GB

Light oil burners

Progressive two-stage or modulating operation

CODE	MODEL
20205717	P 300 P/G
20208700	P 300 P/G
20205643	P 300 P/G
20205561	P 450 P/G
20208702	P 450 P/G

20209234 (3) - 11/2025

Translation of the original instructions

1 Information and general warnings

1.1 Information about the instruction manual

1.1.1 Introduction

The instruction manual supplied with the burner:

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

Symbols used in the manual

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

1.1.2 General dangers

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

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

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

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

1.1.3 Other symbols

DANGER: LIVE COMPONENTS

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

DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.

DANGER: BURNING

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

DANGER: CRUSHING OF LIMBS

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

WARNING: MOVING PARTS

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

DANGER: EXPLOSION

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

PERSONAL PROTECTION EQUIPMENT

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

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

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

ENVIRONMENTAL PROTECTION

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

IMPORTANT INFORMATION

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

➤ This symbol indicates a list.

Abbreviations used

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

1.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

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

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

.....

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

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

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

1.2 Guarantee and responsibility

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

ATTENTION

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

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

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

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

2 Safety and prevention

2.1 Introduction

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

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

It is a good idea to remember the following:

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

Specifically:

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

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

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

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

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

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

ATTENTION

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

2.2 Personnel training

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

The user:

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

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

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

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

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

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

In addition:

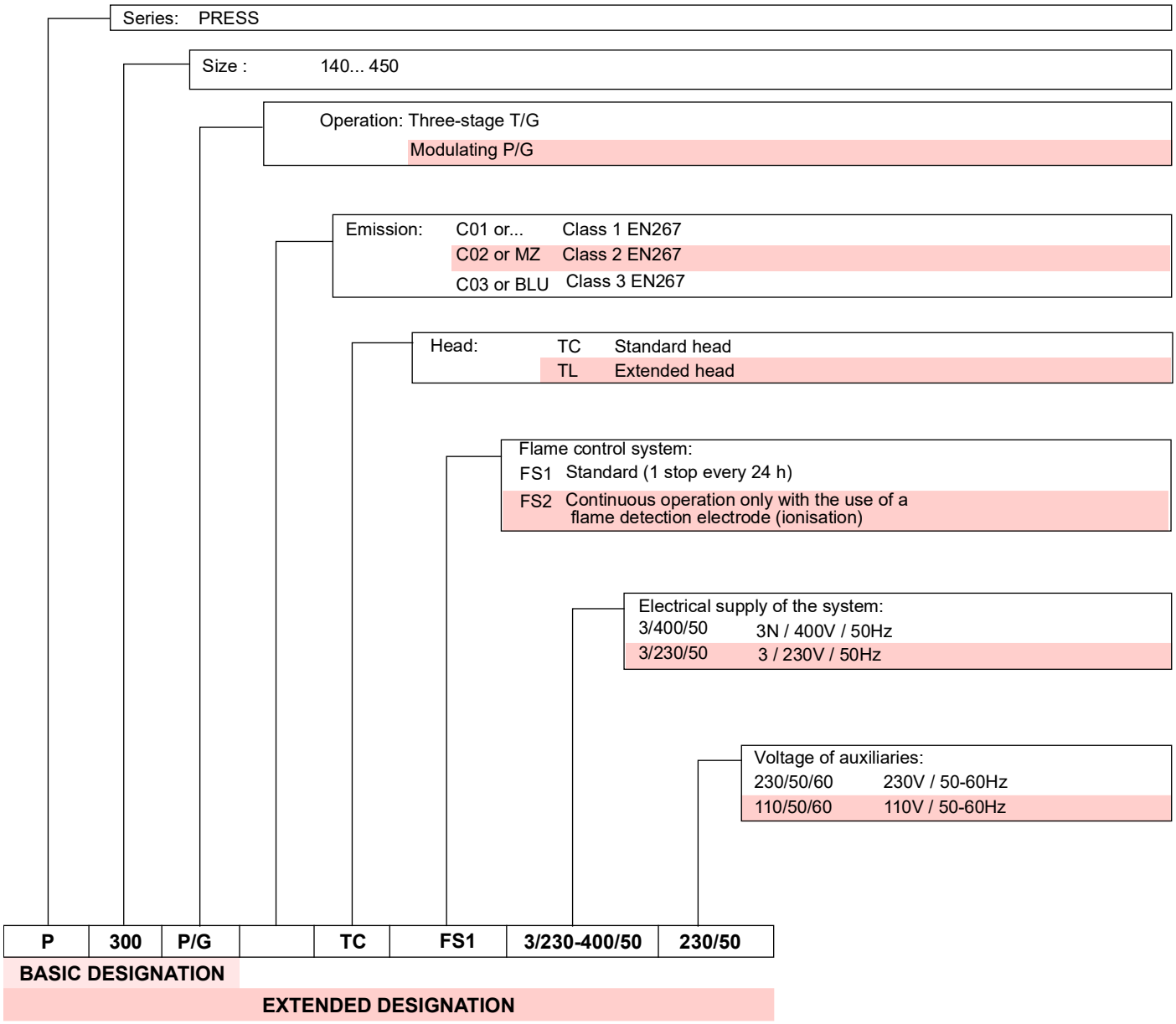
➤ must take all the measures necessary to prevent unauthorised people gaining access to the machine;

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

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

3 Technical description of the burner

3.1 Burner designation



3.2 Models available

Designation			Voltage	Start-up	Code
P 300 P/G	TC	FS1	3/230-400/50	Direct	20205717
P 300 P/G	TC	FS1	3N/400/50	Star/Triangle	20208700
P 300 P/G	TL	FS1	3N/400/50	Star/Triangle	20205643
P 450 P/G	TC	FS1	3N/400/50	Star/Triangle	20205561
P 450 P/G	TL	FS1	3N/400/50	Star/Triangle	20208702

4 Technical description of the burner

4.1 Technical data

MODEL		P 300 P/G	P 450 P/G
Output (1)	kW	890 - 3560	1190 - 5340
Delivery (1)	kg/h	75 - 300	100 - 450
Fuel		Light oil	
- Net calorific value	kWh/kg Mcal/kg	11.8 10.2 (10.200 kcal/kg)	
- Density	kg/dm3	0.82 - 0.85	
- viscosity at 20 °C	mm2/s	max 6 (1,5 °E - 6 cSt)	
Operation		• Intermittent (min. 1 stop every 24 hours). • Progressive two-stage (modulating by kit).	
Nozzle	number	1 (nozzle with return line)	
Standard applications		Boilers: water, steam, diathermic oil	
Ambient temperature	°C	0 - 40	
Combustion air temperature	°C max	60	
Pump output (at 40 bar) pressure range fuel temperature	kg/h bar °C max	730 7-40 140	1000 7-30 140
Weight of the burner (complete with packaging)	kg	230	300

Tab. A

(1) Reference conditions: Room temperature 20°C - Barometric pressure 1000 mbar – Altitude 100 m above sea level.

4.2 Electrical data

MODEL		P 300 P/G	P 300 P/G
CODE		20205717	20208700 - 20205643
Electrical power supply	V Hz	3~ 400-230V 50	3N ~ 400V 50
Absorbed electrical power	kW max	10.9	10.9
Protection level	IP	40	

MODEL		P 450 P/G
CODE		20205561 - 20208702
Electrical power supply	V Hz	3N ~ 400V 50
Absorbed electrical power	kW max	18.7
Protection level		IP 40

Tab. B

4.3 Overall dimensions

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

Bear in mind that inspection of the combustion head requires the burner to be opened and the rear part drawn back on the slide bars.

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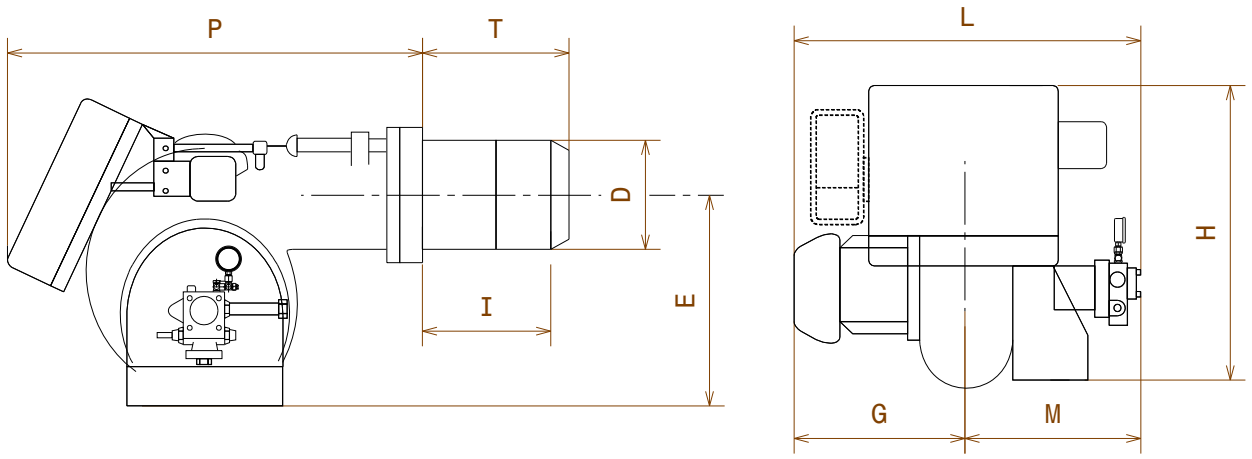

Fig. 1

mm	P	T	I	D	E	L	H	G	M
P 300 P/G TC	1000	444	400	295	496	915	680	502	413
P 300 P/G TL	1000	574	530	295	496	915	680	502	413
P 450 P/G TC	1070	476	420	336	525	961	714	522	439
P 450 P/G TL	1070	606	550	336	525	961	714	522	439

Tab. C

4.4 Standard equipment

Flexible hoses	No.	2
Nipples for flexible hoses	No.	2
Screws	No.	4
Thermal flange gasket	No.	1
Cable grommet (P 300 P/G)	No.	4
Cable grommet (P 450 P/G)	No.	8
Starter (P 450 P/G)	No.	1
Extensions (only for TL versions)	No.	2
Installer booklet	No.	1
Spare parts list	No.	1

4.5 Firing rates

During operation, burner output varies between:
- ➤ **MINIMUM FLOW RATE**: can drop down to 75 kg/h
- ➤ **MAXIMUM OUTPUT**: must be within the firing rate (Fig. 2 and Fig. 3).

ATTENTION

The FIRING RATE was obtained with an ambient temperature of 20°C and a barometric pressure of 1000 mbar (approx. 100m above sea level), with the combustion head adjusted as shown on page 26.

