GB

Forced draught gas burners

Two stage progressive or modulating operation

CODE	MODEL	TYPE
20206280	GAS 3 P/M	533 T1
20205666	GAS 4 P/M	534 T1
20213787	GAS 5 P/M	535 T1
20213788	GAS 6 P/M	536 T1
20213789	GAS 7 P/M	537 T1

20213776 (2) - 06/2025

Translation of the original instructions

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

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

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

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

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

In addition:

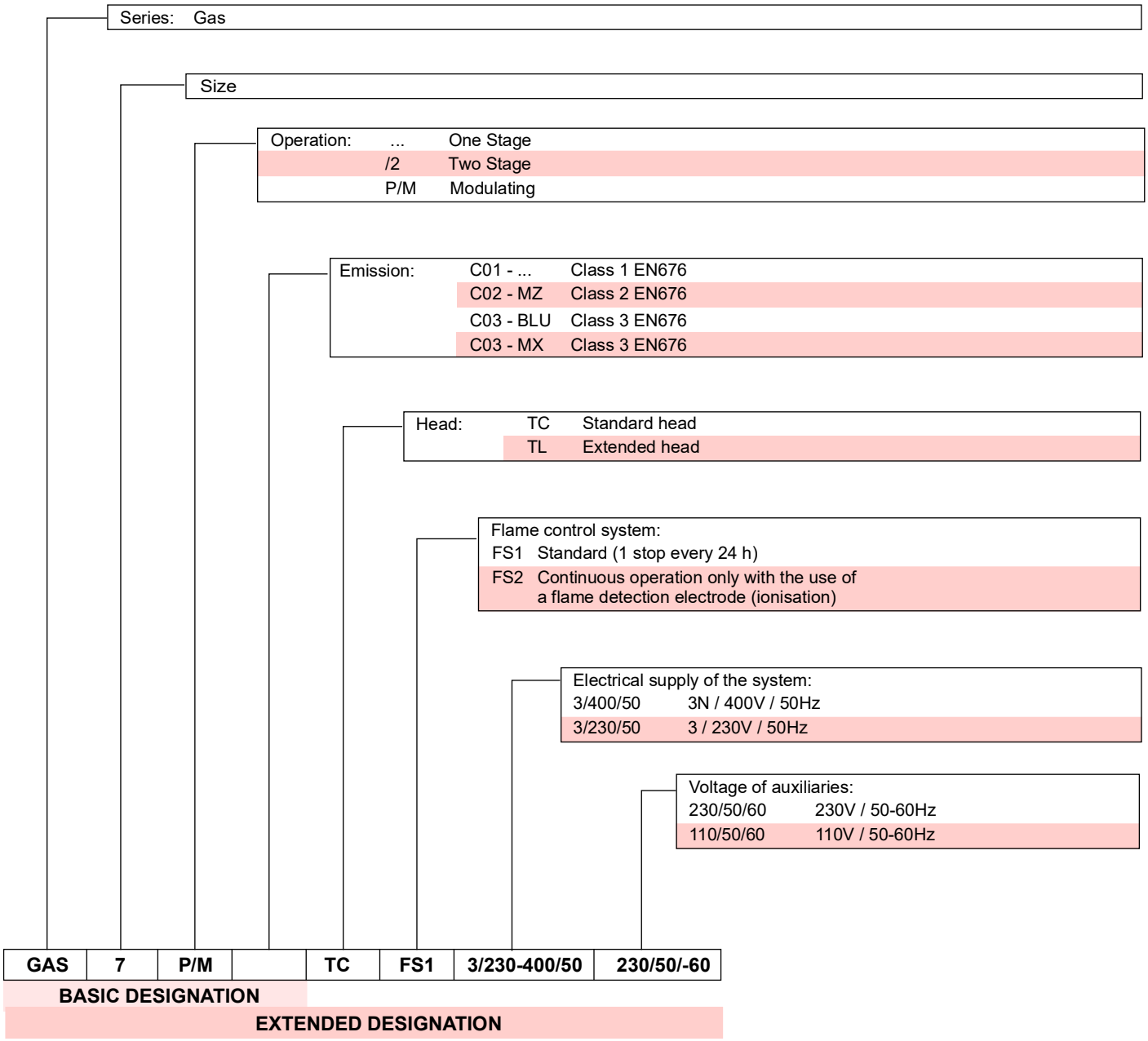
➤ must take all the measures necessary to prevent unauthorised people gaining access to the machine;

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

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

3 Technical description of the burner

3.1 Burner designation



3.2 Models available

	Designation		Voltage	Start-up	Code
GAS 3 P/M	TC	FS1	1/230/50	Direct	20206280
GAS 4 P/M	TC	FS1	1/230/50	Direct	20205666
GAS 5 P/M	TC	FS1	3/230-400/50	Direct	20213787
GAS 6 P/M	TC	FS1	3/230-400/50	Direct	20213788
GAS 7 P/M	TC	FS1	3/230-400/50	Direct	20213789

3.3 Burner categories - Countries of destination

Country of destination	Gas category
SE - FI - AT - GR - DK - CZ - EE - HU - LT - RO - SI - SK - TR - IS - CH - NO	II2H3B/P
ES - GB - IE - PT	II2H3P
DE	II2ELL3B/P
NL	II2EK3B/P
FR	II2Er3P
BE	II2E(R) - I3P
LU - PL	II2E3B/P
LV	I2H
CY - MT	I3B/P

3.4 Technical data

MODEL			GAS 3 P/M	GAS 4 P/M	GAS 5 P/M	GAS 6 P/M	GAS 7 P/M
Type			533 T1	534 T1	535 T1	536 T1	537 T1
Output (1)	2nd stage	kW Mcal/h	130 - 350 112 - 301	180 - 470 155 - 404	320 - 660 275 - 568	520 - 1050 447 - 903	800 - 1760 688 - 1514
	1st stage	kW Mcal/h	80 - 175 69 - 150	120 - 235 104 - 202	155 - 330 133 - 284	300 - 520 258 - 447	400 - 880 344 - 757
Fuel			NATURAL GAS: - G25				
Operation			• FS1: Intermittent (min. 1 stop in 24 hours) • Progressive two-stage or modulating by kit (see ACCESSORIES)				
Standard use			Boilers: water, steam, diathermic oil				
Ambient Temperature		°C	0 - 40				
Combustion air temperature		°C max	60				
Noise level (2)	Sound pressure Sound power	dB(A)	75 85	77 87	82 92	84 94	85 95
Weight (including packaging) (3)		kg	37	43	46	63	101
EC			CE - 0476DP3335				

Tab. A

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

(2) 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) Burners are shipped in cardboard packages. GAS 7 P/M model rests on a wooden platform specially suitable for lift trucks.

3.5 Electrical data

model		GAS 3 P/M	GAS 4 P/M
Type		533 T1	534 T1
Electrical power supply	V Hz	1N ~ 230 +/- 10% 50 - single-phase	
Electrical power consumption	kW max	0.69	0.79
Protection level		IP 40	

model		GAS 5 P/M
Type		535 T1
Electrical power supply	V Hz	230 - 400 ~ +/- 10% / AUX-1N ~ 230 +/- 10% 50 - three-phase
Electrical power consumption	kW max	1.3
Protection level		IP 40

MODEL		GAS 6 P/M	GAS 7 P/M
Type		536 T1	537 T1
Electrical power supply	V Hz	230 - 400 ~ +/- 10% / AUX-1N ~ 230 +/- 10% 50 - three-phase	
Electrical power consumption	kW max	2.2	3.85
Protection level		IP 40	

Tab. B

3.6 Maximum dimensions

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

Note that to inspect the combustion head the burner must be moved backward and turned upward.

The maximum dimension of the burner, without casing, when open is given by measurement I.

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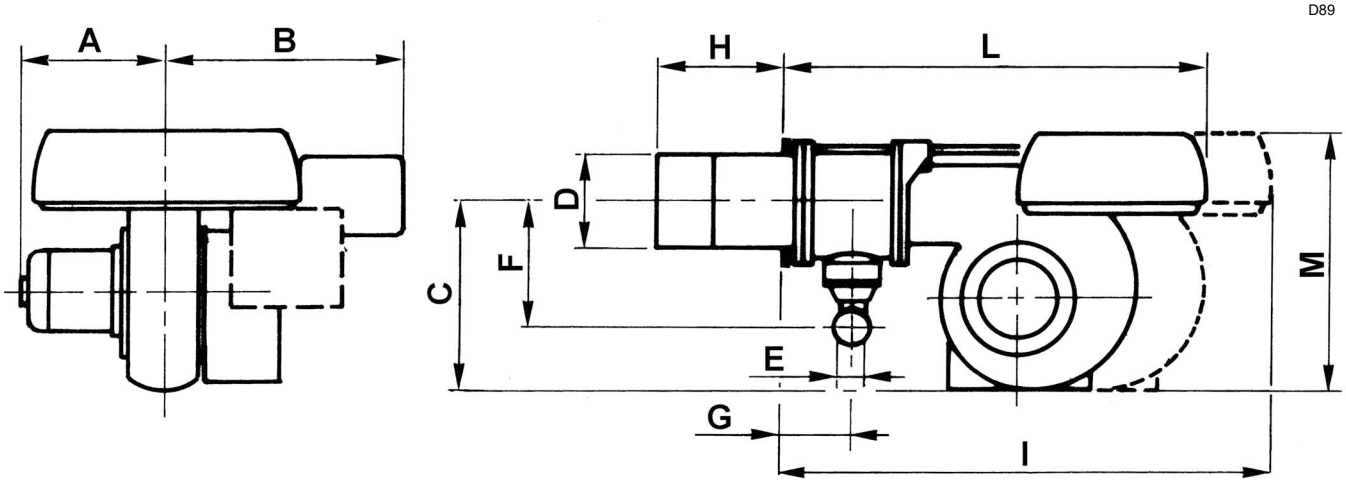


Fig. 1

mm	A	B	C	D	E	F	G	H	I	L	M
GAS 3 P/M	205	380	292	140	Rp 1 1/2	225	97	185	775	610	397
GAS 4 P/M	205	380	292	150	Rp 1 1/2	225	97	187	775	610	397
GAS 5 P/M	226	355	332	155	Rp 1 1/2	225	97	207	810	645	437
GAS 6 P/M	258	377	370	175	Rp 2	250	131	227	966	770	485
GAS 7 P/M	358	400	445	220	Rp 2	305	140	240	1142	920	590

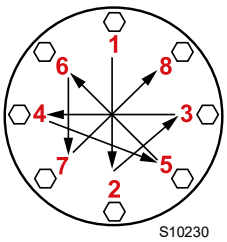
Tab. C

3.7 Burner equipment

Flange for gas train . . . . . No. 1
Seal for flange . . . . . No. 1
Screws . . . . . No. 8
Thermal flange gasket . . . . . No. 1
Instructions . . . . . No. 1
Spare parts list . . . . . No. 1

ATTENTION

It is recommended to tighten the screws of the gas flange with a tightening torque of:
- DN65: **30** Nm ±10%
- DN80: **40** Nm ±10%
- DN100: **50** Nm ±10%
- DN125: **60** Nm ±10%



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

3.8 Firing rates

During operation, burner output varies between:
– MINIMUM OUTPUT in 1st stage
– MAXIMUM OUTPUT in 2nd stage

➤ **The MINIMUM OUTPUT (MIN)** is to be chosen from within the range of values indicated on diagrams.

Example:

for GAS 3 P/M, it can be chosen from 80 and 175 kW (equivalent to 69 and 150 Mcal/h)

It is not required to know the pressure in combustion chamber in 1st stage.

➤ **The MAXIMUM OUTPUT (MAX)** is to be chosen from within the diagram area on the side. This area is known as FIRING RATE and provides the burner maximum output according to the pressure in the combustion chamber. The work point is found by drawing a vertical line from the required output and an horizontal line from the corresponding pressure in the combustion chamber. The intersection point of the two lines is the work point, which must fall within the FIRING RATE.

Example:

for GAS 3 P/M the area is delimited by:
– 130 - 135 kW output axis
– axis of pressures in comb. chamber 0 + 7 mbar
– combustion chamber maximum pressure curve.

If the burner output is 250 kW at a pressure of 5 mbar in the combustion chamber, the work point is on the maximum pressure curve.

This curve has been set with safety margins, so that all the FIRING RATE area can be used.

ATTENTION

The firing rate value (Fig. 3) 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 pag. 19.

The burner output to be matched with the boiler is to be chosen from the MAX area, namely from the FIRING RATE.

The burner can operate also in depressurised combustion chambers.

GAS 3 P/M

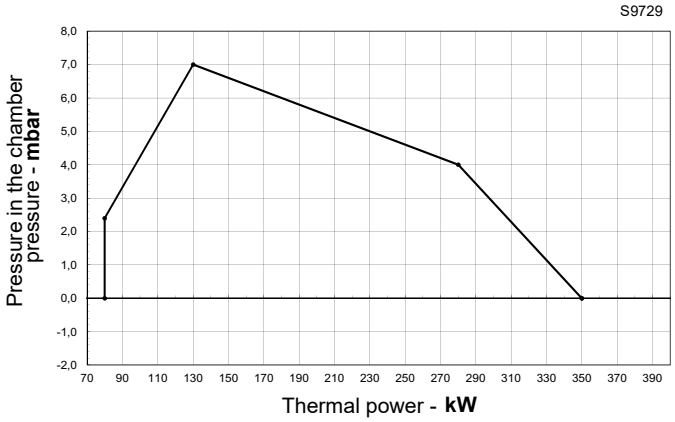
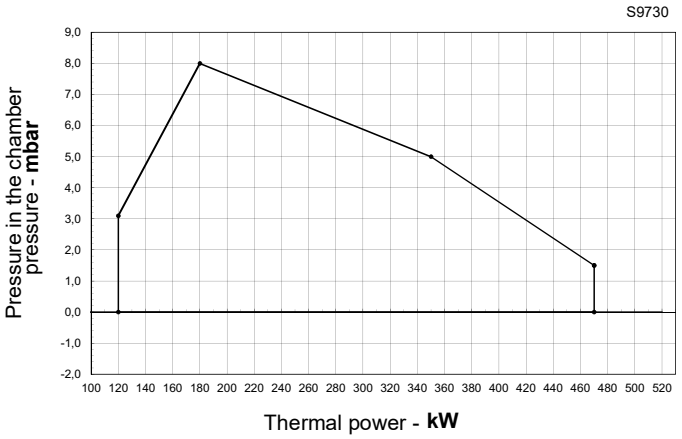
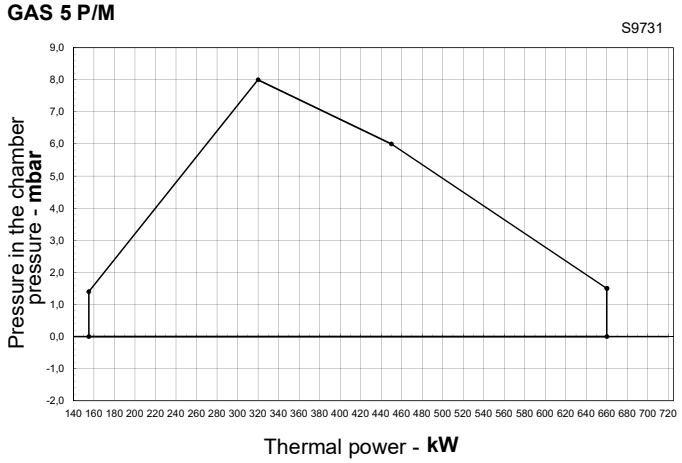


Fig. 2

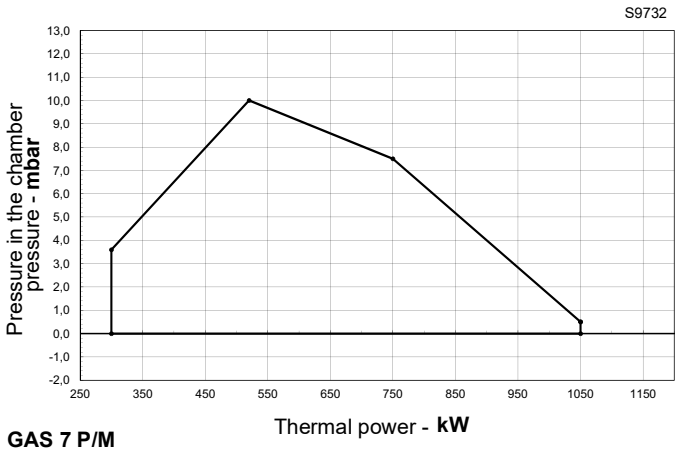
GAS 4 P/M



GAS 5 P/M



GAS 6 P/M



GAS 7 P/M

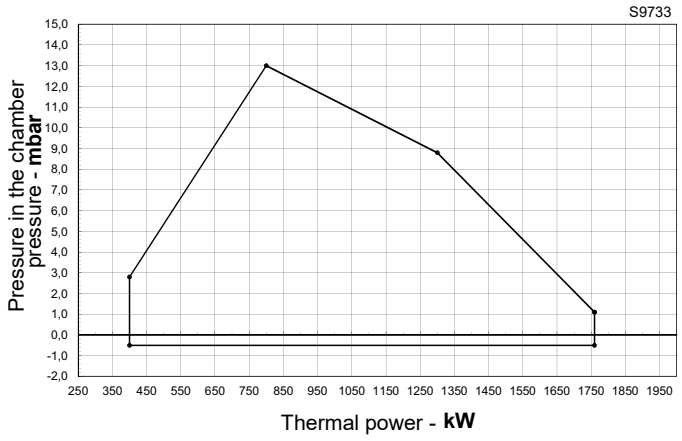


Fig. 3

3.9 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. 4).

