GB

Forced draught gas burners

Two stage progressive or modulating operation

CODE	MODEL	TYPE
20147902	GAS 8 P/M	538 T1
20147903	GAS 8 P/M	538 T1
20147904	GAS 9 P/M	540 T1
20147794	GAS 9 P/M	540 T1
20147795	GAS 9 P/M	540 T1
20147906	GAS 9 P/M	540 T1
20147907	GAS 9 P/M	540 T1
20147908	GAS 9 P/M	540 T1
20148024	GAS 10 P/M	541 T1
20148960	GAS 10 P/M	541 T1
20147796	GAS 10 P/M	541 T1
20147797	GAS 10 P/M	541 T1

20148758 (3) - 10/2021

Translation of the original instructions

1 Declarations

Declaration of Conformity in accordance with ISO / IEC 17050-1		
Manufacturer:	RIELLO S.p.A.	
Address:	Via Pilade Riello, 7 37045 Legnago (VR) Italy	
Product:	Forced draught gas burners	
Model and type:	GAS 8 P/M GAS 9 P/M GAS 10 P/M	538 T1 540 T1 541 T1
These products are in compliance with the following Technical Standards:		
EN 676		
EN 12100		
and according to the European Directives:		
GAR	2016/426/EU	Gas Devices Regulation
MD	2006/42/EC	Machine Directive
LVD	2014/35/EU	Low Voltage Directive
EMC	2014/30/EU	Electromagnetic Compatibility
Such products are marked as follows:		
CE	CE-0085AP0941 CE-0085AP0942 CE-0085AP0943	GAS 8 P/M GAS 9 P/M GAS 10 P/M

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

Legnago, 03.05.2021

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

2 Information and general warnings

2.1 Information about the instruction manual

2.1.1 Introduction

The instruction manual supplied with the burner:

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

Symbols used in the manual

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

2.1.2 General dangers

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

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

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

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

2.1.3 Other symbols

DANGER: LIVE COMPONENTS

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

DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.

DANGER: BURNING

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

DANGER: CRUSHING OF LIMBS

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

WARNING: MOVING PARTS

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

DANGER: EXPLOSION

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

PERSONAL PROTECTION EQUIPMENT

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

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

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

ENVIRONMENTAL PROTECTION

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

IMPORTANT INFORMATION

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

➤ This symbol indicates a list.

Abbreviations used

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

2.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

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

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

.....

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

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

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

2.2 Guarantee and responsibility

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

WARNING

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

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

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

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

3 Safety and prevention

3.1 Introduction

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

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

It is a good idea to remember the following:

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

Specifically:

it can be applied to boilers operating with water, steam, diathermic oil, and to other uses expressly named by the manufacturer; the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the ambient temperature must all be within the values indicated in the instruction manual.

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

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

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

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

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

3.2 Personnel training

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

The user:

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

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

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

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

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

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

In addition:

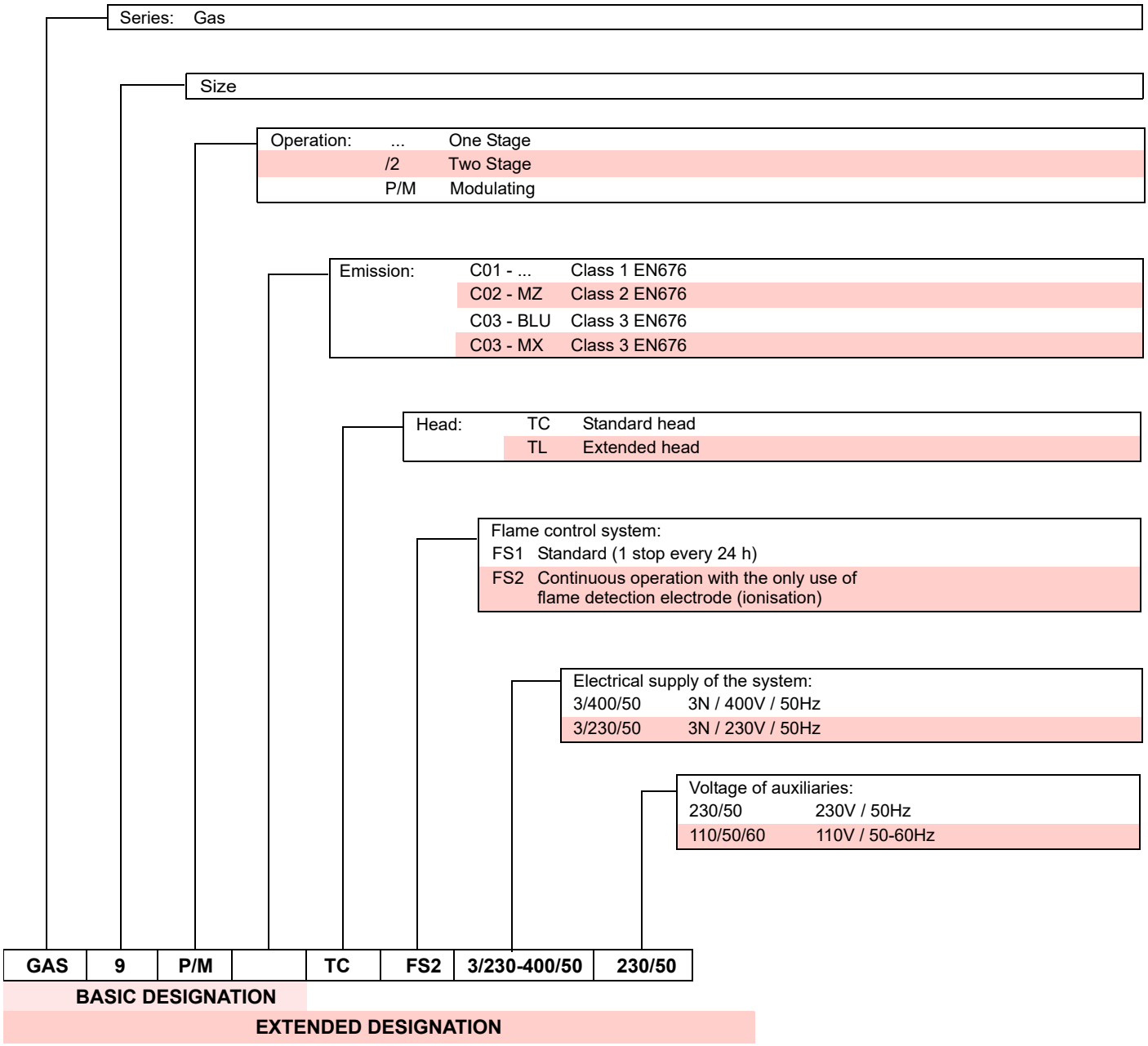
➤ must take all the measures necessary to prevent unauthorised people gaining access to the machine;

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

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

4 Technical description of the burner

4.1 Burner designation



4.2 Models available

Designation	Blast tube length (mm)	Voltage	Start-up	Code
GAS 8 P/M	391	3/230-400/50	Direct	20147902
GAS 8 P/M	501	3/230-400/50	Direct	20147903
GAS 9 P/M	444	3/400/50	Direct	20147904 - 20147794
GAS 9 P/M	574	3/400/50	Direct	20147795
GAS 9 P/M	444	3/230/50	Star-triangle	20147906
GAS 9 P/M	444	3/400/50	Star-triangle	20147907
GAS 9 P/M	574	3/400/50	Star-triangle	20147908
GAS 10 P/M	476	3/230/50	Star-triangle	20148024
GAS 10 P/M	606	3/230/50	Star-triangle	20148960
GAS 10 P/M	476	3/400/50	Star-triangle	20147796
GAS 10 P/M	606	3/400/50	Star-triangle	20147797

4.3 Technical data

MODEL			GAS 8 P/M	GAS 9 P/M	GAS 10 P/M
Type			538 T1	540 T1	541 T1
Output (1)	2nd stage	kW Mcal/h	1163 - 2210 1000 - 1900	1744 - 3488 1500 - 3000	2441 - 4885 2100 - 4200
	1st stage	kW Mcal/h	640 - 1163 550 - 1000	870 - 1744 750 - 1500	1140 - 2441 980 - 2100
Fuel			NATURAL GAS: G20- G25		
			G20 G25	G20 G25	G20 G25
- Lower calorific value		kWh/Nm^3 $Mcal/Nm^3$	10 8,6 8,6 7,4	10 8,6 8,6 7,4	10 8,6 8,6 7,4
- Absolute density		kg/Nm^3	0,71 0,78	0,71 0,78	0,71 0,78
- Max delivery		Nm^3/h	221 257	348 406	488 568
- Pressure at maximum delivery (2)		mbar	18,6 27,8	20,9 32,3	32,4 48,4
OPERATION			- Continuous (FS2) These burners are suitable also for intermittent operation with the only use of the UV flame sensor kit - Progressive two-stage or modulating by kit (see ACCESSORIES)		
Standard applications			Boilers: water, steam, diathermic oil		
Ambient temperature		°C	0 - 40		
NOISE LEVEL (3)	Sound pressure Sound power	dB(A)	86 96	89 99	90 100
Combustion air temperature		°C max	60		

Tab. A

(1) Reference conditions: Ambient temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m a.s.l.
(2) Pressure at test point 13)(Fig. 6 on page 12) with zero pressure in combustion chamber and at maximum burner output.
(3) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum output. The sound Power is measured using the "Free Field" method, required by the EN 15036 standard, and according to an “Accuracy: Category 3” measurement, as described in EN ISO 3746.

4.4 Electrical data

MODEL		GAS 8 P/M	GAS 9 P/M	GAS 9 P/M	GAS 10 P/M	GAS 10 P/M
Type		538 T1	540 T1	540 T1	541 T1	541 T1
Electrical power supply		3 ~ 230 - 400V +/- 10% 50 Hz				
Electrical motor IE3	rpm kW V A	2900 4 230/400 13.3 - 7.7	2930 9.2 230/400 28.6 - 16.5	2930 9.2 400/690 16.5 - 9.6	2920 15 230/400 46.8 - 27	2915 15 400/690 26.8 - 15.5
Ignition transformer	V1 - V2 I1 - I2	230 V - 1x 8 kV 1.5 A - 30 mA				
Absorbed electric power	kW max	5	10.6	10.6	17	17
Protection level		IP 40				

Tab. B

4.5 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 U-U.

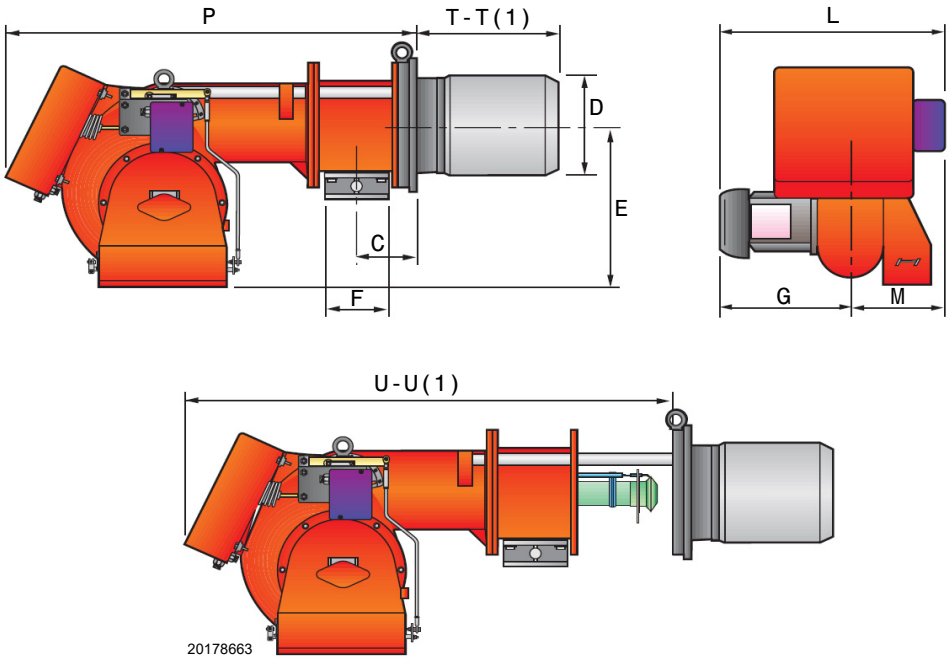


Fig. 1

mm	C	D	E	F	G	L	M	P	T-T (1)	U-U (1)
GAS 8 P/M	158	260	467	DN 80	396	755	359	1090	391 - 501	1541 - 1644
GAS 9 P/M	168	295	496	DN 80	498	871	373	1200	444 - 574	1627 - 1757
GAS 10 P/M	203	336	525	DN 80	508	917	409	1320	476 - 606	1730 - 1860

Tab. C

(1) Blast tube: short-long

4.6 Burner equipment

Seal for train connection . . . . . .No. 1
Screws . . . . . .No. 12
Cable grommets for electrical cables . . . . . .No. 4
Washers . . . . . .No. 8
Extensions (only in extended head models) . . . . . .No. 2
Thermal flange gasket . . . . . .No. 1
Motor starter . . . . . .No. 1
Cable grommets for the starter electrical connections .No. 2
Instructions . . . . . .No. 1
Spare parts list . . . . . .No. 1

4.7 Firing rates

The burner output is to be chosen from within the diagram area.

This area is known as FIRING RATE and provides the burner 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 8 the area is delimited by:

- 1163 - 2210 kW output axis
- 0 + 14 mbar combustion chamber pressure axis
- combustion chamber maximum pressure curve.

If the burner output is 2000 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 below it can be used.

Warning:

WARNING

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

The burner can operate also in depressurised combustion chambers.

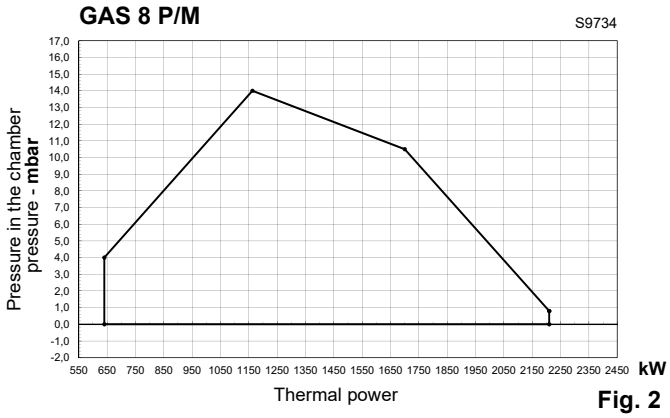


Fig. 2

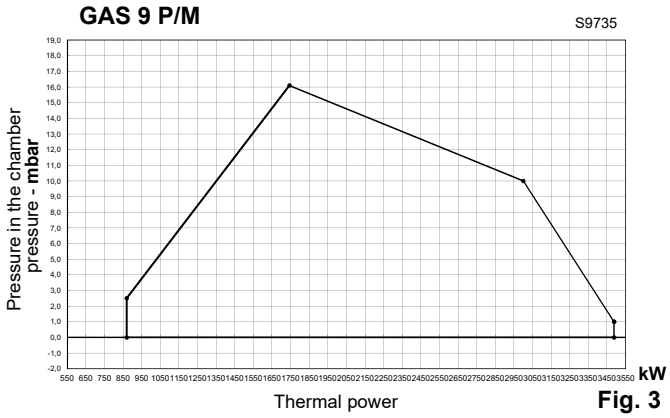


Fig. 3

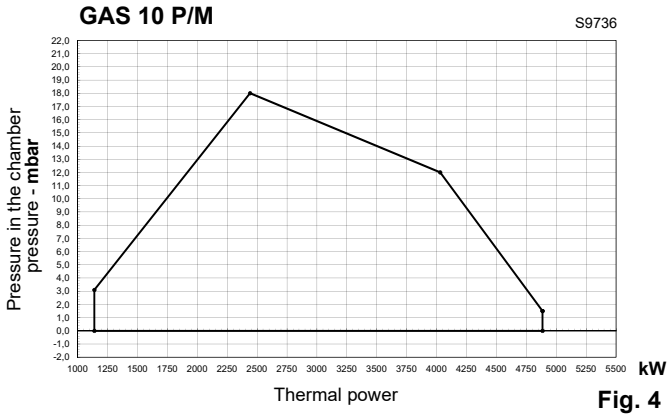


Fig. 4

4.8 Test boiler

The burner/boiler combination does not pose any problems if the boiler is EC approved and its combustion chamber dimensions are similar to those indicated in the diagram (Fig. 5).

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 standard EN 676.

In Fig. 5 you can see the diameter and length of the test combustion chamber.

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

4.8.1 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. 5).

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. 5), consult the manufacturers.

