GB

Dual fuel light oil/ gas burners

Two stage progressive or modulating operation

CODE	MODEL	TYPE
20208729	GI/EMME 1400	680T1
20206079	GI/EMME 2000	681T1
20205812	GI/EMME 3000	682T1
20205991	GI/EMME 4500	683T1

Translation of the 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.

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.

2 Safety and prevention

2.1 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.

ATTENTION

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

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, he undertakes to ensure that everyone knows the use and safety instructions for his own duties;

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

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

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

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

In addition:

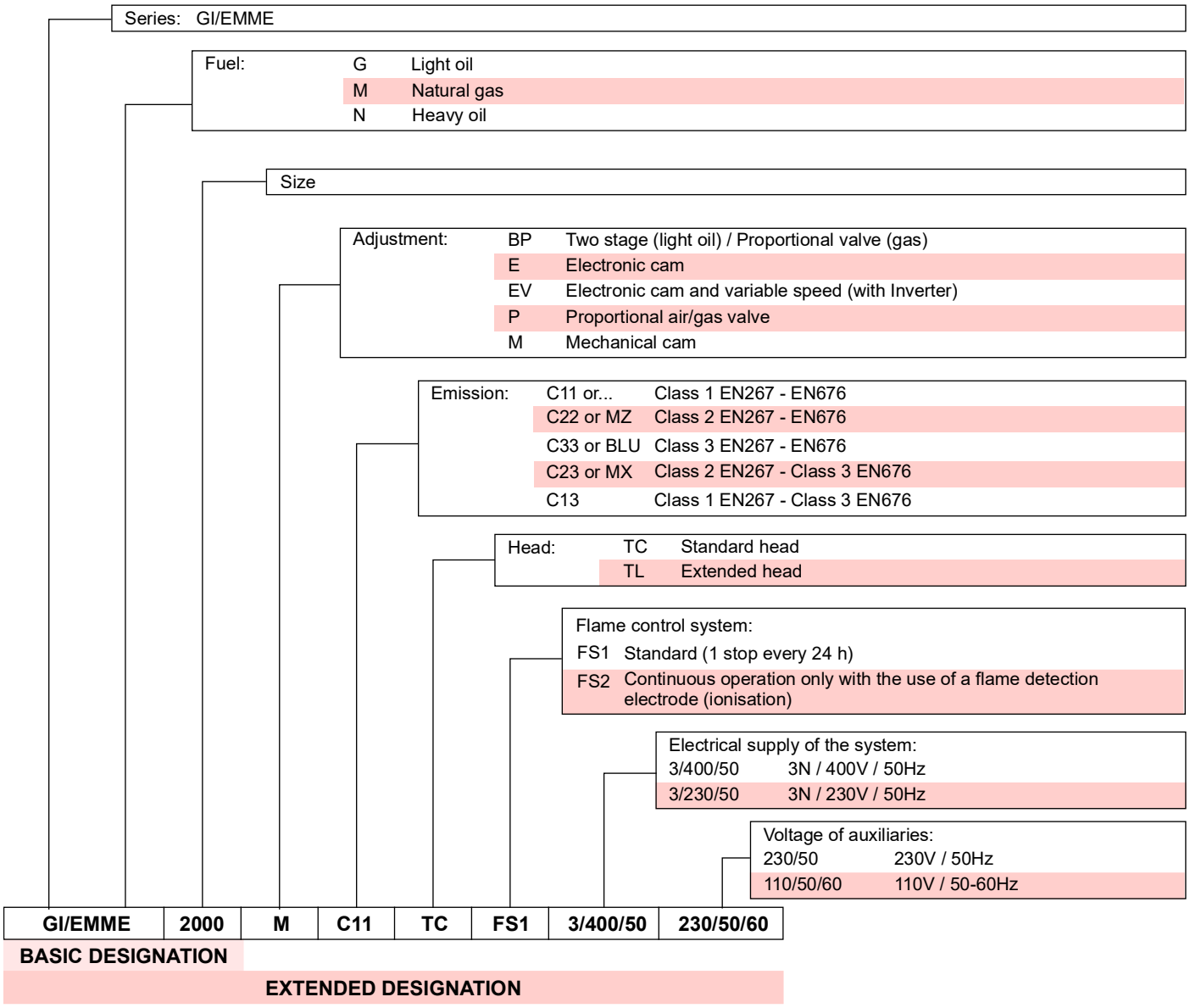
➤ must take all the measures necessary to prevent unauthorised people gaining access to the machine;

➤ 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
GI/EMME 1400	TC	FS1	3 ~ 230/400/50	Direct	20208729
GI/EMME 2000	TC	FS1	3 ~ 230/400/50	Direct	20206079
GI/EMME 3000	TC	FS1	3 ~ 400/50	Direct	20205812
GI/EMME 4500	TC	FS1	3N ~ 400/50	Star/Triangle	20205991

Tab. A

3.3 Burner categories - Countries of destination

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

Tab. B

3.4 Technical data

Model			GI/EMME 1400	GI/EMME 2000	GI/EMME 3000	GI/EMME 4500
Type			680 T1	681 T1	682 T1	683 T1
Minimum	Modulation Output	Kcal/h	350.000	500.000	750.000	1.000.000
		kW	407	580	872	1.163
	Minimum operating output	Kcal/h	705.000	1.000.000	1.500.000	2.021.000
		kW	820	1.163	1.744	2.350
	Maximum operating output	Kcal/h	1.325.000	2.000.000	3.000.000	4.000.000
		kW	1.540	2.325	3.488	4.650
Fuel			Natural gas: G 20 - G 25 - G 31 Light oil			
Operation			– Intermittent (min. 1 stop in 24 hours) – Progressive two-stage or modulating by kit (see accessories)			
Pump:		type	TA2C	TA3C	TA4C	TA5C
- Output at 400 bar		kg/h	350	540	730	1000
- Pressure range		bar	7 - 40	7 - 40	7 - 40	7 - 30
Standard applications			Boilers: water, steam, diathermic oil			
Ambient temperature		°C	0 - 50			
Combustion air temperature		°C max	60			
Noise levels (1)	Sound pressure	dB(A)	75	78	82	84
	Sound power		85	88	92	94
Weight		Kg	190	235	280	285
CE			CE-0476DR4271			

Tab. C

(1) 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.

3.5 Electrical data

Model		GI/EMME 1400	GI/EMME 2000	GI/EMME 3000	GI/EMME 4500
Electrical power supply		3/3N ~ 230/400V +/-10% 50 Hz			
Absorbed electric power (Light oil)	kW max	5.2	6.2	12.6	18.8
Absorbed electric power (Gas)	kW max	3.9	4.8	10.6	16.9
Protection level		IP40			

Tab. D

3.6 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 drawn back (see "Lifting points" on page 16).

L2 Short head blast tube length + spacer

L2* Short head blast tube length

L2** Long head blast tube length

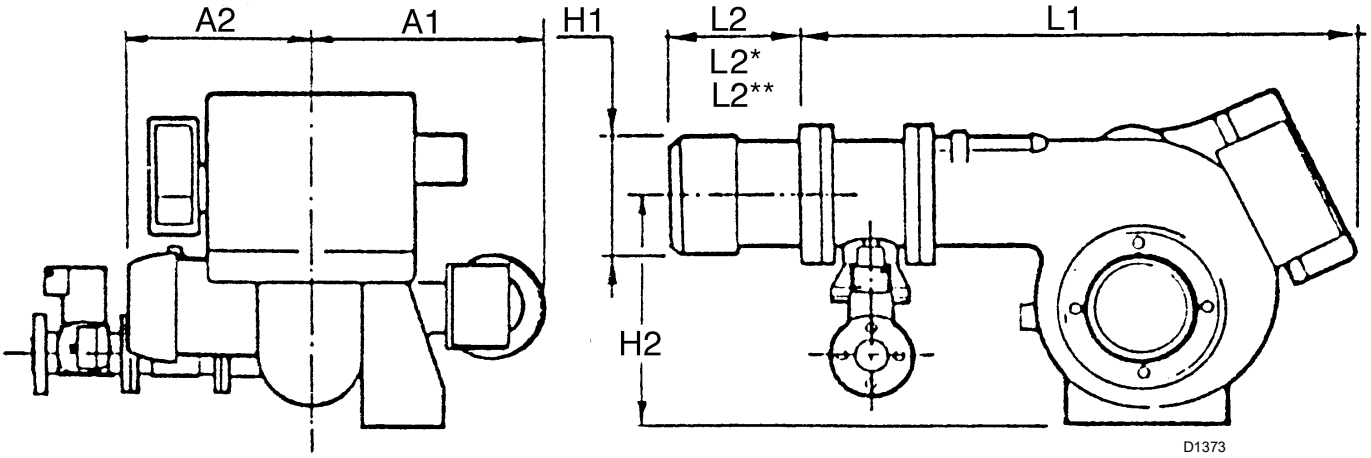


Fig. 1

MODEL	A1	A2	L1	L2	L2*	L2**	H1	H2
GI/EMME 1400	482	376	1090	275	385	495	250	467
GI/EMME 2000	482	396	1090	275	385	495	260	467
GI/EMME 3000	538	447	1320	346	476	606	336	525
GI/EMME 4500	538	508	1320	346	476	606	336	525

Tab. E

3.7 Firing rates

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

The **MINIMUM OUTPUT** must not be lower than the minimum limit of the diagram:
GI/EMME 1400 = 407 kW
GI/EMME 2000 = 581 kW
GI/EMME 3000 = 872 kW
GI/EMME 4500 = 1163 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 18.

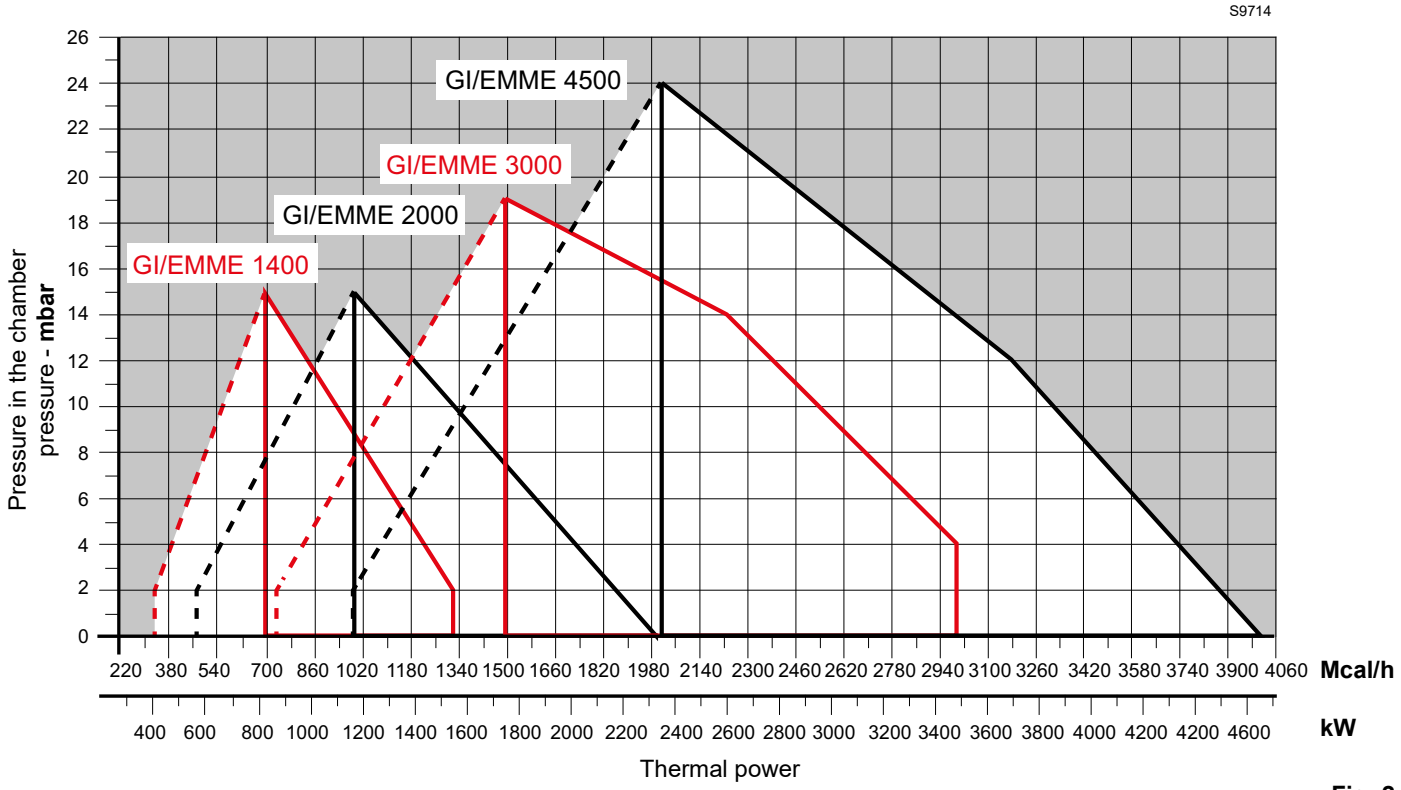


Fig. 2

3.8 Test boiler

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

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

The firing rates were obtained in special test boilers, according to EN 676 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 test boilers, according to standard (EN 676 for gas, EN 267 for light oil), is of 4:1 for light oil and 7:1 for gas.

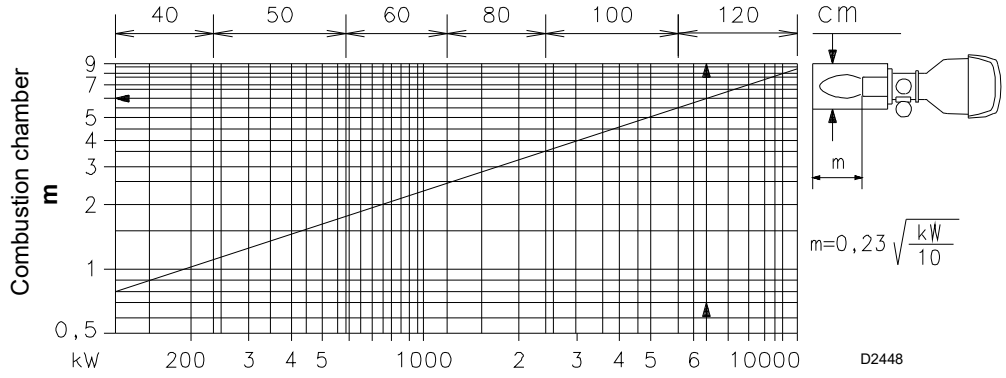


Fig. 3

3.9 Burner description

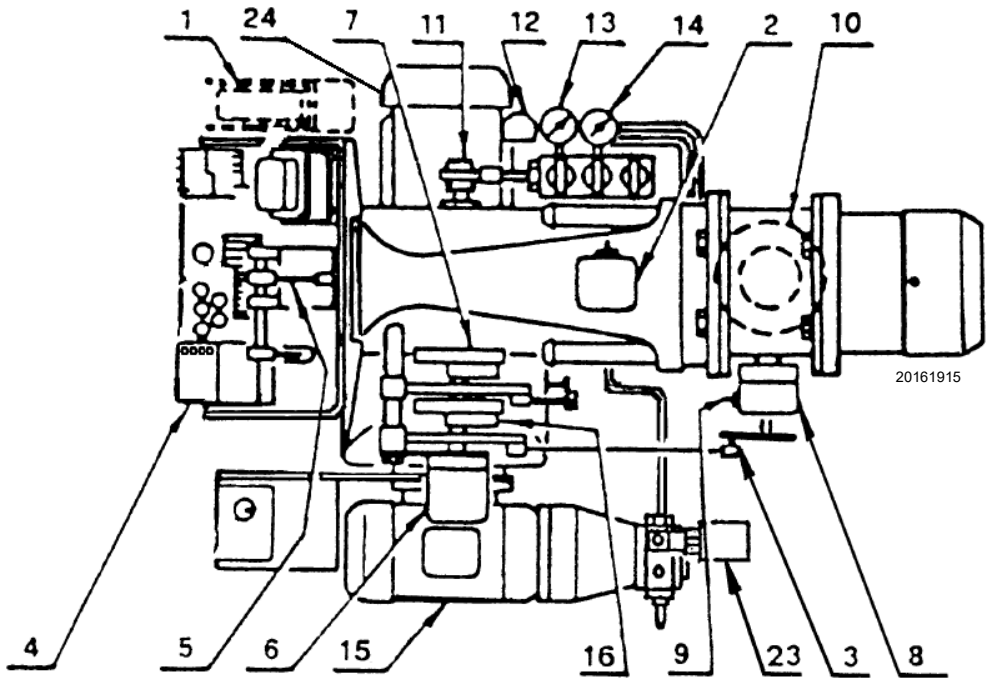


Fig. 4

1 Output modulator (for modulating version only)
2 Air pressure switch
3 Gas butterfly valve control rod
4 Flame control reset button with lockout signal
5 Head drive rod
6 Servomotor
7 Air adjustment cam
8 Maximum gas pressure switch
9 Pipe coupling gas pressure test point
10 Gas regulator
11 Pressure adjustment eccentric on return line
12 Maximum oil pressure switch
13 Return pressure gauge
14 Delivery pressure gauge
15 Pumping unit
16 Adjustment cam
17 Pressure adjuster
18 Intake line connection
19 Return line connection
20 Delivery line connection
21 Vacuometer connection
22 Pressure gauge connection
23 Minimum oil pressure switch
24 Fan motor

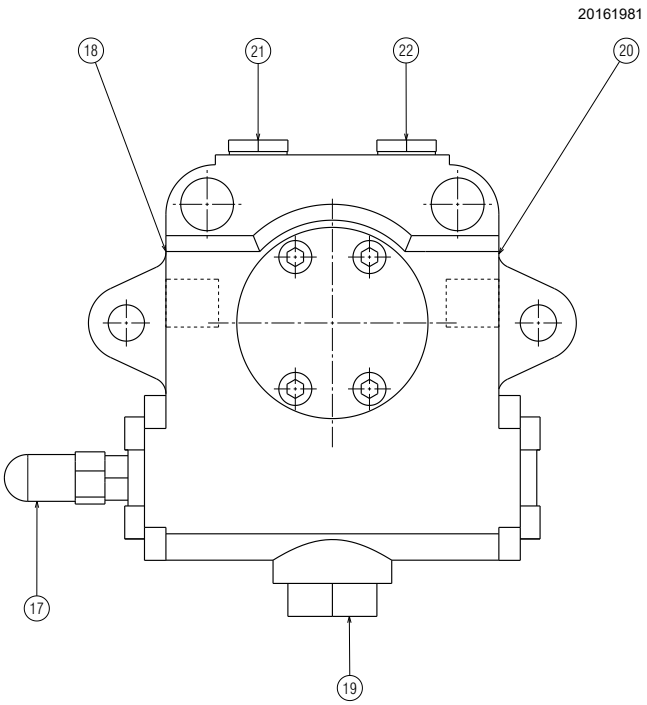


Fig. 5

ATTENTION

– The motor relay release for versions with starter is inside the same.
– Pump motor relay release is inside the box next to the pumping unit.

3.10 Electrical panel description

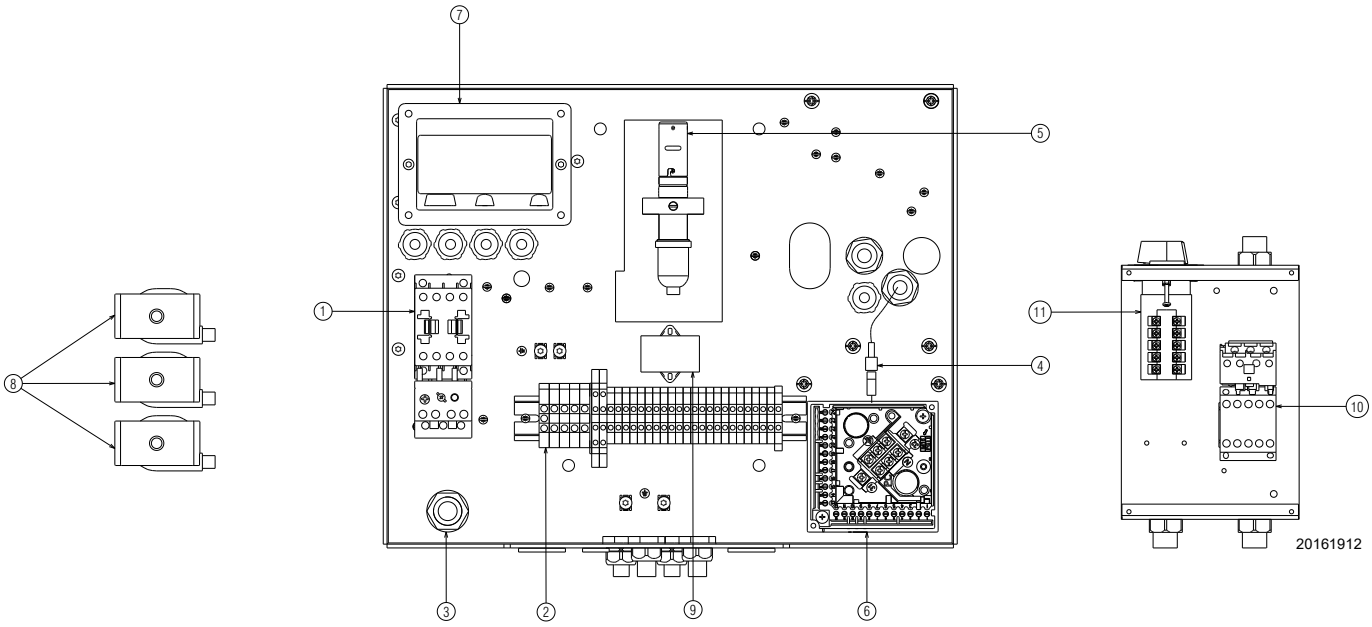


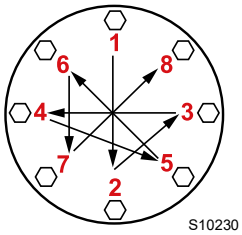
Fig. 6

1 Fan motor overload and contactor (GI/EMME 1400-2000-3000)
2 Terminal board
3 Cable grommets for electrical wiring (to be carried out by the installer)
4 Plug-socket on servomotor cable
5 Flame sensor
6 Flame control base
7 Ignition transformer
8 Oil valve coils
9 Filter to protect against radio disturbance
10 Pump motor contactor and thermal relay
11 Selector switch OIL-0-GAS

3.11 Burner equipment

seal for gas train . . . . . No. 1
Screws . . . . . No. 12
Extensions . . . . . No. 2
Insulating flange gasket No.1
Flexible hoses . . . . . No. 2
Nipples . . . . . No. 2
Cable grommets No.4
Washers . . . . . No. 8
Instruction . . . . . No. 1
Spare parts list . . . . . No. 1

It is recommended to tighten the screws of the gas flange with a tightening torque of **40** Nm ±10%.



