GB

Dual fuel gas oil/gas burner

Progressive two-stage or modulating operation gas side/two-stage light oil side

RLS

CODE	MODEL	TYPE
20092413	RLS 120/EV MX TC FS2	780T2

20093097 (2) - 05/2015

Translation of the original instructions

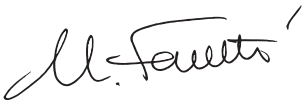
1 Declarations

Declaration of conformity in accordance with ISO / IEC 17050-1		
Manufacturer:	RIELLO S.p.A.	
Address:	Via Pilade Riello, 7 37045 Legnago (VR)	
Product:	Dual fuel gas oil/gas burner	
Model:	RLS 120/EV MX TC FS2	
These products are in compliance with the following Technical Standards:		
EN 676		
EN 267		
EN 12100		
and according to the European Directives:		
GAD	90/396/EEC	Gas Devices Directive
MD	2006/42/EC	Machine Directive
LVD	2006/95/EC	Low Voltage Directive
EMC	2004/108/EC	Electromagnetic Compatibility
Such products are marked as follows:		
CE	CE- in progress	

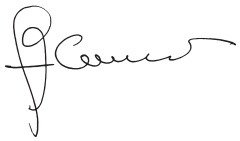
The quality is guaranteed by a quality and management system certified in accordance with UNI EN ISO 9001.

Legnago, 21.05.2015

Executive General Manager
RIELLO S.p.A. - Burner Department
Mr. U. Ferretti



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



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 Service 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 is present. An explosive atmosphere is defined as a mixture of dangerous substances with air, under atmospheric conditions, 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.

MOUNT CASING

This symbol indicates that it is mandatory to mount casing again after maintenance, cleaning or checks.

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

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 sales contract. At the moment of the first start-up, check that the burner is integral and complete.

WARNING

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

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

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

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

3 Safety and prevention

3.1 Introduction

The burners have been designed and built in compliance with current regulations and directives, applying the known technical rules of safety 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.

In particular:

it can be applied to boilers operating with water, steam, diathermic oil, and to other uses expressly foreseen 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 room temperature must all be within the values indicated in the instruction manual.

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

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

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

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

WARNING

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

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

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

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

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

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

In addition:

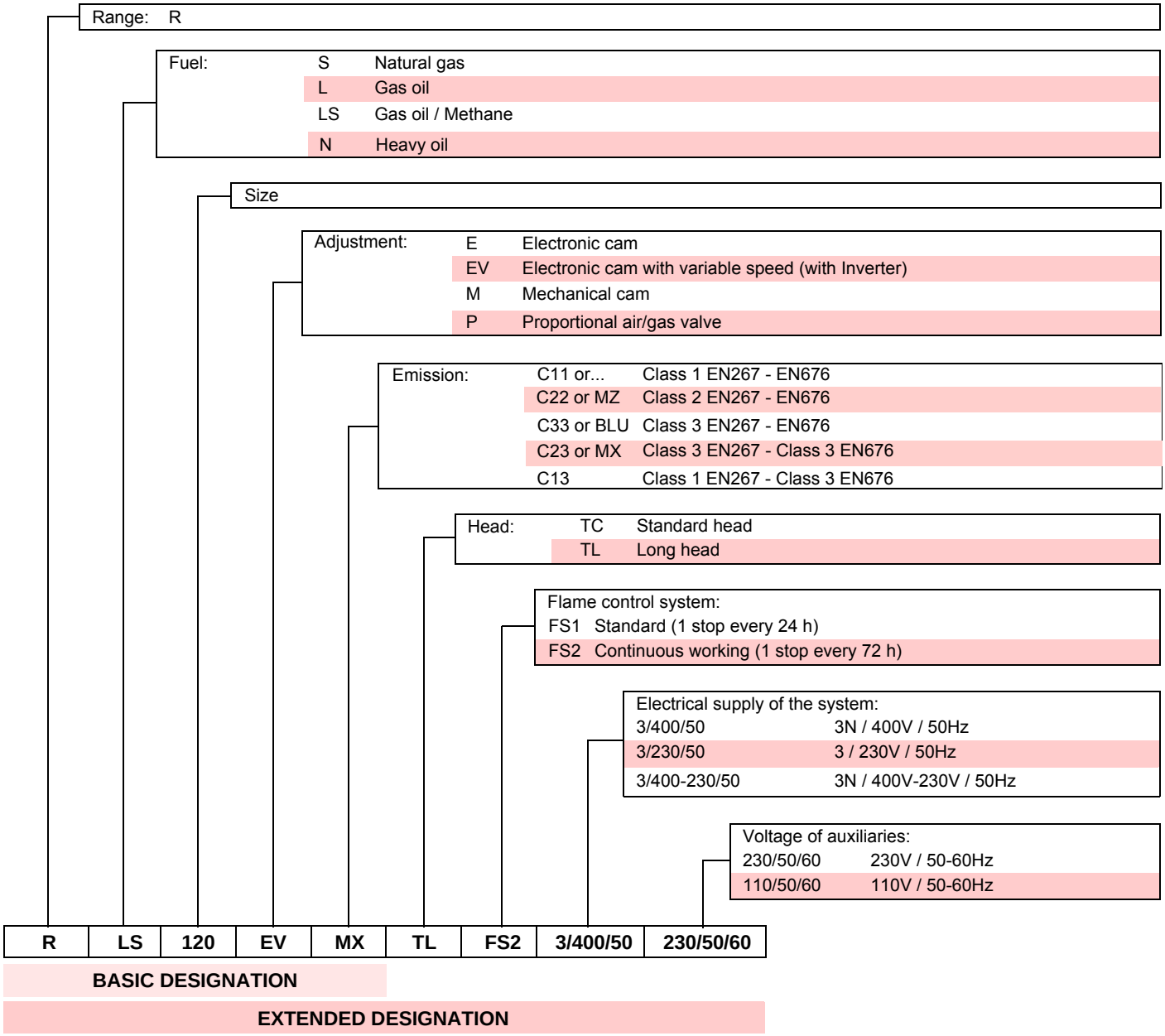
➤ must take all the measures necessary to prevent unauthorised people gaining access to the machine;

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

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

4 Technical description of the burner

4.1 Burner designation



4.2 Models available

Designation	Voltage	Code
RLS 120/EV MX TC FS2	3 ~ 400V - 50Hz	20092413

Tab. A

4.3 Burner categories - Countries of destination

Country of destination	Gas category
SE - FI - AT - GR - DK - ES - GB - IT - IE - PT - IS - CH - NO	I_{2H}
DE	I_{2ELL}
NL	I_{2L}
FR	I_{2Er}
BE	$I_{2E(R)B}$
LU - PL	I_{2E}

Tab. B

4.4 Technical data

Model			**RLS 120/EV MX TC FS2**
Power (1) Delivery (1)	min - max	kW kg/h	300/600 - 1200 25/50 - 101
Fuel			- Light oil, max. viscosity at 20 °C: 6 mm²/s (1.5 °E - 6 cSt) - Natural gas: G20 (methane gas) - G21 - G22 - G23 - G25
Gas pressure at max. output (2) Gas: G20		mbar	20
Operation			- Continuous (min. 1 stop in 72 hours) - Oil: two-stage - Gas: progressive two-stage or modulating (see accessories)
Nozzle		number	2
Standard applications			Boilers: water, steam, diathermic oil
Ambient temperature		°C	0 - 40
Combustion air temperature		°C max	60
Pump	Output (at 12 bar) Pressure range Fuel temperature	kg/h bar ° C max	220 10 - 20 60
Noise levels (3)	Sound pressure Sound power	dBA	76 87
Weight		kg	70

Tab. C

(1) Reference conditions: Ambient temperature 20°C - Barometric pressure 1000 mbar - Altitude 100 m a.s.l.
(2) Gas pressure test point 4)(Fig. 5 on page 11) with 0 mbar in the combustion chamber and burner at maximum output.
(3) Sound pressure measured in the manufacturer's combustion lab, with burner operating on a test boiler, at maximum output. The sound power is evaluated, in line with the regulations, on a spherical surface centred on the burner and with a radius of 1 metre.

4.5 Electrical data

Model			**RLS 120/EV MX TC FS2**
Main electrical supply Control circuit power supply			3 ~ 400V - 50Hz 1N ~ 230V - 50 Hz
Fan motor IE2		rpm V W A	2900 230/400 2200 9.95/4.6
Pump motor IE2		rpm V W A µF	2700 220/240 550 3.6 25
Ignition transformer		V1 - V2 I1 - I2	230V - 2x5 kV 1.9 A - 35 mA
Electrical power consumption	Light oil Gas	kW max	3.3 2.6
Protection level			IP 44

Tab. D

4.6 Maximum dimensions - approximate measurements

The maximum dimensions of the burner are shown 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.

The dimensions of the open burner are indicated by position I

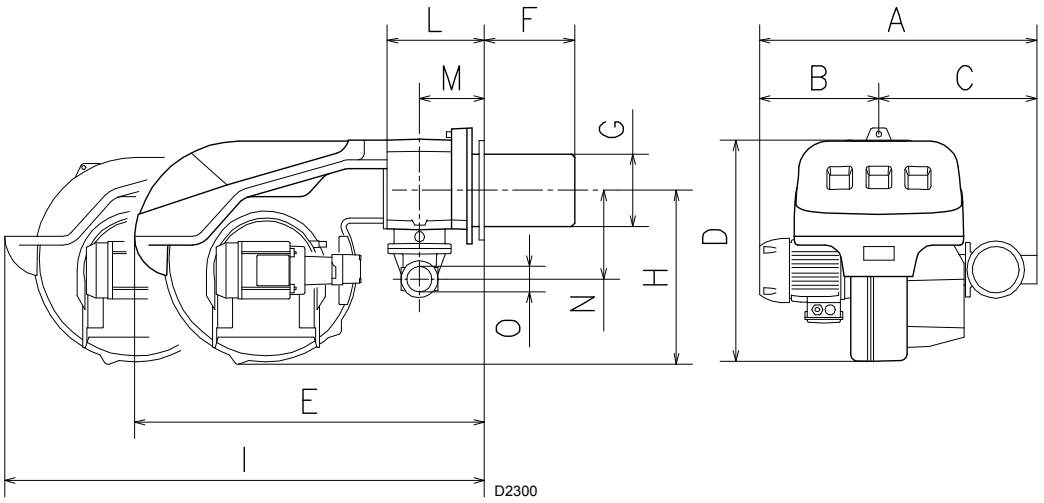


Fig. 1

mm	A	B	C	D	E	F	G	H	I	L	M	N	O
RLS 120/EV MX TC FS2	850	425	425	640	1039	245	218	425	1520	223	143	221	Rp2

Tab. E

4.7 Firing rate

During operation, burner output varies between:

- ➤ **MAXIMUM OUTPUT** selected from within area A (Fig. 2).
- ➤ **MINIMUM OUTPUT**, which should not be lower than the minimum limit of the diagram: 300 kW.

WARNING

The firing rate was obtained at an ambient temperature of 20°C and an atmospheric pressure of 1000 mbar (approx. 100 m above sea level), and with the combustion head adjusted as shown on page 19.

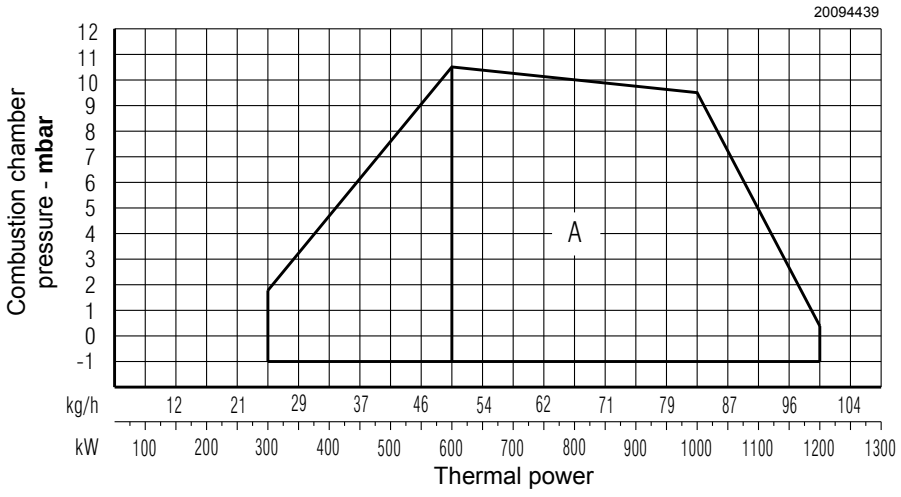


Fig. 2

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. 3).

If the burner must be combined with a boiler that has not been EC approved and/or its combustion chamber dimensions are clearly smaller than those indicated in the diagram (Fig. 3), consult the manufacturer.

The firing rates were set in relation to special test boilers, according to EN 676 regulations.

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

Example:
Output 1000 kW - diameter 60 cm - length 2.5 m

MODULATING RATIO

The modulating ratio, obtained in the test boilers, according to standard (EN 676 for gas, EN 267 for light oil), is of:

– 3 : 1 (gas)
– 2 : 1 (light oil)

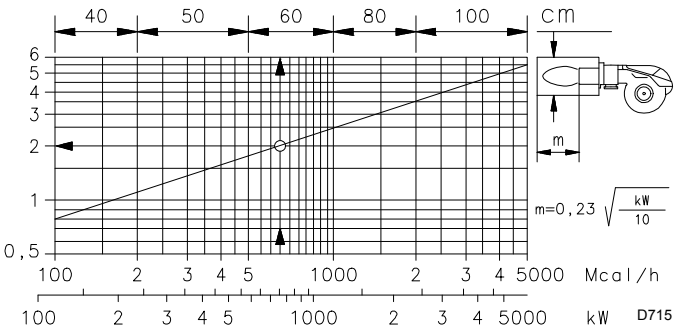


Fig. 3

4.9 Commercial boilers

The burner is suitable for operating in boilers with combustion chamber with runoff from the bottom (three smoke turns) on which the best results are obtained according to NO_x emissions. The boiler front door maximum thickness must not exceed 250 mm (Fig. 4).
The coupling is ensured when the boiler is EC type-approved; for boilers or ovens with combustion chambers of very different dimensions compared to those shown in the diagram of (Fig. 3) preliminary checks are recommended.

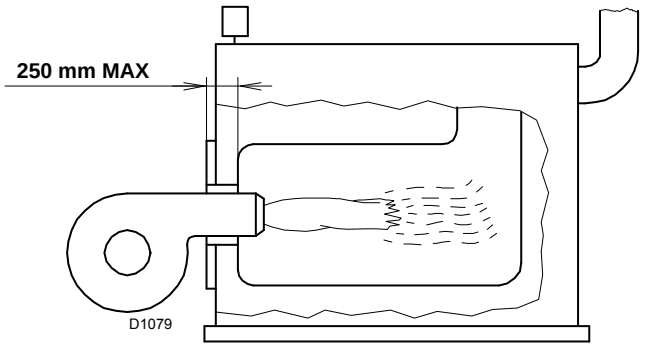


Fig. 4

4.10 Burner equipment

Gas train flange . . . . . No. 1
Flange gasket. . . . . No. 1
Flange fixing screws M10x35. . . . . No. 4
Thermal insulation screen . . . . . No. 1
Screws M12x35 to secure the burner flange to the boiler . No. 4
Flexible hoses . . . . . No. 2
Nipples for flexible hoses with gasket . . . . . No. 2
Pressure switch (for leak detection control) . . . . . No. 1
Technical instructions. . . . . No. 1
Spare parts list . . . . . No. 1

4.11 Burner description

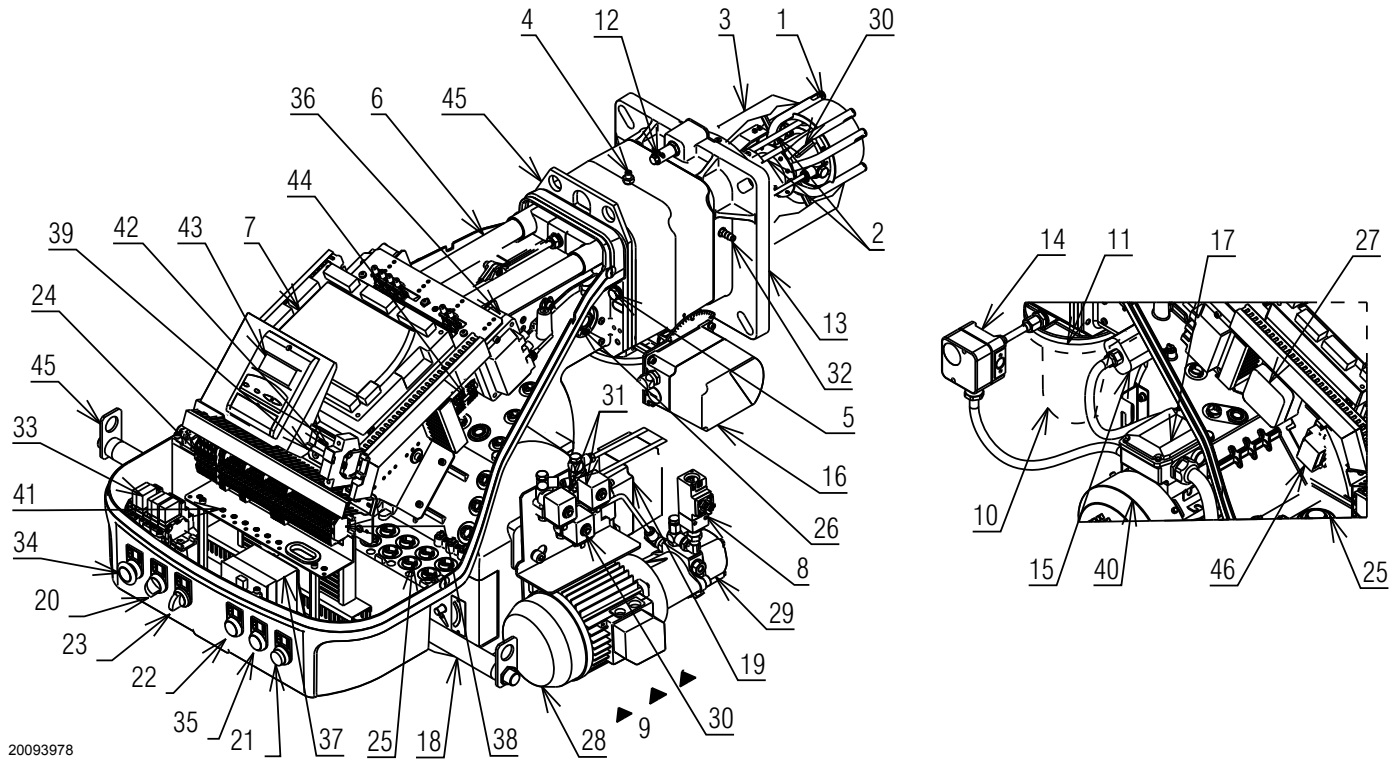


Fig. 5

1 Flame stability disk
2 Ignition electrodes
3 Combustion head
4 Gas pressure test point and head fixing screw
5 Screws to secure fan to pipe coupling
6 Slide bars for opening the burner and inspecting the combustion head
7 Control box for checking flame and air/fuel ratio
8 Minimum oil pressure switch
9 Fan air inlet
10 Gas input pipe
11 Gas butterfly valve
12 Screw for combustion head adjustment
13 Pipe coupling with flange for boiler fixing
14 Maximum gas pressure switch
15 Flame sensor QRI
16 Fuel servomotor
17 Fan motor
18 Extensions for slide bars 6)
19 Air servomotor
20 “BURNER ON” selector
21 Reset button
22 “POWER ON” indicator light
23 “OIL-EXT-GAS” selector
24 Main terminal board
25 Cable grommets for electrical wiring (to be carried out by the installer)
26 Flame inspection window
27 Minimum air pressure switch (differential type)
28 Pump motor
29 Pump
30 1st and 2nd valve
31 Operation valves
32 Air pressure test point
33 Relay “K1-K2-K3-K4-K5”
34 “EMERGENCY STOP” button
35 “FAN MOTOR OVERLOAD” indicator light
36 Ignition transformer
37 Electronic cam transformer
38 Clamp for cable shielding
39 Support rail for fuse holder and available for accessories
40 Rpm sensor
41 Ground screws
42 Fuse holder
43 Operator panel with LCD display
44 Terminal strip for oil valve unit
45 Lifting rings
46 Motor-pump relay

4.12 Control box for the air/fuel ratio (LMV52...)

Warnings

WARNING

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

The LMV52 control box... 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!

