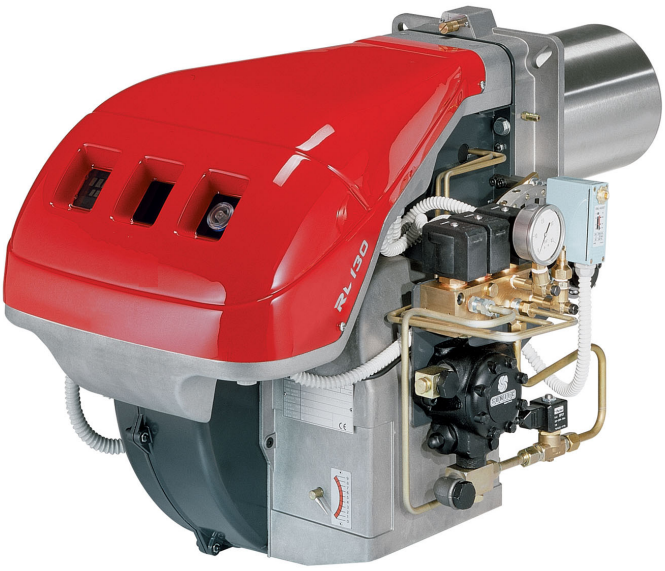
GB

Light oil burners

Progressive two-stage or modulating operation



CODE	MODEL
20205576	RL 70/M
20205587	RL 70/M
20205600	RL 100/M
20205603	RL 100/M
20205645	RL 130/M
20205765	RL 130/M

20209316 (2) - 01/2026

Original instructions

1 Information and general warnings

1.1 Information about the instruction manual

1.1.1 Introduction

The instruction manual supplied with the burner:

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

Symbols used in the manual

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

1.1.2 General dangers

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

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

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

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

1.1.3 Other symbols

DANGER: LIVE COMPONENTS

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

DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.

DANGER: BURNING

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

DANGER: CRUSHING OF LIMBS

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

WARNING: MOVING PARTS

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

DANGER: EXPLOSION

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

PERSONAL PROTECTION EQUIPMENT

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

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

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

ENVIRONMENTAL PROTECTION

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

IMPORTANT INFORMATION

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

➤ This symbol indicates a list.

Abbreviations used

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

1.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

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

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

.....

– the address and telephone number of the nearest Assistance Centre

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

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

1.2 Guarantee and responsibility

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

WARNING

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

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

➤ incorrect installation, start-up, use and maintenance of the burner;
➤ improper, incorrect or unreasonable use of the burner;
➤ intervention of unqualified personnel;
➤ carrying out of unauthorised modifications on the 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.

2 Safety and prevention

2.1 Introduction

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

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

It is a good idea to remember the following:

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

Specifically:

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

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

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

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

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

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

WARNING

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

2.2 Personnel training

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

The user:

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

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

➤ Personnel must 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:

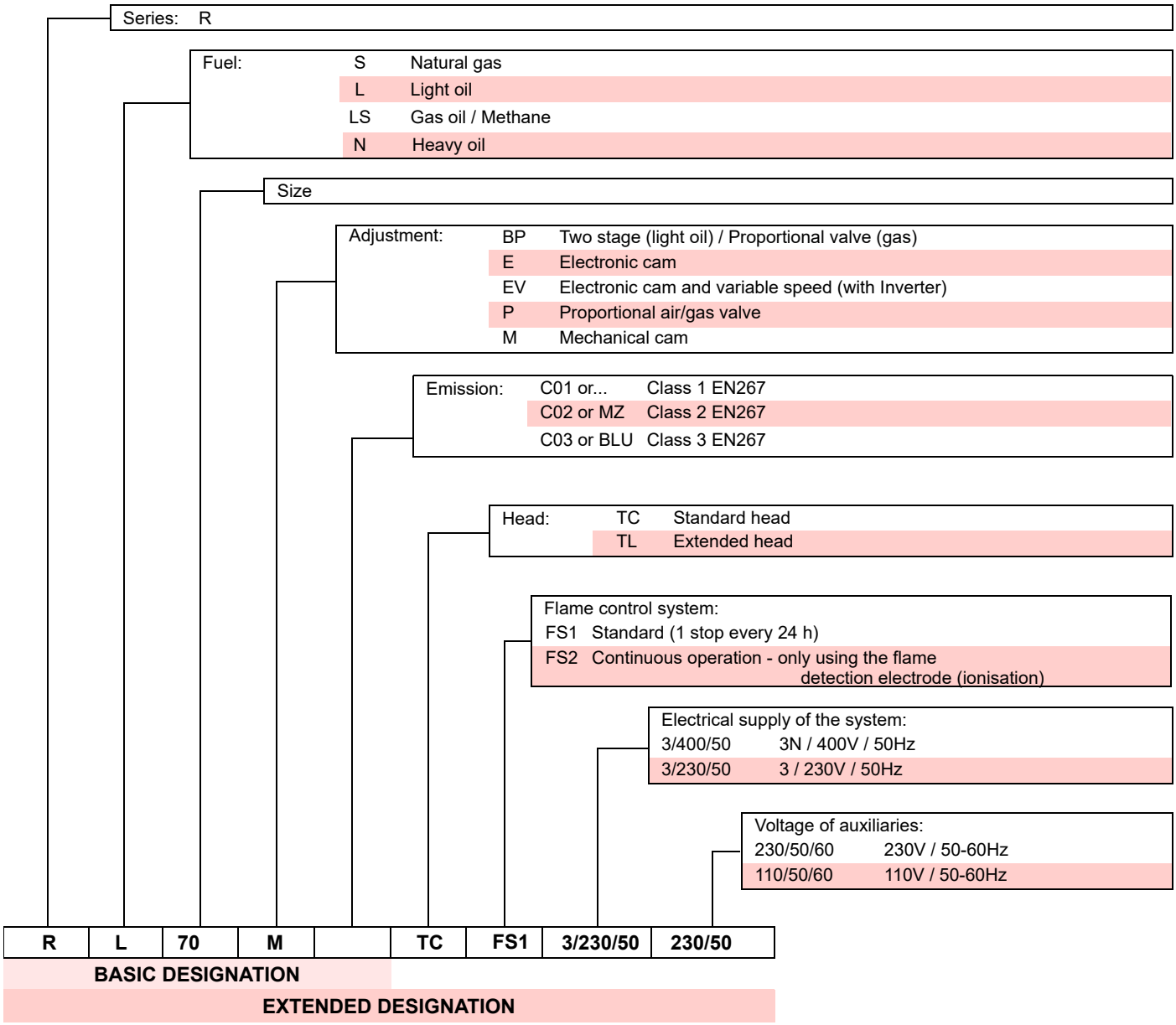
➤ must take all the measures necessary to prevent unauthorised people gaining access to the machine;

➤ 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.

3 Technical description of the burner

3.1 Burner designation



3.2 Models available

Designation			Voltage	Start-up	Code
RL 70/M	TC	FS1	3/230-400/50	Direct	20205587
RL 70/M	TL	FS1	3/230-400/50	Direct	20205576
RL 100/M	TC	FS1	3/230-400/50	Direct	20205600
RL 100/M	TL	FS1	3/230-400/50	Direct	20205603
RL 130/M	TC	FS1	3/230-400/50	Direct	20205645
RL 130/M	TL	FS1	3/230-400/50	Direct	20205765

4 Technical description of the burner

4.1 Technical data

Model			RL 70/M	RL 100/M	RL 130/M
Output (1)	MAX.	kW Mcal/h kg/h	474 - 1043 408 - 897 40 - 88	711 - 1482 612 - 1275 60 - 125	948 - 1779 816 - 1530 80 - 150
	MIN.	kW Mcal/h kg/h	261 - 474 224 - 408 22 - 40	332 - 711 286 - 612 28 - 60	498 - 948 428 - 816 42 - 80
Fuel			Light oil		
- net calorific value		kWh/kg Mcal/kg	11.8 10.2 (10.200 kcal/kg)		
- density		kg/dm3	0.82 - 0.85		
- viscosity at 20 °C		mm2/s	max 6 (1.5 °E - 6 cSt)		
Operation			• Intermittent (min. 1 stop in 24 hours) • Progressive two-stage (modulating by Kit)		
Nozzle		number	1 (nozzle with return)		
Standard applications			Boilers: water, steam, diathermic oil		
Ambient temperature		°C	0 - 40		
Combustion air temperature		°C max	60		
Pump delivery (at 20 bar) pressure range fuel temperature		kg/h bar °C max	190 10 - 21 90		
Electrical protection			IP 44		
Noise levels (2)					
Sound pressure		dBA	75	77	78.5
Sound power			86	88	89.5
Weight		kg	65	68	76

Tab. A

(1) Reference conditions: Ambient temperature 20°C - Barometric pressure 1000 mbar - Altitude 100 m a.s.l.

(2) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output. The sound power is measured with the “Free Field” method, as per EN 15036, and according to an “Accuracy: Category 3” measuring accuracy, as set out in EN ISO 3746.

4.2 Electrical data

Model		RL 70/M	RL 100/M	RL 130/M
Electrical supply	V Hz		230 - 400 ~ +/-10% 50 - three-phase	
Electrical power consumption	kW max	1.7	2.5	2.85

Tab. B

4.3 Maximum dimensions

The maximum 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 withdrawn on the slide bars.

The dimensions of the open burner are indicated by position **U-U**.

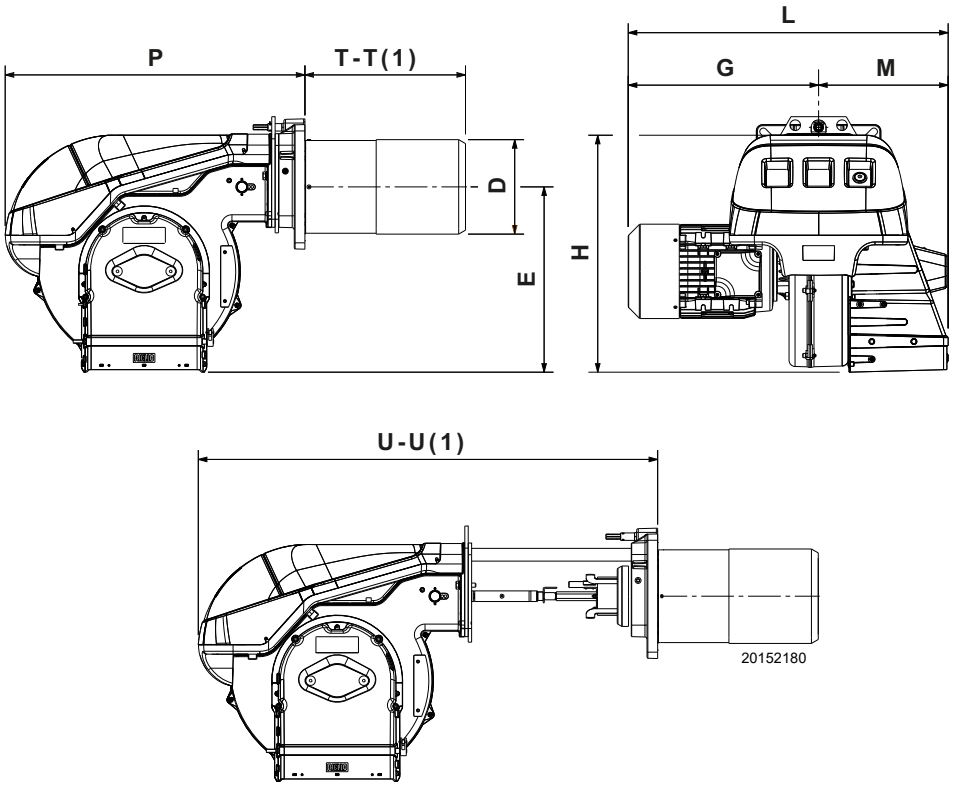


Fig. 1

mm	D	E	G	H	L	M	P	T-T(1)	U-U(1)
RL 70/M	179	425	295	550	660	365	676	272 - 385	951 - 1086
RL 100/M	179	425	325	550	690	365	676	272 - 385	951 - 1086
RL 130/M	189	425	335	550	700	365	676	272 - 385	951 - 1086

Tab. C

(1) Blast tube: short-long

4.4 Standard equipment

Flexible hoses	No. 2
Gaskets for flexible hoses	No. 2
Nipples for flexible hoses	No. 2
Thermal insulation screen	No. 1
Extensions 16)(Fig. 4 on page 10) for slide bars 14) (for models with 385 mm blast tube)	No. 4
Screws to secure the burner flange to the boiler: M 12 x 35	No. 4
Manual	No. 1
Spare part list	No. 1

4.5 Firing rates

During operation, burner output varies between:

➤ **MINIMUM OUTPUT**: area A;

➤ **MAXIMUM OUTPUT**: area B (and C for model RL 130/M).

Graphs (Fig. 2):

Horizontal axis : Burner output

Vertical axis : Combustion chamber pressure

The work point may be found by plotting a vertical line from the desired delivery and a horizontal line from the pressure in the combustion chamber. The intersection of these two lines is the work point which must lie within area A, for MIN output, and within area B, for MAX output.

In order to utilize also area C (RL 130/M) it is necessary to perform the calibration of the combustion head as explained on page 16.

WARNING

The FIRING RATE area values have been obtained considering a surrounding temperature of 20 °C, and an atmospheric pressure of 1000 mbar (approx. 100 m above sea level) and with the combustion head adjusted as shown on page 18.

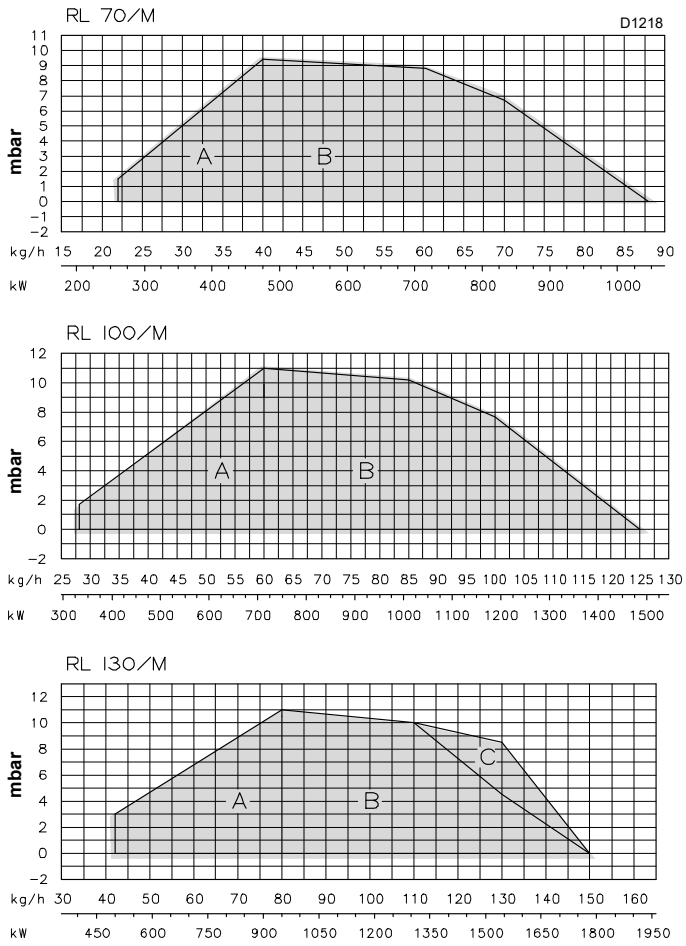


Fig. 2

4.6 Test boiler

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

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

The firing rates were obtained in special test boilers, according to EN 267 regulations.