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

3.12 Flame control (LFL...)

Important notes

ATTENTION

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.

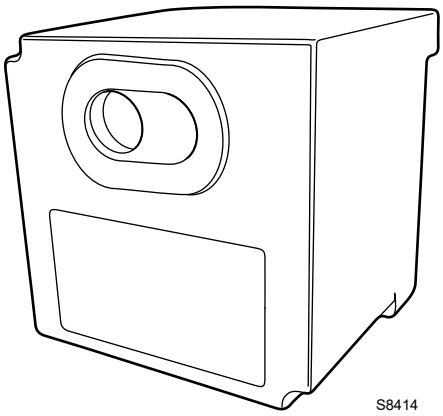


Fig. 7

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. F

3.13 Servomotor SQM40 ...

Important notes

ATTENTION

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

Avoid opening, modifying or forcing the servomotor.

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ 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.
- ➤ Fully disconnect the burner from the mains when working near terminals and servomotor connections.
- ➤ Condensation and exposure to water are not allowed.
- ➤ For safety reasons, the servomotor must be checked after long periods of non-use.

Fig. 8

Technical data

Mains voltage	230 V -15% +10%
Mains frequency	50 / 60 Hz
Power absorption	10 VA
Motor	Synchronous
Drive angle	Varying between 0° and 135°
Protection level	Max. IP 66, with appropriate cable entry
Cable entry	2 x M20
Cable connection	terminal board for 0.5mm^2 (min.) and 2.5mm^2 (max.)
Rotation direction	Anticlockwise
Rated torque (max.)	10 Nm
Holding torque	5 Nm
Operation time	30 s. at 90°
Weight	approx. 2 kg
Environmental conditions:	
Operation	-20....+60° C
Transport and storage	-20...+60°C

4 Installation

4.1 Notes on safety for the installation

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

DANGER

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

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.

4.2 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.

4.3 Preliminary checks

Checking the consignment

CAUTION

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

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

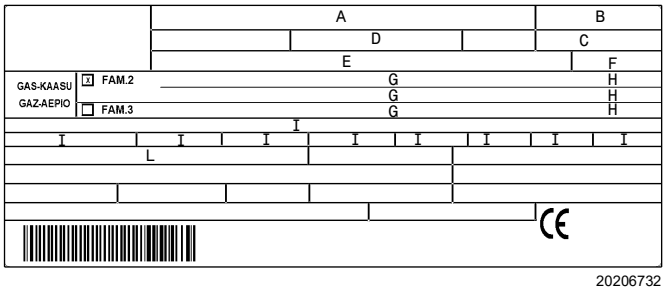


Fig. 9

Checking the characteristics of the burner

Check the identification label of the burner, showing:
- ➤ the model (**A**)(Fig. 9) 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**).

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.

4.4 Operating position

ATTENTION

- The burner is designed to operate only in positions **1**, **2**, **3** and **4** (Fig. 10).
- Installation **1** is preferable, as it is the only one that allows the maintenance operations as described in this manual.
- Installations **2**, **3** and **4** allow operation but make maintenance and inspection of the combustion head more difficult.

DANGER

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

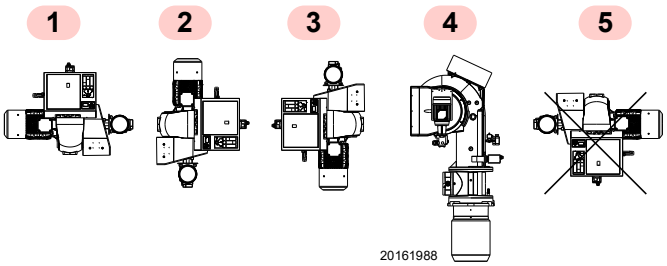


Fig. 10

4.5 Preparing the boiler

4.5.1 Boring the boiler plate

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

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

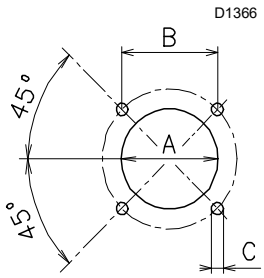


Fig. 11

mm	A	B	C
GI/EMME 1400	255	260	M 16
GI/EMME 2000	265	260	M 16
GI/EMME 3000	340	310	M 20
GI/EMME 4500	340	310	M 20

Tab. G

4.5.2 Blast tube length

The length of the blast tube must be selected according to the indications provided by the manufacturer of the boiler, and in any case it must be greater than the thickness of the boiler door complete with its fettling.

Model	mm
GI/EMME 1400	385
GI/EMME 2000	385
GI/EMME 3000	476
GI/EMME 4500	476

Tab. H

4.6 Lifting points

Provide an adequate lifting system (Fig. 12).

Lift the burner by means of the hooks to fix it to the boiler without separating it from the combustion head.

Fig. 12 shows how to apply the burner to a boiler with a headpiece that is not cooled.

The refractory wall must not extend beyond the end of the combustion head of the burner.

mm	MIN	MAX
GI/EMME 1400	200	300
GI/EMME 2000	200	300
GI/EMME 3000	300	400
GI/EMME 4500	300	400

Tab. I

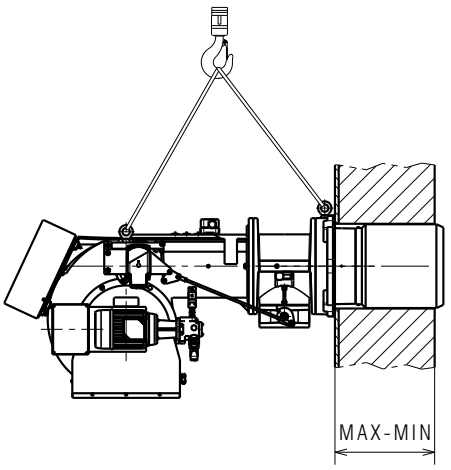


Fig. 12

ATTENTION

Before fitting the burner on the boiler it is advised to fit the nozzle as specified later.

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

ATTENTION

The seal between burner and boiler must be airtight.

4.7 Positioning the electrode

ATTENTION

Position the electrode according to the dimensions shown in Fig. 13.

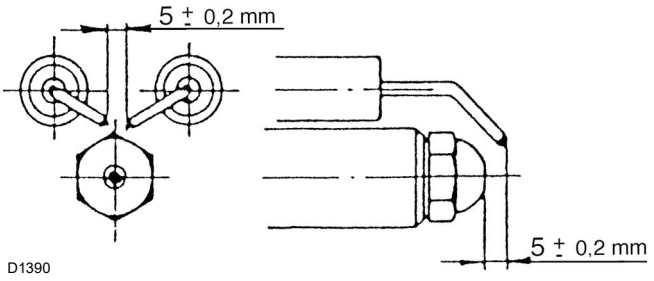


Fig. 13

4.8 Air damper setting

The setting of the air damper is carried out by acting on the variable profile cam. This operation must be performed after regulating the pressure variator and the combustion head.

With burner on, disconnect the servomotor from the power supply by disconnecting the fast-on pin on the electric control shelf, and release the movement by pressing the release button that allows the manual rotation of the cam.

Calibrate in sequence the maximum output, the minimum output and the intermediate outputs.

At the end of the operation, check all calibrations, restore the electrical connections of the servomotor and lock the adjustment screws by means of the transversal ones.

4.8.1 Variation of the air damper tie-rod length

Lengthening the tie-rod is recommended when the air damper moves within a reduced angle (air damper approx. halfway its stoke at the maximum output); it is used to avoid a too curved cam profile.

With the burner off, proceed as follows:

➤ disengage the articulated coupling 2)(Fig. 14) of the lever 1);
➤ loosen the extension 3) from the tie-rod 4) by a few turns;
➤ reconnect the articulated coupling to the lever and lift the profile of the cam until setting the index of the air damper to 0 with servomotor at 0°.

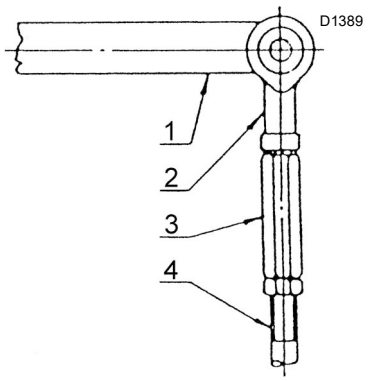


Fig. 14

Key
1 Lever
2 Articulated coupling
3 Extension
4 Tie-rod

4.9 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.

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.

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.

4.9.1 Recommended nozzle

Select the nozzle, with nominal output slightly higher than the one actually required, among the following types:

Model	Nozzle
Fluidics	type **N1** (without interception rod)
Fluidics	type **W2** (with interception rod)
Bergonzo	type **B3** or **B5** (with interception rod)

It is possible to fit also nozzles without interception rod: in this case there will be no anti-dripping feature on the spray holder.

Available nozzles (delivery kg/h):

- **Fluidics**: 70 - 80 - 90 - 100 - 115 - 130 - 145 - 160 - 180 - 200 - 225 - 250 - 275 - 300 - 330 - 360 - 400 - 450
- **Bergonzo**: 70 - 80 - 90 - 100 - 125 - 150 - 175 - 200 - 225 - 250 - 275 - 300 - 325 - 350 - 375 - 400 - 425 - 450

Angles of 45-50° are usually recommended; for narrow combustion chambers use nozzles with 30-35° angles.

To calibrate the delivery range of the nozzle, adjust the fuel maximum and minimum pressure on the nozzle return line, as shown in Fig. 15.

Approximate ration between: Nozzle type and delivery in (%) - Pressure on the return line

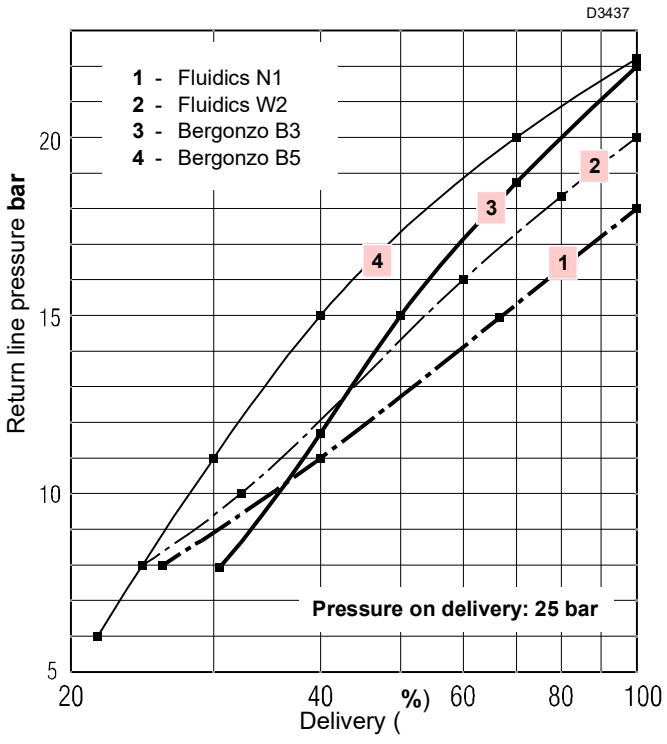


Fig. 15

4.10 Combustion head adjustment

The combustion head moves together with the eccentric 8), the variable profile cams and the gas butterfly valve. The head positioning can be seen on cylinder 2)(Fig. 16).

The control levers of the head are calibrated to the maximum stroke at the factory.

To obtain a different modulation range, calibrate these levers again so that the stroke of the head is as in the diagram (Fig. 17).

ATTENTION

For ignition difficulty proceed as follows:

- ➤ Adjust the fuel pressure on the return line between 5 ÷ 8 bar and regulate the air for a correct combustion.
- ➤ If difficulties persist, set the combustion head to the minimum on notch 2 ÷ 3, keeping the adjustment of the maximum delivery as in the diagram (Fig. 17).

Example:

With GI/EMME 4500 burner, for a modulation from 1,400,000 to 3,400,000 kcal/h, it is possible to detect from the diagram: notch 1 for 1,400,000 kcal/h, notch 6.5 for 3,400,000 kcal/h, with a stroke equal to 5,5 notches.

NOTE:

To prevent any sticking, do not exceed the maximum and minimum opening positions corresponding on cylinder 2)(Fig. 16) to notch 9 with servomotor at 130° and notch 0 with servomotor at 0°, respectively.

To change the stroke of the combustion head proceed as follows:

- ➤ control connecting rod 1) of driving rod 8) of combustion head is provided with a slot; by pulling the tie-rod 9) towards the outside of the slot the stroke of the head shortens by approx. 20 mm (approx. 4 notches).

If a more consistent reduction is needed, act as follows:

- ➤ with servomotor at 0°, loosen the screws 5) and push, in the arrow direction, the ring 6) placed under the variable profile cam. This allows obtaining a reduction of the eccentricity with a consequent reduction of the stroke.

Once the desired stroke has been found, firmly lock the screws 5).

In the previous example (stroke 5.5 notches) the start and end of the stroke must coincide with values 1 and 6.5.

To obtain this, rotate the hexagonal sleeve 3), in one direction or the other, after loosening the nuts 4).

With servomotor set to 0° notch 1 must match with the reference plane 10), while with servomotor set to 130° it must match with notch 6.5.

Once adjustment operations are completed, firmly lock the nuts 4) with the ball joint 9) positioned as in Fig. 16.

Head calibrations are performed with burner closed, not operating and with released servomotor.

At the end of the adjustment, by allowing the cam 7) to perform a few travels, check that between 0° and 130° there is no sticking.

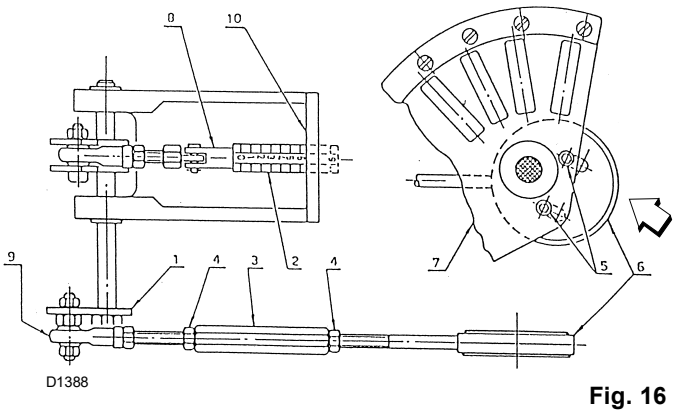


Fig. 16

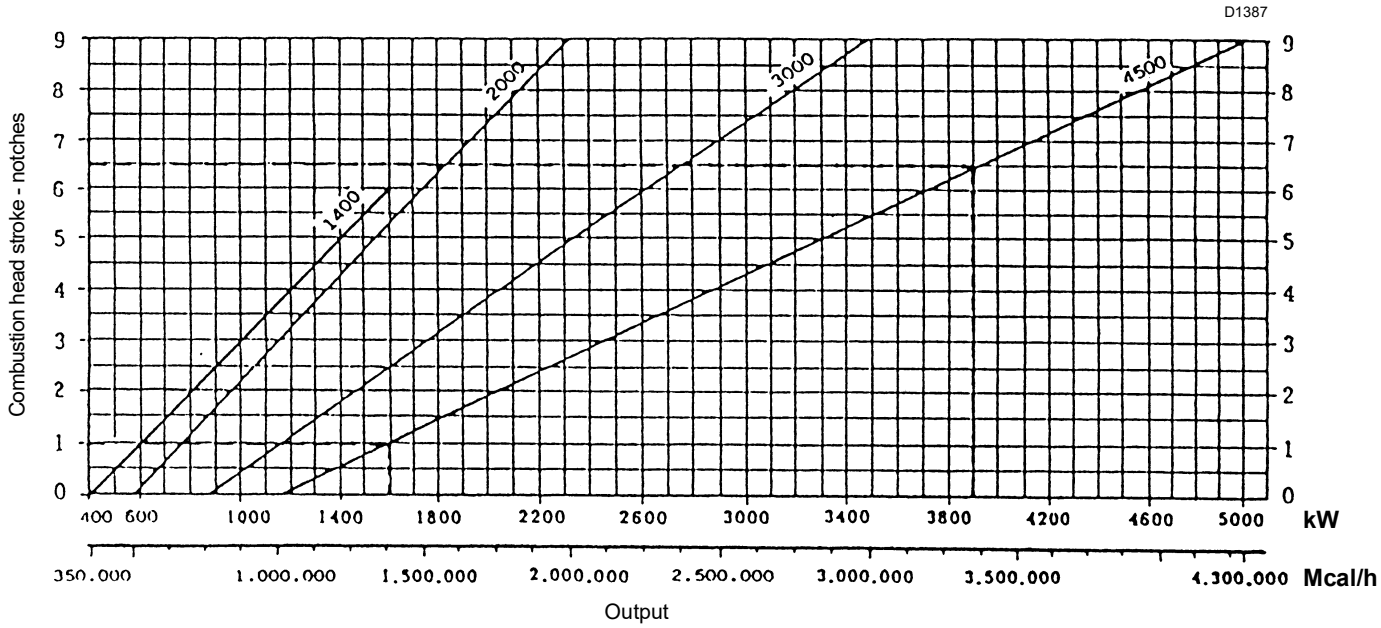


Fig. 17

4.11 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.

ATTENTION

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

4.11.1 Hydraulic system

CAUTION

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

ATTENTION

Follow the instructions below:

➤ Tighten the flexible hoses with the supplied gaskets.

➤ 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.

➤ Finally, connect the other end of the flexible hoses to the suction and return line ducts.

ATTENTION

Before starting the burner make sure that the return pipe line is not clogged. Any obstruction would cause the pump seals to break.

The pump vacuum should not exceed a maximum of 0.45 bar (35 cm Hg). Beyond this limit, gas is released from the fuel.

Oil pipes must be completely airtight.

When the tank is at a level lower than the burner, the return line should terminate at the same level as the suction line.

In this case a non-return valve is not required.

Should however the return line arrive over the fuel level, a non-return valve is required. This solution however is less safe than previous one, due to the possibility of leakage of the valve.

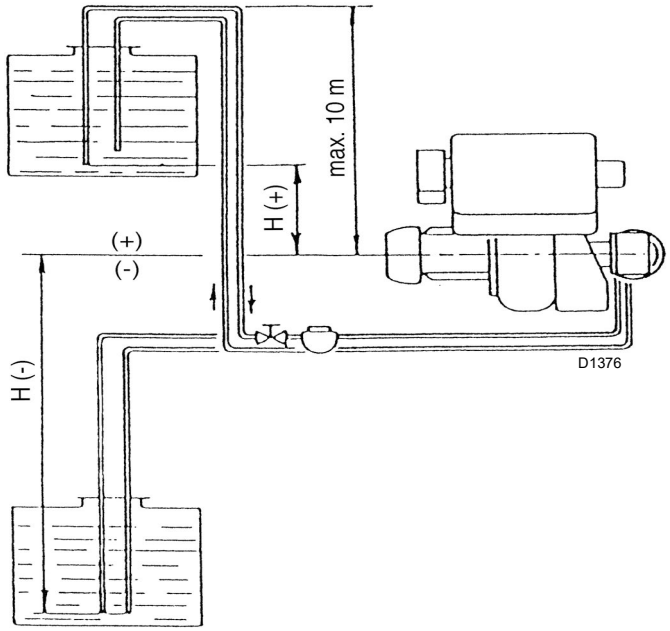


Fig. 18

Key (Fig. 18)

H = Difference of level

L = Total line length

Øi = Inside pipe diameter. The copper pipes with internal diameter of 14 and 16 mm, can be replaced with G 1/2" and G 3/4" steel pipes.