P 300 P/G

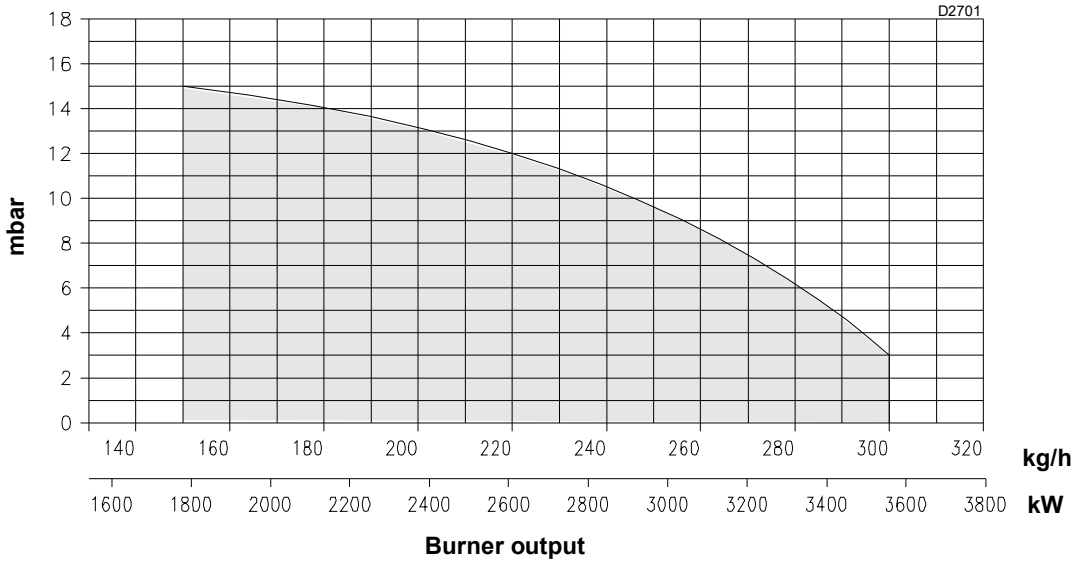

Fig. 2

P 450 P/G

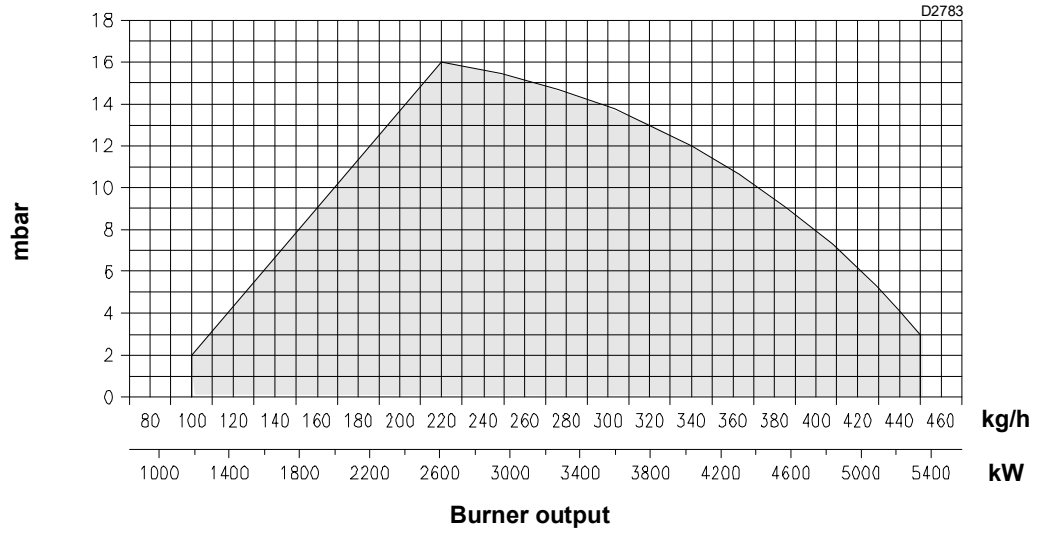

Fig. 3

4.6 Test boiler

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

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

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

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

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

MODULATING RATIO

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

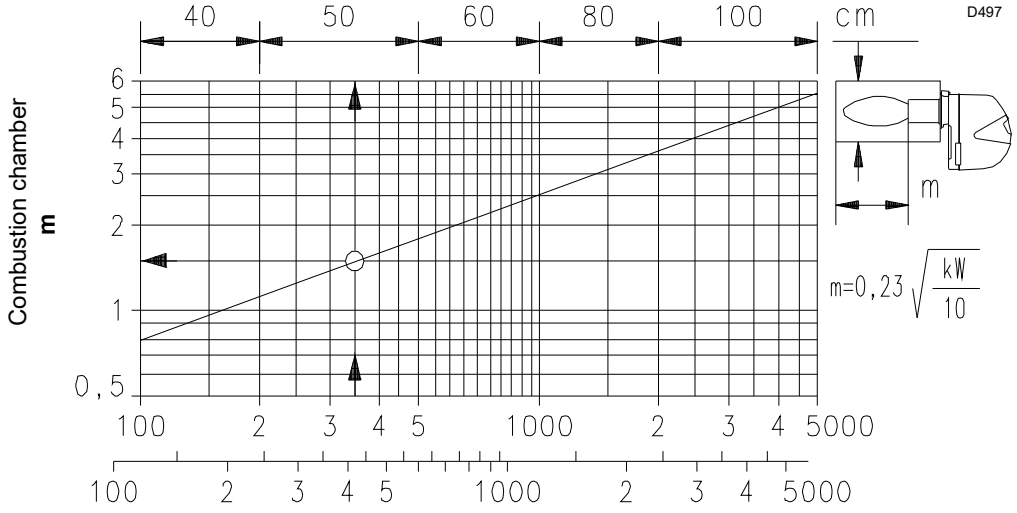

Fig. 4

4.7 Burner description

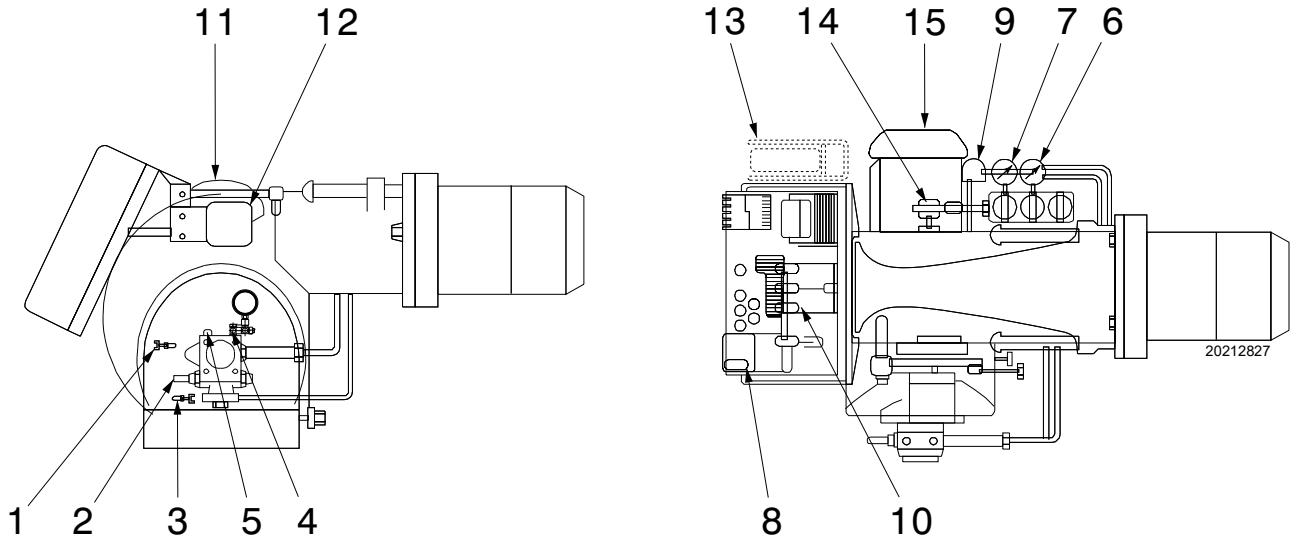

Fig. 5

1 Suction connection
2 Pump pressure regulator
3 Return connection
4 Gauge connection (G 1/4)
5 Vacuometer connection (G 1/4)
6 Delivery pressure gauge
7 Return pressure gauge
8 Flame control reset button with lockout signal
9 Pressure switch
10 Head drive rod
11 Air adjustment cam
12 Servomotor
13 Modulator (only for modulating units)
14 Pressure adjustment eccentric on return line
15 Fan motor

4.8 Electrical panel description

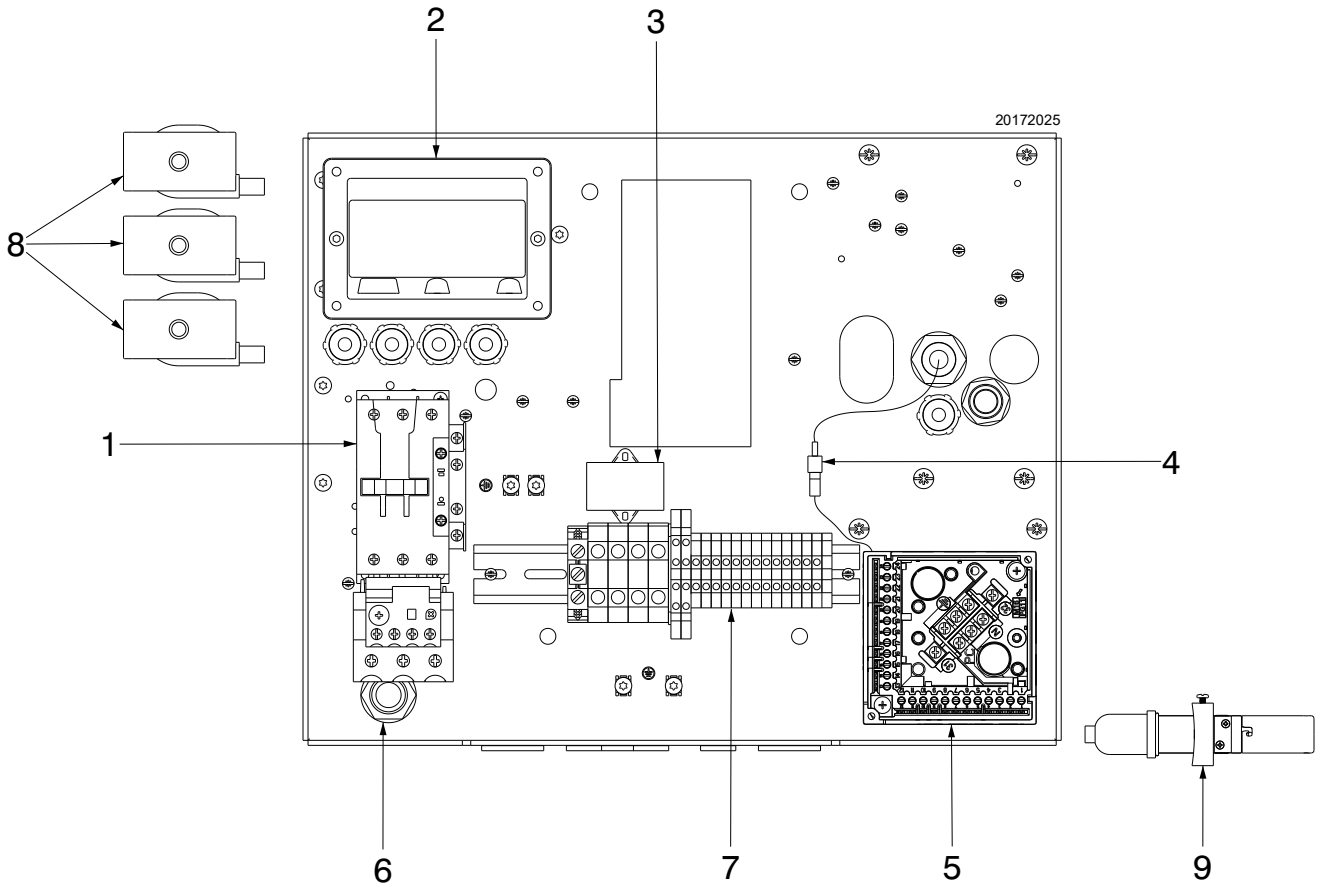

Fig. 6

1 Fan motor thermal relay and contactor (for direct starter version only)
2 Ignition transformer
3 Filter to protect against radio disturbance
4 Servomotor connector
5 Flame control base
6 Cable grommets for external connections (to be carried out by the installer)
7 Terminal board for electric connection
8 Oil valve coils
9 Flame sensor

4.9 Flame control (LFL1...)

Important notes

ATTENTION

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

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

➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
➤ Before modifying the wiring in the LFL1... flame control connection area, fully disconnect the system from the power supply (omnipolar separation).
➤ Protection against electrocution from the flame control and all connected electric components is obtained with the correct assembly.
➤ Before any intervention (assembly and installation operations, assistance, etc.), ensure the wiring is in order and that the parameters are correctly set, then make the safety checks.
➤ Falls and collisions can negatively affect the safety functions. In this case, the flame control must not be operated, even if it displays no evident damage.
➤ **Do not press the reset button or the remote reset button of the flame control for more than 10 seconds because this will damage the internal relay.**

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

Use

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

Installation notes

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

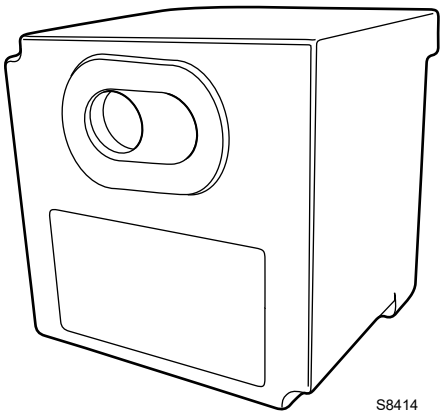

Fig. 7

Electrical wiring of the flame detector

It is important for signal transmission to be almost totally free of any disturbances or loss:

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

Technical data

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

Tab. D

4.10 Servomotor SQM40 ...

Important notes

ATTENTION

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

Avoid opening, modifying or forcing the servomotor.

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ Falls and collisions can negatively affect the safety functions. In this case, the servomotor must not be operated, even if it displays no evident damage.
- ➤ Fully disconnect the burner from the mains when working near terminals and servomotor connections.
- ➤ Condensation and exposure to water are not allowed.
- ➤ For safety reasons, the servomotor must be checked after long periods of non-use.

S8907

Fig. 8

Technical data

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

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.

ATTENTION

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

DANGER

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

5.2 Handling

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

ATTENTION

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

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

CAUTION

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

5.3 Preliminary checks

Checking the consignment

CAUTION

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

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

Check the identification label of the burner, showing:
- ➤ the model (see **A** in Fig. 9) and the type of burner (**B**);
- ➤ the year of manufacture, in cryptographic form (**C**);
- ➤ the serial number (**D**);
- ➤ the absorbed electrical power (**E**);
- ➤ the types of fuel used and the relative supply pressures (**F**);
- ➤ the minimum and maximum possible output data of the burner (**G**) (see Firing rate).

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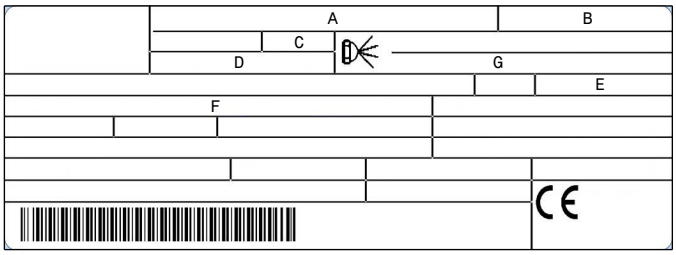

Fig. 9

ATTENTION

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

5.4 Operating position

ATTENTION

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

DANGER

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

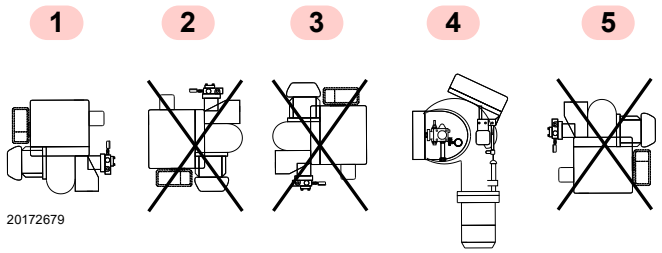

Fig. 10

5.5 Boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 11. The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

For the combustion head protrusion follow the indications provided by the boiler manufacturer.

MODEL	L	O	N
P 300 P/G	260	300	M18
P 450 P/G	310	340	M20

Tab. F

NOTE:

For boilers with front smoke box provide a suitable protection made of refractory material on the part of the head protruding in the combustion chamber.

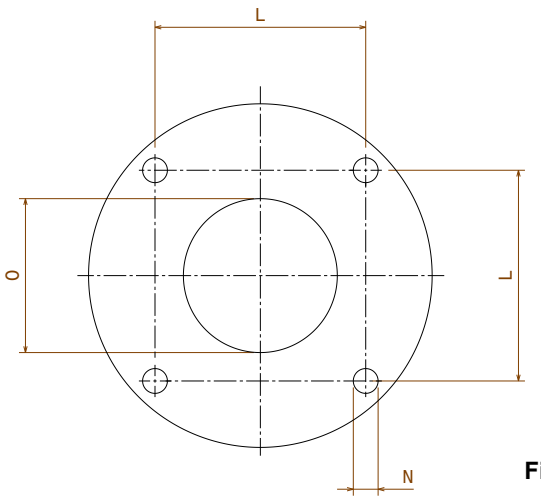

Fig. 11

5.6 Blast tube length

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

MODEL	MIN	MAX
P 300 P/G TC	250	400
P 300 P/G TL	380	530
P 450 P/G TC	270	420
P 450 P/G TL	400	550

Tab. G

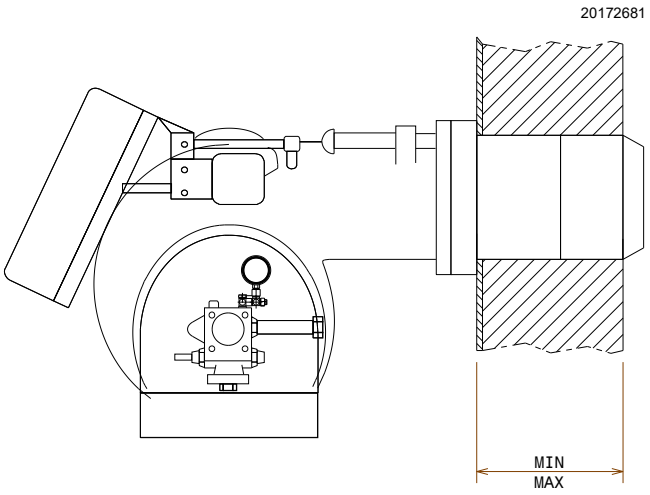

Fig. 12

5.7 Securing the burner to the boiler

Provide an adequate lifting system.

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

To separate the burner from the cast iron blast tube, proceed as follows:

- ➤ remove the cover 1), the split pin and pin 2), the nuts 3) and the screws 4).
- ➤ Pull out the blast tube from the burner by approx. 100÷120 mm and release the driving fork of the head 6) by removing the split pins 5).
- ➤ At this point, it is possible to fully pull out the blast tube from the pins 7).
- ➤ Fix the blast tube to the boiler by inserting the insulating seal 8) in-between.
- ➤ After fitting the selected nozzle, fit the burner on the pins 7) leaving it open by approx. 100 ÷ 120 mm.
- ➤ Refit the fork 6) fixing it with the split pins 5).
- ➤ Completely close the burner fastening it with screws 4), fit the nuts 3), the pin and split pin 2).