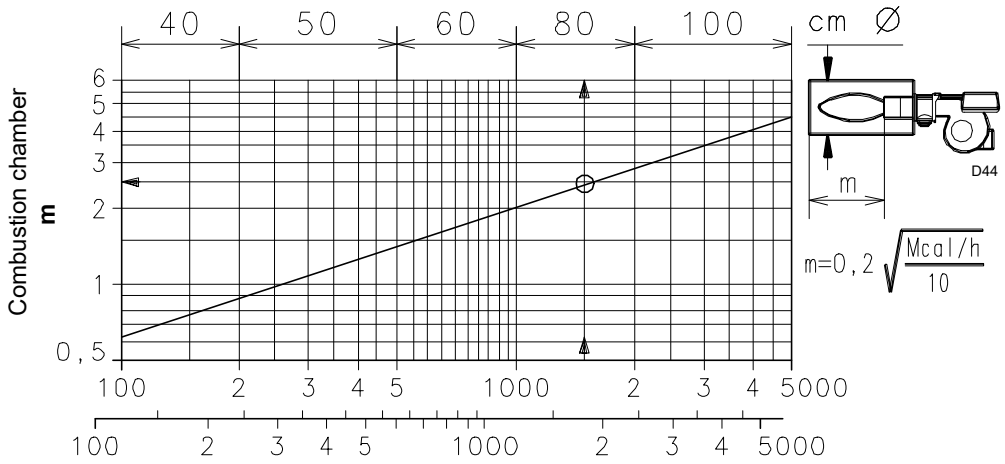


Fig. 5

4.9 Burner description

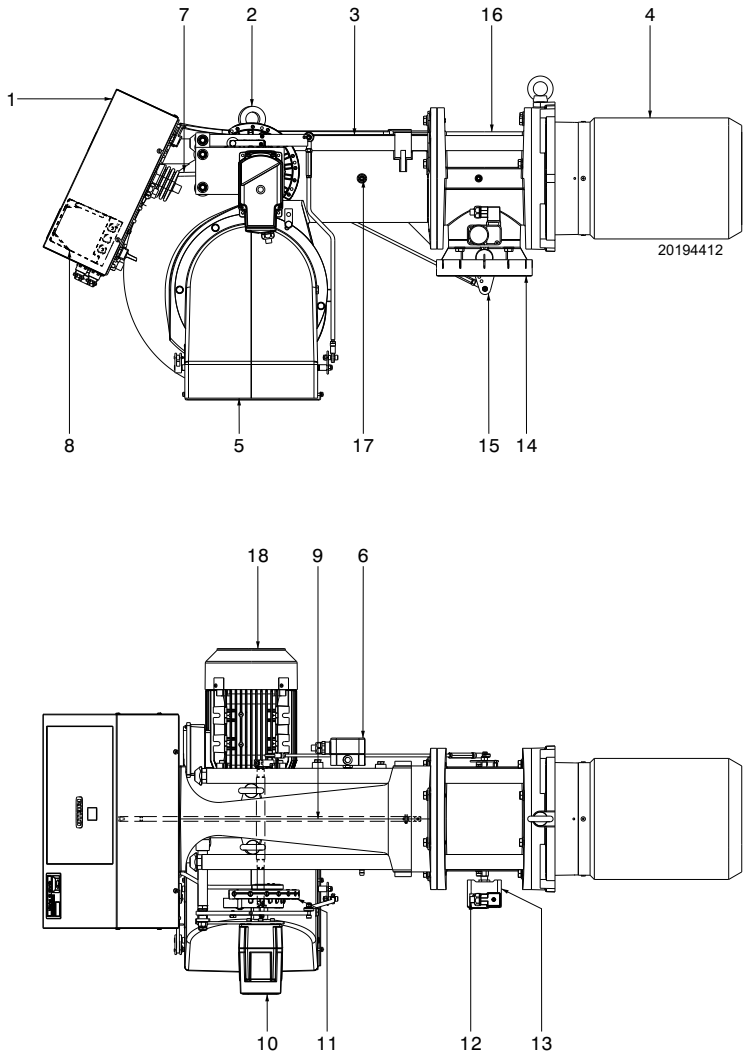


Fig. 6

1 Flame inspection window
2 Lifting rings
3 Slide bars for opening the burner and inspecting the combustion head (see note)
4 Combustion head (two lengths)
5 Closed air damper in stand-by to reduce heat losses
6 Air pressure switch
7 Gas butterfly valve control rod
8 Control box with lockout pilot light and reset button
9 Combustion head control rod
10 Air-gas control servomotor
11 Air adjustment cam
12 Pipe coupling gas pressure test point
13 Maximum gas pressure switch
14 Butterfly valve (gas input pipe)
15 MIN output gas adjustment disk
16 Pipe coupling
17 Fan pressure test point
18 Fan motor

4.10 Electrical panel description

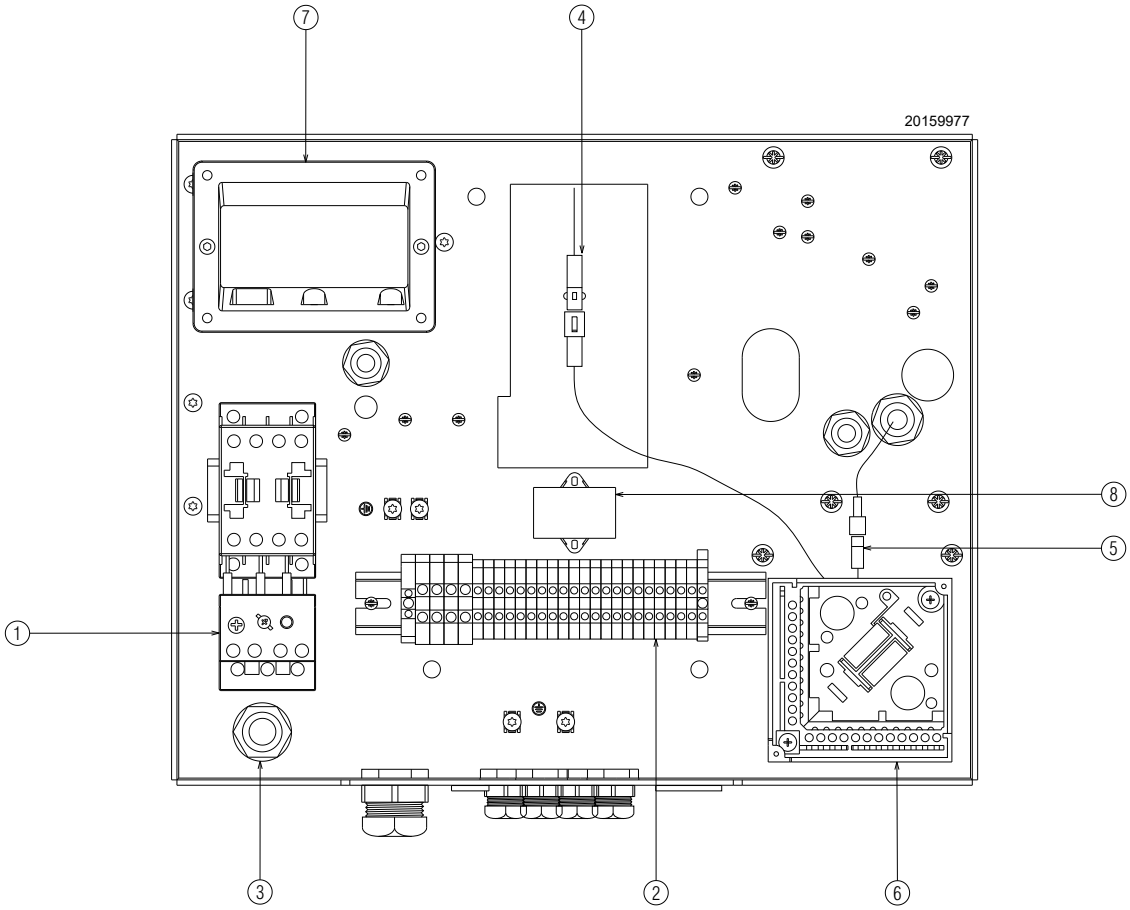


Fig. 7

1 Motor contactor and thermal relay (GAS 8-9 direct start-up)
2 Terminal board
3 Cable grommets supplied as standard (for electrical wirings to be carried out by the installer)
4 Plug-socket on ionisation probe cable
5 Plug-socket on servomotor cable
6 Control box base
7 Ignition transformer
8 Filter to protect against radio disturbance

4.11 Control box RFGO-A22

Important notes

WARNING

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

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

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

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

Use

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

Installation notes

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

Fig. 8

Technical data

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

Tab. D

Electrical wiring of the flame detector

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

4.12 Servomotor SQM40 ...

Important notes

WARNING

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. 9

Technical data

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

Tab. E

5 Installation

5.1 Notes on safety for the installation

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

DANGER

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

WARNING

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

DANGER

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

5.2 Handling

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

WARNING

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

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

CAUTION

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

5.3 Preliminary checks

Checking the consignment

CAUTION

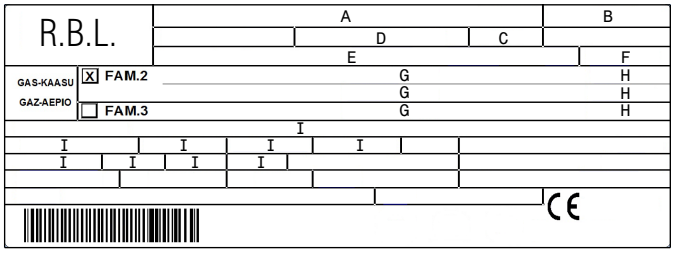
After removing all the packaging, check the integrity of the contents. In the event of doubt, do not use the burner; contact the supplier.

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

Checking the characteristics of the burner

Check the identification label of the burner (Fig. 10), showing:

A the burner model
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.



20189374

Fig. 10

WARNING

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

5.4 Operating position

WARNING

- The burner is set up to operate only in positions **1, 2, 3** and **4** (Fig. 11).
- Installation **1** is preferable, as it is the only one that allows the maintenance operations as described in this manual.
- Installations **2, 3** and **4** permit operation but make maintenance and inspection of the combustion head more difficult.

DANGER

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

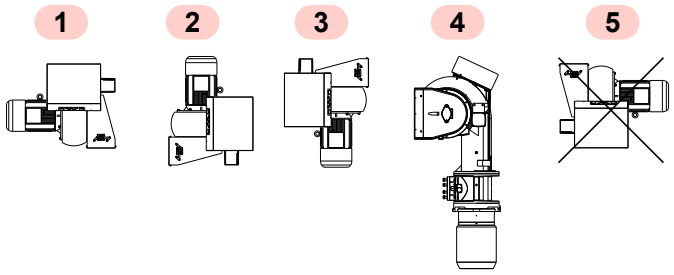


Fig. 11

5.5 Preparing the boiler

5.5.1 Boring the boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 12.

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

mm	D1	DF	Ø
GAS 8 P/M	265	368	M16
GAS 9 P/M	300	368	M18
GAS 10 P/M	350	438	M20

Tab. F

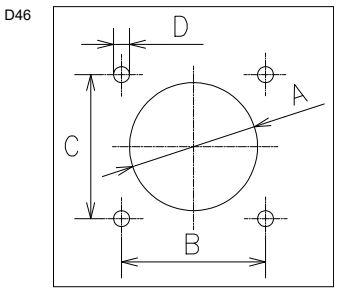


Fig. 12

5.5.2 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 8 P/M	GAS 9 P/M	GAS 10 P/M
Extended head	501	574	606
Short head	391	444	476
Short head plus spacer	281	314	346

Tab. G

For boilers with front flue passes 9)(Fig. 13 on page 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.

5.5.3 Securing the burner to the boiler

Provide an adequate lifting system.

- ➤ Separate the combustion head as shown:
  - Remove the screws 5)(Fig. 13) from the two slide bars 6).
  - Remove the pin 2) and disengage the head control rod 11).
  - Remove the screw 3) and disengage the gas butterfly valve control rod 4).
  - Remove the screws 7) securing the fan to the combustion head.
  - Draw the burner back by about 100-120 mm.
  - Remove the screws 12) and disengage the shifting fork 8).
  - Now remove the burner from the slide bars 6) completely; by removing the burner, also the gas tube 9) will slide out of the elbow 10).
- ➤ Before securing the combustion head to the boiler, make sure the probe and electrode are positioned correctly as in (Fig. 14 on page 19). If the position is incorrect, remove the elbow 10)(Fig. 13) from the pipe coupling 13).

CAUTION

Do not rotate the probe but leave it as in Fig. 14; if it is too close to the ignition electrode, it could damage the control box amplifier.

- ➤ Fix the blast tube to the boiler plate (Fig. 12 on page 17), inserting the supplied insulating flange gasket 14)(Fig. 13).
- ➤ Use the 4 screws, also supplied, after protecting their thread with anti-locking product.
- ➤ The seal between burner and boiler must be airtight.
- ➤ Adjust the combustion head as described below.
- ➤ Then refit the burner on the slide bars 6)(Fig. 13) and the gas tube 9) into the elbow 10).
- ➤ Leave the burner open by about 100-120 mm.
- ➤ Refit the fork 8)(Fig. 13) fixing it with the screws 12).
- ➤ Close the burner.
- ➤ Tighten the screws 7)(Fig. 13) securing the fan to the combustion head.
- ➤ Fit the retainers and the screws 5)(Fig. 13) to the two slide bars 6).
- ➤ Engage the rods 4) and 11) again.

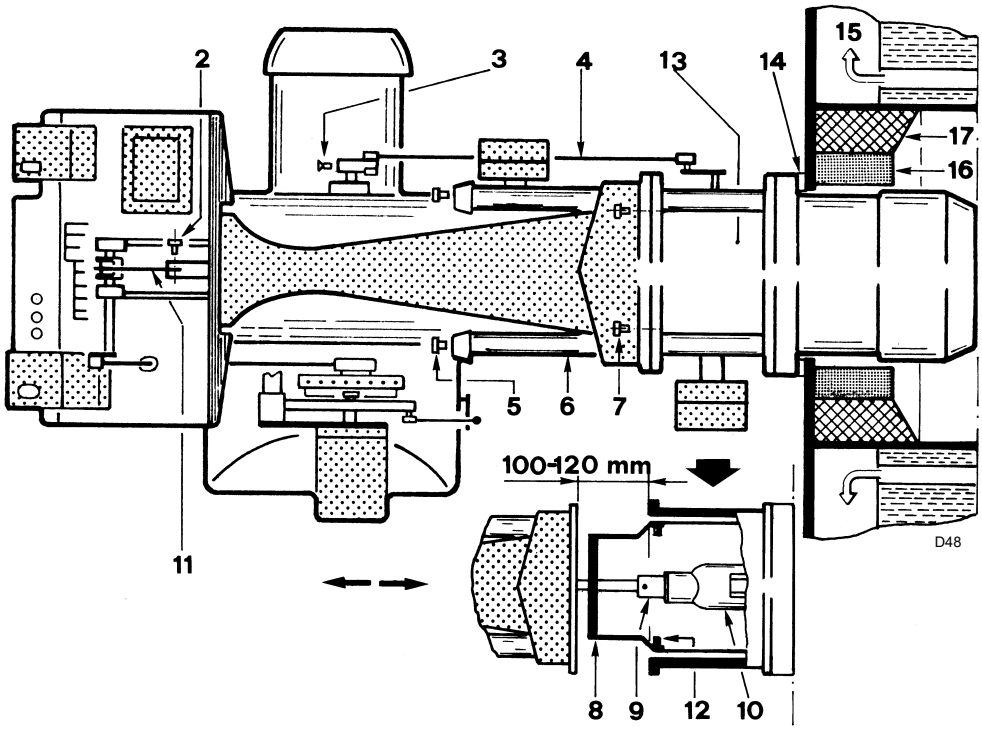


Fig. 13

WARNING

The seal between burner and boiler must be airtight.

5.6 Positioning the probe - electrode

WARNING

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. 14.

If in the previous check the position of the probe or electrode was not correct, remove the screws 7)(Fig. 13 on page 18) extract the inner part of the head 4)(Fig. 6 on page 12), and adjust them.

WARNING

Do not rotate the probe but leave it as in Fig. 14; if it is too close to the ignition electrode, it could damage the control box amplifier.

WARNING

Respect the dimensions shown in Fig. 14.

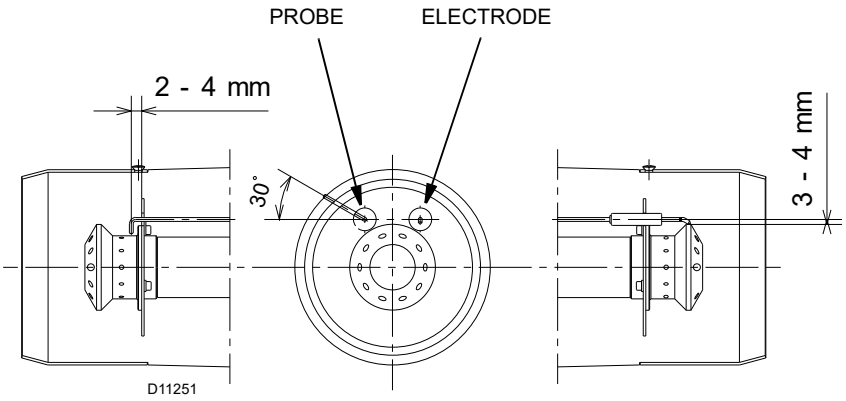


Fig. 14

5.7 Combustion head adjustment

The adjustment of the combustion head depends only on the MIN and MAX output of the burner.

Therefore, these two values must be set before adjusting the combustion head.

The head must not be adjusted if in the final set-up the preset MIN and MAX output values are slightly changed.

Two combustion head adjustments are available:

- ➤ One fixed gas delivery adjustment carried out with the burner open while securing the burner to the boiler page 18.
- ➤ One movable adjustment both for gas and air deliveries carried out with the burner closed, as described in page 27.

WARNING

The notch number is the same for gas and air and can be obtained from the diagram (Fig. 15) according to the burner output.

5.7.1 Fixed gas delivery adjustment

- ➤ Loosen the screw 1)(Fig. 16)
- ➤ Turn the ring nut 2) so that the index 3) matches the required notch 4)
- ➤ Lock the screw 1)

The notch must be chosen from the diagram (Fig. 15) according to the MAX output required for the burner operation.

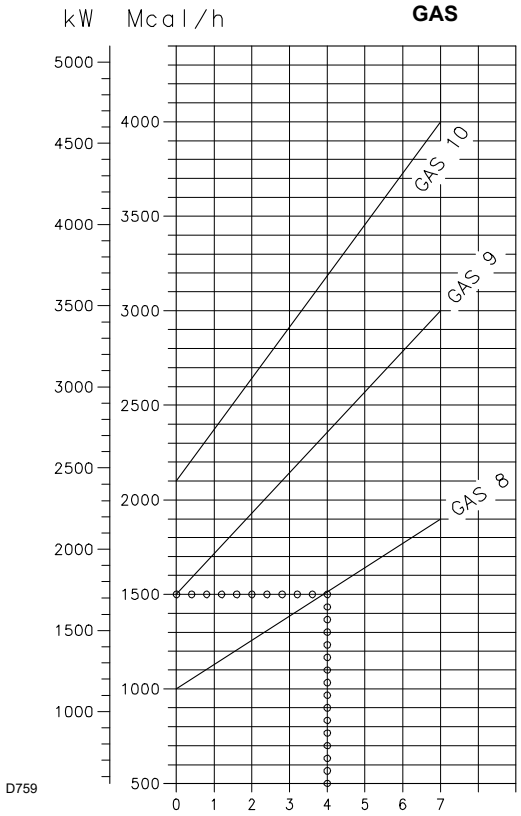
Example:

GAS 8 P/M MAX thermal power 1,500 Mcal/h.