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. 4 you can see the diameter and length of the test combustion chamber.

Example:
Output 1500 Mcal/h: diameter 80 cm - length 2.5 m.

3.9.1 Commercial boilers

The burner/boiler combination does not pose any problems if the boiler is EC approved and its combustion chamber dimensions are similar to those indicated in the diagram (Fig. 4).

If the burner must be combined with a commercial boiler that has not been EC approved (CE mark) and/or its combustion chamber dimensions are clearly smaller than those indicated in diagram (Fig. 4), consult the manufacturers.

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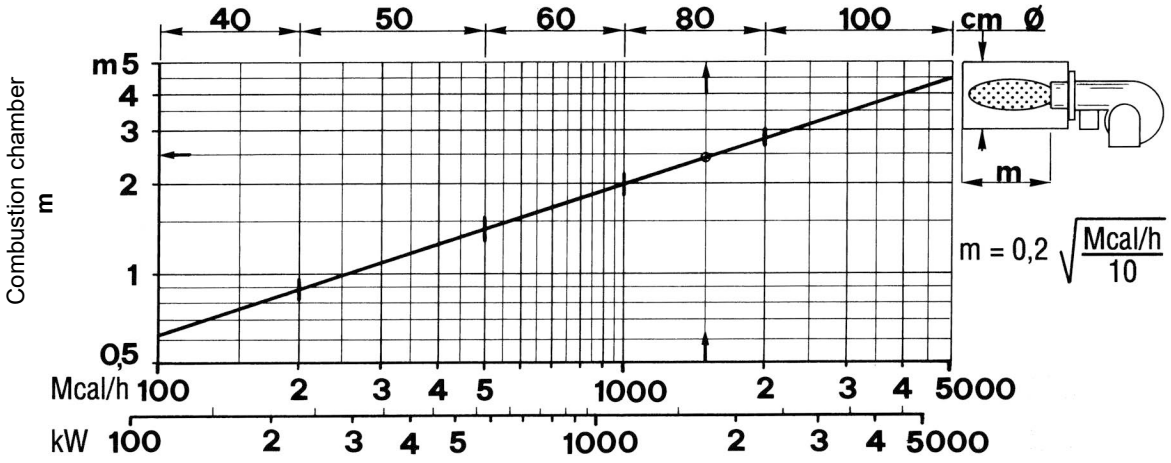

Fig. 4

3.10 Burner description

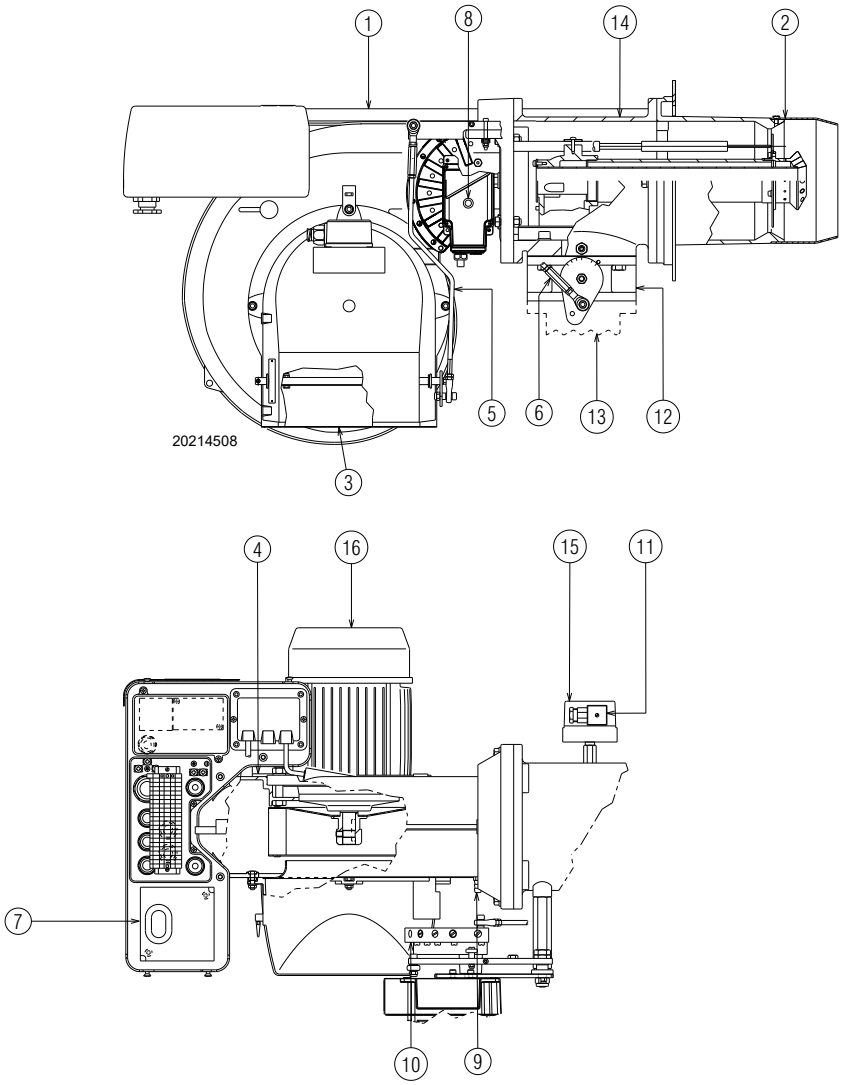

Fig. 5

1 Slide bars for opening the burner and inspecting the combustion head
2 Combustion head
3 Closed air damper in stand-by to reduce heat losses
4 Air pressure switch
5 Air damper control lever
6 Gas butterfly valve control rod
7 Flame control with lockout pilot light and reset button
8 Air-gas control servomotor
9 Fan pressure test point
10 Air adjustment cam
11 Pipe coupling gas pressure test point
12 Gas butterfly valve
13 Gas input pipe
14 Pipe coupling
15 Maximum gas pressure switch
16 Fan motor

3.11 Electrical panel description

1 Capacitor (in GAS 3-4 P/M models)
2 Motor contactor and thermal relay (in GAS 5-6-7 P/M models)
3 Terminal board
4 Cable grommets for electrical wiring (to be carried out by the installer)
5 Plug-socket on ionisation probe cable
6 Plug-socket on servomotor cable
7 Flame control base
8 Ignition transformer
9 Filter to protect against radio disturbance

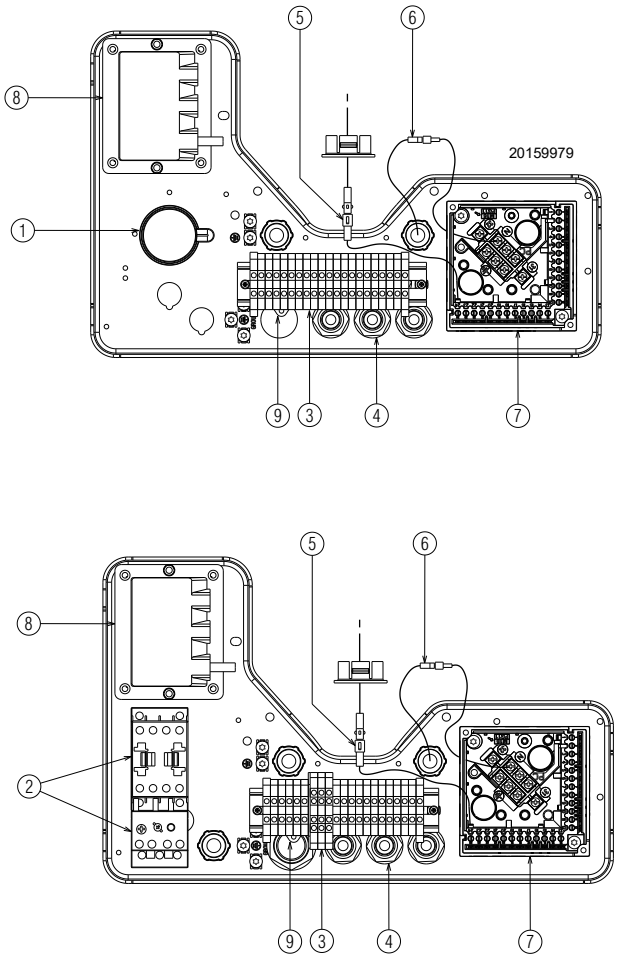

Fig. 6

3.12 Flame control (LFL...)

Important notes

ATTENTION

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

The flame control LFL... 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 LFL... 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 LFL... 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.

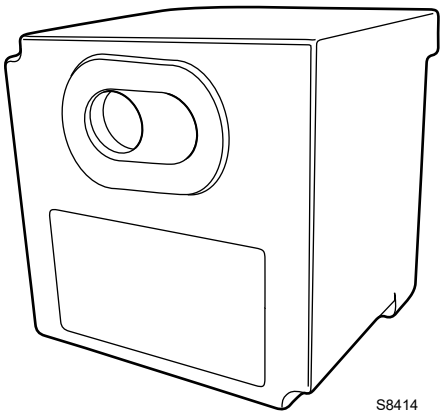

Fig. 7

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. D

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.

S8907

Fig. 8

Technical data

Mains voltage	230 V -15% +10%
Mains frequency	50 / 60 Hz
Power absorption	7... 15 VA
Motor	Synchronous
Drive angle	Varying between 0° and 135°

ATTENTION

Never adjust the red cam No. 1 more than 90° to prevent serious or irreversible damage to the mechanical adjustment parts.

Protection level	Max. IP 66, with appropriate cable entry
Cable entry	2 x M16
Cable connection	terminal board for 0.5 mm^2 (min.) and 2.5 mm^2 (max)
Rotation direction	Anticlockwise
Rated torque (max.)	10 Nm
Holding torque	5 Nm
Operation time	45 s. at 90°
Weight	approx. 2 kg
Environmental conditions:	
Operation	-20....+60° C
Transport and storage	-20...+60°C

Tab. E

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.

Checking the characteristics of the burner

Check the identification label of the burner (Fig. 9), showing:

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

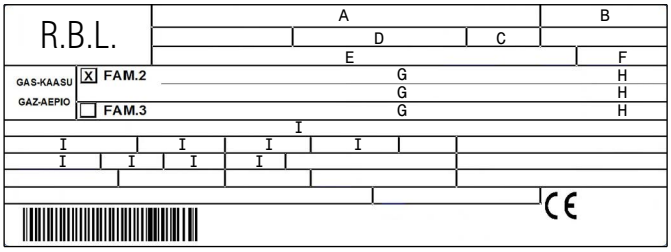

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Fig. 9

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 set up 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** permit operation but make maintenance and inspection of the combustion head more difficult.

DANGER

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

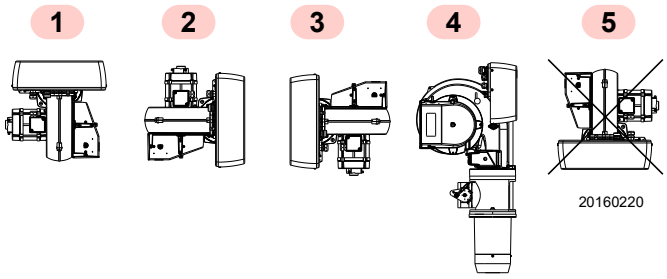


Fig. 10

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.

mm	A	B	C	D
GAS 3 P/M	155	160	160	M10
GAS 4 P/M	165	160	160	M10
GAS 5 P/M	165	160	160	M10
GAS 6 P/M	185	195	195	M12
GAS 7 P/M	230	230	230	M12

Tab. F

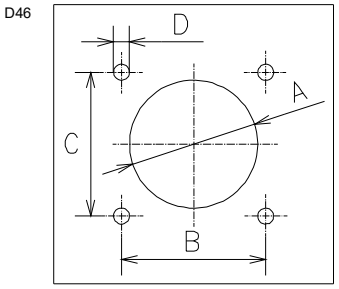


Fig. 11

4.5.2 Blast tube length

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

Blast tube L mm	GAS 3 P/M	GAS 4 P/M	GAS 5 P/M	GAS 6 P/M	GAS 7 P/M
Shortened	43	45	65	85	-
Standard	185	187	207	227	240
Elongated	320	320	365	360	400

Tab. G

For boilers with front flue passes 9)(Fig. 12 a pag. 18), or flame inversion chamber, a protection in refractory material 7) must be inserted between the boiler fettling 8) and the blast tube 6).

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

4.5.3 Securing the burner to the boiler

Provide an adequate lifting system.

➤ Remove blast tube 6)(Fig. 12) from the burner as follows:
  – Remove screws 1) from the two slide bars 2).
  – Remove the screws 3) retaining the blast tube to the burner.
  – Remove the blast tube complete with slide bars.
➤ Now the gas distributor 4) can be easily inspected. Check that probe and electrode are correctly positioned, as shown in Fig. 13. In case of incorrect position, remove the gas distributor 4) when opening the burner for head calibration, see pag. 19.
➤ Fix the blast tube 6) to the boiler plate (Fig. 11 a pag. 17), inserting the supplied insulating flange gasket 5)(Fig. 12). Use the 4 screws, also supplied, after protecting their thread with an anti-locking product.
➤ Refit the burner on slide bars 2)(Fig. 12), refit screws 1) on slide bars and fasten the burner to the blast tube using screws 3).

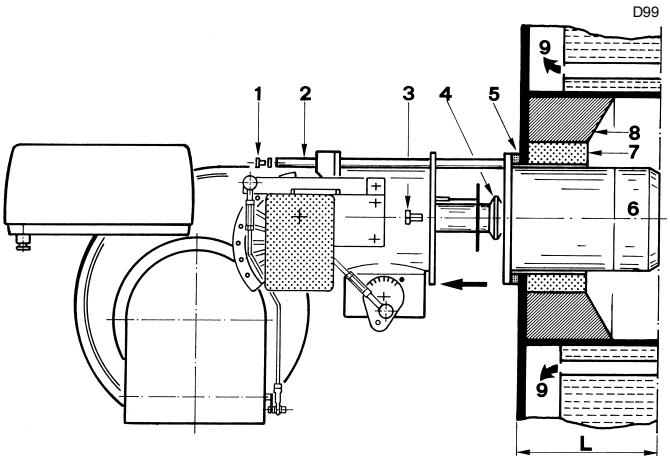


Fig. 12

ATTENTION

The seal between burner and boiler must be airtight.

4.6 Positioning the probe - electrode

ATTENTION

Before securing the burner to the boiler, check (through the opening of the blast tube) that the probe and electrode are correctly positioned, as in Fig. 13.

