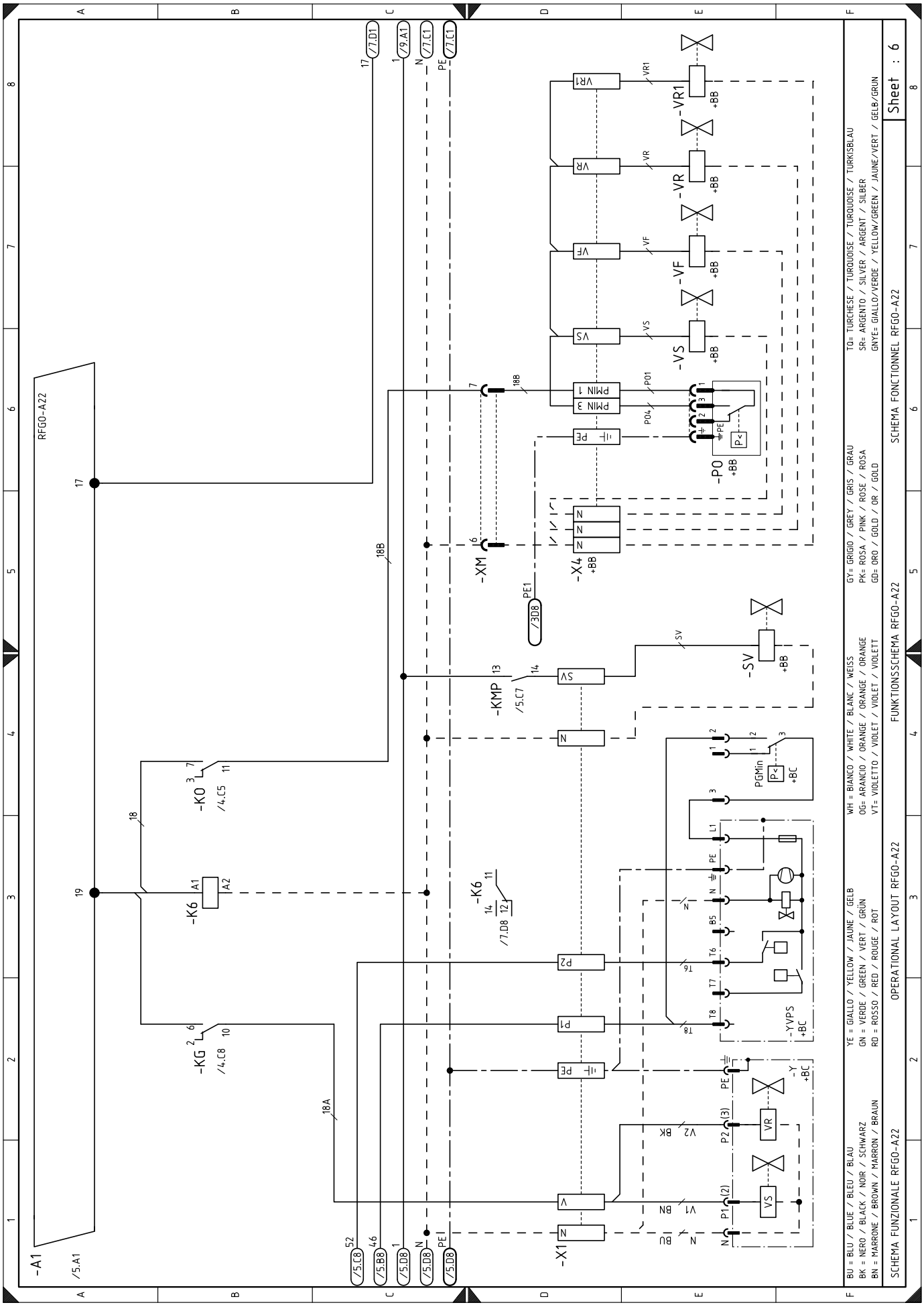
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN


SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 6
RFGO-A22
-A1
-K6
-KO
-KG
-KMP
-XM
-X4
-X1
-PO
-VF
-VR
-VR1
-SV
-YVPS
PGMin
PMIN 1
PMIN 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
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GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
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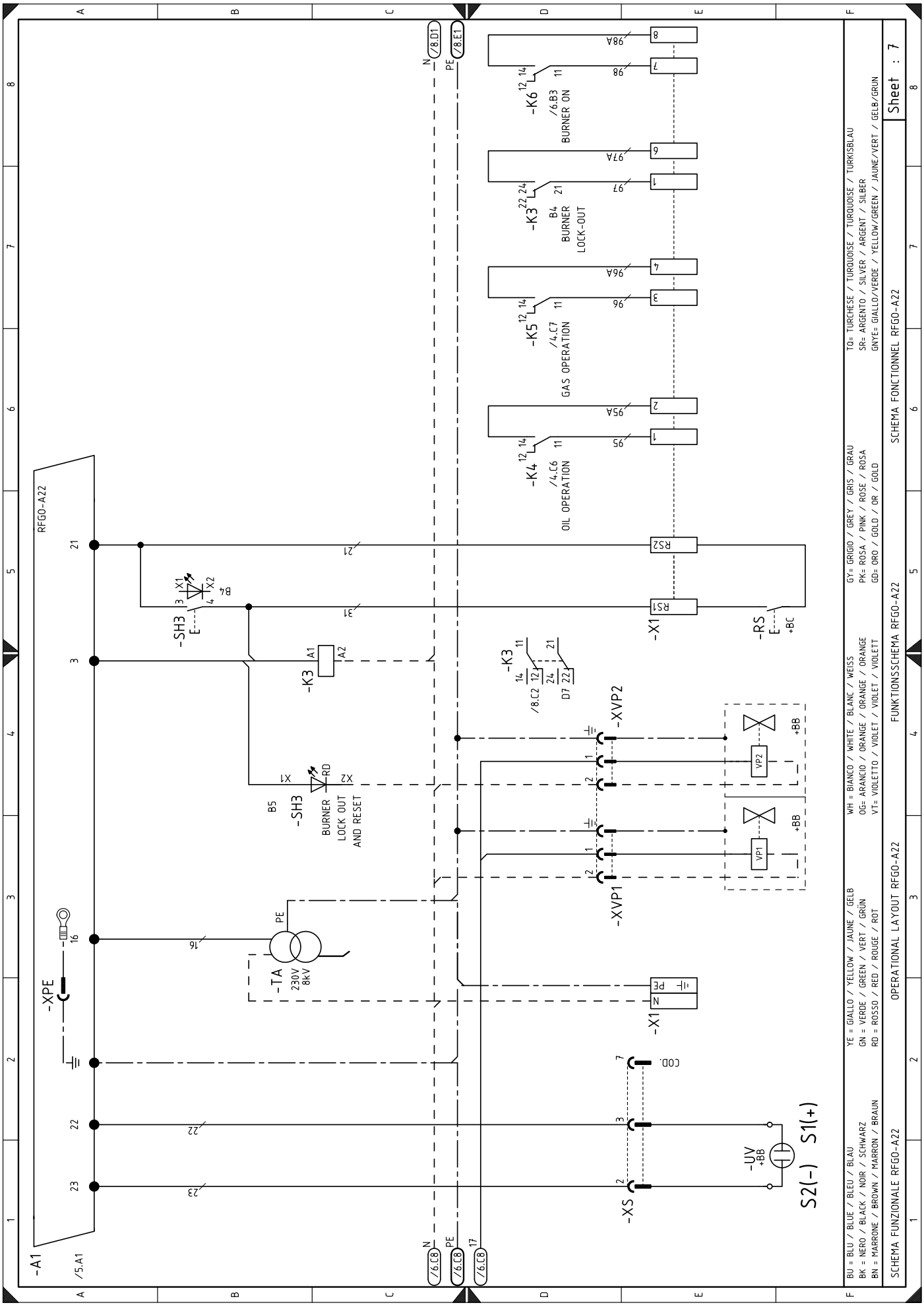
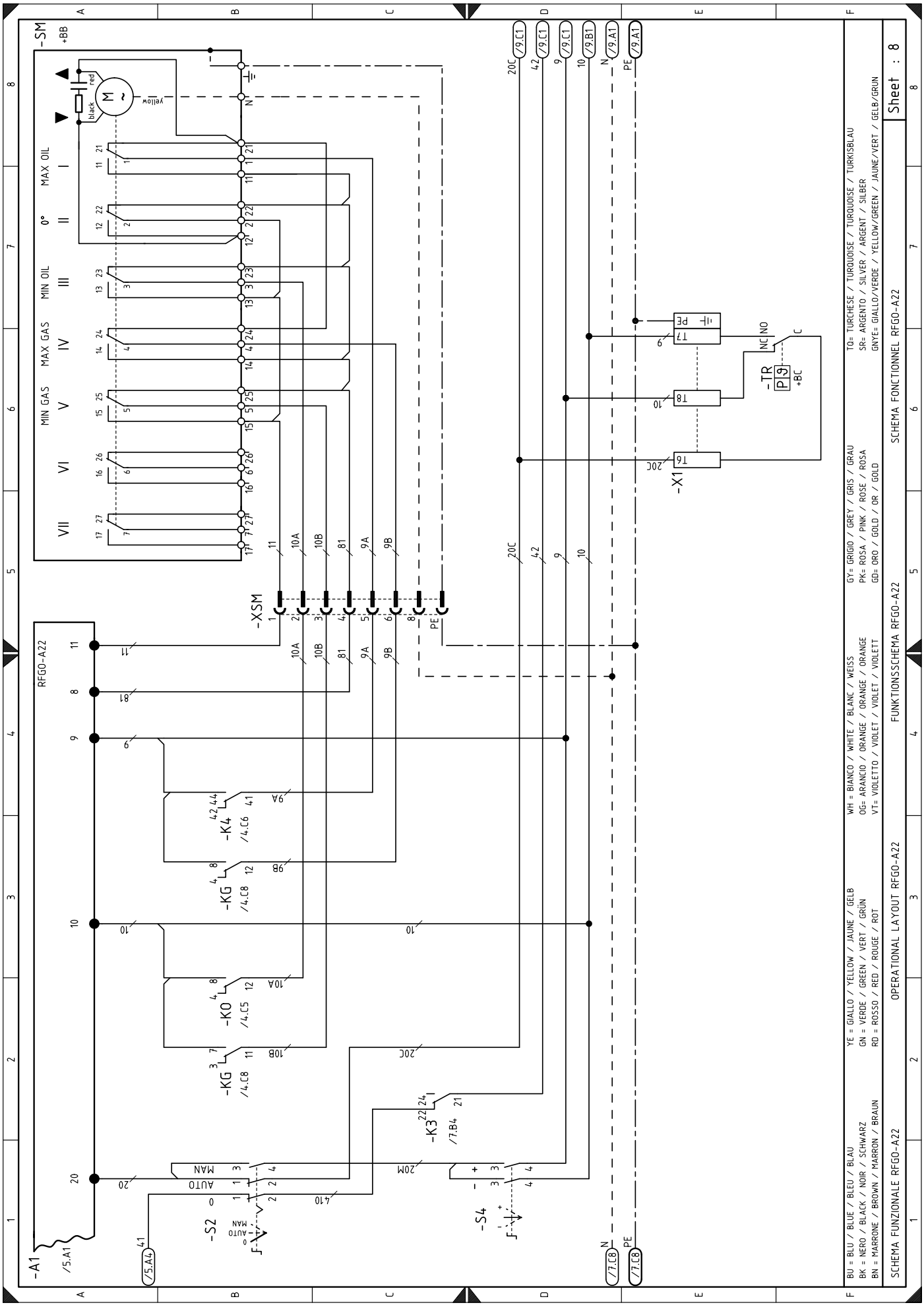
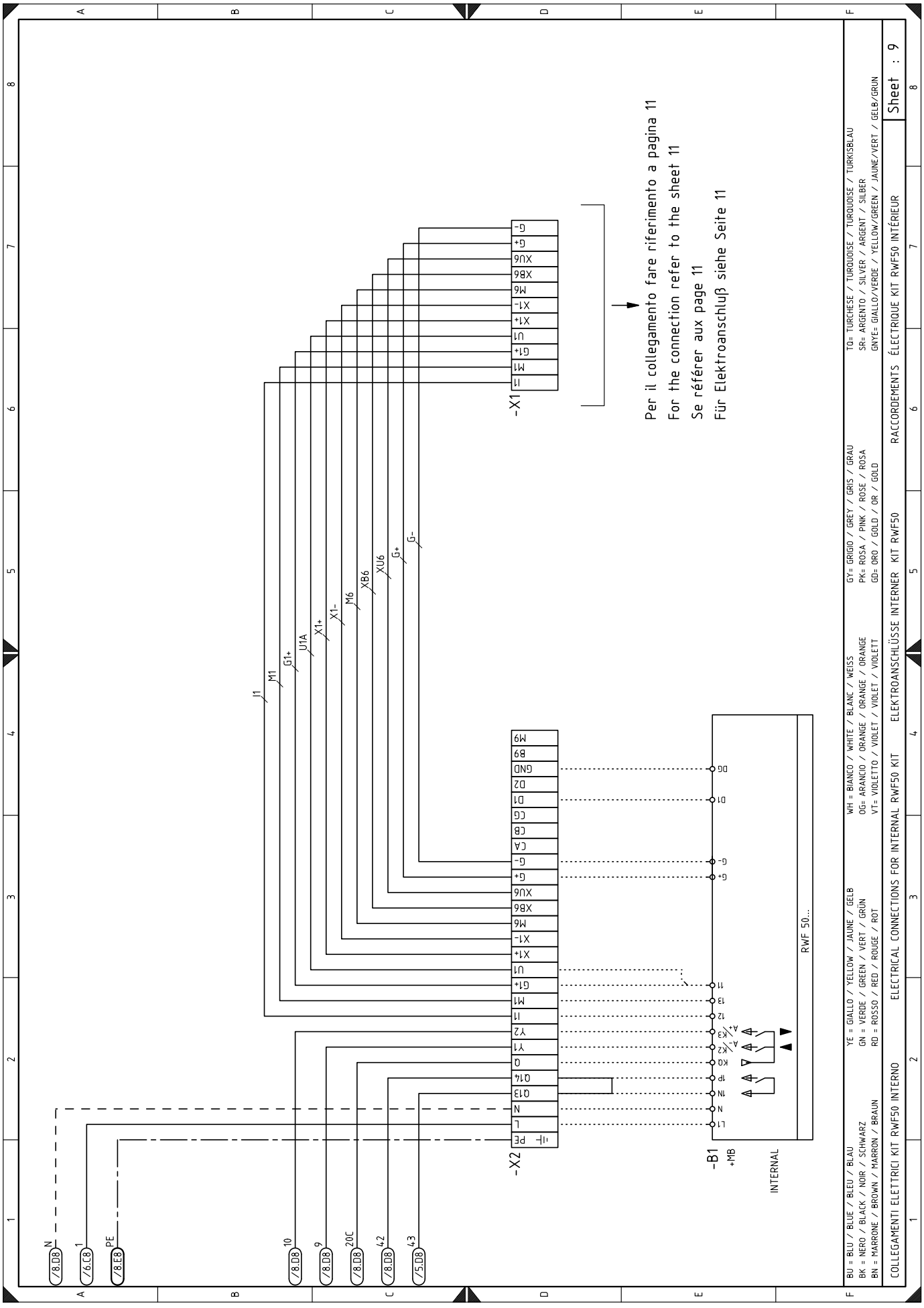
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 7