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

Example:
Output 650 Mcal/h (407 kW): diameter 60 cm - length 2 m.

MODULATING RATIO

The modulating ratio, obtained in test boilers, according to standard (EN 267 for light oil), is of 4:1 for light oil.

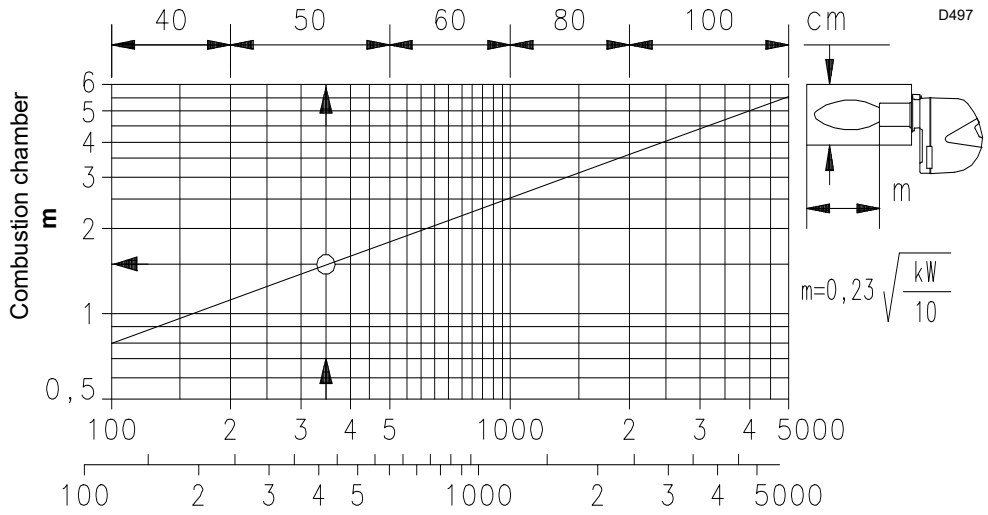


Fig. 3

4.7 Burner description

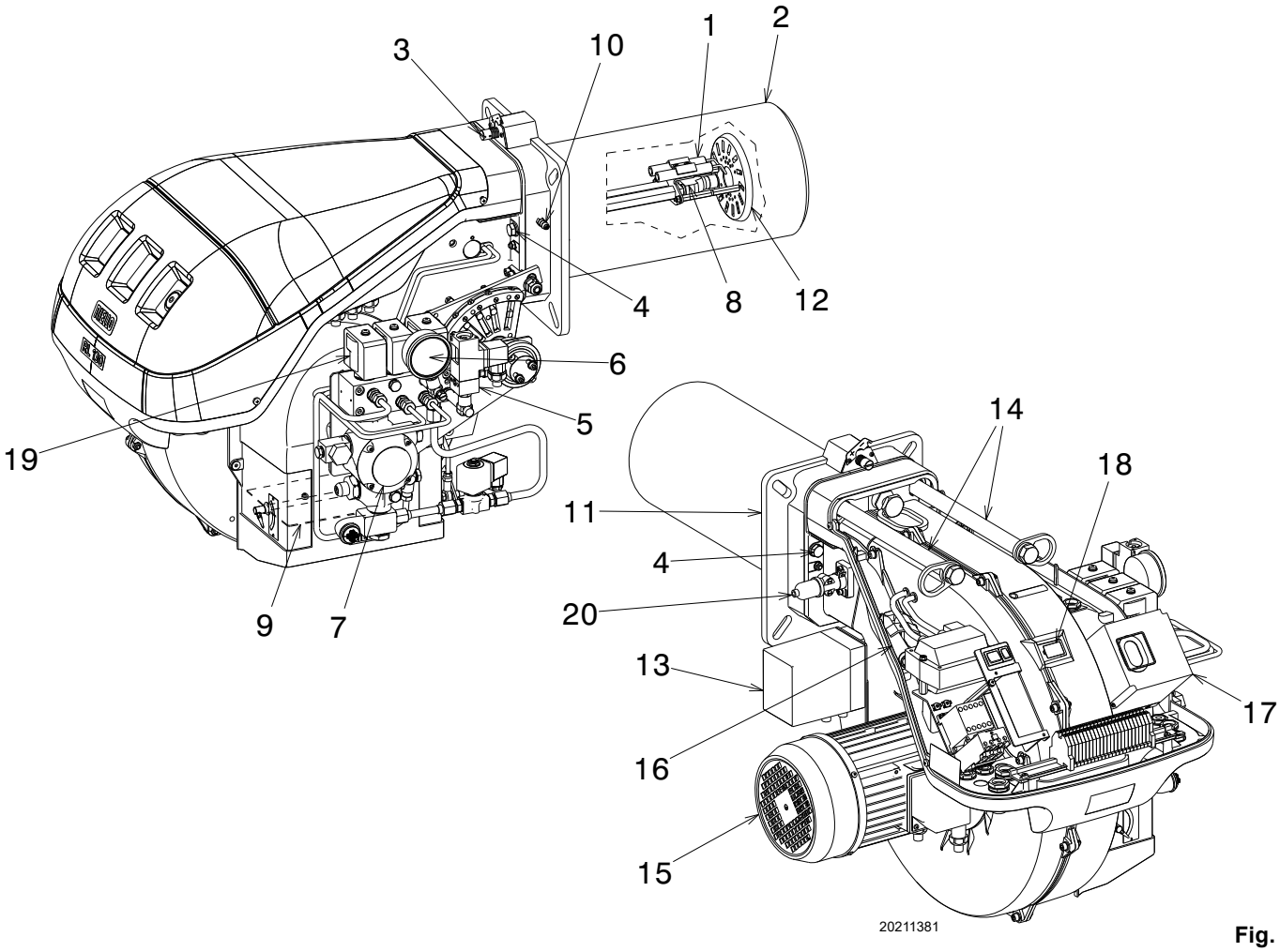


Fig. 4

1 Ignition electrodes
2 Combustion head
3 Screw for combustion head adjustment
4 Screw for fixing fan to flange
5 Oil pressure switch
6 Pressure gauge for pressure on nozzle return
7 Pump
8 Nozzle holder
9 Air gate valve
10 Fan pressure test point
11 Boiler mounting flange
12 Flame stability disk
13 Servomotor, provides adjustment of fuel delivery regulator and of air gate valve. When the burner is not operating the air gate valve is fully closed in order to reduce to a minimum heat dispersion from the boiler due to the flue draught which draws air from the fan suction inlet.
14 Slide bars for opening the burner and inspecting the combustion head
15 Electrical motor
16 Extensions for slide bars 14)
17 Control flame
18 Flame inspection window
19 Valve assembly with pressure regulator on nozzle return
20 Flame sensor

Two types of burner failure may occur:

flame control Lock-out: if the flame control 17) push-button lights up, it indicates that the burner is in lock-out.

To reset, press the push-button of the thermal relay 3)(Fig. 5 on page 11).

4.8 Electrical panel description

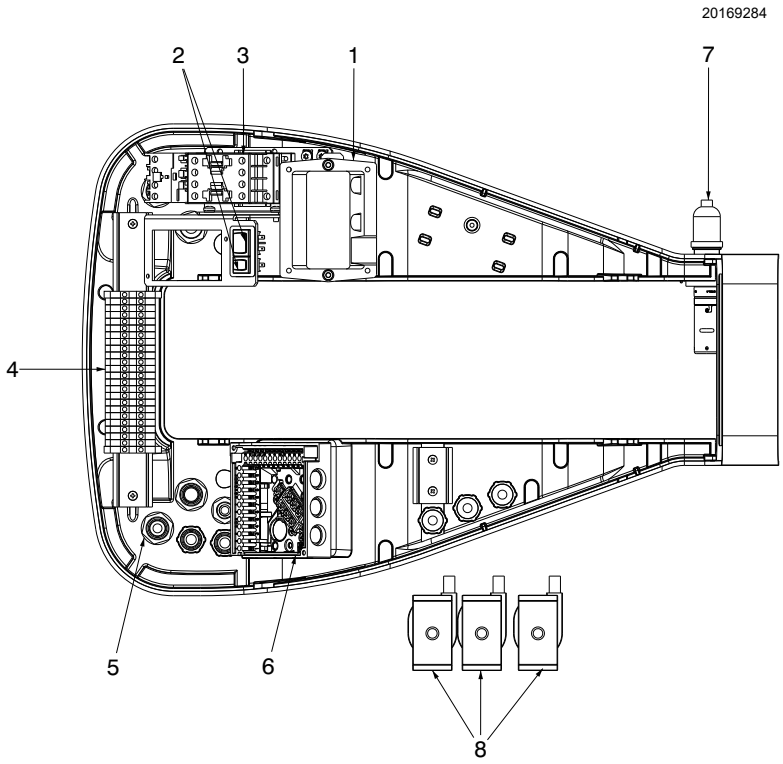


Fig. 5

1 Ignition transformer
2 A switch for:
automatic-manual-OFF operation
A button for:
increase - decrease output
3 Motor contactor and thermal relay with reset button
4 Terminal board for electrical connection
5 Cable-grommets for external connections to be carried out by the installer
6 Flame control base
7 Flame sensor
8 Coil for oil valves

4.9 Flame control (LFL.335)

Important notes

WARNING

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

The flame control LFL1... is a safety device! Avoid opening or modifying it, or forcing its operation. Riello S.p.A. cannot assume any responsibility for damage resulting from unauthorised interventions!

➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
➤ Before modifying the wiring in the LFL1... flame control connection area, fully disconnect the system from the power supply (omnipolar separation).
➤ Protection against electrocution from the flame control 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 flame control must not be operated, even if it displays no evident damage.
➤ **Do not press the reset button or the remote reset button of the flame control for more than 10 seconds because this will damage the internal relay.**

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 flame control is perfectly dry!
– Static charges must be avoided since they can damage the flame control's electronic components when touched.

Use

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

Installation notes

- Check the electrical wiring inside the boiler complies with the national and local safety regulations.
- Do not confuse the powered conductors with the neutral ones.
- Ensure that spliced wires cannot get into contact with neighbouring terminals. Use adequate ferrules.
- Arrange the H.V. ignition cables separately, as far as possible from the flame control 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.

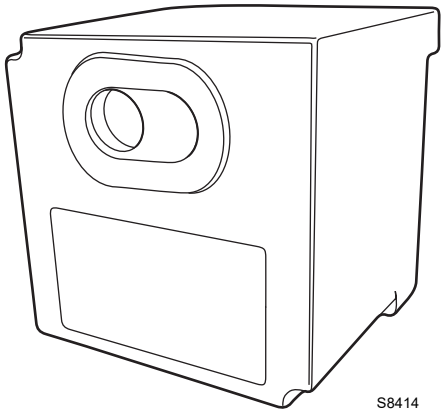


Fig. 6

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).

Technical data

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

Tab. D

4.10 Servomotor (SQN73.4B4A20)

Warnings

WARNING

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

Avoid opening, modifying or forcing the actuators.

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

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

Respect all current local legislation.

Assembly notes

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

Fig. 7

Technical data

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

Tab. E

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.

WARNING

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

DANGER

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.

WARNING

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).
When handling, keep the load at not more than 20-25cm from the ground.

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

CAUTION

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

5.3 Preliminary checks

Checking the consignment

CAUTION

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

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

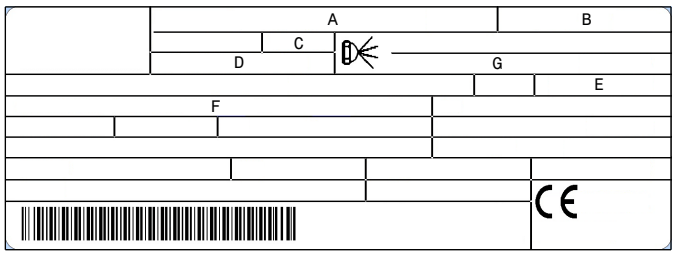


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Fig. 8

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 boiler's firing rate.
- ➤ the category of the appliance/countries of destination (**I**);
- ➤ light oil maximum viscosity (**L**).

WARNING

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

WARNING

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

DANGER

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

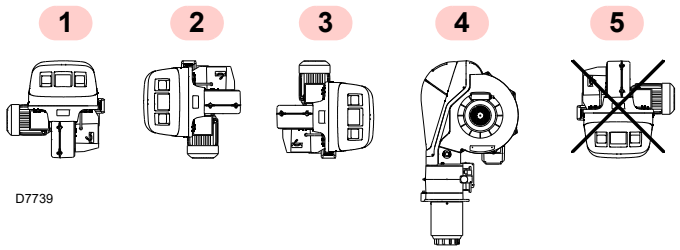


Fig. 9

5.5 Boiler plate

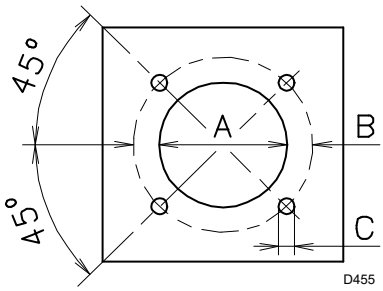


Fig. 10

Drill the combustion chamber locking plate as shown in Fig. 10. The position of the threaded holes can be marked using the thermal screen supplied with the burner.

mm	A	B	C
RL 70/M	185	275-325	M 12
RL 100/M	185	275-325	M 12
RL 130/M	195	275-325	M 12

Tab. F

5.6 Blast tube length

The length of the blast tube must be selected according to the indications provided by the manufacturer of the boiler, and in any case it must be greater than the thickness of the boiler door complete with its fettling. The range of lengths available, L (mm), is as follows:

Boccaglio 9)	RL 70/M	RL 100/M	RL 130/M
Corto	272	272	272
Lungo	385	385	385

Tab. G

For boilers with front flue passes 12) or flame inversion chambers, protective fettling in refractory material 10) must be inserted between the boiler fettling 11) and the blast tube 9).

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

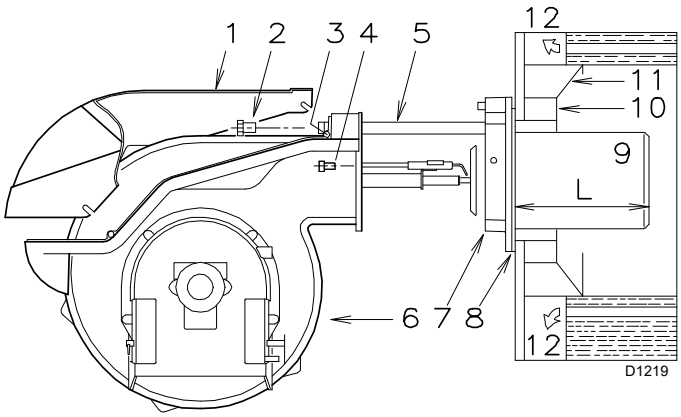


Fig. 11

5.7 Securing the burner to the boiler

Provide an adequate lifting system.

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

Disassemble the blast tube 9) from the burner 6) by proceeding as follows:
– loosen the four screws 3) and remove the cover 1);
– remove the screws 2) from the two slide bars 5);
– remove the two screws 4) fixing the burner 6) to the flange 7);
– withdraw the blast tube 9) complete with flange 7) and slide bars 5).