Risk of explosion!
An incorrect configuration can provoke fuel overcharging, with the consequential risk of explosion!
Operators must be aware that incorrect settings made on the AZL5… display and operating unit and incorrect settings of the fuel and / or air actuator positions can lead to dangerous burner operating conditions.

➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
➤ Before modifying the wiring in the LMV52...control box connection area, fully disconnect the system from the power supply (omnipolar separation). Check the system is not powered and cannot be accidentally reconnected. Failure to do this will lead to the risk of electrocution.
➤ Protection against electrocution from the LMV52... control box and all connected electric components is obtained with 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.
➤ In programming mode, checking the position of the actuators and the VSD (which controls the electronic device for checking the fuel / air ratio) is different from the check in automatic operating mode.
As for automatic operation, the actuators are guided together to the positions requested and, if an actuator does not reach the position requested, adjustments are made until the position is actually reached. However, in contrast to automatic operation, there are no time limits to these corrective actions.
The other actuators maintain their positions until all actuators have reached the positions currently required.
This is absolutely important to set the fuel / air ratio control system.
During the time the fuel / air ratio curves are being programmed, the person making the plant settings must continuously monitor the quality of the combustion process (e.g. by means of a flue gas analyser).
Also, if combustion levels are poor, or in the event of dangerous situations, the commissioning engineer must take appropriate action (e.g. switching off manually).

To ensure the safety and reliability of the LMV52... system, the following instructions must also be followed:
– Avoid conditions which may promote condensation 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.

Fig. 6

Mechanical structure
The LMV5... control box is a system to check the burners, based on a microprocessor and equipped with components to adjust and monitor medium and large capacity forced draught burners.
The base control box of the LMV52... system incorporates the following components:

- Burner adjustment device with system for checking the seal of the gas valves
- Electronic fuel/air ratio monitoring device with a maximum of 6 (LMV52…) actuators
- Optional PID temperature / pressure controller (load controller)
- Optional VSD module Mechanical design

Installation notes

- Check the electric wiring inside the boiler complies with the national and local safety regulations.
- Do not confuse the powered conductors with the neutral ones.
- Make sure the cable grommets of the connected cables comply with the relevant standards (e.g. DIN EN 60730 and DIN EN 60 335).
- Ensure that spliced wires cannot get into contact with neighbouring terminals. Use adequate ferrules.
- Arrange the HV ignition cables separately, as far as possible from the control box and the other cables.
- The burner manufacturer must protect unused AC 230V terminals with dummy plugs (refer to sections Suppliers of other accessory items).
- When wiring the unit, make sure that AC 230V mains voltage cables are run strictly separate from extra low-voltage cables to avoid risks of electrical shock hazard.

Electrical connection of ionisation probe and 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:
  – Line capacitance reduces the magnitude 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

LMV52... base control box	Mains voltage	AC 230V -15% / +10%
	Mains frequency	50 / 60 Hz ±6%
	Power absorption	< 30W (normal)
	Safety class	I, with components in compliance with II and III, according to DIN EN 60730-1
Load on 'input' terminals	F1 unit fuse (internal)	6.3 AT
	Primary perm. mains fuse (external)	Max. 16 AT
	Undervoltage • Safety switch-off from operating position to mains voltage • Restart when mains voltage picks up	 < AC 186V > AC 188V
	Oil pump / magnetic clutch (nominal voltage) • Nominal current • Power factor	 2A cosφ > 0.4
	Air pressure switch test valve (nominal voltage) • Nominal current • Power factor	 0.5A cosφ > 0.4
Load on 'output' terminals	**Total load on the contacts:** • Mains voltage • Total unit input current (safety circuit) load on contacts due to: - Fan motor contactor - Ignition transformer - Valve - Oil pump / magnetic clutch	 AC 230V -15 % / +10% Max. 5 A
	Single contact loading: Fan motor contactor (nominal voltage) • Nominal current • Power factor	 1A cosφ > 0.4
	Alarm output (nominal voltage) • Nominal current • Power factor	 1A cosφ > 0.4
	Ignition transformer (nominal voltage) • Nominal current • Power factor	 2A cosφ > 0.2
	Fuel gas valve (nominal voltage) • Nominal current • Power factor	 2A cosφ > 0.4
	Fuel oil valve (nominal voltage) • Nominal current • Power factor	 1A cosφ > 0.4
Cable length	Main line	Max. 100 m (100 pF / m)
Environmental conditions	Operation Climatic conditions Mechanical conditions Temperature range Humidity	DIN EN 60721-3-3 Class 3K3 Class 3M3 -20...+60°C < 95% RH

Tab. F

4.13 Servomotor (SQM45.2....)

Warnings

WARNING

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

Avoid opening, modifying or forcing the actuators.

➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
➤ Before modifying the wiring in the SQM4... system connection area, fully disconnect the burner control device from the power supply (omnipolar separation).
➤ To avoid the risk of electrocution, protect the connection terminals in a suitable manner and correctly fix the cover.
➤ Check the wiring is in order.
➤ Falls and collisions can negatively affect the safety functions. In this case, the unit must not be operated, even if it displays no evident damage.

Assembly notes

- Check the relevant national safety standards are respected.
- The connection between the actuator command shaft and the control element must be rigid, without any mechanical play.
- To avoid an excessive load on the bearings due to rigid hubs, the use of compensation clutches without any mechanical play is recommended (e.g. metal bellows-type clutches).

Installation notes

- Arrange the H.V. ignition cables separately, as far as possible from the control box and the other cables.
- To avoid the risk of electrocution, make sure that the 230V AC section of the SQM4... unit is fully separated from the functional low-voltage section.
- The static torque is reduced when the electrical supply of the actuator is switched off.
- The housing cover may only be removed for short periods of time for wiring or when making the addressing. In similar cases, make sure that dust or dirt does not penetrate inside the actuator.
- The actuator comprises a PCB with ESD-sensitive components.
- The top side of the board carries a cover which affords protection against direct contact. This protective cover must not be removed! The underside side of the board must not be touched.

WARNING

During the maintenance or replacement of the actuators, be careful not to invert the connectors.

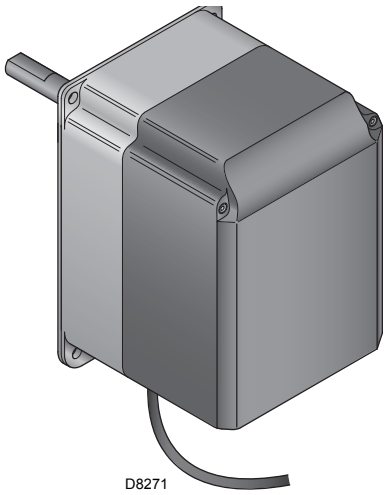


Fig. 7

Technical data

Operating voltage	AC 2 x 12V via bus cable from the base unit or via a separate transformer
Safety class	extra low-voltage with safe isolation from mains voltage
Power consumption	9...15 VA
Degree of protection	to EN 60 529, IP 54, provided adequate cable entries are used
Cable connection	RAST3,5 connectors
Rotation direction	- Anticlockwise (standard) - Clockwise (inverted rotation)
Rated torque (max.)	1.5 Nm
Static torque (max.)	3 Nm
Running time (min.) for 90°	10 s.
Weight	approx. 1 kg
Environmental conditions:	
Operation	DIN EN 60 721-3-3
Climatic conditions	Class 3K3
Mechanical conditions	Class 3M3
Temperature range	-20...+60°C
Humidity	< 95% RH

Tab. G

5 Installation

5.1 Notes on safety for the installation

After carefully cleaning all around the area where the burner will be installed, and arranging the correct lighting of the environment, 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

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 move the burner (still packaged) with a transpallet truck or fork lift truck.

WARNING

The handling operations for the burner can be highly dangerous if not carried out with the greatest attention: keep any unauthorised people at a distance; check the integrity and suitableness of the available means of handling.

Check also that the area in which you are working is empty and that there is an adequate escape area (i.e. a free, safe area to which you can quickly move if the burner should fall).

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

After positioning the burner near the installation point, correctly dispose of all left-over 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

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.

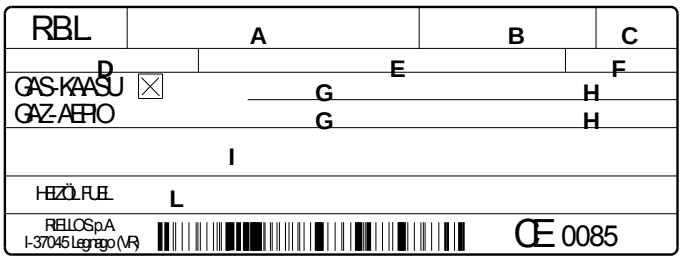
Checking the characteristics of the burner

Check the identification label of the burner, showing:

- ➤ the model **A**)(Fig. 8) and type of burner **B**);
- ➤ the year of manufacture, in cryptographic form **C**);
- ➤ the serial number **D**);
- ➤ the data for electrical supply and the protection level **E**);
- ➤ the absorbed electrical power **F**);
- ➤ the types of gas used and the relative supply pressures **G**);
- ➤ the data of the burner's possible minimum and maximum output **H**) (see Firing rate).

Warning. The burner output must be within the boiler's firing rate;

- ➤ the category of the appliance/countries of destination **I**);
- ➤ light oil maximum viscosity **L**).



D9243

Fig. 8

WARNING

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

5.4 Operating position

WARNING

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

DANGER

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

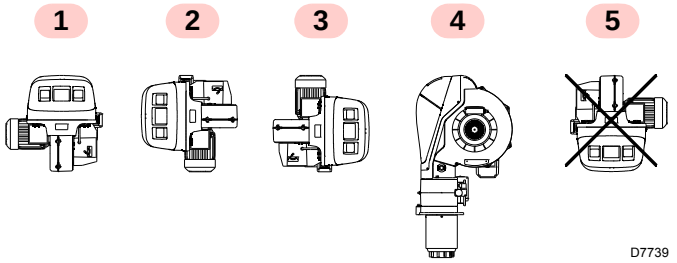


Fig. 9

5.5 Preparing the boiler

5.5.1 Boring the boiler plate

Pierce the closing plate of the combustion chamber, as in (Fig. 10). The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

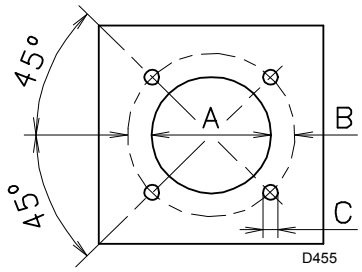


Fig. 10

mm	A	B	C
RLS 120/EV MX TC FS2	230	325 - 368	M16

Tab. H

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.

For boilers with a front flue gas passes 13)(Fig. 12) or flame inversion chamber, a protection device in refractory material 11) must be inserted between the boiler fettling 12) and the blast tube 10).

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

For boilers with a water-cooled front piece, a refractory lining 11)-12)(Fig. 12) is not necessary, unless expressly requested by the boiler manufacturer.

5.6 Lifting the burner

To lift the burner, proceed as follows:

- screw down the two slide bars 1) on the pins 2)(Fig. 11);
- position the two plates 3) fixing them on the relative ring nuts 4).
- The four lifting points are shown in Fig. 11.

WARNING

The manufacturer declines any responsibility for any lifting action other than that indicated in this manual.

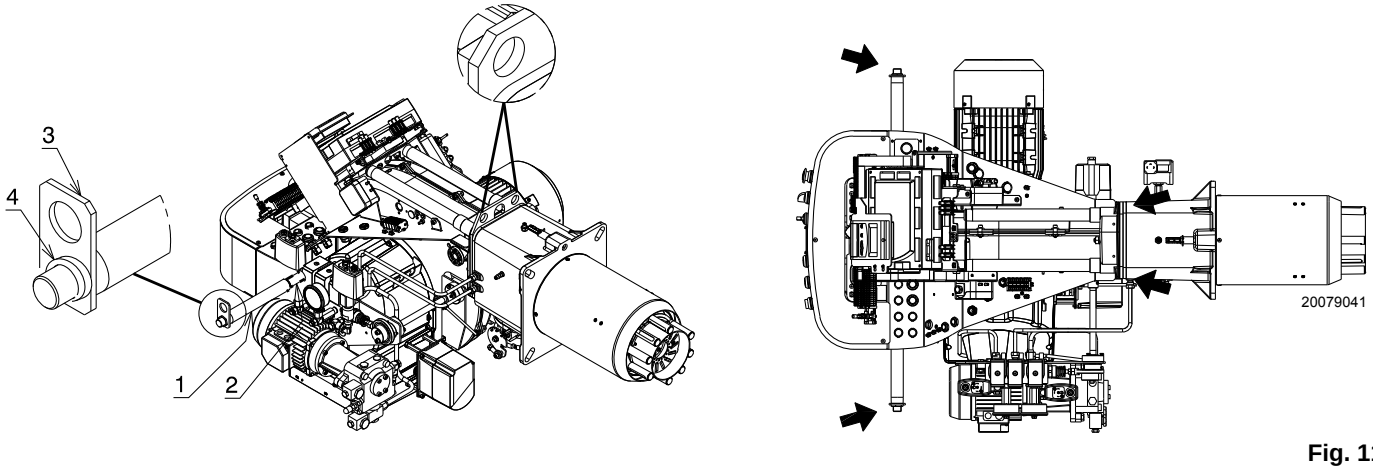


Fig. 11

5.7 Securing the burner to the boiler

Separate the combustion head from the rest of the burner. To do this, proceed as follows:

- ➤ loosen the 4 screws 3) and remove the hood 1);
- ➤ remove screws 2) from the two slide bars 5);
- ➤ disconnect the socket from the maximum gas pressure switch;
- ➤ disconnect the light oil pipes unscrewing the two fittings 7);
- ➤ remove the two screws 4);
- ➤ pull back the burner on the slide bars 5) by about 100 mm;
- ➤ disconnect the electrode cables, then completely unthread the burner from the slide bars.
- ➤ Fix the flange 9)(Fig. 12) to the plate of the boiler interposing the insulating gasket 8) supplied.
- ➤ Use the 4 screws supplied, and tighten with a torque of 35 ÷ 40 Nm, after protecting their thread with anti-seizing products.

WARNING

The seal between burner and boiler must be air-tight: after the start-up, check there is no leakage of flue gases into the external environment.

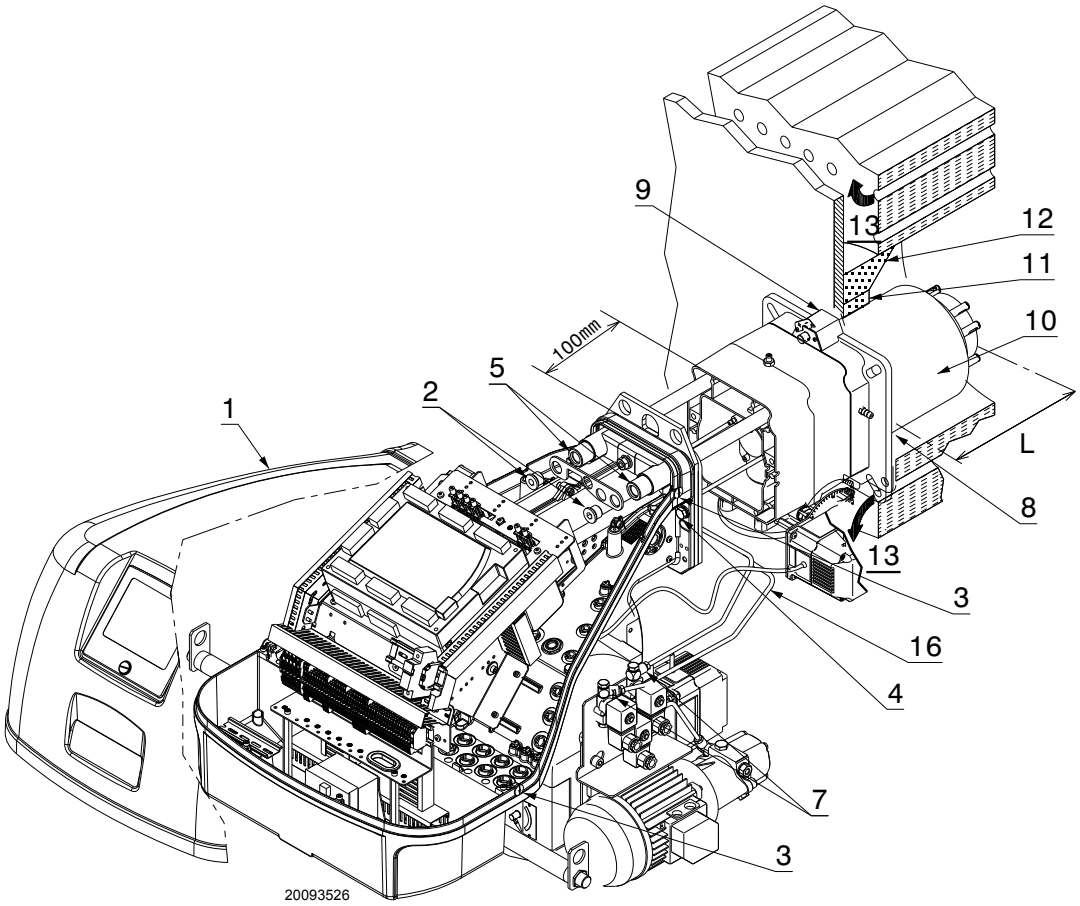


Fig. 12

5.8 Electrodes positioning

WARNING

Make sure that the electrodes are positioned as shown in Fig. 13.