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
RFGO-A22
-A1
/5.A1
-XPE
-TA
230V
8kV
-SH3
BURNER
LOCK OUT
AND RESET
-K3
-XVP1
-XVP2
VP1
VP2
-X1
-XS
-UV
+BB
-SH3
-K3
BURNER
LOCK-OUT
-K4
OIL OPERATION
-K5
GAS OPERATION
-K6
BURNER ON
-X1
-RS
+BC
S2(-) S1(+)


-SM
+BB
MAX OIL
MIN OIL
MAX GAS
MIN GAS
-XSM
-X1
-TR
-A1
-S2
-S4
-K4
-KG
-KO
-K3
RFGO-A22
SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 8


Per il collegamento fare riferimento a pagina 11
For the connection refer to the sheet 11
Se référer aux page 11
Für Elektroanschluß siehe Seite 11
-X1
-X2
-B1
+MB
INTERNAL
RWF 50...
COLLEGAMENTI ELETTRICI KIT RWF50 INTERNO
ELECTRICAL CONNECTIONS FOR INTERNAL RWF50 KIT
ELEKTROANSCHLÜSSE INTERNER KIT RWF50
RACCORDEMENTS ÉLECTRIQUE KIT RWF50 INTÉRIEUR
Sheet : 9
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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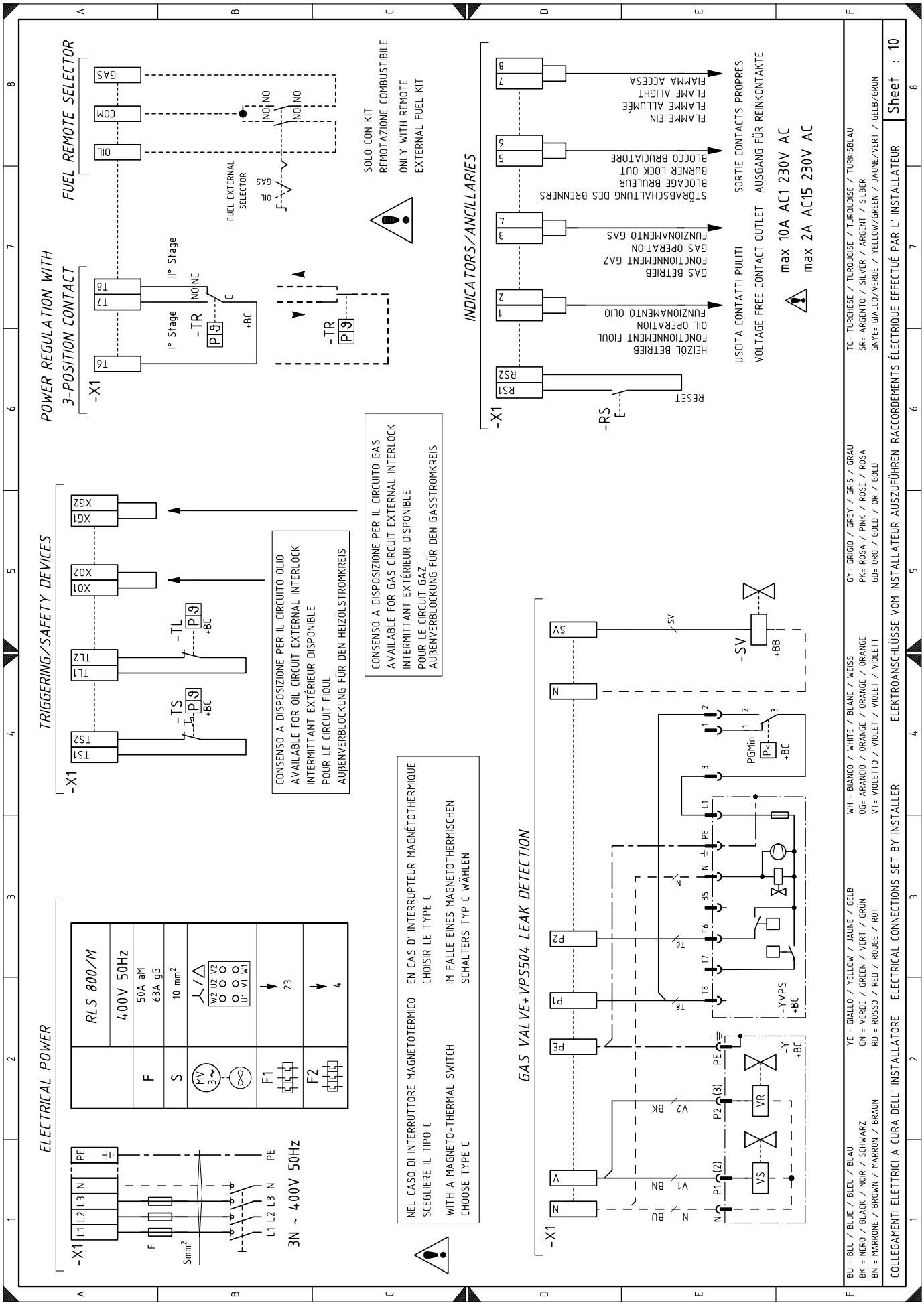
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


ELECTRICAL POWER
RLS 800/M
400V 50Hz
F
50A aM
63A gG
S
10 mm²
F1
23
F2
4
-X1
L1 L2 L3 N PE
3N ~ 400V 50Hz
TRIGGERING/SAFETY DEVICES
POWER REGULATION WITH 3-POSITION CONTACT
FUEL REMOTE SELECTOR
GAS
COM
OIL
I° Stage
II° Stage
-TR