NOTCH: 4

WARNING

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 the ring nut 2)(Fig. 16)

Fig. 15

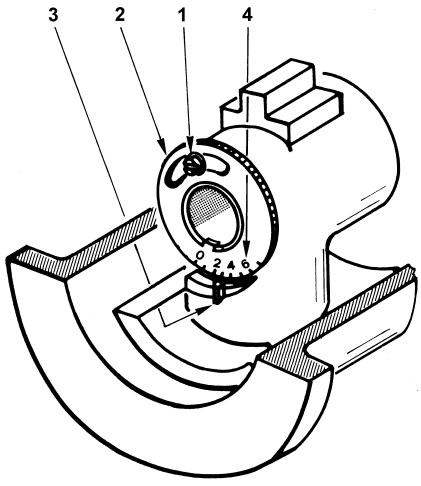


Fig. 16

5.8 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.

WARNING

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

5.8.1 Gas feeding line

Key (Fig. 17 - Fig. 18 - Fig. 19 - Fig. 20)

1 Gas input pipe
2 Manual valve
3 Vibration damping joint
4 Pressure gauge with button cock
5 Filter
6A Includes:
– filter
– working valve
– safety valve
– pressure adjuster
6B Includes:
– working valve
– safety valve
– pressure adjuster
6C Includes:
– safety valve
– working valve
6D Includes:
– safety valve
– working valve
7 Minimum gas pressure switch
8 Leak detection control, supplied as an accessory or built-in, based on the gas train code. In compliance with the EN 676 standard, gas valve leak detection control devices are compulsory for burners with maximum outputs over 1200 kW.
9 Gasket, for “flanged” versions only
10 Pressure adjuster
The train-burner adaptor is supplied separately
P2 Pressure upstream of valves/adjuster
P3 Pressure upstream of the filter
L Gas train, supplied separately
L1 Responsibility of the installer

MBC “threaded”

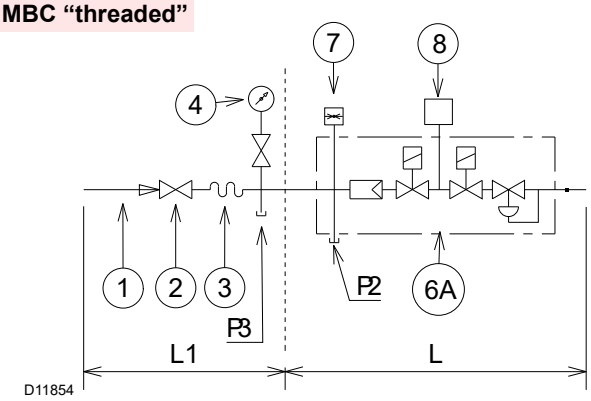


Fig. 17

MBC “flanged”-VGD

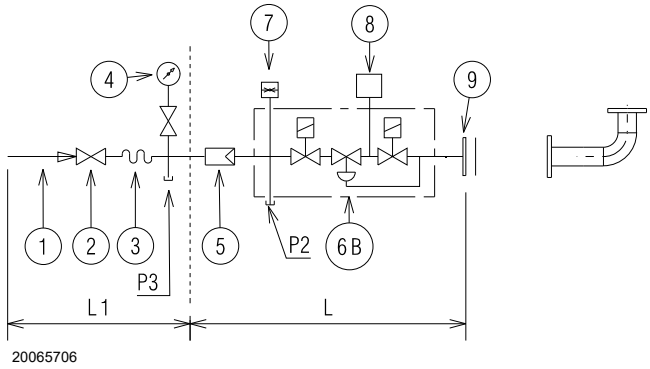


Fig. 18

DMV “flanged or threaded”

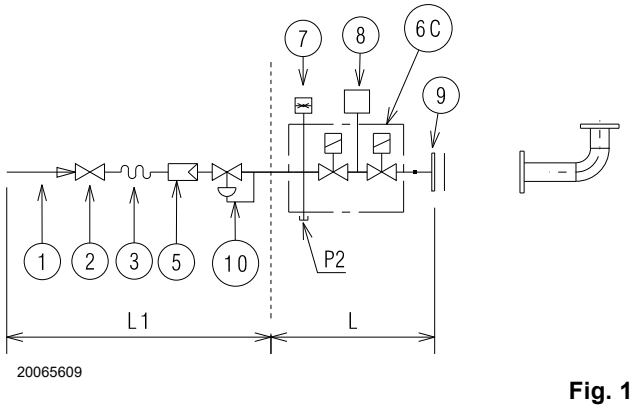


Fig. 19

CB “flanged or threaded”

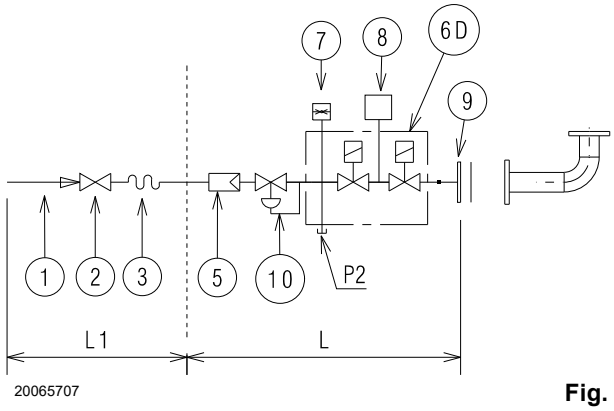


Fig. 20

5.8.2 Gas train

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

5.8.3 Gas train installation


DANGER

Disconnect the electrical 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. 6.

5.8.4 Gas pressure

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

Model	kW	1 Δp (mbar) G20	G25
GAS 8 P/M	1150	0.59	0.87
	1300	0.75	1.11
	1450	0.93	1.38
	1600	1.14	1.69
	1750	1.36	2.01
	1900	1.60	2.37
	2050	1.86	2.75
	2200	2.15	3.18
GAS 9 P/M	1800	1.41	2.09
	2000	1.74	2.58
	2200	2.11	3.12
	2400	2.51	3.71
	2600	2.94	4.35
	2800	3.42	5.06
	3000	3.92	5.80
	3200	4.46	6.60
	3400	5.04	7.46
	3500	5.33	7.89
GAS 10 P/M	2500	1.08	1.60
	2800	1.35	2.00
	3100	1.65	2.44
	3400	1.99	2.95
	3700	2.35	3.48
	4000	2.75	4.07
	4300	3.18	4.71
	4600	3.64	5.39
	4900	4.13	6.11

Tab. H


WARNING

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 12)(Fig. 6 on page 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 12) (Fig. 6 on page 12).
- Find in Tab. H related to the burner concerned, the pressure value closest to the result of the subtraction.
- Read the corresponding output on the left.

Example GAS 9 P/M with natural gas G20:

Gas pressure at test point	=	13 mbar
Pressure in combustion chamber	=	3 mbar
13 - 3	=	10 mbar

corresponding to a maximum output of 2900 kW in the diagram of GAS 9 P/M.

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 12) (Fig. 6 on page 12), set the output required from the burner operation:

- find the nearest output value in Tab. H for the burner in question.
- Read, on the right (column 1), the pressure at the test point 12)(Fig. 6 on page 12).
- Add this value to the estimated pressure in combustion chamber.

Example GAS 9 P/M with natural gas G20:

Required output: 2900 kW

Gas pressure at an output of 2900 kW	=	10 mbar
Pressure in combustion chamber	=	3 mbar
10 + 3	=	13 mbar

pressure required at test point 12)(Fig. 6 on page 12).

5.9 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.
- Burners have been type-approved for continuous operation (FS2). Burner FS1 operation has also been approved only with the use of the UV flame sensor kit.
- The RFGO safety device features two built-in flame amplifiers which allow using it for applications with UV sensor only, FR sensor only or with both sensors (UV+FR). The FR amplifier circuit is subject to constant auto-control, which allows to use it for applications requiring a burner operating cycle longer than 24 hours. When it is used as a UV control, the system is considered as non-permanent, requiring one burner recycle every 24 hours.
  Normally, burner stopping is guaranteed by the boiler's thermostat/pressure switch.
  If this is not the case, a time switch must be applied to L-N in series, to stop the burner at least once every 24 hours. Refer to the wiring diagrams.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel. Do not use the gas tubes as an earthing system for electrical devices.
- The electrical system must be suitable for the maximum 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 terminal board of the burner are passed through cable grommets, as indicated in Fig. 21.

NOTE:
TR and TL remote controls are not necessary when RWF50 regulator is used for modulating operation; their function is carried out by the regulator itself.

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

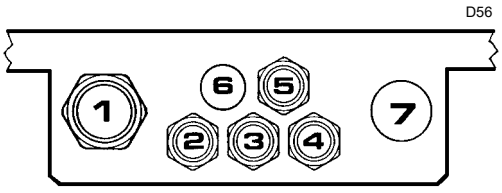


Fig. 21

1	Pg 29	Three-phase power supply (from the mains or from star/triangle starter)
2	Pg 13.5	Single-phase power supply
3	Pg 13.5	TR and TL remote control or probe (RWF50)
4	Pg 13.5	Gas valves
5	Pg 13.5	VPS Valve leak test
6	Pg 13.5	Hole for RWF50 pipe union
7	Pg 29	Hole for pipe union, if any

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

5.10 Calibration of the thermal relay

The thermal relay (Fig. 22) 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.

WARNING

The automatic reset can be dangerous.

This operation is not foreseen in the burner operation.

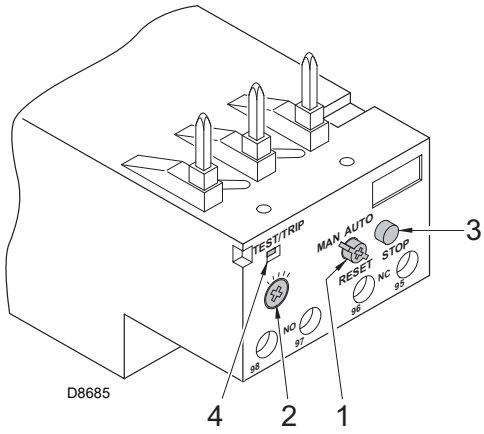


Fig. 22

5.11 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 control box carries out the switching off phase.

DANGER

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

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

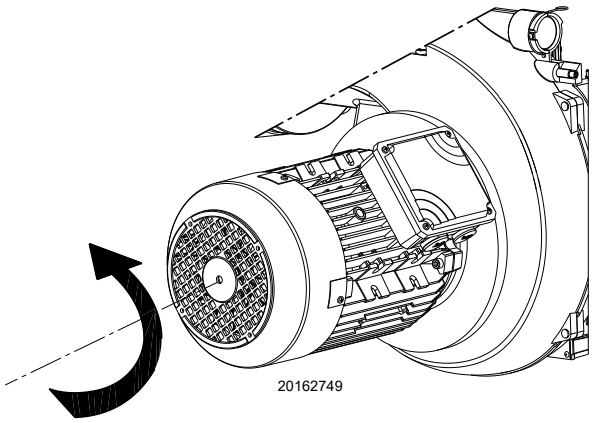


Fig. 23

6 Start-up, calibration and operation of the burner

6.1 Notes on safety for the first start-up

WARNING

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

WARNING

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

WARNING

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

6.2 Adjustments prior to ignition

Open the manual valves upstream of the gas train:

- ➤ adjust the minimum gas pressure switch to the start of the scale (Fig. 33 on page 33).
- ➤ Adjust the maximum gas pressure switch to the end of the scale (Fig. 34 on page 33).
- ➤ Adjust the air pressure switch to the start of the scale (Fig. 35 on page 33).
- ➤ 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. 24) to the gas pressure test point on the pipe coupling.
- ➤ It is used to calculate approximate MAX burner output using the diagrams on page 18
- ➤ 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.
- ➤ Do not perform any operation on the gas butterfly valve, which must be closed (index at 0°) with the burner off.
- ➤ Do not perform any operation on air damper and combustion head.

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.

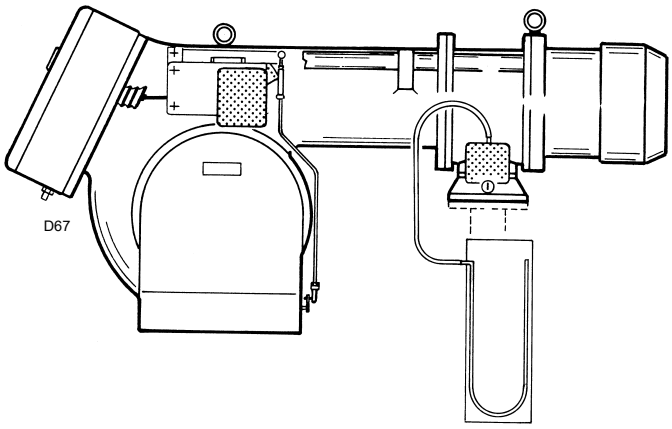


Fig. 24

6.3 Burner start-up

Close the remote controls and turn:

As soon as the burner starts, check that the lamps or the testers connected to the solenoid valves or the warning lights on the solenoid valves indicate no voltage presence.

If they indicate the presence of voltage, stop the burner **immediately** and check the electric connections.

6.4 Burner ignition

Once the above steps are completed, the burner should ignite.

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

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

The arrival of gas to the sleeve is indicated by the U-type pressure gauge (Fig. 24).

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

If the burner locks out again, refer to chapter "Flame control lockout or emergency stop condition" on page 39.

WARNING

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

DANGER

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

6.5 Burner adjustment

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

Adjust in sequence:

1 Combustion head
2 Servomotor
3 Output upon ignition
4 Preliminary calibrations, if necessary
5 MAX output
6 MIN output
7 Intermediate outputs between the two
8 Air pressure switch
9 Maximum gas pressure switch
10 Minimum gas pressure switch

6.5.1 Combustion head

The fixed gas delivery adjustment has been carried out, see page 20. Now it is necessary to carry out the movable adjustment which concerns both gas and air deliveries at the same time.

Please remember that this adjustment depends only on the MIN and MAX outputs required for the burner operation.

Movable gas-air delivery adjustment (Fig. 25) - (Fig. 26 on page 28)

It consists of a forward-backward movement of the two shutters located in the combustion head.

The two shutters, moved by the servomotor 10)(Fig. 6 on page 12) together with the gas butterfly valve and the air damper, vary the gas and air outlet sections.

When the burner output switches from MAX to MIN, the two shutters reduce the outlet sections and keep the gas and air pressures at an optimal value. In this way, a high combustion efficiency is ensured even with low deliveries.

The reverse movement is obtained when the output is switched from MIN to MAX.

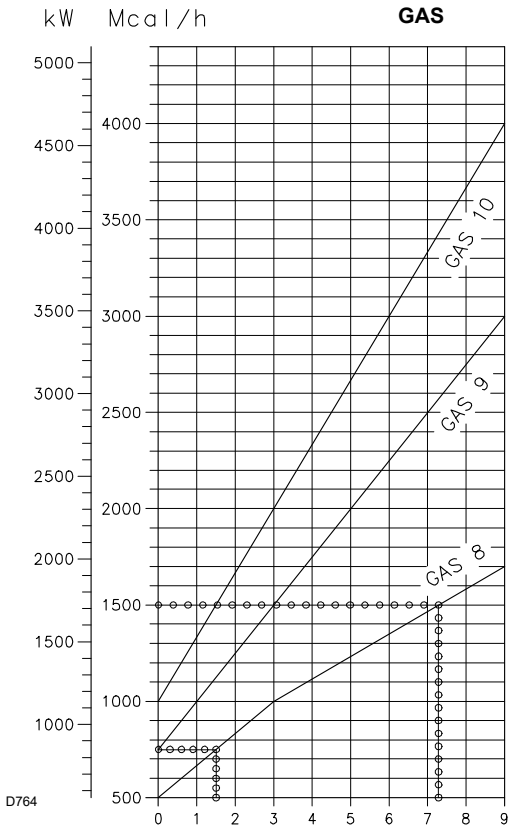
The position of the two shutters is indicated by the notch on the graduated cylinder 2)(Fig. 26 on page 28) referred to plane 10). Notch 0: min. opening; notch 9: max. opening. The control levers operate simultaneously on both shutters. They are factory set for the maximum 9-notch stroke, movement of cylinder 2) from notch 0 to notch 9, suitable to obtain the maximum output variation when the burner is operating: approx. 1-4.

For a lower MIN-MAX ratio, the levers must be recalibrated in such a way that the stroke of the cylinder 2) is performed between the two notches related to the required outputs, which can be obtained from the diagram (Fig. 25).

For example:

with GAS 8 P/M for an output variation between 750 (MIN) and 1,500 (MAX) Mcal/h, the cylinder 2) must move from the notch 1.5 (MIN) to the notch 7.2 (MAX) with a stroke of 5.7 notches.

To change the stroke of the cylinder 2) it must be considered that the rod 1)(Fig. 26 on page 28) driving the push-rod 8) features a slot: moving the articulated coupling 9) towards the slot outer side will shorten the stroke of the cylinder 2) by up to 4 notches.



Notches on the ring nut 2)(Fig. 16)

Fig. 25

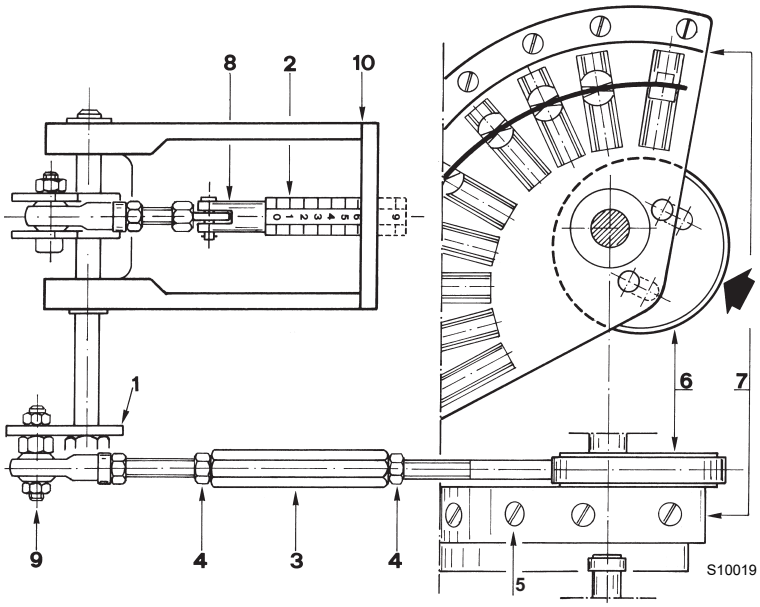


Fig. 26

Proceed as follows (with burner off):

- ➤ use the diagram to calculate the notches relating to the required MIN and MAX outputs (Fig. 25), as well as the stroke of the cylinder 2)(Fig. 26):
- ➤ MAX notch - MIN notch.
- ➤ Release the variable profile cam 7)(Fig. 26) from the servomotor by pressing the lever 9)(Fig. 30 on page 30).
- ➤ Manually rotate the cam 11)(Fig. 6 on page 12) from 0° to 130°.
- ➤ Check the stroke of the cylinder 2)(Fig. 26) referring to the plane 10)(Fig. 26).
- ➤ If the stroke is greater than indicated by the diagram (Fig. 25 on page 27), loosen the nut fixing the articulated coupling 9)(Fig. 26), move the articulated coupling along the slot with subsequent attempts until, with the complete rotation from 0° to 130° of cam 7)(Fig. 26), the required stroke is obtained on the plane 10)(Fig. 26).
- ➤ Lock the articulated coupling fixing nut.