If in the previous check the position of the probe or electrode was not correct, remove the screws 6)(Fig. 15 a pag. 19) extract the inner part 1)(Fig. 15 a pag. 19) of the head, and adjust them.

ATTENTION

Do not rotate the probe but leave it as in Fig. 13; if it is too close to the ignition electrode, it could damage the flame control amplifier.

ATTENTION

Respect the dimensions shown in Fig. 13.

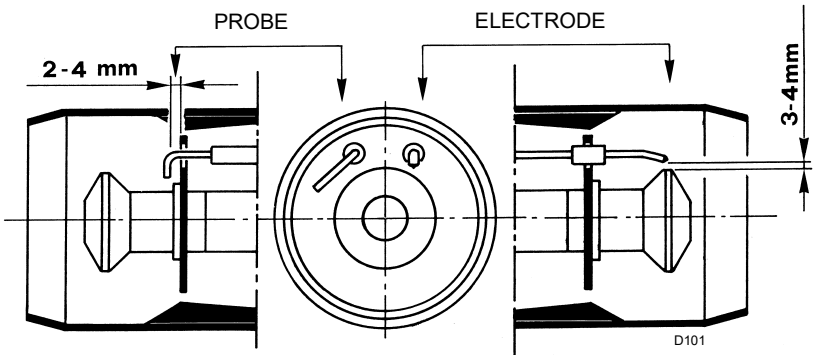


Fig. 13

4.7 Combustion head adjustment

The adjustment of the combustion head depends only on the MAX output of the burner. Therefore, this value must be set before adjusting the combustion head.

There are two head adjustments available: the gas one and the air one.

They are to be performed after opening the burner as follows:

- ➤ disengage the articulated coupling 1)(Fig. 14) of the air damper control lever
- ➤ Remove the screws 2) retaining the fan to the coupling 4).
- ➤ Open the burner by moving the **unit A** backwards on the two slide bars 3). The **unit B** remains fitted to the boiler (Fig. 14).

ATTENTION

remove the two screws 6)(Fig. 15) and the elbow 1) from the coupling 4)(Fig. 14), if it has been previously found out that the electrode or the probe need to be calibrated.

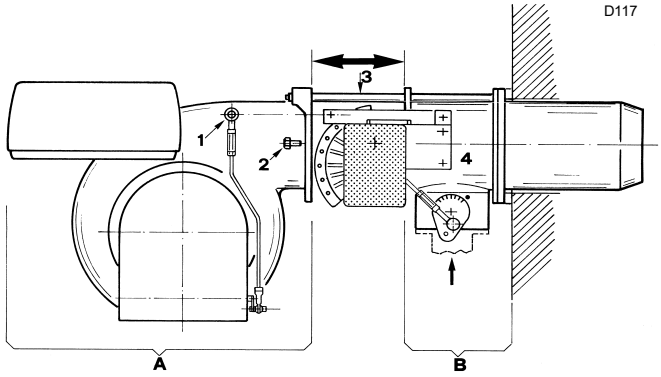


Fig. 14

Gas adjustment

- ➤ Loosen the screw 3)(Fig. 15);
- ➤ turn the ring nut 2) so that the index 5) matches the required notch 4);
- ➤ lock the screw 3).

Air adjustment

- ➤ Loosen the two screws 6)(Fig. 15);
- ➤ move the elbow 1) forward or backward so that its rear surface 7) matches the desired notch of the plate 8);
- ➤ lock the screws 6).

ATTENTION

The notch number is the same for gas and air and can be obtained from the diagram (Fig. 16) according to the minimum set burner output.

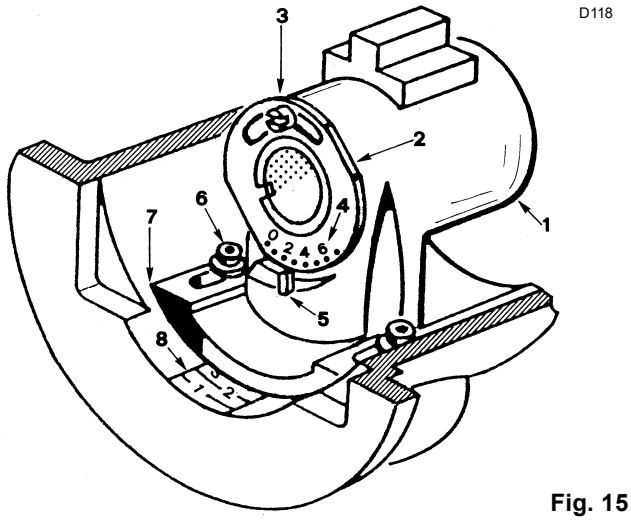


Fig. 15

Example:

The GAS 3 P/M burner is installed in a 240 kW boiler. Considering an efficiency of 89%, the burner must supply around 270 kW.

The diagram (Fig. 15) shows that the gas and air adjustments for this output are carried out on notch 4.5.

NOTE:

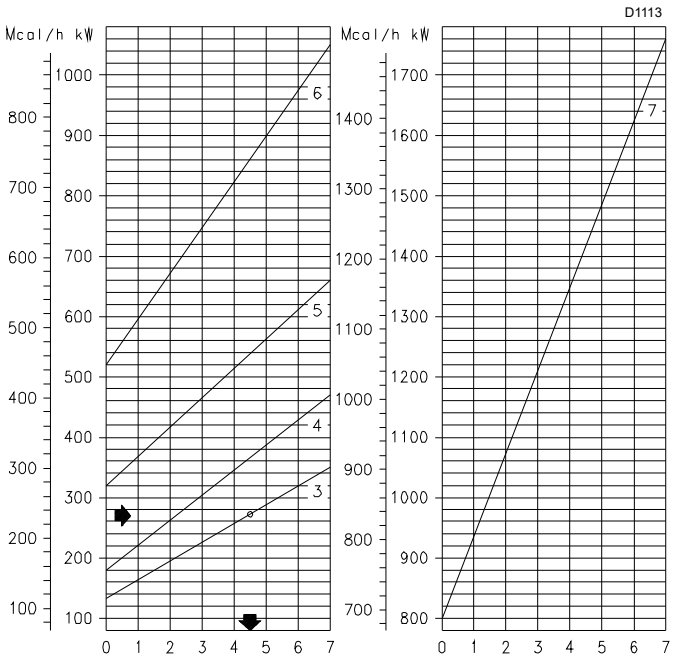
The diagram shows the ideal settings for the ring nut 2 (Fig. 15). If the pressure in the gas supply network is very low and does not allow reaching the required pressure (and hence the required output), it is possible to further open the ring nut by 1-2 notches.

Lastly, close the burner:

- – Make the unit A (Fig. 14) slide on the two slide bars 3)
- – Refit the screws 2)
- – Engage again the articulated coupling 1) of the air damper control lever, by fully tightening the relevant screw.

ATTENTION

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



Notches on ring nut 2)(Fig. 15) and plate 8)(Fig. 15)

Fig. 16

4.8 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.

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

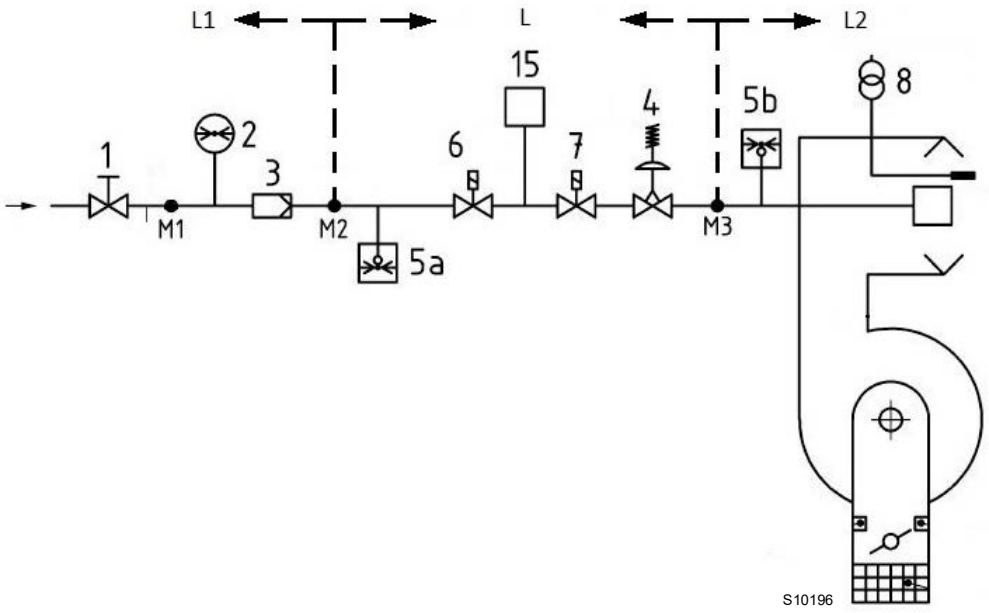


Fig. 17

Key (Fig. 17)

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

4.8.2 Gas train

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

4.8.3 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 train can enter the burner from the right or left side, depending on which is the most convenient, see Fig. 5.

4.8.4 Gas pressure

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

	kW	1 Δp (mbar) G20	G25
GAS 3 P/M	130	3.6	5
	154	4	5.6
	179	4.8	6.7
	203	5.8	8.1
	228	6.9	9.7
	252	8	11.2
	277	8.9	12.5
	301	9.8	13.7
	326	10.7	15
	350	11.7	16.4
GAS 4 P/M	180	3.7	5.2
	212	4.3	6
	244	5	7
	277	5.8	8.1
	309	6.6	9.2
	341	7.3	10.2
	373	8.1	11.3
	406	9.1	12.7
	438	10.4	14.6
	470	12	16.8
GAS 5 P/M	320	7.6	10.6
	358	8	11.2
	396	8.4	11.8
	433	9	12.6
	471	9.5	13.3
	509	10.1	14.1
	547	10.8	15.1
	584	11.3	15.8
	622	11.9	16.7
	660	12.4	17.4
GAS 6 P/M	520	9.4	13.2
	579	10.1	14.1
	638	10.7	15
	697	11.2	15.7
	756	11.6	16.2
	814	12	16.8
	873	12.4	17.4
	932	12.8	17.9
	991	13.3	18.6
	1050	13.8	19.3
GAS 7 P/M	800	9.5	13.3
	907	10.4	14.6
	1013	11.3	15.8
	1120	12.2	17.1
	1227	13	18.2
	1333	13.9	19.5
	1440	14.6	20.4
	1547	15.3	21.4
	1653	16	22.4
	1760	16.8	23.5

Tab. H

ATTENTION

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

The values shown in Tab. H refer to:
– Natural gas G 20 NCV 10 kWh/Sm^3 (8.6 Mcal/Sm^3)
– Natural gas G 25 NCV 8.6 kWh/Sm^3 (7.4 Mcal/Sm^3)

Column 1
Combustion head pressure drop.
Gas pressure measured at test point 11)(Fig. 5 a pag. 12), with:
– combustion chamber at 0 mbar;
– Gas G20 (natural gas)

To calculate the approximate output at which the burner operates:
– subtract the combustion chamber pressure from the gas pressure measured at test point 11)(Fig. 5 a pag. 12).
– Find in Tab. H a pag. 21 related to the burner concerned, the pressure value closest to the result of the subtraction.
– Read the corresponding output on the left.

GAS 6 P/M example:
➤ Maximum output operation
➤ Natural gas G 20 Net Calorific Value 9.45 kWh/Sm^3

Gas pressure at test point 11)(Fig. 5 a pag. 12)	=	14 mbar
Pressure in combustion chamber	=	2 mbar
14 - 2	=	12 mbar

A pressure of 12 mbar, column 1 (Tab. H a pag. 21), corresponds to an output of 814 kW in the table.

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 11)(Fig. 5 a pag. 12), set the MAX output required from the burner operation:
– Find (in the table relating to the burner in question) the value closest to that required.
– Read, on the right (column 1), the pressure at the test point 11)(Fig. 5 a pag. 12).
– Add this value to the estimated pressure in combustion chamber.

GAS 6 P/M example:

Required burner maximum output operation: 814 kW

Natural gas G 20 Net Calorific Value 9.45 kWh/Sm^3

Gas pressure at an output of 814 kW, from the table, column 1 (Tab. H a pag. 21)	=	12 mbar
Pressure in combustion chamber	=	2 mbar
12 + 2	=	14 mbar

pressure required at test point 11)(Fig. 5 a pag. 12).

4.9 Electrical connections

Notes on safety for the electrical wiring


DANGER

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

Before carrying out any maintenance, cleaning or checking operations:


DANGER

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


DANGER

Close the fuel shut-off valve.


DANGER

Avoid condensate, ice and water leaks from forming.

Use flexible cables according to EN 60 335-1 Regulations:

- if in PVC sheath, use at least H05 VV-F
- if in rubber sheath, use at least H05 RR-F.

All the cables to be connected to the burner terminal board 3)(Fig. 6 a pag. 13) must be routed through cable grommets 4)(Fig. 6 a pag. 13).

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

GAS 3-4 P/M

1 -	single-phase power supply	Pg 13.5
2 -	TR or RWF remote control (the pipe union is not required in the 2nd case)	Pg 13.5
3 -	TL or probe (RWF) remote control	Pg 13.5
4 -	gas valves (when VPS leak detection device is not fitted)	Pg 13.5
5 -	Gas pressure switch or device	Pg 13.5
6 -	Hole for pipe union, if any	Pg 11
7 -	Hole for pipe union, if any	Pg 21

GAS 5-6-7 P/M

1 -	Three-phase power supply	Pg 21
2 -	single-phase power supply	Pg 13.5
3 -	TR or RWF remote control (the pipe union is not required in the 2nd case)	Pg 13.5
4 -	TL or probe (RWF) remote control	Pg 13.5
5 -	gas valves (when VPS leak detection device is not fitted)	Pg 13.5
6 -	Gas pressure switch or valve leak detection device	Pg 13.5
7 -	Hole for pipe union, if any	Pg 11

ATTENTION

To ensure IP40 protection level, close the holes of unused pipe unions.

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

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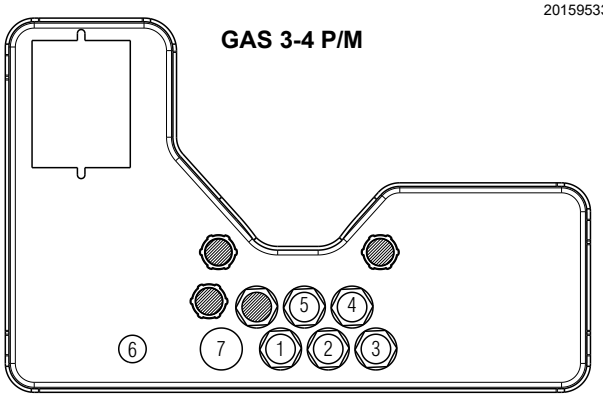
GAS 3-4 P/M



GAS 5-6-7 P/M

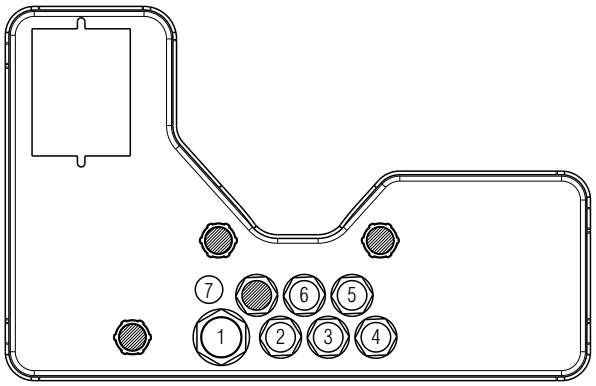


Fig. 18

4.10 Calibration of the thermal relay (only model GAS 5-6-7)

The thermal relay (Fig. 19) 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.