-TL
-TS
+BC
SOLO CON KIT
REMOTAZIONE COMBUSTIBILE
ONLY WITH REMOTE
EXTERNAL FUEL KIT
INDICATORS/ANCILLARIES
FLAMME EIN
FLAMME ALLUMÉE
FLAME ALIGHT
FLAMMA ACCESA
BLOCCO BRUCIATORE
BURNER LOCK OUT
BLOCAGE BRULEUR
STÖRABSCHALTUNG DES BRENNERS
FUNZIONAMENTO GAS
GAS OPERATION
FONCTIONNEMENT GAZ
GAS BETRIEB
FUNZIONAMENTO OLIO
OIL OPERATION
FONCTIONNEMENT FIOUL
HEIZÖL BETRIEB
RESET
-RS
USCITA CONTATTI PULITI
VOLTAGE FREE CONTACT OUTLET
SORTIE CONTACTS PROPRES
AUSGANG FÜR REINKONTAKTE
max 10A AC1 230V AC
max 2A AC15 230V AC
CONSENSO A DISPOSIZIONE PER IL CIRCUITO GAS
AVAILABLE FOR GAS CIRCUIT EXTERNAL INTERLOCK
INTERMITTANT EXTÉRIEUR DISPONIBLE
POUR LE CIRCUIT GAZ
AUßENVERBLOCKUNG FÜR DEN GASSTROMKREIS
CONSENSO A DISPOSIZIONE PER IL CIRCUITO OLIO
AVAILABLE FOR OIL CIRCUIT EXTERNAL INTERLOCK
INTERMITTANT EXTÉRIEUR DISPONIBLE
POUR LE CIRCUIT FIOUL
AUßENVERBLOCKUNG FÜR DEN HEIZÖLSTROMKREIS
NEL CASO DI INTERRUTTORE MAGNETOTERMICO EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
SCEGLIERE IL TIPO C CHOISIR LE TYPE C
WITH A MAGNETO-THERMAL SWITCH IM FALLE EINES MAGNETOTHERMISCHEN
CHOOSE TYPE C SCHALTERS TYP C WÄHLEN
GAS VALVE+VPS504 LEAK DETECTION
-SV
-YVPS
-Y
PGMin
VS
VR