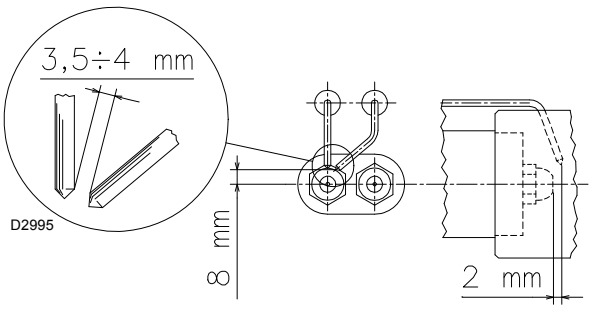


Fig. 13

5.9 Nozzle installation

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

WARNING

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

CAUTION

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

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

5.9.1 Choice of nozzles for 1st and 2nd stage

Both nozzles must be chosen from among those listed in Tab. I.

The first nozzle determines the delivery of the burner in the 1st stage.

The second nozzle works together with the 1st nozzle to determine the delivery of the burner in the 2nd stage.

The deliveries of the 1st and 2nd stages must be contained within the value range indicated on page 8.

Use nozzles with a 60° spray angle at the recommended pressure of 12 bar.

As a rule the two nozzles have equal deliveries but the 1st stage nozzle may have a delivery less than 50% of the total delivery when a reduction of the counter-pressure peak is desired at the moment of starting (the burner allows good combustion rates also with a 40 - 100% ratio between the 1st and 2nd stage).

Example

Boiler output = 900 kW - efficiency 90%

Output required by the burner =

900 : 0,9 = 1000 kW;

1000 : 2 = 500 KW per nozzle;

therefore, two equal, 60°, 12 bar nozzles are required:

1° = 10 GPH - 2° = 10 GPH,

or the following two different nozzles:

1° = 12 GPH - 2° = 8 GPH.

GPH	kg/h			kW
	10 bar	12 bar	14 bar	12 bar
5	19,2	21,2	23,1	251,4
5,5	21,1	23,3	25,4	276,3
6	23,1	25,5	27,7	302,4
6,5	25	27,6	30	327,3
7	26,9	29,7	32,3	352,3
7,5	28,8	31,8	34,6	377,2
8	30,8	33,9	36,9	402,1
8,3	31,9	35,2	38,3	417,5
8,5	32,7	36,1	39,2	428,2
9	34,6	38,2	41,5	453,1
9,5	36,5	40,3	43,8	478
10	38,4	42,4	46,1	502,9
10,5	40,4	44,6	48,4	529
11	42,3	46,7	50,7	553,9
12	46,1	50,9	55,3	603,7
12,3	47,3	52,2	56,7	619,1
13	50	55,1	59,9	653,5
13,8	53,1	58,5	63,3	693,8
14	53,8	59,4	64,5	704,5
15	57,7	63,6	69,2	754,3
15,3	58,8	64,9	70,5	769,7
16	61,5	67,9	73,8	805,3
17	65,4	72,1	78,4	855,1
17,5	67,3	74,2	80,7	880
18	69,2	76,4	83	906,1
19	73	80,6	87,6	956
19,5	75	82,7	89,9	980,9
20	76,9	84,8	92,2	1005,8
21,5	82,7	91,2	99,1	1081,7
22	84,6	93,3	101,4	1106,6
22,5	86,5	95,5	103,7	1132,6
23	88,4	97,6	106	1157,5
23,5	90,4	99,7	108,3	1182,4
24	92,2	101,8	110,6	1207,3

Tab. I

5.9.2 Nozzle assembly

Remove screw 1)(Fig. 14) and extract the internal part 2).

Fit two nozzles with the box spanner 1)(Fig. 15) (16 mm), after having removed the plastic plugs 2), fitting the spanner through the central hole in the flame stability disk or loosen screws 1)(Fig. 16), remove disk 2) and replace the nozzles using the wrench 3).

WARNING

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

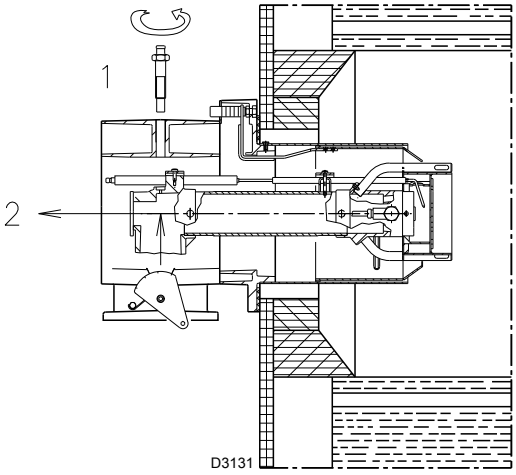


Fig. 14

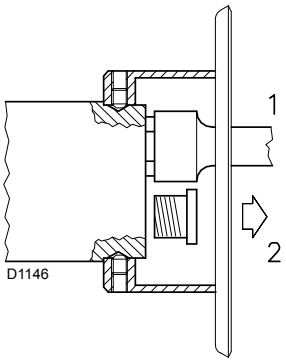


Fig. 15

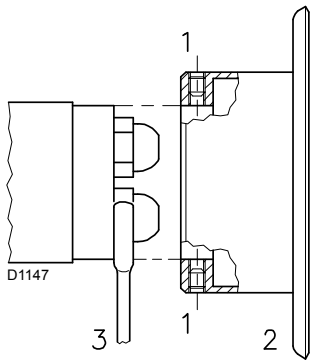


Fig. 16

The nozzle for the 1st stage of operation is the one lying beneath the firing electrodes.

5.10 Combustion head adjustment

The adjustment of the combustion head depends only on the maximum output of the burner.

Turn the screw 5)(Fig. 17) until the notch indicated by the diagram (Fig. 18) corresponds with the front part of the flange 6).

WARNING

To facilitate the adjustment, loosen the screw 1) (Fig. 14), adjust, then block.

Example:

Burner maximum output = 800 kW.
From the diagram (Fig. 18) it shows that for this output, the adjustment of the combustion head is carried out on the notch 4 (Fig. 17).

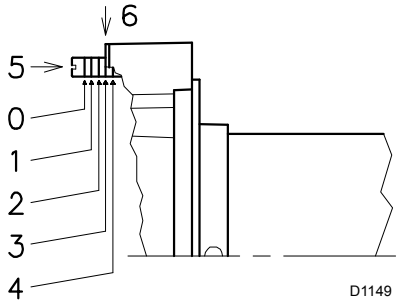


Fig. 17

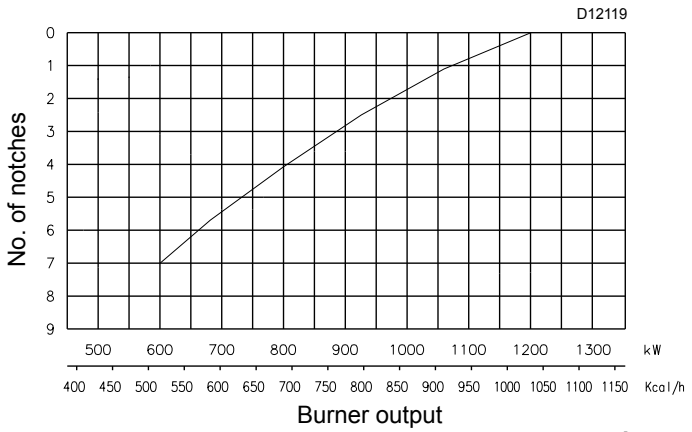


Fig. 18

5.11 Burner closing

Refit the burner on the slide bars 3)(Fig. 19) at approximately 100 mm from the pipe coupling 4) - burner in the position shown in Fig. 12.

- ➤ Insert the electrode cables and then slide the burner up to the pipe coupling, burner in the position shown in Fig. 19.
- ➤ Refit screws 2) on slide bars 3).
- ➤ Fix the burner to the pipe coupling with the screws 1).
- ➤ Reconnect the light oil pipes by screwing the two fittings 6).
- ➤ Re-couple the articulated coupling 7) to the graduated sector 5).
- ➤ Connect the socket of the maximum gas pressure switch

WARNING

On closing the burner on the two guides it is advisable to gently pull the high voltage wires outwards until they are under slight tension.

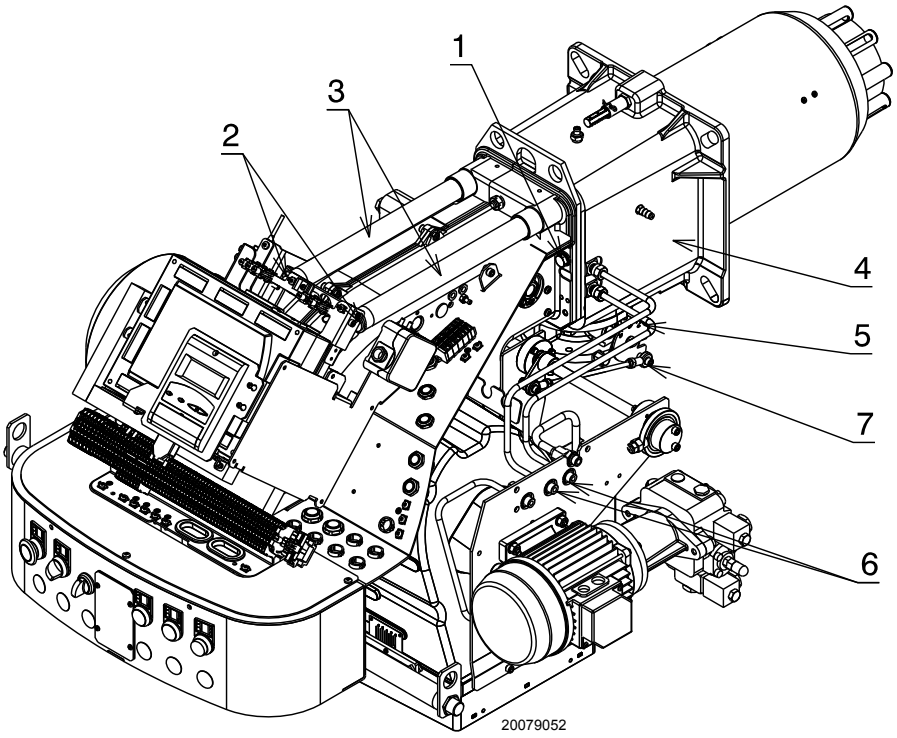


Fig. 19

5.12 Light oil supply

WARNING

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

Precautions: avoid knocking, attrition, sparks and heat.

Make sure the fuel interception tap 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.

5.12.1 Double-pipe circuit

The burner is equipped with a self-priming pump which is capable of feeding itself within the limits listed in (Fig. 20).

Tank higher than burner A (Fig. 20).

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

Tank lower than burner B (Fig. 20).

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

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

5.12.2 The loop circuit

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

This circuit is extremely useful whenever the burner pump does not succeed in self-priming because the tank distance and/or height difference are higher than the values listed in (Fig. 20).

+/- H [m]	Ø [mm]		
	12	14	16
4.0	71	138	150
3.0	62	122	150
2.0	53	106	150
1.0	44	90	150
0.5	40	82	150
0	36	74	137
-0.5	32	66	123
-1.0	28	58	109
-2.0	19	42	81
-3.0	10	26	53
-4.0	-	10	25

Tab. J

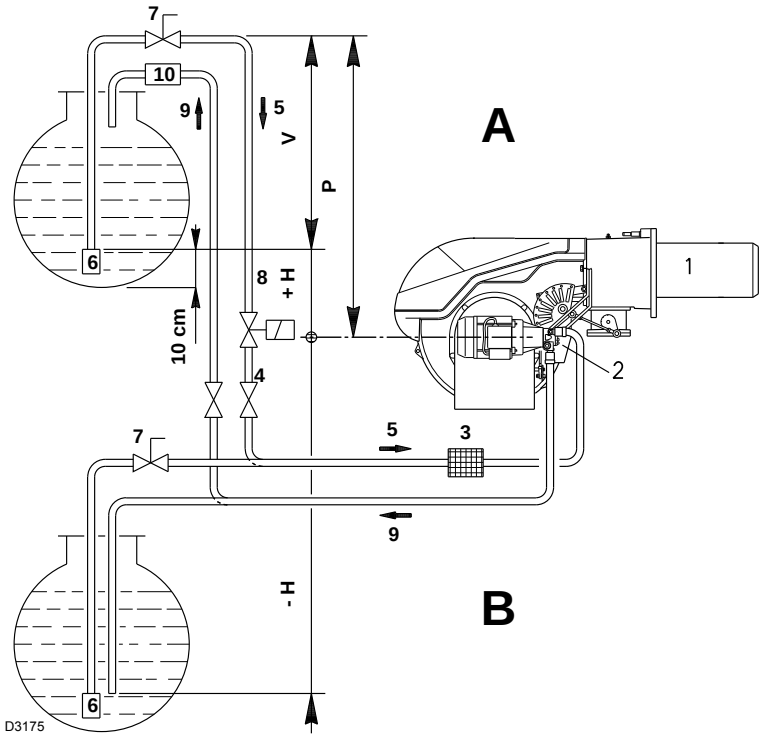


Fig. 20

Key (Fig. 20)
H = Pump/Foot valve height difference
L = Piping length
Ø = Inside pipe diameter
1 = Burner
2 = Pump
3 = Filter
4 = Manual on/off valve
5 = Suction line
6 = Foot valve
7 = Quick closing manual valve with remote control (Italy only)
8 = On/off solenoid valve (Italy only). See electrical layout. Connections to be carried out by the installer (SV).
9 = Return line
10 = Check valve (only Italy)

5.12.3 Hydraulic connections

CAUTION

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

WARNING

Follow the instructions below:

- ➤ tighten the flexible hoses with the supplied gaskets.
- ➤ The pump will break down immediately if it is run with the return line closed and the by-pass screw inserted.
- ➤ Take care that the hoses are not stretched or twisted during installation.
- ➤ Place the pipes so that they are not crushed or are in contact with hot parts of the boiler and so that it is possible to open the burner.
- ➤ Connect, finally, the other end of the flexible hoses to the suction line and return line ducts by nipples supplied with the equipment.

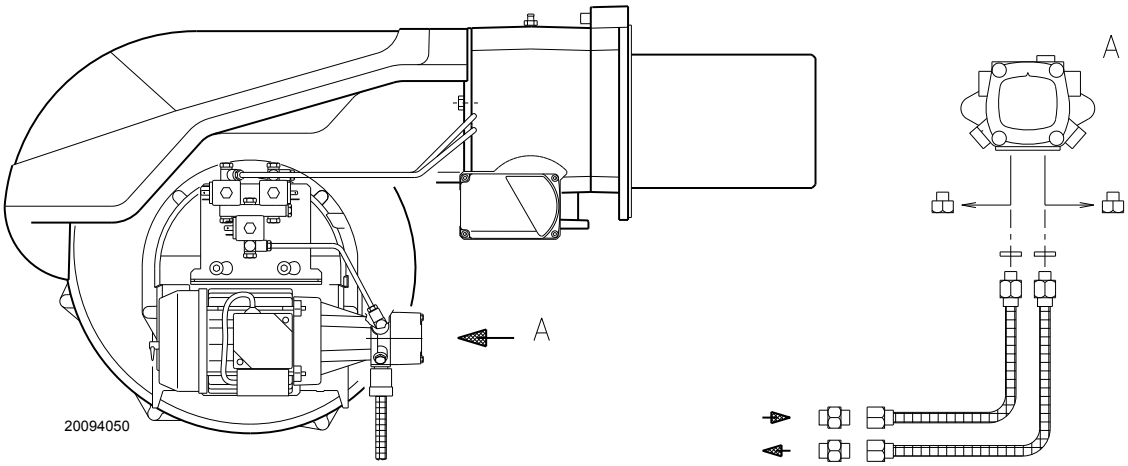


Fig. 21

5.13 Pump

WARNING

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. 22).