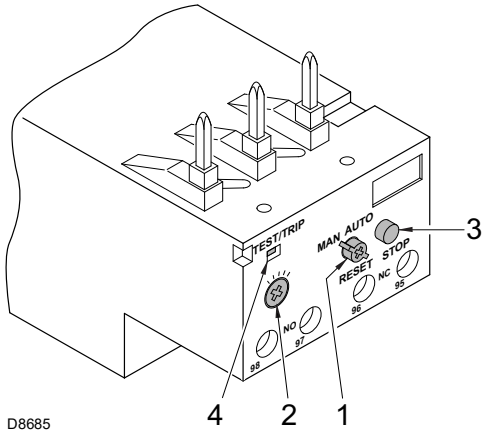


Fig. 19

4.11 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.

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.

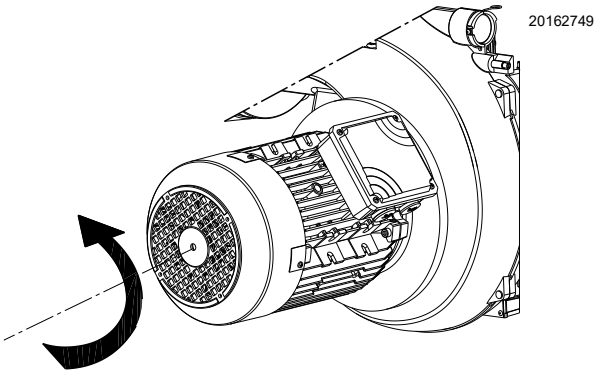


Fig. 20

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" a pag. 34.

5.2 Adjustments prior to ignition

Combustion head adjustment is already described on pag. 19.

In addition, the following adjustments must also be made:

- ➤ Open the manual valves upstream of the gas train.
- ➤ Adjust the minimum gas pressure switch to the start of the scale (Fig. 29 a pag. 31).
- ➤ Adjust the maximum gas pressure switch to the end of the scale (Fig. 28 a pag. 30).
- ➤ Adjust the air pressure switch to the start of the scale (Fig. 27 a pag. 30).
- ➤ 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 (Fig. 21) to the gas pressure test point on the pipe coupling.
- ➤ Used to approximately calculate the MAX burner output (Tab. H).
- ➤ Connect two lights or testers in parallel to the two gas line solenoid valves VR and VS in order to check the exact moment at which voltage arrives. 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.

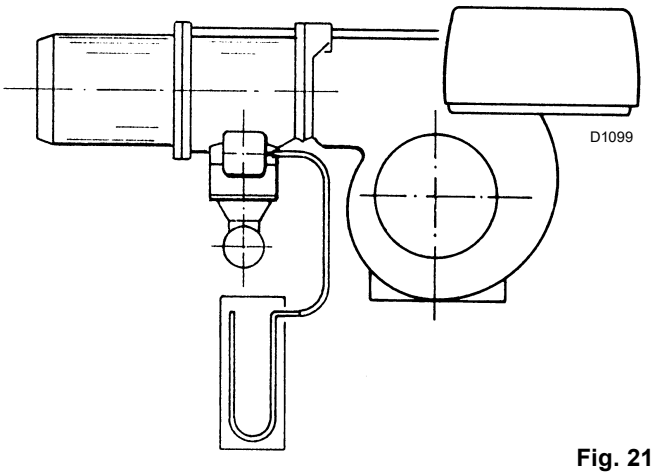


Fig. 21

5.3 Burner start-up

Close remote controls.

As soon as the burner starts, check the direction of rotation of the motor. 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.

5.4 Burner ignition

In the case that the motor starts but the flame does not appear and the flame control locks out, unlock it and wait for a new starting attempt.

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

In this case increase gas ignition flow rate.

The arrival of gas to the sleeve is indicated by the U-type pressure gauge (Fig. 21).

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

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

5.5 Servomotor adjustment

SQM 40 servomotor provides simultaneous adjustment of the air damper by means of the variable profile cam and the gas butterfly valve.

It performs a 130° rotation in 45 s.

It is equipped with three adjustable cams that activate as many contacts, factory set as follows:

I	**RED cam** Limits rotation toward maximum position.	**130°**
II	**BLUE cam** Limits rotation toward minimum position. With burner off, the air damper must be closed.	**0°**
III	**ORANGE cam:** Adjusts the ignition position and the MIN output.	**20°**
IV	Not used	
V	Not used	
VI	Not used	

Each cam is equipped with a screw that adjusts the activation point of contacts.

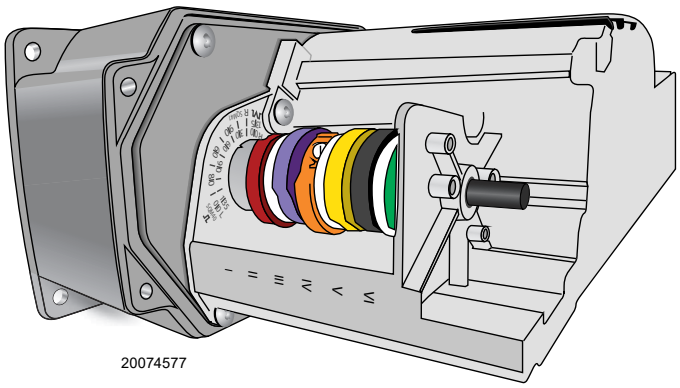


Fig. 22

5.6 Burner adjustment

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

Adjust in sequence:

1 - Output upon ignition

2 - Preliminary calibrations, if necessary

3 - MAX output

4 - MIN output

5 - Intermediate outputs between Min. and Max.

6 - Air pressure switch

7 - Maximum gas pressure switch

8 - Minimum gas pressure switch

5.6.1 Ignition output

5.6.2 Preliminary calibrations, if necessary

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.

They concern the arm (Fig. 24) of the gas butterfly valve, the tie-rod (Fig. 23) controlling the arm (Fig. 24) and the tie-rod 7)(Fig. 25 a pag. 28) controlling the air damper.

Their calibration depends on the MIN and MAX outputs required for the burner operation.

➤ The burner is factory set for a MIN-MAX output ratio of 1:3 - 1:4. The articulated coupling 1)(Fig. 23) controlling the arm (Fig. 24) of the gas butterfly valve is positioned at 90°. In this way the gas butterfly valve turns by 90° when the cam 2)(Fig. 25) covers the whole angle of 130° (A) (Fig. 26 a pag. 29). When the MIN-MAX ratio is approximately 1:2, the articulated coupling 1)(Fig. 23) must be moved from 90° hole to 60° hole (Fig. 24), with the burner off. In this case the gas butterfly valve turns by 60° when the cam 2)(Fig. 25) covers the whole angle of 130° (B) (Fig. 26 a pag. 29).

➤ If the 1- 2 ratio falls within the highest output range (e.g. 40-80% of the MAX burner output), it is necessary, apart from moving the articulated coupling from 90° to 60°, to **shorten** the tie-rod (Fig. 23) and rotate the working angle of the gas butterfly valve so that the maximum opening is 90°: from 0 - 60°(Fig. 26 a pag. 29) to 30 - 90°(Fig. 26 a pag. 29). In this case the gas butterfly valve remains partially open, index at about 30°, with the burner in stand-by mode.

To shorten the tie-rod, proceed as follows, with the burner off:

– Disengage the articulated coupling 1)(Fig. 23) from the arm (Fig. 24).
– Loosen the nuts 3)(Fig. 23).
– Tighten the hexagon 2) by a few turns.
– Lock the nut 3).
– Reconnect the articulated coupling 1)(Fig. 23) to the arm (Fig. 24).

➤ If the 1- 2 ratio falls within the lowest output range (e.g. 25-50% of the MAX burner output), **lengthen** the tie-rod 7)(Fig. 25) controlling the air damper. In this way, a too curved cam profile can be avoided.

With the burner off, proceed as follows (Fig. 25):

– Disengage the articulated coupling 4) from the lever 8).
– Loosen the nut 6).
– Loosen the hexagon 5) by a few turns.
– Lock the nut 6).
– Reconnect the articulated coupling 4) to the lever 8).
– Lift the cam profile 2) from its initial part by tightening a few screws 1) until the index located on the damper shaft reaches the 0° position again, with the servomotor at 0°.

Once any of the above described calibrations have been performed, start the burner and as soon as the flame is ignited, disconnect the servomotor 8)(Fig. 5 a pag. 12) by opening the mobile plug-socket 6)(Fig. 6 a pag. 13) placed on the cable which connects it to the flame control 7)(Fig. 5 a pag. 12).

Adjust MAX, MIN and INTERMEDIATE outputs in sequence.

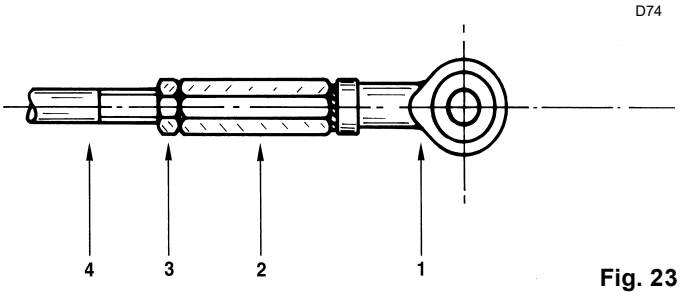


Fig. 23

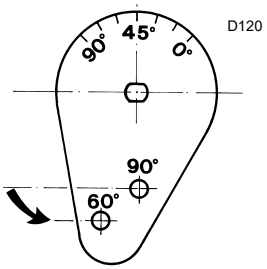


Fig. 24

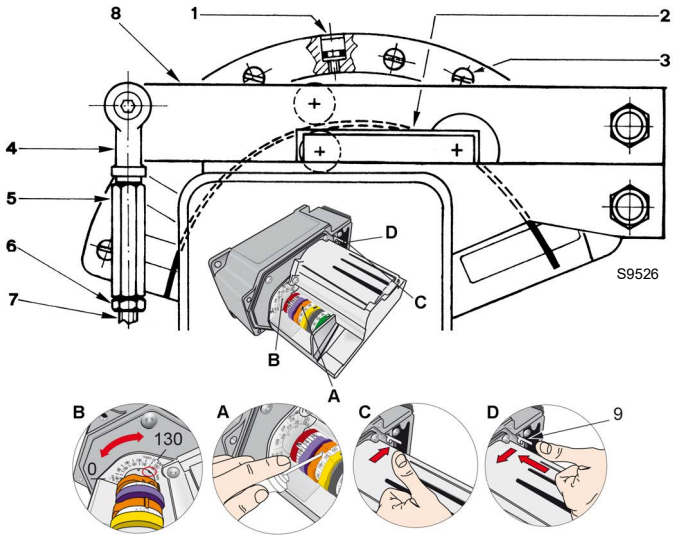


Fig. 25

5.6.3 MAX output

2nd stage MAX output must be selected within the MAX firing rate range reported in pag. 10.

MAX gas delivery adjustment

➤ Disengage the variable profile cam 2)(Fig. 25 a pag. 28) from the servomotor by pressing on lever 9).
➤ Manually rotate the cam 2) slowly clockwise up to 130°, read in correspondence with the index 10).
➤ Engage the cam 2) to the servomotor again by laterally shifting and then pulling the lever 9).

At this point, measure the gas delivery.

➤ To reduce it, slightly close the adjustment valve located on the gas train.
➤ To increase it, fully open the adjustment valve and then, if necessary, increase the pressure adjuster outlet gas pressure.

When the pressure adjuster calibration is modified to obtain the required MAX output, the ignition output previously set must be checked again.

The gas delivery must be read on the meter.

A rough indication can be obtained from Tab. H a pag. 21; just read the gas pressure at the pipe coupling 16)(Fig. 23 a pag. 28) on the U-shaped pressure gauge and follow the instructions given on pag. 21.

MAX air adjustment

Adjust the end profile of cam 2)(Fig. 25 a pag. 28) by turning the screws 1). Do not work on just one screw, but also on those closer to it, so that the cam is progressively curved.

– Tighten the screw to increase the air delivery
– Loosen the screw to reduce the air delivery.

5.6.4 MIN output

The 1st stage minimum output must be selected within the range of MIN values indicated in the diagrams of pag. 10.

MIN gas delivery adjustment

➤ Disengage the cam 2)(Fig. 25 a pag. 28) by pressing on lever 9)(Fig. 26).
➤ Manually rotate the cam slowly anticlockwise until reaching the 20° position, read in correspondence with the index B.
➤ Engage the cam 2) again by pressing the lever 9)(Fig. 25 a pag. 28) and measure the gas delivery at the meter.

The MIN delivery can be changed in two ways:

➤ Disengage the cam 2)(Fig. 25 a pag. 28) and rotate it by hand anticlockwise until reaching the 10° position to reduce the delivery; rotate it clockwise until reaching the 30° position to increase it. Then engage the cam 2) and calibrate the cam III (Fig. 22 a pag. 27) on the activation point found. The cam III is factory set to 20° and can be positioned between 10° and 30°.
➤ Lengthen the tie-rod 4)(Fig. 23 a pag. 28) of the gas butterfly valve to reduce the delivery, shorten the tie-rod to increase it. To change the tie-rod length proceed as follows, with the burner off:

– Disengage the articulated coupling 1)(Fig. 23 a pag. 28) from the arm (Fig. 24 a pag. 28).
– Loosen the nuts 3)(Fig. 23 a pag. 28).
– Tighten the hexagon 2) to shorten the tie-rod; loosen the hexagon to lengthen it.
– Lock the nut 3).
– Reconnect the articulated coupling 1) to the arm (Fig. 24).

Small changes to the tie-rod for adjusting the min. delivery do not alter the max. delivery which anyway has to be checked.

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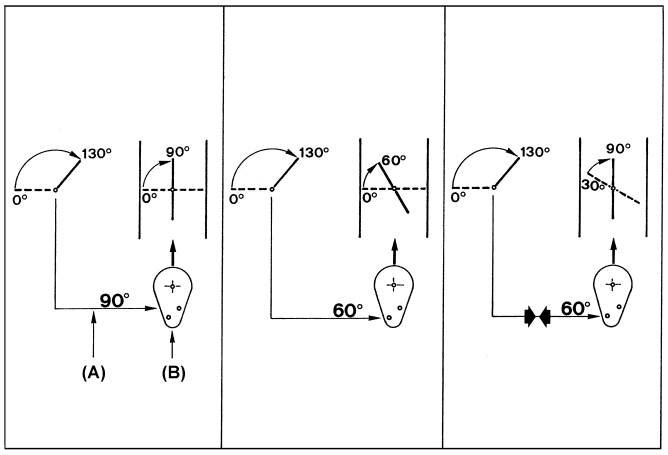


Fig. 26

MIN air adjustment

Adjust the initial profile of cam 2)(Fig. 25 a pag. 28) by gradually turning the screws 1).

Pay attention not to change the profile end part that adjusts the damper to the maximum delivery, previously set.

5.6.5 Intermediate outputs

(especially necessary for modulating operation)

Gas

No adjustment is required

Air

The adjustment is carried out by working on the profile cam adjustment intermediate screws 1)(Fig. 25 a pag. 28), paying attention not to move those related to the minimum and maximum delivery.

Check that the combustion is satisfactory at 2- 3 intermediate points between MIN and MAX.

After the adjustment, lock the screws 1)(Fig. 25 a pag. 28) using the transversal screws 3) and restore the electrical connections of the servomotor by inserting the mobile plug-socket 6)(Fig. 6 a pag. 13).

5.7 Pressure switch adjustment

5.7.1 Air pressure switch

Adjust the air pressure switch after performing all other burner adjustments with the air pressure switch set to the start of the scale (Fig. 27).

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

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

If the burner locks out again, turn the knob slightly anticlockwise.

as a rule, the air pressure switch must limit the CO in the fumes to less than 1% (10,000 ppm). To check this, insert a combustion analyser into the chimney, slowly close the fan suction inlet (for example with cardboard) and check that the burner locks out, before the CO in the fumes exceeds 1%.

The incorporated air pressure switch can work in a 'differential' mode if connected with two pipes. If a strong depression in the combustion chamber during the pre-purging phase does not allow the air pressure switch to switch, this can be obtained by applying a second tube between the air pressure switch and the suction inlet of the fan. In this way, the pressure switch will work in differential mode.