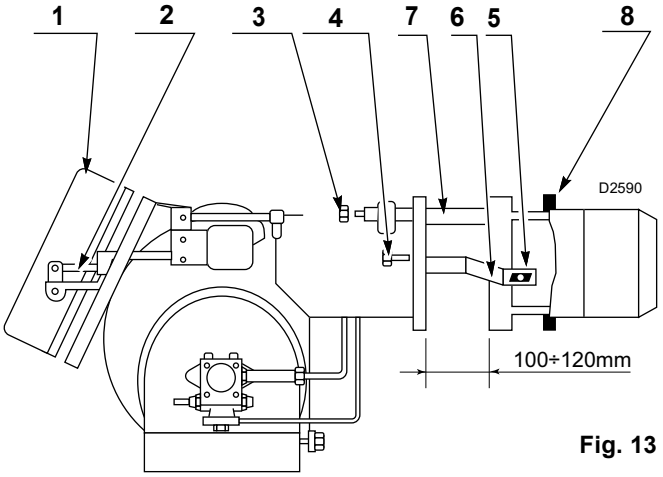

Fig. 13

ATTENTION

The seal between burner and boiler must be airtight.

5.8 Nozzle assembly

At this installation stage the burner is still separated from the blast tube; therefore it is possible to fit the nozzle with a 24mm wrench 3)(Fig. 14) after removing the screws 1) and the turbulator 2). Do not use any sealing products such as: gaskets, tape or sealants. Be careful to avoid damaging the nozzle sealing seat.

ATTENTION

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

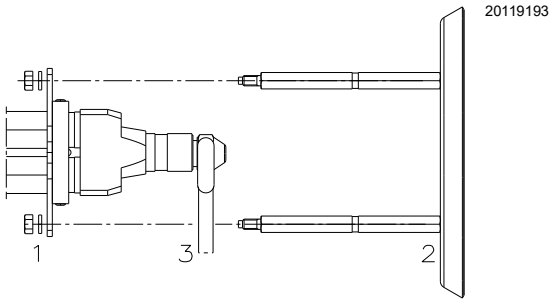

Fig. 14

5.9 Electrodes adjustment

ATTENTION

Check that the electrodes are positioned correctly, as in Fig. 15, complying with the dimensions indicated.

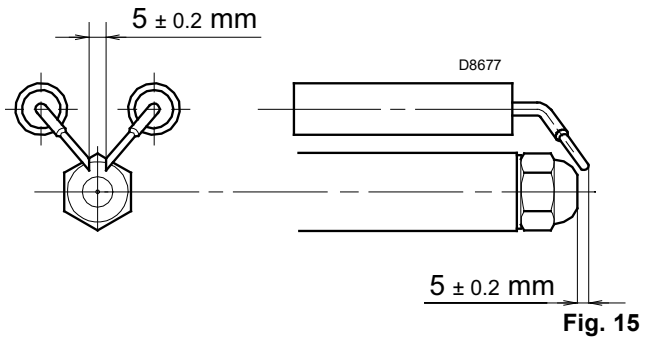

Fig. 15

5.10 Nozzle installation

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

ATTENTION

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

CAUTION

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

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

5.10.1 Nozzle selection

If you want a delivery somewhere between the two values shown in the diagram (Fig. 16), select a nozzle with a higher flow rate. The reduction in the flow rate is obtained with the pressure variator.

AVAILABLE NOZZLES

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

Tab. H

NOZZLES RECOMMENDED:

- Fluidics, type N1 (without interception rod)
- Fluidics, type W2 (with interception rod)
- Bergonzo, type B3 or B5 (with interception rod)

NOTE:

It is possible to fit also nozzles without interception rod (Fluidics N1): in this case there will be no anti-dripping feature on the spray holder.

To calibrate the delivery range of the nozzle, suitably adjust the fuel maximum and minimum pressure on the nozzle return line, as shown in the diagram (Fig. 16).

- ➤ After fitting the nozzle, remove the servomotor protection cover 12)(Fig. 5 on page 10), and turn the burner on.
- ➤ After turning on the unit, immediately disconnect the servomotor from the power supply by opening the connector 4)(Fig. 5 on page 10).
- ➤ In this way the burner remains in minimum flow rate operating mode.
- ➤ Manually and slowly rotate the variable profile cam, integrally connected to the eccentric 8), and check the pressure variation on the pressure gauge 3)(Fig. 22 on page 25).
- ➤ The pressure and the flow output of the nozzle are at their minimum level when the servomotor is at the 20° position.
- ➤ The pressure and the flow output of the nozzle are at their maximum when the servomotor is at the 130° position.

The return line pressure corrections are possible by changing the eccentric 8) and the nut with the lock nut 6)(Fig. 22 on page 25).

5.10.2 Indicative relation between: nozzle type and flow rate (in %) - return line pressure

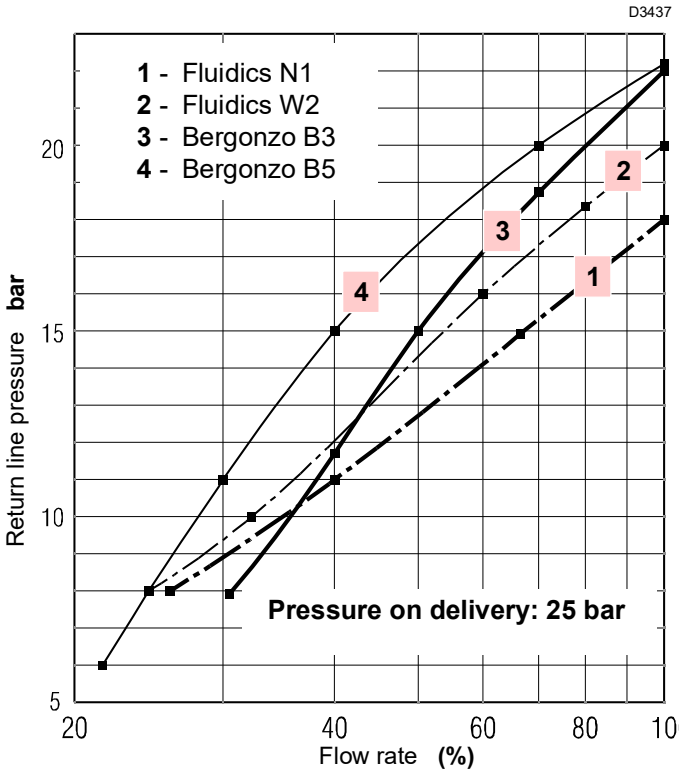

Fig. 16

5.11 Light oil supply

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

Precautions: avoid knocking, attrition, sparks and heat.

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

ATTENTION

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

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

When the tank is at a level lower than the burner, the return line should terminate at the same level as the suction line. In this case a non-return valve is not required.

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

ATTENTION

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

Any obstruction would cause the pump seals to break.

Oil pipes must be completely airtight.

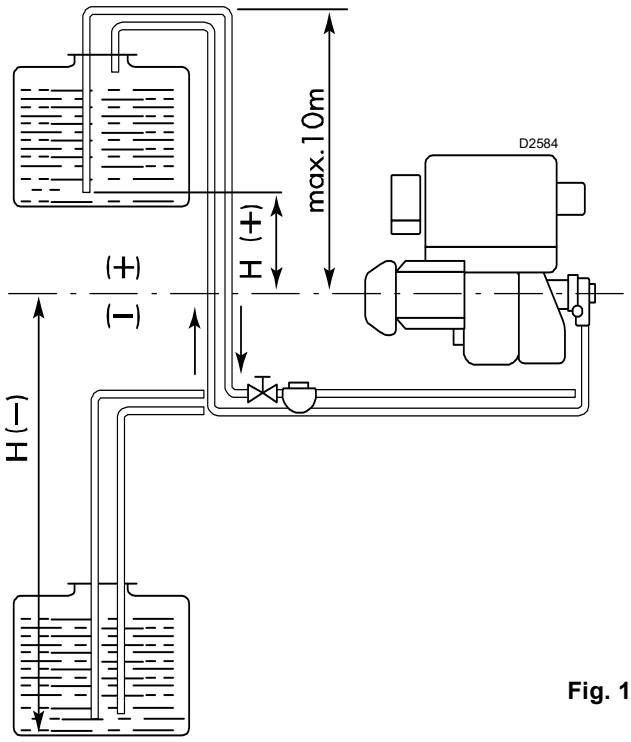

Fig. 17

MODEL	H metres	L metres ø G 1/2	L metres ø G 3/4
P 300 P/G	+ 2.0	25	85
	+ 1.5	23	80
	+ 1.0	20	70
	+ 0.5	18	65
	0	15	60
	- 0.5	12	50
	- 1.0	10	45
	- 1.5	8	35
	- 2.0	5	30
	-3.0	3	15
MODEL	**H metres**	**L metres ø G 3/4**	**L metres ø G 1**
P 450 P/G	+ 2.0	55	130
	+ 1.5	50	120
	+ 1.0	45	110
	+ 0.5	40	100
	0	35	90
	- 0.5	30	80
	- 1.0	25	70
	- 1.5	20	60
	- 2.0	15	45
	-3.0	10	25

Tab. I

Key

H = Pump/Foot valve height difference
L = Pump/Foot valve height difference
Ø = Inside pipe diameter

5.11.1 Hydraulic connections

CAUTION

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

The pumps are equipped with a by-pass that connects return line with suction line. They are installed on the burner with the by-pass closed by screw 6)(Fig. 19).

It is therefore necessary to connect both hoses to the pump.

The pump will break down immediately if it is run with the return line closed and the by-pass screw inserted.

Remove plugs from suction and return connectors of the pump.

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

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

Finally, connect, the other end of the hoses to the suction line and return line ducts using the nipples supplied with the equipment.

ATTENTION

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

5.11.2 Hydraulic circuit diagram

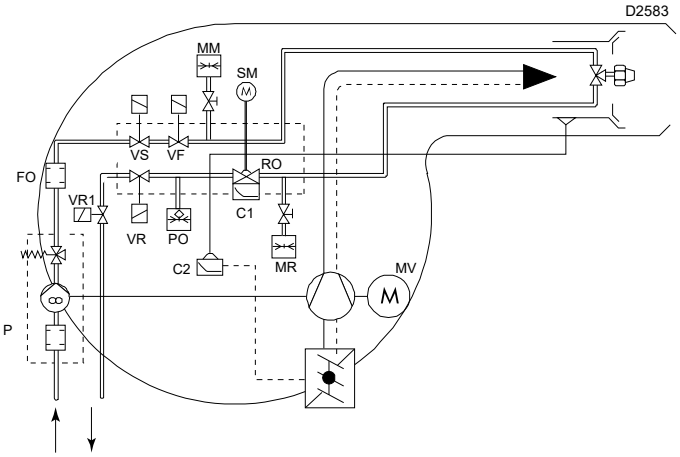

Fig. 18

Cn - Control cams
FO - Oil filter
MM - Delivery pressure gauge
MR - Return pressure gauge
P - Pump with filter and pressure adjuster
RO - Pressure adjuster on return line

5.12 Pump

5.12.1 Technical data

Pump		TA4C4010-7	TA5C3010-7
Burner		**P 300 P/G**	**P 450 P/G**
Min. delivery rate at 40 bar pressure	kg/h	730	1000
Delivery pressure range	bar	7 - 40	7-30
Max. suction depression	cm Hg	30	30
Viscosity range	cSt	4 - 75	4-75
Maximum light oil temperature	°C	140	140
Max. suction and return pressure	bar	5	5
Pressure calibration in the factory	bar	25	25

Tab. J

5.12.2 Priming pump

ATTENTION

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

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

- ➤ In order for self-priming to take place, the cap 4) on the pump (Fig. 19) must be loosened to bleed off the air contained in the suction line.
- ➤ Start the burner by closing the remote controls. As soon as the burner starts, check the direction of rotation of the fan blade.
- ➤ The pump can be considered to be primed when the light oil starts coming out of the cap 4).
- ➤ Close the burner and tighten the cap 4).

The time required for this operation depends upon the diameter and length of the suction tubing.

If the pump fails to prime at first start-up and the burner locks out, wait approx. 15 seconds, reset the burner, and then repeat the start-up operation. And so on.

After 5 or 6 starting operations allow 2 or 3 minutes for the transformer to cool.

Do not light the photocell in order to prevent the burner lockout; the burner locks out in any case about ten seconds after its start.

ATTENTION

The above-mentioned operation is possible because the pump is already full of fuel when it leaves the factory.

If the pump has been drained, fill it with fuel through the opening on the vacuometer 3)(Fig. 19) prior to starting; otherwise, the pump will seize.

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

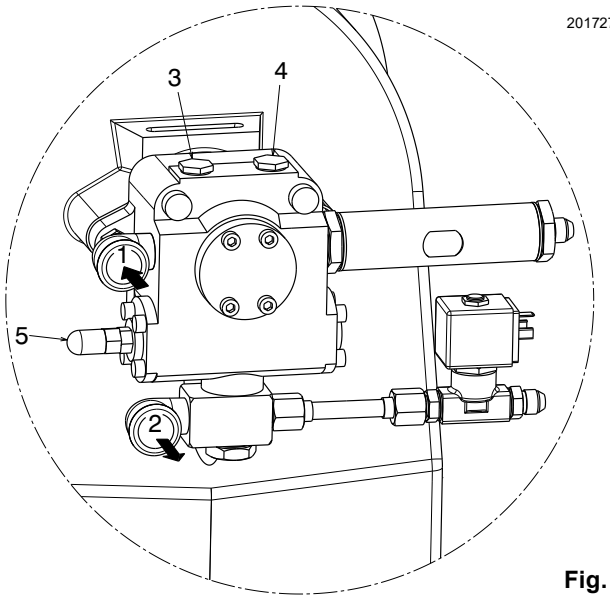

Fig. 19

1 Suction line
2 Return line
3 Vacuometer connection
4 Pressure gauge connection
5 Pressure adjustment

5.13 Electrical connections

Notes on safety for the electrical wiring


DANGER

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

Before carrying out any maintenance, cleaning or checking operations:


DANGER

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


DANGER

Close the fuel shut-off valve.


DANGER

Avoid condensate, ice and water leaks from forming.

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

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

5.14 Calibration of the thermal relay

The thermal relay (Fig. 20) 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).

In case of 230V power supply, change the motor connection from star to delta and replace the thermal relay with the one supplied with the burner.

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

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

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

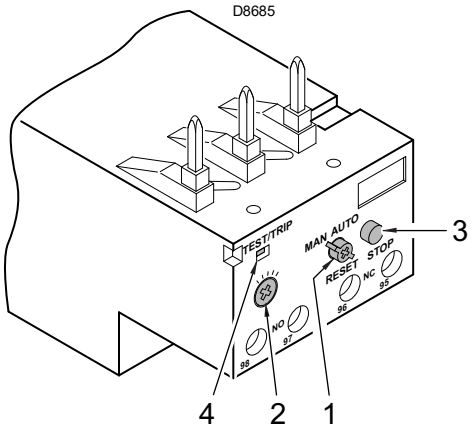

Fig. 20

ATTENTION

The automatic reset can be dangerous.