Technical data

Pump SUNTEC AJ6 CC

Min. delivery rate at 20 bar pressure	220 kg/h
Delivery pressure range	10 - 20 bar
Max. suction depression	0,45 bar
Viscosity range	2,8 - 75 cSt
Max. light oil temperature	60 °C
Max. suction and return pressure	2 bar
Pressure calibration in the factory	12 bar
Filter mesh width	0,150 mm

Tab. K

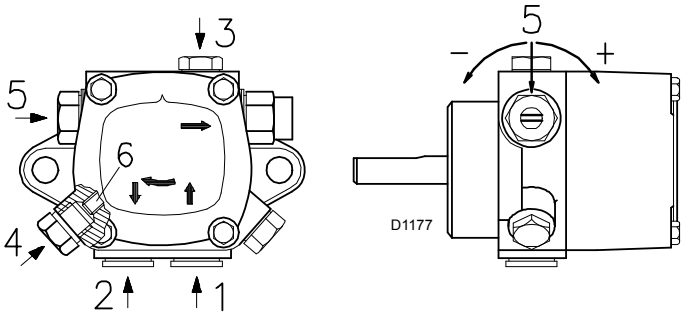


Fig. 22

Key to lay-out (Fig. 22)

1	Suction	G 1/4”
2	Return	G 1/4”
3	Pressure gauge attachment	G 1/8”
4	Vacuum meter attachment	G 1/8”
5	Pressure adjustment screw	
6	By-pass screw	

5.13.1 Priming pump

WARNING

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

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

➤ In order for self-priming to take place, the screw 3) on the pump (Fig. 22) must be loosened to bleed off the air contained in the suction line.
➤ Start the burner closing the thermostats/pressure switches and with the switch 23)(Fig. 5 on page 11) on "**OIL**".
As soon as the burner starts check the rotation direction of the fan impeller (Fig. 23).
➤ The pump can be considered to be primed when the light oil starts coming out of the screw 3)(Fig. 22).
➤ Stop the burner and tighten the screw 3)(Fig. 22).

The time required for this operation depends upon the diameter and length of the suction tubing. If the pump fails to prime at the first starting of the burner and the burner locks out, wait approx. 15 seconds, reset the burner, and then repeat the starting operation as often as required. And so on.

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

Darken the QRI flame sensor or the burner will lock out; the burner should lock out anyway about 10 seconds after it starts.

WARNING

The operation is possible because the pump is already full of fuel when it leaves the factory. If the pump has been drained, fill it with fuel through the opening on the vacuum meter prior to starting; otherwise, the pump will seize.

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

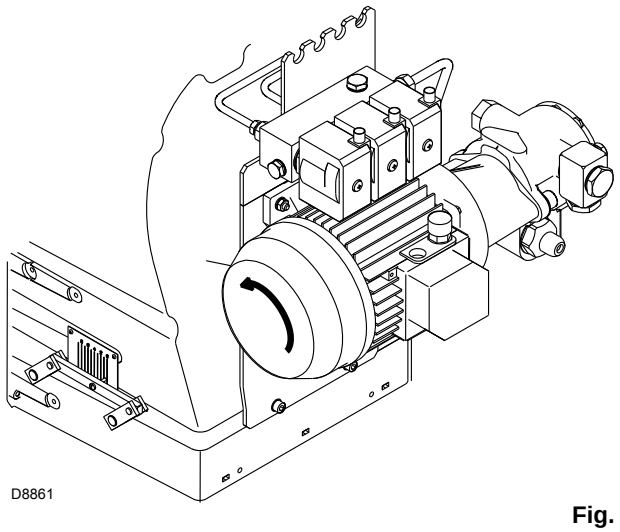


Fig. 23

5.14 Operating cycle (light oil)

– The working valve closes, the motor starts.
– The pump 3)(Fig. 24) draws fuel from the tank through the pipe 1) and pushes it under pressure to the outlet.
– The piston 4) rises and the fuel returns to the tank through the piping 5) - 7). The screw 6) closes the by-pass towards the suction line and the solenoid valves 8)-9)-2), de-energised, closing the path towards the nozzle
– The damper is positioned on the minimum flow.
– Ignition electrode emits a spark.
– The solenoids 8) - 9) open; the fuel passes into the pipe 10) and crosses the filter 11) and is then sprayed out through the nozzle, igniting when it comes into contact with the spark.
– The starting cycle comes to an end.

5.14.1 Operation

Once the start-up cycle is completed, the servomotor command passes to the load command that controls the pressure or the temperature in the boiler.

– If the temperature or the pressure is low (and the load command is closed as a consequence), the burner passes to the second stage.
– If as a result the temperature or the pressure increases until the load command opens, the burner decreases the output to the first stage.
– The burner stops when the demand for heat is less than the amount of heat delivered by the burner at minimum output.
– The servomotor returns to the angle 0°. The air damper closes completely to reduce heat loss to a minimum.
– Each time the system requires a variation in output, the burner automatically changes the air output (air damper).

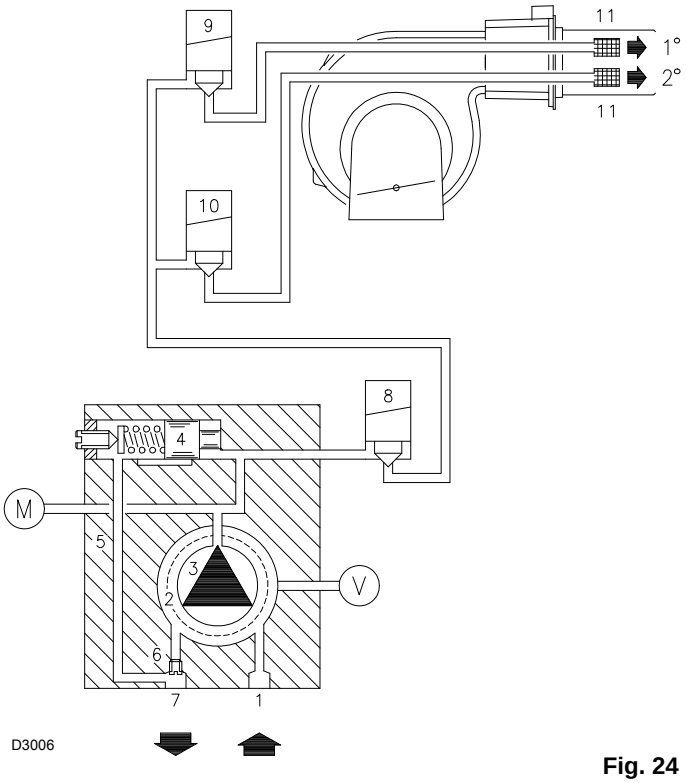


Fig. 24

5.14.2 Ignition failure

➤ If the burner does not switch on, it goes into lockout within 3 seconds from the opening of the oil valve.
➤ If the flame goes out accidentally during operations, the burner will go into lockout for 1 second.

5.15 Gas feeding

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

Precautions: avoid knocking, attrition, sparks and heat.

Make sure the fuel interception tap 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.

5.15.1 Gas feeding line

Key (Fig. 25 - Fig. 26 - Fig. 27 - Fig. 28)

1 Gas input pipe
2 Manual valve
3 Vibration damping joint
4 Pressure gauge with push-button cock
5 Filter
6A Includes:
– filter
– safety valve
– pressure adjuster
– working valve
6C Includes
– safety valve
– working valve
6D Includes:
– safety valve
– working valve
7 Minimum gas pressure switch
8 Leak detection control, provided as an accessory or integrated, 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
11 Train-Burner adaptor, supplied separately
P2 Upline pressure of valves/adjuster
P3 Upstream pressure of the filter
L Gas train, supplied separately
L1 The responsibility of the installer

MB

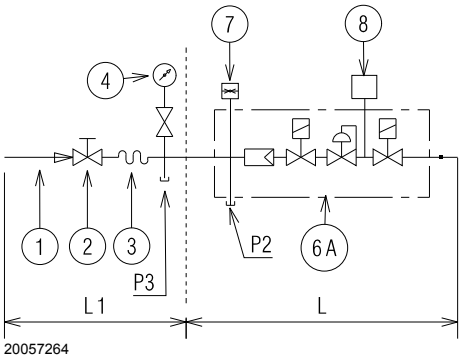


Fig. 25

MBC

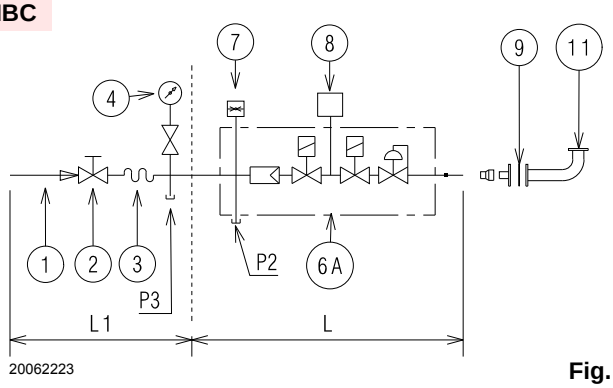


Fig. 26

DMV

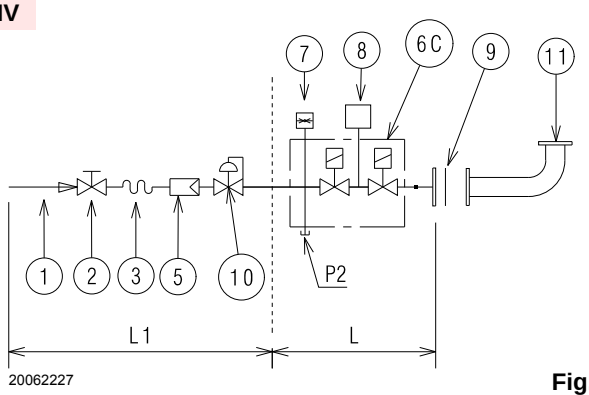


Fig. 27

CB

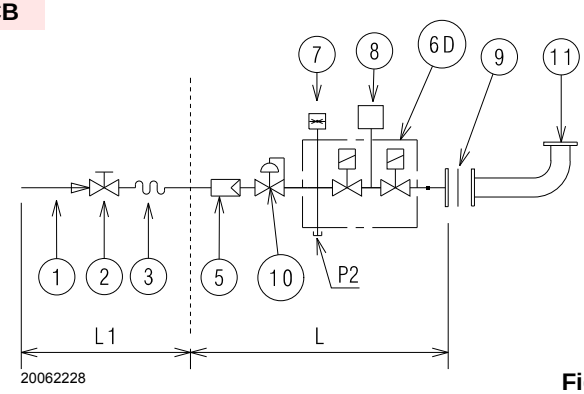


Fig. 28

5.15.2 Gas train

Approved according to standard EN 676 and provided separately from the burner.

To select the correct gas train model, refer to the supplied “Burner-gas train combination” manual.

5.15.3 Gas train installation

DANGER

Disconnect the electrical power using the 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. 29.

The gas train must be connected to the gas connection 1)(Fig. 29), using the flange 2), the gasket 3) and the screws 4) supplied with the burner.

WARNING

The gas solenoids must be as close as possible to the burner to ensure that the gas reaches the combustion head within the safety time of 3s.

Ensure that the maximum pressure to the burner is within the calibration range of the pressure adjuster.

See the accompanying instructions for the adjustment of the gas train.

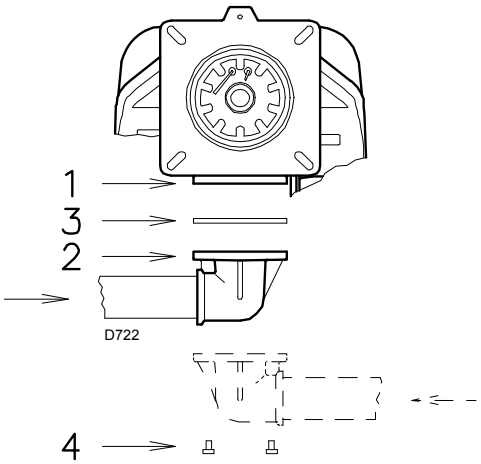


Fig. 29

5.15.4 Gas pressure

Tab. L indicates the pressure drop depending on the operating output of the burner.

kW	1 Δp (mbar)	2 Δp (mbar)
600	4.6	0.3
650	5.8	0.3
715	7.5	0.4
760	8.6	0.4
825	10.2	0.5
890	11.8	0.5
955	13.4	0.6
1020	15.0	0.7
1090	16.8	0.8
1170	18.8	0.8
1200	19.5	1.0

Tab. L

The values shown in Tab. L refer to:
– Natural gas G 20 NCV 9.45 kWh/Sm^3 (8.2 Mcal/Sm^3)
– Natural gas G 25 NCV 8.13 kWh/Sm^3 (7.0 Mcal/Sm^3)

Column 1

Combustion head pressure drop.
Gas pressure measured at test point 1)(Fig. 30), with:
- combustion chamber at 0 mbar;
- burner working at maximum output.

Column 2

Pressure loss at gas butterfly valve 2)(Fig. 30) with maximum opening: 90°.

To calculate the approximate output at which the burner operates:
– subtract the combustion chamber pressure from the gas pressure measured at test point 1) (Fig. 30).
– Find, in Tab. L related to the burner concerned, the pressure value closest to the result of the subtraction.
– Read off the corresponding output on the left.

Example with G 20 natural gas:
Maximum output operation

Gas pressure at test point 1)(Fig. 30)	=	18.0 mbar
Pressure in combustion chamber	=	3.0 mbar
18.0 - 3.0	=	15.0 mbar

A pressure of 15.0 mbar, column 1, corresponds in Tab. L to an output of 1020 kW.

This value serves as a rough guide; the effective output must be measured at the gas meter.

To calculate the required gas pressure at test point 1)(Fig. 30), set the maximum modulating output required from the burner operation:

– find the nearest output value in Tab. L for the burner in question.
– Read, on the right (column 1), the pressure at the test point 1)(Fig. 30).
– Add this value to the estimated pressure in the combustion chamber.

Example with G 20 natural gas:
Operating at the desired maximum output: 1020 kW

Gas pressure at an output of 1020 kW	=	15.0 mbar
Pressure in combustion chamber	=	3.0 mbar
15.0 + 3.0	=	18.0 mbar

pressure required at test point 1)(Fig. 30).

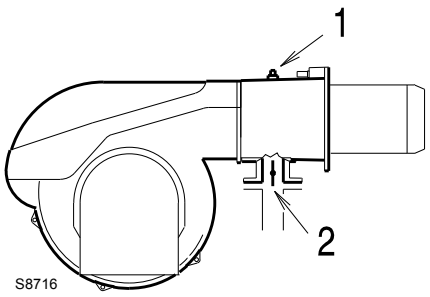


Fig. 30

5.16 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.
- ➤ Do not invert the neutral with the phase in the electrical supply line. Any inversion would cause a lockout due to firing failure.
- ➤ The burners have been set for continuous operation (FS2).
  This means they should compulsorily be stopped at least once every 72 hours to enable the control box 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 must be fitted in series to IN which serves to stop the burner at least once every 72 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;
  – use an omnipolar switch with an opening of at least 3 mm between the contacts (overvoltage category), as per the provisions of current safety standards.
- ➤ Do not touch the device with wet or damp body parts and/or in bare feet.
- ➤ Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:

DANGER

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

DANGER

Turn off the fuel interception tap.

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 in compliance with the EN 60 335-1 standard.

5.16.1 Supply cables and external connections passage

The use of the cable grommets can take various forms; by way of example we indicate the following mode (Fig. 31):

1 M20 - Single phase power supply
2 M20 - Consents/safety
3 M16 - Consents/safety
4 Available

Cable grommets used in the factory:

A Flame sensor QRI
B Max. gas pressure switch
C Motor rpm sensor
D Min. oil pressure switch
E 2nd stage oil valve
F 1st stage oil valve
G Safety oil valve
H Air servomotor
I Pump motor
J Tube for air pressure switch

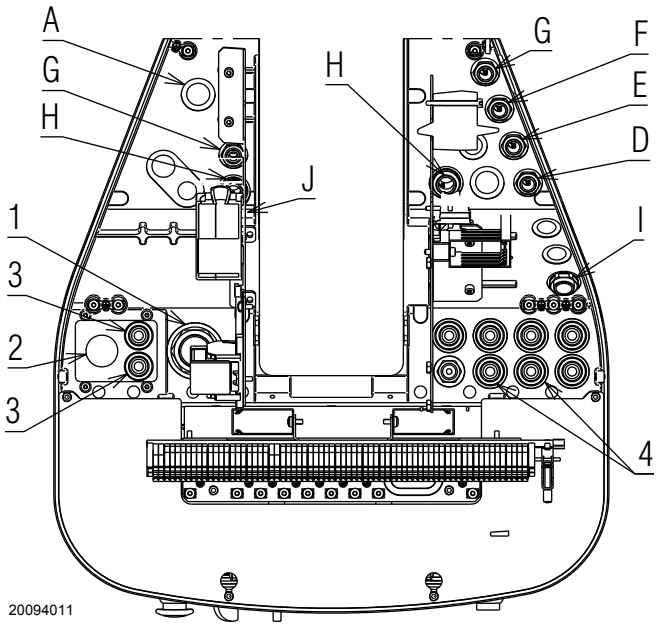


Fig. 31

Perform all maintenance, cleaning or inspection operations and mount the casing again.

5.16.2 Shielding the connections

WARNING

It is important to shield the motor cable 1) as indicated in (Fig. 32).

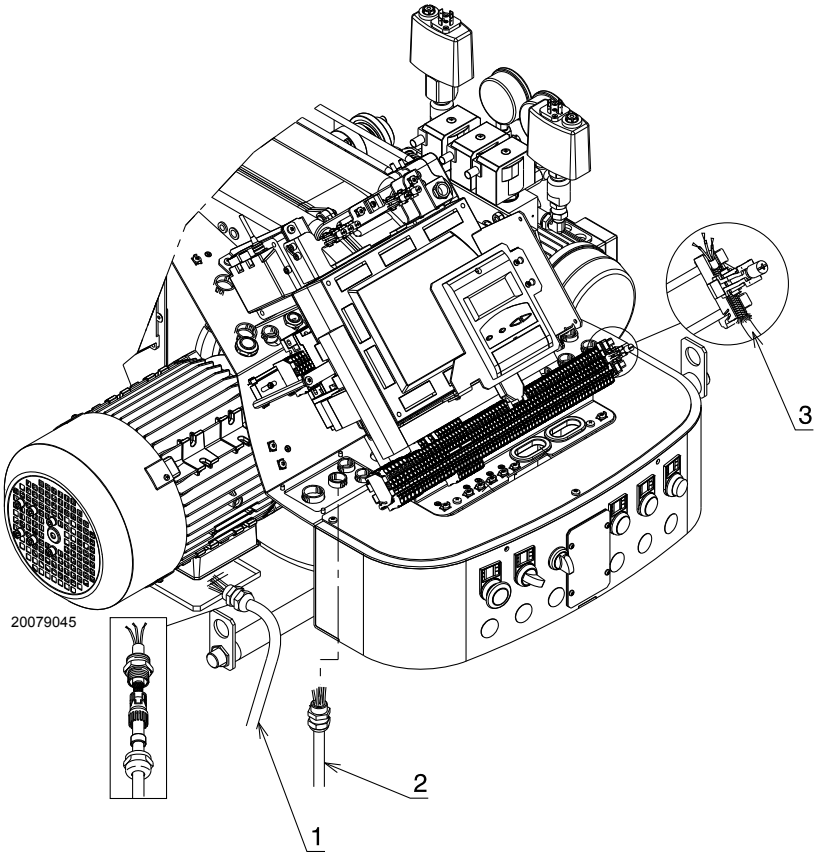


Fig. 32

5.16.3 Inverter connection

WARNING

For specific information regarding the inverter electrical connections, refer to the wiring diagrams.