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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GD= ORO / GOLD / OR / GOLD
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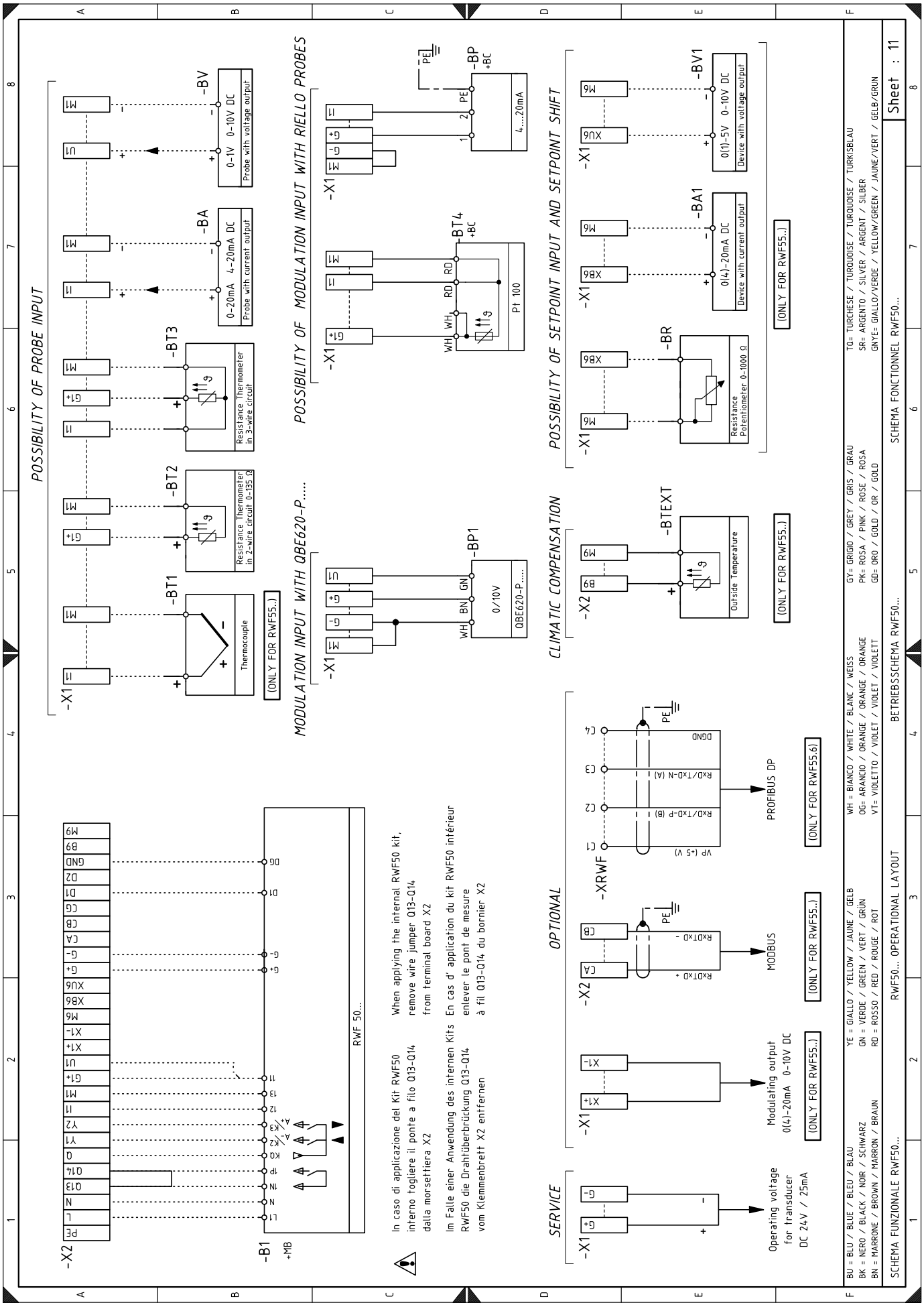
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 10


POSSIBILITY OF PROBE INPUT
-BV
0-1V 0-10V DC
Probe with voltage output
-BA
0-20mA 4-20mA DC
Probe with current output
-BT3
Resistance Thermometer in 3-wire circuit
-BT2
Resistance Thermometer in 2-wire circuit 0-135 Ω
-BT1
Thermocouple
(ONLY FOR RWF55..)
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-BP
+BC
4...20mA
-BT4
Pt 100
MODULATION INPUT WITH QBE620-P.....