If with the articulated coupling 9)(Fig. 26) at the end of the slot, the required stroke reduction is not obtained, proceed as follows:

- ➤ Manually bring the servomotor back to 0°.
- ➤ Loosen the Allen screws 5) retaining the servomotor shaft eccentric.
- ➤ Push the ring 6) in the direction indicated by the arrow in order to reduce the eccentricity and thus the stroke of the shaft 8).
- ➤ Once the required stroke is obtained, position the servomotor to 0°. Check whether the notch of the cylinder 2) on the reference plane 10) corresponds to the required MIN value, if not:
- ➤ Loosen the nuts 4).
- ➤ Turn the hexagonal pipe coupling 3) to shorten or lengthen the rod, until the minimum notch value collimates on the plane 10).
- ➤ Lock the nuts 4).
- ➤ By manually rotating the cam 7)(Fig. 26) from 0° to 130°, check the absence of jamming during the movement and that the MIN and MAX notches correspond to the indications found in the diagram (Fig. 25 on page 27).

6.6 Servomotor adjustment

The servomotor adjusts simultaneously, through driving gears, the output and pressure of the air and the delivery of the fuel in use. It performs a 135° rotation in 45s. After the adjustment made in the factory to its 6 cams to allow an initial ignition.

Check that they are as shown below.

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

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

WARNING

Do not alter the factory setting.

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

WARNING

It is recommended that no adjustments are made.

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

Cam IV (YELLOW): Not used

Cam V (BLACK): Not used

Cam VI (GREEN): Not used

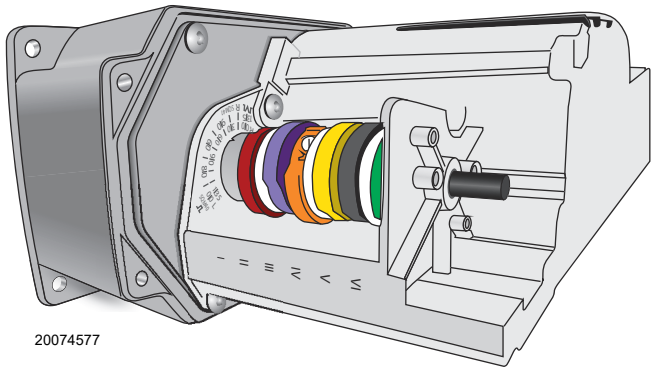


Fig. 27

6.6.1 Output upon ignition

According to EN 676 standard:

Burners with MAX output above 120 kW

Ignition must be performed at a lower output than the max. operation output.

The regulatory standard sets that the value be defined according to the control box safety time "ts":

- For "ts" = 2s, ignition output must be equal to or lower than 1/2 of max. operation output.
- For "ts" = 3s, ignition output must be equal to or lower than 1/3 of max. operation output.

Example:
MAX operation output of 600 kW.
Ignition output must be equal to or lower than:
- 300 kW with ts = 2 s.;
- 200 kW with ts = 3 s.

In order to measure the ignition output:

➤ disconnect the plug - socket 4)(Fig. 7 on page 13) on the ionisation probe cable (the burner will fire and then go into lockout after the safety time has elapsed).
➤ Perform 10 ignitions with consecutive lockouts.
➤ Read the quantity of gas burned on the meter.
➤ This quantity must be equal to or lower than the quantity given by the formula, for ts = 3s:

$$\frac{\text{Nm}^3/\text{h} \text{ (max. burner delivery)}}{360}$$

➤ The ignition output must be adjusted on the brake of the gas valve 14)(Fig. 6 on page 12).

6.6.2 Preliminary calibrations, if necessary

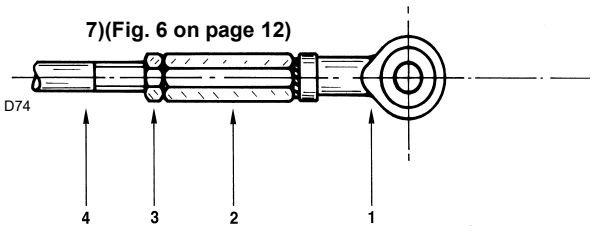


Fig. 28

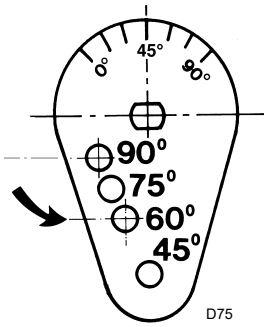


Fig. 29

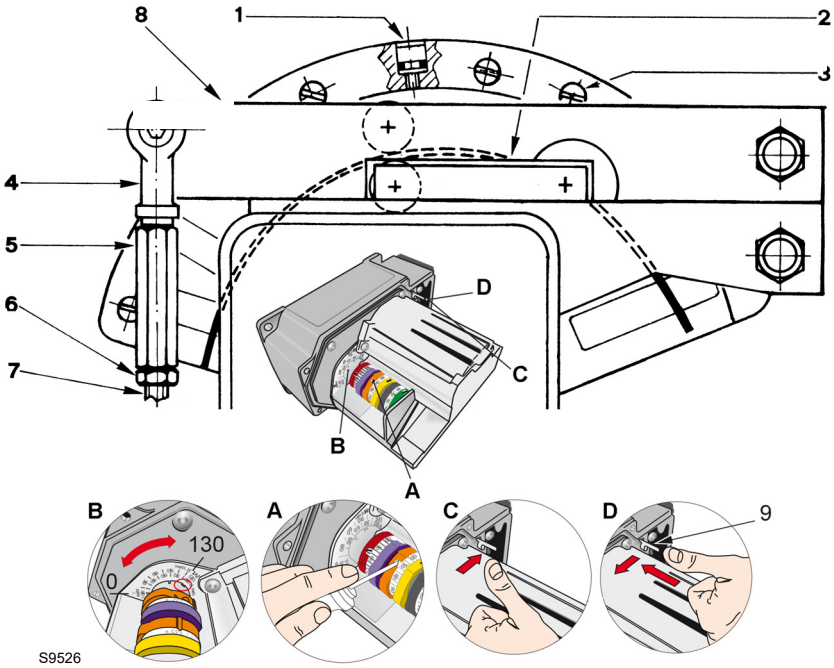


Fig. 30

They concern the disc (Fig. 29) of the gas butterfly valve, the tie-rod (Fig. 28) controlling the disc (Fig. 29) and the tie-rod 7)(Fig. 30) 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. 28) controlling the disc (Fig. 29) of the gas butterfly valve is positioned at 90°.
  In this way the gas butterfly valve turns by 90° when the cam 2)(Fig. 30) covers the whole angle of 130° (A) (Fig. 31).

When the MIN-MAX ratio is approximately 1:2, the articulated coupling 1)(Fig. 28) must be moved from 90° hole to 60° hole (Fig. 29), with the burner off.
In this case the gas butterfly valve turns by 60° when the cam 2)(Fig. 30) covers the whole angle of 130° (B) (Fig. 31).
On the disc (Fig. 29) there are two additional holes, 75° and 45°, that can be used in special cases, when the working angle of the butterfly valve is to be reduced in the presence of a higher gas pressure upstream of the butterfly valve itself.

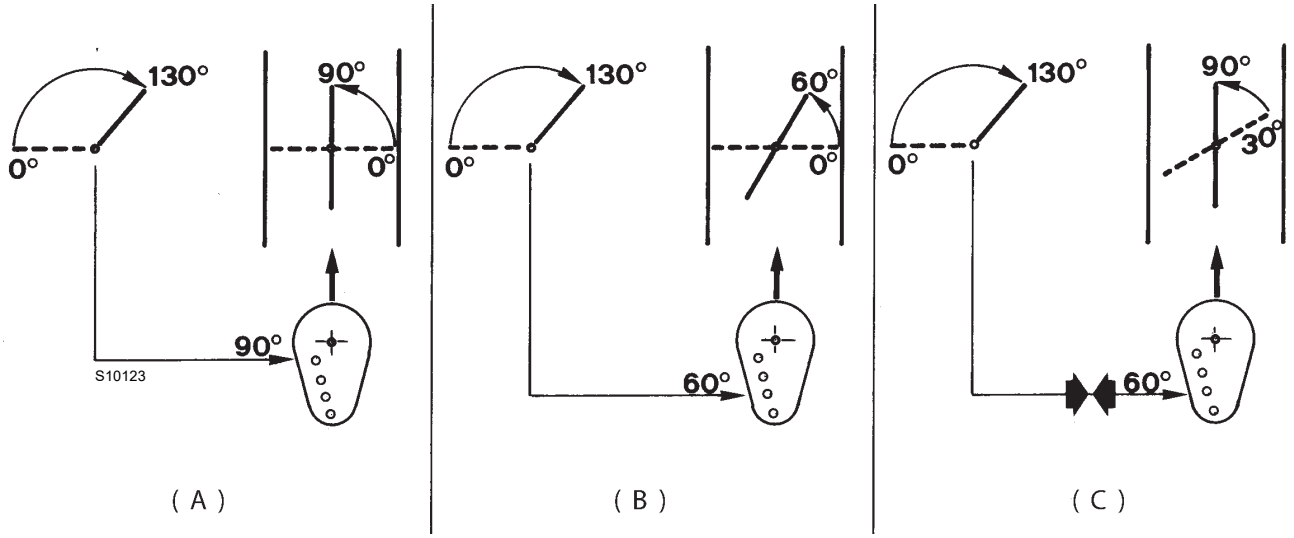


Fig. 31

- 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 couplings from 90° to 60°, to shorten the tie-rod (Fig. 28) and rotate the working angle of the gas butterfly valve so that the maximum opening is 90°:
  from 0 - 60°(B) to 30 - 90°(C)(Fig. 31).

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. 28 on page 30) from the disc (Fig. 29 on page 30).
- Loosen the nuts 3)(Fig. 28 on page 30).
- Tighten the hexagon 2) by a few turns.
- Lock the nut 3).
- Reconnect the articulated coupling 1)(Fig. 28 on page 30) to the disc (Fig. 29 on page 30).

- 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. 30) controlling the air damper. In this way, a too curved cam profile can be avoided.

With the burner off, proceed as follows (Fig. 30 on page 30):
- Disengage the articulated coupling 4) from the lever 9)(Fig. 30 on page 30).
- Loosen the nut 6).
- Loosen the hexagon 5) by a few turns.
- Lock the nut 6).
- Reconnect the articulated coupling 4) to the lever 9)(Fig. 30 on page 30).
- Lift the cam profile 2)(Fig. 30 on page 30) 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 10)(Fig. 6 on page 12) by opening the mobile plug-socket 5)(Fig. 7 on page 13) placed on the cable which connects it to the control box 8)(Fig. 6 on page 12).

6.6.3 Maximum output

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

MAX gas delivery adjustment

Disengage the variable profile cam 2)(Fig. 30 on page 30) from the servomotor by pressing on lever 9)(Fig. 30 on page 30).

Manually rotate the cam 2) slowly clockwise up to 130°, read in correspondence with the index (B) (Fig. 30 on page 30).

Engage the cam 2) to the servomotor again by laterally shifting and then pulling the lever 9)(Fig. 30 on page 30).

At this point, measure the gas delivery.

To reduce it, slightly close the adjustment valve “Gas supply” on page 21 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 on page 22; just read the gas pressure at the pipe coupling 16)(Fig. 6 on page 12) on the U-shaped pressure gauge (Fig. 24 on page 26) and follow the instructions given on page 22.

MAX air adjustment

Adjust the end profile of cam 2)(Fig. 30 on page 30) 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.

6.6.4 Minimum output

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

MIN gas delivery adjustment
➤ Disengage the cam by pressing on lever 9)(Fig. 30 on page 30).
➤ Manually rotate the cam slowly anticlockwise until reaching the 20° position, read in correspondence with the index (B)(Fig. 30 on page 30).
➤ Engage the cam 2) again by pulling the lever 9)(Fig. 30 on page 30) and measure the gas delivery at the meter.

The MIN delivery can be changed in three ways:

- Turn the disc 2)(Fig. 32) to 0 to reduce the gas delivery, turn it to 2 to increase it.
- Disengage the cam 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 II and calibrate the cam III (Fig. 30 on page 30) 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. 28 on page 30) 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. 28 on page 30) from the disc (Fig. 29 on page 30).
➤ Loosen the nuts 3)(Fig. 28 on page 30).
➤ Tighten the hexagon 2) to shorten the tie-rod; loosen the hexagon to lengthen it.
➤ Lock the nut 3).
➤ Reconnect the articulated coupling 1)(Fig. 28 on page 30) to the disc (Fig. 29 on page 30).

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

MIN air adjustment

Adjust the initial profile of cam 2)(Fig. 30 on page 30) by gradually turning the screws 1)(Fig. 32).

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

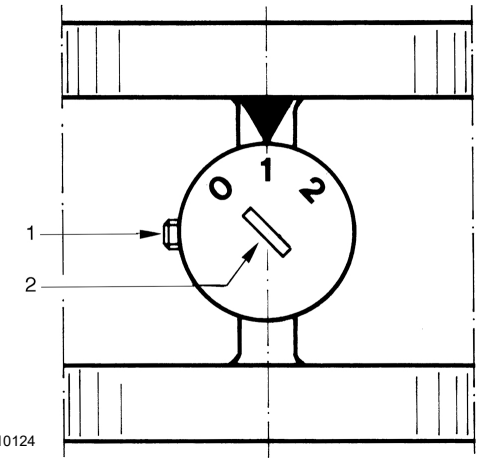


Fig. 32

6.6.5 Intermediate outputs

(especially necessary for modulating operation)

Gas

No adjustment of gas delivery is required.

Air

The adjustment is carried out by working on the profile cam adjustment intermediate screws 1)(Fig. 30 on page 30), 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. 30 on page 30) using the transversal screws 3) and restore the electrical connections of the servomotor by inserting the mobile plug-socket 5)(Fig. 7 on page 13).

6.7 Pressure switch adjustment

6.7.1 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. 33).

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

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

WARNING

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%.

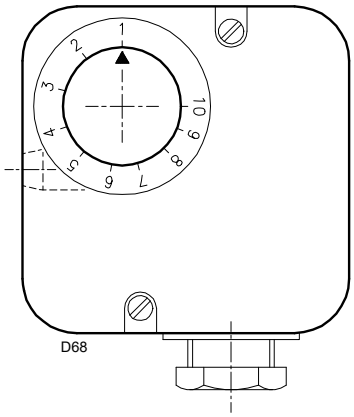


Fig. 33

6.7.2 Maximum gas pressure switch

Adjust the maximum gas pressure switch (Fig. 34) after making all other burner adjustments with the maximum gas pressure switch set to the end of the scale.

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

The maximum gas pressure switch must be regulated to a value no higher than 30% of the measurement read on the gauge when the burner is working at maximum output.

After making the adjustment, remove the pressure gauge and close the tap.

6.7.3 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. 35) 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.

WARNING

1 kPa = 10 mbar

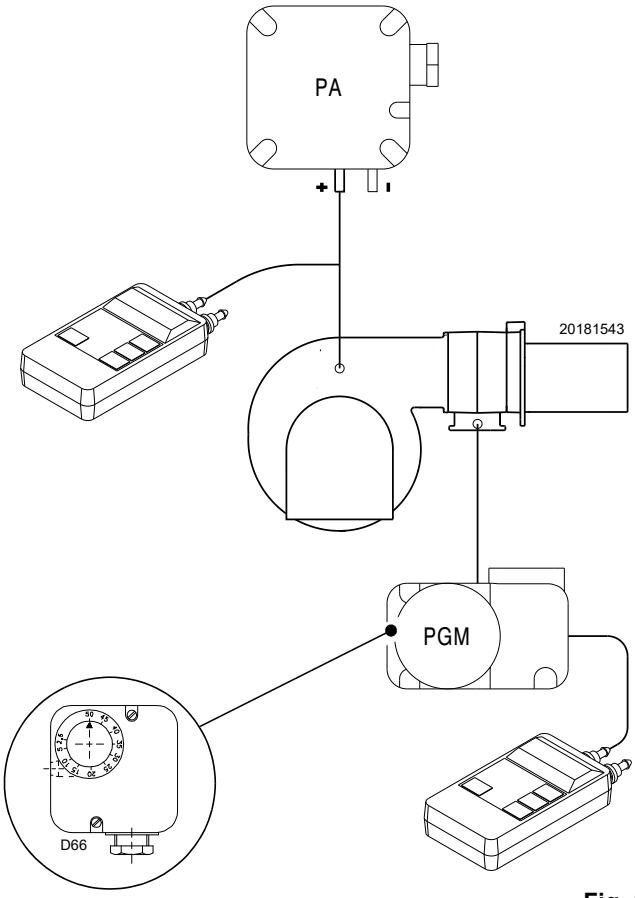


Fig. 34

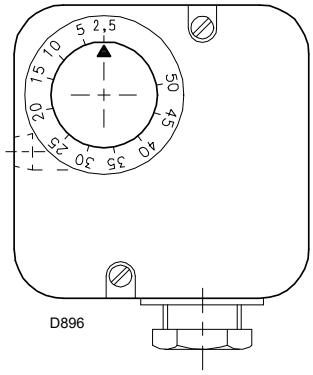


Fig. 35

6.7.4 Flame presence check

The burner is fitted with an ionisation system to check that a flame is present. The minimum current for control box operation is 6 µA. The burner provides a much higher current, so that no check is usually needed. However, if it is necessary to measure the ionisation current, disconnect the plug-socket 5)(Fig. 7 on page 13) on the ionisation probe cable and insert a full scale 100 µA direct current microammeter.