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

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

5.7.2 Maximum gas pressure switch

Adjust the maximum gas pressure switch (Fig. 28) 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.

Fig. 27

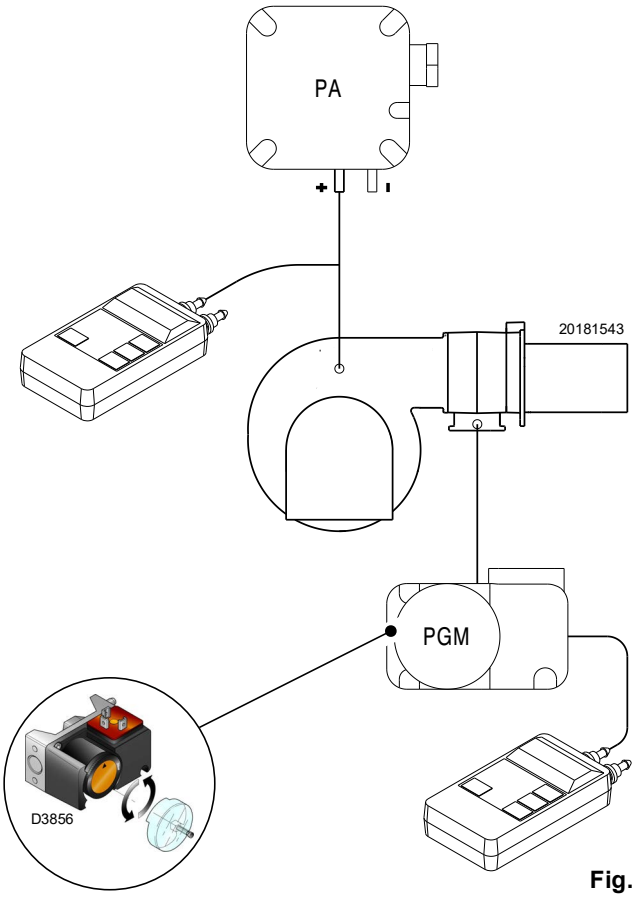


Fig. 28

5.7.3 Minimum gas pressure switch

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

Adjust the minimum gas pressure switch (Fig. 29) 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

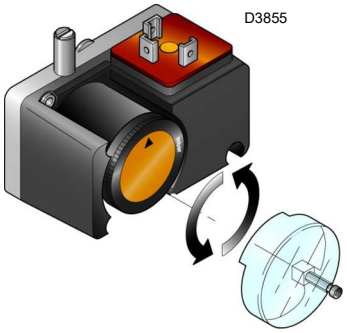


Fig. 29

5.7.4 Flame presence check

The burner is fitted with an ionisation system to check that a flame is present. The minimum current required for the flame control operation is 6 μA. The burner supplies a significantly higher current value, so that no check is usually needed. However, if it is necessary to measure the ionisation current, disconnect the plug-socket 5)(Fig. 6 a pag. 13) on the ionisation probe cable and insert a direct current microammeter with a base scale of 100 μA.

ATTENTION

Carefully check polarities.

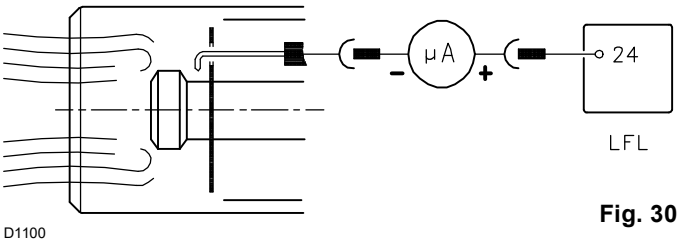


Fig. 30

5.8 Burner operation

5.8.1 Burner start-up

0s: Control remote control TL closes.
6s: Fan servomotor start-up.
2s: Servomotor start-up: turn to the right by 130°. 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, ranging from 10° and 30°.
117s: The air damper and gas butterfly valve assume the MIN output position (with cam III) at 20°.
120s: Ignition electrode strikes a spark.
126s: The safety valve VS opens, along with the adjustment valve VR, (quick opening). The flame ignites with a small output - point A. The output gradually increases, and the valve slowly opens, until MIN output is reached - point B.
129s: The spark goes out.
150s: The start-up cycle ends.

STANDARD IGNITION
(no. = seconds from instant 0)

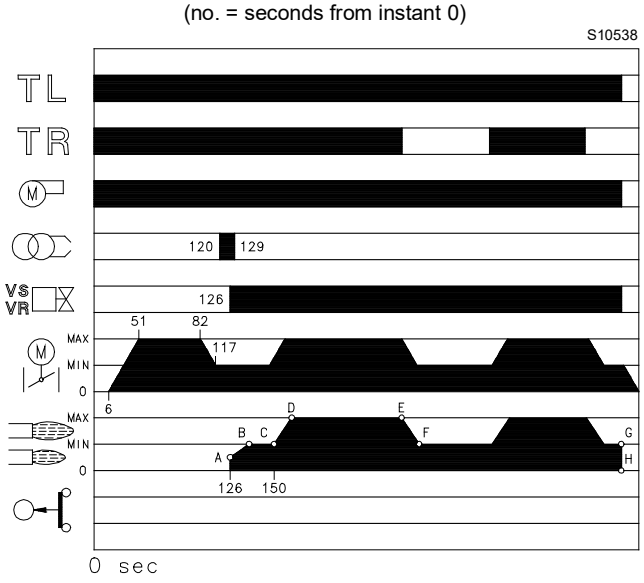


Fig. 31

5.8.2 Steady state operation

Burner without output regulator RWF

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 electric 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).
– If the temperature or pressure then 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, and the servomotor returns to angle 0° limited by the contact of cam I. The air damper closes completely to reduce heat losses to a minimum.

With each change of output, the servomotor automatically modifies the gas output (butterfly valve) and the air flow rate (fan damper).

IGNITION FAILURE

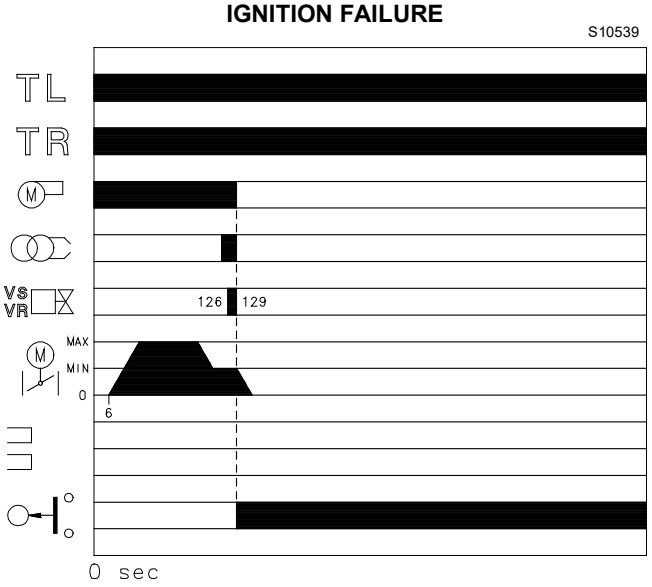


Fig. 32

Burner with output regulator RWF

See the manual supplied with the regulator.

5.8.3 Ignition failure

If the burner does not ignite, it locks out within 3 seconds after the gas valve opens, 129 s after the TL closes.

5.8.4 Burner flame goes out during operation

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

5.9 Final checks (with burner operating)

➤ Disconnect a wire of the minimum gas pressure switch ➤ Open the thermostat/pressure switch TL ➤ Open the thermostat/pressure switch TS	⇨	The burner must stop
➤ Disconnect the P shared wire of the maximum gas pressure switch ➤ Disconnect the P shared wire of the air and gas pressure switch ➤ Disconnect the electrical connections of the ionisation probe	⇨	The burner must stop in lockout

Tab. I

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.

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

Fan
Check to make sure that no dust has accumulated inside the fan or on its impellers, as this condition will cause a reduction in the air flow rate and provoke polluting combustion.

Boiler
Clean the boiler as indicated in its accompanying instructions in order to maintain all the original combustion characteristics intact, especially: the flue gas temperature and combustion chamber pressure.

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

Gas filter
Change the gas filter when it is dirty.

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.
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.

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. If in doubt, disassemble the elbow 1)(Fig. 15 a pag. 19).

Servomotor
Release cam 2)(Fig. 22 a pag. 27), by pressing on lever 9)(Fig. 25 a pag. 28) and rotate it backwards and forwards to make sure it moves smoothly. Engage cam 2)(Fig. 22 a pag. 27) again.

6.2.4 Combustion control (gas)

CO_2
It is advisable to adjust the burner with a CO_2 not greater than about 10% (gas with Ncv 8600 kcal/m3). In this way it is avoided that a small decalibration (for example a variation in the tension) could cause a combustion with an air defect and with the subsequent formation of CO.

CO
It should not exceed 100 mg/kWh.

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. J

6.2.5 Safety components

The safety components should be replaced at the end of their life cycle indicated in the following table. The specified life cycles do not refer to the warranty terms indicated in the delivery or payment conditions.

Safety component	Life cycle
Flame control	10 years or 250.000 operation cycles
Flame sensor	10 years or 250.000 operation cycles
Gas valves (solenoid)	10 years or 250.000 operation cycles
Pressure switches	10 years or 250.000 operation cycles
Pressure adjuster	15 years
Servomotor (electronic cam) (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. K

6.3 Opening the burner

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.

- ➤ Disengage the articulated coupling 1)(Fig. 33) of the air damper control lever;
- ➤ remove the screws 2) retaining the fan to the coupling;
- ➤ open the burner by moving the unit A backwards on the two slide bars 3). The unit B remains fitted to the boiler.

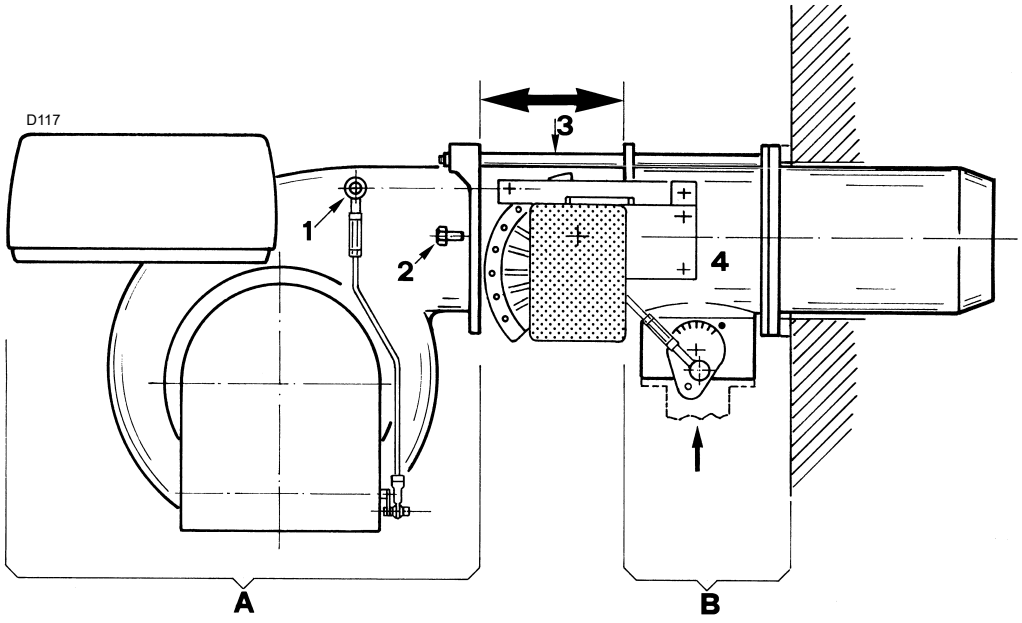


Fig. 33

6.4 Closing the burner

ATTENTION

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

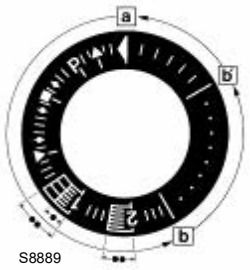
After carrying out maintenance, cleaning or checking operations, reassemble the cover and all the safety and protection devices of the burner.

7 Faults - Possible causes - Solutions

The LFL... flame control is equipped with a lockout indicator (Fig. 34) 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. 35.



Lockout indicator

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

Fig. 34

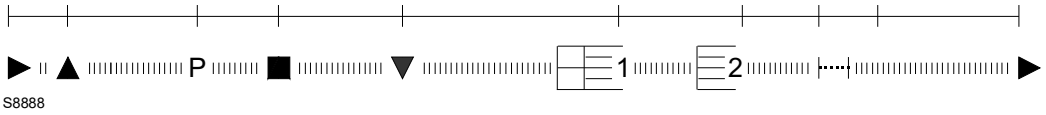


Fig. 35

Fuse replacement

The fuse 2)(Fig. 36) 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. 36.

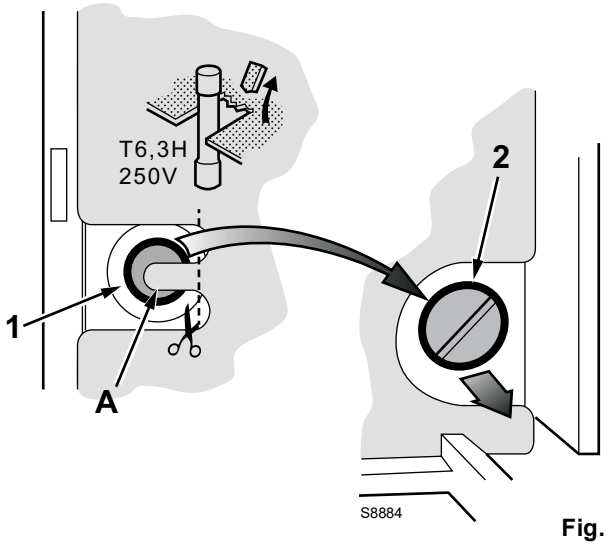


Fig. 36

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 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 (2)
		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. L

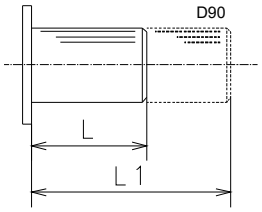
A Appendix - Accessories

Extended head kit

L = standard head

L1 = extended head obtainable with the kit

MODEL	CODE	L	L1
GAS 3 P/M	**3000605**	L = 185	L1 = 320 mm
GAS 4 P/M	**3000606**	L = 187	L1 = 320 mm
GAS 5 P/M	**3000607**	L = 207	L1 = 365 mm
GAS 6 P/M	**3000608**	L = 227	L1 = 360 mm
GAS 7 P/M	**3000678**	L = 240	L1 = 400 mm

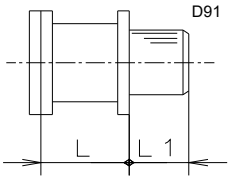


Spacer kit to shorten the combustion head

L = Spacer thickness

L1 = Resulting blast tube length

MODEL	CODE	L	L1
GAS 3 P/M	**3000755**	L = 142	L1 = 43 mm
GAS 4 P/M	**3000755**	L = 142	L1 = 45 mm
GAS 5 P/M	**3000755**	L = 142	L1 = 65 mm
GAS 6 P/M	**3000755**	L = 142	L1 = 85 mm
GAS 7 P/M	-	-	-



Kit for LPG operation

It is essential for the burner's LPG operation.

L = kit for standard head

L1 = kit for extended head

MODEL	CODE	L/L1
GAS 3 P/M	**3000657**	L = 185 mm
GAS 3 P/M	**3000807**	L1 = 320 mm
GAS 4 P/M	**3000658**	L = 187 mm
GAS 4 P/M	**3000808**	L1 = 320 mm
GAS 5 P/M	**3000659**	L = 207 mm
GAS 5 P/M	**3000809**	L1 = 365 mm
GAS 6 P/M	**3000753**	L = 227 mm
GAS 6 P/M	**3000810**	L1 = 360 mm
GAS 7 P/M	**3000806**	L = 240 mm
GAS 7 P/M	**3000811**	L1 = 400 mm

Kit for TOWN GAS operation

It is essential for the burner's town gas operation.