This operation is not foreseen in the burner operation.

5.15 Motor rotation

As soon as the burner starts, place yourself in front of the cooling fan of the fan motor and check that it turns anticlockwise (Fig. 21).

If this is not the case:

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

DANGER

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

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

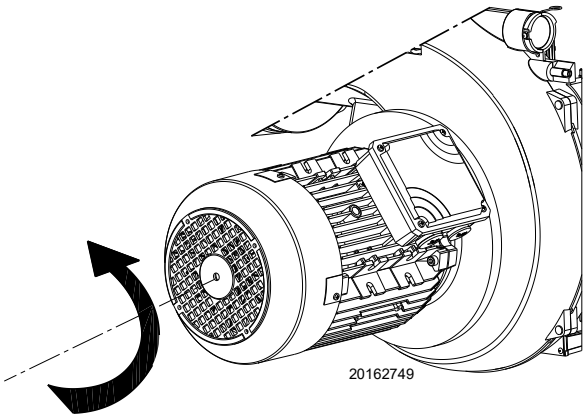

Fig. 21

6 Start-up, calibration and operation of the burner

6.1 Notes on safety for the first start-up

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.

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

6.2 Adjustments prior to ignition (light oil)

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

Carry out the fuel change with burner off.

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

6.2.1 Nozzle

See information on page 17.

6.2.2 Combustion head

The adjustment of the combustion head already carried out on page 19 need not to be altered unless the 2nd stage output of the burner is changed.

6.2.3 Pump pressure

See information on page 21.

6.3 Maximum fuel flow rate adjustment

It is carried out by choosing the right nozzle in Tab. K:

Model	Nozzle type N1 - 50°	Maximum flow rate kg/h	Fuel pressure at pressure gauge delivery bar	Fuel maximum pressure at pressure gauge return bar
P 300 P/G	330	302	24	16.5
	300	290	25	17.8
	275	270	25	17.5
	250	246	25	17.3
	225	220	25	18.0
	200	188	25	18.0
	180	177	28	17.8
	160	160	25	17.8
P 450 P/G	450	448	25	17.2
	400	398	25	18.0
	360	349	25	18.0
	330	326	25	18.0
	300	289	25	18.0
	275	265	25	18.0
	250	239	25	18.0
	225	215	25	18.0

Tab. K

If you want a maximum flow rate somewhere between the two values shown in the table, select a nozzle with a higher flow rate.

Flow rate can be decreased at a later time by acting on the pressure variator, as specified in page 25.

6.4 Pressure variator adjustment

The pressure variation on the return line - pressure gauge 3)(Fig. 22 on page 25) changes the flow rate of the fuel coming out of the nozzle.

6.4.1 Pressure variator

To calibrate the eccentric 8), proceed as follow:

remove the cover 9), loosen the screws 7), turn the screw 4) until the desired eccentricity is obtained. By turning screw 4) to the right (+) the eccentricity increases, thereby increasing the difference between the maximum and minimum capacity of the nozzle. By turning screw 4) to the left (-) the eccentricity decreases, thereby decreasing the difference between the maximum and minimum capacity of the nozzle.

- ➤ For a correct calibration, the eccentric 8) must operate on the entire range of travel of the servomotor (20° ÷ 130°): a pressure variation must correspond to each servomotor variation.
- ➤ Never drive the variator piston fully home: the stop ring 5) determines the maximum stroke.
- ➤ At the end of the adjustment, manually check that between 20° and 130° there is no sticking and that the maximum and minimum pressures correspond to the one selected according the diagram of page 18.
- ➤ To control the outlet delivery of the nozzle, proceed as follows:
- ➤ Open the burner following the instructions of page 16, connect a pipe to the nozzle, simulate the ignition and proceed with the weighing at the maximum and minimum pressures.
- ➤ If at the maximum delivery of the nozzle (maximum pressure on the return line) pressure oscillations can be seen on the pressure gauge 3), slightly reduce the pressure until they disappear (Fig. 22).

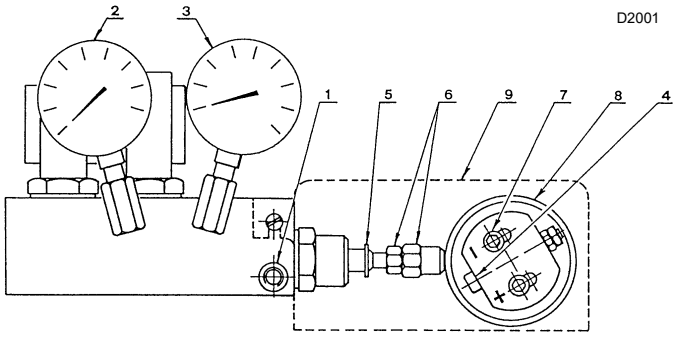

Fig. 22

Key (Fig. 22)
1 Pressure switch connection
2 Delivery pressure gauge
3 Return pressure gauge
4 Eccentric adjustment screw
5 Piston stop ring
6 Piston calibration nut and lock nut
7 Eccentric locking screws
8 Variable eccentric
9 Cover

6.5 Combustion head adjustment

The combustion head moves at the same time of the eccentric 8), (Fig. 22) and variable profile cam 1) (Fig. 26).

The head positioning can be seen on cylinder 2) (Fig. 23).

The control levers of the head are set at the factory to the maximum stroke of 45 mm. The graduated cylinder 2) moves from notch 0 to notch 9), suitable for a modulation range of 75 ÷ 300 kg/h.

To obtain a different modulation range, calibrate these levers again so that the stroke of the head is as in the following diagram (Fig. 25).

Example with P 300 P/G burner:

for a modulation from 100 ÷ 235 kg/h, it is possible to detect from the diagram: notch 1 at 100 kg/h, notch 7 at 235 kg/h, with a stroke equal to 6 notches.

ATTENTION

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

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

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

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

with servomotor at 0°, loosen the screws 5) and push, in the arrow direction, the ring 6) placed under the variable profile cam 7). This allows obtaining a reduction of the eccentricity with a consequent reduction of the stroke.

When finished, firmly tighten the screws 5).

The desired stroke of the combustion head is set with the above-indicated calibrations. In the previous example (6 notches) the start and end of the stroke must coincide with values 1 and 7. To obtain this, rotate the hexagonal sleeve 3), in one direction or the other, after loosening the nuts 4).

With servomotor set to 0° notch 1 must match with the reference plane 10), while with servomotor set to 130° it must match with notch 7. Once adjustment operations are completed, firmly lock the nuts 4) with the ball joint 9) positioned as in the figure. Head calibrations are performed with burner closed, not operating and with released servomotor.

At the end of the adjustment, by allowing the cam 7) to perform a few travels, check that between 0° and 130° there is no sticking (Fig. 23).

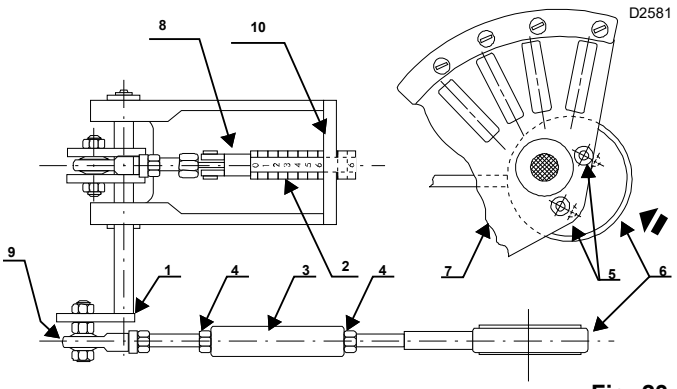

Fig. 23

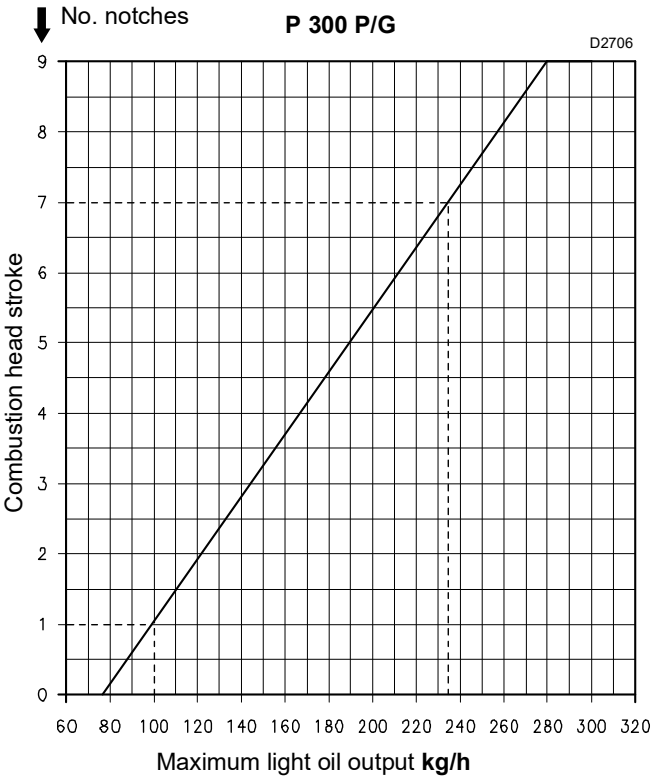

Fig. 24

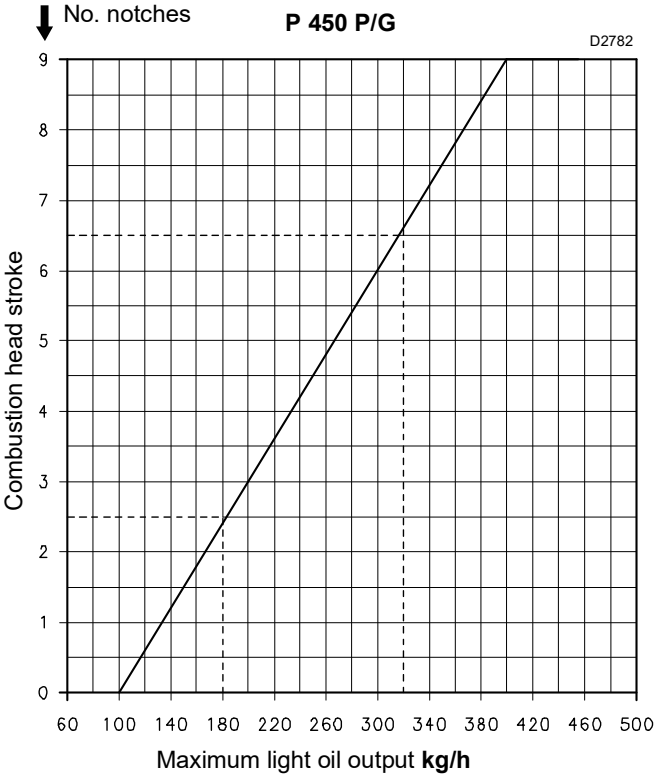

Fig. 25

6.6 Air damper setting

The setting of the air damper is carried out by acting on the variable profile cam 1)(Fig. 26). This operation must be performed after regulating the pressure variator and the combustion head. With burner on, disconnect the servomotor from the power supply and release it manually by pressing the release button placed on the lower side.

Maximum output adjustment

Set the servomotor to 130°, lock it and change the profile 4) by gradually acting on the screws 2).

Minimum output adjustment

Unlock the servomotor again, set it manually to 20°, lock it and adjust the profile 4) by gradually acting on the screws 2).

Intermediate output adjustments

They are carried out in the same manner.

At the end of the operation, check all calibrations, restore the electrical connections of the servomotor and lock the adjustment screws 2) by means of the transversal screws 3).

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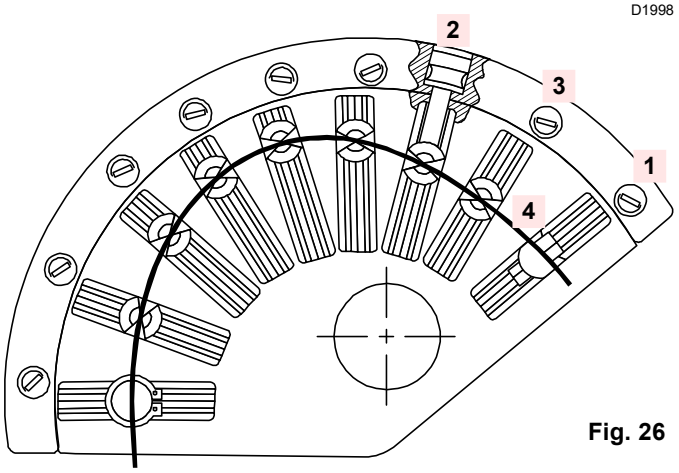


Fig. 26

1 - Cam
2 - Adjustment screws
3 - Locking screws
4 - Adjustable profile

6.6.1 Variation of the air damper tie-rod length

Lengthening the tie-rod is recommended when the air damper moves within a reduced angle (air damper approx. halfway its stoke at the maximum output). In this way, a too curved cam profile 4)(Fig. 26) can be avoided.

With the burner off, proceed as follows:

- ➤ Disengage the articulated coupling 2) from the lever 1).
- ➤ Loosen the extension 3)(Fig. 27) from the tie-rod 4) by some turns.
- ➤ Reconnect the articulated coupling to the lever and lift the profile 4) until setting the index of the air damper to 0 with servomotor at 0°.

D2004

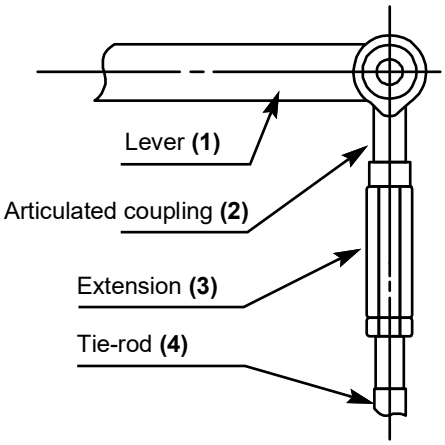


Fig. 27

6.7 Servomotor adjustment

The servomotor adjusts simultaneously, through driving gears, the output and pressure of the air and the delivery of the fuel in use. It performs a 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:

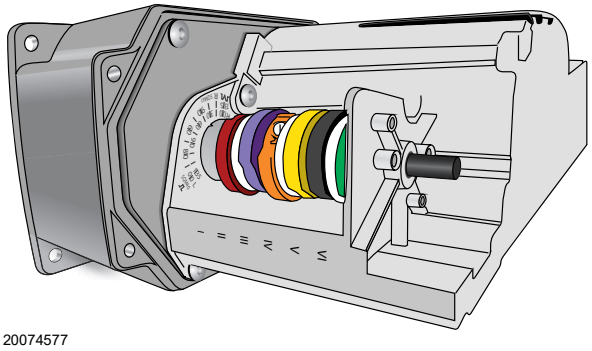


Fig. 28

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

ATTENTION
Do not make any adjustments.