5.7.1 Combustion head calibration

At this point check, for model RL 130/M, whether the maximum delivery of the burner in 2nd stage operation is contained in area B or in area C of the firing rate. See page 9.

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

If, on the other hand, it is in area C:
– unscrew the screws 1)(Fig. 12) and disassemble the blast tube 5);
– unscrew the screws 3) and remove the shutter 4);
– tighten the screws 3) on the rod 2);
– now refit the blast tube 5) and the screws 1).

Once this operation has been carried out (if it was required), secure flange 7)(Fig. 11) to the boiler plate interposing the supplied gasket 8). Use the 4 screws provided after having protected the thread with antiscruffing products.

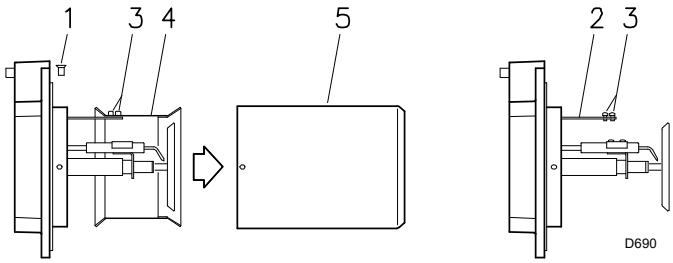


Fig. 12

WARNING

The seal between burner and boiler must be airtight.

5.8 Electrode positions

WARNING

Check that the electrodes are positioned correctly, as in Fig. 13, complying with the dimensions indicated.

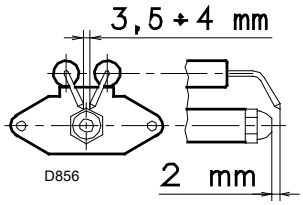


Fig. 13

5.9 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.

WARNING

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.

5.9.1 Choice of nozzle

See diagram (Fig. 28 on page 24).

In case an intermediate delivery between the two values indicated in the diagram (Fig. 28 on page 24), is required, a nozzle with higher delivery must be chosen. Delivery reduction will be obtained by means of the pressure regulator.

RECOMMENDED NOZZLES:

Type A3 or A4 Bergonzo nozzles - 45° angle

5.10 Nozzle assembly

At this stage of installation the burner is still disassembled from the blast tube; it is therefore possible to fit the nozzle with the box spanner 1)(Fig. 14), fitting the spanner through the central hole in the flame stability disk. Do not use any sealing products such as gaskets, sealing compound, or tape. Be careful to avoid damaging the nozzle sealing seat.

Finally refit the burner 3)(Fig. 16) to the slide bars 2) and slide it up to the flange 5), **keeping it slightly raised to prevent the flame stability disk from pressing against the blast tube**.

Tighten the screws 1) on the slide bars 2) and screws 4) fixing the burner to the flange.

If it proves necessary to change a nozzle with the burner already fitted to the boiler, proceed as outlined below:

– Retract the burner on its slide bars as shown in Fig. 11 on page 15.
– Remove the nuts 1)(Fig. 15) and the disk 2).
– Use spanner 3)(Fig. 15) to change the nozzles.

WARNING

➤ 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.

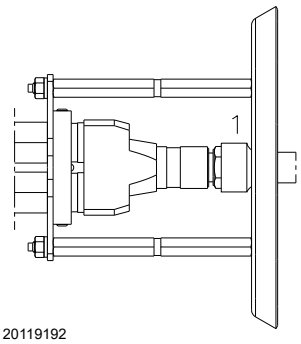


Fig. 14

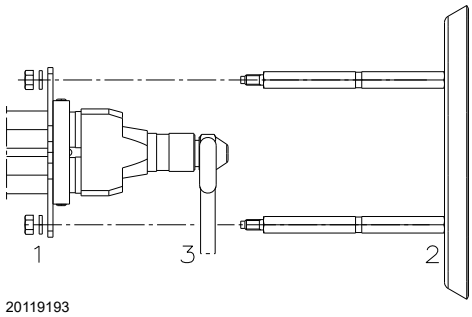


Fig. 15

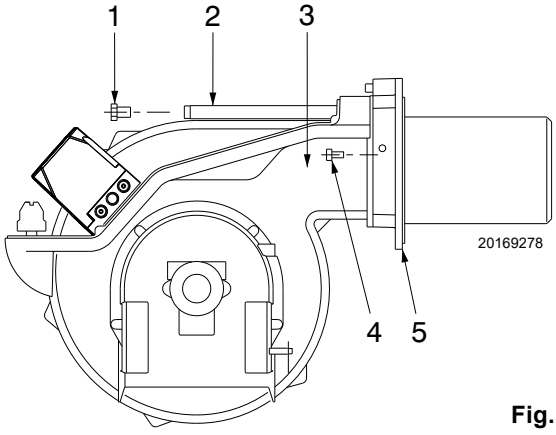


Fig. 16

5.11 Combustion head setting

The setting of the combustion head depends exclusively on the maximum burner delivery at which it will be operating.

Turn screw 4)(Fig. 17) until the notch shown in diagram (Fig. 18) is level with the front surface of flange 5)(Fig. 17).

Example:

RL 70/M, maximum light oil delivery = 50 kg/h

Diagram (Fig. 18) indicates that for a delivery of 50 kg/h the RL 70/M Model requires the combustion head to be set to approx. three notches, as shown in Fig. 17.

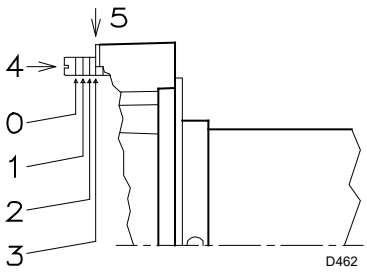


Fig. 17

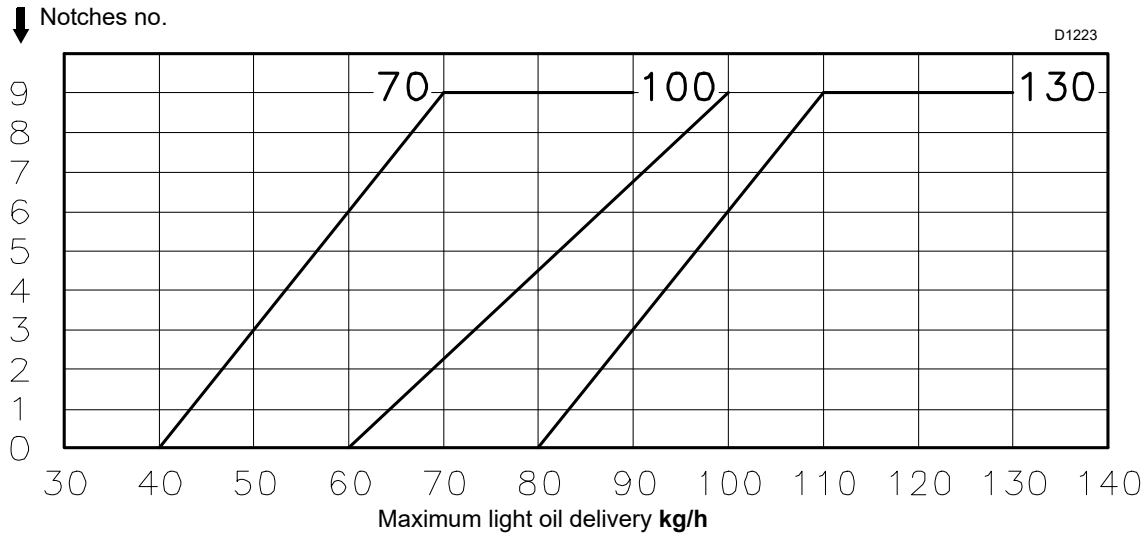


Fig. 18

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.

WARNING

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

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.

The tank higher than the burner A

The distance "P" must not exceed 10 meters in order to avoid subjecting the pump's seal to excessive strain; the distance "V" must not exceed 4 meters in order to permit pump self-priming even when the tank is almost completely empty.

The tank lower than the burner B

Pump depression values higher than 0.45 bar (35 cm Hg) must not be exceeded because at higher levels gas is released from the fuel, the pump starts making noise and its working life-span decreases.

It is good practice to ensure that the return and suction lines enter the burner from the same height; in this way it will be less probable that the suction line fails to prime or stops priming.

The loop circuit

A loop circuit consists of a loop of piping departing from and returning to the tank with an auxiliary pump that circulates the fuel under pressure. A branch connection from the loop goes to feed 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 Tab. G.

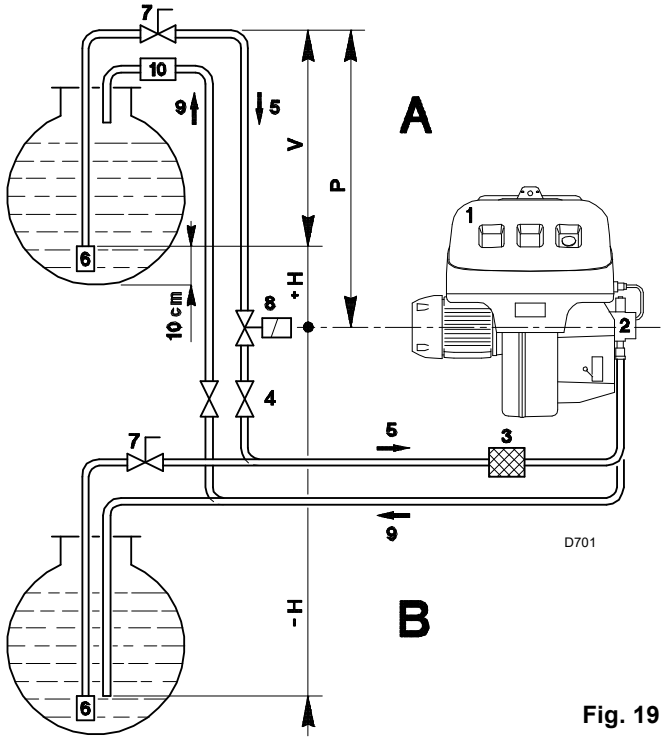


Fig. 19

+ H - H (m)	L (m)					
	RL 70/M Ø (mm)			RL 100/M - 130/M Ø (mm)		
	10	12	14	12	14	16
+ 4.0	51	112	150	71	138	150
+ 3.0	45	99	150	62	122	150
+ 2.0	39	86	150	53	106	150
+ 1.0	32	73	144	44	90	150
+ 0.5	29	66	132	40	82	150
0	26	60	120	36	74	137
- 0.5	23	54	108	32	66	123
- 1.0	20	47	96	28	58	109
- 2.0	13	34	71	19	42	81
- 3.0	7	21	46	10	26	53
- 4.0	-	8	21	-	10	25

Tab. H

Key

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 = Rapid closing manual valve remote controlled (only Italy)
8 = On/off solenoid valve (only Italy)
9 = Return line
10 = Check valve (only Italy)

5.12.1 Hydraulic connections

CAUTION

➤ Make sure that the hoses to the pump supply and return line are installed correctly.

The pumps are equipped with a by-pass that connects return line with suction line. The pumps 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 the plugs from the suction and return connections of the pump.

Insert the hose connections with the supplied seals into the connections and screw them down.

Take care that the hoses are not stretched or twisted during installation.

Install the hoses where they cannot be stepped on or come into contact with hot surfaces of the boiler.

Now connect the other end of the hoses to the suction and return lines by using the supplied nipples.

WARNING

During the installation, hoses must not be stressed with twisting.

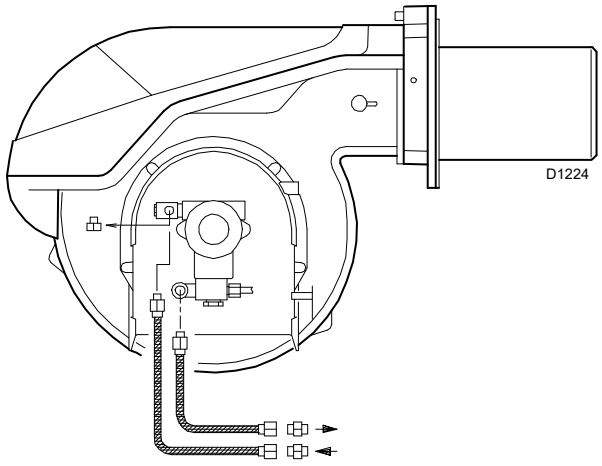


Fig. 20

5.12.2 Scheme of hydraulic circuit

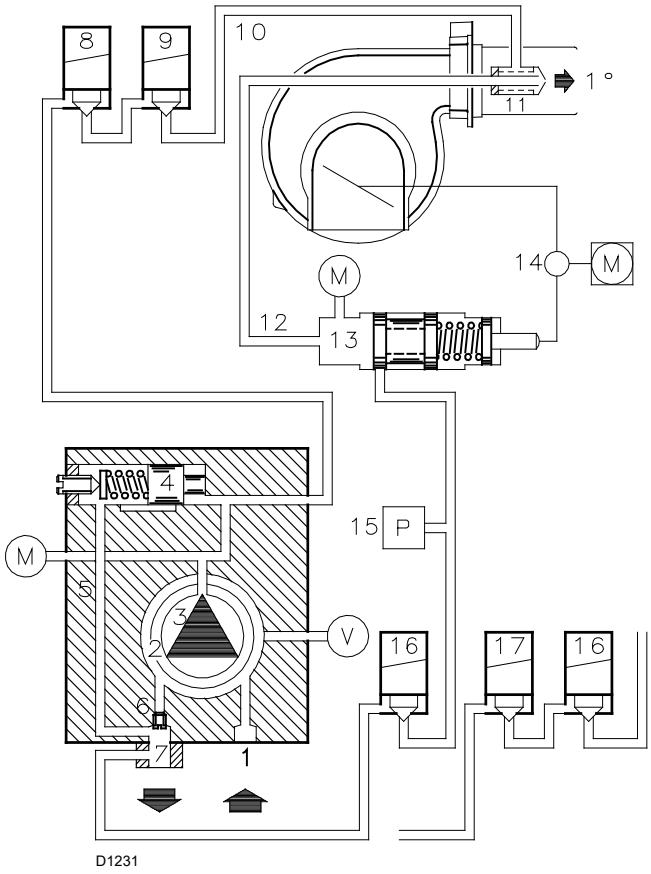


Fig. 21

1 Pump suction line
2 Filter
3 Pump
4 Pressure adjuster
5 Pressure test point
6 Bypass screw
7 Pump return line
8 Safety valve
9 Operation valve
10 Delivery pipeline
11 Nozzle
12 Return pipeline
13 Pressure adjuster
14 Eccentric for pressure adjuster
15 Maximum oil pressure switch
16 Return valve
17 Return valve
M Pressure gauge
V Vacuometer

5.13 Pump

5.13.1 Technical data

Pump		J7 C
Min. delivery rate at 20 bar pressure	kg/h	190
Delivery pressure range	bar	10 - 21
Max. suction depression	bar	0,45
Viscosity range	cSt	2,8 - 200
Light oil max. temperature	°C	90
Max. suction and return pressure	bar	1,5
Pressure calibration in the factory	bar	20
Filter mesh width	mm	0,170

Tab. I

5.13.2 Pump priming

- **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 self-priming to take place, one of the screw 3)(Fig. 22) of the pump must be loosened in order to bleed off the air contained in the suction line.
- Start the burner by closing the control devices with switch 1)(Fig. 27) in the "MAN" position. As soon as the burner starts, check the direction of rotation of the fan blade, by looking through the flame inspection window 18)(Fig. 4 on page 10).
- The pump can be considered primed when the light oil starts coming out of the screw 3). Stop the burner: switch 1)(Fig. 27 on page 24) set to "OFF" and tighten the screw 3).