It can be applied both to L standard head and L1 extended head with (A). Burners have not been EC-type approved for town gas operation. Using town gas burners is allowed only in industrial application and non-EC countries.

MODEL	CODE
GAS 3 P/M	**3000742**
GAS 4 P/M	**3000754**
GAS 5 P/M	**3000759**
GAS 6 P/M	**3000768**
GAS 7 P/M	**3000769**

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 the heat generator

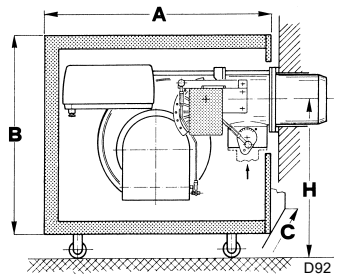
PARAMETER TO BE CONTROLLED		PROBE		REGULATOR	
	FIRING RATE	TYPE	CODE	TYPE	CODE
Temperature	- 100...+ 500 °C	PT 100	3010110	RWF50 RWF55	20105445 20105717
Pressure	0...2.5 bar 0...16 bar	Output probe 4...20 mA	3010213 3010214		

Acoustic shroud kit

It is used to significantly reduce the noise generated by the burner (— 14/18 dBA). It is made of steel and sound-absorbing materials and encloses the burner completely.

The shroud is fitted on wheels and can be easily moved to inspect the burner.

MODEL	CODE
GAS 3-4-5-6 P/M	**3010403**
GAS 7 P/M	**3010404**



mm	A	B	C	H MIN	H MAX	kg
GAS 3-4-5-6 P/M	710	620	745	540	1160	60
GAS 7 P/M	985	820	920	730	1350	101

Continuous purging kit

It is made of a small three-way solenoid valve to be installed between the air pressure switch and the fan. It allows the burner to ignite again after the continuous ventilation following flame extinction.

MODEL	CODE
GAS 3-4-5-6-7 P/M	**3010030**

Radio disturbance protection kit

It consists of a three-pole potentiometer with a value of 0-1000 ¾ for 0-100% stroke, to be installed inside the servomotor. It signals the servomotor position to provide indications or feedbacks to different kinds of tools.

MODEL	CODE
GAS 3-4-5-6-7 P/M	**3010021** **20096322**

Gas trains in compliance with EN 676

Please refer to manual.

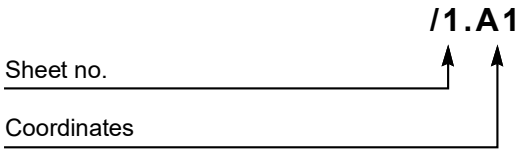
ATTENTION

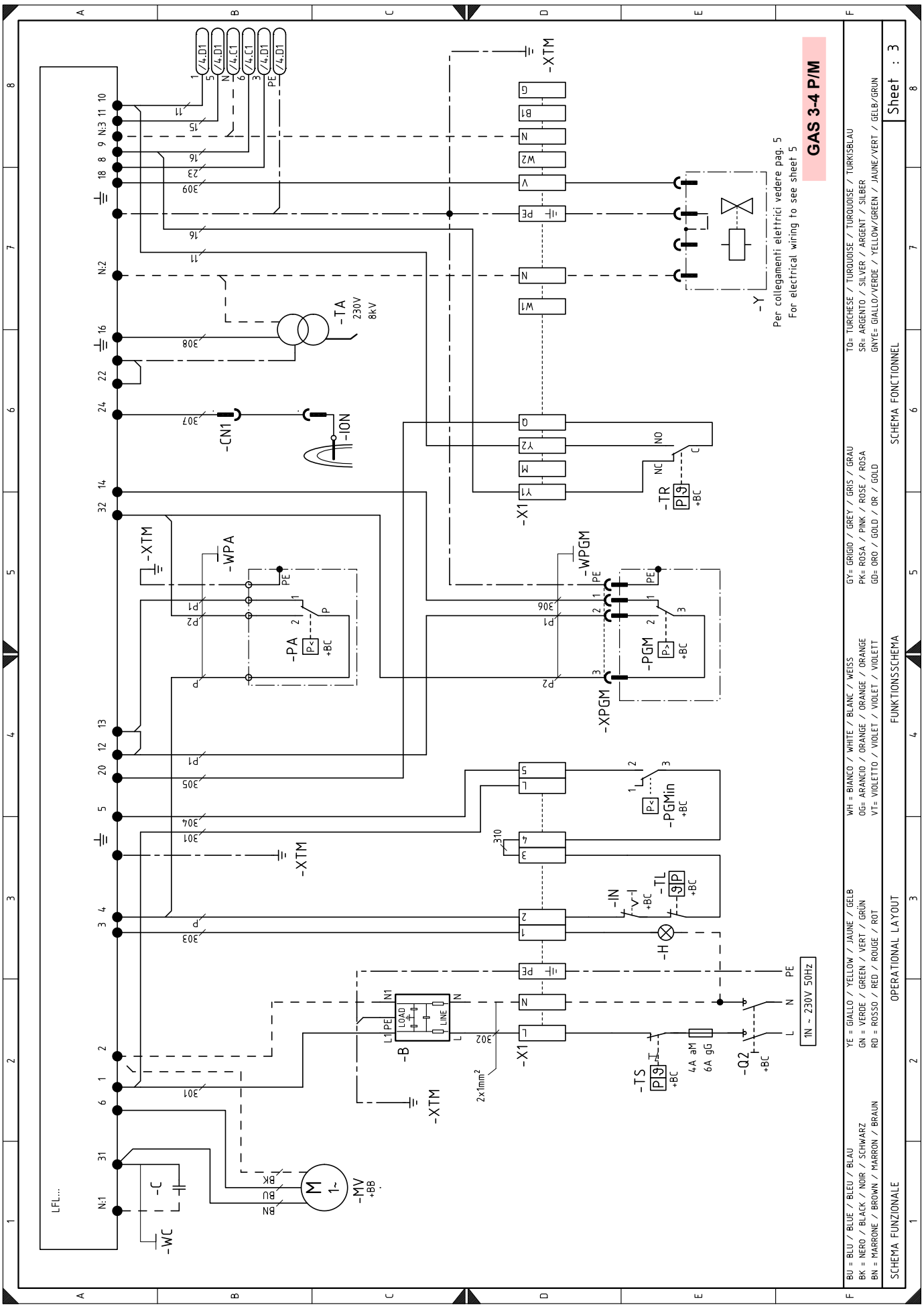
The installer is responsible for the addition of any safety device not foreseen in this manual.

B Appendix - Electrical panel layout

1	**Index of layouts**
2	Indication of references
3	Functional layout
4	Functional layout
5	Electrical wiring that is the responsibility of the installer
6	Electrical wiring that is the responsibility of the installer
7	Functional layout RWF 50