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

ATTENTION
It is recommended that no adjustments are made.

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

Cam IV (YELLOW): Not used

Cam V (BLACK): Not used

Cam VI (GREEN): Not used

6.8 Pressure switch adjustment

6.8.1 Oil pressure switch

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

Recommended calibration (recommended values with return line resistance in tank of ≤ 0.5 bar): **3.0 ÷ 3.5 bar**.

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

To adjust the pressure switches, use a tool to operate the adjustment screw, see Fig. 29.

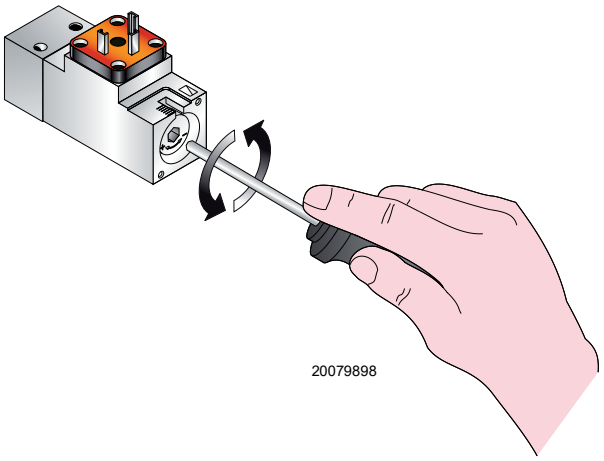


Fig. 29

6.9 Operation sequence of the burner

6.9.1 Burner start-up program

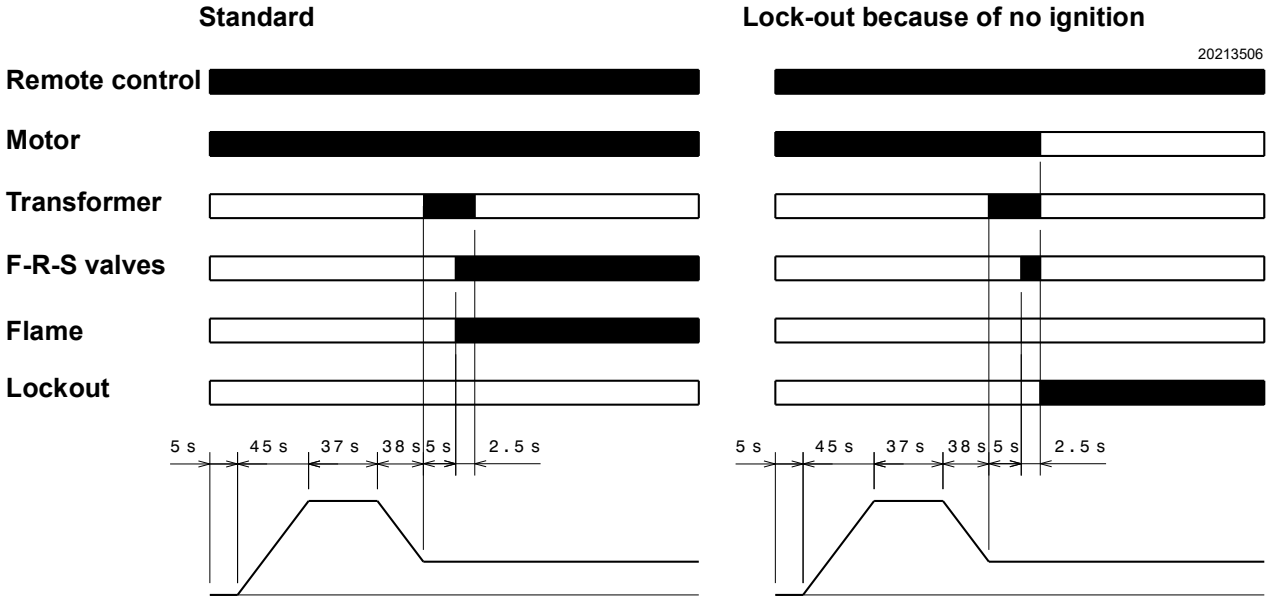


Fig. 30

6.10 Final checks

- ➤ **Block the flame sensor and turn off the remote controls:** the burner must start and then stop in lockout after approximately 5 s after start-up.
- ➤ **Free the flame sensor and turn off the remote controls:** the burner must stop in lockout.
- ➤ **Block the flame sensor when the burner is operating:** the flame must turn off and the burner stop in lockout within 3 s.
- ➤ **Turn on the remote control TL followed by TS while the burner is operating**: the burner must stop.

ATTENTION

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

7 Maintenance

7.1 Notes on safety for the maintenance

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

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

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

Before carrying out any maintenance, cleaning or checking operations:

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

Close the fuel shut-off valve.

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

7.2 Maintenance programme

7.2.1 Maintenance frequency

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

7.2.2 Checking and cleaning

The operator must use the required equipment during maintenance.

Combustion

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

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

Tab. L

Burner

Make sure that the screws are well secured.

Combustion head

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

Nozzle

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

Do not clean the nozzle openings.

Flexible hoses

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

Fuel tank

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

Pump

The delivery pressure must be stable at 20 bar.

The depression must be less than 0.45 bar.

Unusual noise must not be evident during pump operation.

If the pressure is unstable, or the pump runs noisily, the flexible hose must be detached from the line filter and the fuel must be sucked from a tank located near the burner. This measure permits the cause of the anomaly to be traced to either the suction piping or the pump.

If the pump is found to be responsible, check to make sure that the filter is not dirty. The vacuometer is installed upstream from the filter and consequently will not indicate whether the filter is clogged or not.

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

Electrical current to flame sensor (Fig. 31)

Clean the glass cover from any dust that may have accumulated.
To remove the sensor pull it outwards with force; it is inserted only by pressure.
Min. value for a good work: 70 µA.
If the value is lower, it could be due to:
– exhausted sensor;
– low voltage (lower than 187 V);
– bad regulation of the burner;

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

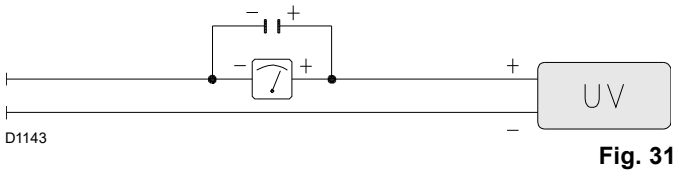


Fig. 31

7.2.3 Safety components

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

The specified life cycles do not refer to the warranty terms indicated in the delivery or payment conditions.

Safety component	Life cycle
Flame control	10 years or 250.000 operation cycles
Flame sensor	10 years or 250.000 operation cycles
Gas valves (solenoid)	10 years or 250.000 operation cycles
Pressure switches	10 years or 250.000 operation cycles
Pressure adjuster	15 years
Servomotor (electronic cam)	10 years or 250.000 operation cycles
Oil valve (solenoid)	10 years or 250.000 operation cycles
Oil regulator	10 years or 250.000 operation cycles
Pipes/ oil fittings (metallic)	10 years
Fan impeller	10 years or 500.000 start-ups

Tab. M

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.

To open the burner, proceed as indicated in paragraph "Securing the burner to the boiler" on page 16.

7.4 Closing the burner

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

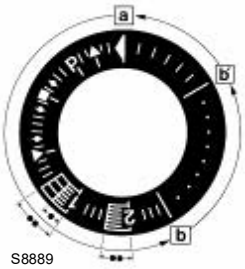
After carrying out maintenance, cleaning or checking operations, reassemble the cover and all the safety and protection devices of the burner.

8 Faults - Possible causes - Solutions

The LFL1... flame control is equipped with a lockout indicator (Fig. 32) that turns during the start-up programme, and is visible from the small lockout window.

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

The positions of the lockout indicator are shown in Fig. 33.



Lockout indicator

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

Fig. 32

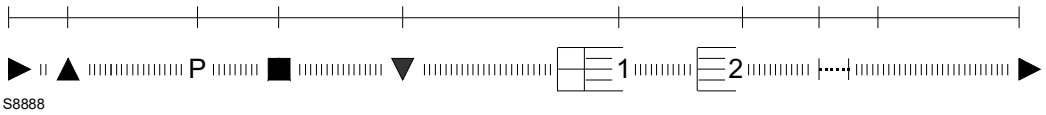


Fig. 33

Fuse replacement

The fuse 2)(Fig. 34) is in the rear part of the flame control. A spare fuse 1) is also available: it can be extracted after breaking the panel tab A) that houses it. In the event that fuse 2) has been tripped, replace it as shown in Fig. 34.

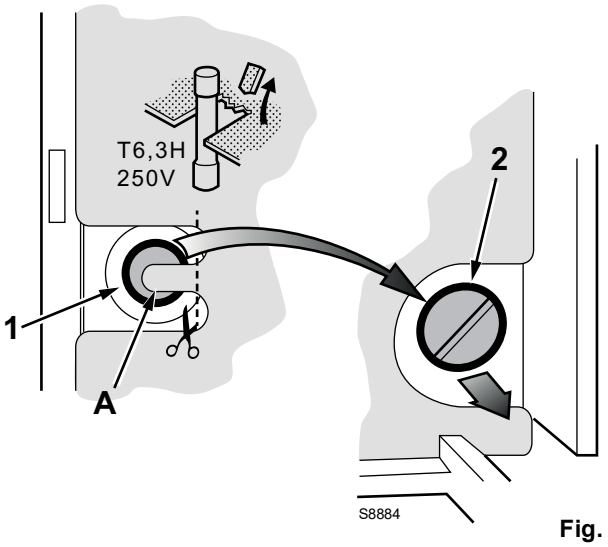


Fig. 34

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

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

ATTENTION

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

DANGER

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

8.1 Light oil operation

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

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

Tab. N

A Appendix - Accessories

Soundproofing box kit

Burner	Type	dB(A20170350 (1))	Code
PRESS 300 P/G PRESS 450 P/G	C7	10	3010376

Burner support kit

Burner	Code
PRESS 300 P/G PRESS 450 P/G	3000731

Kit for modulating operation

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

PARAMETER TO BE CONTROLLED		PROBE		OUTPUT REGULATOR	
Adjustment field		Type	Code	Type	Code
Temperature	- 100...+ 500 °C	PT 100	3010110	RWF50.2 RWF55.5	20100018 20101965
Pressure	0...2.5 bar	Output probe 4...20 mA	3010213		
	0...16 bar		3010214		
	0...25 bar		3090873		

Potentiometer kit

Burner	Code
PRESS 300 P/G PRESS 450 P/G	20096322

Spacer kit

Burner	Code
P 300 P/G	3000723
P 450 P/G	3000751

230 V conversion kit

Burner	Code
PRESS 300 P/G	20163347

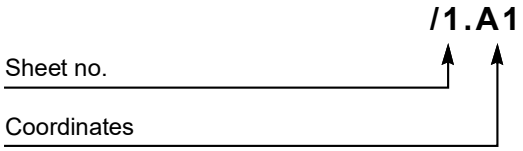
ATTENTION

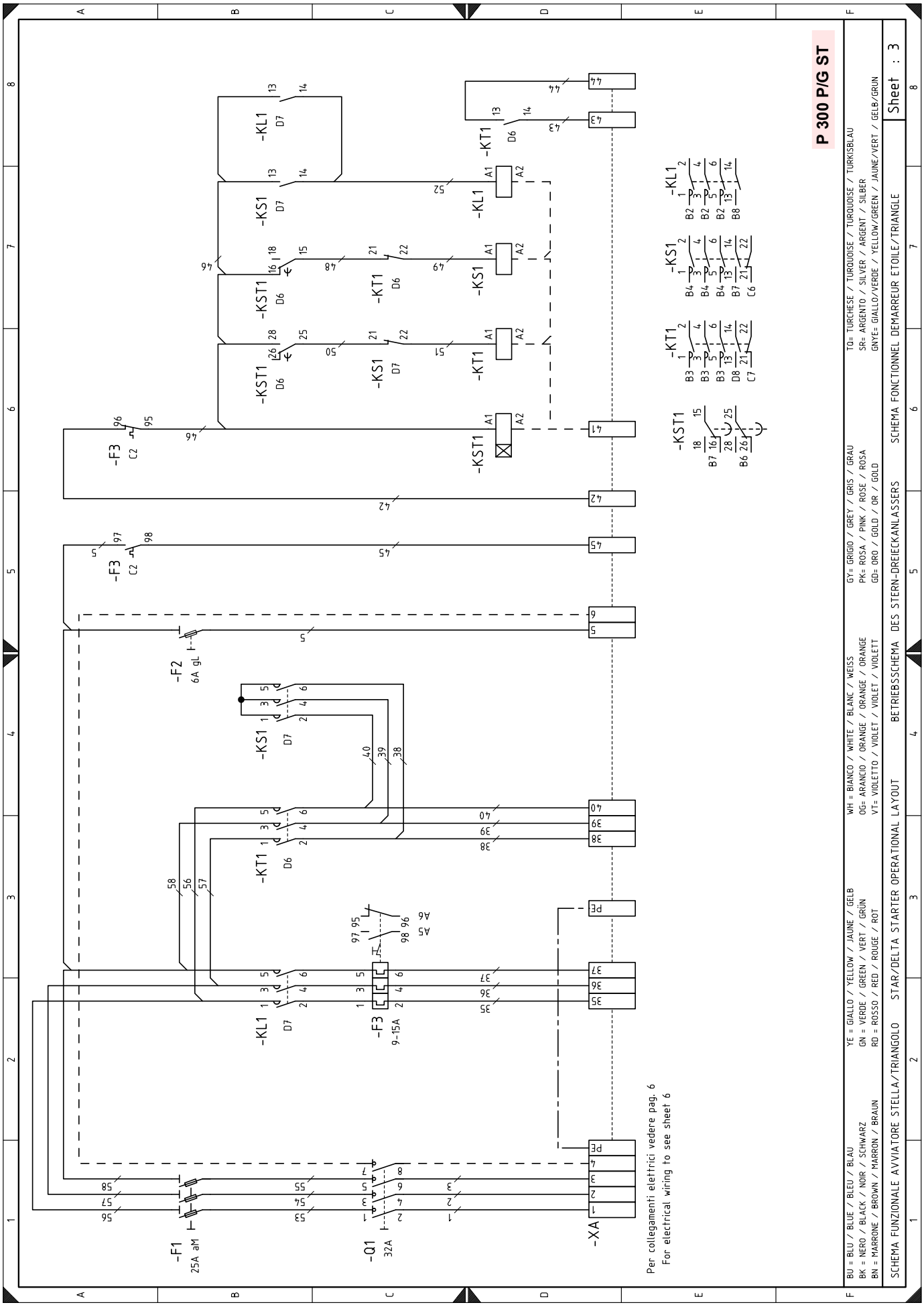
The installer is responsible for the addition of any safety device not foreseen in this manual.