	GI/EMME 1400		GI/EMME 2000		GI/EMME 3000		GI/EMME 4500	
					L m			
H m	Øi 14	Øi 16	Øi 16	Øi 18	Øi G 1/2"	Øi G 3/4"	Øi G 3/4"	Øi G 1"
+ 2,0	55	70	40	60	25	85	55	130
+ 1,5	45	65	35	55	23	80	50	120
+ 1,0	40	60	30	50	20	70	45	110
+ 0,5	35	50	25	45	18	65	40	100
0	30	45	20	40	15	60	35	90
- 0,5	25	40	18	35	12	50	30	80
- 1,0	20	35	15	30	10	45	25	70
- 1,5	15	30	13	25	8	35	20	60
- 2,0	10	25	10	20	5	30	15	45
- 3,0	5	15	5	10	3	15	10	25

Tab. J

4.12 Hydraulic operation diagram

4.12.1 Oil pressure switch

It triggers the lockout condition of the burner in case of too much counter-pressure on the fuel return line.

Recommended calibration (recommended values with return line resistance in tank of ≤ 0.5 bar):

GI/EMME 1400: 1.5 ÷ 2.0 bar
GI/EMME 2000: 2.0 ÷ 2.5 bar
GI/EMME 3000: 3.0 ÷ 3.5 bar
GI/EMME 4500: 4.0 ÷ 4.5 bar

In case of flame control lockout (in position “P”) calibrate the pressure switch again with incremental values of 0.5 bar.

Motor lockout

It is caused by the motor overload protection in case of overload or no phase.

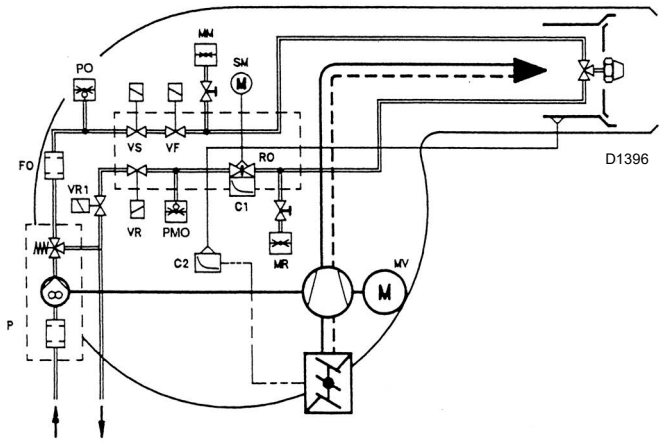


Fig. 19

Key (Fig. 19)

Cn - Control cams
FO - Oil filter
MM - Delivery pressure gauge
MR - Return pressure gauge
MV - Fan motor
P - Pump with pressure adjuster
PO - Minimum oil pressure switch
POM - Maximum oil pressure switch
RO - Pressure adjuster on return line
Vn - Valves

4.13 Pressure variator

To calibrate the eccentric 8)(Fig. 20):

➤ remove the cover 9), loosen the screws 7), turn the screw 4) until the desired eccentricity is obtained;
➤ 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.

At every eccentricity variation it may be necessary to offset the stroke by means of the nut and locknut 6).

Note

- 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.
- At the end of the adjustment, manually check that between 20° and 130° there is no sticking and that the maximum and minimum pressures correspond to the one selected according the diagram (Fig. 15 on page 17).
- 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.

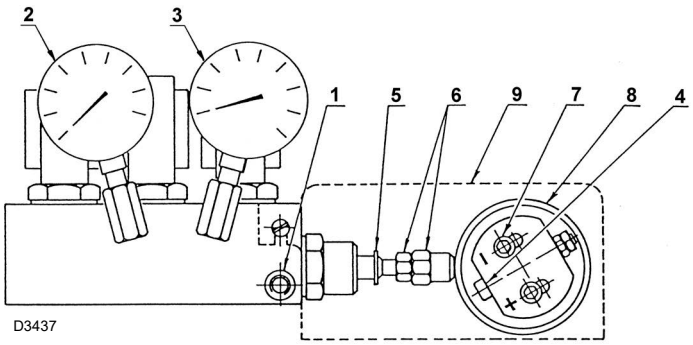


Fig. 20

Key

1 Pressure switch connection
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
9 Cover

4.14 Pump

4.14.1 Technical data

Pump		GI/EMME 1400 TA2C	GI/EMME 2000 TA3C	GI/EMME 3000 TA4C	GI/EMME 4500 TA5C
Min. delivery rate at 40 bar pressure	kg/h	350	540	730	1000
Delivery pressure range	bar	7 - 40	7 - 40	7 - 40	7 - 40
Max. suction depression	cm Hg	30	30	30	30
Viscosity range	cSt	4 - 800	4 - 800	4 - 75	4 - 75
Maximum light oil temperature	°C	140	140	140	140
Max. suction and return pressure	bar	5	5	5	5
Pressure calibration in the factory	bar	25	25	25	25

Tab. K

4.14.2 Priming pump (example)

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 self-priming to take place, the screw 4) on the pump (Fig. 21) must be loosened to bleed off 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).

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 flame 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 3)(Fig. 21) 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.

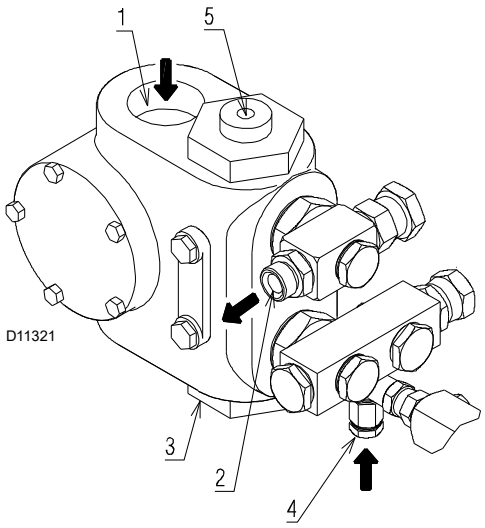


Fig. 21

Key (Fig. 21)
1 Suction line
2 Return line
3 Vacuometer connection
4 Pressure gauge connection
5 Pressure adjuster

4.15 Gas supply

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

Precautions: avoid knocking, attrition, sparks and heat.

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

ATTENTION

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

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

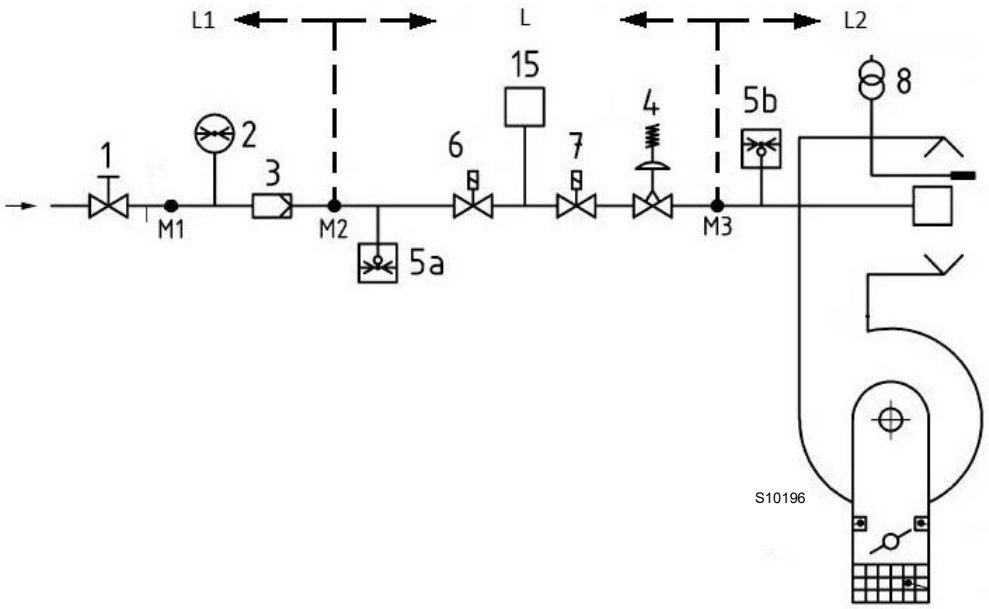


Fig. 22

Key (Fig. 22)

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

4.15.2 Gas train

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

4.15.3 Gas train installation


DANGER

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. 23).

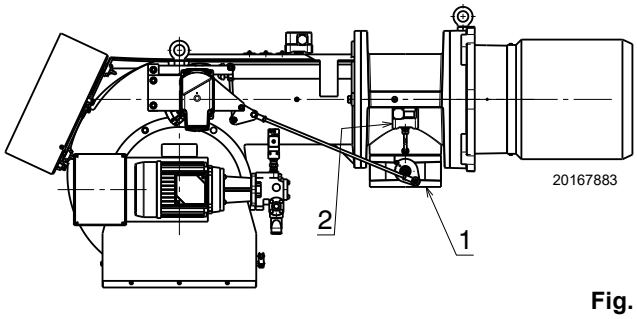


Fig. 23

4.15.4 Gas pressure

Fig. 24, Fig. 25, Fig. 26 and Fig. 27 on page 25 indicate the minimum pressure drops along the gas supply line, depending on the maximum burner output.

The values shown in Fig. 24, Fig. 25, Fig. 26 and Fig. 27 on page 25 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)

Combustion head pressure drop

Gas pressure measured at the test point 2)(Fig. 23), with:
- Combustion chamber at 0 mbar;
- Burner working at maximum output;
- Combustion head adjusted as in page 18.

To calculate the approximate maximum output of the burner in this way:
– subtract the combustion chamber pressure from the gas pressure measured at test point 2)(Fig. 23).
– Find, in the Fig. 24, Fig. 25, Fig. 26 and Fig. 27 on page 25 for the chosen burner, the pressure value closest to the result of the subtraction.
– Read the corresponding output.


ATTENTION

The data of thermal output and combustion head gas pressure are related to full open (90°) gas butterfly valve.

Example G/M 3000 with G20 natural gas:
Maximum output operation

Gas pressure at test point 2)(Fig. 23)	=	32.9 mbar
Pressure in combustion chamber	=	5 mbar
32.9 - 5	=	27.9 mbar

A pressure of 27.9 mbar, corresponds in the Fig. 24, Fig. 25, Fig. 26 and Fig. 27 on page 25 to an output of 2983 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 2)(Fig. 23), set the MAX output required from the burner operation:
– find the nearest output value in the Fig. 24, Fig. 25, Fig. 26 and Fig. 27 on page 25 for the chosen burner.
– Read the pressure at the test point 2)(Fig. 23).
– Add this value to the estimated pressure in the combustion chamber.

Example for G/M 3000 with G20 natural gas:
Required burner maximum output operation: 2983 kW

Gas pressure at an output of 2983 kW	=	27.9 mbar
Pressure in combustion chamber	=	5 mbar
27.9 + 5	=	32.9 mbar

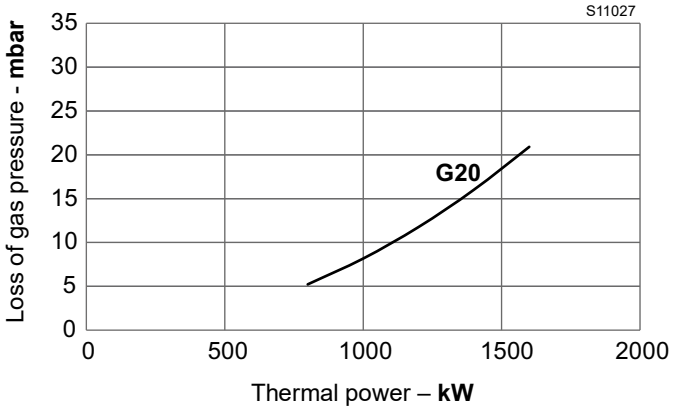
Pressure required at test point 2)(Fig. 23).

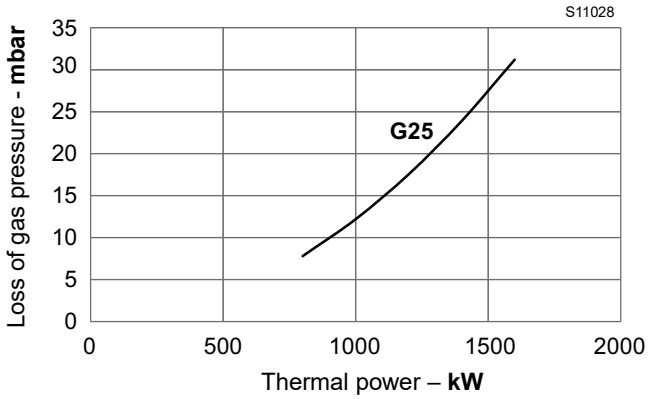
Example G/M 3000 with natural gas G20:
Operation at maximum modulating output

Gas pressure at an output of 8000 kW	=	27.9 mbar
Pressure in combustion chamber	=	5 mbar
27.9 + 5	=	32.9 mbar

pressure required at test point 2)(Fig. 23).

G/M 1400





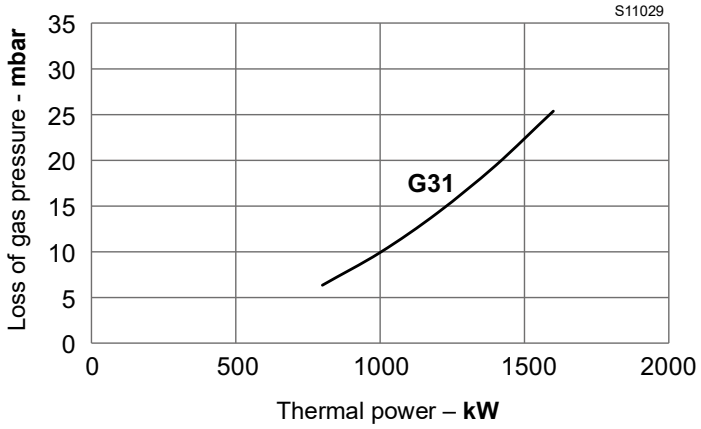
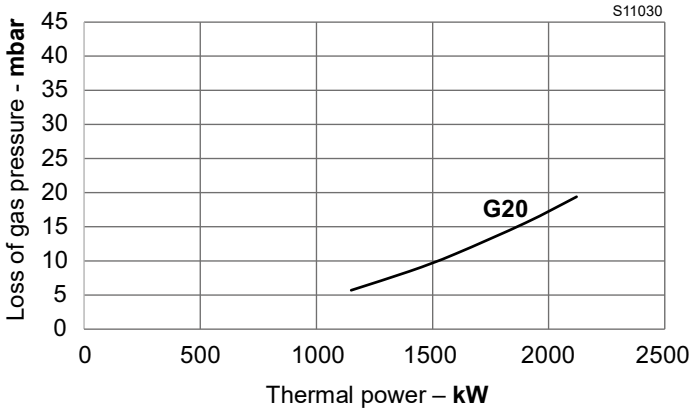
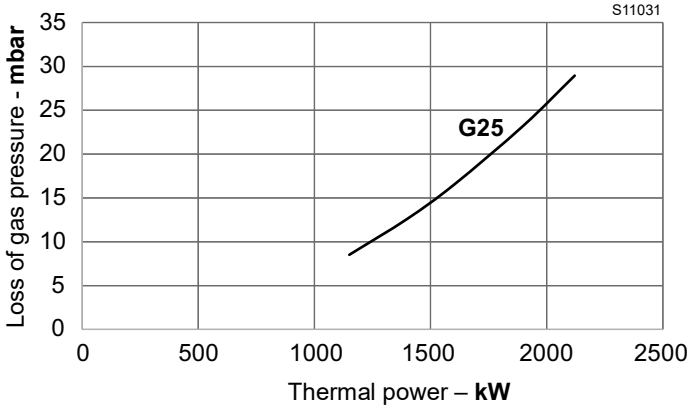


Fig. 24

G/M 2000





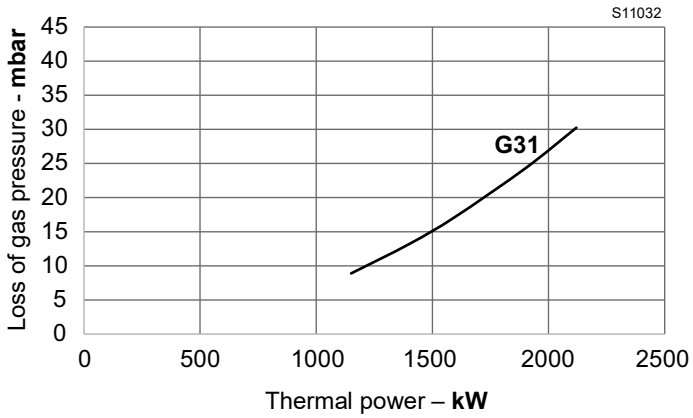
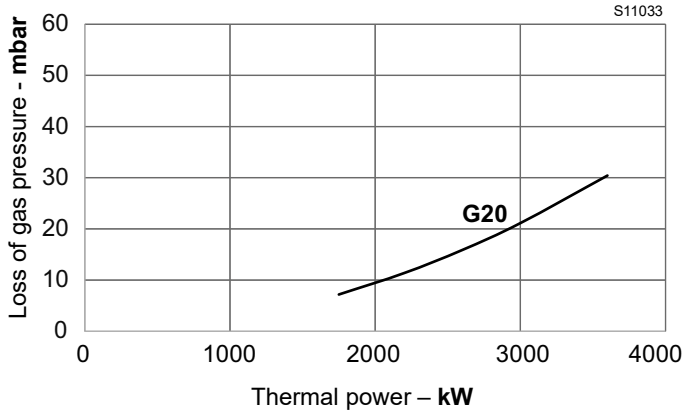
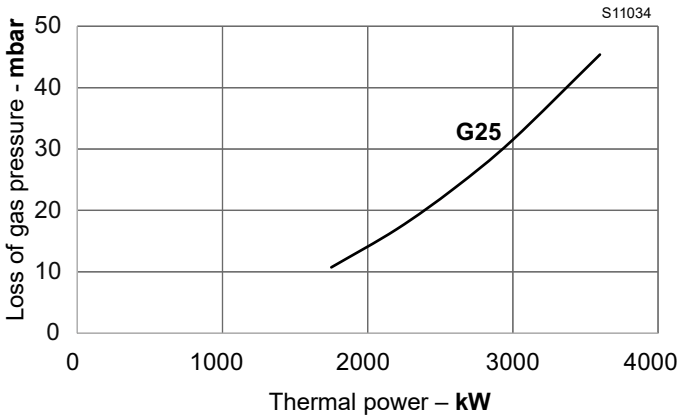


Fig. 25

G/M 3000





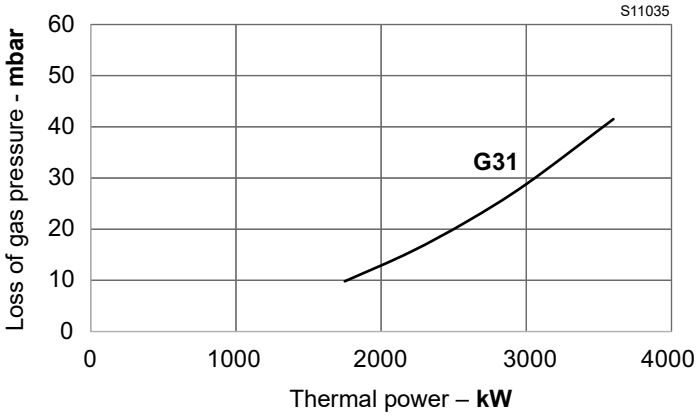
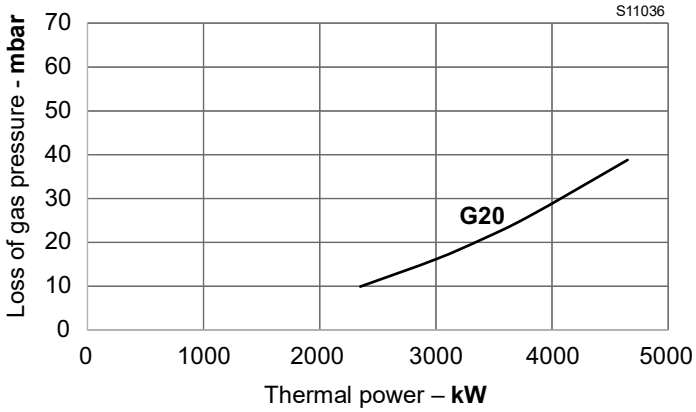
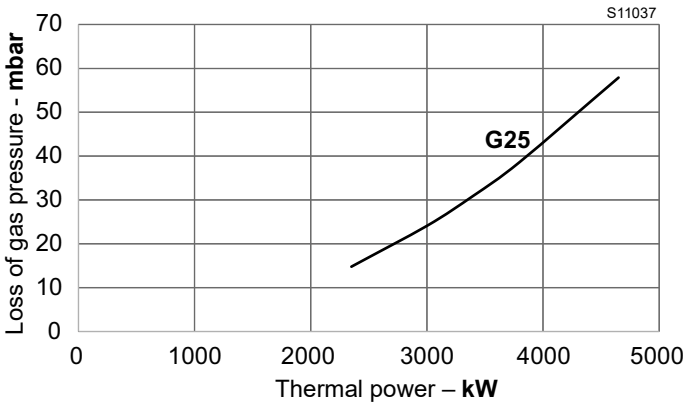


Fig. 26

G/M 4500





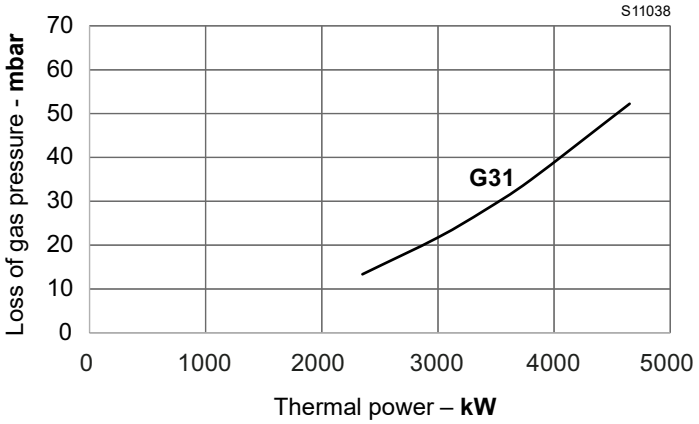


Fig. 27

4.16 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.