To calibrate the inverter parameters, see the inverter's specific technical instructions.

The connection between the inverter and the LMV52.... should be carried out as indicated in Fig. 32.

1 Motor power supply cable
2 Single phase power supply cable
3 Connection between the inverter and the LMV52...

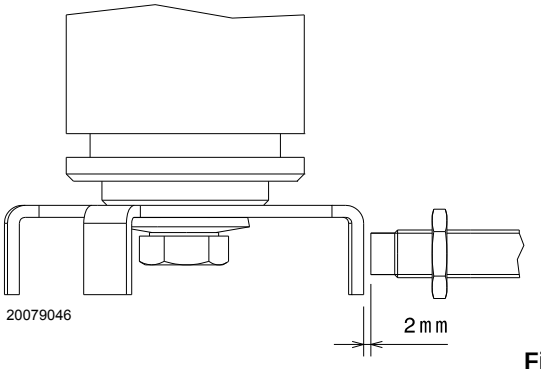


Fig. 33

5.16.4 Adjusting the speed sensor

WARNING

The positioning of the rpm sensors 1) with respect to the disc 2)(Fig. 33) should be respected!

WARNING

It is important that the disc is installed as indicated in Fig. 34

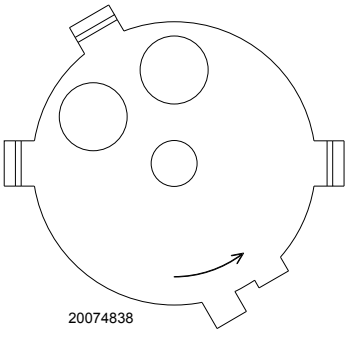


Fig. 34

6 Start-up, calibration and operation of the burner

6.1 Notes on safety for the first start-up

WARNING

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

WARNING

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

6.2 Adjustments prior to ignition (light oil)

WARNING

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 18.

6.2.2 Combustion head

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

6.2.3 Pump adjustment

It is possible to adjust after burner ignition. In this phase, therefore, limit to apply a pressure gauge on the specific pump connector.

6.3 Adjustments prior to ignition (gas)

The adjustment of the combustion head, air and gas was described on page page 19.

In addition, the following adjustments must also be made:

- ➤ Open manual valves upstream from the gas train.
- ➤ Adjust the minimum gas pressure switch to the start of the scale.
- ➤ Adjust the maximum gas pressure switch to the start of the scale.
- ➤ Adjust the air pressure switch to the start of the scale.
- ➤ Purge the air from the gas line.
  We recommend using a plastic tube routed outside the building and to purge air until gas is smelt.
- ➤ Fit a U-type pressure gauge (Fig. 35) to the gas pressure test point on the pipe coupling. The manometer readings are used to calculate MAX burner output using the Tab. L on page 25.

WARNING

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.

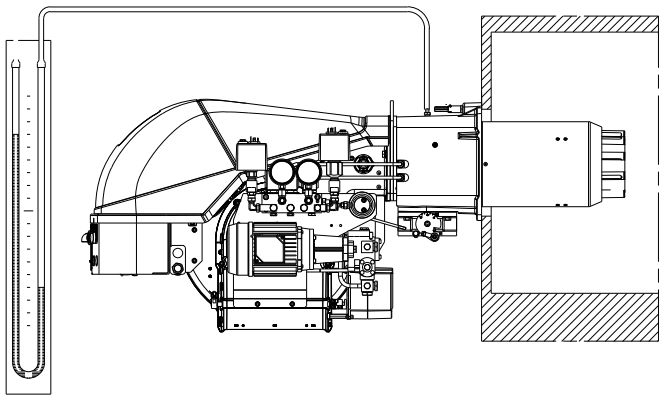


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Fig. 35

6.4 Operations before start-up

Bleed the air from the piping of the gas train, connecting a plastic tube to the pressure test point 1)(Fig. 36) of the minimum gas pressure switch.

Take the vent tube outside the building so you can notice the smell of gas.

Connect two lamps or testers to the two gas line solenoids to check the exact moment in which voltage is supplied.
This operation is unnecessary if each of the two solenoids is equipped with a pilot light that signals voltage passing through.

WARNING

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.

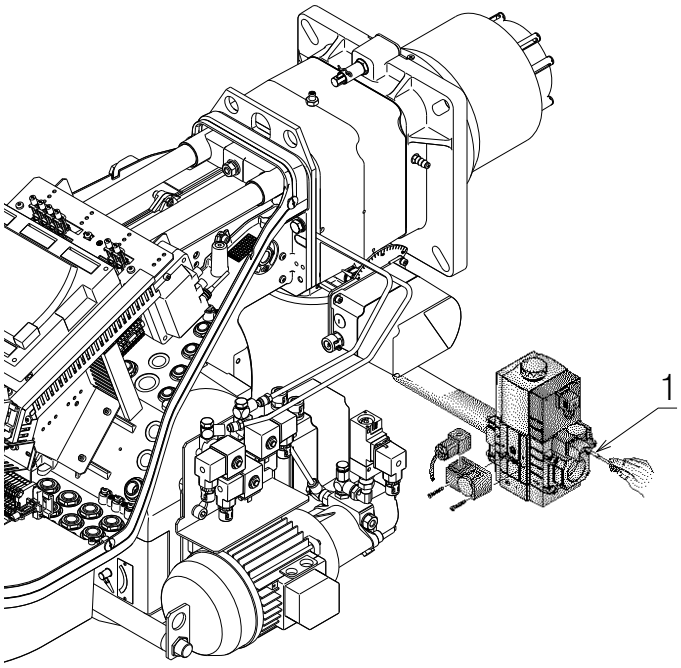


Fig. 36

6.5 Burner start-up

Feed electricity to the burner via the disconnecting switch on the boiler panel.

Close the thermostats/pressure switches and calibrate the parameters of the LMV52.

Put the switch "**BURNER ON**" to **"ON"** (Fig. 37).

Put the switch to the **"OIL"** position for operating with light oil and on **"GAS"** to operate with gas or "**EXT**" for the external selection.

DANGER

Make sure that the lights or testers connected to the solenoids, or the pilot lights on the solenoids themselves, indicate that no voltage is present.

If voltage is present, stop the burner **immediately** and check the electrical wiring.

DANGER

When the burner starts, check the direction of the rotation of the motor, as shown in(Fig. 37).

As soon as the burner starts up, go in front of the cooling fan of the fan motor and check it is rotating anticlockwise.

If this is not the case:
- ➤ place the switch of Fig. 37 in position "**OFF**" and wait for the control box to carry out the switch-off phase;
- ➤ disconnect the burner from the electrical supply;
- ➤ invert the phases on the inverter.

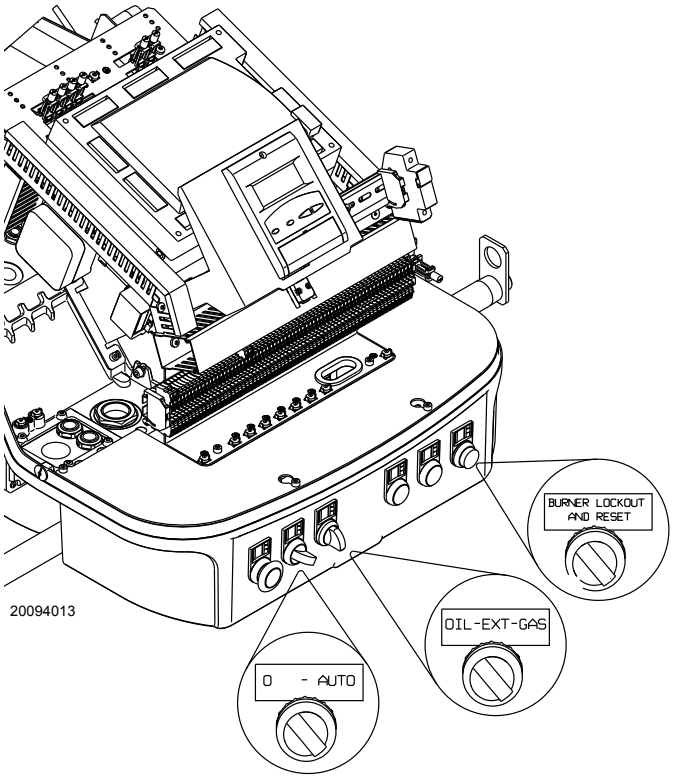


Fig. 37

6.6 Stopping of the burner

The burner can be stopped by:
- ➤ intervening on the disconnecting switch of the electrical supply line, located on the boiler panel;
- ➤ using the "**BURNER ON/OFF**" switch (Fig. 37).

6.7 Change of fuel

There are three options of change of fuel:
1 with the AZL device
2 with selector “**OIL-EXT-GAS**” (Fig. 38)
3 with a remote selector connected to the main terminal board.

Placing the selector switch to “**EXT**” position, activates the remote selection of the fuel.

In this position, if there is no remote selector, the AZL device sets the priority fuel; the display shows the selected fuel.

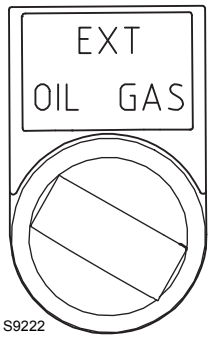


Fig. 38

6.8 Gas/air delivery adjustment

- ➤ Slightly move towards the maximum flow rate (butterfly valve fully open);
- ➤ adjust the maximum delivery required with the pressure stabiliser.
- ➤ Adjust the fuel parameters with the air servomotor and memorise the maximum combustion value;
- ➤ slowly complete the procedure, synchronising the combustion with the two servomotors and memorising the different adjustment values.

WARNING

For the start-up procedure and the adjustment of the parameters, see the specific manual of the electronic cam, supplied with the burner.

6.9 Light oil/air delivery adjustment

- ➤ Position the selector for selecting the light oil fuel.
- ➤ During the ignition phase, slightly move towards the oil servomotor, with an approximate adjustment of max. 90°.
- ➤ Adjust the maximum pressure on the return nozzle using the “nut and blocking nut”.
- ➤ Adjust the fuel parameters with the air servomotor and memorise the maximum combustion value;
- ➤ slowly complete the procedure, synchronising the combustion with the two servomotors
- ➤ Memorise the different adjustment values.

6.10 Checking the air and gas pressure on the combustion head

To carry out this operation a pressure gauge must be used to measure the air and gas pressure at the combustion head, as shown in Fig. 39.

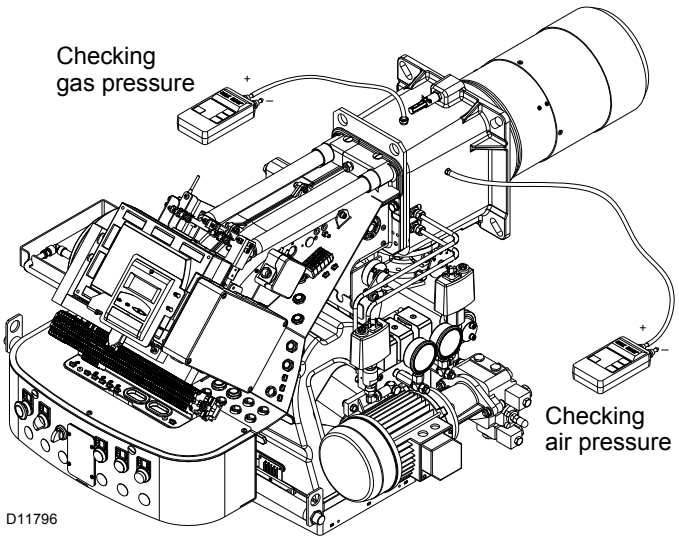


Fig. 39

6.11 Burner adjustment

6.11.1 Firing output

According to the regulation EN 676.

Burners with MAX output up to 120 kW

Ignition can be performed at the maximum operation output level.
Example:
– max. operation output: 120 kW
– max. firing output: 120 kW

Burners with MAX output above 120 kW

Ignition must be performed at a lower output than the max. operation output.
If ignition output does not exceed 120 kW, no calculations are required. If ignition output exceeds 120 kW, the regulations prescribe that the value be defined according to the control box safety time “ts”:
for ts = 3 s, ignition output must be equal to, or lower than, 1/3 of max. operation output.

Example:
MAX operation output of 450 kW.
The ignition output must be equal to, or less than, 150 kW with ts = 3 s

In order to measure the ignition output:
➤ disconnect the cable of flame sensor QRI 15)(Fig. 5 on page 11); the burner will fire and then go into lockout after the safety time has elapsed;
➤ perform 10 ignitions with consecutive lockouts;
➤ on the meter, read the quantity of gas burned:
this quantity must be equal to, or lower than, the quantity given by the formula, for ts = 3s:

$$Vg = \frac{\textbf{Qa} \text{ (max. burner delivery) } \textbf{x n x ts}}{\textbf{3600}}$$

Vg volume supplied in ignitions carried out (Sm^3)
Qa ignition delivery (Sm^3/h)
n number of ignitions (10)
ts safety time (sec)

Example for gas G 20 (9,45 kWh/Sm^3):
ignition output 150 kW corresponding to 15.87 Sm^3/h.
After 10 ignitions with lockout, the delivery indicated on the meter must be equal to, or less than:

$$Vg = \frac{\textbf{15.87 x 10 x 3}}{\textbf{3600}} = \textbf{0.132 Sm}^{\textbf{3}}$$

6.11.2 Maximum output

The MAX output must be set within the firing rate (Fig. 2 on page 9).

Gas adjustment

Measure the gas delivery on the meter.
As a general rule, this value can be found on Tab. L on page 25, just read the gas pressure on the pressure gauge (Fig. 35 on page 29) and follow the indications given on page 25.
– If it is necessary to reduce it, lower the output gas pressure via the pressure adjuster located beneath the gas valve.
– If it needs to be increased, increase the output gas pressure via the adjuster.

Air adjustment

If necessary vary the degrees of the air servomotor.

6.11.3 Minimum output

The MIN output must be set within the firing rate (Fig. 2 on page 9).

6.12 Final calibration of the pressure switches

6.12.1 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. 40).

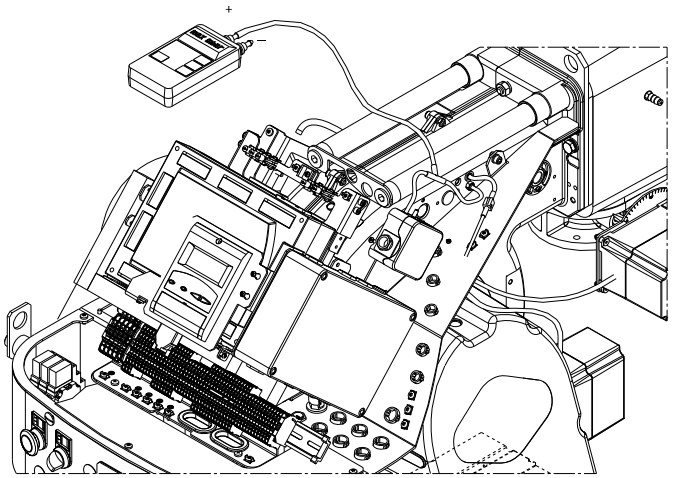
With the burner operating at MIN output, insert a combustion analyser in the stack, slowly close the suction inlet of the fan (for example, with a piece of cardboard) until the CO value does not exceed 100 ppm.

Slowly turn the appropriate knob clockwise until the burner goes into lockout.

Check the indication of the arrow pointing upwards on the graduated scale.
Turn the knob clockwise again, until the value shown on the graduated scale corresponds with the arrow pointing downwards, and so recovering the hysteresis of the pressure switch (shown by the white mark on a blue background, between the two arrows). Now check the correct start-up of the burner.

If the burner locks out again, turn the knob slightly anticlockwise.
During these operations it may be useful to measure the air pressure with a pressure gauge.
The connection of the pressure gauge is shown in (Fig. 40).

In certain applications in strong depression situations, the connection of the pressure switch does not allow it to change over.
In this case it is necessary to connect the pressure switch in differential mode, applying a second tube between the air pressure switch and the fan suction line mouth.
In this case, the pressure gauge must also be connected in differential mode.



D11694

Fig. 40

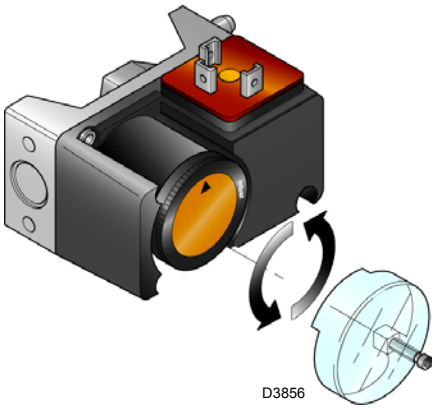
6.12.2 Maximum gas pressure switch

Adjust the maximum gas pressure switch after performing all the other burner adjustments with the pressure switch set to the end of the scale (Fig. 41).

With the burner operating at MAX output, lower the adjustment pressure by slowly turning the relative knob anticlockwise until the burner locks out.

Turn the knob clockwise by 2 mbar and repeat the start-up of the burner.

If the burner locks out again, turn the knob clockwise again by 1 mbar.