-BP1
0/10V
QBE620-P.....
CLIMATIC COMPENSATION
-BTEXT
Outside Temperature
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-BR
Resistance Potentiometer 0-1000 Ω
-BA1
0(4)-20mA DC
Device with current output
-BV1
0(1)-5V 0-10V DC
Device with voltage output
-X2
PE N L1 Q13 Q14 Q Y1 Y2 M1 G1+ U1 X1+ X1- M6 XB6 XU6 G+ G- CA CB CG D1 D2 GND B9 M9
-B1
+MB
RWF 50...
In caso di applicazione del Kit RWF50 interno togliere il ponte a filo Q13-Q14 dalla morsettiera X2
When applying the internal RWF50 kit, remove wire jumper Q13-Q14 from terminal board X2
Im Falle einer Anwendung des internen Kits RWF50 die Drahtüberbrückung Q13-Q14 vom Klemmenbrett X2 entfernen
En cas d' application du kit RWF50 intérieur enlever le pont de mesure à fil Q13-Q14 du bornier X2
SERVICE
Operating voltage for transducer DC 24 V / 25mA
OPTIONAL
Modulating output 0(4)-20mA 0-10V DC
(ONLY FOR RWF55..)
MODBUS
(ONLY FOR RWF55..)
-XRWF
VP (+5 V)
RxD/TxD-P (B)
RxD/TxD-N (A)
DGND
PROFIBUS DP
(ONLY FOR RWF55.6)
CLIMATIC COMPENSATION
(ONLY FOR RWF55..)
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
(ONLY FOR RWF55..)
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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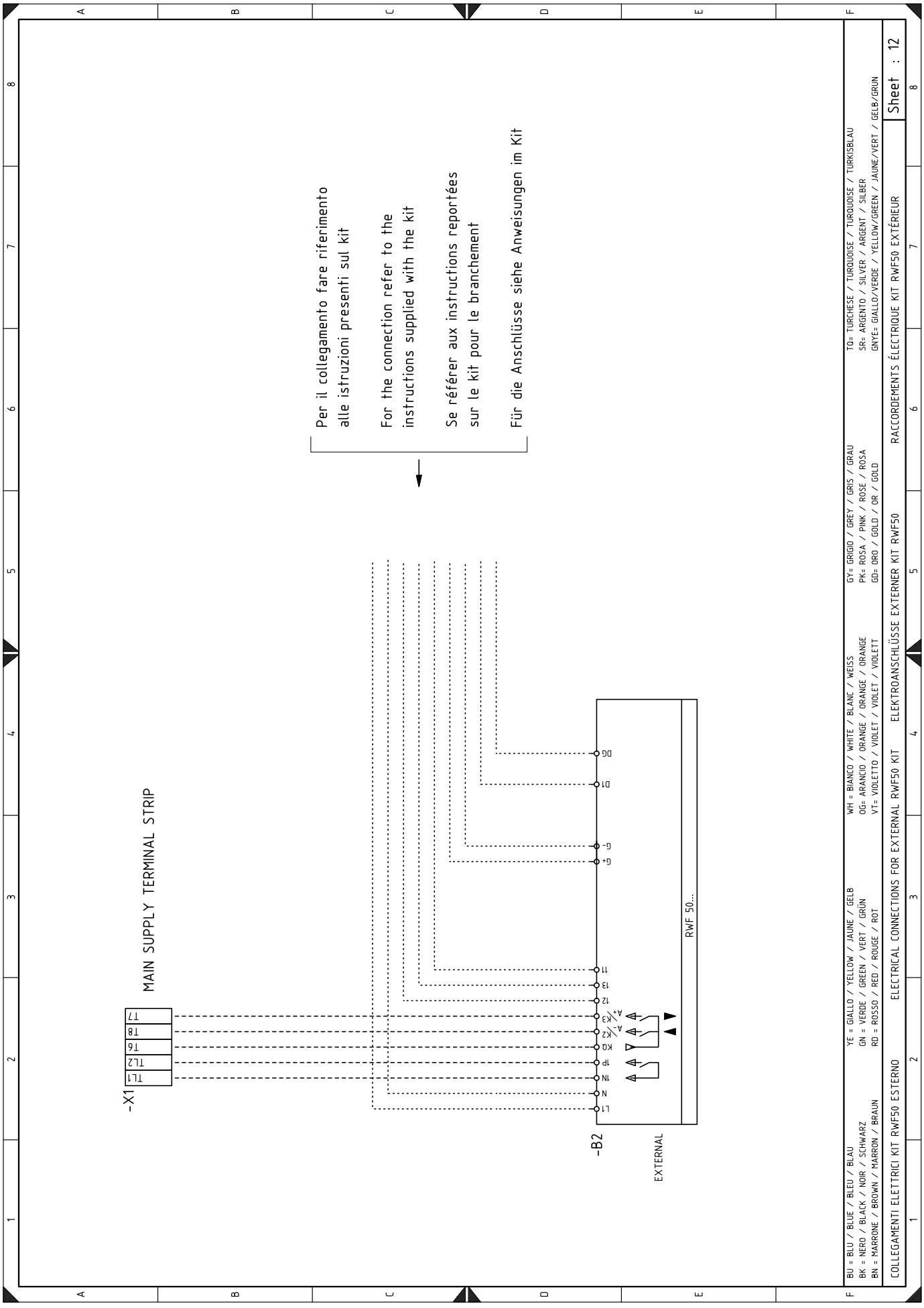
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE RWF50... RWF50... OPERATIONAL LAYOUT BETRIEBSSCHEMA RWF50... SCHEMA FONCTIONNEL RWF50...