The time required for this operation depends upon the diameter and length of the suction tubing. If the pump fails to prime at the first starting of the burner and the burner locks out, wait approx. 15 seconds, reset the burner, as often as required. After 5 or 6 starting operations allow 2 or 3 minutes for the transformer to cool.

WARNING

The a.m. 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 vacuum meter 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.

PUMP
SUNTEC J7 C

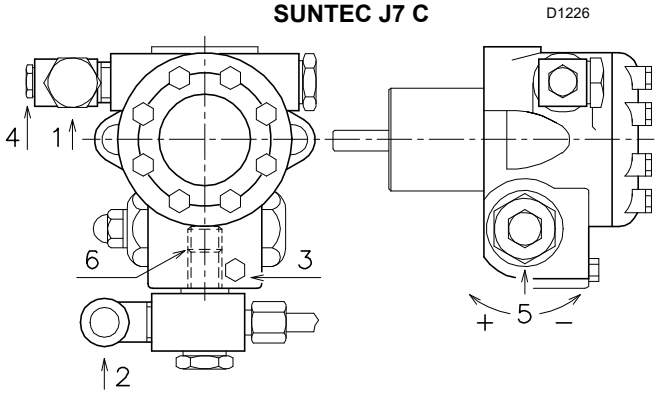


Fig. 22

1	Suction	G 1/2"
2	Return	G 1/2"
3	Pressure gauge connection	G 1/8"
4	Vacuum meter connection	G 1/8"
5	Pressure adjustment screw	
6	Screw for by-pass	

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 use.
  This means they should compulsorily be stopped at least once every 24 hours to enable the flame control to perform checks of its own start-up efficiency. Normally, burner stopping is guaranteed by the boiler's thermostat/pressure switch.
- If this is not the case, a time switch should be fitted in series to TL to stop the burner at least once every 24 hours. Refer to the wiring diagrams.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel. Do not use the gas tubes as an earthing system for electrical devices.
- The electrical system must be suitable for the maximum power absorption of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for that level of power absorption.
- For the main power supply of the device from the electricity mains:
  - do not use adapters, multiple sockets or extensions;
  - make provisions for an omnipolar switch with a gap between the contacts of at least 3 mm (over-voltage category III), as required by current safety regulations.
- Do not touch the device with wet or damp body parts and/or in bare feet.
- Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:


DANGER

Disconnect the electrical supply from the burner by means of the main system 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 standard EN 60 335-1.

5.14.1 Supply cables and external connections passage

All the cables to be connected to the burner terminal board 8)(Fig. 23 and Fig. 24) must be threaded through cable grommets.

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

Key (Fig. 23 and Fig. 24)

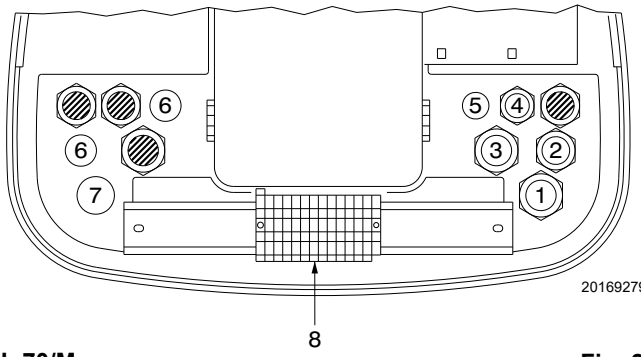
RL 70/M (Fig. 23)

1	Pg 13,5	Three-phase power supply
2	Pg 11	Single-phase power supply
3	Pg 13.5	Control device TL
4	Pg 9	Control device TR or probe (RWF)
5	Pg 9	Set up for faird lead
6	Pg 11	Set up for faird lead
7	Pg 13,5	Set up for faird lead

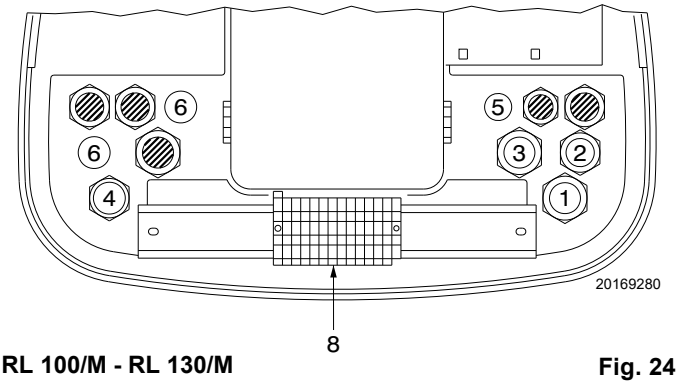
RL 100/M - RL 130/M (Fig. 24)

1	Pg 13,5	Three-phase power supply
2	Pg 11	Single-phase power supply
3	Pg 13.5	Control device TL
4	Pg 13,5	Control device TR or probe (RWF)
5	Pg 9	Set up for faird lead
6	Pg 11	Set up for faird lead

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



RL 70/M **Fig. 23**



RL 100/M - RL 130/M **Fig. 24**

5.15 Calibration of the thermal relay

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

For calibration 2), refer to the table indicated in the electrical lay-out (electrical wiring in charge of the installer).

To reset, in case of an intervention of the thermal relay, press button “RESET” 1).

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

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

WARNING

The automatic reset can be dangerous.

This operation is not foreseen in the burner operation.

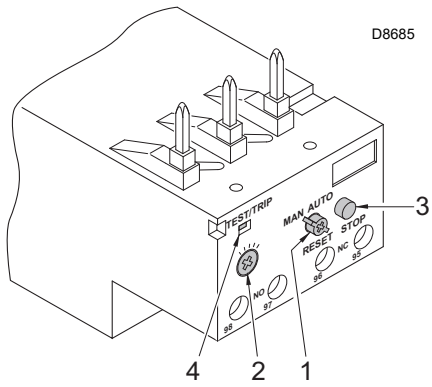


Fig. 25

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. 26).

If this is not the case:

➤ put the switch of the burner to “0” (off) and wait until the flame control 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.

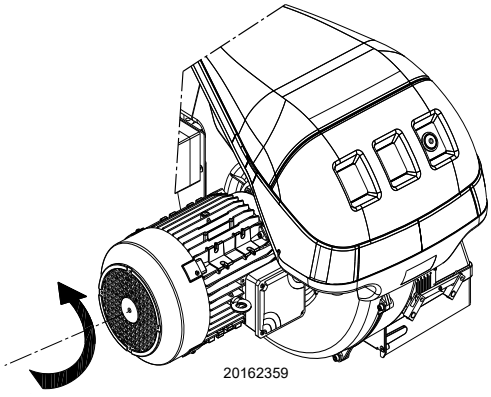


Fig. 26

6 Start-up, calibration and operation of the burner

6.1 Notes on safety for the first start-up

WARNING

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

WARNING

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

6.2 Burner firing

Turn off the remote controls and set the switch 1)(Fig. 27) to **"MAN"**.

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

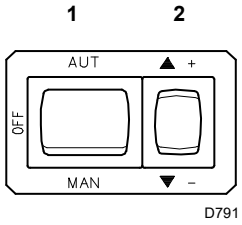


Fig. 27

6.3 Operation

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

The following settings that have already been made do not require modification under normal circumstances:

➤ Combustion head

➤ Servomotor, cams I - II - IV - V

Contrarily, the settings listed below must be adjusted in sequence:

1 MAX burner output;
2 MIN burner output;
3 Intermediate outputs between MAX and MIN output.

1 - MAX output

Max output of the burner must be set within the firing rate range shown on page 9.

In the above instructions we left the burner running in MIN output operation. Now press button 2)(Fig. 27) "+" until servomotor arrives at 130°.

Adjusting the nozzle flow rate

The nozzle flow rate varies according to the fuel pressure on the nozzle return.

Diagram (Fig. 28) indicates this relationship for type A3 and A4 Bergonzo nozzles with pump delivery pressure of 20 bars.

Diagram:

Horizontal axis : bar, nozzle return pressure

Vertical axis : kg/h, nozzle flow rate

NOTE:
with a pump delivery pressure of 20 bar, the pressure on the nozzle return must not exceed 17 bars.
The pressure difference between pump delivery and nozzle return must be at least 3 bars. With smaller pressure differences, the pressure on the nozzle return can be unstable.

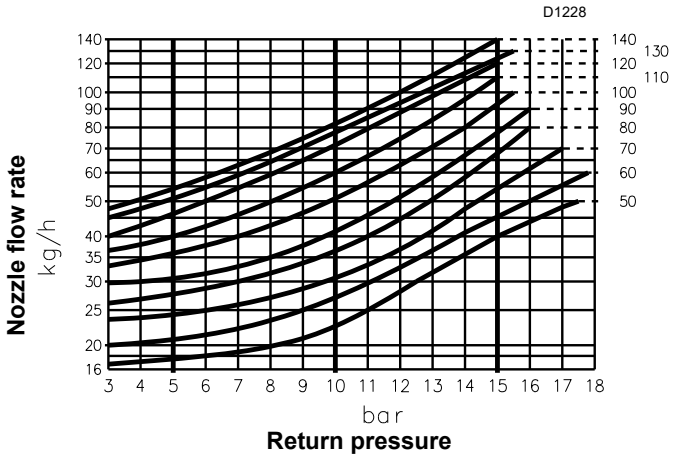


Fig. 28

6.3.1 Pressure regulator

The nozzle return pressure value is indicated by the pressure gauge 1)(Fig. 29).

The output and the pressure of the nozzle are at maximum when the servomotor is positioned on 130°.

The fine adjustment of the pressure in the return line may be carried out by changing the setting of the eccentric 6)(Fig. 29), of the nut and lock-nut 4)(Fig. 29).

The eccentric setting should be carried out by loosening screws 7), and turning the screw 5) to obtain the desired eccentricity. Turn clockwise the screw 5) to increase the eccentricity, increasing the difference between the min. and max. capacity of the nozzle; turn counter-clockwise the screw 5) to decrease the eccentricity and, consequently the difference between the min. and max. capacity of the nozzle.

NOTE:

- **The proper setting of the eccentric 6) is possible when its operation field follows the servomotor operation field (20° ÷ 130°): so, that every variation of the servomotor position corresponds to a pressure variation.**
- **Do not let the piston beat repeatedly: the stop ring 3)(Fig. 29) determines the maximum stroke.**
- **When the setting is carried out, verify manually that no slow-down occurs between (page 26) 0° and 130° and that the maximum and minimum pressures correspond to those chosen as per diagram (Fig. 28 on page 24).**
- **If you wish to check the delivery capacity of the nozzle, open the burner, attach the nozzle, simulate the start-up and then proceed with weighing of the maximum and minimum pressures of the fuel.**
- **If at the maximum capacity of the nozzle (maximum pressure in the return line) pressure fluctuations are detected on the manometer 1), slightly decrease the pressure in the return line until they are completely eliminated.**

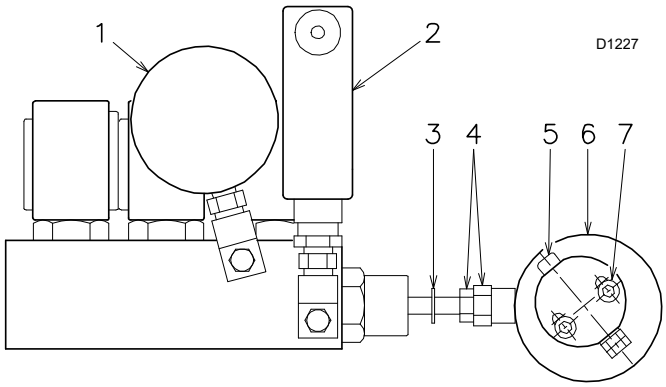


Fig. 29

1 Pressure gauge for pressure on nozzle return
2 Oil pressure switch
3 Ring for piston stop
4 Nut and lock-nut for piston setting
5 Eccentric adjusting screw
6 Variable eccentric
7 Eccentric locking screws

6.3.2 Adjusting air deliver

Progressively adjust the end profile of cam 2)(Fig. 30) using adjustment screws 5).

– Turn the screws clockwise to increase air delivery.
– Turn the screws counter-clockwise to reduce air delivery.

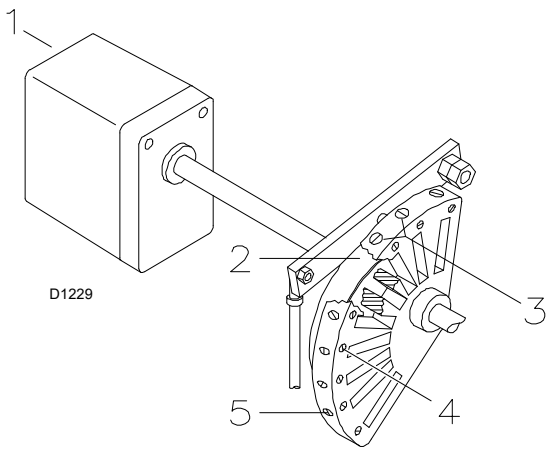


Fig. 30

1 Servomotor
2 Adjustable profile cam
3 Adjustment screws for cam profile
4 Adjustment fixing screws
5 Adjustment screws for cam profile

2 - Min output

Max output of the burner must be set within the firing rate range shown on page 9.

Press button 2)(Fig. 27 on page 24) “output reduction“ and keep it pressed until the servomotor has reached 20° (factory setting).

Adjusting the nozzle flow rate

The nozzle flow rate is given in diagram (Fig. 28 on page 24) corresponding to the pressure on the nozzle return read on the pressure gauge 1)(Fig. 29 on page 25).

The output and the pressure of the nozzle are at minimum when the servomotor is positioned on 20°.

To set return pressure, see page 9.

Adjusting air delivery

Progressively adjust the starting profile of cam 2)(Fig. 30) by turning the screws 3).

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

3 - Intermediate output air/oil flow rate adjustment

Press the switch 2)(Fig. 27 on page 24) “output increase” a little so that the servomotor turns by about 15°. Adjust the screws until optimal combustion is obtained. Proceed in the same way with the other screws.

Take care that the cam profile variation is progressive.

Switch the burner off with switch 1)(Fig. 27 on page 24), at the OFF position, disengage the cam 2)(Fig. 30) from the servomotor, by pressing the button 3)(Fig. 31) and moving it to the right, and check more than once that the movement is soft and smooth, and does not grip, by rotating the cam 2) forward and backward by hand.

Engage cam 2) to the servomotor again by moving button 2)(Fig. 31) to the left.

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

Once you have finished adjusting outputs MAX - MIN - INTERMEDIATE, check ignition once again: noise emission at this stage must be identical to the following stage of operation. If you notice any sign of pulsations, reduce the ignition stage delivery.

Finally fix the adjustment by turning screws 4)(Fig. 30).

NOTE:
The servomotor follows the adjustment of cam III only when the cam angle is reduced. If it is necessary to increase the cam angle, first increase the servomotor angle with the key “output increase”, then increase the III cam angle, and finally bring the servomotor back to the MIN output position with the key “output decrease”.

In order to adjust cam III, especially for fine movements, key 10)(Fig. 31), held by a magnet under the servomotor, can be used.