B Appendix - Electrical panel layout

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

2 Reference indication

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Sheet : 3
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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RD = ROSSO / RED / ROUGE / ROT
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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
-F1 25A aM
-Q1 32A
-F2 6A gL
-F3 C2
-F3 9-15A
-KL1 D7
-KS1 D7
-KT1 D6
-KST1 D6
-XA
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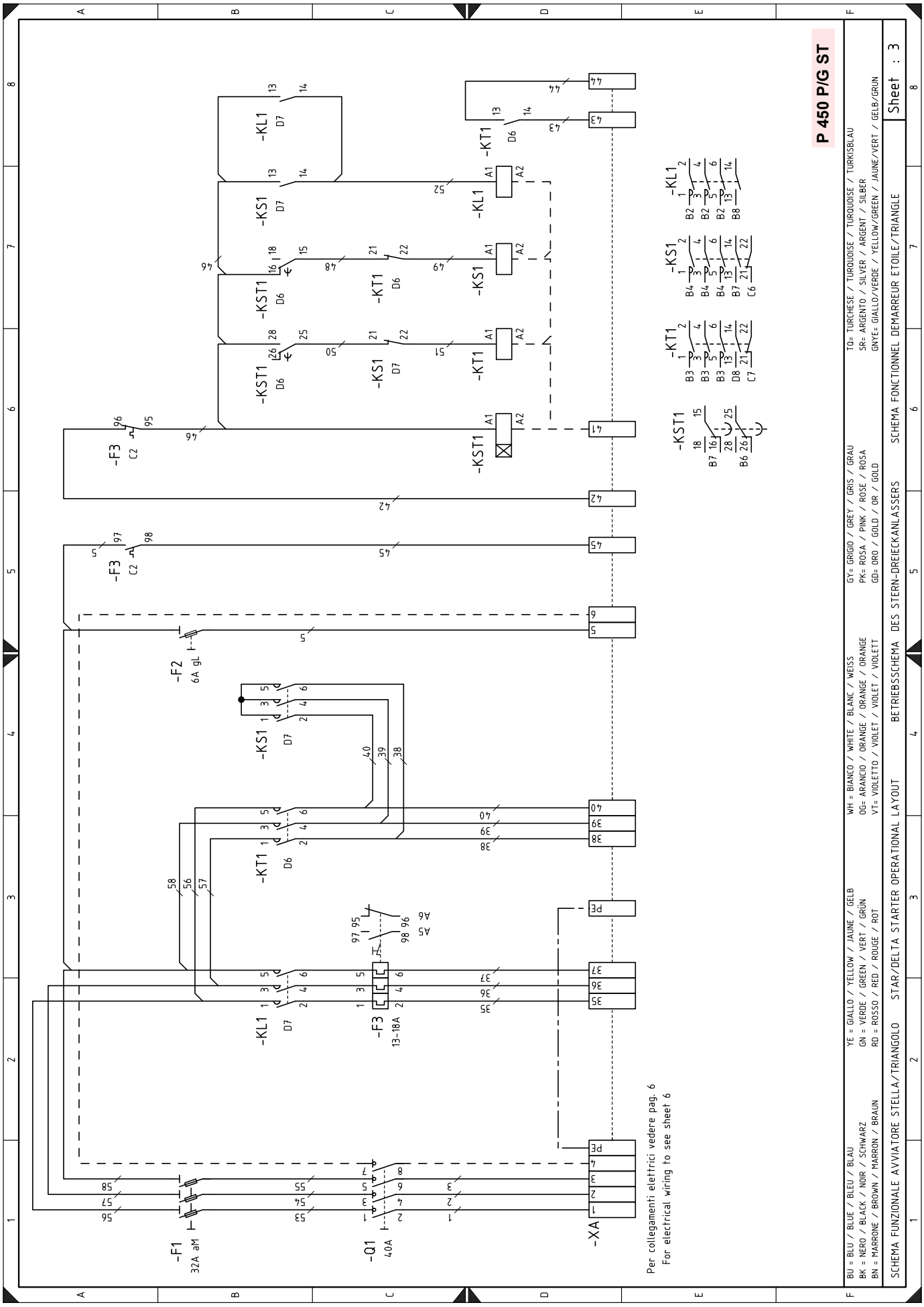
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GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
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-Q1 40A
-F2 6A gL
-F3 13-18A
-XA
-KL1
-KS1
-KT1
-KST1
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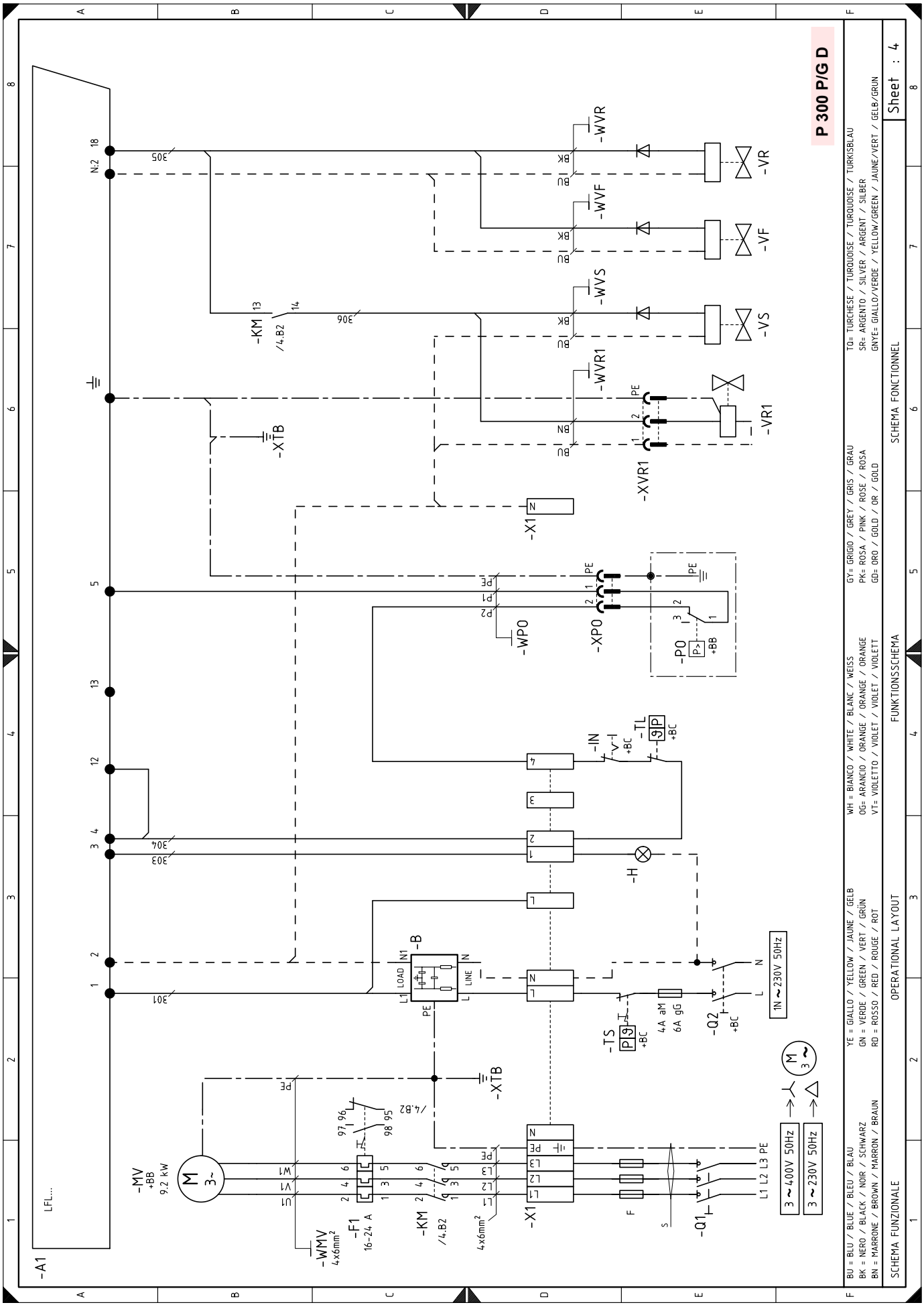
For electrical wiring to see sheet 6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+BB
9.2 kW
-WMV
4x6mm²
-F1
16-24 A