D3856

Fig. 41

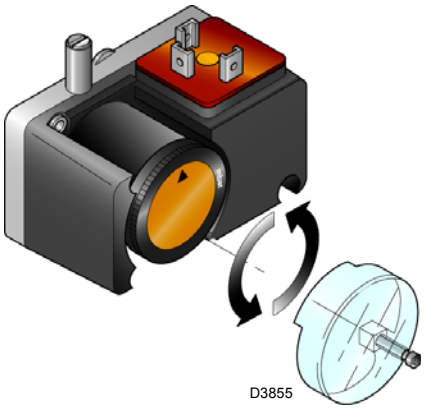
6.12.3 Minimum gas pressure switch

Adjust the minimum gas pressure switch after performing all the other burner adjustments with the pressure switch set to the start of the scale (Fig. 42).

With the burner operating at MAX output, increase adjustment pressure by slowly turning the relative knob clockwise until the burner stops.

Then turn the knob anticlockwise by 2 mbar and repeat burner start-up to ensure it is uniform.

If the burner locks out again, turn the knob anticlockwise again by 1 mbar.



D3855

Fig. 42

6.12.4 Minimum oil pressure switch

The minimum oil pressure switch (Fig. 43) is calibrated in the factory at 18 bar. If the oil pressure falls below this value in the delivery line, the pressure switch stops the burner.

The burner restarts automatically if the pressure goes above 18 bar after the burner starts.

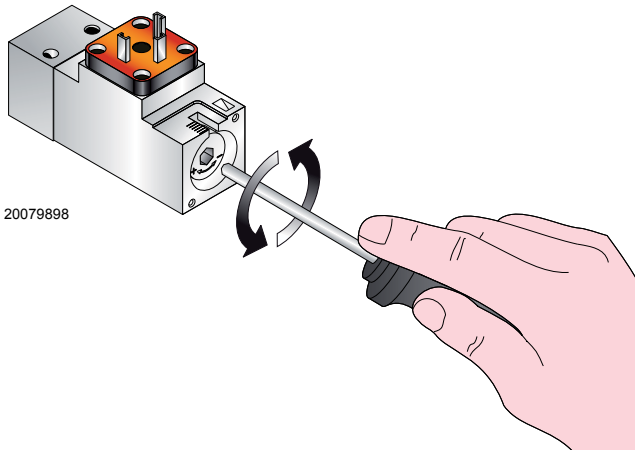


Fig. 43

6.13 Final checks (with burner operating)

➤ Open the thermostat/pressure switch TL ➤ Open the thermostat/pressure switch TS	⇨	The burner must stop
➤ Turn the knob of the gas maximum pressure switch knob to the minimum end of scale position ➤ Turn the knob of the air pressure switch to the maximum end of scale position	⇨	The burner must stop in lockout
➤ Turn off the burner and cut off the power ➤ Disconnect the minimum gas pressure switch connector ➤ Turn the knob of the minimum oil pressure switch to the maximum end of scale position	⇨	The burner must not start
➤ Darken the flame sensor QRI	⇨	The burner must stop in lockout due to ignition failure

Tab. M

WARNING

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

7 Maintenance

7.1 Notes on safety for the maintenance

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

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

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 main system switch.

DANGER

Turn off the fuel interception tap.

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 flue gases. Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.

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.

Flame inspection window

Clean the glass of the flame inspection window

Combustion head

Open the burner and make sure that all components of the combustion head are in good condition, not deformed by the high temperatures, free of impurities from the surroundings and correctly positioned. In case of doubts, remove the internal part.

Nozzles (light oil)

Do not clean the nozzle openings; it is also advisable to not open them, while it is possible to clean or change the filter.

Replace the nozzles every 2-3 years or whenever necessary. The change of nozzles requires a control of the combustion.

IRD cell

Clean the glass cover from any dust that may have accumulated.

Voltage on the QRI cell

Minimum value for correct operation: 3.5V DC (value on AZL display at about 50%).

If the value is lower, it could be due to:
– cell not positioned correctly
– low voltage (lower than 187V)
– bad regulation of the burner

In order to measure, use a voltmeter with a 10V DC scale connected as in the diagram (Fig. 44).

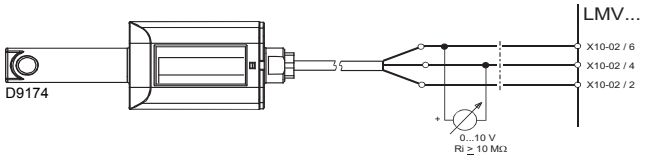


Fig. 44

Flexible hoses (light oil)

Check to make sure that the flexible hoses are still in good condition and that they are not crushed or otherwise deformed.

Burner

Check for excess wear or loose screws in the mechanisms controlling the air damper and the gas butterfly valve. Also make sure that the screws securing the electrical leads in the burner connections are fully tightened.

Combustion

Adjust the burner if the combustion values found at the beginning of the operation do not comply with the regulations in force or, at any rate, do not produce good combustion.

Use the appropriate card to record the new combustion values; they will be useful for subsequent controls.

7.3 Opening the burner

DANGER

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

DANGER

Turn off the fuel interception tap.

DANGER

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

- ➤ Loosen the screws 1) and remove the hood 2).
- ➤ Remove the screws 7) from the two slide bars 4).
- ➤ Assemble the two extensions 9) on the slide bars 4).
- ➤ Refit the screws 7) on the extensions.
- ➤ Disconnect the socket from the maximum gas pressure switch.
- ➤ Disconnect the light oil pipes 6).
- ➤ Remove the screws 3) and move the burner backwards by about 100 mm on the slide bars 4). Disconnect the electrode cables, then completely retract the burner.
- ➤ At this point it is possible to extract the inner part 5) after having removed the screw 10).

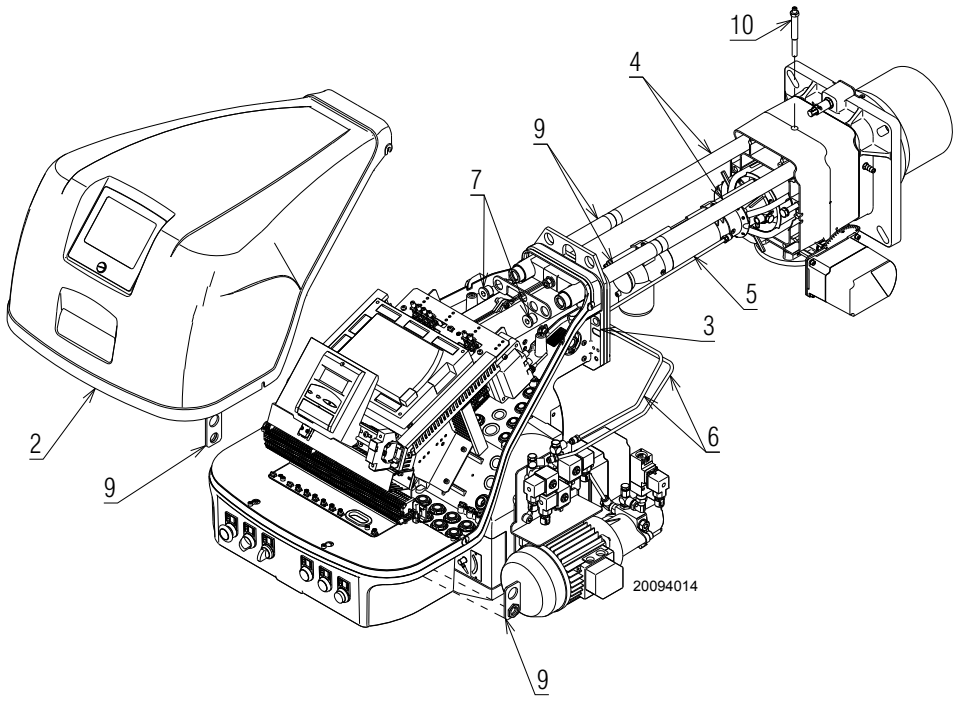


Fig. 45

7.4 Closing the burner

- ➤ Push the burner to approximately 100 mm from the pipe coupling.
- ➤ Reconnect the cables and slide in the burner until it comes to a stop.
- ➤ Replace the screws 3) and carefully pull the probe and electrode cables outwards until they are slightly taut.
- ➤ Reconnect the light oil pipes 6).
- ➤ Connect the socket of the maximum gas pressure switch.
- ➤ Disassemble both slide bar extensions 9) and place it in the original position.

Carry out all maintenance work and mount the casing again.

8 Faults - Possible causes - Solutions

If faults arise in ignition or operations, the burner performs a “safety stop”, which is signalled by the red burner lockout LED.

The display of the operator panel visualises alternately the lock-out code and the relative diagnostic.

To restore start-up conditions, refer to the Start-up, calibration and operation of the burner.

When the burner starts up again, the red LED goes out.

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.

A Appendix - Accessories

Long head kit

Burner	Standard head length (mm)	Extended head length (mm)	Code
RLS 120/EV MX TC FS2	260	395	3010360

Spacer kit

Burner	Thickness (mm)	Code
RLS 120/EV MX TC FS2	102	3000722

Continuous purging kit

Burner	Code
RLS 120/EV MX TC FS2	3010094

Soundproofing box kit

Burner	Code	Type	Noise reduction
RLS 120/EV MX TC FS2	3010404	C4/5	10 [dB(A)]

Head kit for flame inversion boiler

Burner	Code
RLS 120/EV MX TC FS2	20006402

Inverter kit (variable speed drive)

Burner	Max output (kW)	Code
RLS 120/EV MX TC FS2	3,0	20063533

Probe for checking temperature/pressure

Parameter to be checked		Probe	
	Adjustment field	Type	Code
Temperature	- 100...+ 500°C	PT 100	3010110
Pressure	0...2.5 bar 0...16 bar	Output probe 4....20 mA	3010213 3010214

Software interface kit

Burner	Code
RLS 120/EV MX TC FS2	3010388

Air/combustion fume temperature sensor

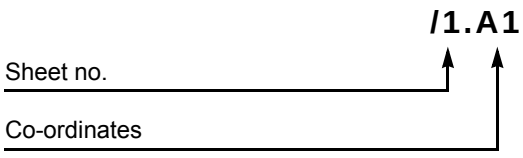
Parameter to be checked		Probe	
	Adjustment field	Type	Code
Temperature	- 100...+ 500°C	PT 1000Ni1000	3010377

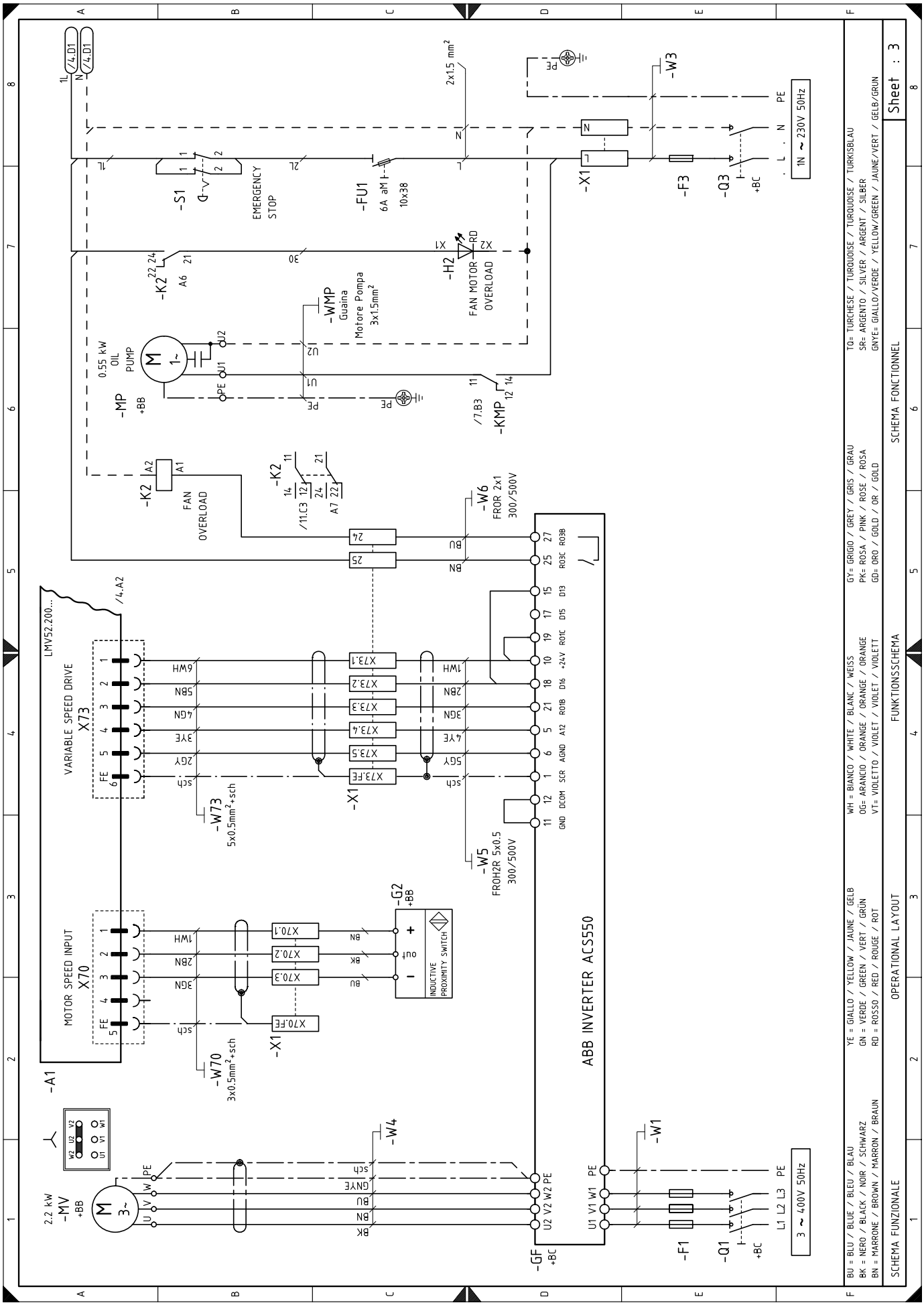
Gas trains in compliance with EN 676

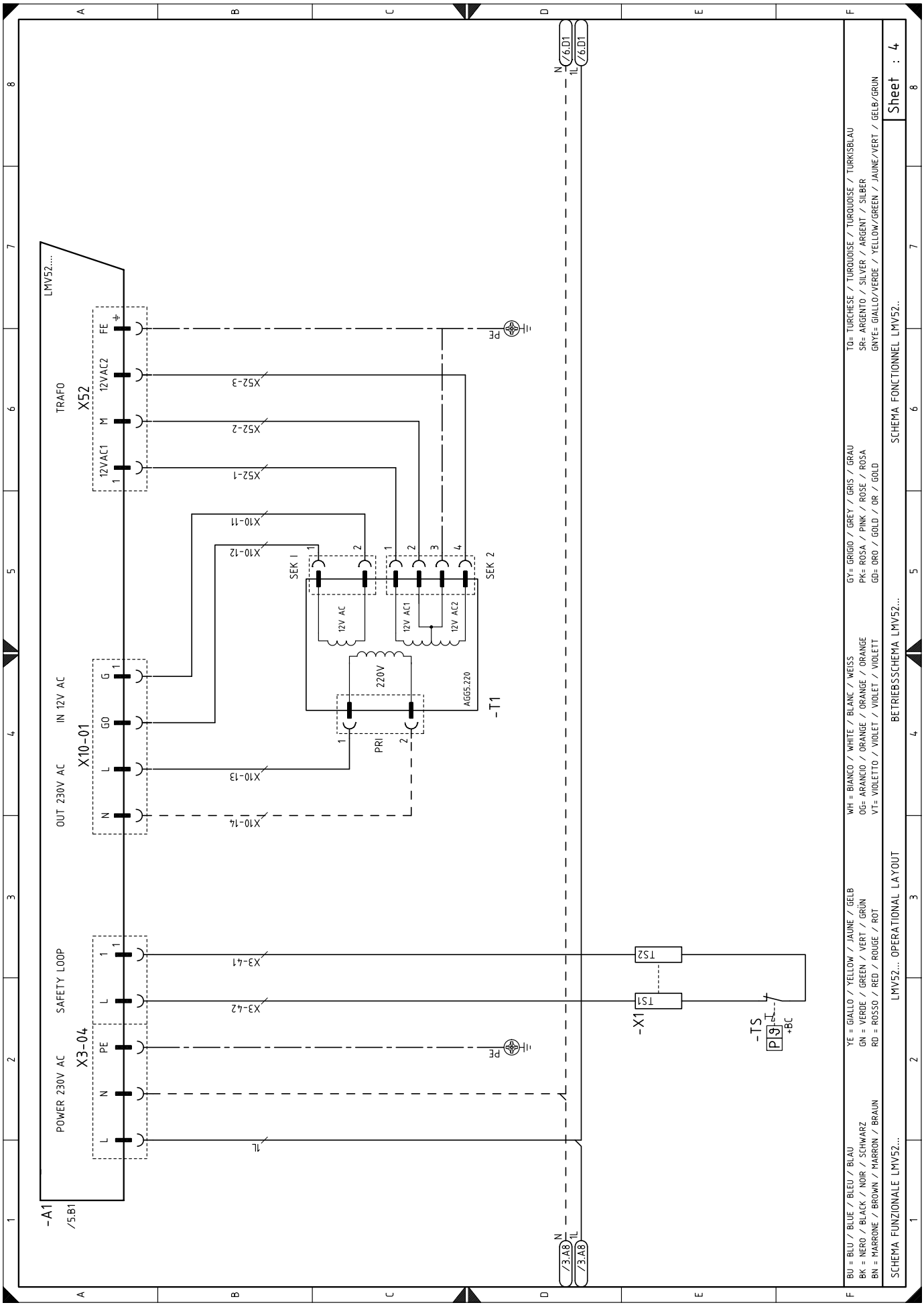
Please refer to manual.