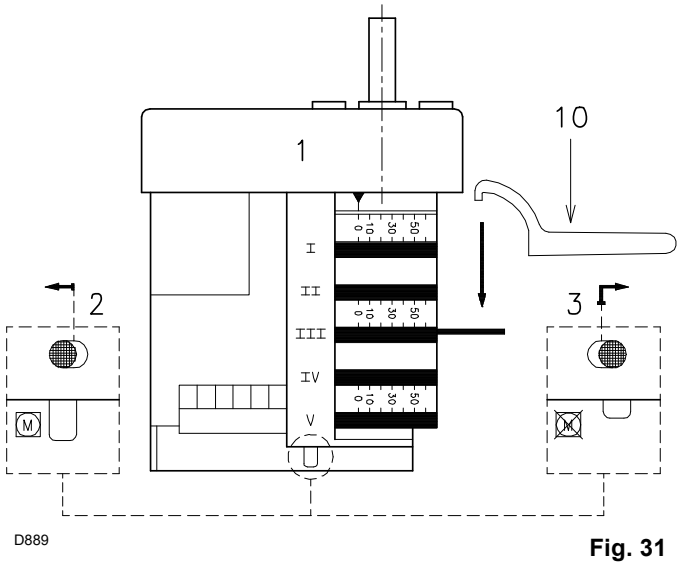


Fig. 31

6.3.3 Servomotor

The servomotor provides simultaneous adjustment of the air gate valve, by means of the variable profile cam and the pressure regulator. The servomotor rotates through 130° in 42 seconds.

Do not alter the factory setting for the 5 cams; simply check that they are set as indicated below:

Cam I:	**130°**	Limits rotation toward maximum position.
Cam II:	**0°**	Limits rotation toward the minimum position. When the burner is shut down the air gate valve must be closed: 0°.
Cam III:	**20°**	Adjusts the ignition position and the MIN output.
Cams IV - V:		**not utilized.**

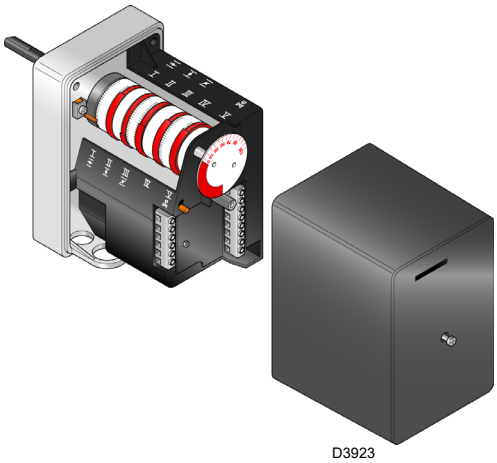


Fig. 32

6.4 Pressure switch adjustment

6.4.1 Oil pressure switch

The oil pressure switch 5)(Fig. 4 on page 10) is factory set to 3 bar. If the gas oil pressure reaches this value in the return piping, the pressure switch stops the burner.

Burner starts again automatically if the pressure goes down under 3 bar after burner shut down.

If a loop circuit with Px pressure feeds the burner, the pressure switch should be adjusted to Px + 3 bar.

To adjust the pressure switches, set the adjustment screw with a tool, see Fig. 33.

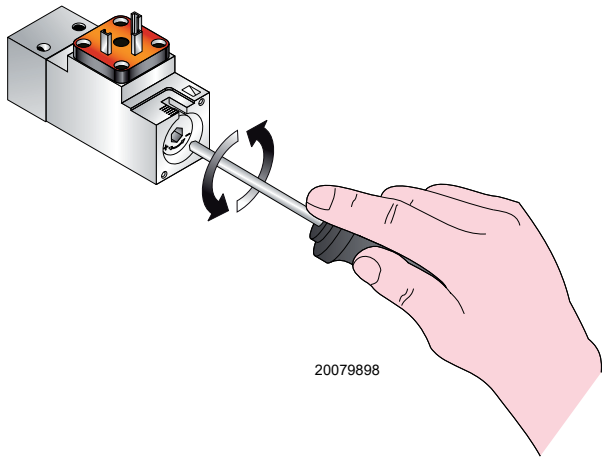


Fig. 33

6.5 Operation sequence of the burner

6.5.1 Burner starting

0 s : Control device TL closes, the motor starts.
The pump 3) sucks the fuel from the tank through the piping 1) and the filter 2) and pumps it under pressure to delivery. The piston 4) rises and the fuel returns to the tank through the piping 5) - 7). The screw 6) closes the by-pass heading towards suction and the de-energized solenoid valves 8) - 9) - 16) - 17) close the passage to the nozzle.

6 s : Servomotor starts: 130° rotation to right, until contact is made on cam I)(Fig. 31 on page 26).The air gate valve is positioned on MAX. output.

48 s : Pre-purge stage with air delivery at MAX. output.

85 s : Servomotor rotates to left until contact is made on cam III) (Fig. 31 on page 26).

121 s : Air gate valve and pressure regulator are positioned on MIN output.

123 s : Ignition electrode strikes a spark.

128 s : Solenoid valves 8) - 9) - 16) open; the fuel passes through the piping 10) and filter 11), and enters the nozzle.
A part of the fuel is then sprayed out through the nozzle, igniting when it comes into contact with the spark: flame at a low output level, point A; the rest of the fuel passes through piping 12 at the pressure adjusted by the regulator 13, then, through piping 7), it goes back into the tank.

131 s : The spark goes out.

153 s : The starting cycle ends.

6.5.2 Steady state operation (Fig. 34)

Burner without output regulator RWF

At the end of the starting cycle, the servo-motor control then passes to load control TR for boiler pressure or temperature, point B.

➤ If the temperature or pressure is low (and the TR load control is consequently closed), the burner progressively increases output up to MAX (section B-C).

➤ If subsequently the temperature or pressure increases until TR opens, the burner progressively decreases output down to MIN (section D-E). And so on.

➤ The burner locks out when demand for heat is less than the heat supplied by the burner in the MIN output (section F-G). Load control TL opens. The servomotor returns to the 0° angle limited by contact with cam II)(Fig. 31 on page 26). The gate valve closes completely to reduce thermal dispersion to a minimum.

Every time output is changed, the servomotor automatically modifies gas oil delivery (pressure regulator) and air delivery (fan gate valve).

Burner with output regulator RWF

See the handbook enclosed with the regulator.

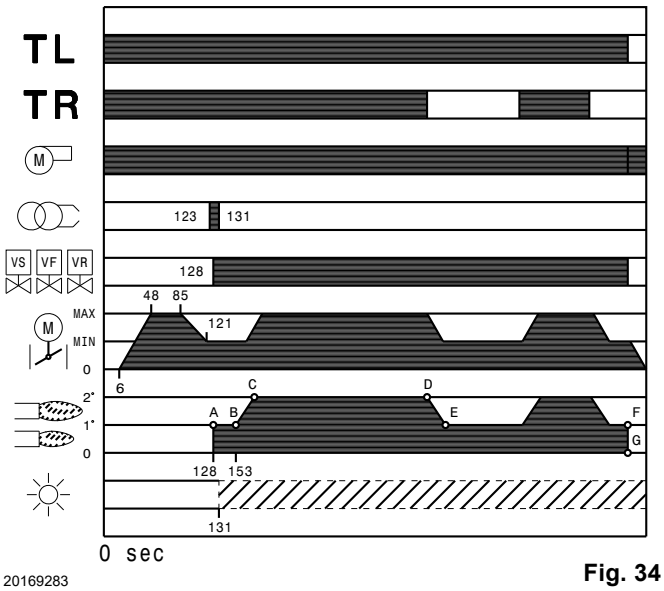


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Fig. 34

6.5.3 Firing failure

If the burner does not fire, it goes into lock-out within 2.5 s of the opening of the light oil valve and the pre-purging phase starts and lasts 15 seconds.

6.5.4 Undesired shut-down during operation

If the flame should go out for accidental reasons during operation, the burner will lock out in 1 s.

6.6 Final checks

➤ **Obscure the flame sensor and switch off the control devices:** the burner should start and then lock-out about 5 s after starting.

➤ **Illuminate the flame sensor and switch off the control devices:** burner should go into lock-out.

➤ **Obscure the flame sensor while the burner is operating:** flame should go out and burner lock out within 1 s.

➤ **Switch off control device TL followed by control device TS while the burner is operating:** the burner should stop.

WARNING

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

7 Maintenance

7.1 Notes on safety for the maintenance

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

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

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

Before carrying out any maintenance, cleaning or checking operations:

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

Close the fuel 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 Checking and cleaning

The operator must use the required equipment during maintenance.

Combustion

It is required an analysis of the flue gases at the boiler outlet. Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.
If the combustion values measured before starting maintenance do not comply with applicable Standards or do not indicate efficient combustion, consult the table below or contact our Technical Support Service to implement the necessary adjustments.

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

Tab. J

Pump

The pump delivery pressure must be stable at 20 bar.

The depression must be less than 0.45 bar.

Unusual noise must not be evident during pump operation.

If the pressure is found to be unstable or if 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 line or the pump.

If the pump is found to be responsible, check to make sure that the filter is not dirty. The vacuum meter is installed up-line from the filter and consequently will not indicate whether the filter is clogged or not.

Contrarily, if the problem lies in the suction line, check to make sure that the filter is clean and that air is not entering the piping.

Servomotor

Disengage the cam 2)(Fig. 31 on page 26) from the servomotor, by pressing and moving button 3)(Fig. 31 on page 26) towards the right, and turn it backwards and forwards by hand to make sure it moves freely. Now engage the cam again by moving the button 2)(Fig. 31 on page 26) to the left.

Filters (Fig. 35)

Check the following filter boxes:

• on line 1) • in pump 2) • at nozzle 3), and clean or replace as required.

If rust or other impurities are observed inside the pump, use a separate pump to suck out any water and other impurities that may have deposited on the bottom of the tank.

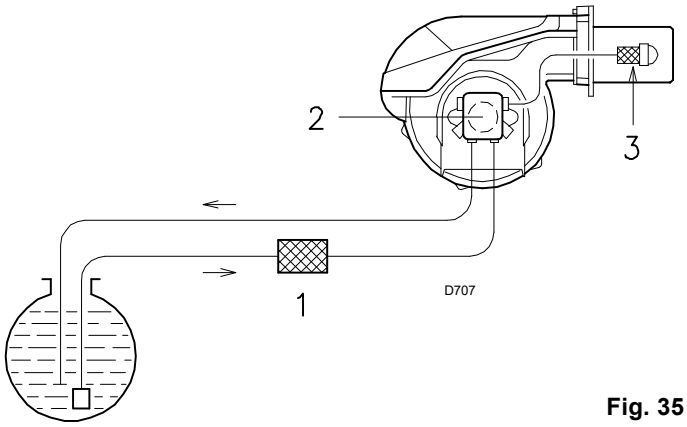


Fig. 35

Combustion head

Check to make sure that all the parts of the combustion head are in good condition, positioned correctly, free of all impurities, and that no deformation has been caused by operation at high temperatures.

Nozzle

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

Do not clean the nozzle openings.

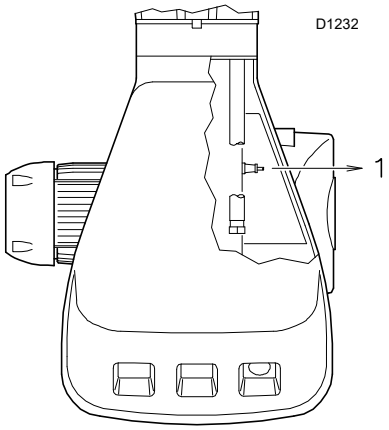


Fig. 36

Flame sensor

Clean the glass cover from any dust that may have accumulated. The sensor 1) can be removed by pulling it outward forcefully.

Flame inspection window

Clean the glass.

Flexible hoses

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

Fuel tank

Every 5 years, or whenever necessary, suck out any water or other impurities present on the bottom of the tank using a separate pump.

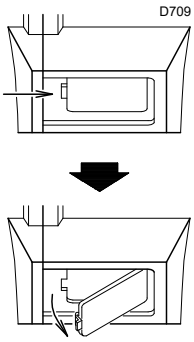


Fig. 37

Burner

Make sure that the screws are fully tightened.

Electrical current to flame sensor (Fig. 38)

Clean the glass cover from any dust that may have accumulated. To remove the sensor pull it outwards with force; it is inserted only by pressure.
Min. value for a good work: 70 µA.
If the value is lower, it could be due to:

– exhausted sensor;
– low voltage (lower than 187 V);
– bad regulation of the burner;

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

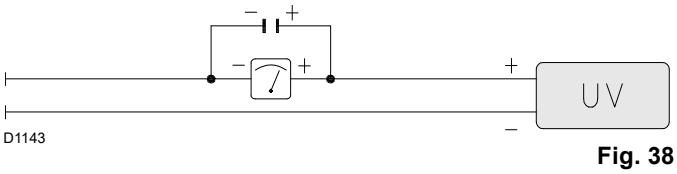


Fig. 38

Fuel pump and/or couplings replacement

Carry out in conformity with (Fig. 39).

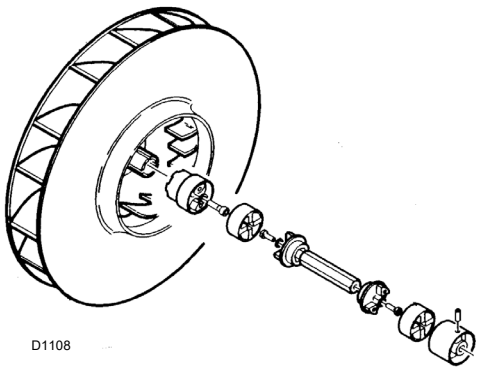


Fig. 39

7.2.3 Safety components

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

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)	10 years or 250.000 operation cycles
Oil valve (solenoid)	10 years or 250.000 operation cycles
Oil regulator	10 years or 250.000 operation cycles
Pipes/ oil fittings (metallic)	10 years
Fan impeller	10 years or 500.000 start-ups

Tab. K

7.3 Opening the burner

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

Close the fuel shut-off valve.

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

To open the burner, proceed as follows:
- Switch off the electrical power;
- loosen screws 1) and withdraw the cover 2);
- unscrew screws 3);
- fit the two extensions 4) supplied with the burner onto the slide bars 5) (models with 385 mm blast tube);
- pull part A backward keeping it slightly raised to avoid damaging the disk 6) on blast tube 7).

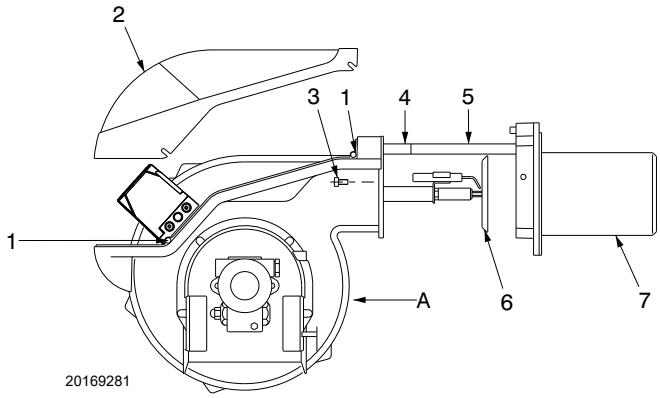


Fig. 40

7.4 Closing the burner

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

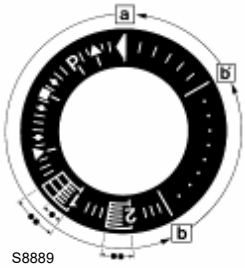
After carrying out maintenance, cleaning or checking operations, reassemble the cover and all the safety and protection devices of the burner.