WARNING

Carefully check polarities.

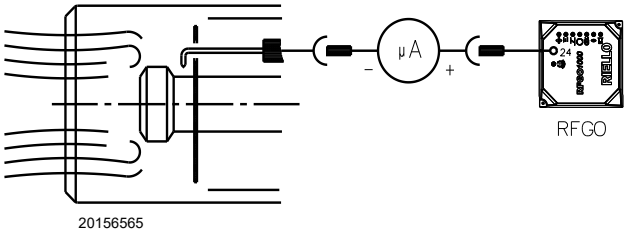


Fig. 36

NOTE:

When the calibration of the pressure adjuster is changed to obtain the required 2nd stage output, the ignition must be checked again.

A rough indication of the 2nd stage max delivery can be obtained by just reading the gas pressure at the coupling 16)(Fig. 6 on page 12) on the U-shaped pressure gauge (Fig. 24 on page 26) and following the instructions given in page 22.

6.8 Burner operation

6.8.1 Burner start-up

(gas trains in compliance with EN 676)

- **0s** : Control remote control TL closes.
- **6s** : Servomotor start-up: rotate to the right by 130°, i.e. until the contact intervenes on the cam I (Fig. 27 on page 29).
  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 (Fig. 27 on page 29) at 20°.
- **120s** : The air damper and gas butterfly valve assume the MIN output position - with cam III (Fig. 27 on page 29) at 20°).
- **121s** : Ignition electrode strikes a spark.
- **127s** : The safety valve VS opens, along with the adjustment valve VR, (quick opening). The flame is ignited at a low output level, point A.
  The output is then progressively increased, with the valve opening slowly up to MIN output, point B.
- **130s** : The spark goes out.
- **150s** : The start-up cycle ends

6.8.2 Steady state operation

STEADY STATE OPERATION

Burner without output regulator RWF50

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 control box RFGO carries on checking the presence of the flame and the correct position of the air and gas maximum pressure switches).

- If the temperature or pressure is low (so the TR remote control is closed), the burner progressively increases the output up to the MAX value (section C-D).
- Then if the temperature or pressure increases until the TR opens, the burner progressively decreases its output to the MIN value (section E-F). And so on.
- The burner locks out when the heat request is less than the heat supplied by the burner at MIN output, (section G-H). The TL remote control opens, and the servomotor returns to angle 0° limited by the contact of cam I (Fig. 30 on page 30). The air damper closes completely to reduce heat losses to a minimum.

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

Burner with output regulator RWF50

See the manual supplied with the adjuster.

Burner flame goes out during operation

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

STANDARD IGNITION

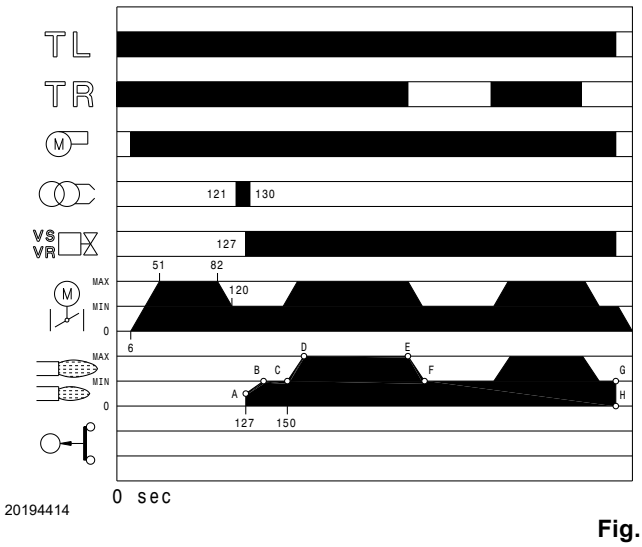


Fig. 37

6.8.3 Ignition failure

If the burner does not ignite, it locks out within 3 s after the gas valve opens, 130 seconds from TL closure and the post-purging phase starts and lasts in 18 seconds.

IGNITION FAILURE

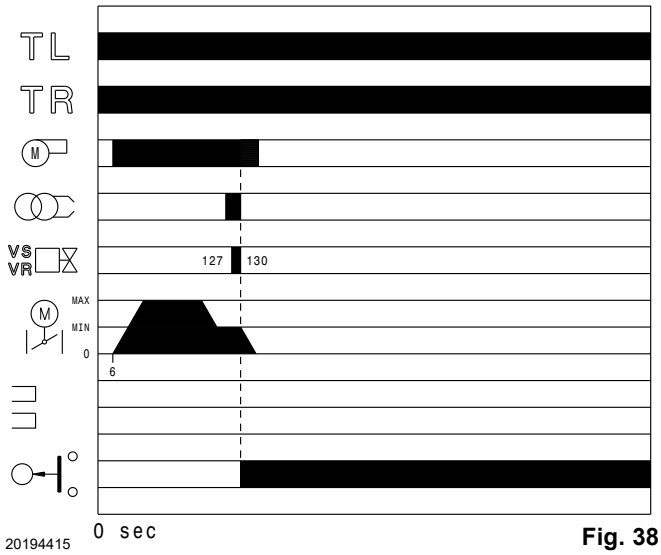


Fig. 38

7 Maintenance

7.1 Notes on safety for the maintenance

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

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


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.

7.2 Maintenance programme

7.2.1 Maintenance frequency

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

7.2.2 Safety test - with no gas supply

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

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

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

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

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

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

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


WARNING

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

7.2.3 Checking and cleaning

The operator must use the required equipment during maintenance.

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.

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

Tab. I

7.2.4 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.

Flame presence check

Check the level of the flame detection signal with the “Check mode” function from the flame control: the LEDs from 2 to 6 indicate the flame signal level, respectively. See paragraph **“LED indicator and special function”** on page 39

Check Mode

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

7.2.5 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
Flexible hoses (if present)	5 years or 30.000 pressurised cycles
Fan impeller	10 years or 500.000 start-ups

Tab. J

7.3 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.

➤ Remove the screws 7)(Fig. 39) retaining the fan 3) to the coupling 4).
➤ Open the burner by moving the unit fan backwards on the two slide bars 6). The unit coupling remains fitted to the boiler.

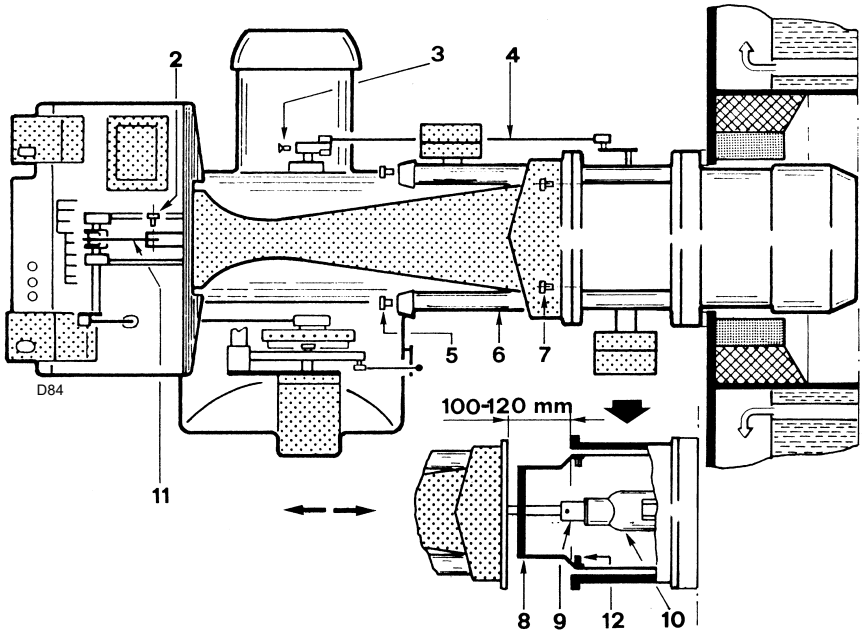


Fig. 39

7.4 Closing the burner

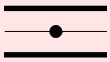
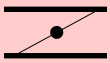
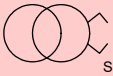
WARNING

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.

8 LED indicator and special function

8.1 Description of LED lamps

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

Tab. K

8.2 Check mode function

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

To enable the check mode function:

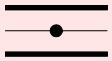
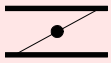
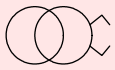
- keep the reset button pressed, see chapter 8 for more details, for at least 3 seconds, the status LED changes from green to yellow to signal that the control device is in check mode.
- the control device locks out during pre-purging, after a time-out of max 30 minutes the flame control will automatically exit the check mode function.
- check mode has a 2 minute timeout during the 2nd safety time. When it ends, the flame control goes back to the normal operating status.
- check mode has a 2 minute timeout during the MTFI status. When it ends, the flame control goes back to the normal operating status.
- During the check mode 1st or 2nd safety time, the flame signal level can be indicated by the 5 central LEDS on the flame control central panel, which turn on proportionally.
  Each lit LED (starting from the flame LED) represents 20% of the signal power.
  To exit the check mode function, press the reset button; the flame control will go back to the normal operating mode.

8.3 Flame control lockout or emergency stop condition

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

8.4 LED lamps: burner operating status

OPERATING STATUSES INDICATED BY LEDS DURING NORMAL OPERATION AND CHECK MODE

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

Tab. L

1. LEDs form a progress bar which indicates the Flame Signal Power in order to orientate the sensors during commissioning (LEDs “Grow” upwards, moving away from the Status at 20% intervals of flame power.)
2. LEDs indicate the error or lock-out code for troubleshooting.
3. LEDs change from ON to BLINKING to OFF showing the servomotor movement control until the position-reached feedback is received See paragraph **“Problems - Causes - Remedies signalled by LED indicators”** on page 41“.

9 Problems - Causes - Remedies signalled by LED indicators

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

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

Unlocking the control device

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

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

Error / RFGO LED lock-out Codes

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


WARNING

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

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


WARNING

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

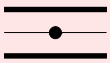
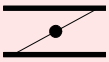
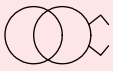
It is not admitted to tamper with or act on the system or control in a way that could compromise the product safety or warranty.
Any tests on safety devices or on loads, such as fan motor, valves, igniter, flame sensors, must be performed with the shut-off valves closed and by qualified personnel.

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


WARNING

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

Error / RFGO LED lock-out codes

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

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

Tab. M

Fault explanation

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

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

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

Tab. N

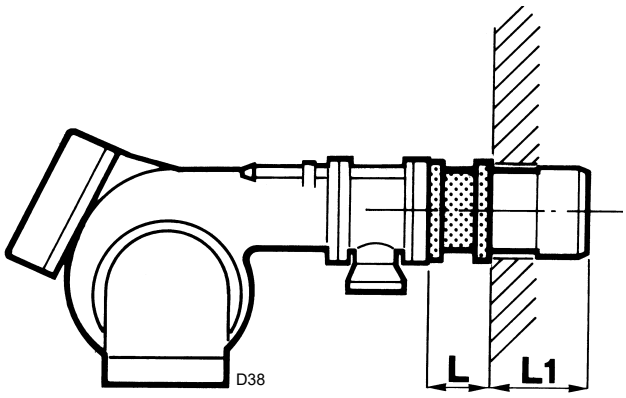
A Appendix - Accessories

Spacer kit to shorten the combustion head

L = Spacer thickness

L1 = Resulting blast tube length

Burner	mm	mm	Code
GAS 8 P/M	L = 110	L1 = 281	3000722
GAS 9 P/M	L = 130	L1 = 314	3000723
GAS 10 P/M	L = 130	L1 = 346	3000751



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

Support

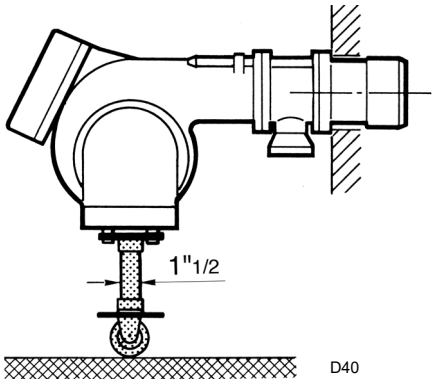
It has to be fitted to burners with extended head (501-574-606). It ensures the burner safety when it is opened on the elongated slide bars.

The support is not essential for burners with short head, but it makes it easier to open them.

The 1” 1/2 tube of the support has to be adjusted by the installer to the length suitable for the system.

The base is equipped with wheels.

Burner	Code
All models	3000731



Potentiometer 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 10)(Fig. 6 on page 12).

It signals the servomotor position to provide indications or feed-backs to different kinds of tools.

Burner	Code
All models	20096322

UV flame sensor kit

Burner	Code
All models	20144943

Thermal relay 230V kit

Burner	Code
GAS 9 P/M	20163347

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.

Burner	Code
All models	3010030

Town gas kit

Burner	Code
GAS 9 P/M	3010298
GAS 10 P/M	3010300

Soundproofing box kit

Burner	Code
GAS 8 P/M	3010404
GAS 9-10 P/M	3010376

Gas trains in compliance with EN 676

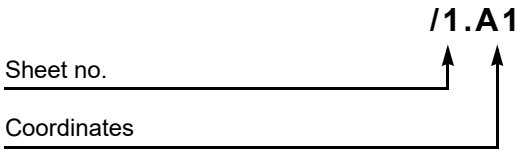
Please refer to manual.