Sheet : 11


Per il collegamento fare riferimento alle istruzioni presenti sul kit
For the connection refer to the instructions supplied with the kit
Se référer aux instructions reportées sur le kit pour le branchement
Für die Anschlüsse siehe Anweisungen im Kit
MAIN SUPPLY TERMINAL STRIP
-X1
TL1
TL2
T6
T8
T7
-B2
EXTERNAL
RWF 50...
L1
N
1N
1P
K2
A-/K3
A+/K3
11
13
12
G+
G-
D1
DG
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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YE = GIALLO / YELLOW / JAUNE / GELB
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PK= ROSA / PINK / ROSE / ROSA
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TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI KIT RWF50 ESTERNO
ELECTRICAL CONNECTIONS FOR EXTERNAL RWF50 KIT
ELEKTROANSCHLÜSSE EXTERNER KIT RWF50
RACCORDEMENTS ÉLECTRIQUE KIT RWF50 EXTÉRIEUR
Sheet : 12

Wiring layout key

A1	Electrical control box
B1	Output power regulator RWF50 internal
B2	Output regulator RWF50 external
BA	Probe with output under current
BA1	Output device in current to modify remote setpoint
BP	Pressure probe
BP1	Pressure probe
BR	Remote setpoint potentiometer
BT1	Thermocouple probe
BT2	Probe Pt100, 2 wires
BT3	Probe Pt100, 3 wires
BT4	Probe Pt100, 3 wires
BTEXT	External probe for climatic compensation of the setpoint
BV	Probe with output under voltage
BV1	Device with output under voltage for change of remote setpoint
F	Three-phase line fuses
F1	Fan motor thermal relay
F2	Pump motor thermal relay
F3	Auxiliary fuse
H1	Burner ON warning lamp
H2	Fan motor and pump motor lockout warning lamp
KL1	Star/triangle starter line contactor and direct start-up
KMP	Pump motor contactor
KT1	Star/triangle starter triangle contactor
KS1	Start/triangle starter star contactor
KST1	Star/triangle starter timer
K3	Burner lockout dry contact output relay
K4	Output relay for light oil operation clean contacts
K5	Output relay for gas operation clean contacts
K6	Burner ON dry contact output relay
KG	Gas operation relay
KO	Light oil operation relay
MP	Pump motor
MV	Fan motor
PA	Air pressure switch
PE	Burner earth
PGM	Maximum gas pressure switch
PGMin	Minimum gas pressure switch
PO	Oil pressure switch
PO1	Maximum oil pressure switch on return line
RS	Remote burner reset button
SV	General safety valve
S1	Emergency stop button
S2	Off / automatic / manual selector
S4	Output increase / decrease selector
S5	Fuel selector and enable signal to remote fuel selector
SH3	Burner reset button and lockout signal
SM	Servomotor
TA	Ignition transformer
TL	Limit thermostat/pressure switch
TR	Adjustment thermostat/pressure switch
TS	Safety thermostat/pressure switch
UV	Flame sensor
Y	Gas adjustment valve + gas safety valve
YVPS	Gas valve leak detection device
X1	Main supply terminal board
X2	Terminal board for kit RWF50
X4	Light oil unit terminal board
XAUX	Auxiliary terminal board
XM	Light oil unit connector
XPGM-XPGM1	Maximum gas pressure switch connector
XRWF	Terminal board for RWF50 output power regulator
XVP1	Pilot valve 1 connector
XVP2	Pilot valve 2 connector
XS	Flame sensor connector
XSM	Servomotor connector
VF	Light oil operation valve
VP1	Pilot valve 1
VP2	Pilot valve 2
VR	Light oil return valve
VR1	Light oil return valve
VS	Safety light oil valve

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