2 Indication of references




GAS 3-4 P/M
Per collegamenti elettrici vedere pag. 5
For electrical wiring to see sheet 5
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
1N ~ 230V 50Hz
-XTM
-WPA
-PA
-WPGM
-PGM
-XPGM
-PGMin
-TA
230V
8kV
-CN1
-ION
-X1
-TR
-IN
-TL
-H
-B
-TS
-Q2
-C
-WC
-MV
LFL...
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
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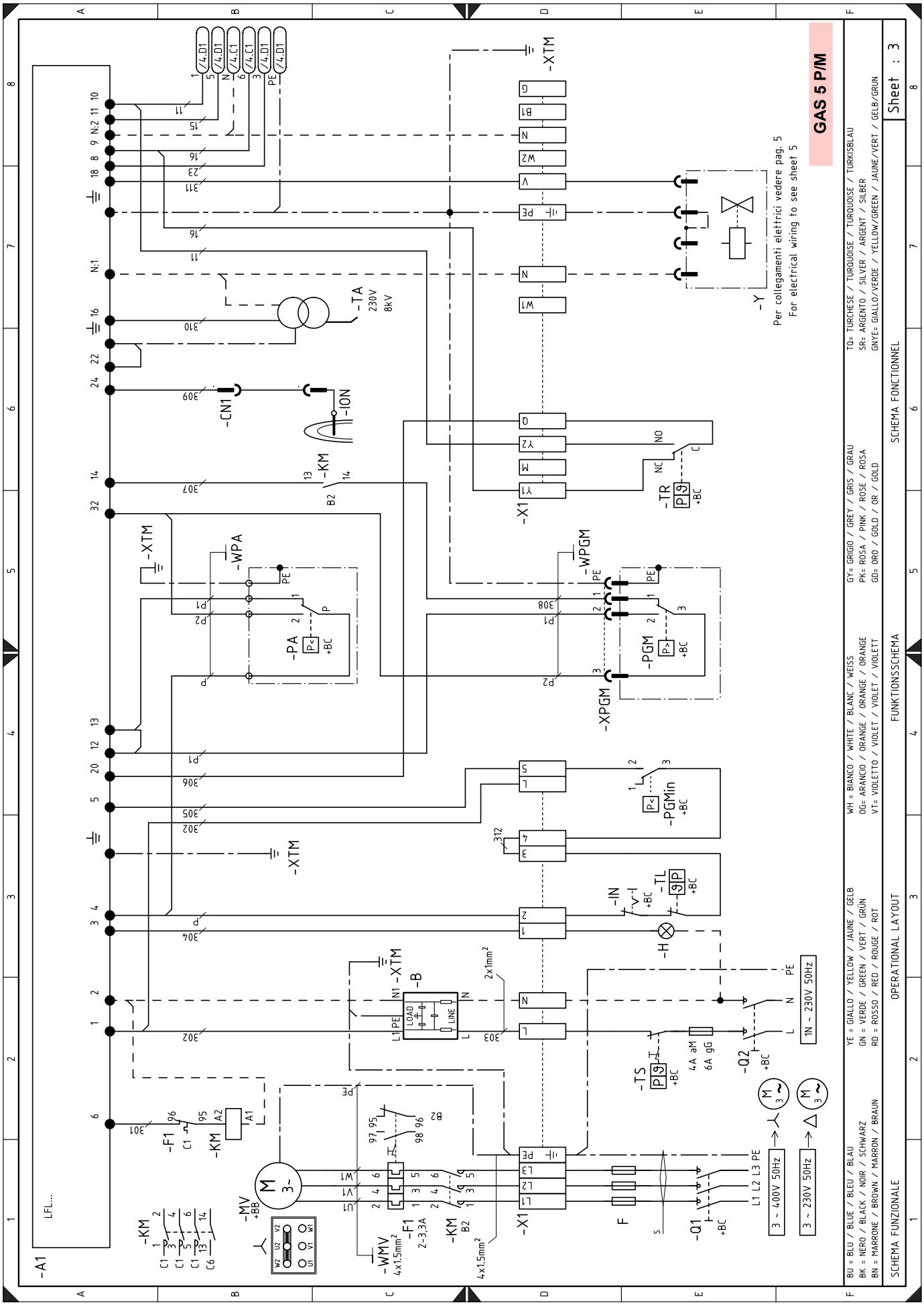
GAS 5 P/M
Per collegamenti elettrici vedere pag. 5
For electrical wiring to see sheet 5
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
-A1
LFL...
-KM
-F1
-MV
-WMV
-TA
230V
8kV
-CN1
-ION
-XTM
-WPA
-PA
-WPGM
-PGM
-XPGM
-PGMin
-IN
-TL
-H
-B
-TS
-Q2
-Q1
-X1
-Y
-TR
F
1N ~ 230V 50Hz
3 ~ 400V 50Hz
3 ~ 230V 50Hz
BU = BLU / BLUE / BLEU / BLAU
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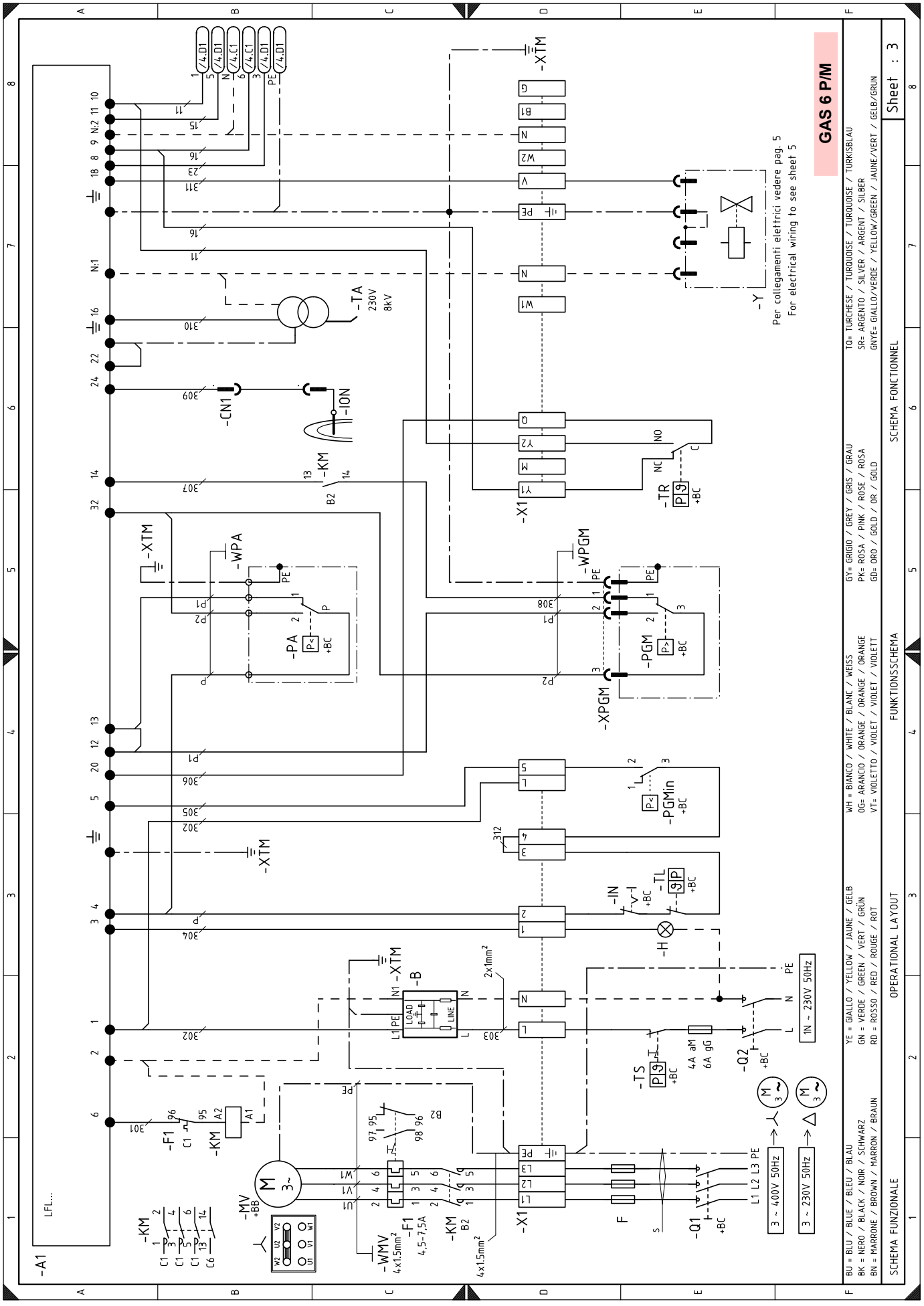
GAS 6 P/M
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
Per collegamenti elettrici vedere pag. 5
For electrical wiring to see sheet 5
-A1
LFL...
-KM
-F1
-MV
-WMV
-TA
230V
8kV
-CN1
-ION
-XTM
-WPA
-PA
-WPGM
-PGM
-XPGM
-PGMin
-IN
-TL
-H
-B
-TS
-Q2
-Q1
-X1
-TR
-Y
F
1N ~ 230V 50Hz
3 ~ 400V 50Hz
3 ~ 230V 50Hz
4A aM
6A gG
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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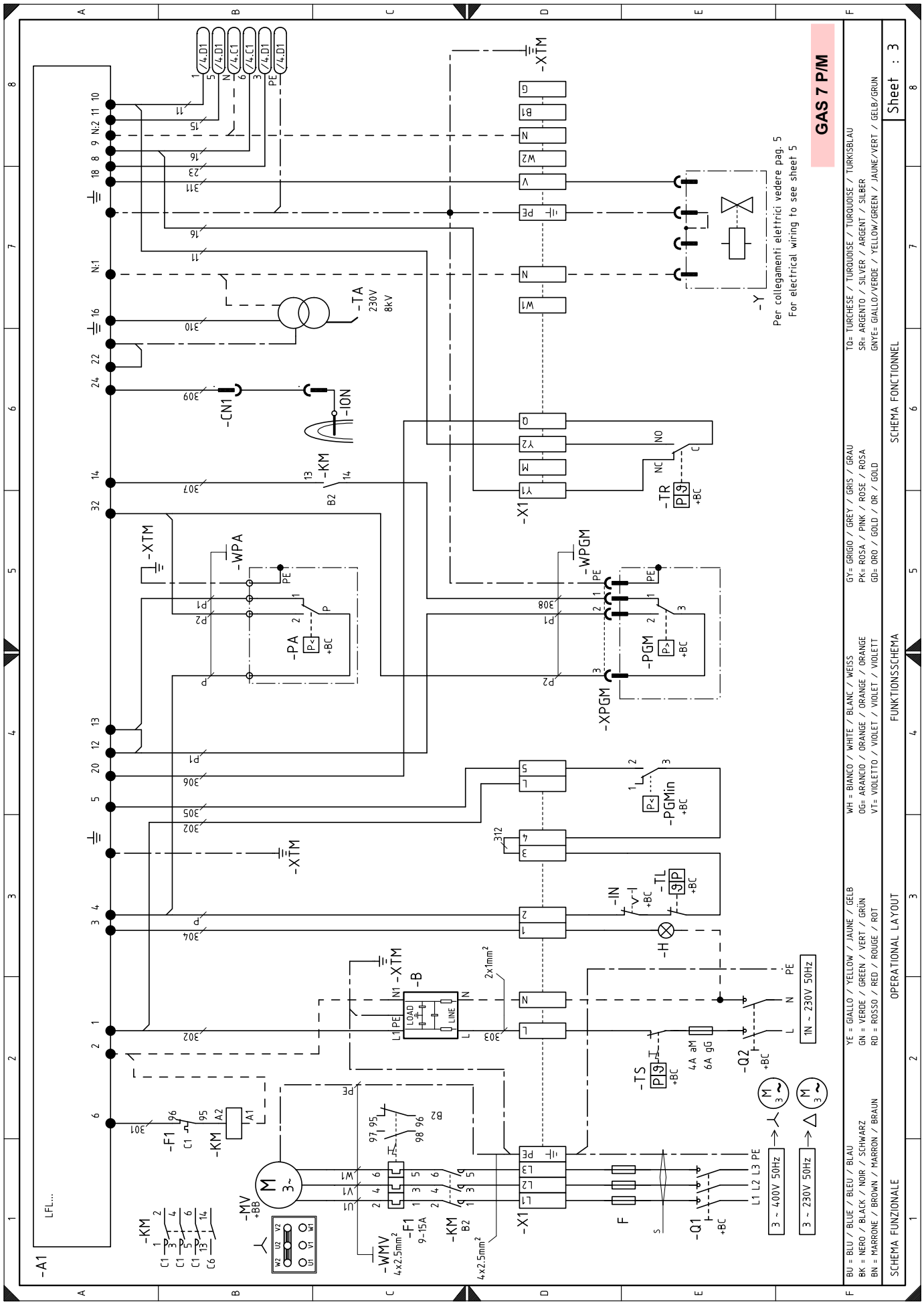
GAS 7 P/M
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
Per collegamenti elettrici vedere pag. 5
For electrical wiring to see sheet 5
-A1
LFL...
-KM
-F1
-MV
-WMV
-CN1
-ION
-TA
230V
8kV
-XTM
-X1
-Y
-TR
-WPA
-PA
-WPGM
-PGM
-XPGM
-PGMin
-IN
-TL
-H
-B
-TS
-Q2
-Q1
F
1N ~ 230V 50Hz
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3 ~ 230V 50Hz
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SR= ARGENTO / SILVER / ARGENT / SILBER
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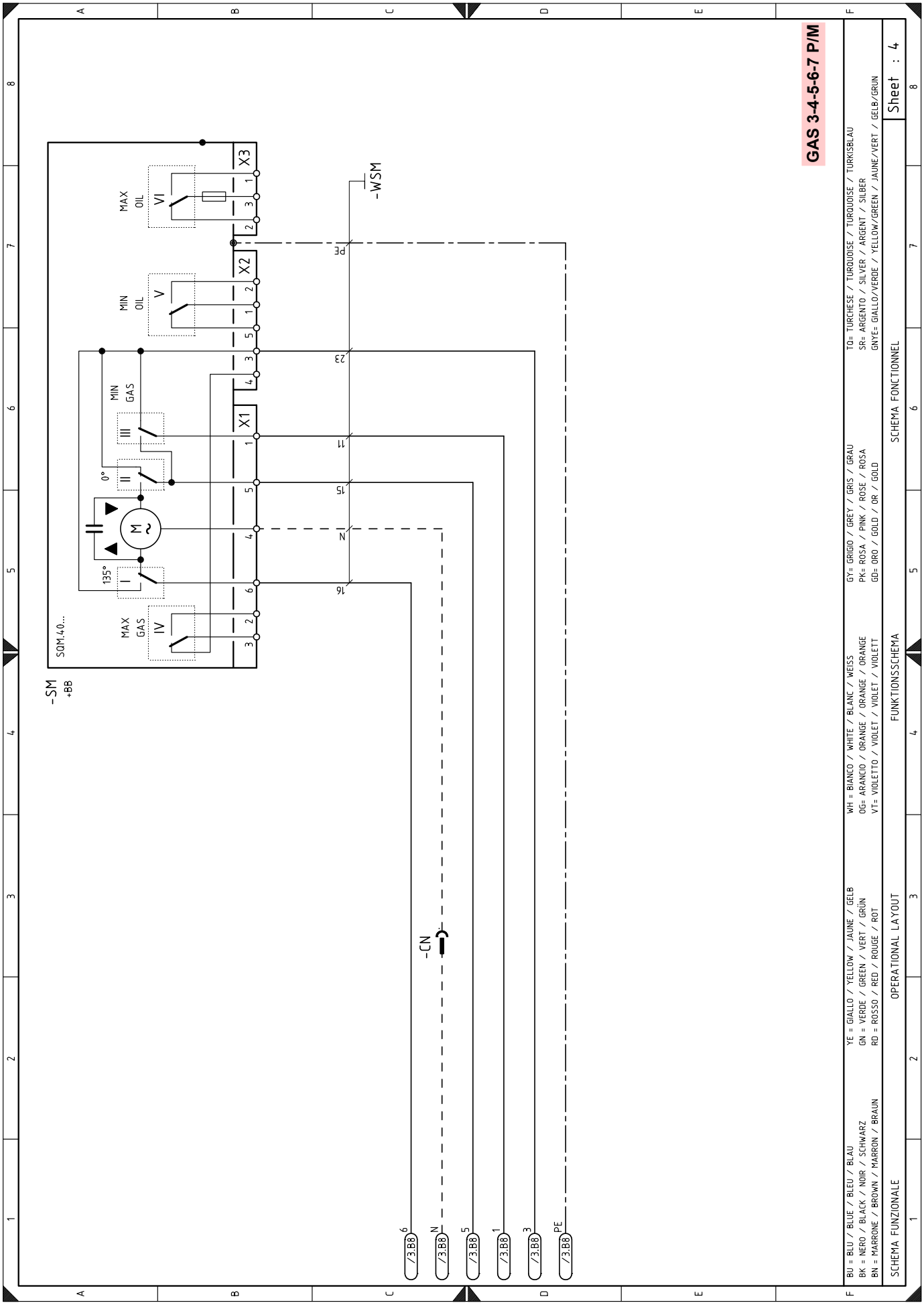
GAS 3-4-5-6-7 P/M
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 4
-SM
+BB
SQM40...
MAX OIL
MIN OIL
MIN GAS
MAX GAS
-WSM
-CN
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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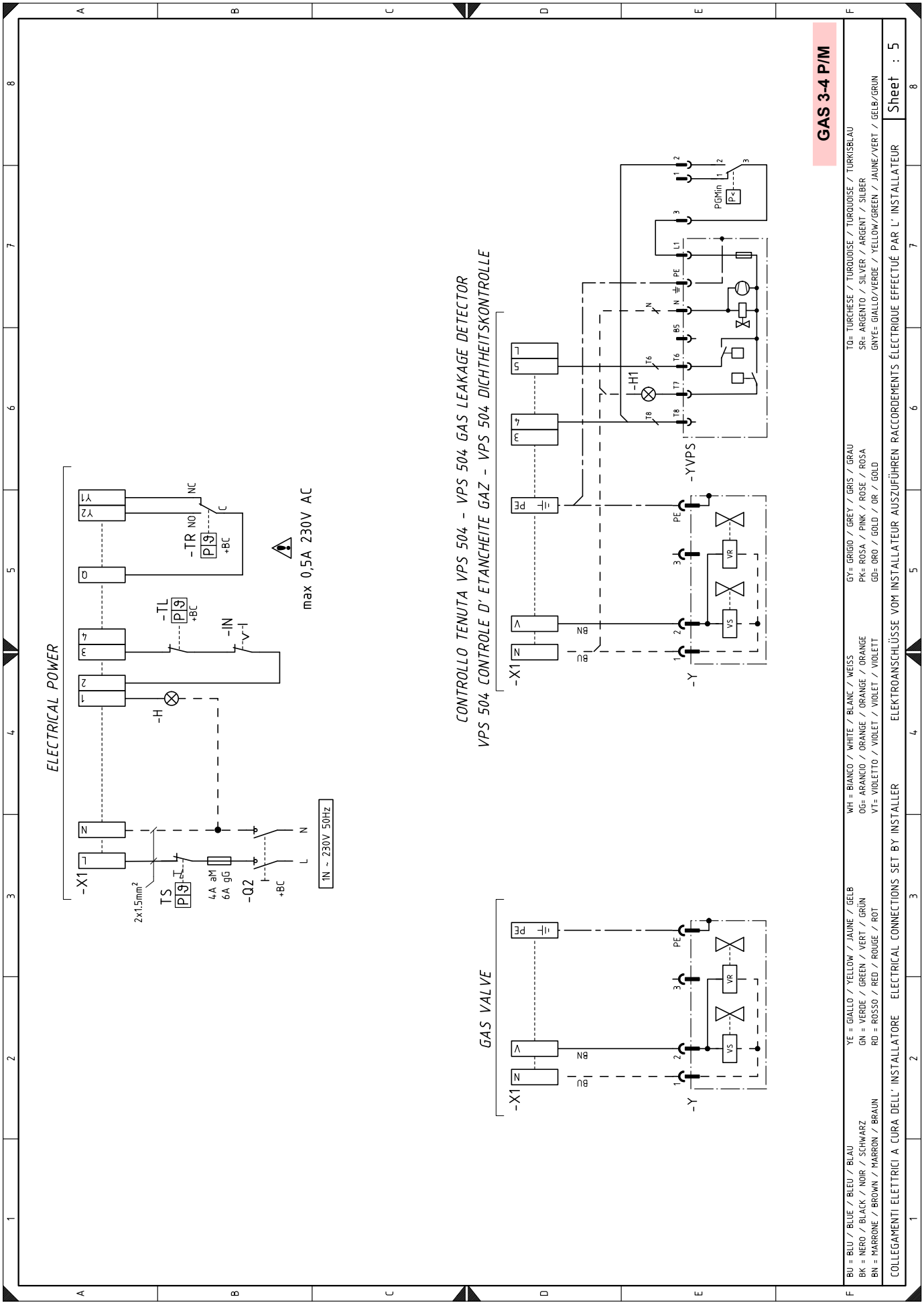
GAS 3-4 P/M
ELECTRICAL POWER
-X1
2x1.5mm²
TS
-H
4A aM
6A gG
-Q2
+BC
1N ~ 230V 50Hz
-TL
-IN
-TR NO
NC
max 0,5A 230V AC
CONTROLLO TENUTA VPS 504 - VPS 504 GAS LEAKAGE DETECTOR
VPS 504 CONTROLE D' ETANCHEITE GAZ - VPS 504 DICHTHEITSKONTROLLE
-YVPS
-H1
PGMin
GAS VALVE
-Y
VS
VR
BU = BLU / BLUE / BLEU / BLAU
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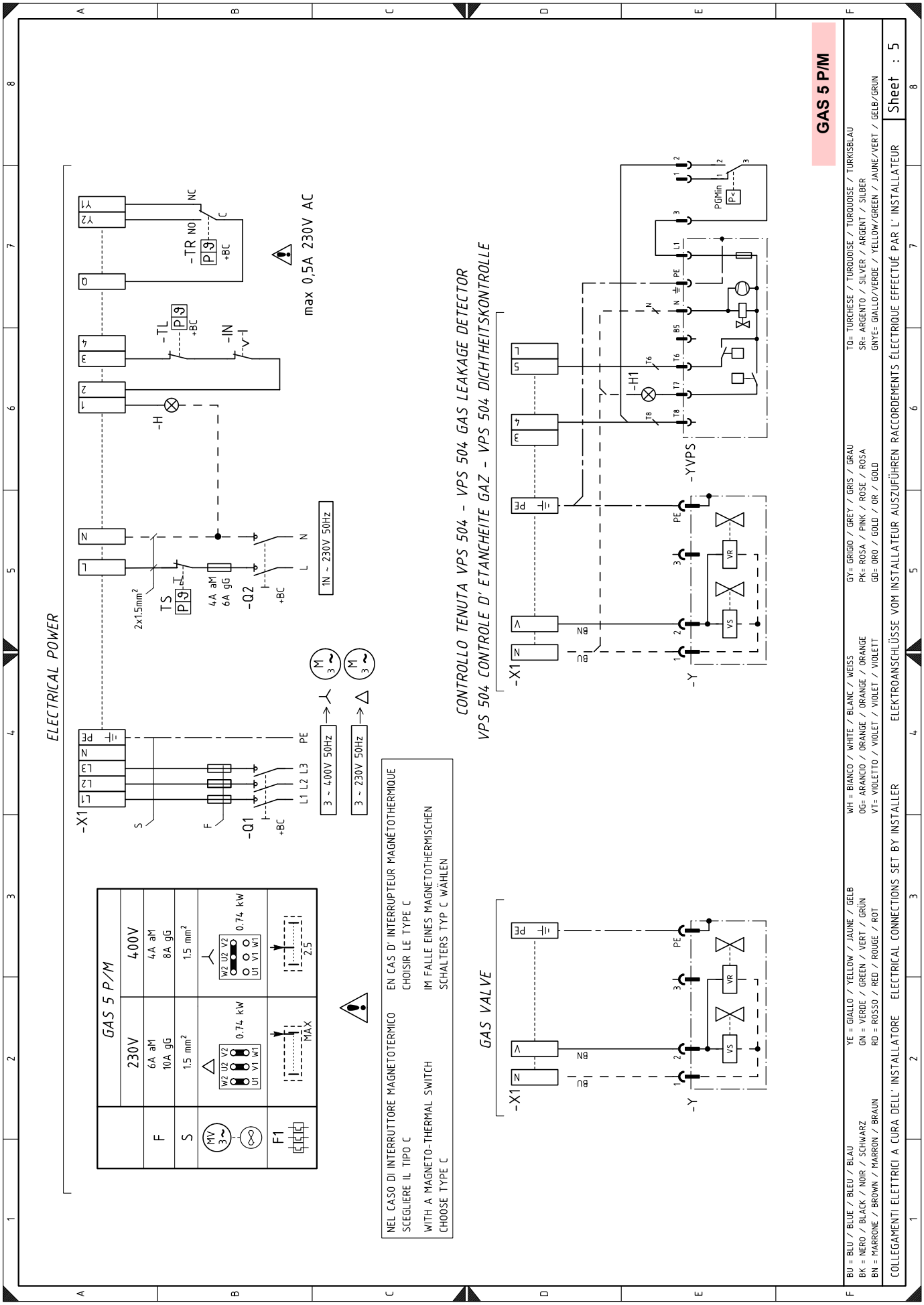
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN
RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