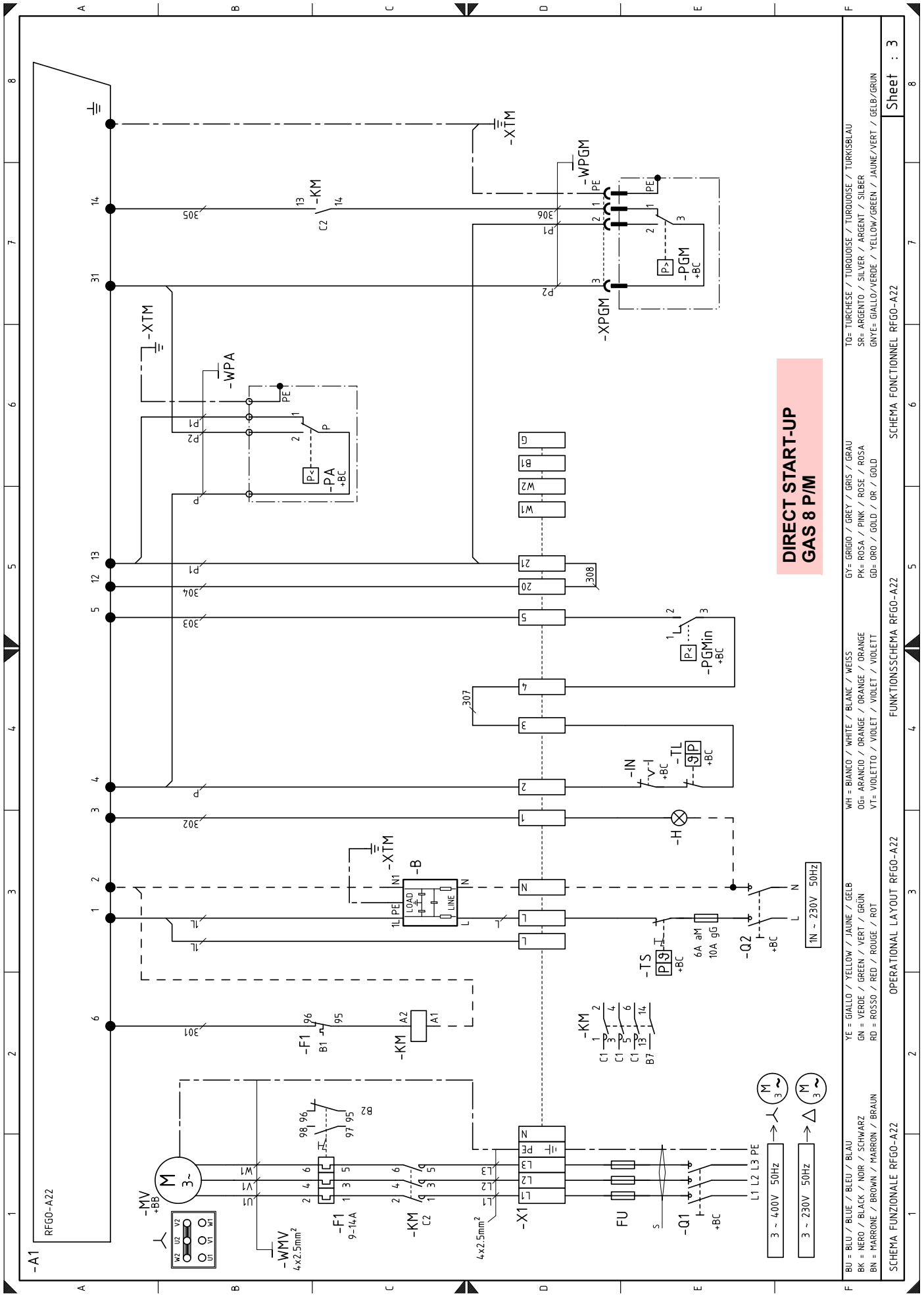
ATTENTION

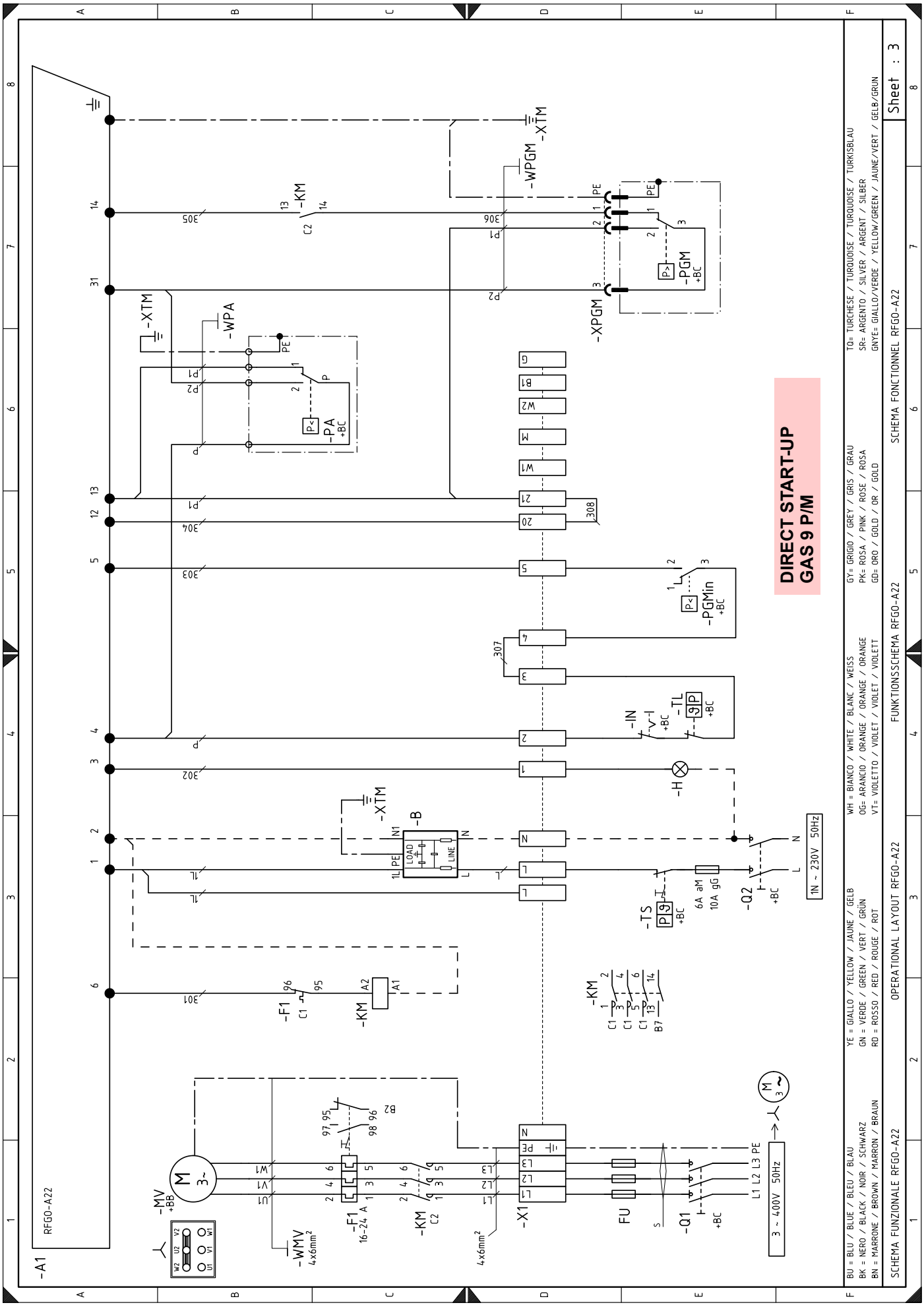
The installer is responsible for the addition of any safety device not foreseen in this manual.

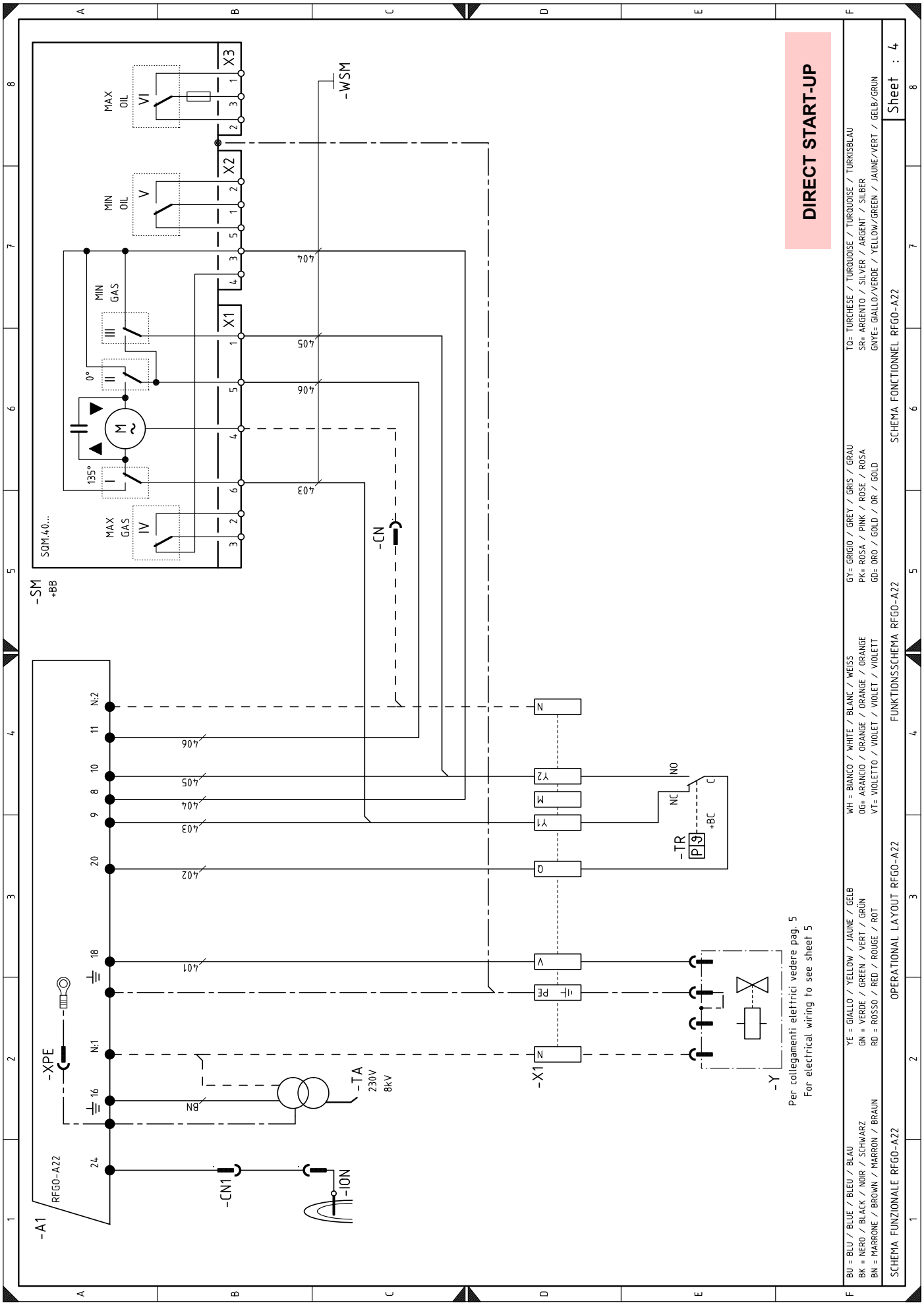
B Appendix - Electrical panel layout

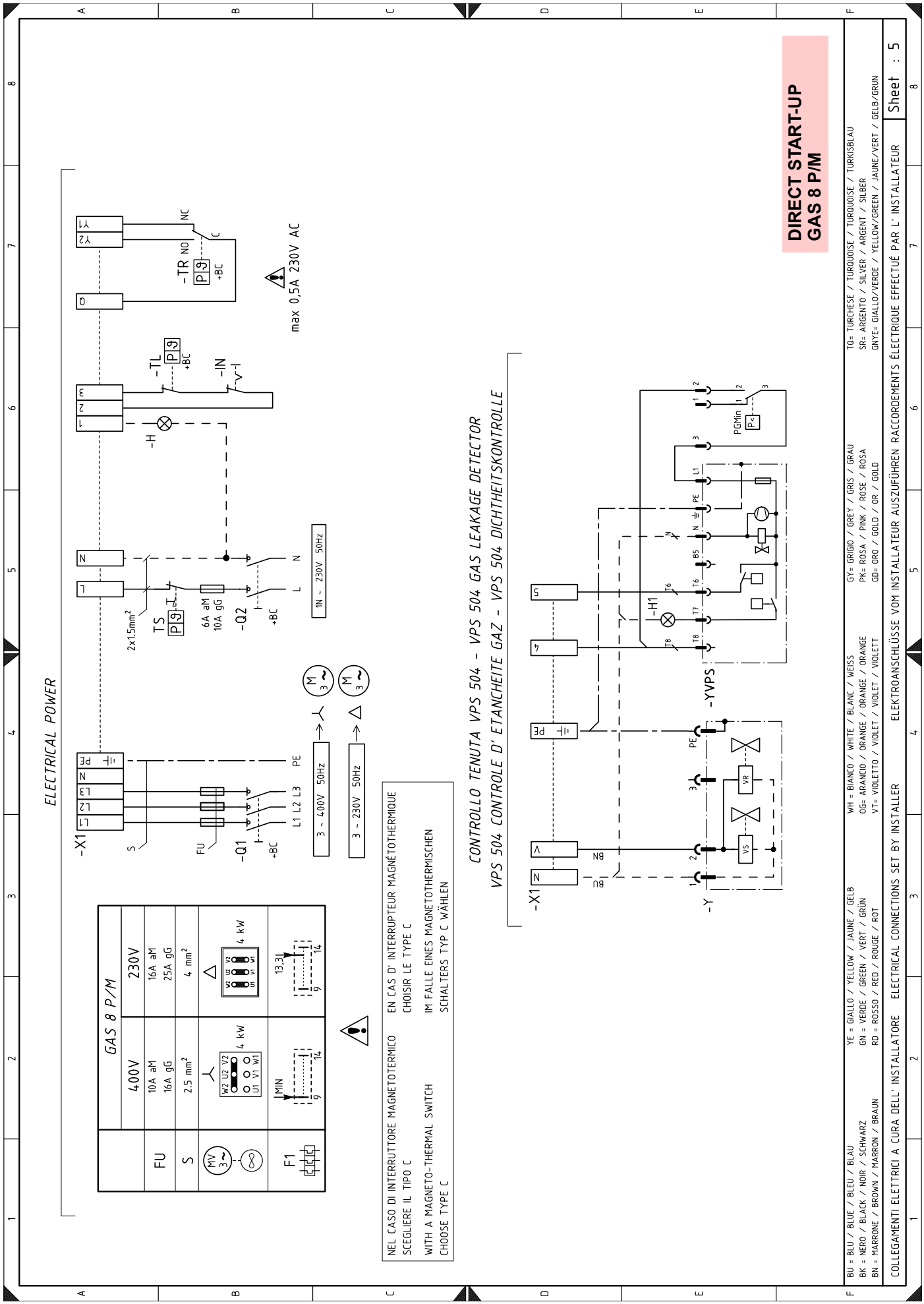
2 Indication of references

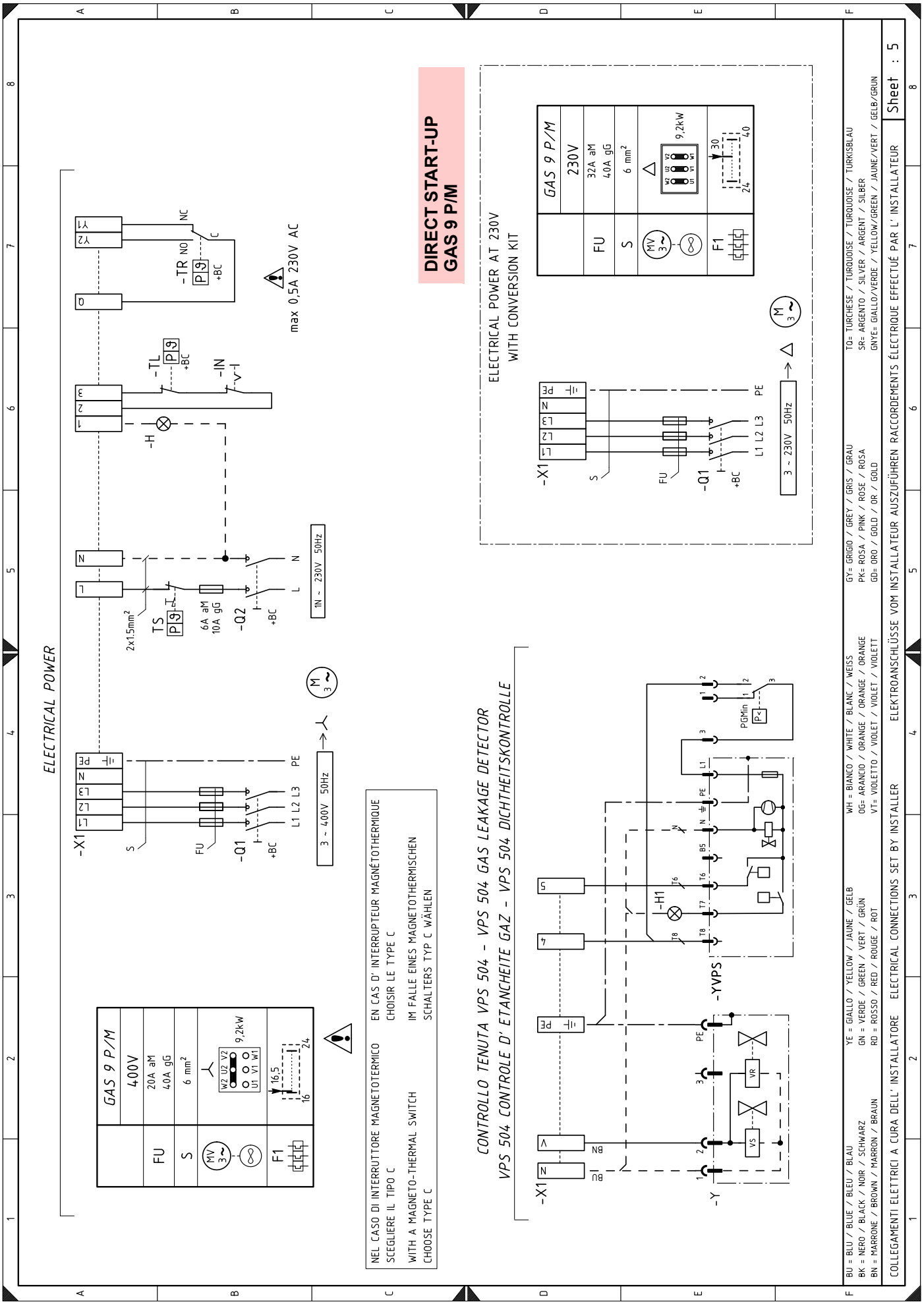


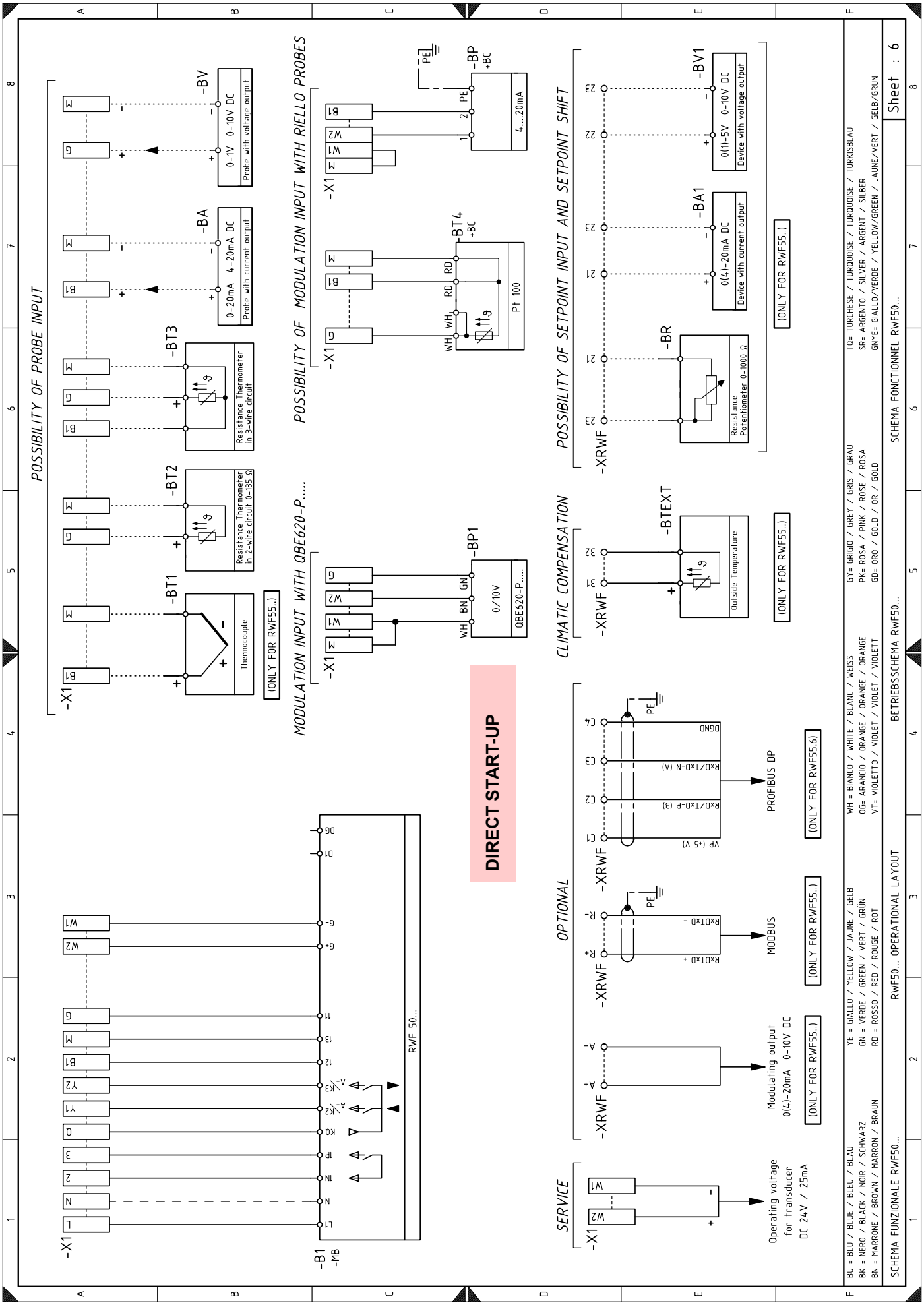

DIRECT START-UP
GAS 8 P/M
-A1
RFGO-A22
-MV
-WMV
-F1
-KM
-X1
FU
-Q1
-Q2
-TS
-H
-IN
-TL
-B
-XTM
-WPA
-PA
-WPGM
-XPGM
-PGM
-PGMin
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 3