-KM
/4.B2
4x6mm²
-X1
-XTB
-B
LOAD N1
LINE
-WP0
-XP0
-P0
+BB
-IN
+BC
-TL
+BC
-H
-TS
+BC
4A aM
6A gG
-Q2
+BC
1N ~230V 50Hz
-Q1
L1 L2 L3 PE
3 ~400V 50Hz
3 ~230V 50Hz
-WVR
-VR
-WVF
-VF
-WVS
-VS
-WVR1
-VR1
-XVR1
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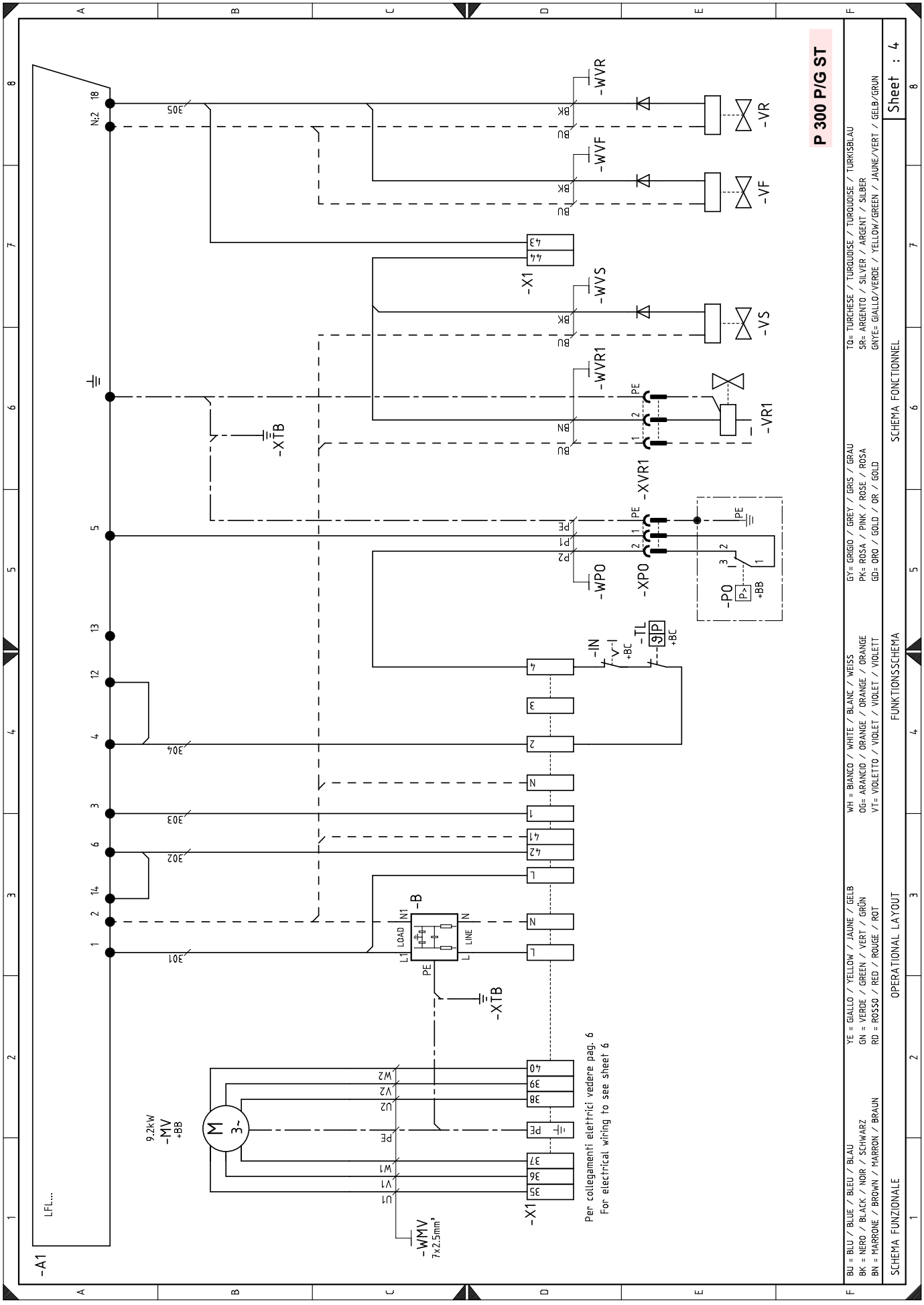
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-VR
-wVF
-VF
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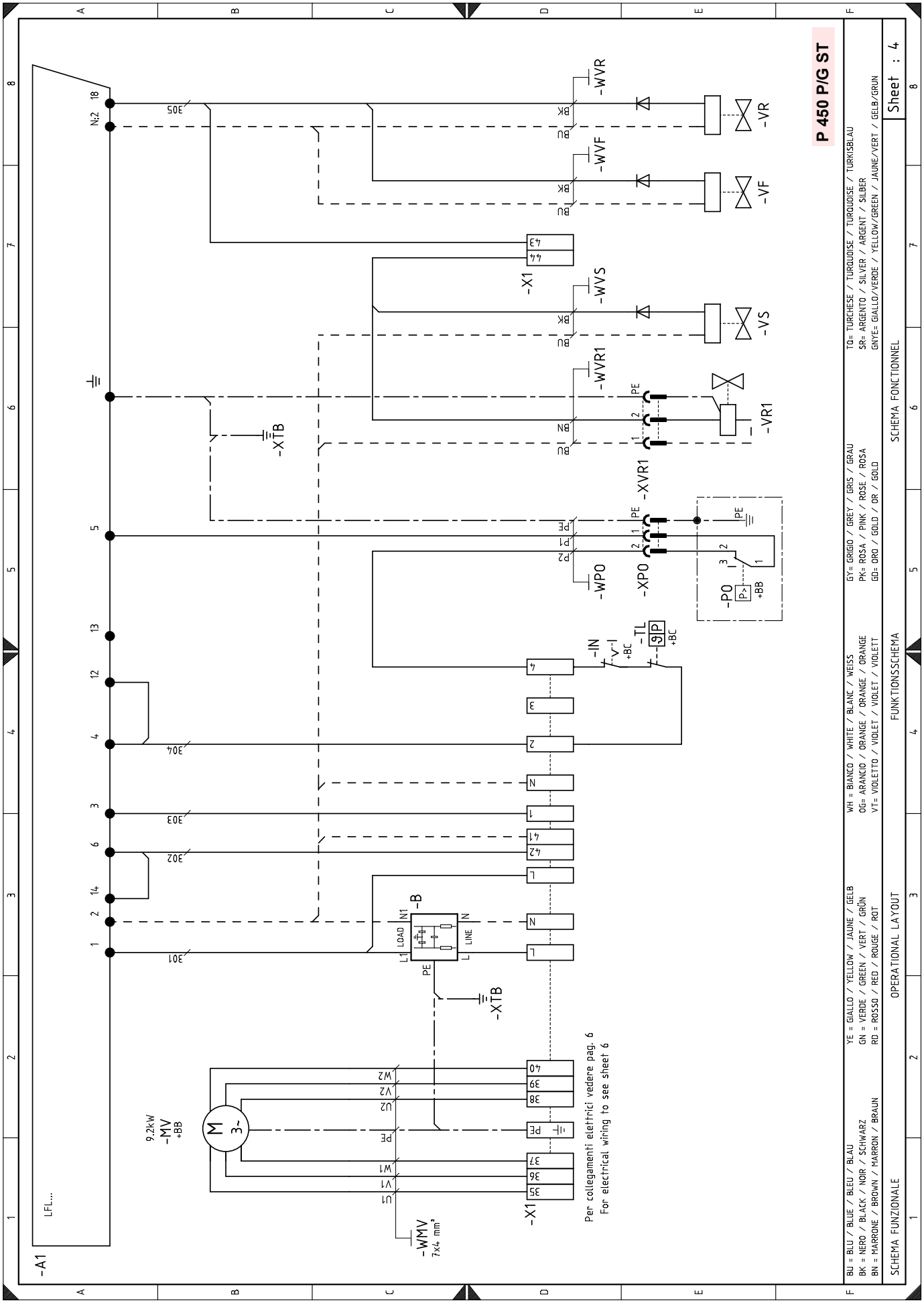
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-WVS
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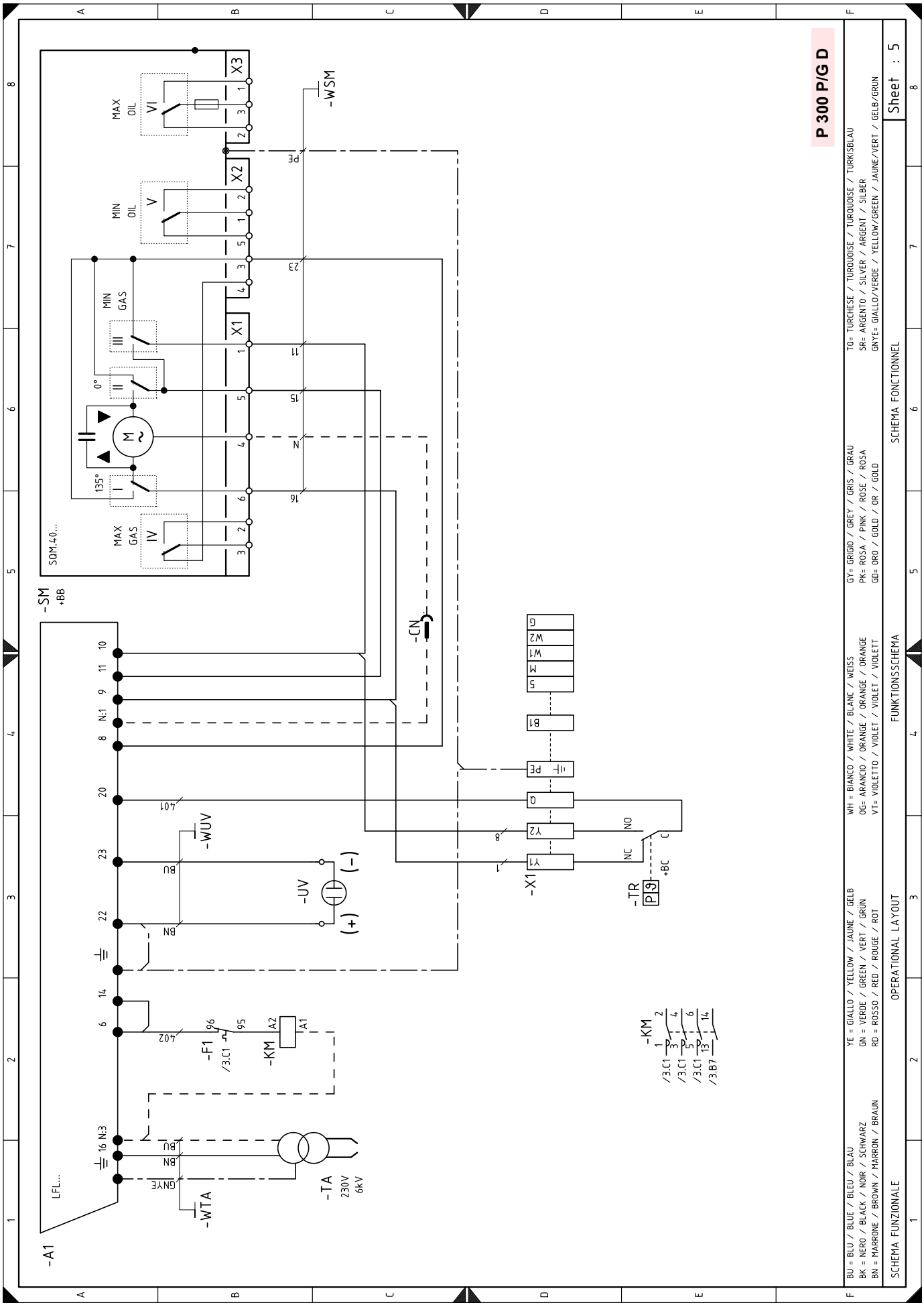
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230V
6kV
-WTA
-F1
-KM
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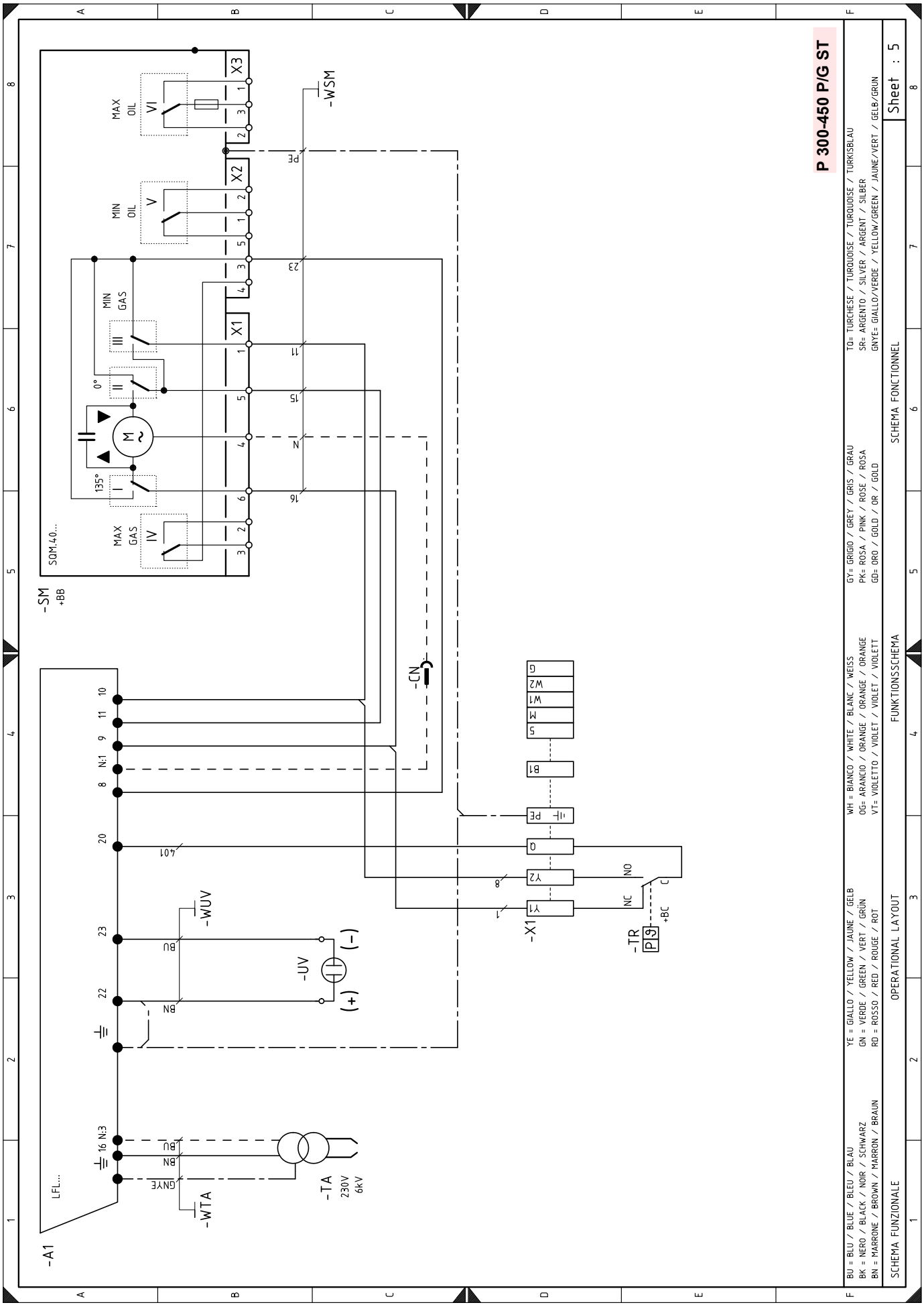
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-TA
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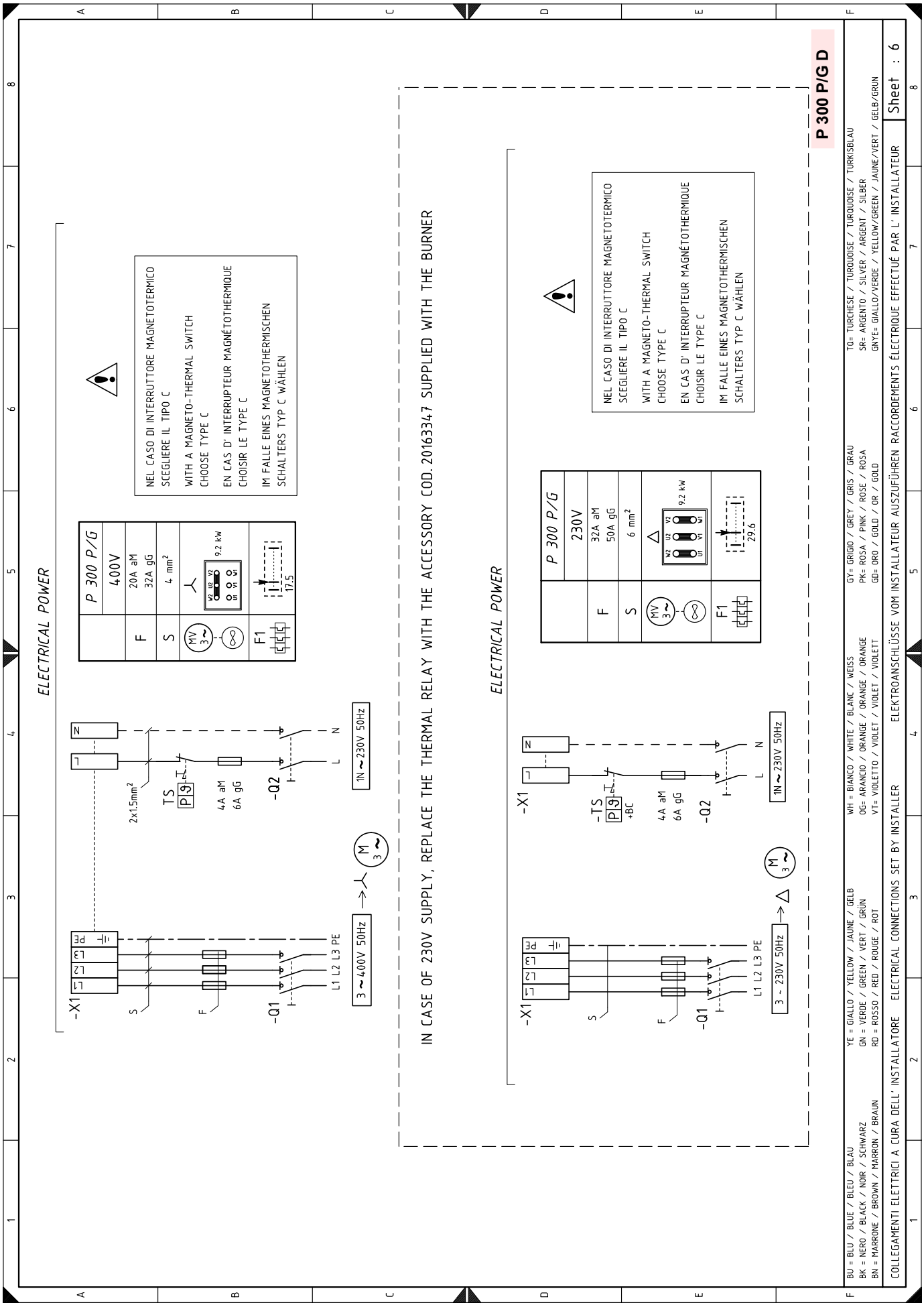
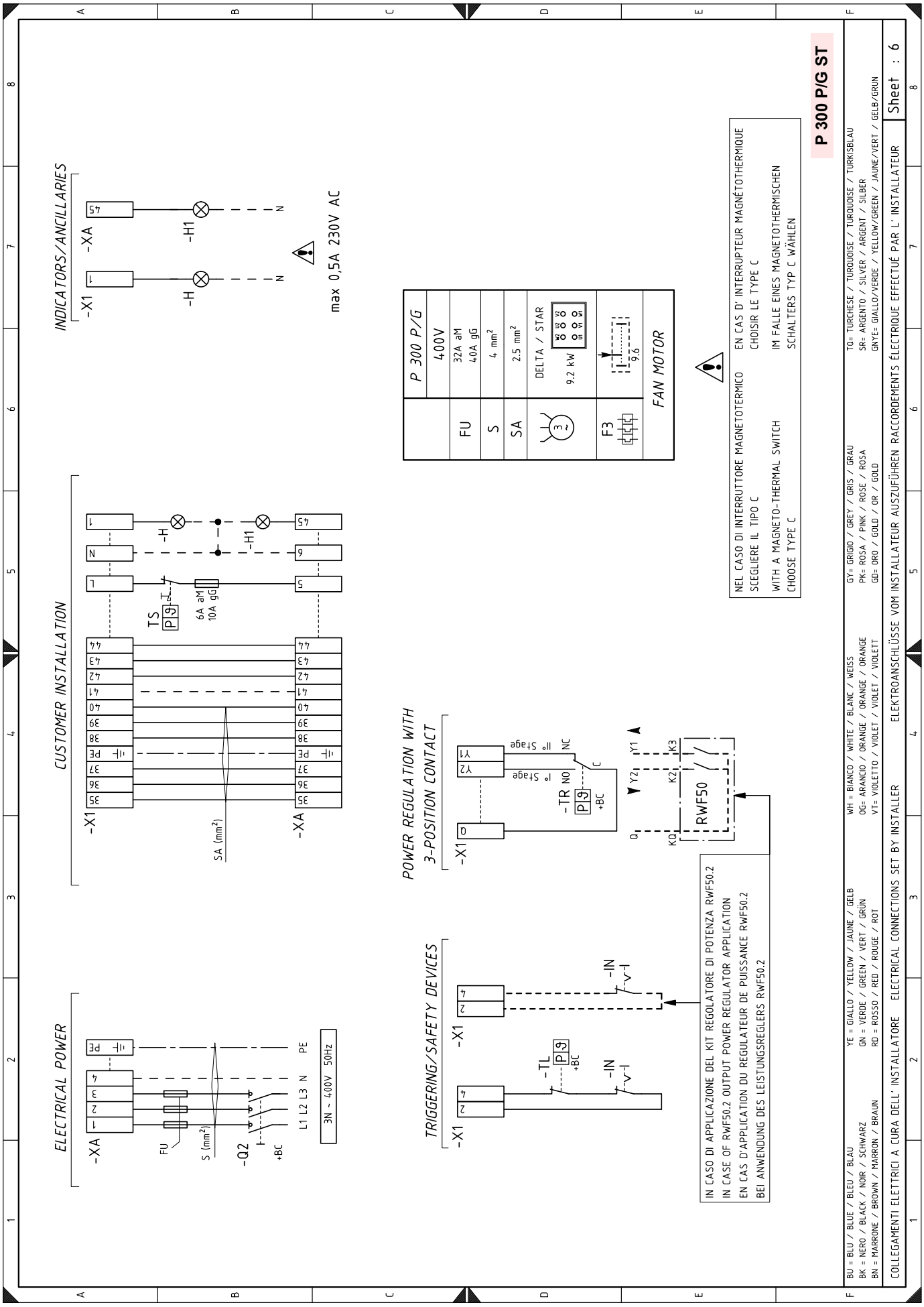
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