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.

4.16.1 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. 28.

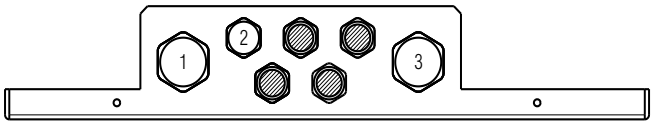


Fig. 28

Key (Fig. 28)

1	Pg29	Three-phase power supply
2	Pg13.5	Single-phase power supply
3	Pg29	TR remote control, TL, gas valve and leak test

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

4.17 Calibration of the thermal relay

The thermal relay (Fig. 29) 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.

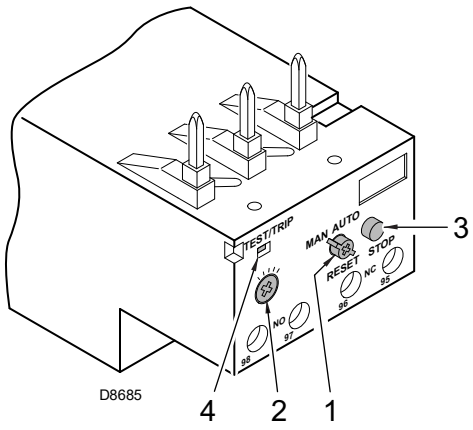


Fig. 29

4.18 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. 30).

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.

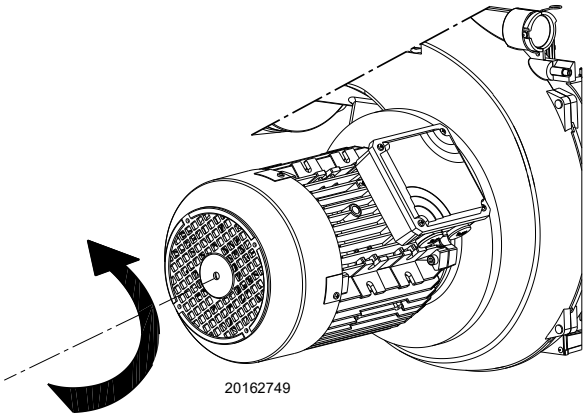


Fig. 30

5 Start-up, calibration and operation of the burner

5.1 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 38.

5.2 Adjustments prior to ignition (light oil)

ATTENTION

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

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.

5.2.1 Nozzle

See information on page 17.

5.2.2 Combustion head

The adjustment of the combustion head already carried out on page 18 need not to be altered unless the 2nd stage output of the burner is changed.

5.2.3 Pump pressure

In order to change pump pressure, act on screw 17)(Fig. 4 on page 10). See information on page 21.

5.2.4 Fan damper

Refer to the adjustment of the servomotor on page 30.

5.3 Burner ignition (light oil)

Position the selector 11)(Fig. 6 on page 11) on "**OIL**".

When the limit thermostat (TL) is closed, the "**CALL FOR HEAT**" 3) request is sent.

At first ignition, there is a momentary drop in fuel pressure due to the filling of the nozzle piping. This lowering of the fuel pressure can cause the burner to lockout and can sometimes give rise to pulsations.

If the burner locks out again, refer to chapter "Faults - Possible causes - Solutions" on page 42.

Once the following adjustments have been made, the ignition of the burner must generate a noise similar to the noise generated during operation.

5.4 Adjustments prior to ignition (gas)

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 (Fig. 37 on page 34) to the start of the scale.
- ➤ Adjust the maximum gas pressure switch (Fig. 36 on page 34) to the end of the scale.
- ➤ Adjust the air pressure switch (Fig. 35 on page 34) 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. 31), with socket (+) on the gas pressure of the pipe coupling and (-) in the combustion chamber.
  Used to approximately calculate the MAX burner output.
- ➤ Connect two lamps or testers to the two gas line 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.

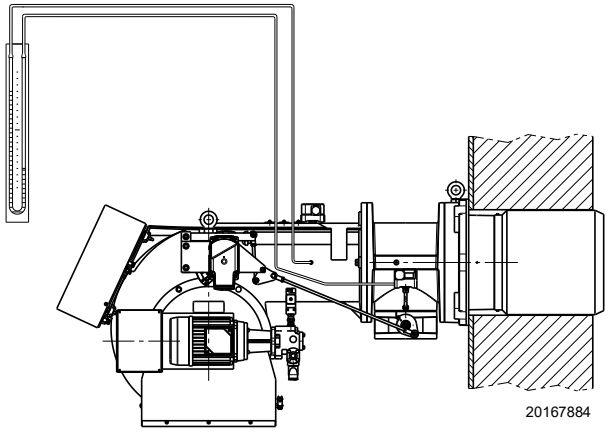


Fig. 31

5.5 Burner start-up (gas)

Close the remote controls and set the switch 11)(Fig. 5 on page 10) to “**AUTO**”.

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.

When the limit thermostat (TL) closes, the heat request is sent and the burner begins the starting cycle.

5.6 Burner ignition

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

If ignition does not occur, it is possible that gas is not reaching the combustion head within the safety time period of 3 seconds. Therefore, it is necessary to increase gas ignition delivery.

The arrival of gas to the sleeve is indicated by the U-type pressure gauge (Fig. 31).

If the burner locks out again, refer to chapter "Faults - Possible causes - Solutions” on page 42.

ATTENTION

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.

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

5.7 Servomotor adjustment

The servomotor adjusts simultaneously, through driving gears, the output and pressure of the air and the delivery of the fuel in use. It performs a 130° rotation in 45s. After the adjustment made in the factory to its 6 cams to allow an initial ignition.

Check that they are as shown below.

In the event of a modification, follow what is described below for each cam:

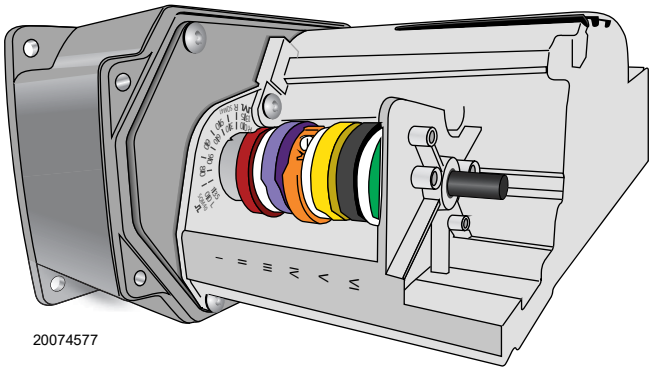


Fig. 32

Cam I (RED): **130°** (The same for all models).
Limits rotation toward maximum position.

ATTENTION
Do not make any adjustments.

Cam II (BLUE): **0°** (The same for all models).
Limits rotation toward minimum position. With the burner off, the air damper is completely closed: 0°

ATTENTION
It is recommended that no adjustments are made.

Cam III (ORANGE): **20°** (The same for all models).
Adjusts the position of ignition and minimum output of gas fuel.

Cam IV (YELLOW): **130°** (The same for all models).
Adjusts the position of the maximum output of gas fuel.

Cam V (BLACK): **20°** (The same for all models)
Adjusts the position of ignition and minimum output of oil fuel.

Cam VI (GREEN): **130°** (The same for all models)
Adjusts the position of the maximum output of oil fuel.

5.8 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 and gas damper and on the combustion head by appropriate levers.

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.

The values indicated in Tab. L and Tab. M can be a reference for a good combustion calibration.

EN 676		Air excess		CO
		Max. output $\lambda \leq 1.2$	Max. output $\lambda \leq 1.3$	
GAS	Theoretical max CO_2 0 % O_2	CO_2 % Calibration		mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$	
G 20	11.7	9.7	9	≤ 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. L

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. M

5.9 Ignition output of the burner

ATTENTION

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

5.10 Air / fuel adjustment

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

A Oil pump delivery pressure:
act on the screw 5)(Fig. 4 on page 10) located on the pump.

B Air cam:
act on the adjustment screws 2)(Fig. 35) after having loosened the screws 3).

C Gas cam:
act on the adjustment screws 2)(Fig. 34) after having loosened the screws 3).

D Oil cam:
modify the eccentricity by acting on the screw 4)(Fig. 33) after having loosened the screws 7).
By tightening the screw 4) the eccentricity increases, thereby increasing the difference between the maximum and minimum return pressure of the nozzle.

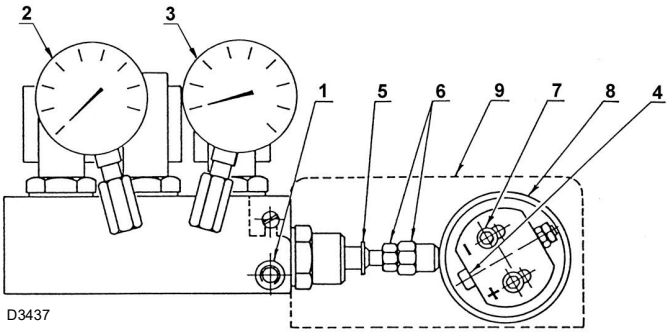


Fig. 33

Key (Fig. 33)
1 Pressure switch connection
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
9 Cover

5.10.1 Air cam

Use the adjusters 2)(Fig. 34) after loosening the screws 3).

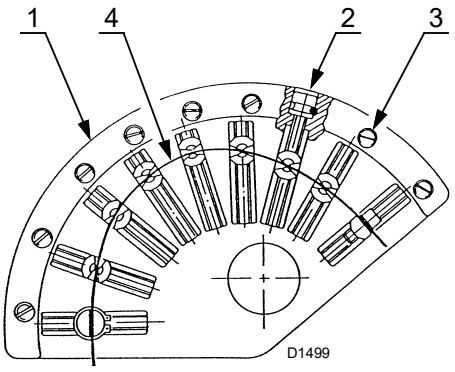


Fig. 34

Key (Fig. 34)
1 Cam
2 Adjustment screws
3 Locking screws
4 Adjustable profile

5.10.2 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 small button placed under its cams, 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 in manual "**MAN**". At this point, after the pre-purging phase, the servomotor stops at about 45°.
- ➤ 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. 33) must be varied by means of nut 6).
- ➤ Calibrate the air delivery by adjusting the variable profile cam with the screws 2)(Fig. 34).
- ➤ 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 5)(Fig. 33), 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.
- ➤ Turn off the burner and wait for the complete shut-down of the fan motor.
- ➤ Now move the selector 11)(Fig. 6 on page 11) to "**GAS**", perform a new ignition and check the correct gas operation 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. 34).

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.

5.11 Pressure switch adjustment

5.11.1 Air pressure switch

The air pressure switch is set after all other adjustments have been made. Begin with the switch at the start of the scale. With the burner operating, increase adjustment pressure by slowly turning the relevant knob clockwise until the burner stops. Then turn the knob anticlockwise by 0.1 kPa (1 mbar) and repeat burner start-up to ensure it is operating regularly.

If the burner locks out again, turn the knob again anti-clockwise by 0.5 mbar.

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%.

ATTENTION

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

5.11.2 Maximum gas pressure switch

Adjust the maximum gas pressure switch (Fig. 36) 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.

5.11.3 Minimum gas pressure switch

Adjust the minimum gas pressure switch (Fig. 37) 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

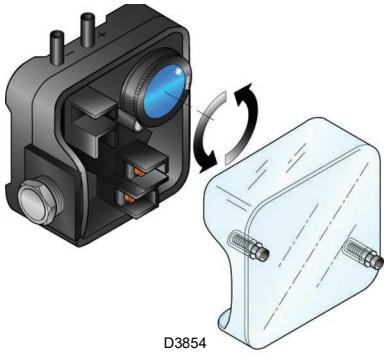


Fig. 35

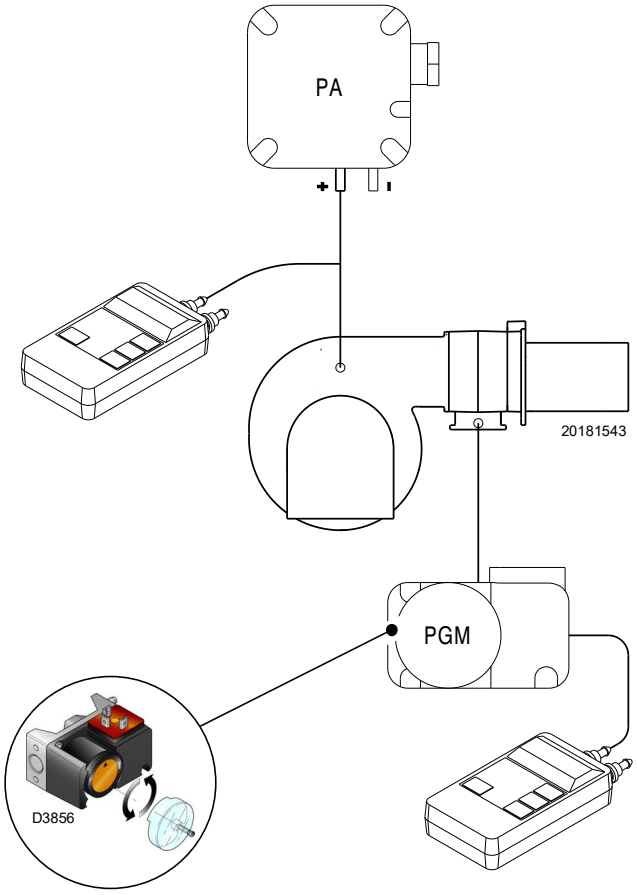


Fig. 36

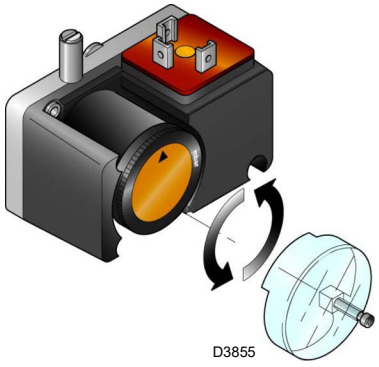


Fig. 37

5.11.4 Minimum oil pressure switch (Fig. 40)

The minimum oil pressure switch is calibrated in the factory at 16-18 bar. If the oil pressure falls below this value in the delivery line, the pressure switch stops the burner.

The burner restarts automatically if the pressure goes above bar value set after the burner starts.

5.11.5 Maximum oil pressure switch (Fig. 41)

The maximum oil pressure switch is calibrated in the factory at 4-5 bar. If the oil pressure in the return line goes above this value, the pressure switch stops the burner in a lockout.

To adjust the pressure switches, use a tool to operate the adjustment screw.

5.11.6 Air bleeding (Fig. 38)

It is carried out by opening the relevant screw placed on the minimum gas pressure switch fitted on the gas train.

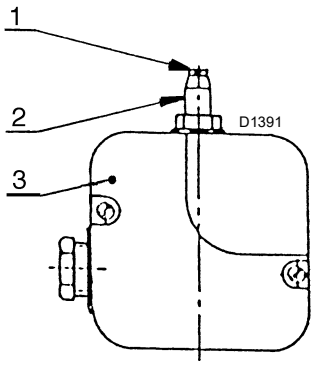


Fig. 38

Key (Fig. 38)

1 - Screw

2 - Connection for pressure measurement

3 - Pressure switch

5.11.7 Gas butterfly valve

The gas butterfly valve is equipped with an external adjustment, see Fig. 39, that can facilitate the following calibration of the cam in case of low pressure values available in the network. By means of ring nut **B** it is possible to modify the passage section to the minimum setting.

– 0 minimum opening
– 2 maximum opening

At the end of the adjustment lock with dowel **A**.

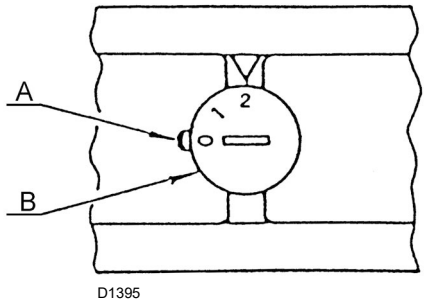


Fig. 39

AIR / GAS ratio adjustment

The adjustment of the gas delivery to that of the air must be carried out after defining the light oil operation conditions, and can be obtained by varying the cam profile.

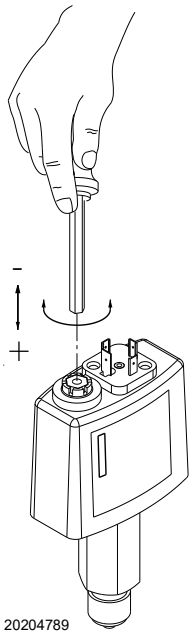


Fig. 40

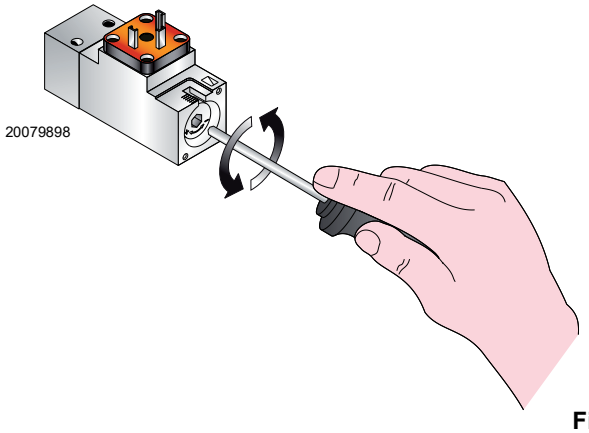


Fig. 41

5.12 Burner operation

5.12.1 Burner start-up

(gas trains in compliance with EN 676)

0s : Control remote control TL closes.
Fan servomotor start-up.

6s : Servomotor start-up: turn to the right by 130°, i.e. until the contact intervenes on cam I (Fig. 32 on page 30).
The air damper is positioned to MAX output.

51s : Pre-purging stage with MAX output air delivery.
Duration 31 seconds.

82s : The servomotor rotates to the left until reaching the angle set on cam III at 20° (Fig. 32 on page 30), ranging from 10° and 30°.

117s : The air damper and gas butterfly valve assume the MIN output position (with cam III at 20°)(Fig. 32 on page 30).

120s : Ignition electrode strikes a spark.

126s : The safety valve VS opens, along with the adjustment valve VR, (quick opening). The flame is ignited at a low output level, point A.
The output is then progressively increased, with the valve opening slowly up to MIN output, point B.

129s : The spark goes out.

150s : The start-up cycle ends

5.12.2 Steady state operation

Burner without RWF50 output regulator

At the end of the start-up cycle, the servomotor control switches to TR remote control that controls the pressure or temperature in the boiler, point C. (The flame control carries on checking the presence of the flame and the correct position of the air and gas maximum pressure switches).

- If the temperature or pressure is low (so the TR remote control is closed), the burner progressively increases the output up to the MAX value (section C-D).
- 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 remote control opens, the servomotor returns to angle 0° limited by the contact of the cam I)(Fig. 32 on page 30). The air damper closes completely to reduce heat losses to a minimum.

Upon every output change, 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 RWF50

See the manual supplied with the regulator.

Burner flame goes out during operation

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

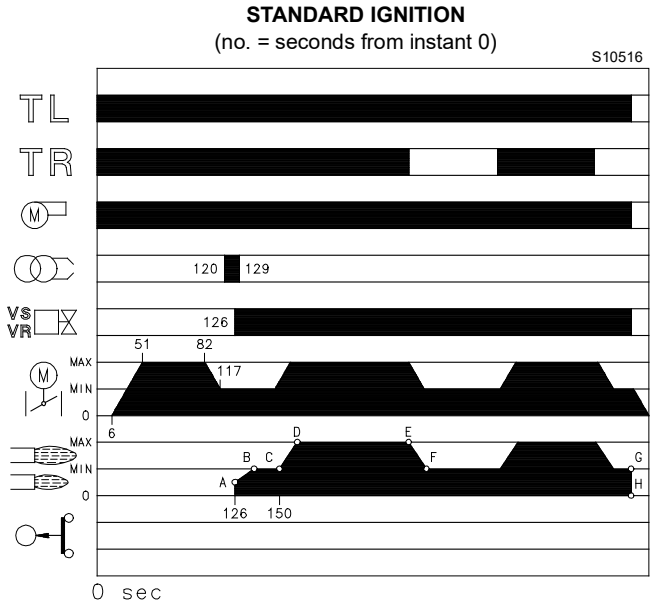


Fig. 42

5.12.3 Ignition failure

If the burner does not ignite, it locks out within 3 seconds after the gas valve opens, 129 seconds after the TL closes and the post-purging phase starts lasting 17 seconds.