DIRECT START-UP
GAS 9 P/M
-A1
RFGO-A22
-MV
-WMV
-F1
-KM
-X1
FU
-Q1
-Q2
-TS
-H
-IN
-TL
-B
-PA
-PGM
-PGMin
-WPA
-WPGM
-XPGM
-XTM
3 ~ 400V 50Hz
1N ~ 230V 50Hz
SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 3


DIRECT START-UP
SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 4
-SM
+BB
SQM.40...
MAX OIL
MIN OIL
MIN GAS
MAX GAS
-WSM
-CN
-A1
RFGO-A22
-XPE
-CN1
-ION
-TA
230V
8kV
-X1
-TR
-Y
Per collegamenti elettrici vedere pag. 5
For electrical wiring to see sheet 5
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


DIRECT START-UP
GAS 8 P/M
ELECTRICAL POWER
-X1
-Q1
-Q2
-TS
-TL
-IN
-H
-TR
max 0,5A 230V AC
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
2x1.5mm²
6A aM
10A gG
GAS 8 P/M
400V
230V
10A aM
16A gG
2.5 mm²
4 mm²
4 kW
MIN
F1
FU
S
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
-YVPS
-Y
-H1
PGMin
BU = BLU / 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


DIRECT START-UP
GAS 9 P/M
ELECTRICAL POWER
ELECTRICAL POWER AT 230V
WITH CONVERSION KIT
GAS 9 P/M
400V
230V
FU
S
F1
20A aM
40A gG
32A aM
40A gG
6 mm²
9,2kW
-X1
-Q1
-Q2
-TR
-TL
-IN
-H
-H1
-Y
-YVPS
TS
max 0,5A 230V AC
2x1,5mm²
6A aM
10A gG
3 ~ 400V 50Hz
3 ~ 230V 50Hz
1N ~ 230V 50Hz
L1 L2 L3
PE
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
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


POSSIBILITY OF PROBE INPUT
-X1
-BT1
Thermocouple
(ONLY FOR RWF55..)
-BT2
Resistance Thermometer in 2-wire circuit 0-135 Ω
-BT3
Resistance Thermometer in 3-wire circuit
-BA
0-20mA 4-20mA DC
Probe with current output
-BV
0-1V 0-10V DC
Probe with voltage output
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-X1
-BT4
Pt 100
-BP
4....20mA
MODULATION INPUT WITH QBE620-P.....
-X1
-BP1
0/10V
QBE620-P.....
DIRECT START-UP
CLIMATIC COMPENSATION
-XRWF
-BTEXT
Outside Temperature
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-XRWF
-BR
Resistance Potentiometer 0-1000 Ω
-BA1
0(4)-20mA DC
Device with current output
-BV1
0(1)-5V 0-10V DC
Device with voltage output
(ONLY FOR RWF55..)
OPTIONAL
-XRWF
VP (+5 V)
RxD/TxD-P (B)
RxD/TxD-N (A)
DGND
PROFIBUS DP
(ONLY FOR RWF55.6)
RxDTxD +
RxDTxD -
MODBUS
(ONLY FOR RWF55..)
Modulating output
0(4)-20mA 0-10V DC
(ONLY FOR RWF55..)
SERVICE
Operating voltage for transducer DC 24 V / 25mA
-X1
-B1
-MB
RWF 50...
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
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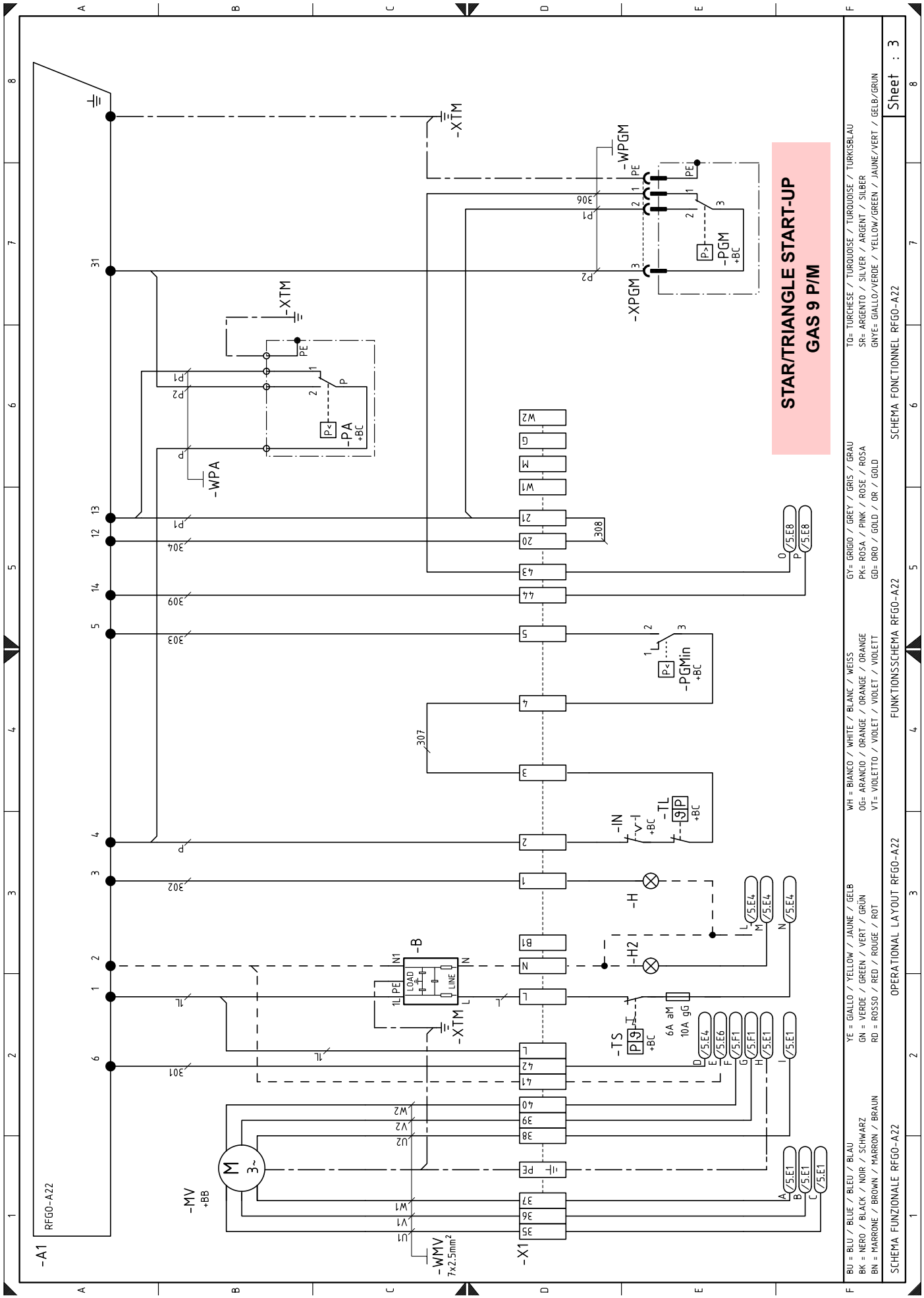
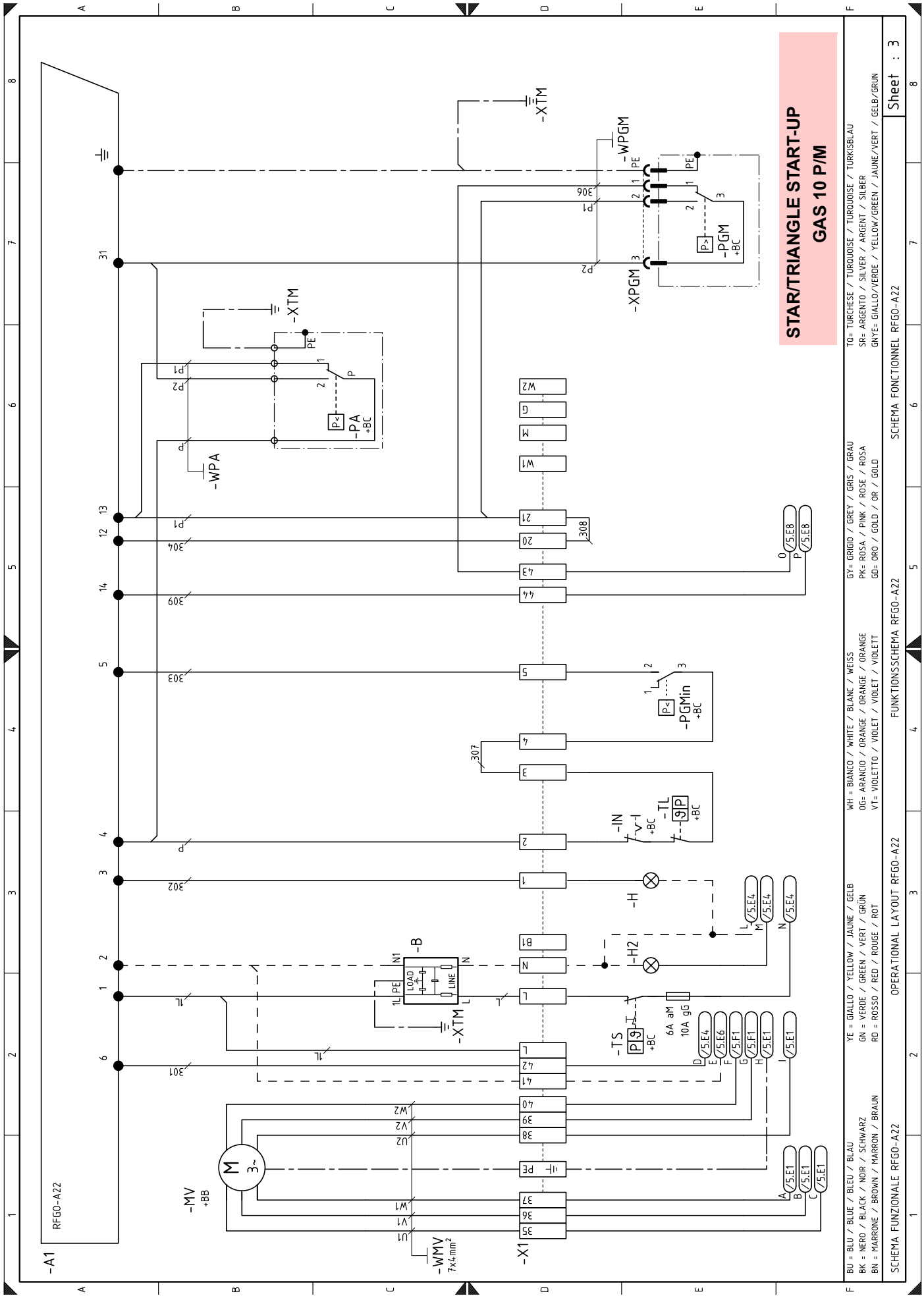
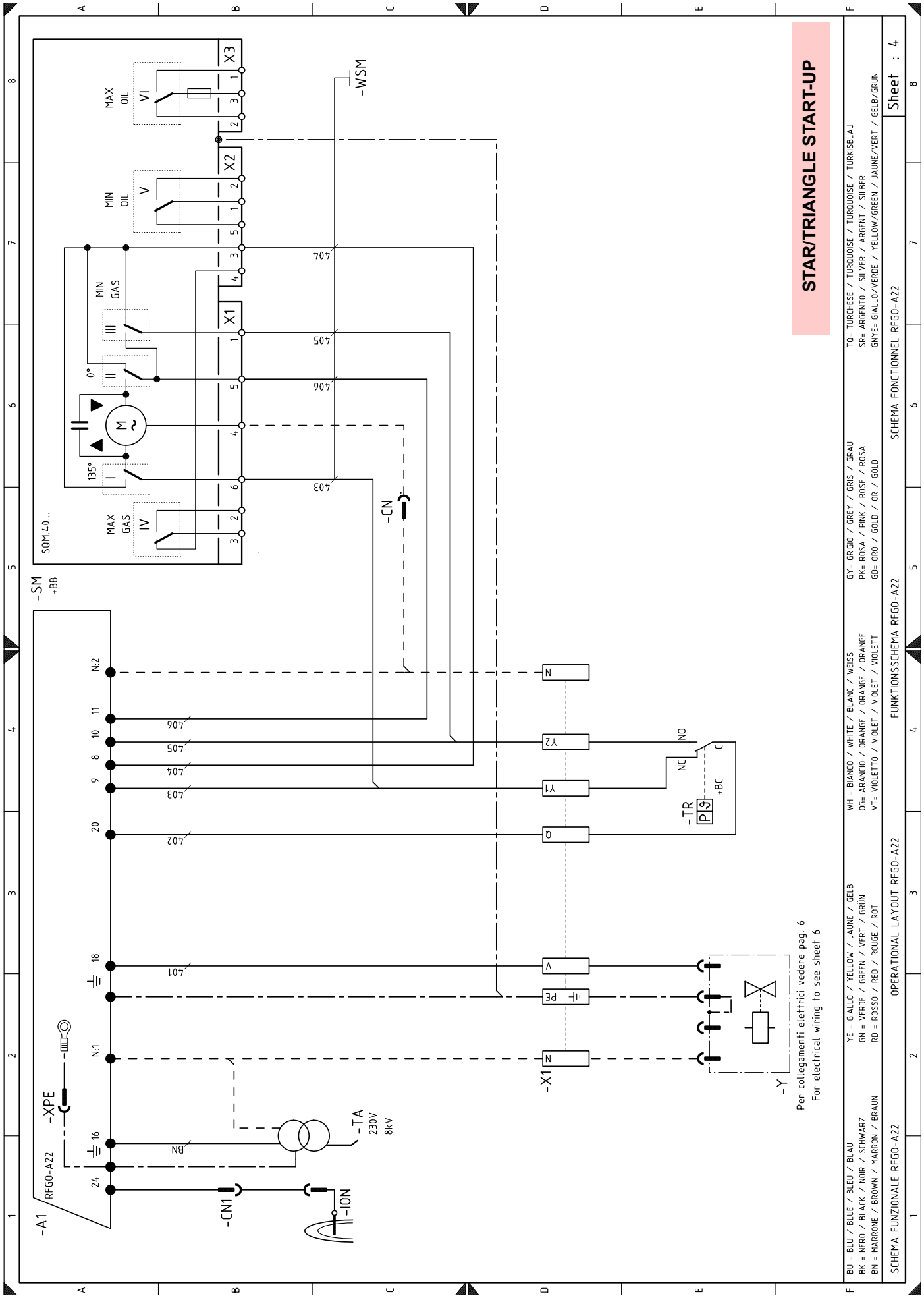
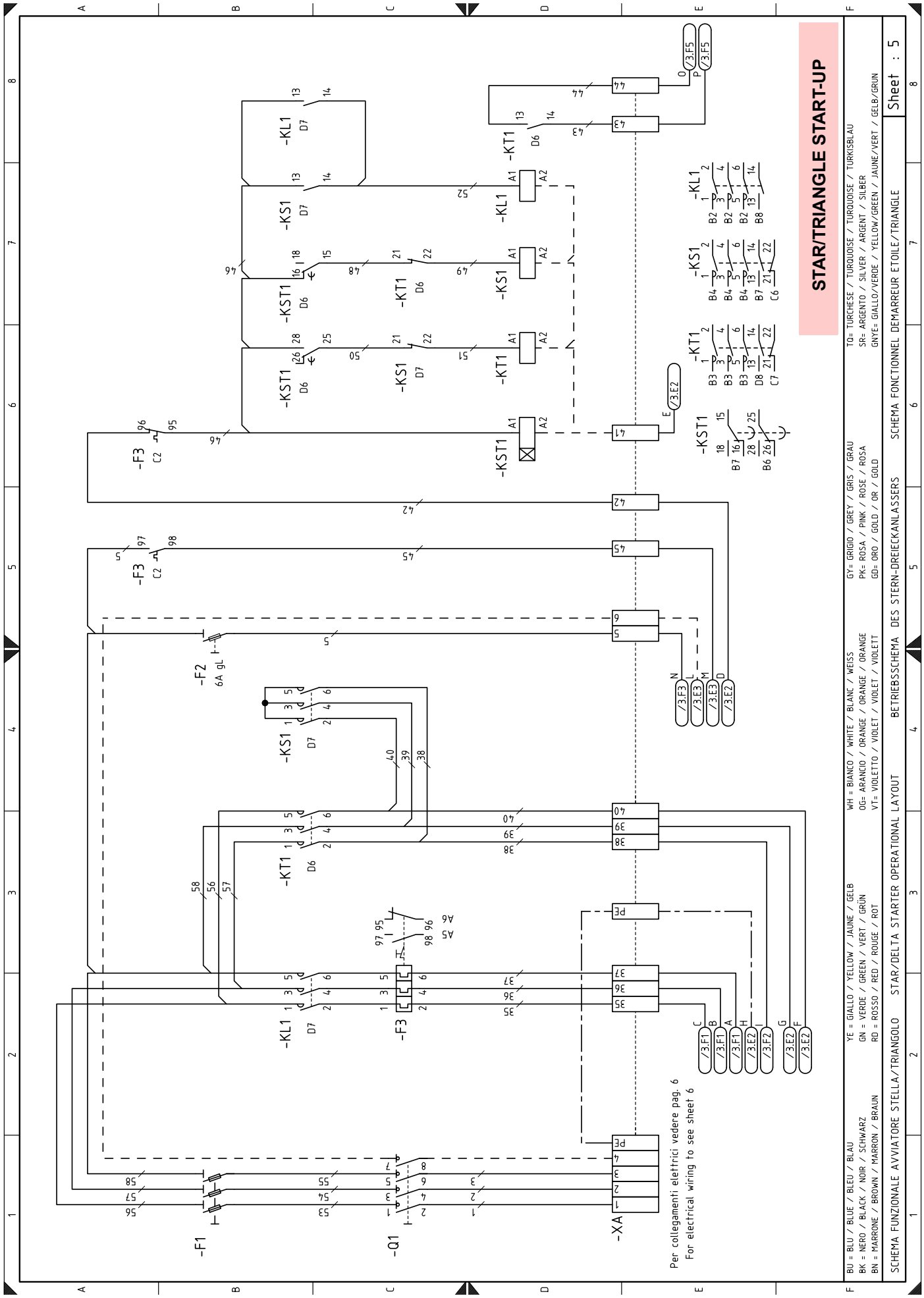
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE RWF50... RWF50... OPERATIONAL LAYOUT BETRIEBSSCHEMA RWF50... SCHEMA FONCTIONNEL RWF50...
Sheet : 6