GAS 5 P/M
ELECTRICAL POWER
CONTROLLO TENUTA VPS 504 - VPS 504 GAS LEAKAGE DETECTOR
VPS 504 CONTROLE D' ETANCHEITE GAZ - VPS 504 DICHTHEITSKONTROLLE
GAS VALVE
max 0,5A 230V AC
1N ~ 230V 50Hz
3 ~ 400V 50Hz
3 ~ 230V 50Hz
L1 L2 L3 PE
L N
2x1.5mm²
4A aM
6A gG
0.74 kW
1.5 mm²
2.5
MAX
NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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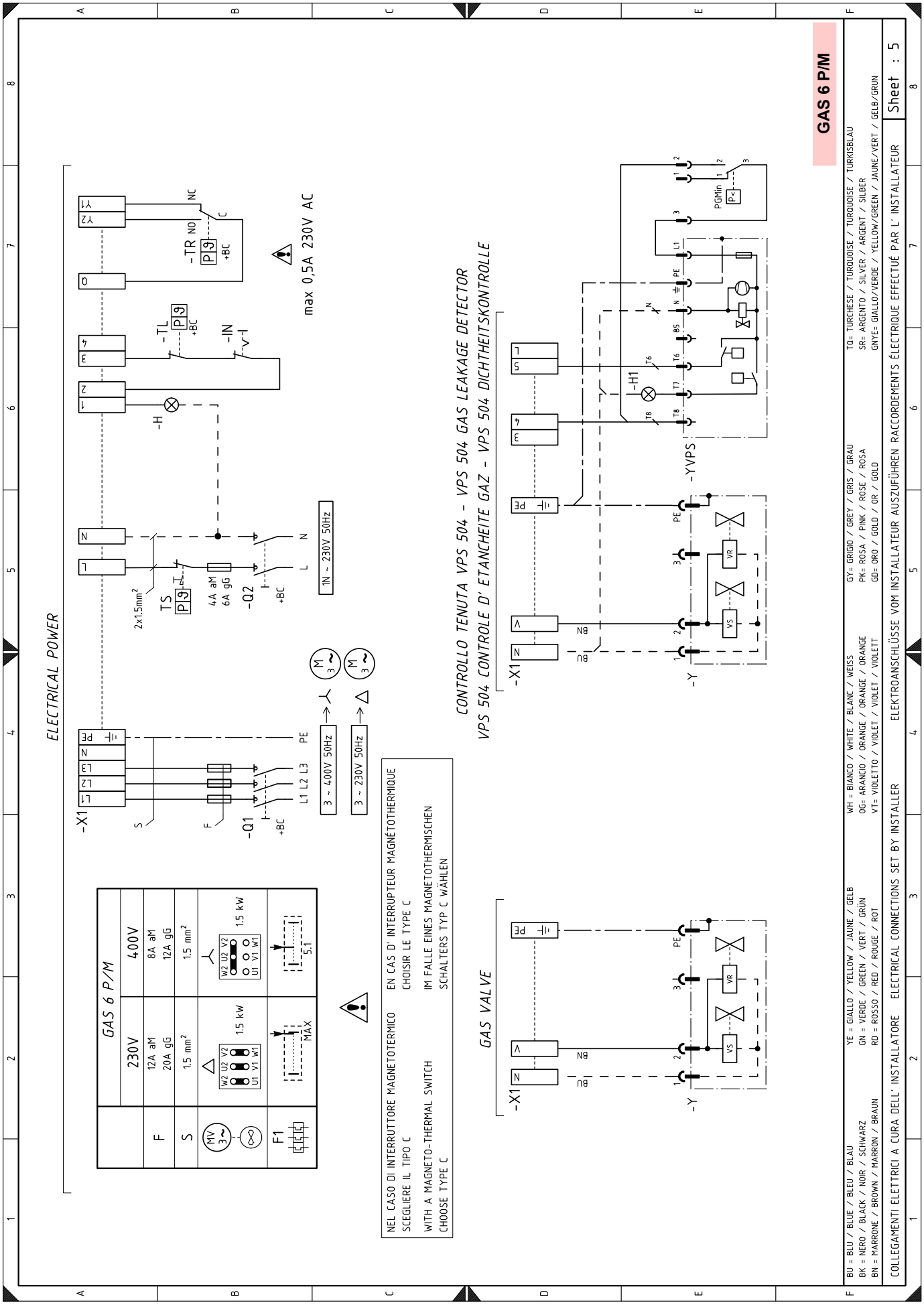
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


GAS 6 P/M
ELECTRICAL POWER
GAS 6 P/M
230V
400V
F
S
F1
12A aM
20A gG
8A aM
12A gG
1.5 mm²
1.5 kW
MAX
5.1
-X1
-Q1
-Q2
-TR
-TL
-IN
-H
TS
2x1.5mm²
4A aM
6A gG
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
max 0,5A 230V AC
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
CONTROLLO TENUTA VPS 504 - VPS 504 GAS LEAKAGE DETECTOR
VPS 504 CONTROLE D' ETANCHEITE GAZ - VPS 504 DICHTHEITSKONTROLLE
GAS VALVE
-YVPS
-Y
-H1
PGMin
BU = BLU / BLUE / BLEU / BLAU
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TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
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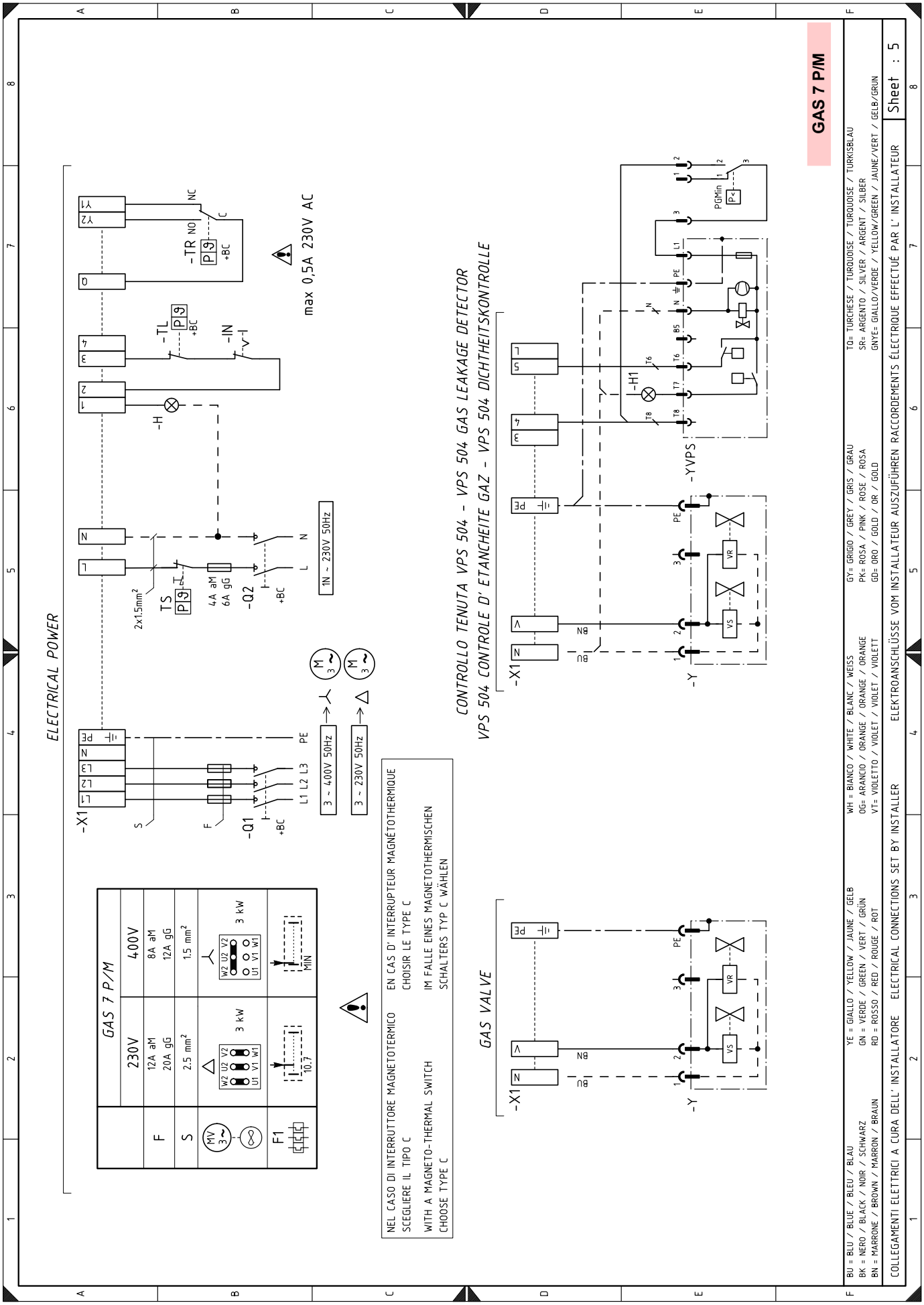
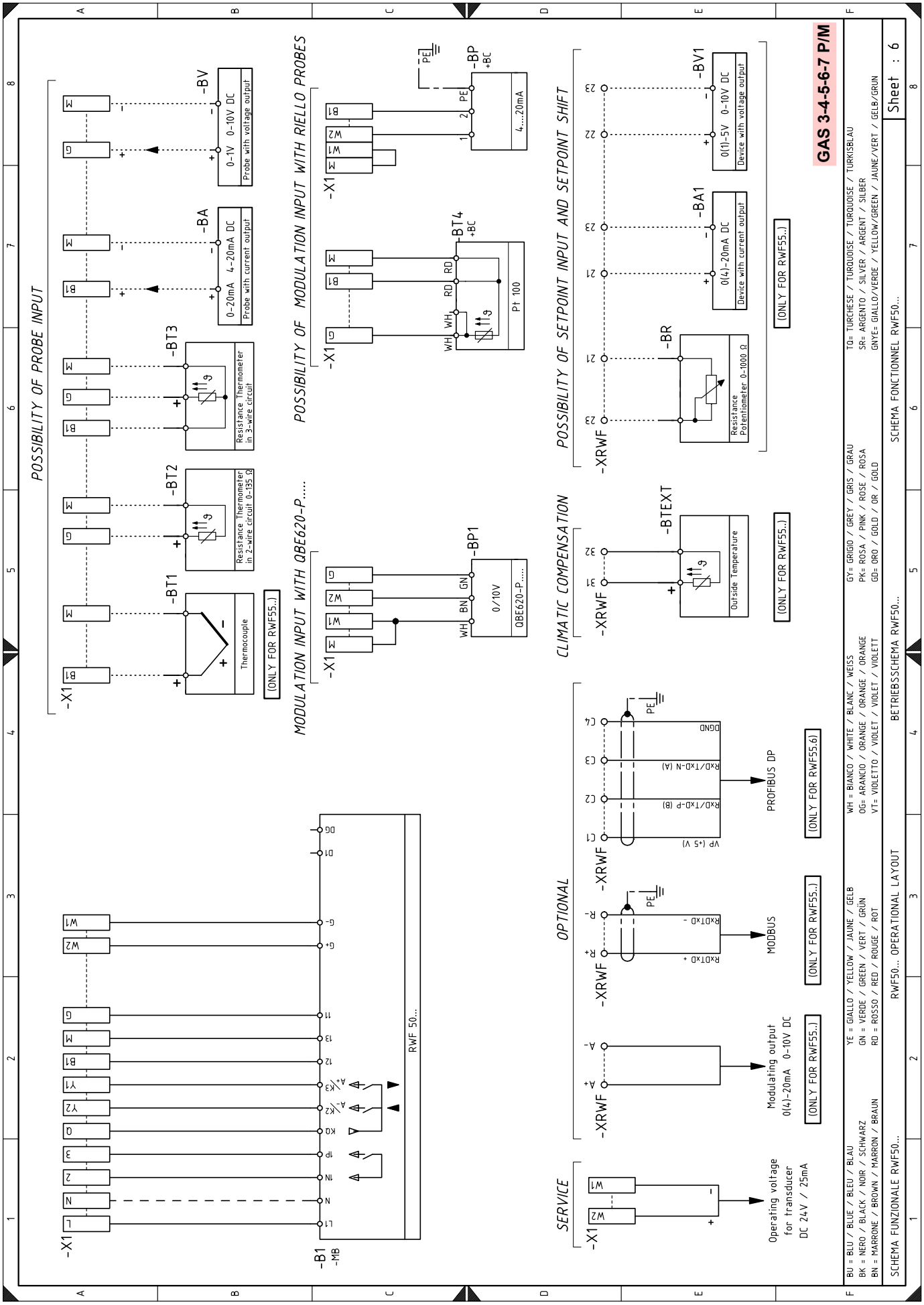
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN
RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


GAS 7 P/M
ELECTRICAL POWER
-X1
-Q1
-Q2
-TR
-TL
-IN
-H
TS
max 0,5A 230V AC
1N ~ 230V 50Hz
3 ~ 400V 50Hz
3 ~ 230V 50Hz
L1 L2 L3 PE
L N
2x1.5mm²
4A aM
6A gG
+BC
NC NO C
GAS 7 P/M
230V
400V
F
S
F1
12A aM
20A gG
8A aM
12A gG
2.5 mm²
1.5 mm²
3 kW
10.7
MIN
NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN
CONTROLLO TENUTA VPS 504 - VPS 504 GAS LEAKAGE DETECTOR
VPS 504 CONTROLE D' ETANCHEITE GAZ - VPS 504 DICHTHEITSKONTROLLE
VPS 504 DICHTHEITSKONTROLLE
-YVPS
-H1
PGMin
GAS VALVE
-Y
-X1
GAS 7 P/M
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 5


GAS 3-4-5-6-7 P/M
POSSIBILITY OF PROBE INPUT
-BV
0-1V 0-10V DC
Probe with voltage output
-BA
0-20mA 4-20mA DC
Probe with current output
-BT3
Resistance Thermometer in 3-wire circuit
-BT2
Resistance Thermometer in 2-wire circuit 0-135 Ω
-BT1
Thermocouple
(ONLY FOR RWF55..)
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-BP
4....20mA
-BT4
Pt 100
MODULATION INPUT WITH QBE620-P.....
-BP1
0/10V
QBE620-P.....
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-BV1
0(1)-5V 0-10V DC
Device with voltage output
-BA1
0(4)-20mA DC
Device with current output
-BR
Resistance Potentiometer 0-1000 Ω
CLIMATIC COMPENSATION
-BTEXT
Outside Temperature
OPTIONAL
PROFIBUS DP
MODBUS
SERVICE
Operating voltage for transducer DC 24V / 25mA
Modulating output 0(4)-20mA 0-10V DC
RWF 50...
-B1 -MB
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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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 : 6

WIRING DIAGRAM 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 modification
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
C	Capacitor
CN	Servomotor connector
CN1	Ionisation probe connector
F	Three-phase line fuses
F1	Thermal relay, Three-phase line fuses
H	Remote lockout signal
H1	Remote lockout signal due to leak detection control
KM	Motor contactor
MV	Fan motor
PA	Air pressure switch
PGM	Maximum gas pressure switch
Q1	Three-phase disconnecting switch
Q2	Single-phase disconnecting switch
SM	Servomotor
ION	Ionisation probe
TA	Ignition transformer
X1	Burner terminal strip
XPE	Burner earth
XTB	Shelf earth
IN	Burner manual stop switch
PGMin	Minimum gas pressure switch
YVPS	Leak test
Y	Gas adjustment valve + gas safety valve
TR	Adjustment thermostat/pressure switch
TL	Limit thermostat/pressure switch
TS	Safety thermostat/pressure switch
XPGM	Maximum gas pressure switch connector
XRWF	RWF50 terminal board

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