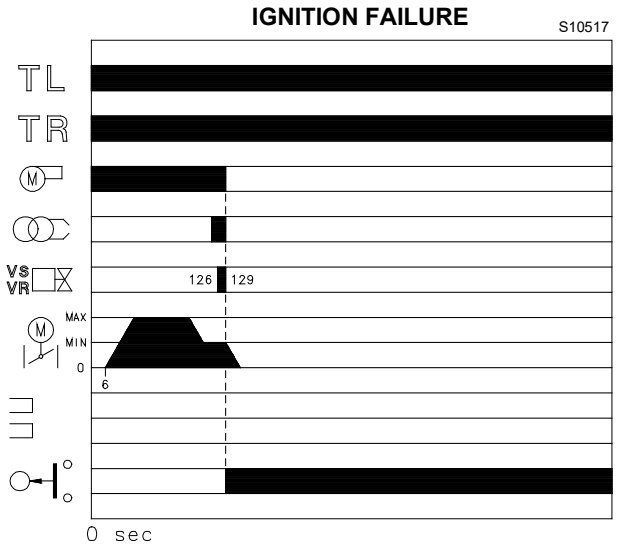


Fig. 43

5.13 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. N

ATTENTION

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

6 Maintenance

6.1 Notes on safety for the maintenance

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

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


DANGER

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

Before carrying out any maintenance, cleaning or checking operations:


DANGER

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


DANGER

Close the fuel shut-off valve.

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

6.2 Maintenance programme

6.2.1 Maintenance frequency

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

6.2.2 Safety test - with no gas supply

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

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

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

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

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

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

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


ATTENTION

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

6.2.3 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.

Combustion head maintenance

During burner opening, it is recommended to support its weight with suitable means or through the relevant wheeled support supplied upon request.

Repeat the operations described in paragraph "Lifting points” on page 16 using the relevant extensions, for pins 5)(Fig. 46 on page 42), supplied as standard.

Burner
Check that there is no excess wear or loosen screws, especially on cams 3)(Fig. 32 on page 30).
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.

Electrical current to flame sensor (Fig. 44)

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.

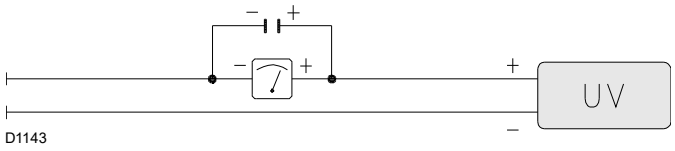


Fig. 44

6.2.4 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
Fan impeller	10 years or 500,000 start-ups

Tab. O

LIGHT OIL OPERATION

Pump

The delivery pressure must comply with the graph on page 17.
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.

Filters

Check the filtering baskets on line and at nozzle 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.

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		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. P

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

Tab. Q

6.3 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.

To separate the burner from the combustion head, proceed as follows (Fig. 45):

- ➤ Remove the cover from the shelf 1), the pin 2), the retainers 4) and the screws 3).
- ➤ Disconnect the pipes 6).
- ➤ Disconnect the tie-rod of the gas butterfly valve removing the screw 11).
- ➤ Pull out the burner from the combustion head by approx. 100÷120 mm and release the driving fork 7) by removing the screws 10).
- ➤ At this point, it is possible to fully pull out the burner from the pins 5).
- ➤ Fix the blast tube to the boiler by inserting the insulating flange gasket 9) in-between.
- ➤ Fit the burner on the pins 5) leaving it open by approx. 100 ÷ 120 mm.
- ➤ Refit the fork 7) fixing it with the screws 10).
- ➤ Completely close the burner fastening it with screws 3), fit the retainers 4), the split pin 2), the gas butterfly valve tie-rod 11) and the pipes 6).
- ➤ With burner open, it is possible to separate the gas sleeve 8) from the blast tube.

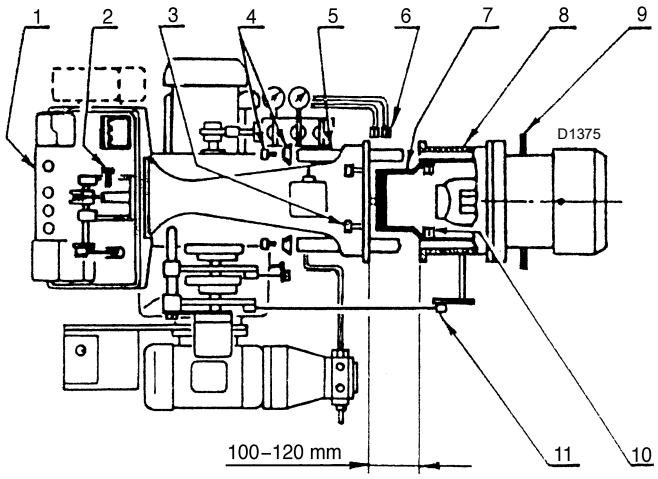


Fig. 45

6.4 Closing the burner

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

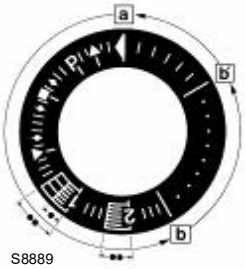
After carrying out maintenance, cleaning or checking operations, reassemble the cover and all the safety and protection devices of the burner.

7 Faults - Possible causes - Solutions

The LFL1... flame control is equipped with a lockout indicator (Fig. 46) 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. 47.



Lockout indicator

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

Fig. 46

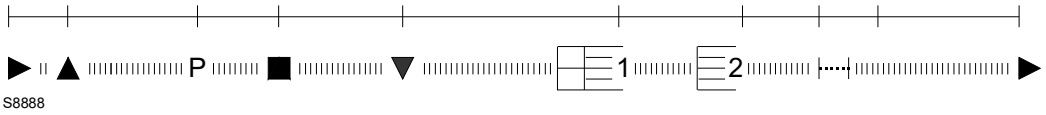


Fig. 47

Fuse replacement

The fuse 2)(Fig. 48) 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. 48.

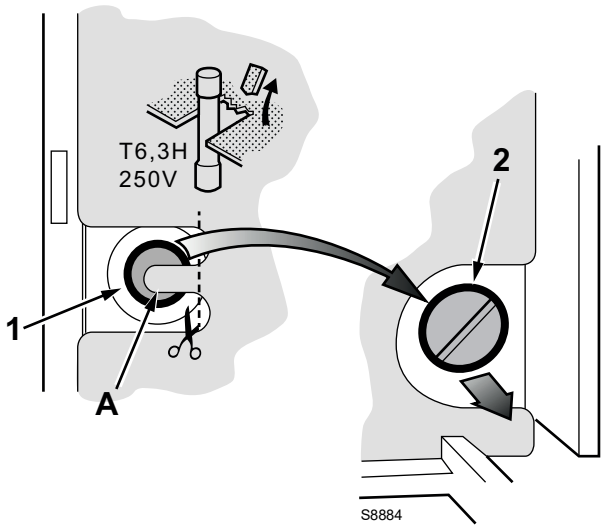


Fig. 48

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.

ATTENTION

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.

7.1 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. R

7.2 Gas operation

Symbol	Problem	Probable cause	Suggested remedy
◀	The burner does not start	No electrical power supply	Close all switches and check connections
		A limit or safety thermostat/pressure switch open	Adjust or replace
		Flame control lockout	Release the flame control
		Flame control fuse interrupted	Replace it
		Incorrect electrical wiring	Check
		Defective flame control	Replace
		No gas supply	Open the manual valves between meter and train
		Mains gas pressure insufficient	Contact your GAS COMPANY
		Minimum gas pressure switch fails to close	Adjust or replace
		Air pressure switch in operating position	Adjust or replace
		The servomotor contact does not intervene (closure cam 0°)	Adjust the closure cam 0° or replace the servomotor
	The burner does not come on and the lockout appears	Flame simulation	Replace the flame control
		Faulty motor remote control switch	Replace
		Defective electrical motor	Replace
		Motor lockout	Release the thermal relay
▲	The burner starts but stops at maximum air damper setting	The servomotor contact does not intervene (maximum cam opening)	Cam adjustment (maximum opening) or replace the servomotor
P	The burner starts and then goes into lockout	Air pressure switch does not switch owing to lack of air pressure:	
		Air pressure switch poorly adjusted	Adjust or replace
		Pressure switch pressure point pipe clogged	Clean
		Poorly adjusted head	Adjust
		Dirty fan	Clean
		High depression in the furnace	Contact our Technical Department
■	The burner turns on and then remains in lockout mode	Failure to the flame detection circuit	Replace the flame control
▼	The burner remains in pre-purging phase	The servomotor contact does not intervene (minimum cam)	Cam adjustment (minimum) or replace the servomotor

Symbol	Problem	Probable cause	Suggested remedy
1	Once the pre-purging and the safety time has elapsed the burner goes into lockout without the flame appearing	The GAS solenoid valve lets too little gas through	Increase
		The GAS solenoid valve does not open	Replace the coil or the rectifier panel
		Gas pressure too low	Increase pressure at governor
		Ignition electrode incorrectly adjusted	Adjust it
		Electrode grounded due to broken insulation	Replace
		High voltage cable defective or grounded	Replace
		High voltage cable deformed by high temperature	Replace and protect
		Faulty ignition transformer	Replace
		Incorrect valve or ignition transformer connections	Redo them
		Defective flame control	Replace
		A closed valve upstream the gas train	Open
		Air in pipework	Bleed air
	Lockout with flame appearing	The GAS solenoid valve lets too little gas through	Increase
		Dirty flame sensor	Check, replace flame sensor
		Faulty connection	Check, replace flame sensor
		Insufficient detection current (min.70 µA)	Measure current, replace flame sensor
		Flame sensor exhausted, faulty	Replace
		Maximum gas pressure switch intervention	Adjust or replace
		Defective flame control	Replace
	The burner continues to repeat the start-up cycle without lockout	The gas pressure in the gas mains lies very close to the value to which the gas pressure switch has been set. The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner stops. Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. And so on.	Reduce the intervention pressure of the minimum gas pressure switch. Replace the gas filter cartridge
	Lockout without symbol indication	Flame simulation	Replace the flame control
|	Burner goes into lockout during operation	Faulty flame sensor	Replace worn parts
		Air pressure switch faulty	Replace
◀	Lockout when the burner stops	Permanent flame in the combustion head or flame simulation	Eliminate permanency of flame or replace the flame control
	Ignition with pulsations	Poorly adjusted head	Adjust
		Ignition electrode incorrectly adjusted	Adjust it
		Incorrectly adjusted fan air damper: too much air	Adjust
		Output during ignition phase is too high	Reduce

Tab. S

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	20100018
Pressure	0...2.5 bar 0...16 bar	Output probe 4...20 mA	3010213 3010214	RWF55.5	20101965

Potentiometer kit

Burner	Code
GI/EMME 1400 - 2000 GI/EMME 3000 - 4500	3010021

Spacer kit

Burner	Thickness (mm)	Code
GI/EMME 1400 - 2000	102	3000722
GI/EMME 3000 - 4500	130	3000751

Soundproofing box kit

Burner	Type	dB(A)	Code
GI/EMME 1400 - 2000 GI/EMME 3000 - 4500	C7	10	3010376

LPG kit

Burner	Code
GI/EMME 1400 - 2000	3010063
GI/EMME 3000	3090223
GI/EMME 4500	3090937

Burner support kit

Burner	Code
GI/EMME 1400 - 2000 GI/EMME 3000 - 4500	3000731

Gas trains in compliance with EN 676

Please refer to manual.

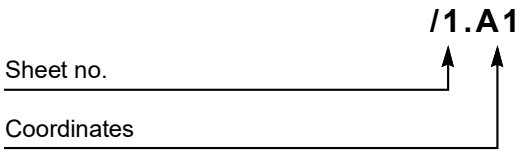
ATTENTION

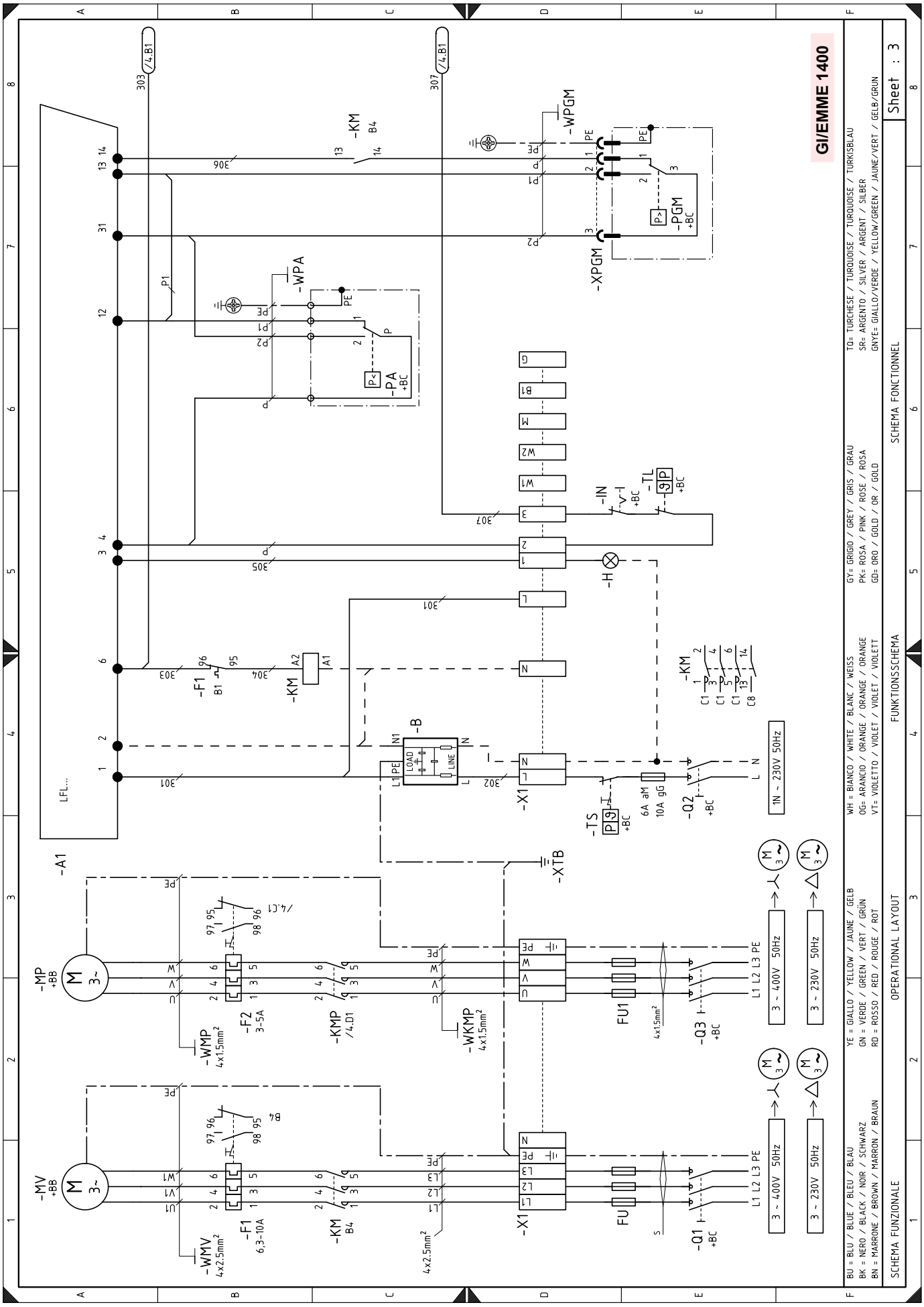
The installer is responsible for the addition of any safety device not foreseen in this manual.

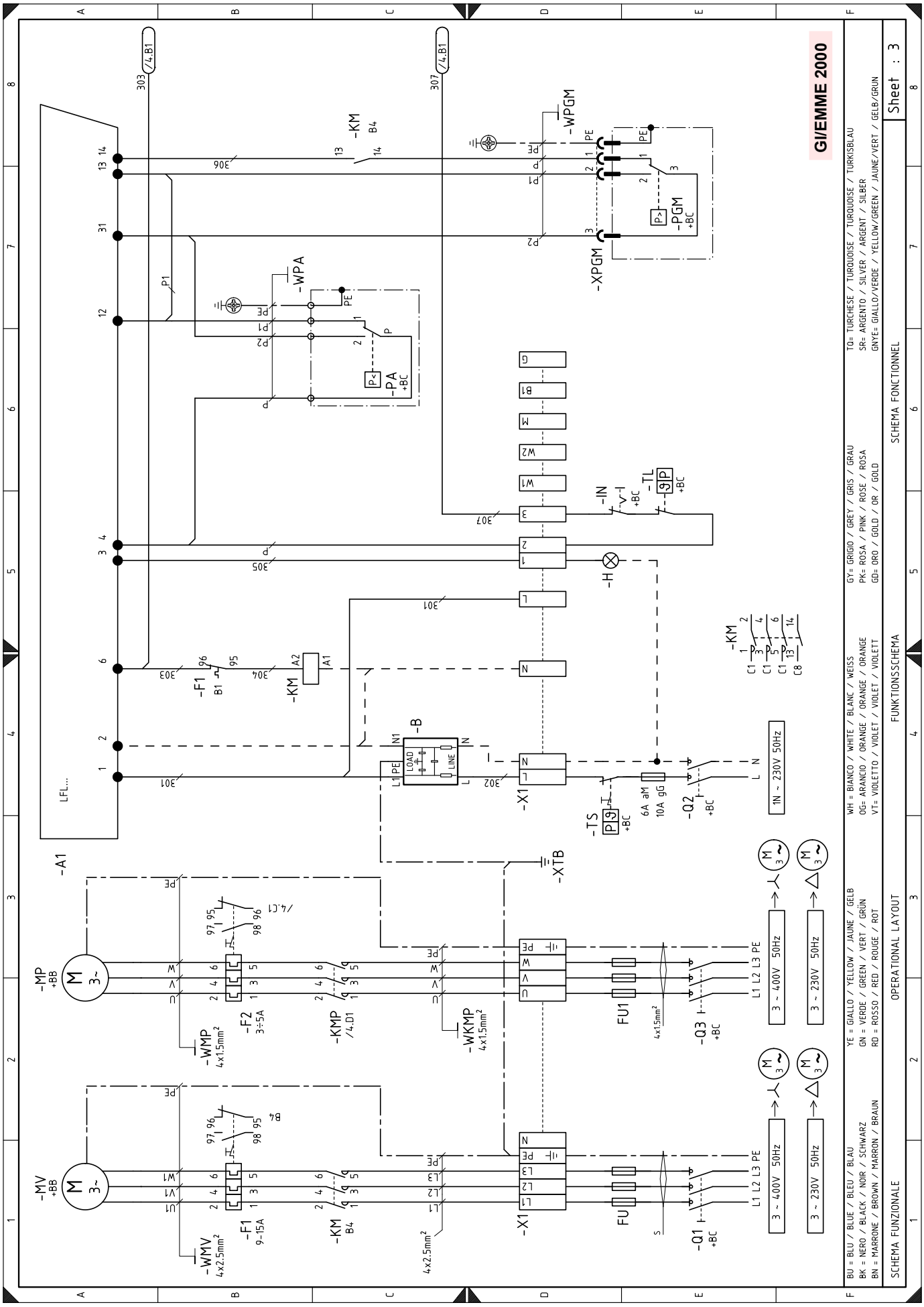
B Appendix - Electrical panel layout

1	**Index of layouts**
2	Indication of references
3	GI/EMME 1400 Functional layout GI/EMME 2000 Functional layout GI/EMME 3000 - 400V Functional layout GI/EMME 4500 - 400V Functional layout
4	GI/EMME 1400-2000-3000 Functional layout GI/EMME 4500 - 400V Functional layout
5	GI/EMME 1400-2000-3000 Functional layout GI/EMME 4500 S-T Functional layout
6	GI/EMME 1400-2000-3000 Functional layout GI/EMME 4500 S-T Functional layout
7	GI/EMME 1400 Electrical wiring that is the responsibility of the installer GI/EMME 2000 Electrical wiring that is the responsibility of the installer GI/EMME 3000 - 400V Electrical wiring that is the responsibility of the installer GI/EMME 4500 S-T Functional layout
8	GI/EMME 2000-3000 Functional layout GI/EMME 4500 - 400V Electrical wiring that is the responsibility of the installer
9	GI/EMME 4500 S-T Functional layout

2 Indication of references




GI/EMME 1400
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
-A1
-MP
-MV
-WMP
-WMV
-F1
-F2
-KM
-KMP
-WKMP
-X1
-XTB
-B
-H
-IN
-TL
-TS
-WPA
-PA
-WPGM
-XPGM
-PGM
-Q1
-Q2
-Q3
FU
FU1
LFL....
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
6A aM
10A gG