STAR/TRIANGLE START-UP
GAS 9 P/M
-A1
RFGO-A22
-MV
+BB
-WMV
7x2.5mm²
-X1
-XTM
-WPGM
-XPGM
-PGM
+BC
-WPA
-PA
+BC
-PGMin
+BC
-IN
+BC
-TL
+BC
-H
-H2
-B
-TS
+BC
6A aM
10A gB
SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 3
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


STAR/TRIANGLE START-UP
GAS 10 P/M
SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 3
-A1
RFGO-A22
-MV
-WMV
-X1
-XTM
-WPGM
-XPGM
-PGM
-WPA
-PA
-PGMin
-IN
-TL
-H
-H2
-B
-TS
6A aM
10A gG
BU = BLU / 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


STAR/TRIANGLE START-UP
SCHEMA FUNZIONALE RFGO-A22
OPERATIONAL LAYOUT RFGO-A22
FUNKTIONSSCHEMA RFGO-A22
SCHEMA FONCTIONNEL RFGO-A22
Sheet : 4
-A1
RFGO-A22
-XPE
-CN1
-ION
-TA
230V
8kV
-SM
+BB
SQM.40...
-WSM
-CN
-X1
-Y
-TR
P19
+BC
NO
NC
C
MAX OIL
MIN OIL
MIN GAS
MAX GAS
0°
135°
Per collegamenti elettrici vedere pag. 6
For electrical wiring to see sheet 6
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


STAR/TRIANGLE START-UP
SCHEMA FUNZIONALE AVVIATORE STELLA/TRIANGOLO STAR/DELTA STARTER OPERATIONAL LAYOUT BETRIEBSSCHEMA DES STERN-DREIECKANLASSERS SCHEMA FONCTIONNEL DEMARREUR ETOILE/TRIANGLE
Sheet : 5
Per collegamenti elettrici vedere pag. 6
For electrical wiring to see sheet 6
-F1
-Q1
-XA
-F2 6A gL
-F3
-KL1
-KS1
-KST1
-KT1
BU = BLU / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
RD = ROSSO / RED / ROUGE / ROT
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
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GY= GRIGIO / GREY / GRIS / GRAU
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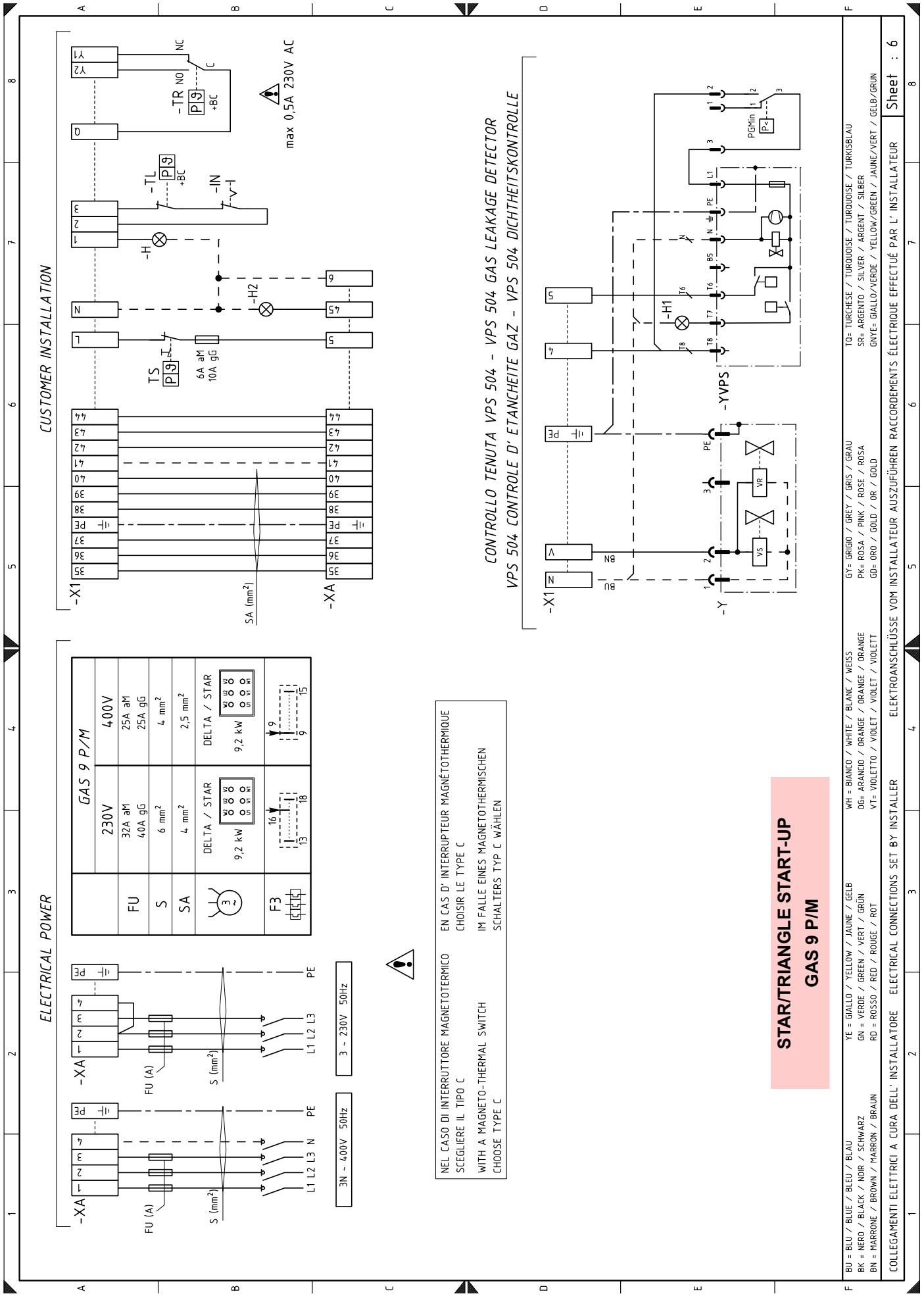
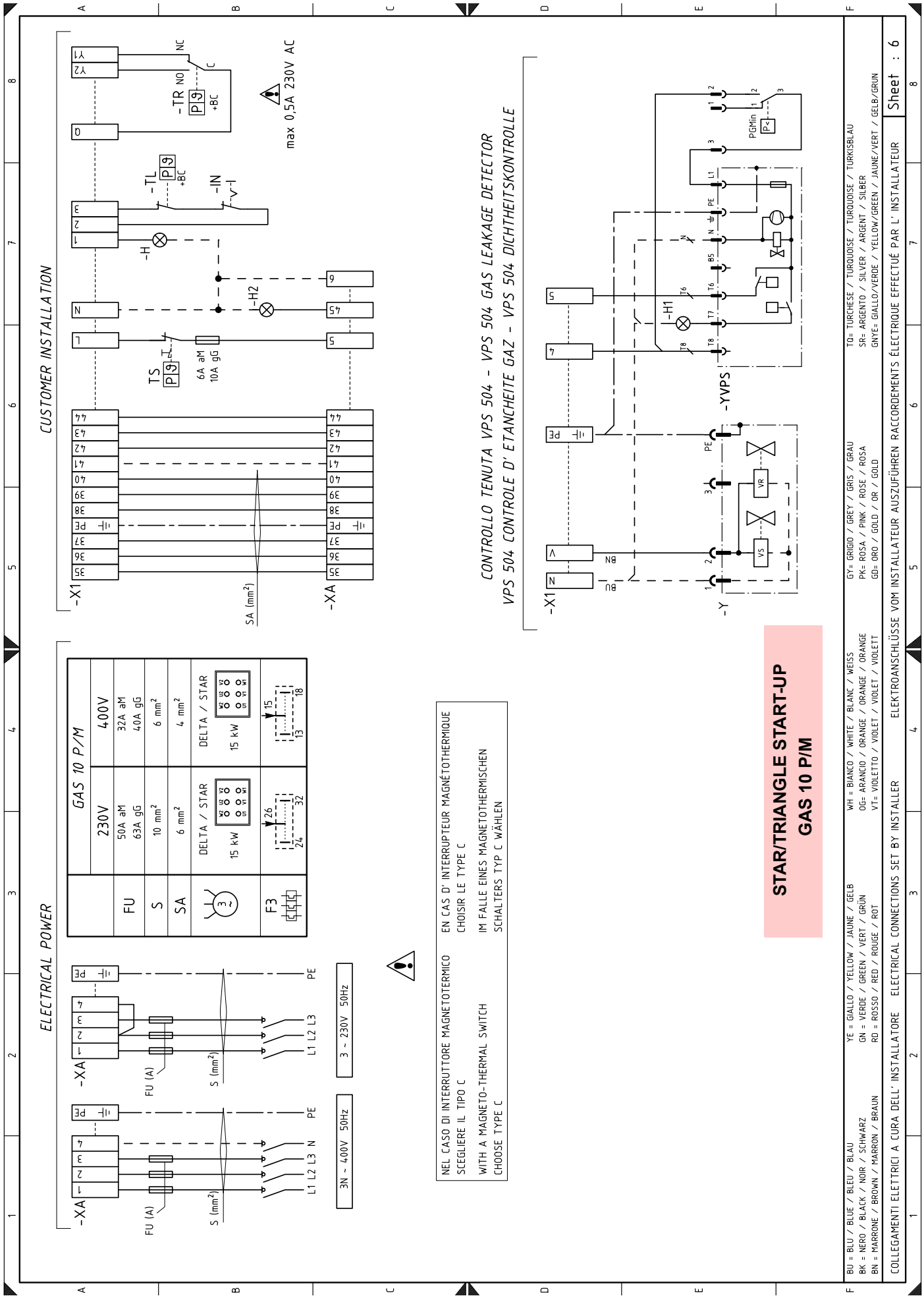
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


CUSTOMER INSTALLATION
ELECTRICAL POWER
CONTROLLO TENUTA VPS 504 - VPS 504 GAS LEAKAGE DETECTOR
VPS 504 CONTROLE D' ETANCHEITE GAZ - VPS 504 DICHTHEITSKONTROLLE
GAS 9 P/M
230V
400V
FU
S
SA
F3
32A aM
40A gG
25A aM
25A gG
6 mm²
4 mm²
2,5 mm²
9,2 kW
DELTA / STAR
-X1
-XA
-YVPS
-Y
-H
-H1
-H2
-TL
-IN
-TR
TS
6A aM
10A gG
max 0,5A 230V AC
3N ~ 400V 50Hz
3 ~ 230V 50Hz
L1 L2 L3 N PE
L1 L2 L3 PE
FU (A)
S (mm²)
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
STAR/TRIANGLE START-UP
GAS 9 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 : 6


ELECTRICAL POWER
CUSTOMER INSTALLATION
CONTROLLO TENUTA VPS 504 - VPS 504 GAS LEAKAGE DETECTOR
VPS 504 CONTROLE D' ETANCHEITE GAZ - VPS 504 DICHTHEITSKONTROLLE
GAS 10 P/M
230V
400V
FU
S
SA
F3
50A aM
63A gG
32A aM
40A gG
10 mm²
6 mm²
4 mm²
DELTA / STAR
15 kW
-XA
-X1
-Y
-YVPS
-TR
-TL
-IN
-H
-H1
-H2
TS
6A aM
10A gG
max 0,5A 230V AC
SA (mm²)
FU (A)
S (mm²)
L1 L2 L3 N PE
L1 L2 L3 PE
3N ~ 400V 50Hz
3 ~ 230V 50Hz
NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN
STAR/TRIANGLE START-UP
GAS 10 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
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VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
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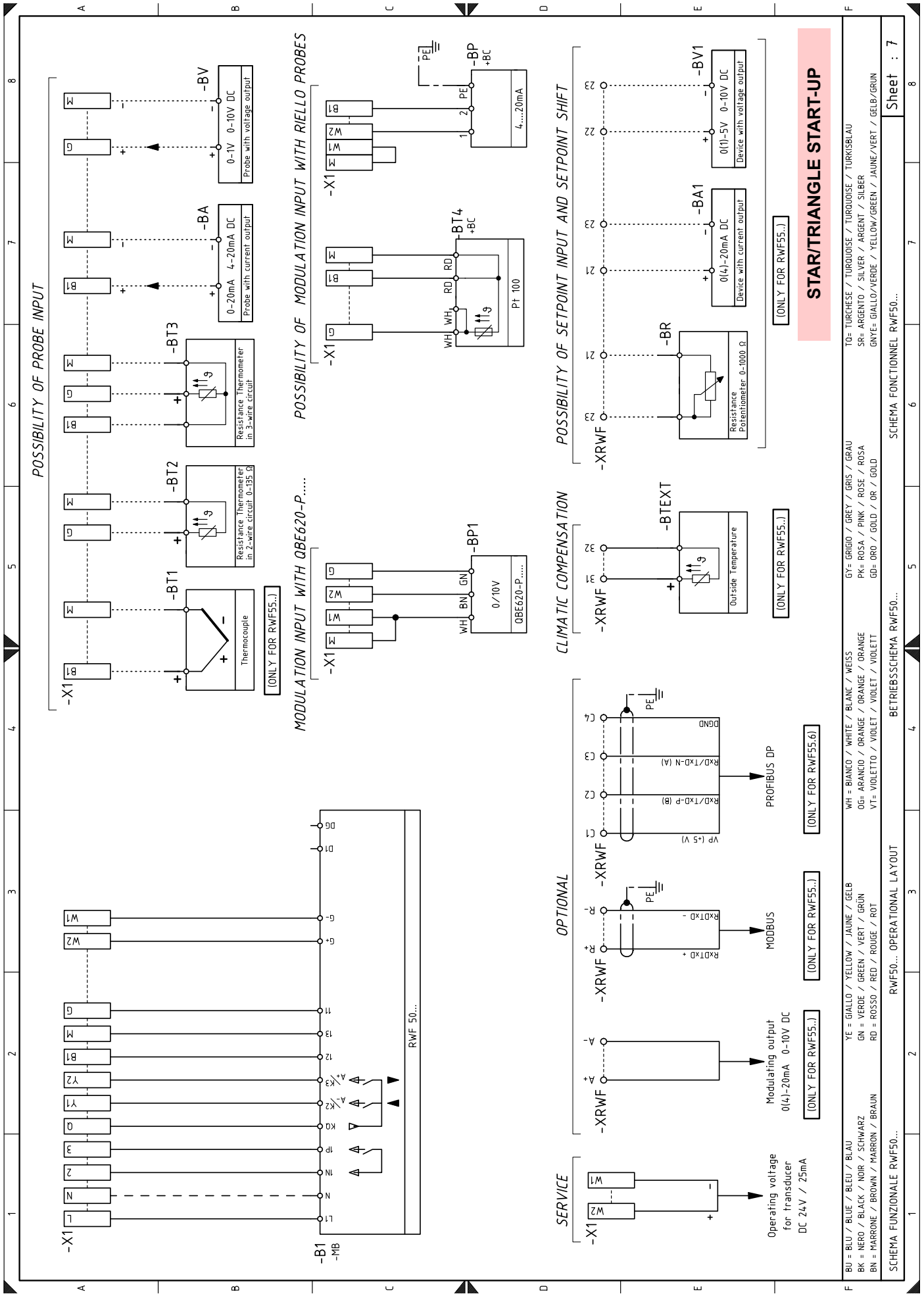
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN
RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 6


POSSIBILITY OF PROBE INPUT
-X1
-BT1
Thermocouple
-BT2
Resistance Thermometer in 2-wire circuit 0-135 Ω
-BT3
Resistance Thermometer in 3-wire circuit
-BA
0-20mA 4-20mA DC
Probe with current output
-BV
0-1V 0-10V DC
Probe with voltage output
(ONLY FOR RWF55..)
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-X1
-BP
+BC
4....20mA
-BT4
Pt 100
MODULATION INPUT WITH QBE620-P.....
-X1
-BP1
QBE620-P.....
0/10V
CLIMATIC COMPENSATION
-XRWF
-BTEXT
Outside Temperature
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-XRWF
-BR
Resistance Potentiometer 0-1000 Ω
-BA1
0(4)-20mA DC
Device with current output
-BV1
0(1)-5V 0-10V DC
Device with voltage output
STAR/TRIANGLE START-UP
OPTIONAL
-XRWF
Modulating output
0(4)-20mA 0-10V DC
MODBUS
PROFIBUS DP
(ONLY FOR RWF55..)
(ONLY FOR RWF55.6)
SERVICE
Operating voltage for transducer DC 24V / 25mA
-B1
-MB
RWF 50....
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE RWF50... RWF50... OPERATIONAL LAYOUT BETRIEBSSCHEMA RWF50... SCHEMA FONCTIONNEL RWF50...
Sheet : 7

WIRING DIAGRAM KEY

A1	Electrical control box
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 modification
CN	Servomotor connector
CN1	Ionisation probe connector
FU	Three-phase line fuses
F1	Thermal relay, Three-phase line fuses
F2	Single-phase line fuses
F3	Thermal relay
H	Remote lockout signal
H1	Remote lockout signal due to leak detection control
H2	Remote motor lockout signal
IN	Burner manual stop switch
ION	Ionisation probe
KL1	Line contactor
KM	Motor contactor
KS1	Star contactor
KST1	Timing relay for switching from star to triangle
KT1	Triangle contactor
MV	Fan motor
PA	Air pressure switch
PGM	Maximum gas pressure switch
PGMin	Minimum gas pressure switch
Q1	Three-phase disconnecting switch
Q2	Single-phase disconnecting switch
SM	Servomotor
TA	Ignition transformer
TL	Limit thermostat/pressure switch
TR	Adjustment thermostat/pressure switch
TS	Safety thermostat/pressure switch
X1	Burner terminal strip
XA	Starter terminal strip
XPE	Earth control box
XPGM	Maximum gas pressure switch connector
XRWF	RWF50 terminal board
Y	Gas adjustment valve + gas safety valve
YVPS	Leak test

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