8 Faults - Possible causes - Solutions

The LFL1... flame control is equipped with a lockout indicator (Fig. 41) that turns during the start-up programme, and is visible from the small lockout window.

When the burner does not start or stops, due to a failure, the symbol that appears on the indicator indicates the type of interruption.

The positions of the lockout indicator are shown in Fig. 42.



Lockout indicator

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

Fig. 41

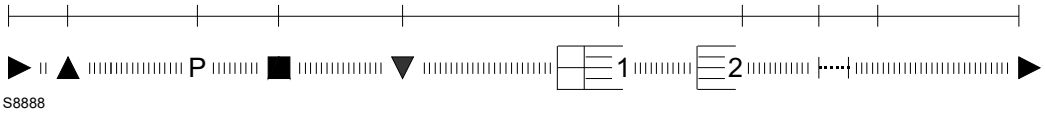


Fig. 42

Fuse replacement

The fuse 2)(Fig. 43) is in the rear part of the flame control. A spare fuse 1) is also available: it can be extracted after breaking the panel tab A) that houses it. In the event that fuse 2) has been tripped, replace it as shown in Fig. 43.

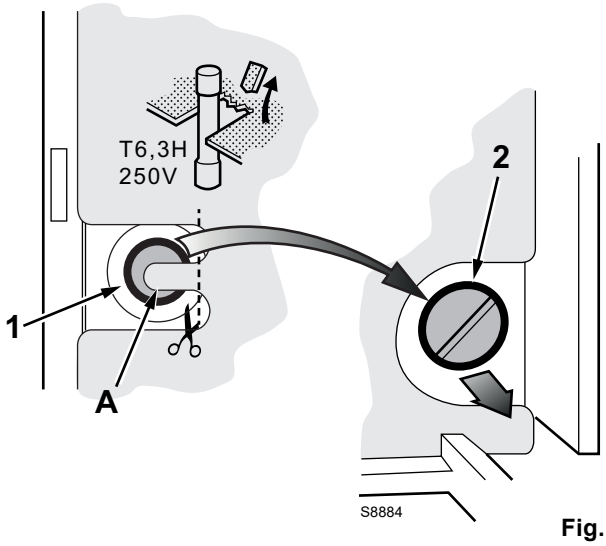


Fig. 43

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

If a burner malfunction is detected, first of all:
- check that the electrical wiring is adequately connected;
- check whether fuel is delivered;
- check that every adjustment parameter is adequately set.

WARNING

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

DANGER

In the event there are further lockouts or faults with the burner, the maintenance interventions must only be carried out by qualified, authorised personnel, in accordance with the contents of this manual and in compliance with the standards and regulations of current laws.

8.1 Light oil operation

Symbol	Problem	Probable cause	Suggested remedy
◀	The burner does not start	Limiter or safety control device open	Adjust or replace
		Flame control lockout	Release
		Fan motor lockout	Release the thermal relay
		No electrical power supply	Close all switches - check connections
		No light oil	Check the light oil supply circuit
		Flame control fuse interrupted	Replace
		Pump is jammed	Replace
		Faulty motor remote control switch	Replace
		Defective flame control	Replace
		Faulty electrical motor	Replace
		Defective safety solenoid valve	Replace
	The burner does not come on and the lockout appears	Flame simulation	Replace the flame control
		Flame sensor short circuit	Replace flame sensor
		Two-phase electrical supply, thermal relay steps in	Reset the thermal relay at return of the three phases
▲	The burner starts but stops at maximum air damper setting	The servomotor contact does not intervene	Adjust cam or replace servomotor
P	The burner starts and then goes into lockout	Air pressure switch poorly adjusted	Adjust it
		Pressure switch pressure point pipe blocked	Clean
■	The burner starts and then goes into lockout	Failure to the flame detection circuit	Replace flame control
▼	The burner remains in pre-purging phase	The servomotor contact III does not intervene	Adjust cam or replace servomotor
1	Once the pre-purging and the safety time has elapsed the burner goes into lockout without the flame appearing	No fuel in the tank, or water on the bottom	Refill with fuel, or remove the water
		Bad head and damper adjustments	Adjust
		High voltage cable defective or grounded	Replace
		High voltage cable deformed by high temperature	Replace and protect
		Bad electrical wiring on valves or transformer	Check
		Pump unprimed	Prime it
		Pump suction line connected to return line	Correct connection
		Soiled filters (nozzle line)	Clean
		Valves up-line from pump closed	Open them
		Opposite motor rotation	Change electrical wiring to the motor
		Light oil solenoid valves do not open	Check connections and solenoids
		Pilot burner does not work	Check
		Defective flame control	Replace
		Ignition electrode incorrectly adjusted	Adjust it
		Electrode grounded due to broken insulation	Replace
		Motor/pump coupling broken	Replace
		Faulty ignition transformer	Replace
	The flame ignites regularly but the burner goes into lock out at the end of the safety time	Faulty flame sensor or defective flame control	Replace flame sensor or flame control
		Dirty flame sensor	Clean
	Smoke in flame (dark Bacharach)	Little air	Adjust the fan head and damper
		Incorrect pump pressure	Adjust
		Nozzle filter clogged	Clean or replace
		Boiler room air vents insufficient	Increase
		Dirty or worn nozzle	Replace
		Flame disk soiled, loose or deformed	Clean it, tighten it or replace it
	Smoke in flame (yellow Bacharach)	Too much air	Adjust head and air dampers

Symbol	Problem	Probable cause	Suggested remedy
	Ignition with pulses or flame failure, delayed ignition	Poorly adjusted head	Adjust
		Incorrectly adjusted fan air damper: too much air	Adjust
		Nozzle not fit for burner or boiler	See nozzle table
		Defective nozzle	Replace
		Unsuitable pump pressure	Adjust
		Ignition electrode not adjusted correctly or soiled	Adjust it
		Output during ignition phase is too high	Reduce
	The burner does not pass to the 2nd stage	Remote control device TR fails to close	Adjust or replace
		Defective flame control	Replace
	Uneven fuel supply	Understand whether the cause lies in the pump or the fuel supply system	Supply fuel to the burner from a tank positioned near the burner itself
	Pump rusty on the inside	Water in the tank	Remove the water with a pump
	Noisy pump, unstable pressure	Air has entered the suction line	Block the couplings
		Depression value too high (higher than 35 cm Hg):	
		Excessive difference of level between burner and tank	Power the burner from a loop circuit
		Piping diameter too small	Increase
		Dirty suction line filters	Clean
		Suction line valves closed	Open them
		The paraffin solidifies due to the low temperature	Put additive in the light oil
	Pump unprimes after prolonged pause	Return pipe not immersed in fuel	Bring it to the same height as the suction line
		Air in the suction line	Block the couplings
	Pump leaks light oil	Loss of sealing organ	Replace the pump
	Dirty combustion head	Dirty nozzle or nozzle filter	Replace
		Unsuitable nozzle delivery or angle	See recommended nozzles
		Loose nozzle	Block it
		Environmental impurities on flame stability disc	Clean
		Incorrect head adjustment, or little air	Adjust it, opening the damper
		Blast tube length not suitable for the boiler	Contact the boiler manufacturer
	Burner goes into lockout during operation	Flame sensor faulty or dirty	Replace it or clean it
		Air pressure switch faulty	Replace

Tab. L

A Appendix - Accessories

Extended head Kit (for short head versions only)

Burner	L (mm) Standard head	L (mm) Head obtainable with the kit	Code
RL 70/M	272	385	3010159
RL 100/M	272	385	3010160
RL 130/M	370	526	3010161

Soundproofing box kit

Burner	Type	dB(A)	Code
All models	C4/5	10	3010404

Degasser kit

Burner	Filter	Code
All models	with filter	3010055

Kit for modulation operation

Two components should be ordered:
- ➤ the output regulator to install on the burner;
- ➤ the probe to install on the heat generator.

PARAMETER TO BE CHECKED		PROBE		POWER REGULATOR	
	Range	Type	Code	Type	Code
Temperature	- 100...+ 500 °C	PT 100	3010110	RWF50 RWF55	20082208 20099657
Pressure	0...2,5 bar 0...16 bar 0...25 bar	Probe with output 4...20 mA	3010213 3010214 3090873		

Spacer kit

Burner	Code
All models	3010129

Potentiometer kit

Burner	Code
All models	3010416

Head kit for “reverse flame chamber”

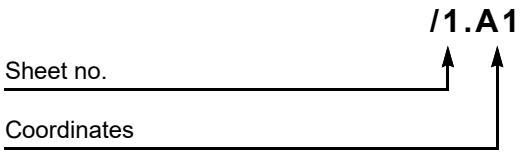
Burner	Code
RL 70-100/M	3010180
RL 130/M	3010183

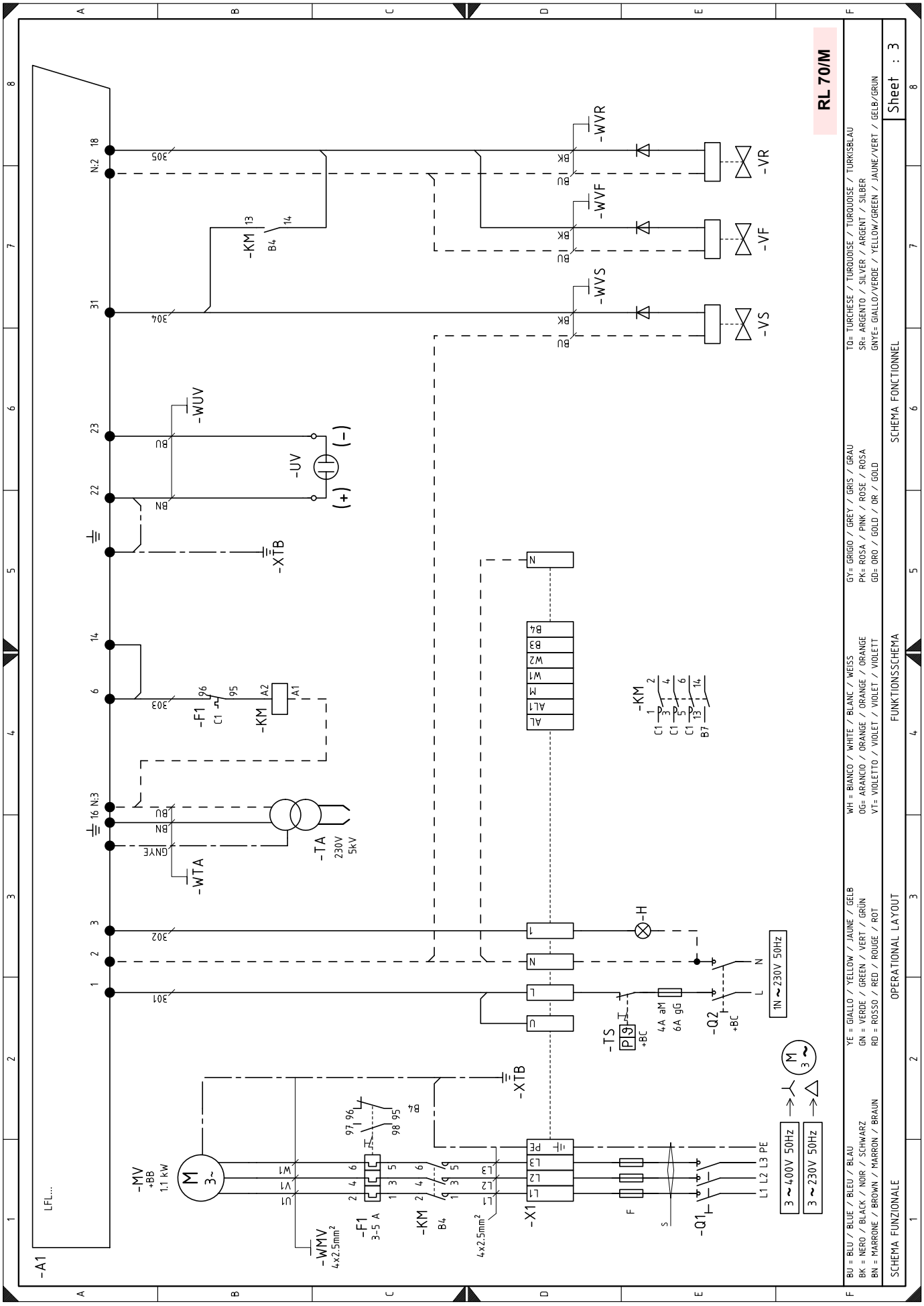
ATTENTION

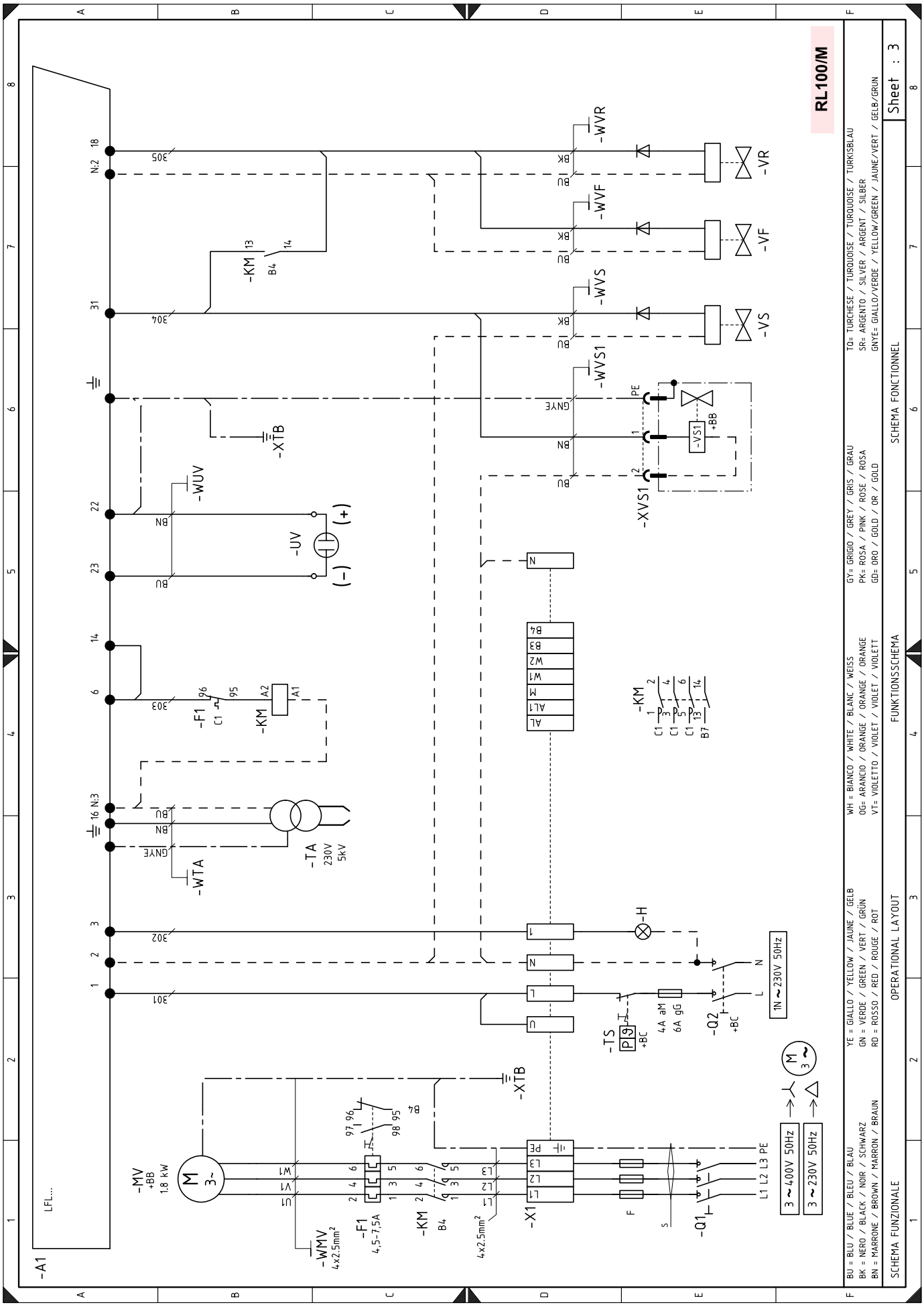
The installer is responsible for the addition of any safety device not foreseen in this manual.