GI/EMME 2000
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OPERATIONAL LAYOUT
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SCHEMA FONCTIONNEL
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-WMP
-WMV
-WKMP
-F1
-F2
-KM
-KMP
-B
-X1
-XTB
-Q1
-Q2
-Q3
-FU1
-FU
-H
-IN
-TL
-TS
-WPA
-PA
-WPGM
-XPGM
-PGM
LFL...
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
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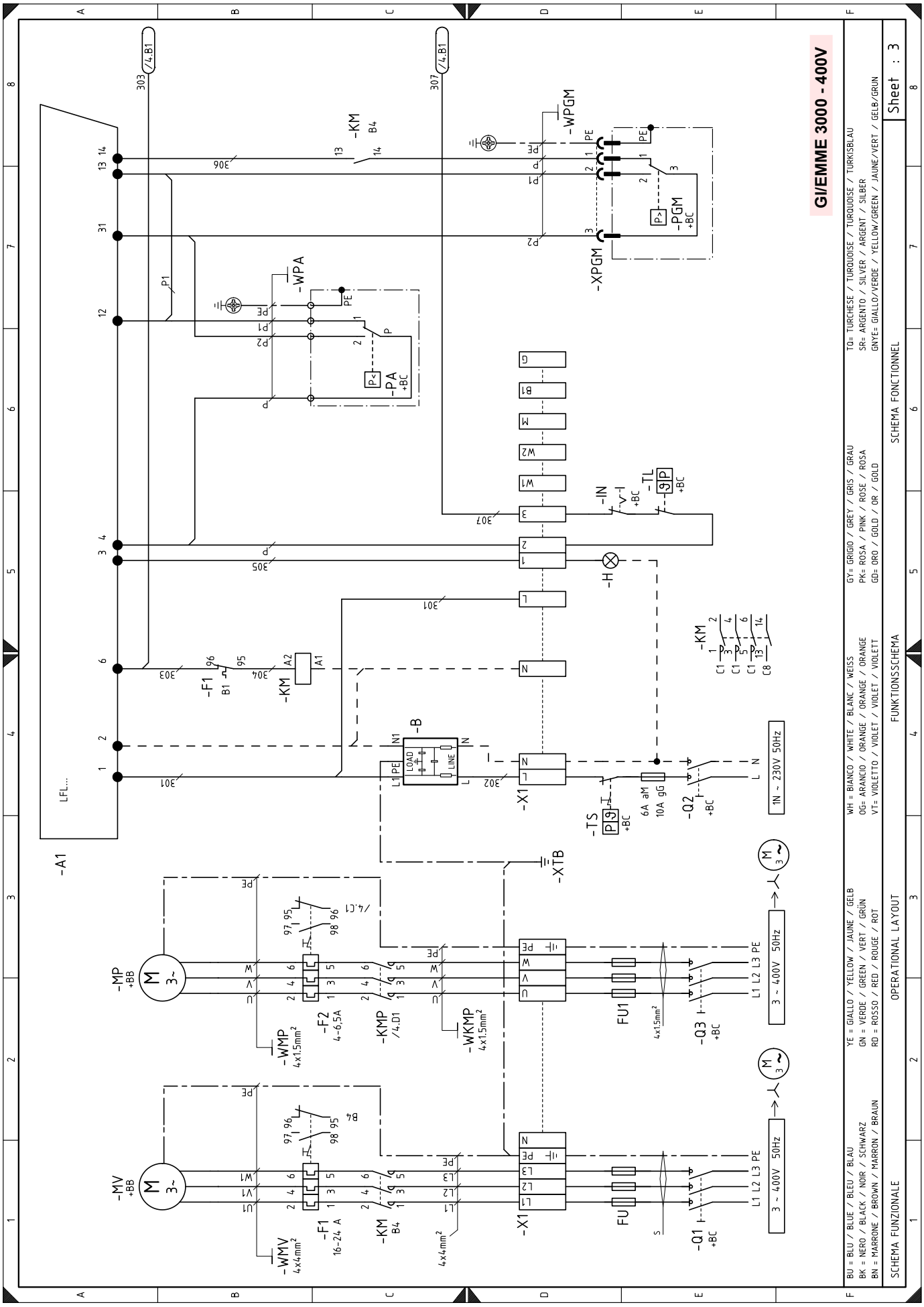
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


GI/EMME 3000 - 400V
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OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
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-WMP
-WMV
-WPA
-WPGM
-XPGM
-PA
-PGM
-KM
-F1
-F2
-KMP
-WKMP
-B
-X1
-XTB
-H
-IN
-TL
-TS
-Q1
-Q2
-Q3
FU1
FU
3 ~ 400V 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
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WH = BIANCO / WHITE / BLANC / WEISS
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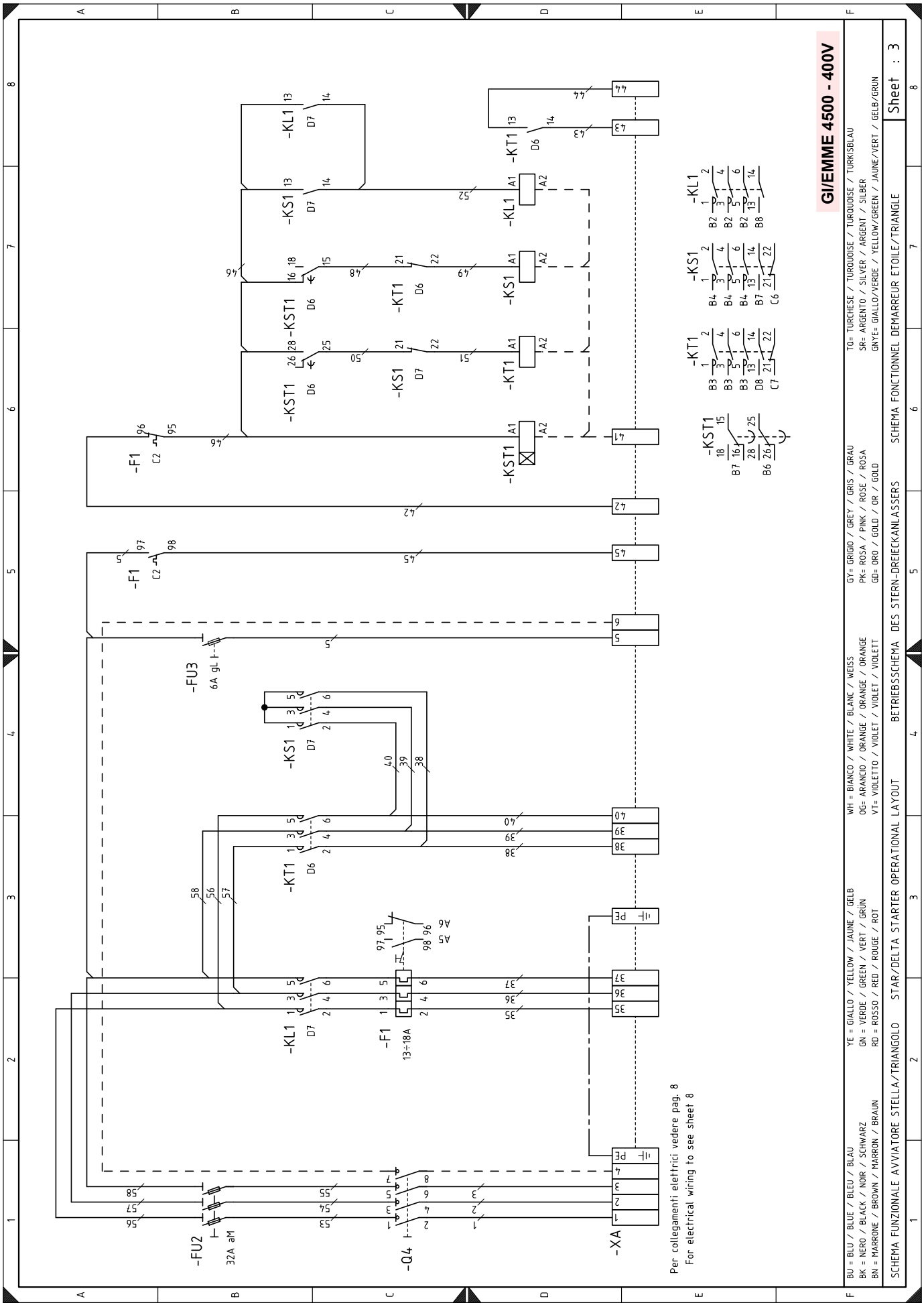
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


GI/EMME 4500 - 400V
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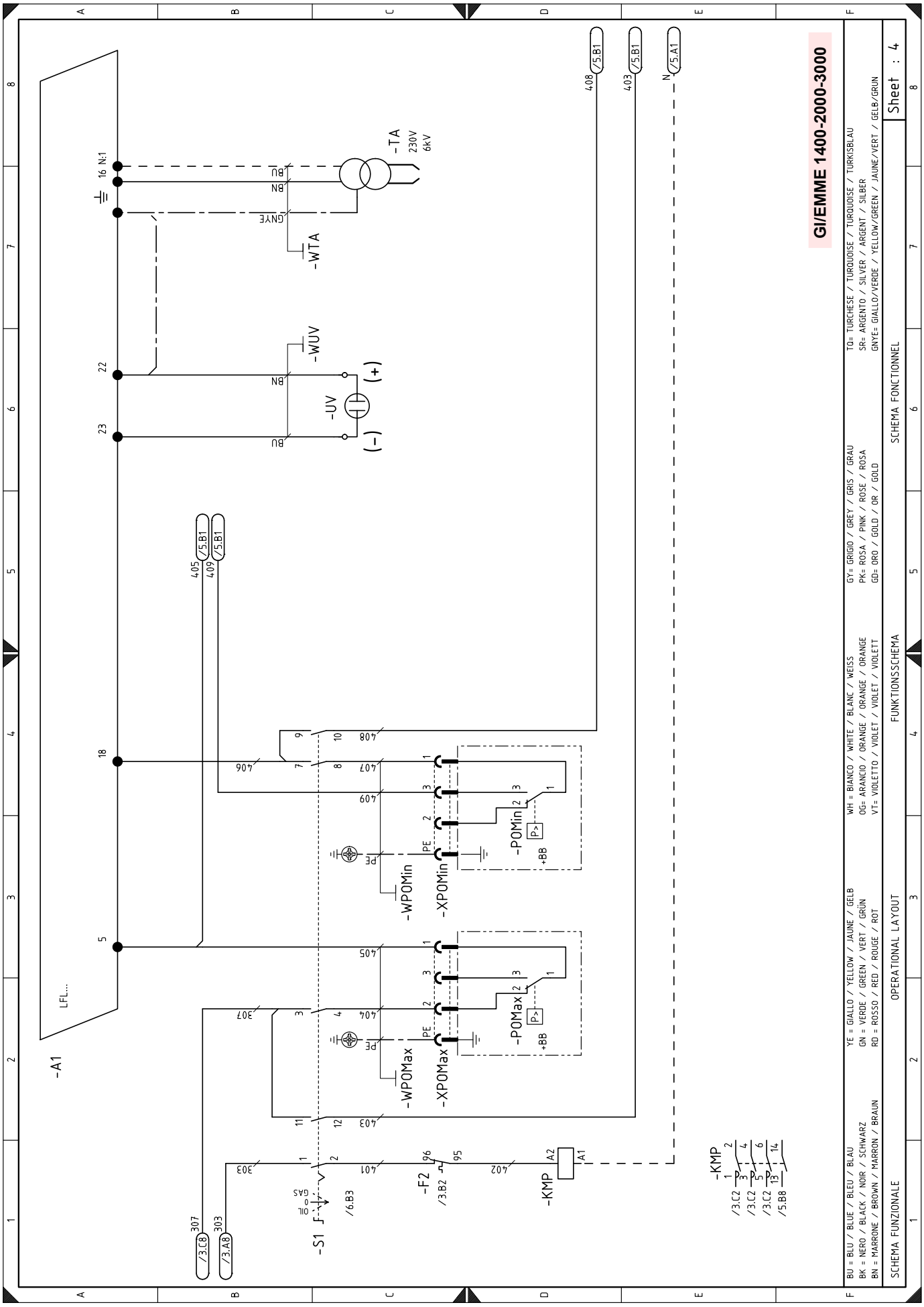
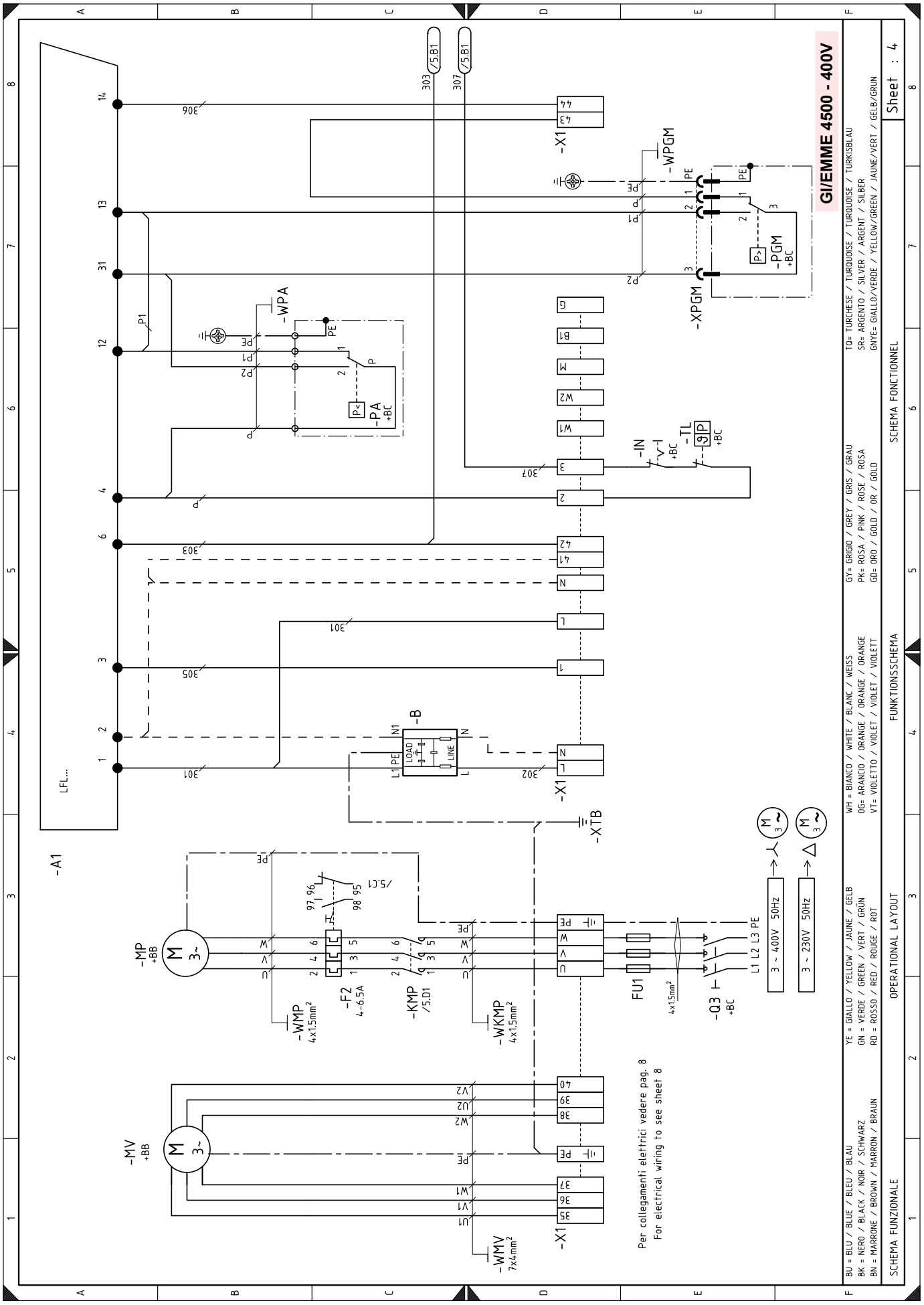
Sheet : 3
Per collegamenti elettrici vedere pag. 8
For electrical wiring to see sheet 8
-F1
-FU2
-FU3
-KS1
-KT1
-KL1
-KST1
-Q4
-XA


GI/EMME 1400-2000-3000
-A1
LFL....
-TA
230V
6kV
-WTA
-WUV
-UV
(+)
(-)
-wPOMin
-XPOMin
-POMin
-wPOMax
-XPOMax
-POMax
-S1
-F2
-KMP
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 4
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


GI/EMME 4500 - 400V
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 4
-A1
-MP +BB
-MV +BB
-WMP 4x1.5mm²
-WKMP 4x1.5mm²
-WMV 7x4mm²
-F2 4-6.5A
-KMP /5.D1
-Q3 +BC
FU1
-B
-XTB
-X1
-WPA
-PA +BC
-WPGM
-XPGM
-PGM +BC
-IN +BC
-TL +BC
3 ~ 400V 50Hz
3 ~ 230V 50Hz
L1 L2 L3 PE
Per collegamenti elettrici vedere pag. 8
For electrical wiring to see sheet 8
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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PK= ROSA / PINK / ROSE / ROSA
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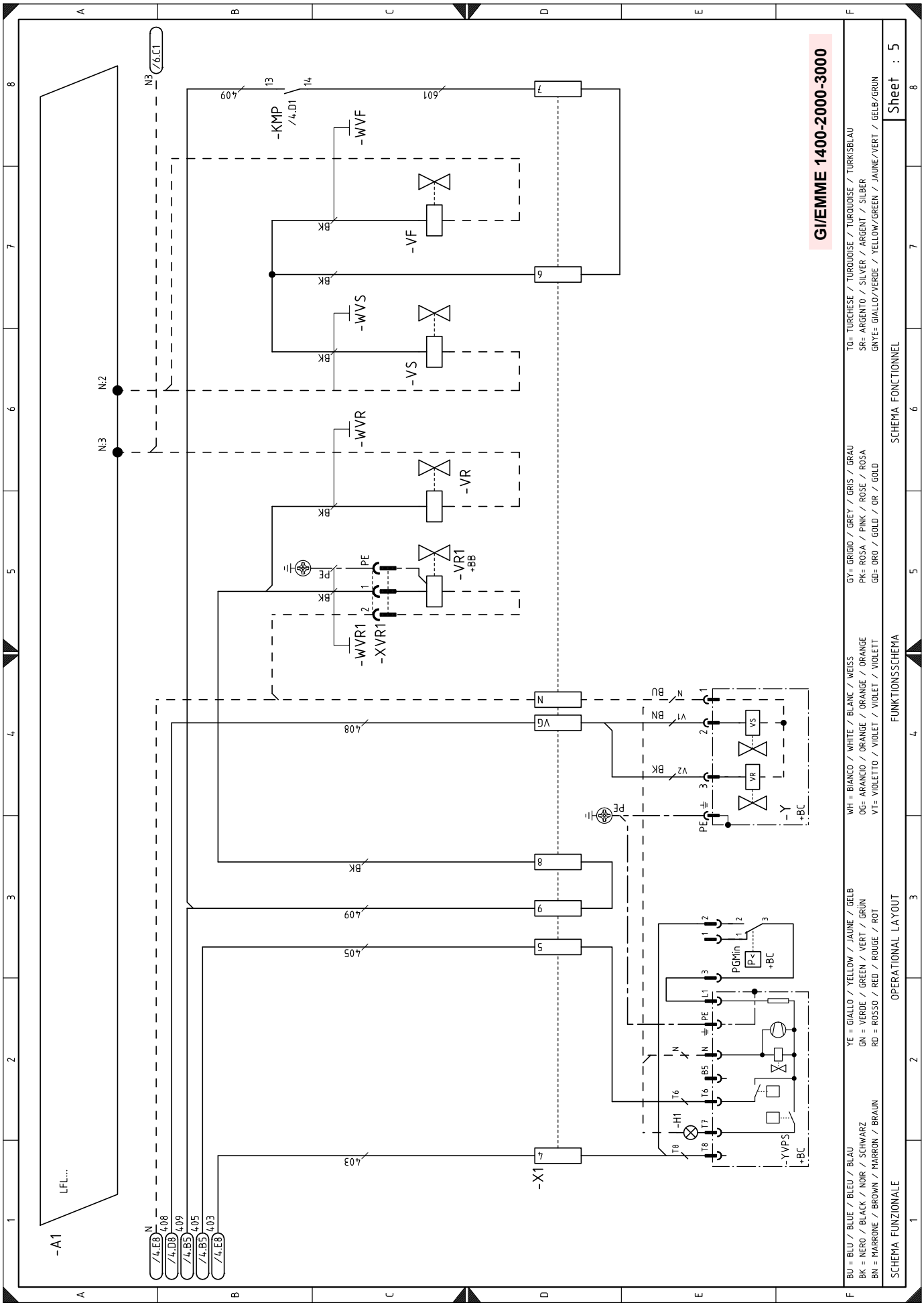
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