B Appendix - Electrical panel layout

2 Indication of references




SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 3
1N ~ 230V 50Hz
3 ~ 400V 50Hz
ABB INVERTER ACS550
LMV52.200...
VARIABLE SPEED DRIVE
MOTOR SPEED INPUT
INDUCTIVE PROXIMITY SWITCH
EMERGENCY STOP
FAN OVERLOAD
FAN MOTOR OVERLOAD
OIL PUMP
-S1
-FU1
-K2
-H2
-WMP
-MP
-KMP
-X1
-F3
-Q3
-W3
-W6
-W73
-W5
-W70
-A1
-G2
-MV
-W4
-GF
-F1
-Q1
-W1


LMV52....
TRAFO
X52
12VAC2
M
12VAC1
FE
X52-3
X52-2
X52-1
X10-11
X10-12
SEK 1
SEK 2
12V AC
12V AC1
12V AC2
220V
AGG5.220
-T1
PRI
X10-01
OUT 230V AC
IN 12V AC
GO
G
X10-13
X10-14
X3-04
POWER 230V AC
SAFETY LOOP
PE
N
L
X3-41
X3-42
-A1
/5.B1
PE
TL
TS2
TS1
-X1
-TS
P9
+BC
/6.D1
/3.A8
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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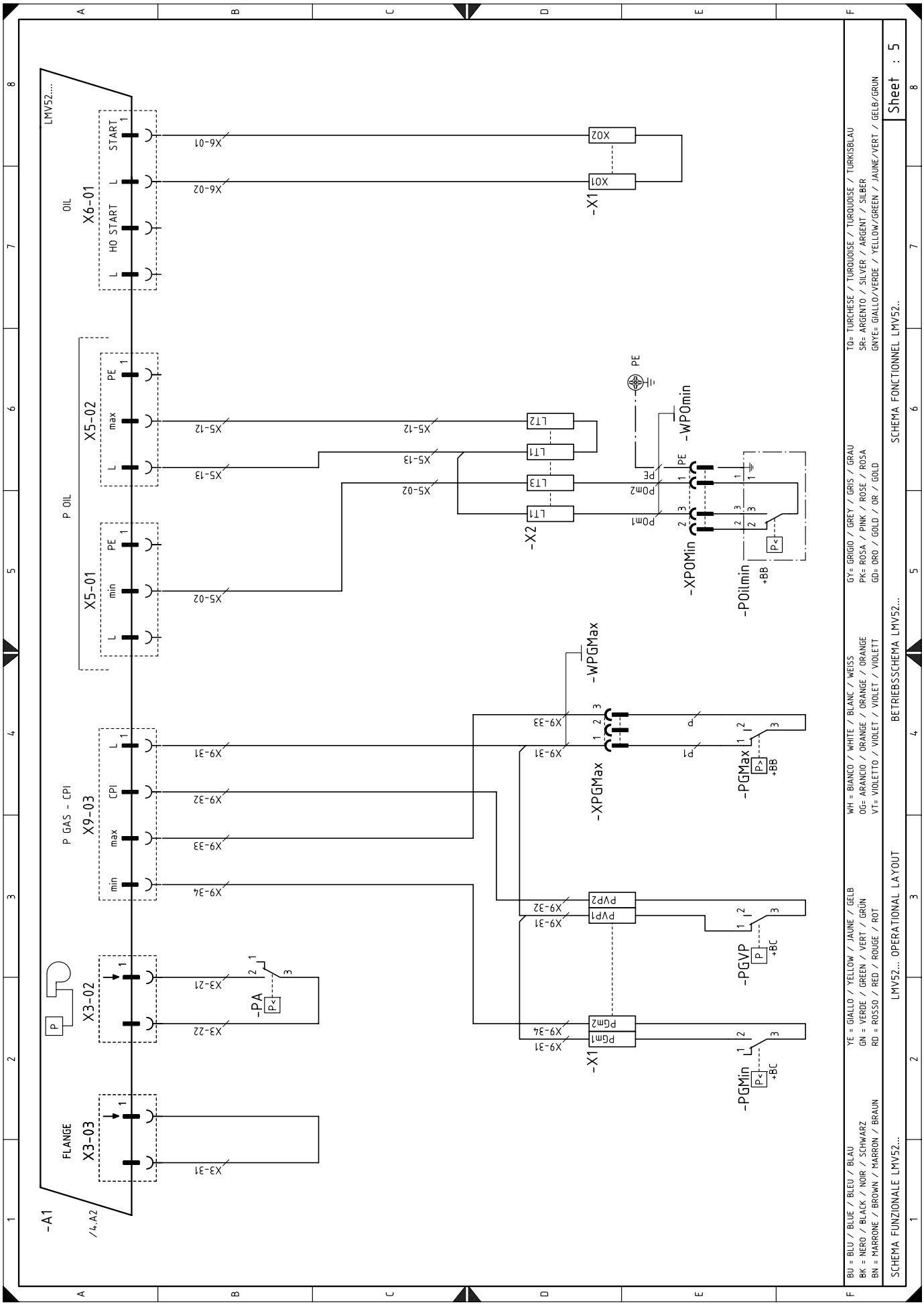
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 4


LMV52....
-A1
/4.A2
FLANGE
X3-03
X3-02
P GAS - CPI
X9-03
P OIL
X5-01
X5-02
OIL
X6-01
START
HO START
-X1
-X2
-wPGMax
-XPGMax
-PGMax
-PGVP
-PGMin
-PA
-wPOmin
-XPOMin
-POilmin
PE
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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RD = ROSSO / RED / ROUGE / ROT
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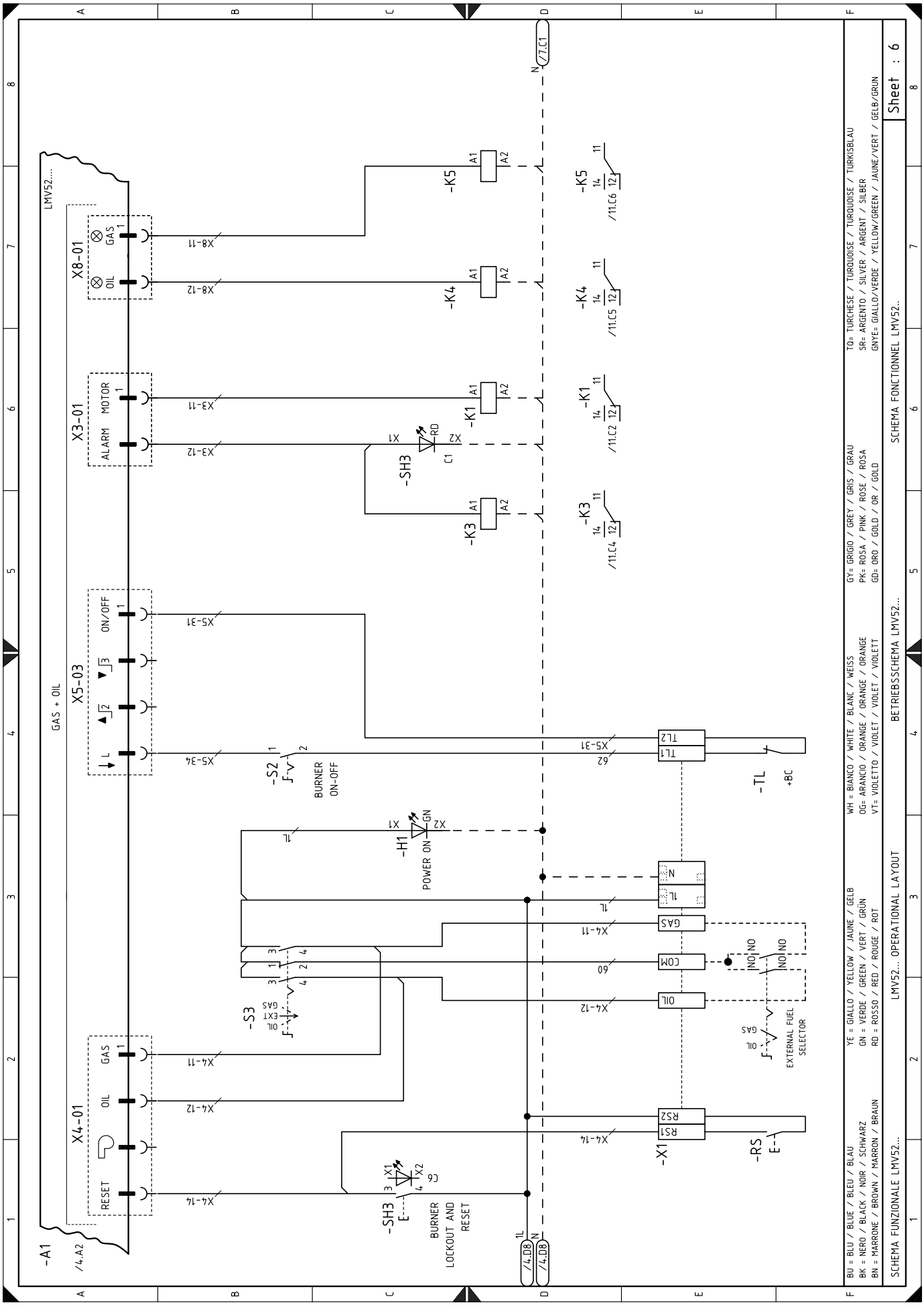
SCHEMA FUNZIONALE LMV52...
LMV52.. OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52..
Sheet : 5


LMV52....
GAS + OIL
X8-01
X3-01
X5-03
X4-01
ON/OFF
MOTOR
ALARM
GAS
OIL
RESET
-A1
/4.A2
-K5
-K4
-K1
-K3
-SH3
-S2
BURNER ON-OFF
-H1
POWER ON
-S3
-SH3
BURNER LOCKOUT AND RESET
-TL
+BC
-X1
-RS
EXTERNAL FUEL SELECTOR
GAS
OIL
COM
TL1
TL2
RS1
RS2
N
L
/7.C1
/11.C6
/11.C5
/11.C2
/11.C4
/4.D8
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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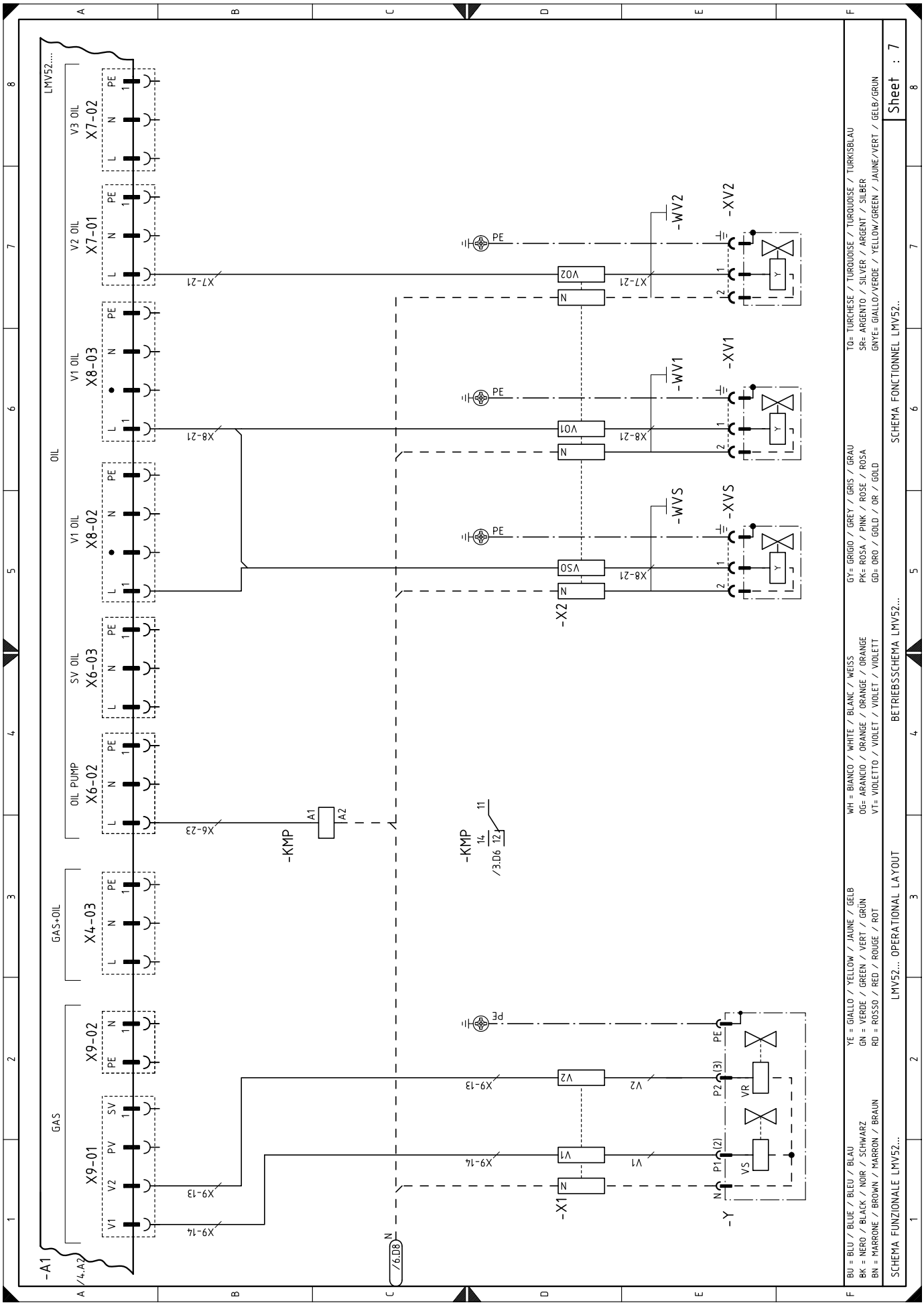
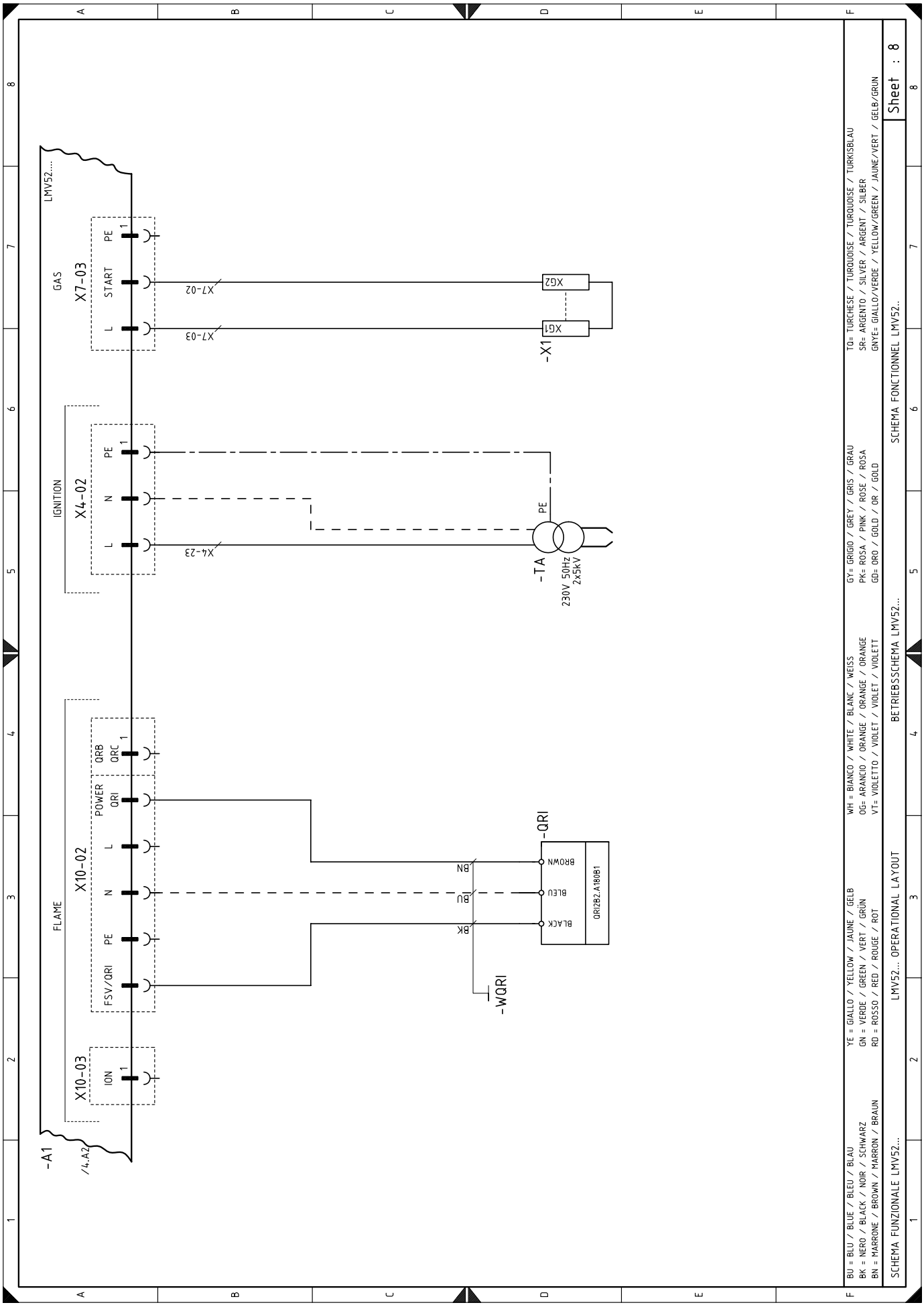
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 6


LMV52....
OIL
GAS
GAS+OIL
OIL PUMP
SV OIL
V1 OIL
V2 OIL
V3 OIL
X9-01
X9-02
X4-03
X6-02
X6-03
X8-02
X8-03
X7-01
X7-02
-A1
-KMP
-X1
-X2
-Y
-WV2
-XV2
-WV1
-XV1
-WVS
-XVS
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 7