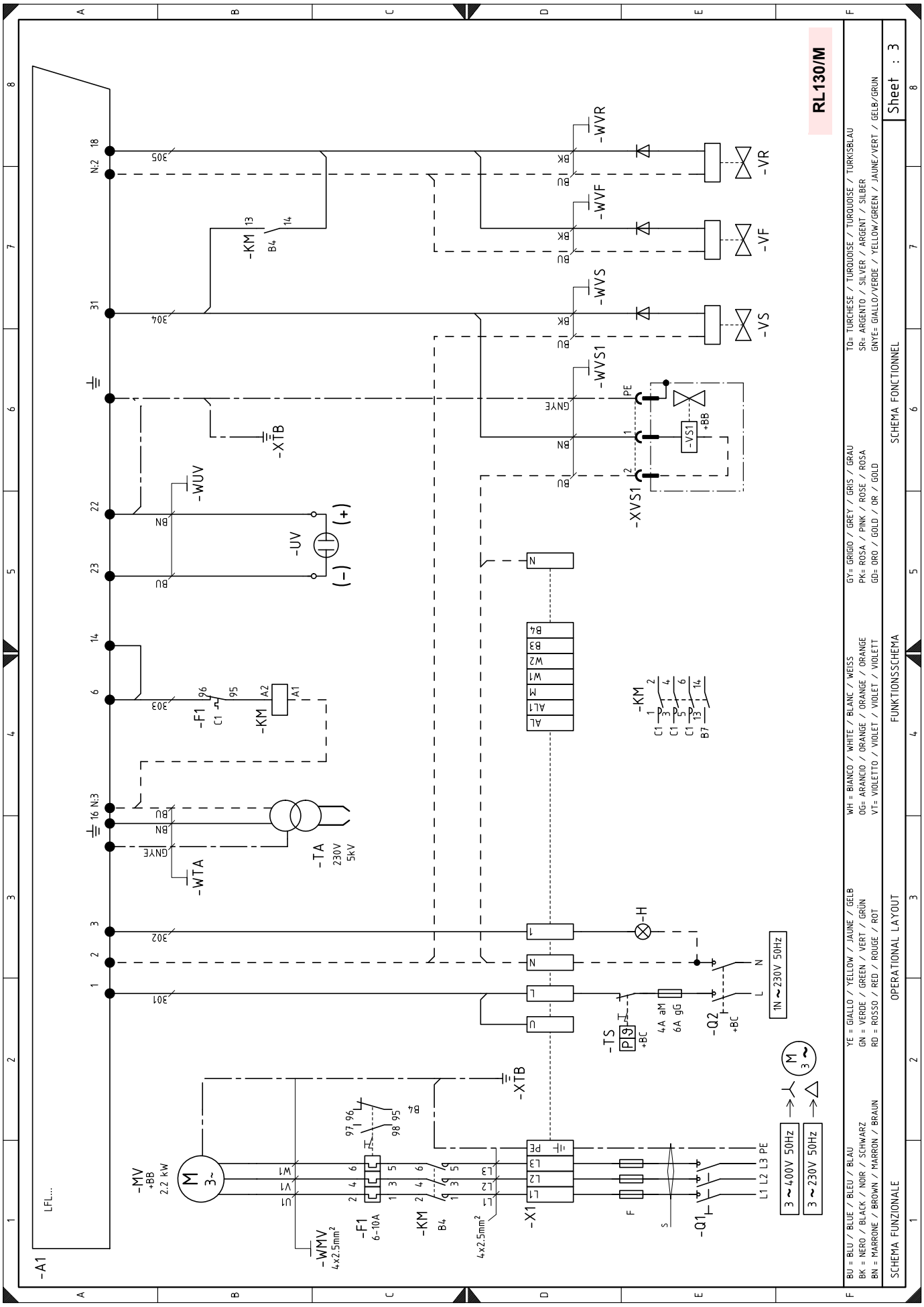
B Appendix - Electrical panel layout

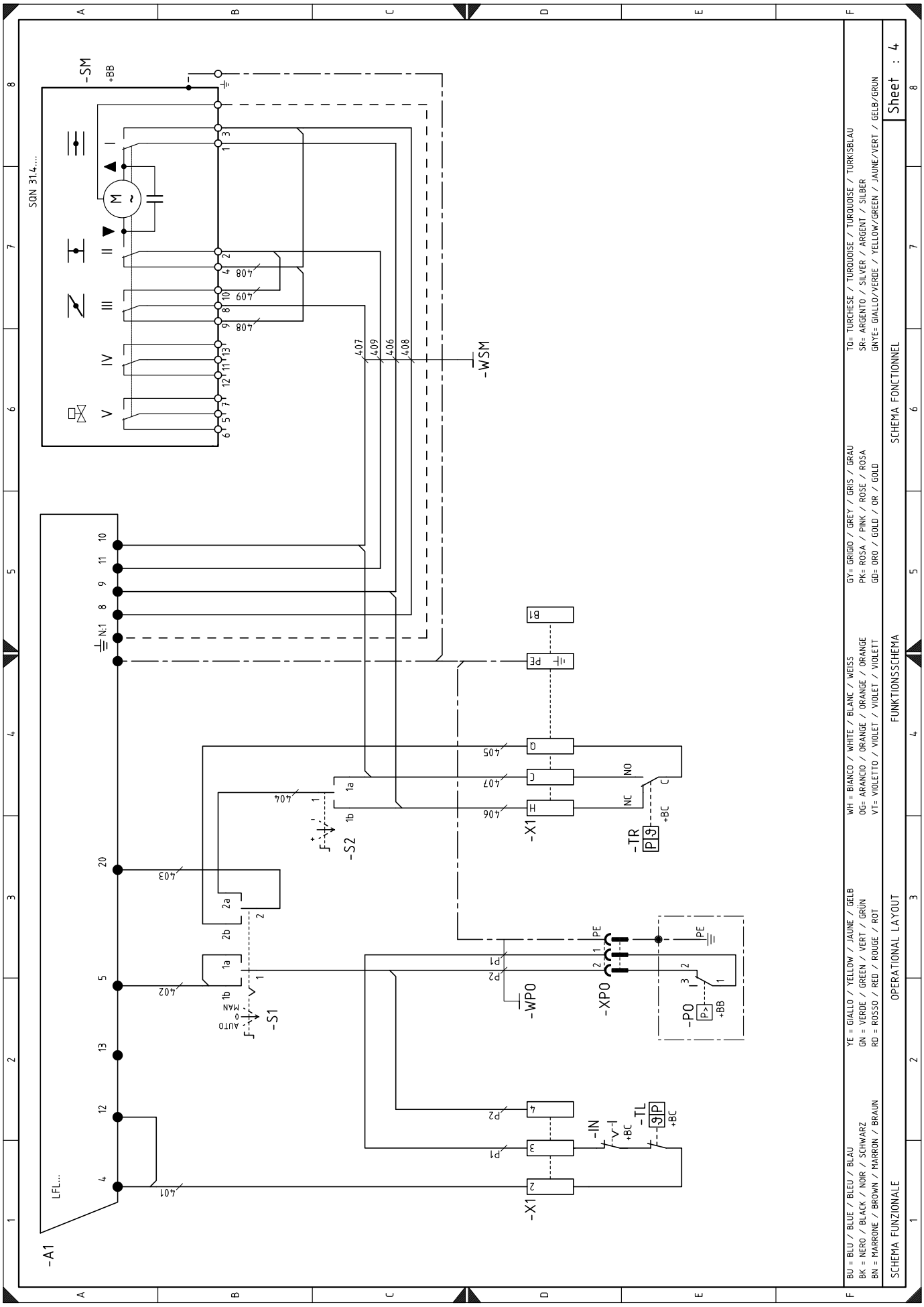
2 Indication of references




RL 70/M
-A1
LFL....
-MV
+BB
1.1 kW
-WMV
4x2.5mm²
-F1
3-5 A
-KM
B4
4x2.5mm²
-X1
-XTB
-Q1
-Q2
+BC
-TS
-H
4A aM
6A gG
-TA
230V
5kV
-WTA
-KM
-F1
-XTB
-UV
(-)
(+)
-WUV
-WVR
-WVF
-WVS
-VR
-VF
-VS
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
L1 L2 L3 PE
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TÜRKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3


RL100/M
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
-A1
LFL...
-MV +BB 1.8 kW
-WMV 4x2.5mm²
-F1 4,5-7,5A
-KM
-X1
-XTB
-Q1
-Q2 +BC
-TS +BC
-H
-WTA
-TA 230V 5kV
-UV
-WUV
-F1
-KM
-WVR
-WVF
-WVS
-WVS1
-VR
-VF
-VS
-VS1 +BB
-XVS1
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
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


RL130/M
-A1
LFL....
-MV
+BB
2.2 kW
-WMV
4x2.5mm²
-F1
6-10A
-KM
B4
4x2.5mm²
-X1
-XTB
-WTA
-TA
230V
5kV
-WUV
-UV
(+)
(-)
-WVR
-WVF
-WVS
-WVS1
-VR
-VF
-VS
-XVS1
-VS1
+BB
-H
-TS
-Q2
+BC
4A aM
6A gG
1N ~230V 50Hz
-Q1
3 ~400V 50Hz
3 ~230V 50Hz
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3


SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 4
-A1
LFL...
-SM
SQN 31.4...
-WSM
-S1
-S2
-X1
-TR
-WPO
-XPO
-PO
-IN
-TL
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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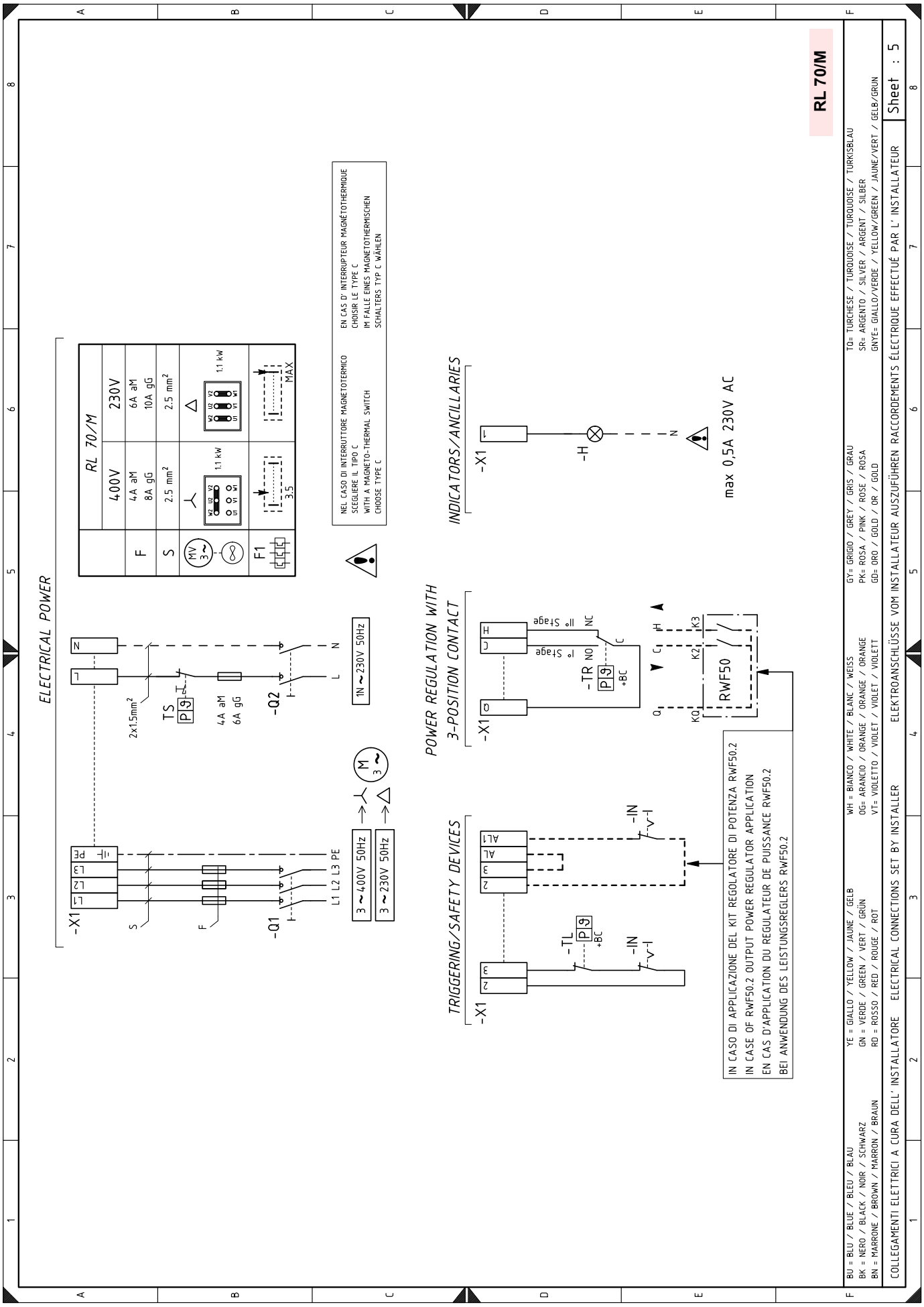
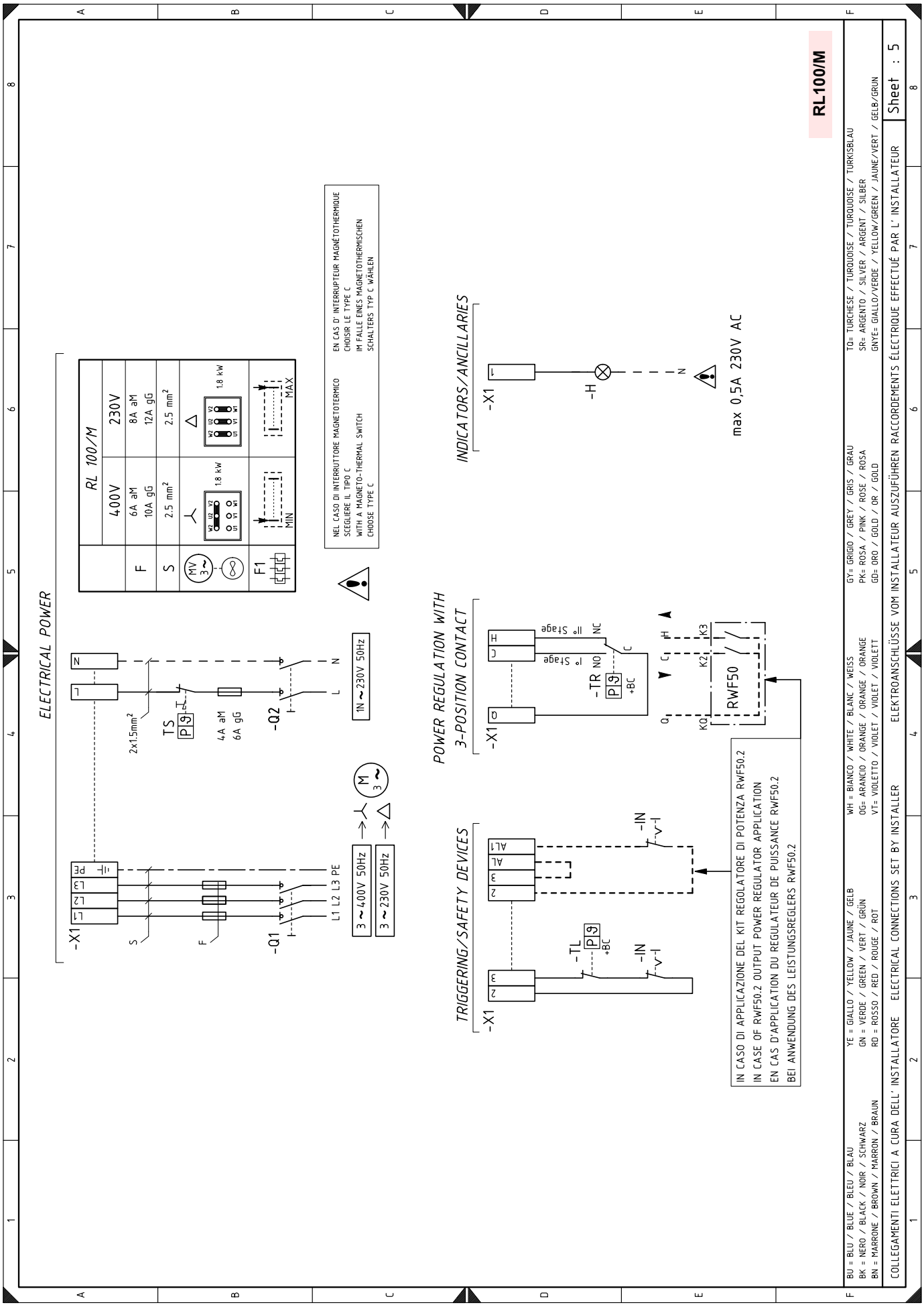
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