GI/EMME 1400-2000-3000
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 5
-A1
LFL...
-KMP
-WVF
-VF
-WVS
-VS
-WVR
-VR
-VR1
-XVR1
-X1
-Y
-H1
-YVPS
PGMin
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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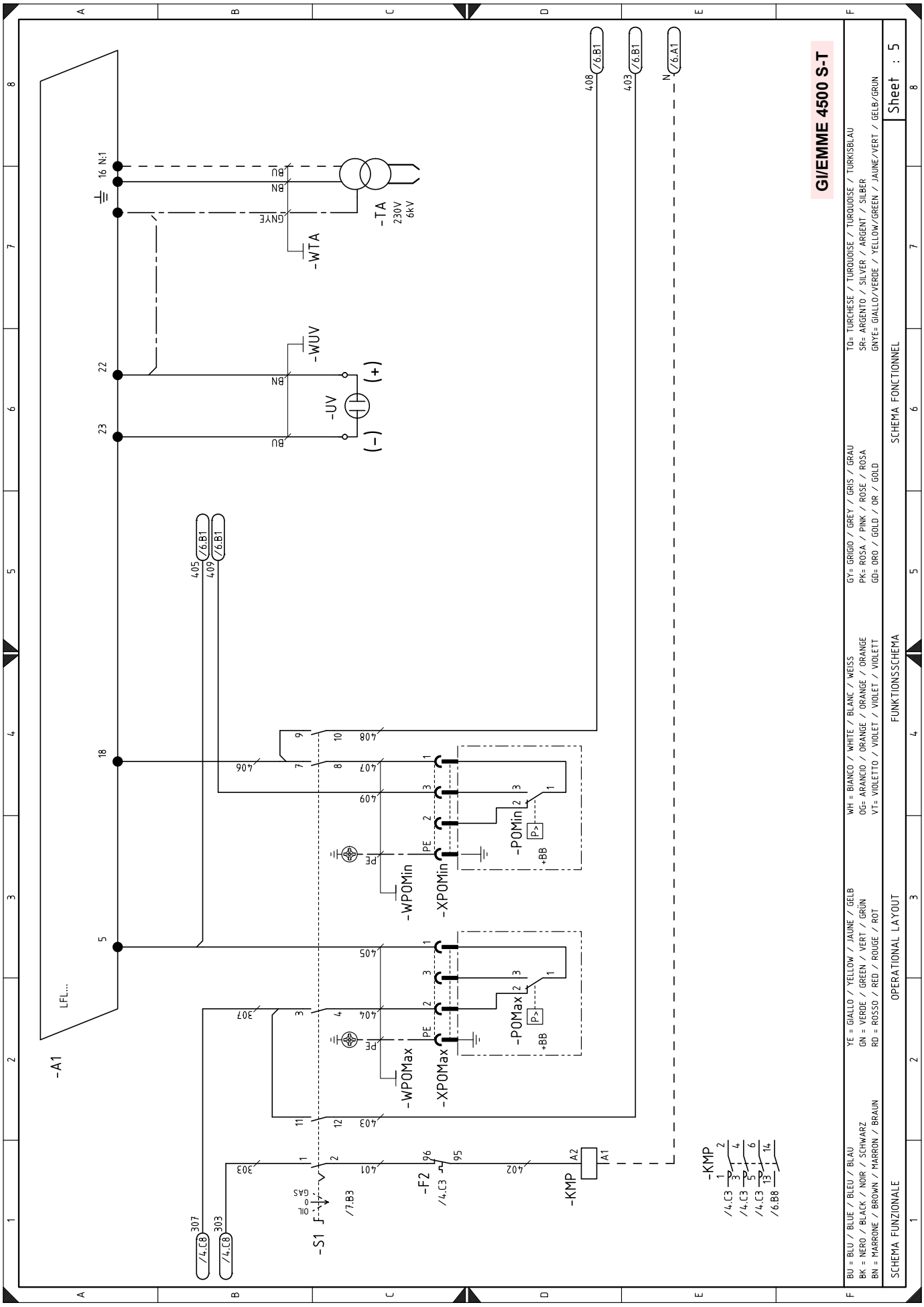
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


GI/EMME 4500 S-T
-A1
LFL...
-TA
230V
6kV
-WTA
-WUV
-UV
(+)
(-)
-S1
-F2
-KMP
-WPOMin
-XPOMin
-POMin
-WPOMax
-XPOMax
-POMax
+BB
PE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
SCHEMA FUNZIONALE
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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PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
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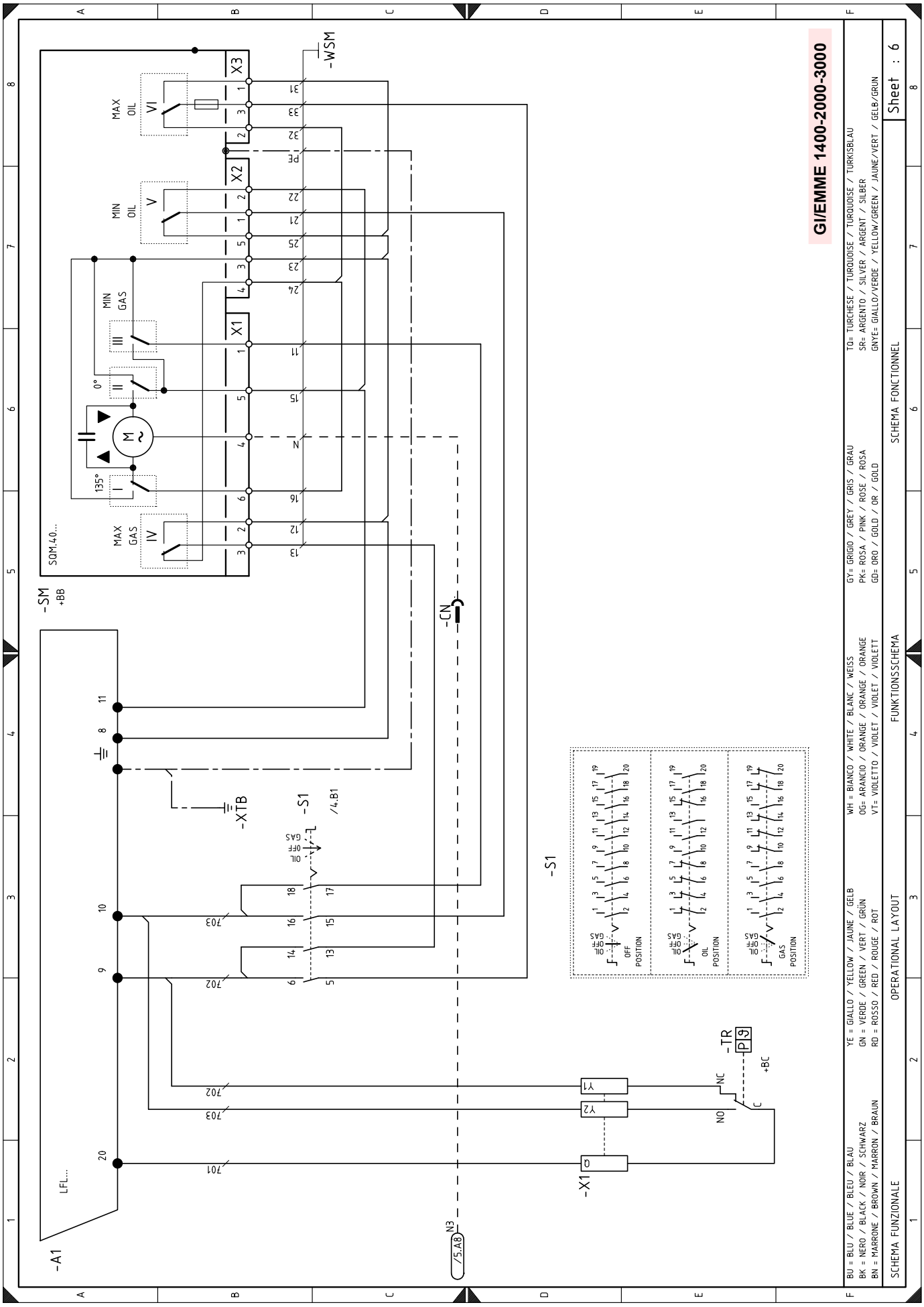
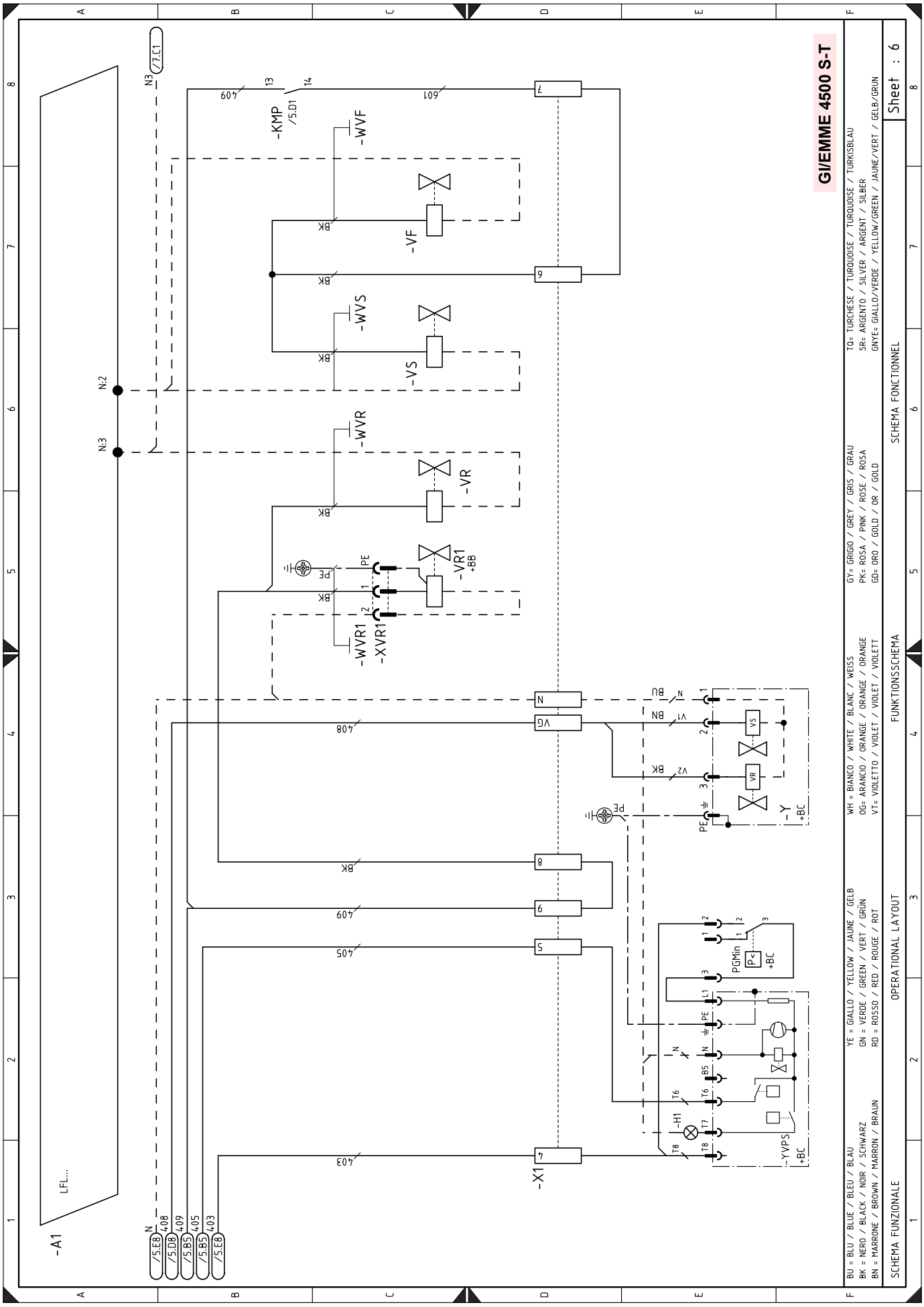
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


GI/EMME 1400-2000-3000
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 6
-A1
LFL...
-SM
+BB
SQM40...
-WSM
-CN
-XTB
-S1
-TR
P19
+BC
-X1
MAX OIL
MIN OIL
MIN GAS
MAX GAS
135°
0°
OFF POSITION
OIL POSITION
GAS POSITION
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


GI/EMME 4500 S-T
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 6
-A1
LFL...
-X1
-KMP
-WVF
-VF
-WVS
-VS
-WVR
-VR
-VR1
-WVR1
-XVR1
-H1
-YVPS
-Y
PGMin
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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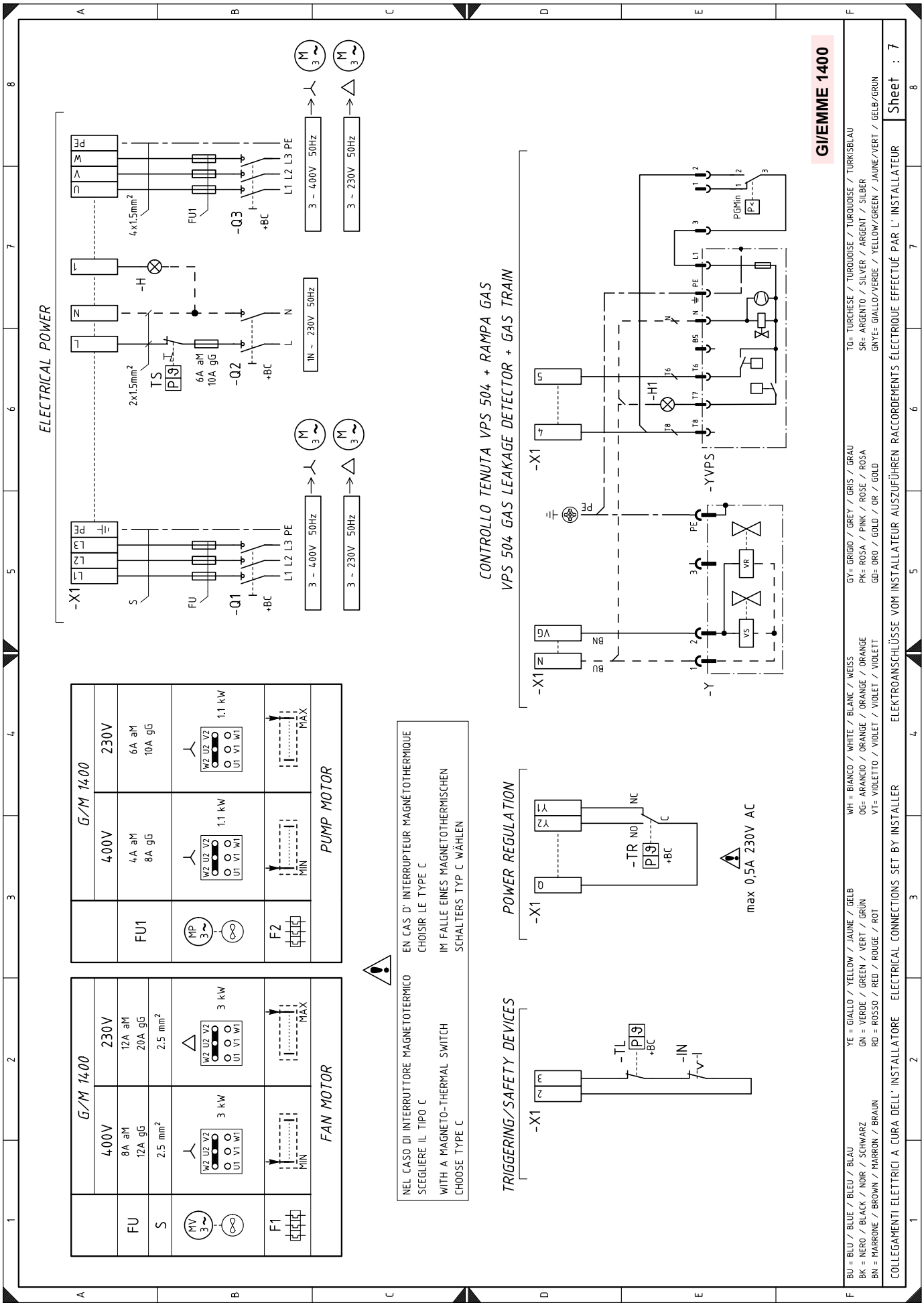
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


ELECTRICAL POWER
CONTROLLO TENUTA VPS 504 + RAMPA GAS
VPS 504 GAS LEAKAGE DETECTOR + GAS TRAIN
TRIGGERING/SAFETY DEVICES
POWER REGULATION
PUMP MOTOR
FAN MOTOR
G/M 1400
400V
230V
FU
S
FU1
F1
F2
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
max 0,5A 230V AC
GI/EMME 1400
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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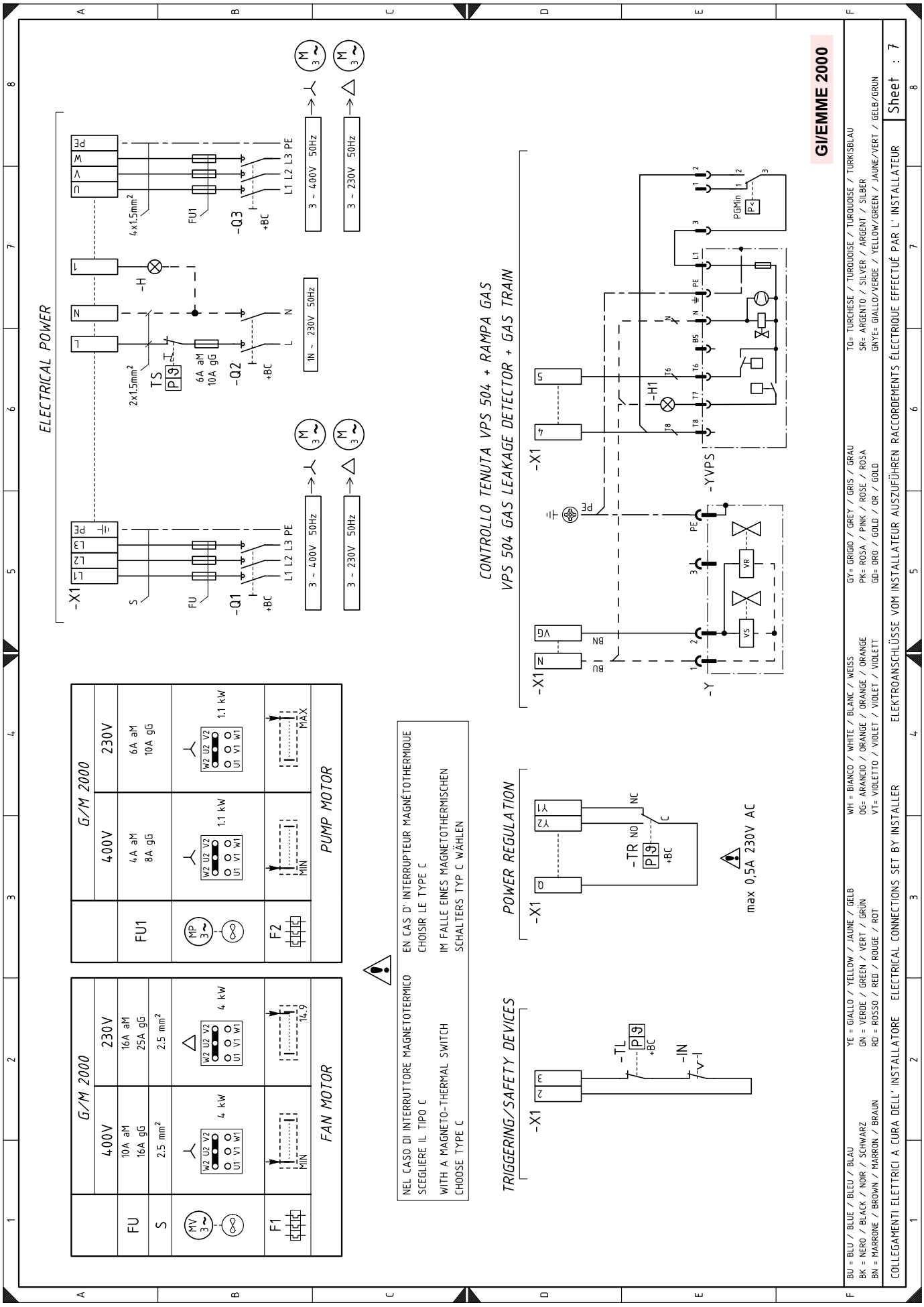
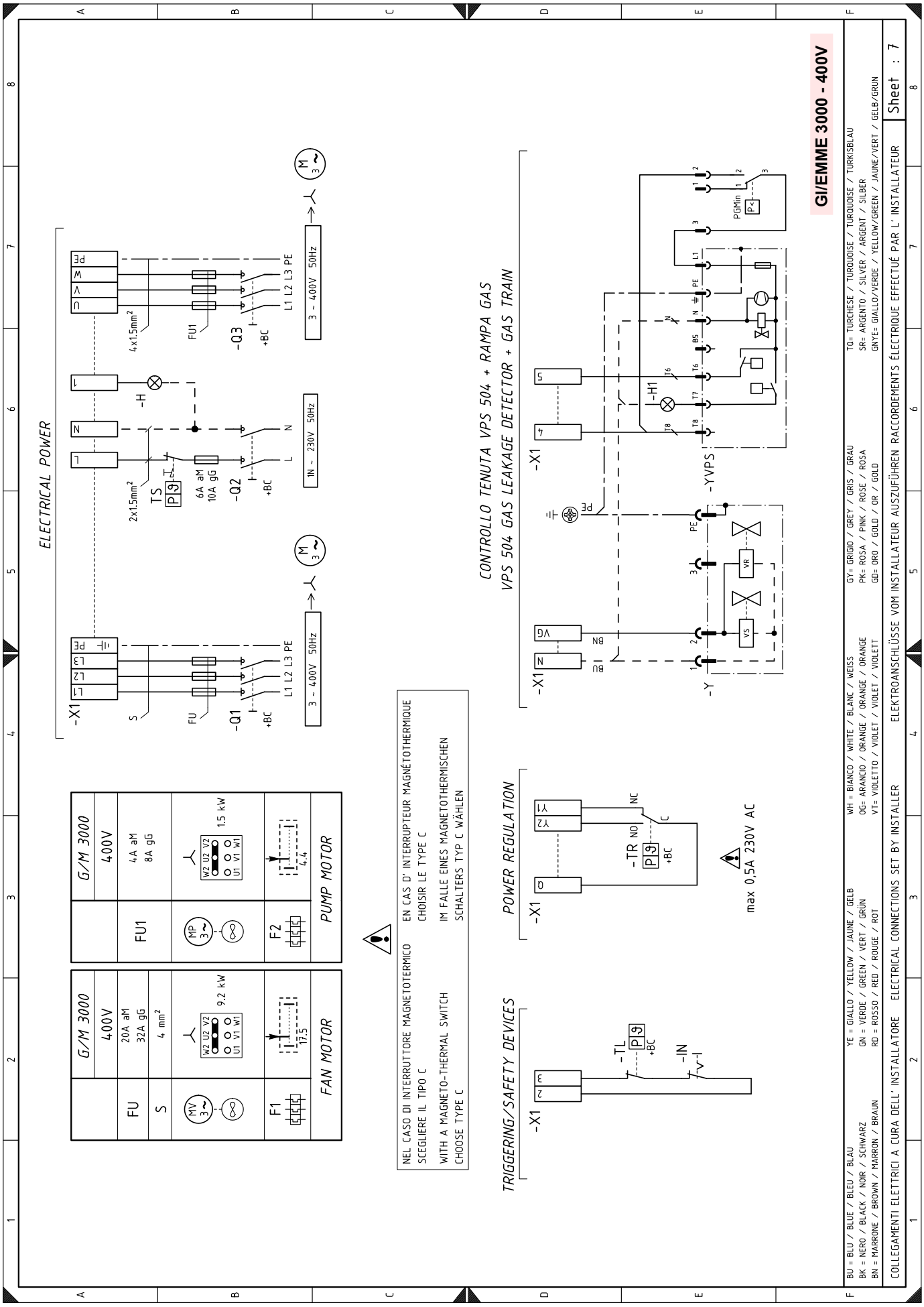
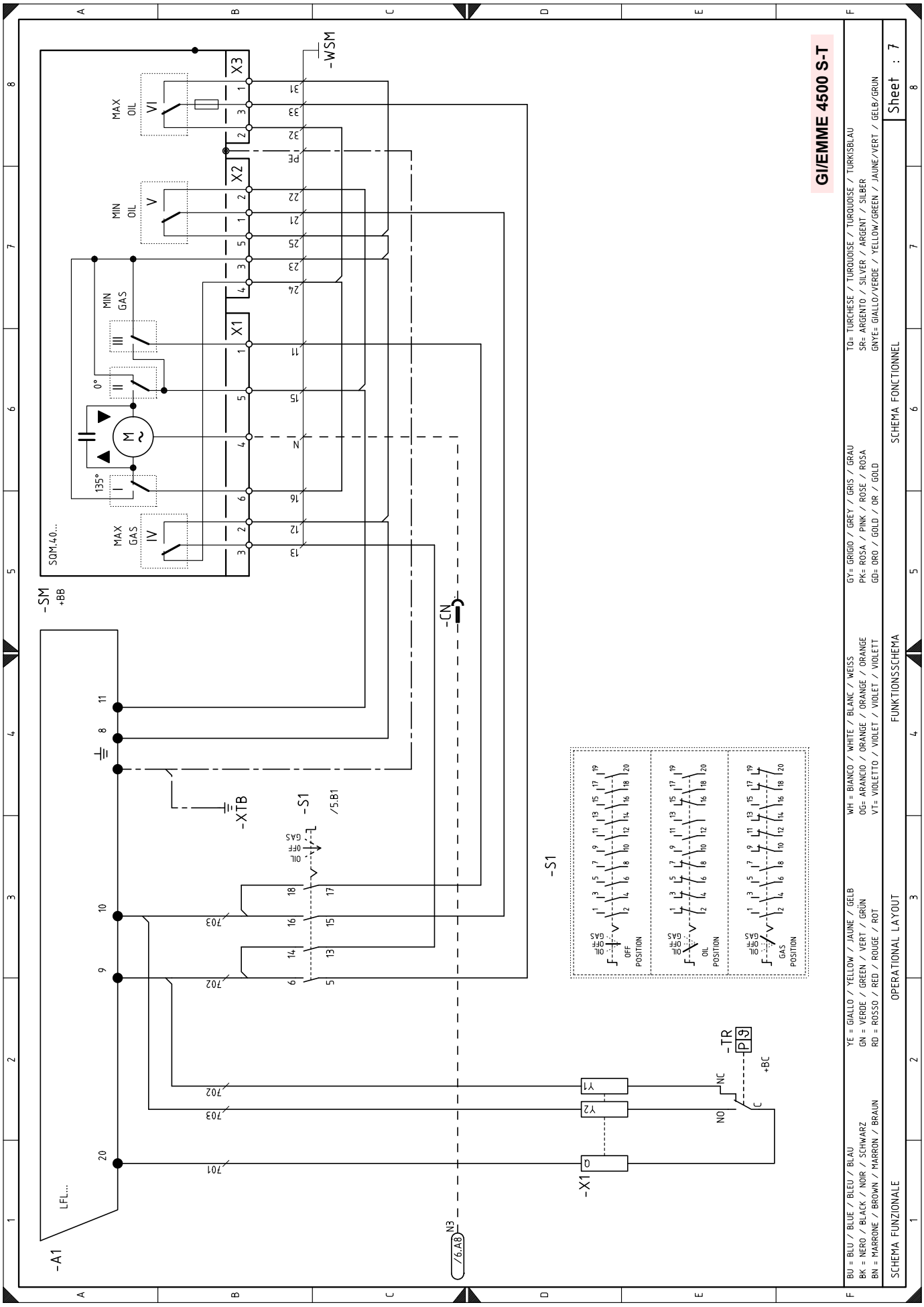
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN
RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 7