ELECTRICAL POWER
P 300 P/G
400V
F 20A aM 32A gG
S 4 mm²
F1 17.5
9.2 kW
NEL CASO DI INTERRUTTORE MAGNETOTERMICO
SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH
CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN
SCHALTERS TYP C WÄHLEN
-X1
2x1.5mm²
TS
4A aM
6A gG
-Q2
-Q1
L1 L2 L3 PE
L N
1N ~ 230V 50Hz
3 ~ 400V 50Hz
IN CASE OF 230V SUPPLY, REPLACE THE THERMAL RELAY WITH THE ACCESSORY COD. 20163347 SUPPLIED WITH THE BURNER
ELECTRICAL POWER
P 300 P/G
230V
F 32A aM 50A gG
S 6 mm²
F1 29.6
9.2 kW
NEL CASO DI INTERRUTTORE MAGNETOTERMICO
SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH
CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN
SCHALTERS TYP C WÄHLEN
-X1
-TS
+BC
4A aM
6A gG
-Q2
-Q1
L1 L2 L3 PE
L N
1N ~ 230V 50Hz
3 ~ 230V 50Hz
P 300 P/G D
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


P 300 P/G ST
INDICATORS/ANCILLARIES
-X1
-XA
-H
-H1
max 0,5A 230V AC
CUSTOMER INSTALLATION
TS
P19
6A aM
10A gG
SA (mm²)
ELECTRICAL POWER
FU
S (mm²)
-Q2
+BC
L1 L2 L3 N PE
3N ~ 400V 50Hz
TRIGGERING/SAFETY DEVICES
-TL
-IN
POWER REGULATION WITH
3-POSITION CONTACT
-TR
1° Stage
2° Stage
NO
NC
RWF50
K1
K2
K3
Y1
Y2
P 300 P/G
400V
32A aM
40A gG
4 mm²
2.5 mm²
DELTA / STAR
9.2 kW
9,6
FAN MOTOR
FU
S
SA
F3
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
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50.2
IN CASE OF RWF50.2 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50.2
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50.2
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
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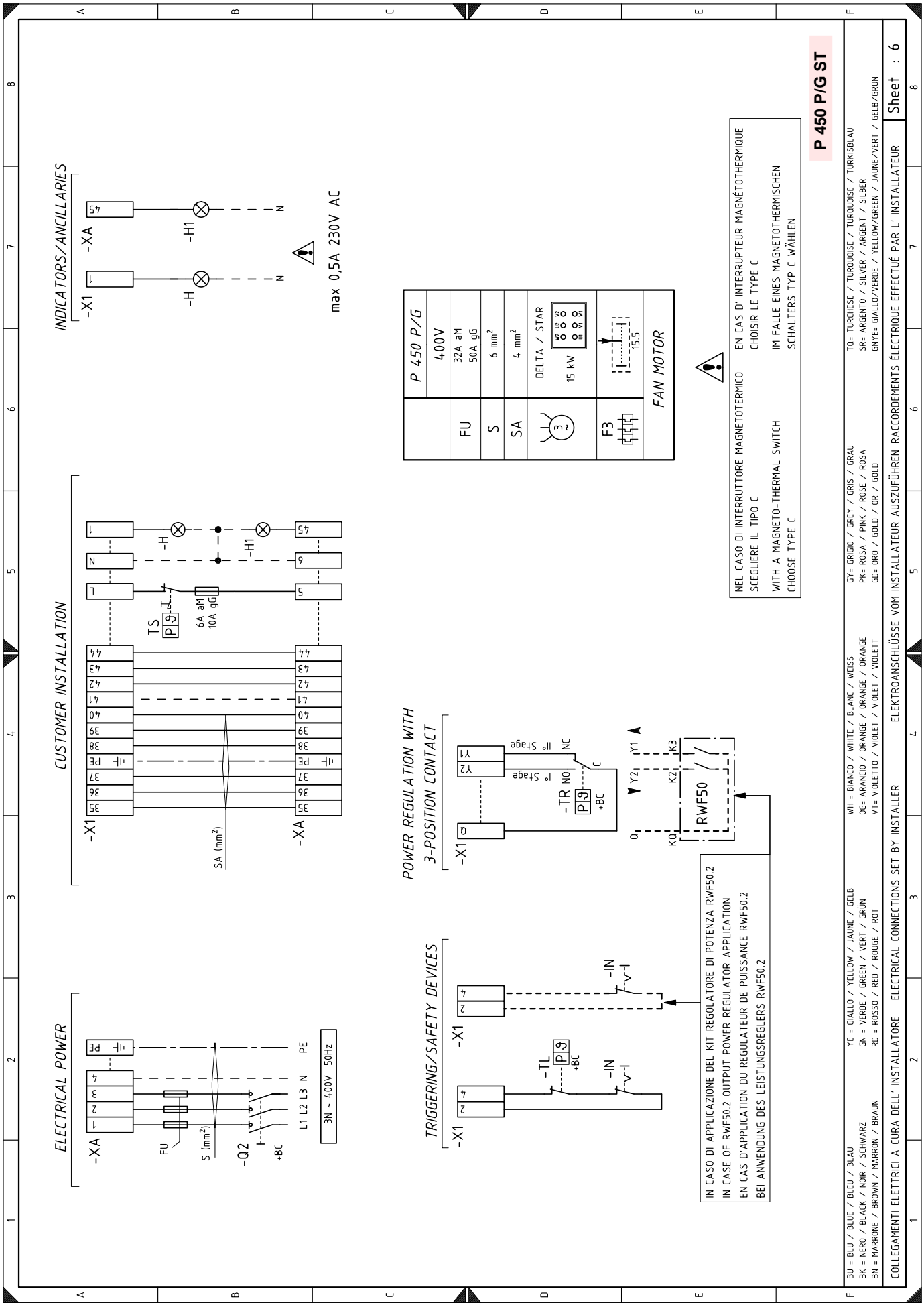
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TÜRKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 6


INDICATORS/ANCILLARIES
-X1
-XA
-H
-H1
max 0,5A 230V AC
CUSTOMER INSTALLATION
-X1
-XA
-H
-H1
TS
6A aM
10A gG
SA (mm²)
ELECTRICAL POWER
-XA
FU
S (mm²)
-Q2
+BC
L1 L2 L3 N PE
3N ~ 400V 50Hz
TRIGGERING/SAFETY DEVICES
-X1
-TL
-IN
POWER REGULATION WITH
3-POSITION CONTACT
-X1
-TR
1° Stage
2° Stage
RWF50
K1
K2
K3
Y1
Y2
IN CASO DI APPLICAZIONE DEL KIT REGOLATORE DI POTENZA RWF50.2
IN CASE OF RWF50.2 OUTPUT POWER REGULATOR APPLICATION
EN CAS D'APPLICATION DU REGULATEUR DE PUISSANCE RWF50.2
BEI ANWENDUNG DES LEISTUNGSREGLERS RWF50.2
P 450 P/G
400V
FU 32A aM 50A gG
S 6 mm²
SA 4 mm²
DELTA / STAR
15 kW
F3
FAN MOTOR
NEL CASO DI INTERRUTTORE MAGNETOTERMICO EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
SCEGLIERE IL TIPO C CHOISIR LE TYPE C
WITH A MAGNETO-THERMAL SWITCH IM FALLE EINES MAGNETOTHERMISCHEN
CHOOSE TYPE C SCHALTERS TYP C WÄHLEN
P 450 P/G ST
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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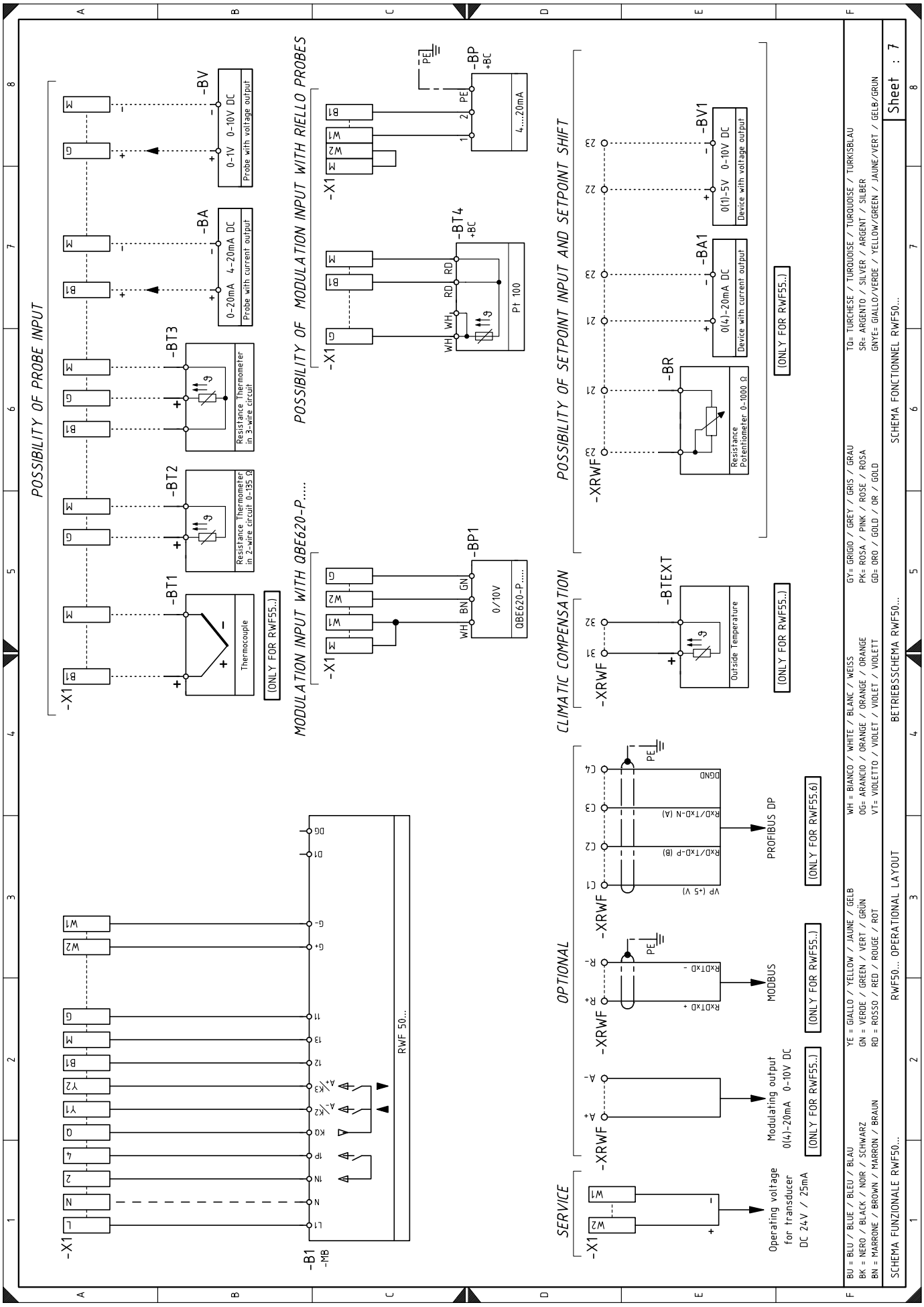
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 6


POSSIBILITY OF PROBE INPUT
-X1
-BT1
Thermocouple
(ONLY FOR RWF55..)
-BT2
Resistance Thermometer in 2-wire circuit 0-135 Ω
-BT3
Resistance Thermometer in 3-wire circuit
-BA
0-20mA 4-20mA DC
Probe with current output
-BV
0-1V 0-10V DC
Probe with voltage output
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-X1
-BT4
+BC
Pt 100
-BP
+BC
4....20mA
MODULATION INPUT WITH QBE620-P.....
-X1
-BP1
0/10V
QBE620-P.....
CLIMATIC COMPENSATION
-XRWF
-BTEXT
Outside Temperature
(ONLY FOR RWF55..)
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-XRWF
-BR
Resistance Potentiometer 0-1000 Ω
-BA1
0(4)-20mA DC
Device with current output
-BV1
0(1)-5V 0-10V DC
Device with voltage output
(ONLY FOR RWF55..)
OPTIONAL
SERVICE
-XRWF
Modulating output 0(4)-20mA 0-10V DC
(ONLY FOR RWF55..)
MODBUS
PROFIBUS DP
(ONLY FOR RWF55.6)
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	Flame control
B	Filter to protect against radio disturbance
B1	RWF50 output power regulator
X1	Burner terminal strip
XA	Starter terminal strip
MV	Fan motor
F1	Three-phase line fuses, fan motor thermal relay
F	Three-phase line fuses
FU	Three-phase line fuses
F2	Single-phase line fuses
F3	Fan motor thermal relay
SM	Servomotor
TA	- Ignition transformer
XTB	Burner earth
IN	Burner manual stop switch
TL	Limit thermostat/pressure switch
TS	Safety thermostat/pressure switch
TR	Adjustment thermostat/pressure switch
H	Lockout signalling
H1	Lockout signalling
Q1	Three-phase disconnecting switch
Q3	Three-phase disconnecting switch
Q2	Single-phase disconnecting switch
CN	Servomotor connector
VF	Working valve
VR	Adjustment valve
VR1	Return valve
VS	Safety valve
XVR1	Return valve connector
PO	Oil pressure switch
XPO	Oil pressure switch connector
UV	Flame sensor
XPE	Flame control earth
XRWF	RWF50 terminal board
KL1	Line contactor
KS1	Star contactor
KT1	Triangle contactor
KST1	Timer
BA	Current input DC 4...20mA
BA1	Current input DC 4...20mA for remote setpoint change
BP	Pressure probe
BP1	Pressure probe
BR	Remote setpoint potentiometer
BT1	Thermocouple probe
BT2	Probe Pt100, 2 wires
BT3	Probe Pt100, 3 wires
BT4	Probe Pt100, 3 wires
BTEXT	External probe for climatic compensation of the setpoint
BV	Voltage input DC 0...10V
BV1	Voltage input DC 0...10V for remote setpoint change

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