RL 70/M
ELECTRICAL POWER
RL 70/M
400V
230V
F
4A aM
8A gG
6A aM
10A gG
S
2.5 mm²
2.5 mm²
1.1 kW
1.1 kW
F1
3.5
MAX
-X1
2x1.5mm²
TS
4A aM
6A gG
-Q2
-Q1
L1 L2 L3 PE
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN
INDICATORS/ANCILLARIES
-X1
-H
max 0,5A 230V AC
POWER REGULATION WITH 3-POSITION CONTACT
-X1
-TR
I° Stage
II° Stage
TRIGGERING/SAFETY DEVICES
-X1
-TL
-IN
RWF50
K2
K3
K0
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50.2
IN CASE OF RWF50.2 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50.2
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50.2
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
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
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


RL100/M
ELECTRICAL POWER
RL 100/M
400V
230V
F
6A aM
10A gG
8A aM
12A gG
S
2.5 mm²
2.5 mm²
1.8 kW
1.8 kW
F1
MIN
MAX
-X1
-Q1
-Q2
-TS
-F
4A aM
6A gG
2x1.5mm²
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
L1 L2 L3 PE
L N
NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN
POWER REGULATION WITH 3-POSITION CONTACT
TRIGGERING/SAFETY DEVICES
INDICATORS/ANCILLARIES
-X1
-TR
-TL
-IN
-H
1° Stage
2° Stage
NO
NC
RWF50
K1
K2
K3
K0
max 0,5A 230V AC
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50.2
IN CASE OF RWF50.2 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50.2
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50.2
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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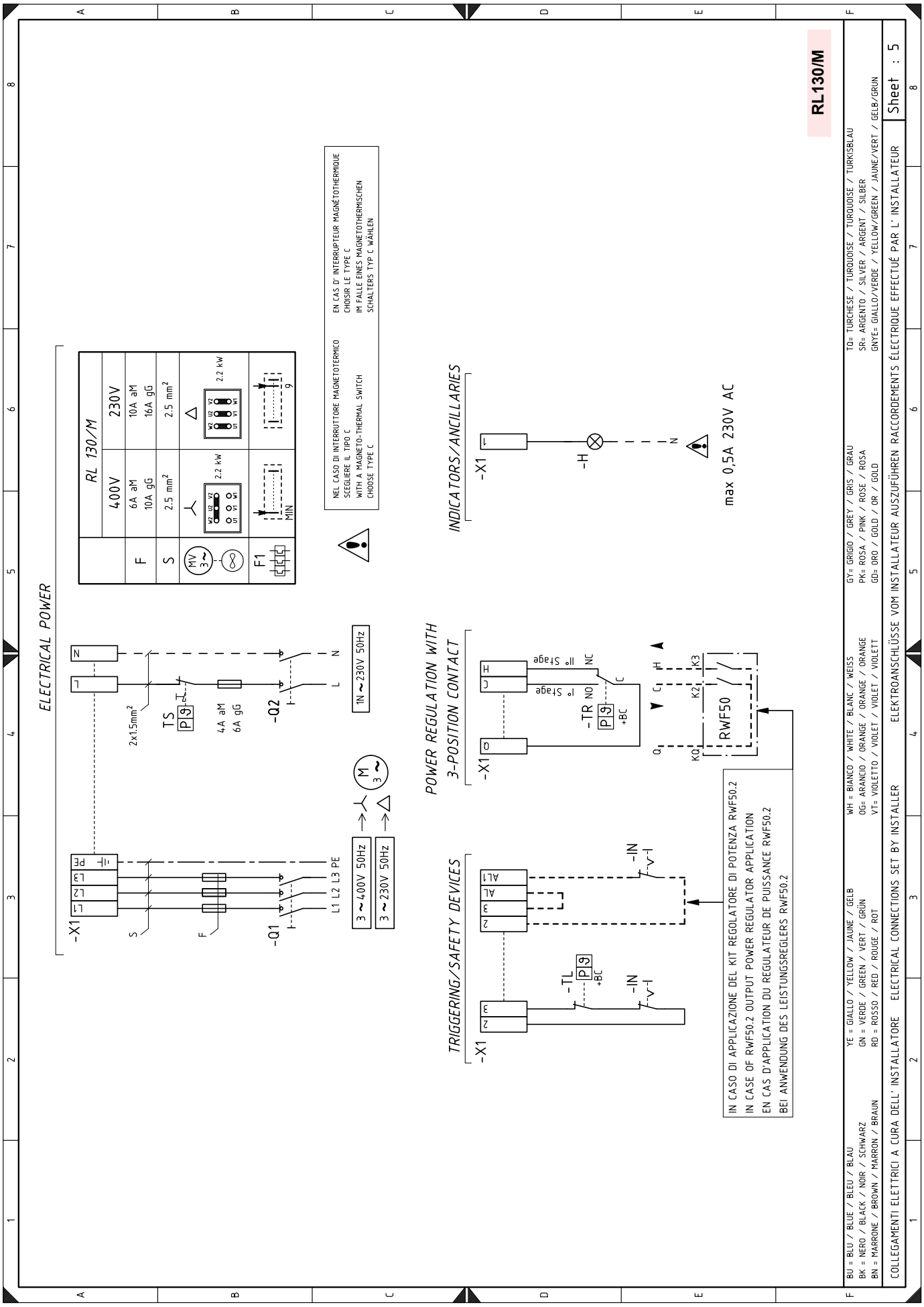
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN
RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


RL130/M
ELECTRICAL POWER
RL 130/M
400V
230V
F
6A aM
10A gG
10A aM
16A gG
S
2.5 mm²
2.5 mm²
2.2 kW
2.2 kW
F1
MIN
NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN
-X1
2x1.5mm²
TS
4A aM
6A gG
-Q2
-Q1
L1 L2 L3 PE
L N
3 ~400V 50Hz
3 ~230V 50Hz
1N ~230V 50Hz
INDICATORS/ANCILLARIES
-H
max 0,5A 230V AC
POWER REGULATION WITH 3-POSITION CONTACT
I° Stage
II° Stage
-TR
+BC
TRIGGERING/SAFETY DEVICES
-TL
-IN
RWF50
K1
K2
K3
K0
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50.2
IN CASE OF RWF50.2 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50.2
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50.2
BU = BLU / BLUE / BLEU / BLAU
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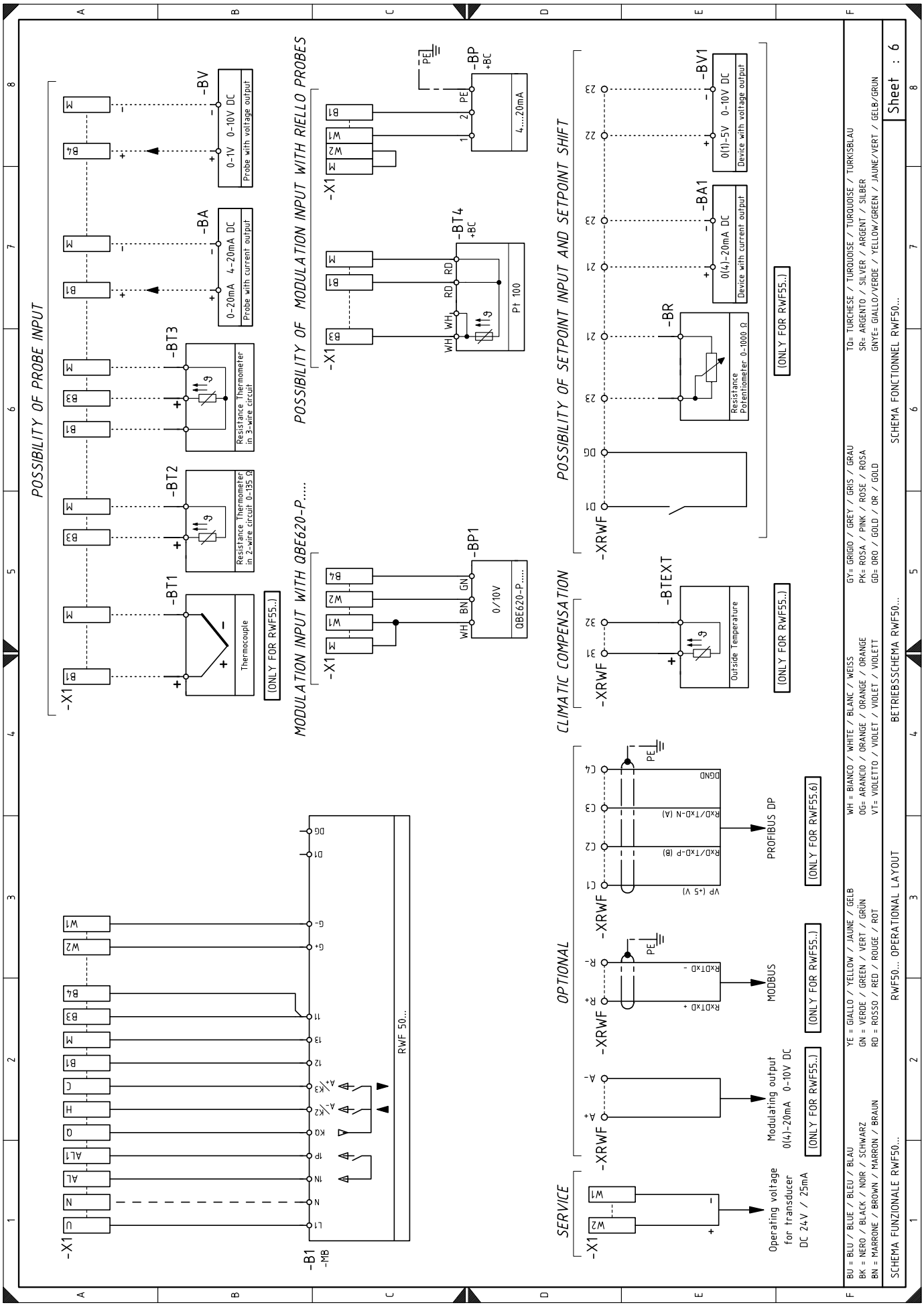
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


POSSIBILITY OF PROBE INPUT
-X1
-BT1
Thermocouple
(ONLY FOR RWF55..)
-BT2
Resistance Thermometer in 2-wire circuit 0-135 Ω
-BT3
Resistance Thermometer in 3-wire circuit
-BA
0-20mA 4-20mA DC
Probe with current output
-BV
0-1V 0-10V DC
Probe with voltage output
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-X1
-BT4
+BC
Pt 100
-BP
+BC
4....20mA
MODULATION INPUT WITH QBE620-P.....
-X1
-BP1
0/10V
QBE620-P.....
CLIMATIC COMPENSATION
-XRWF
-BTEXT
Outside Temperature
(ONLY FOR RWF55..)
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-XRWF
-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
(ONLY FOR RWF55..)
OPTIONAL
-XRWF
VP (+5 V)
RxD/TxD-P (B)
RxD/TxD-N (A)
DGND
PROFIBUS DP
(ONLY FOR RWF55.6)
-XRWF
RxDTxD +
RxDTxD -
MODBUS
(ONLY FOR RWF55..)
SERVICE
-X1
Operating voltage for transducer DC 24V / 25mA
-XRWF
Modulating output 0(4)-20mA 0-10V DC
(ONLY FOR RWF55..)
-X1
-B1
-MB
RWF 50...
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
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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 FUNZIONALE RWF50...
RWF50... OPERATIONAL LAYOUT
BETRIEBSSCHEMA RWF50...
SCHEMA FONCTIONNEL RWF50...
Sheet : 6

WIRING DIAGRAM KEY

A1	Flame control
F	Protection fuses for three line
F1	Thermal relay for fan motor
H	Remote lockout signal
B1	RWF power modulator
BA	Probe with current output
BA1	Device with current output for editing remote setpoint
BP	Pressure probe
BP1	Pressure probe
BR	Remote setpoint voltage divider
BT1	Thermocouple probe
BT2	Probe Pt100 with 2 wires
BT3	Probe Pt100 with 3 wires
BT4	Probe Pt100 with 3 wires
BTEXT	External probe for the climatic compensation of the setpoint
BV	Probe with voltage output
BV1	Device with voltage output for editing remote setpoint
KM	Fan motor contactor
IN	External switch for ON/OFF burner
MV	Fan motor
SM	Servomotor
S1	Operation switch: MAN = manual AUT = automatic OFF = off
S2	Button for - = output decrease + = output increase
PO	Oil pressure switch
XPO	Connector for oil pressure switch
TA	Ignition transformer
TL	Limit thermostat
TR	Adjustment thermostat
TS	Safety thermostat
UV	UV flame sensor
VR	Adjustment valve
VS	Safety valve
VF	Operation valve
VS1	Safety valve
XVS1	Safety valve connector
XPE	flame control earth
XTB	Burner earth
X1	Terminal board

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