ELECTRICAL POWER
CONTROLLO TENUTA VPS 504 + RAMPA GAS
VPS 504 GAS LEAKAGE DETECTOR + GAS TRAIN
POWER REGULATION
TRIGGERING/SAFETY DEVICES
PUMP MOTOR
FAN MOTOR
G/M 2000
400V
230V
FU1
F1
F2
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
max 0,5A 230V AC
GI/EMME 2000
Sheet : 7
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN
RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR


GI/EMME 3000 - 400V
ELECTRICAL POWER
CONTROLLO TENUTA VPS 504 + RAMPA GAS
VPS 504 GAS LEAKAGE DETECTOR + GAS TRAIN
POWER REGULATION
TRIGGERING/SAFETY DEVICES
FAN MOTOR
PUMP MOTOR
G/M 3000
400V
FU
S
FU1
F1
F2
20A aM
32A gG
4 mm²
4A aM
8A gG
9.2 kW
1.5 kW
17,5
4,4
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
3 ~ 400V 50Hz
1N ~ 230V 50Hz
L1 L2 L3 PE
L N
4x1.5mm²
2x1.5mm²
6A aM
10A gG
max 0,5A 230V AC
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 : 7


GI/EMME 4500 S-T
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 7
-A1
LFL...
-SM
+BB
SQM.40...
-WSM
-CN
-XTB
-S1
-TR
+BC
-X1
-S1
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
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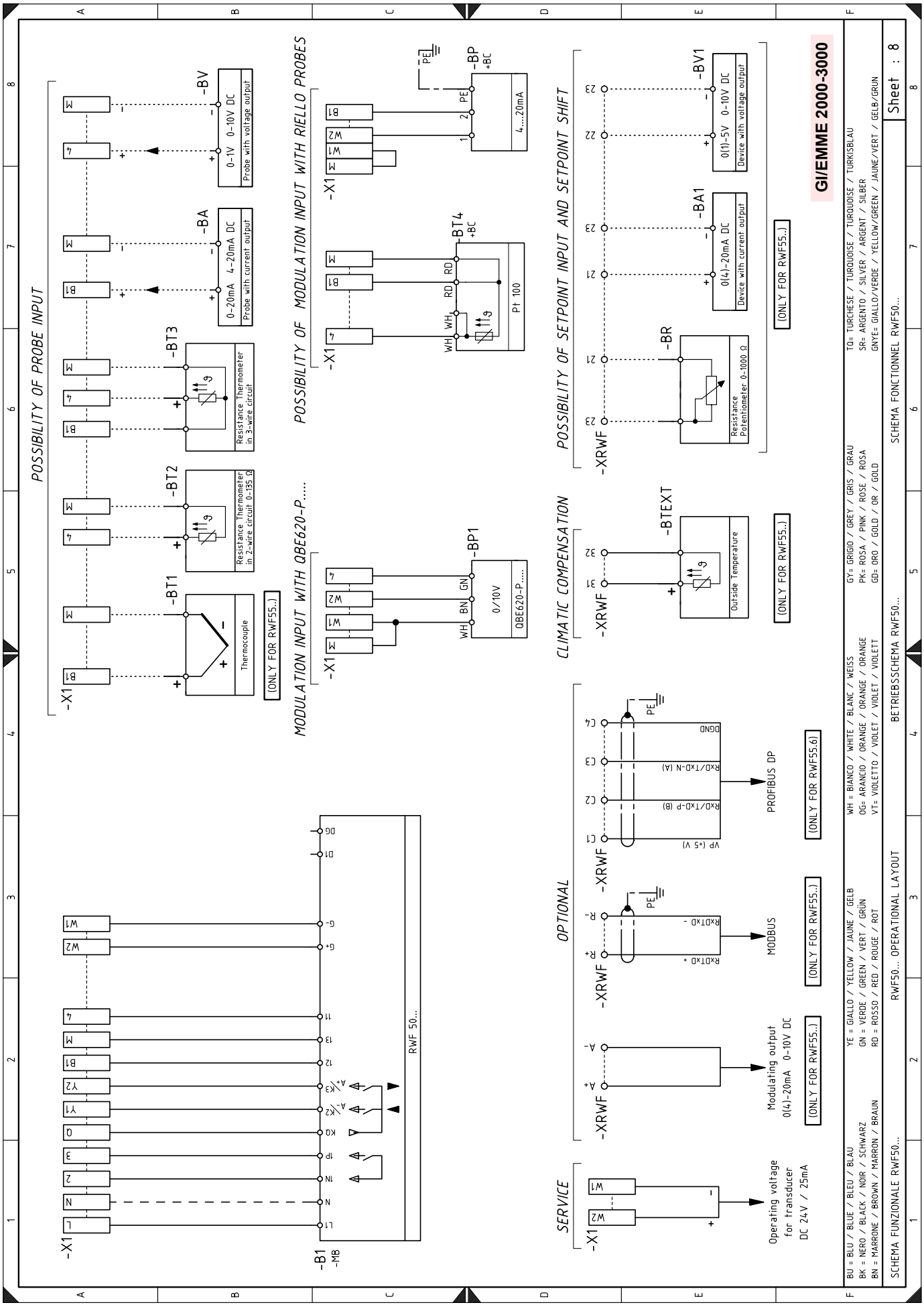
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


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
PROFIBUS DP
MODBUS
Modulating output
0(4)-20mA 0-10V DC
(ONLY FOR RWF55..)
(ONLY FOR RWF55.6)
SERVICE
-X1
Operating voltage for transducer DC 24V / 25mA
-B1
-MB
RWF 50....
GI/EMME 2000-3000
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
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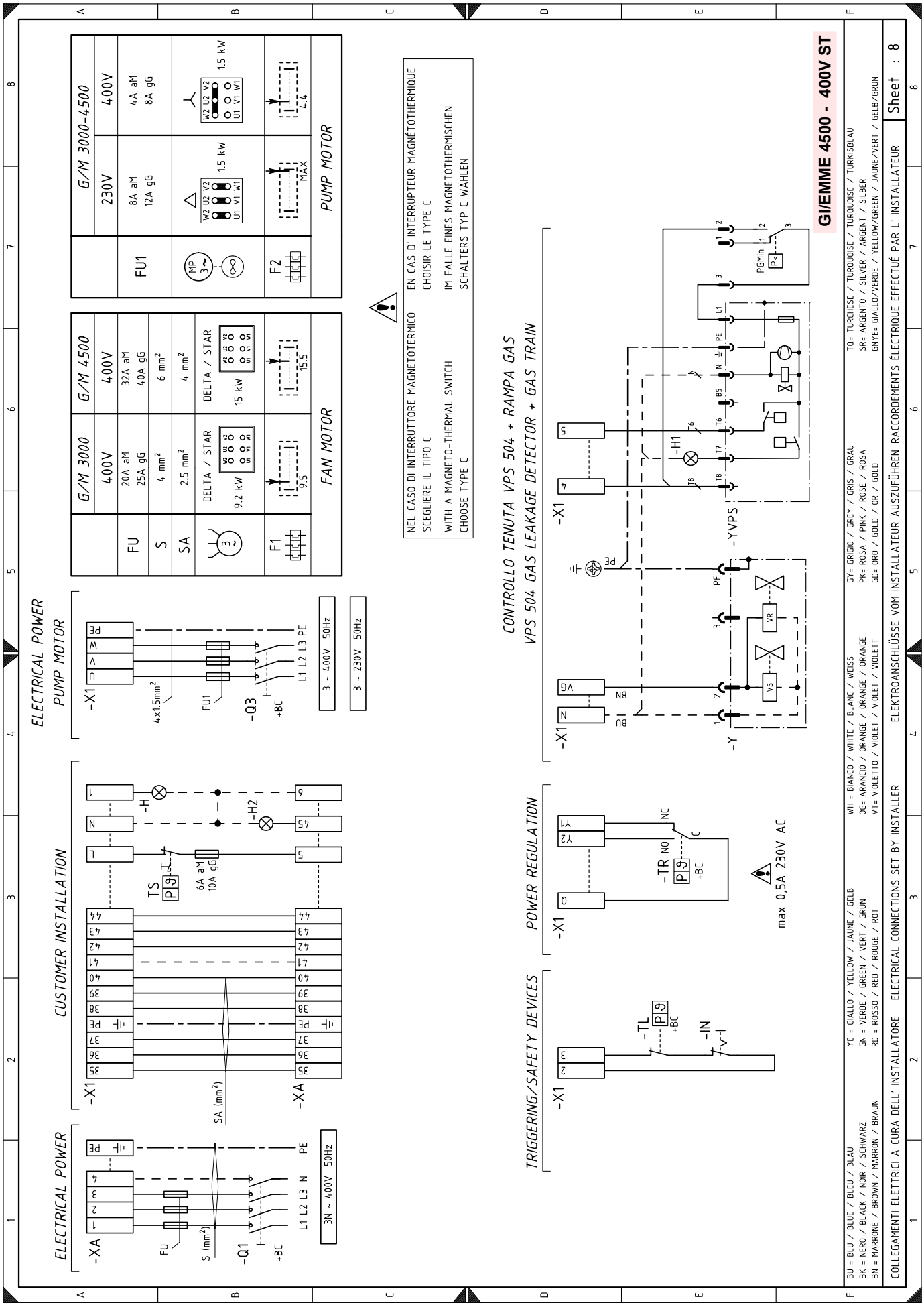
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TÜRKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE RWF50...
RWF50... OPERATIONAL LAYOUT
BETRIEBSSCHEMA RWF50...
SCHEMA FONCTIONNEL RWF50...
Sheet : 8


GI/EMME 4500 - 400V ST
ELECTRICAL POWER
PUMP MOTOR
CUSTOMER INSTALLATION
ELECTRICAL POWER
CONTROLLO TENUTA VPS 504 + RAMPA GAS
VPS 504 GAS LEAKAGE DETECTOR + GAS TRAIN
POWER REGULATION
TRIGGERING/SAFETY DEVICES
G/M 3000
G/M 4500
G/M 3000-4500
FAN MOTOR
PUMP MOTOR
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
max 0,5A 230V AC
3N ~ 400V 50Hz
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
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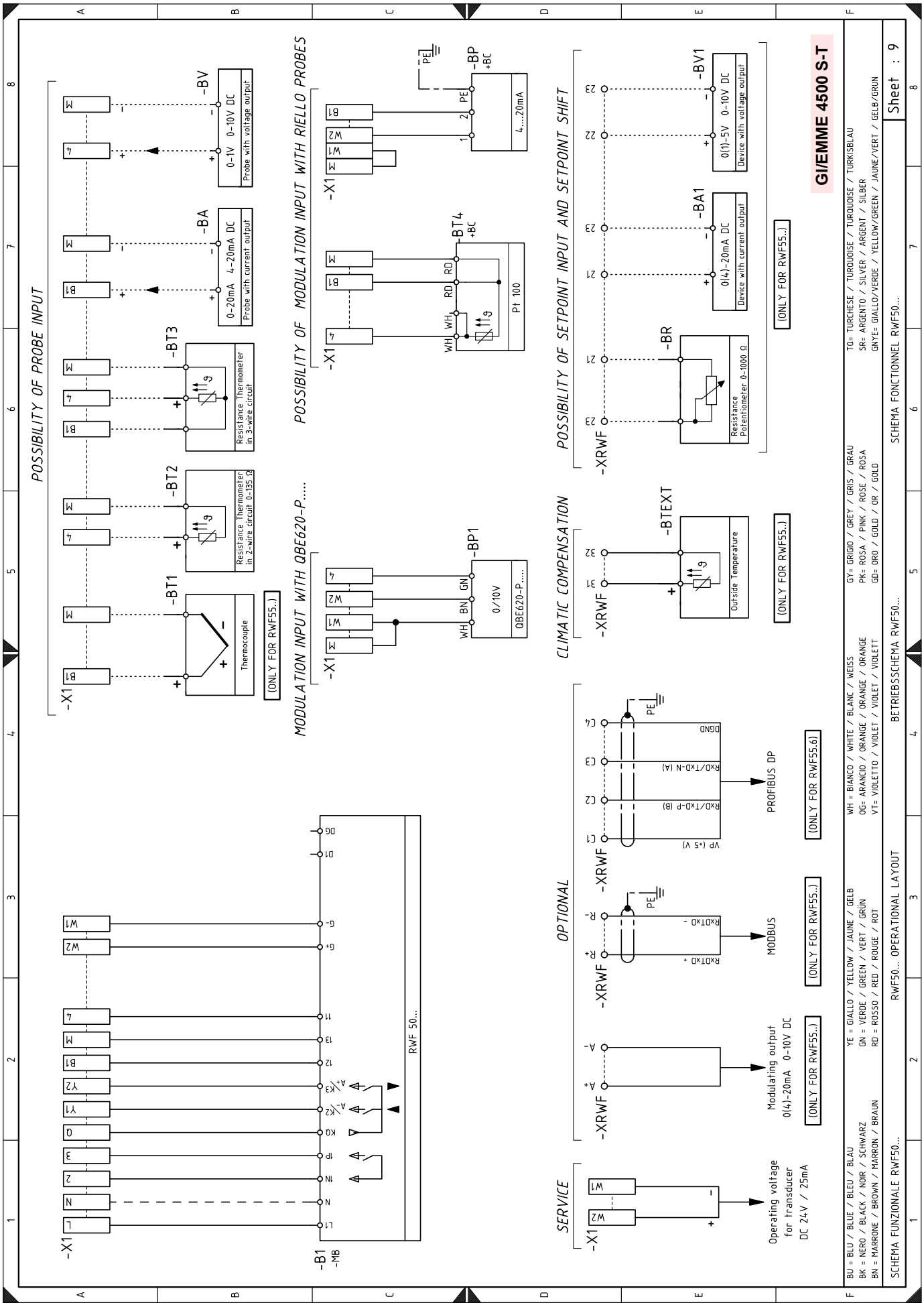
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 8


GI/EMME 4500 S-T
POSSIBILITY OF PROBE INPUT
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
MODULATION INPUT WITH QBE620-P.....
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
CLIMATIC COMPENSATION
OPTIONAL
SERVICE
Thermocouple
Resistance Thermometer in 2-wire circuit 0-135 Ω
Resistance Thermometer in 3-wire circuit
Probe with current output
Probe with voltage output
Pt 100
4....20mA
QBE620-P.....
Outside Temperature
Resistance Potentiometer 0-1000 Ω
Device with current output
Device with voltage output
(ONLY FOR RWF55..)
(ONLY FOR RWF55.6)
PROFIBUS DP
MODBUS
Modulating output 0(4)-20mA 0-10V DC
Operating voltage for transducer DC 24V / 25mA
RWF 50....
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE RWF50...
RWF50... OPERATIONAL LAYOUT
BETRIEBSSCHEMA RWF50...
SCHEMA FONCTIONNEL RWF50...
Sheet : 9

Wiring layout key

A1	Flame control
B	Filter to protect against radio disturbance
B1	RWF50 output power regulator
BA	Current input DC 4...20mA
BA1	Current input DC 4...20mA for remote setpoint change
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	Voltage input DC 0...10V
BV1	Voltage input DC 0...10V for remote setpoint change
CN	Servomotor connector
F1	Fan motor thermal relay
F2	Pump motor thermal relay
FU	Three-phase line fuses
FU1	Three-phase line fuses
FU2	Three-phase line fuses
FU3	Single-phase line fuses
H	Remote lockout signal
H1	Remote lockout signal due to leak detection control
H2	Remote motor lockout signal
IN	Burner manual stop switch
KM	Fan motor contactor
KMP	Pump motor contactor
KT1	Triangle contactor
KS1	Star contactor
KL1	Line contactor
KST1	Timing relay for switching from star to triangle
MP	Pump motor
MV	Fan motor
PA	Air pressure switch
PGM	Maximum gas pressure switch
PGMin	Minimum gas pressure switch
POMax	Maximum oil pressure switch
POMin	Minimum oil pressure switch
Q1	Three-phase disconnecting switch of fan motor line
Q2	Single-phase disconnecting switch
Q3	Three-phase disconnecting switch of pump motor line
Q4	Three-phase disconnecting switch of Star/Triangle line
SM	Servomotor
UV	Flame sensor
TA	Ignition transformer
TL	Limit thermostat/pressure switch
TS	Safety thermostat/pressure switch
S1	Selector switch
TR	Adjustment thermostat/pressure switch
VR	Oil return valve
VR1	Oil return valve
VS	Oil safety valve
VF	Oil operation valve
XPGM	Maximum gas pressure switch connector
XPOMax	Maximum oil pressure switch connector
XPOMin	Minimum oil pressure switch connector
XRWF	RWF50 terminal board
X1	Burner terminal strip
XA	Starter terminal strip
XTB	Burner earth
XVR1	Oil return valve connector
YVPS	Leak test
Y	Gas adjustment valve + gas safety valve

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