LMV52....
GAS
X7-03
PE
START
L
X7-02
X7-03
XG2
XG1
-X1
IGNITION
X4-02
PE
N
L
X4-23
-TA
230V 50Hz
2x5kV
FLAME
X10-02
POWER
QRB
QRC
QRI
L
N
PE
FSV/QRI
X10-03
ION
-A1
/4.A2
-QRI
BROWN
BLEU
BLACK
QRI2B2.A1B0B1
BN
BU
BK
-WQRI
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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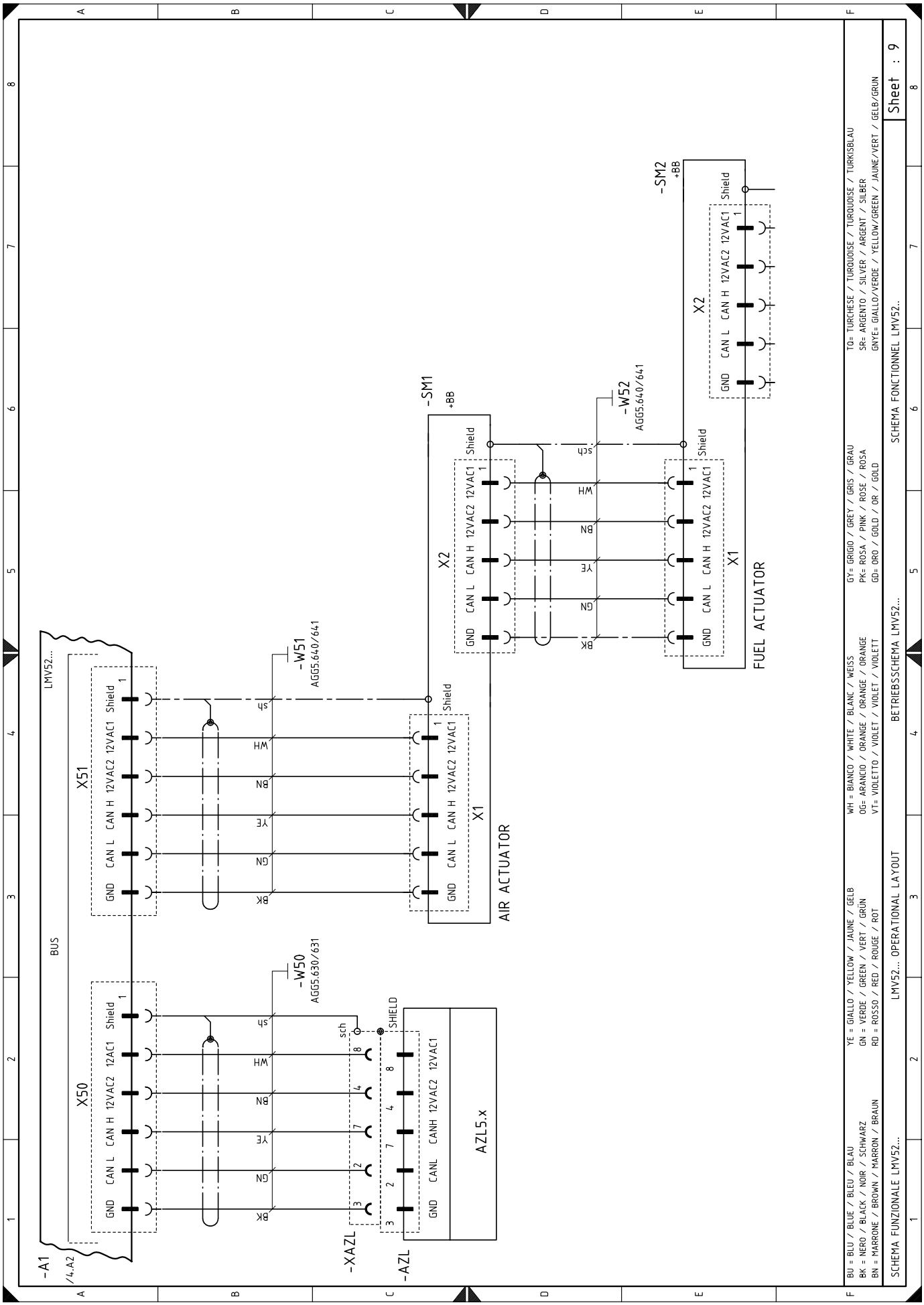
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52..
Sheet : 8


-A1
/4.A2
LMV52...
X50
GND CAN L CAN H 12VAC2 12AC1 Shield
X51
GND CAN L CAN H 12VAC2 12VAC1 Shield
BUS
-W50
AGG5.630/631
-W51
AGG5.640/641
-W52
AGG5.640/641
-XAZL
SHIELD
-AZL
GND CANL CANH 12VAC2 12VAC1
AZL5.x
-SM1
+BB
X2
GND CAN L CAN H 12VAC2 12VAC1 Shield
X1
AIR ACTUATOR
-SM2
+BB
X2
GND CAN L CAN H 12VAC2 12VAC1 Shield
X1
FUEL ACTUATOR
BK GN YE BN WH sch
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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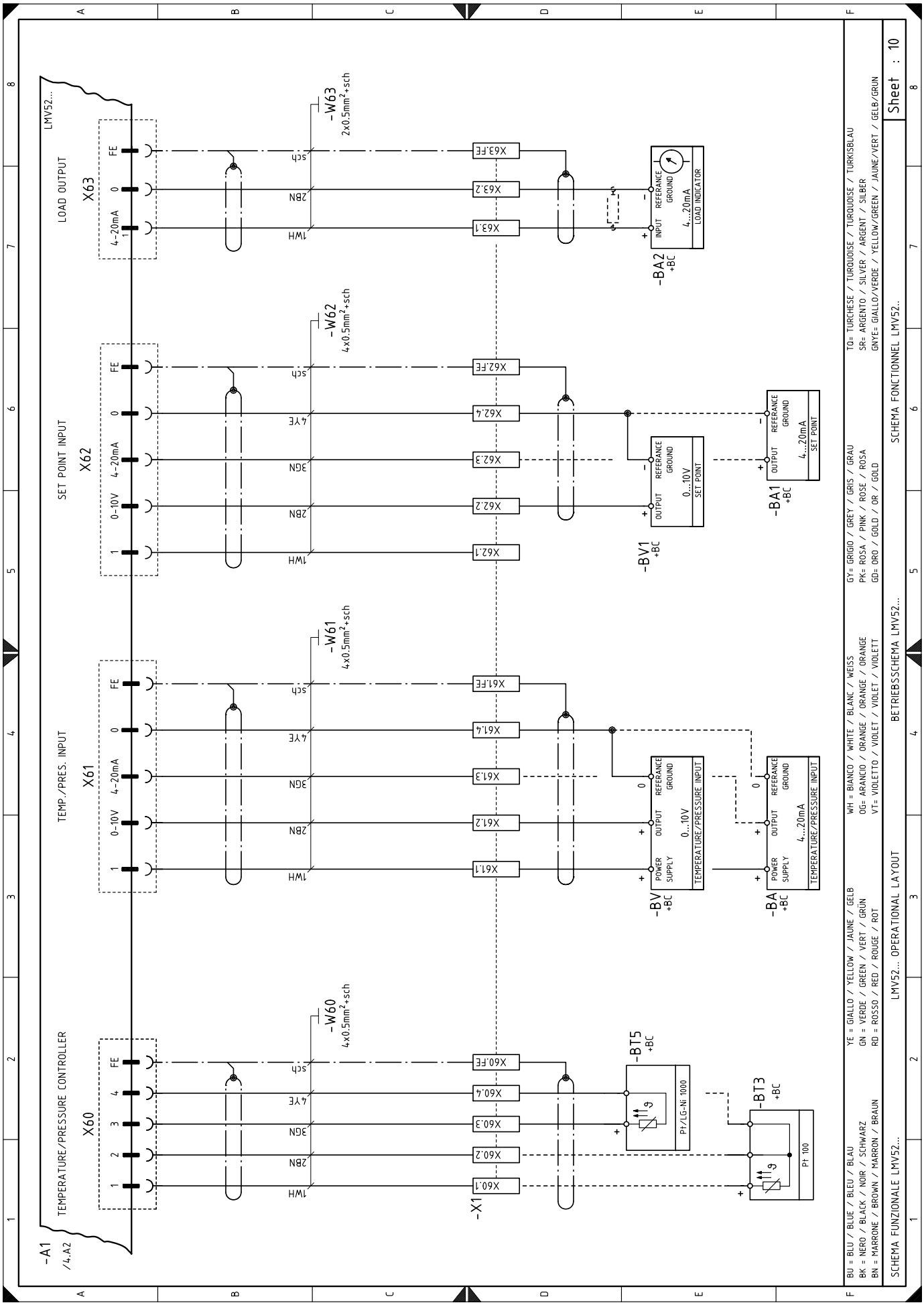
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 9


-A1
/4.A2
TEMPERATURE/PRESSURE CONTROLLER
X60
TEMP./PRES. INPUT
X61
SET POINT INPUT
X62
LOAD OUTPUT
X63
LMV52...
-W60
4x0.5mm²+sch
-W61
4x0.5mm²+sch
-W62
4x0.5mm²+sch
-W63
2x0.5mm²+sch
-X1
-BT5 +BC
-BT3 +BC
-BV +BC
-BA +BC
-BV1 +BC
-BA1 +BC
-BA2 +BC
Pt/LG-Ni 1000
Pt 100
TEMPERATURE/PRESSURE INPUT
LOAD INDICATOR
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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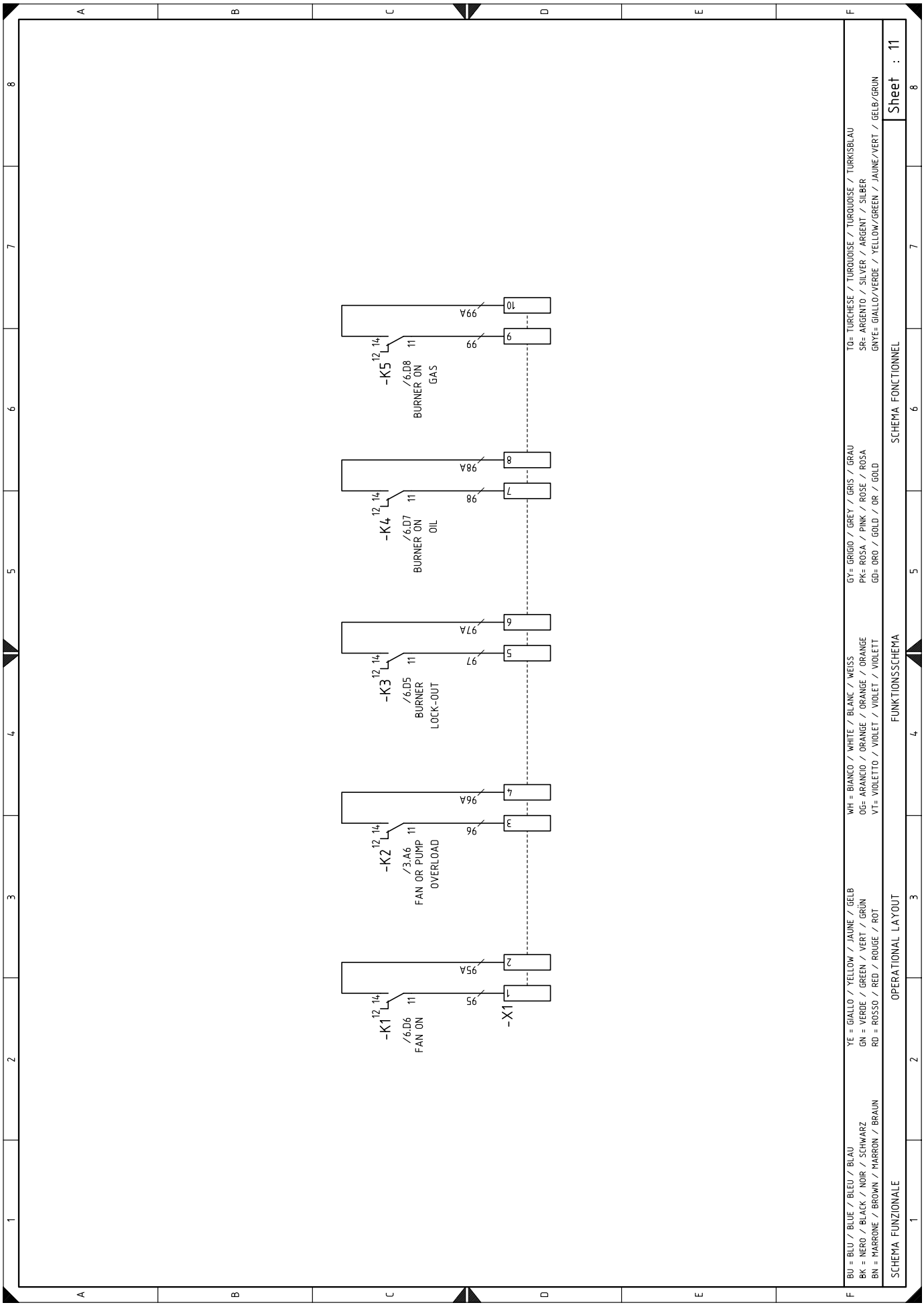
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 10


-K5
/6.D8
BURNER ON
GAS
-K4
/6.D7
BURNER ON
OIL
-K3
/6.D5
BURNER
LOCK-OUT
-K2
/3.A6
FAN OR PUMP
OVERLOAD
-K1
/6.D6
FAN ON
-X1
99A
99
98A
98
97A
97
96A
96
95A
95
10
9
8
7
6
5
4
3
2
1
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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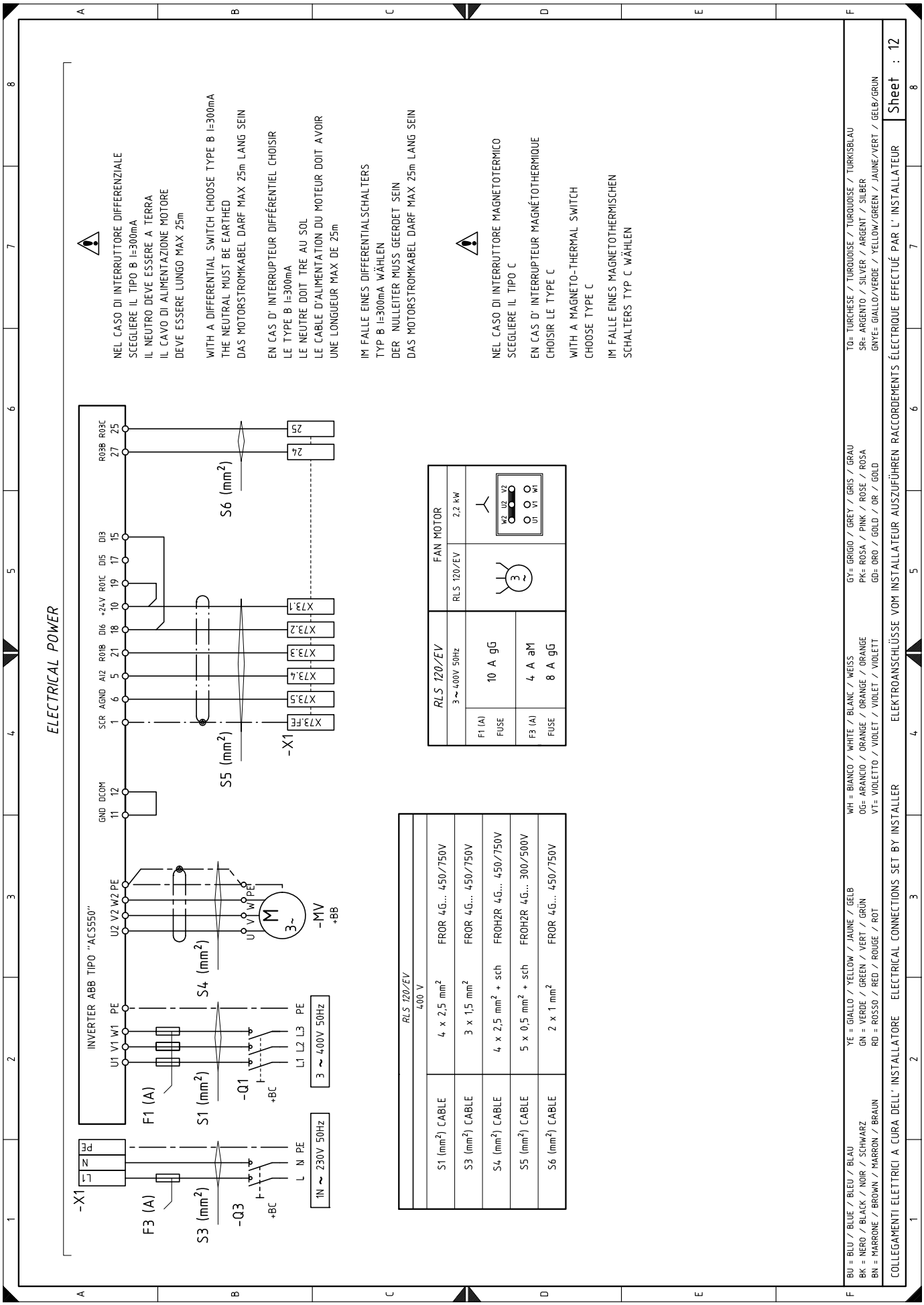
SCHEMA FUNZIONALE
OPERATIONAL LAYOUT
FUNKTIONSSCHEMA
SCHEMA FONCTIONNEL
Sheet : 11


ELECTRICAL POWER
INVERTER ABB TIPO "ACS550"
-X1
F1 (A)
F3 (A)
-Q1
-Q3
-MV
+BB
+BC
S1 (mm²)
S3 (mm²)
S4 (mm²)
S5 (mm²)
S6 (mm²)
3 ~ 400V 50Hz
1N ~ 230V 50Hz
RLS 120/EV
FAN MOTOR
2,2 kW
10 A gG
4 A aM
8 A gG
NEL CASO DI INTERRUTTORE DIFFERENZIALE
SCEGLIERE IL TIPO B I=300mA
IL NEUTRO DEVE ESSERE A TERRA
IL CAVO DI ALIMENTAZIONE MOTORE
DEVE ESSERE LUNGO MAX 25m
WITH A DIFFERENTIAL SWITCH CHOOSE TYPE B I=300mA
THE NEUTRAL MUST BE EARTHED
DAS MOTORSTROMKABEL DARF MAX 25m LANG SEIN
EN CAS D' INTERRUPTEUR DIFFÉRENTIEL CHOISIR
LE TYPE B I=300mA
LE NEUTRE DOIT TRE AU SOL
LE CABLE D'ALIMENTATION DU MOTEUR DOIT AVOIR
UNE LONGUEUR MAX DE 25m
IM FALLE EINES DIFFERENTIALSCHALTERS
TYP B I=300mA WÄHLEN
DER NULLEITER MUSS GEERDET SEIN
DAS MOTORSTROMKABEL DARF MAX 25m LANG SEIN
NEL CASO DI INTERRUTTORE MAGNETOTERMICO
SCEGLIERE IL TIPO C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
CHOISIR LE TYPE C
WITH A MAGNETO-THERMAL SWITCH
CHOOSE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN
SCHALTERS TYP C WÄHLEN
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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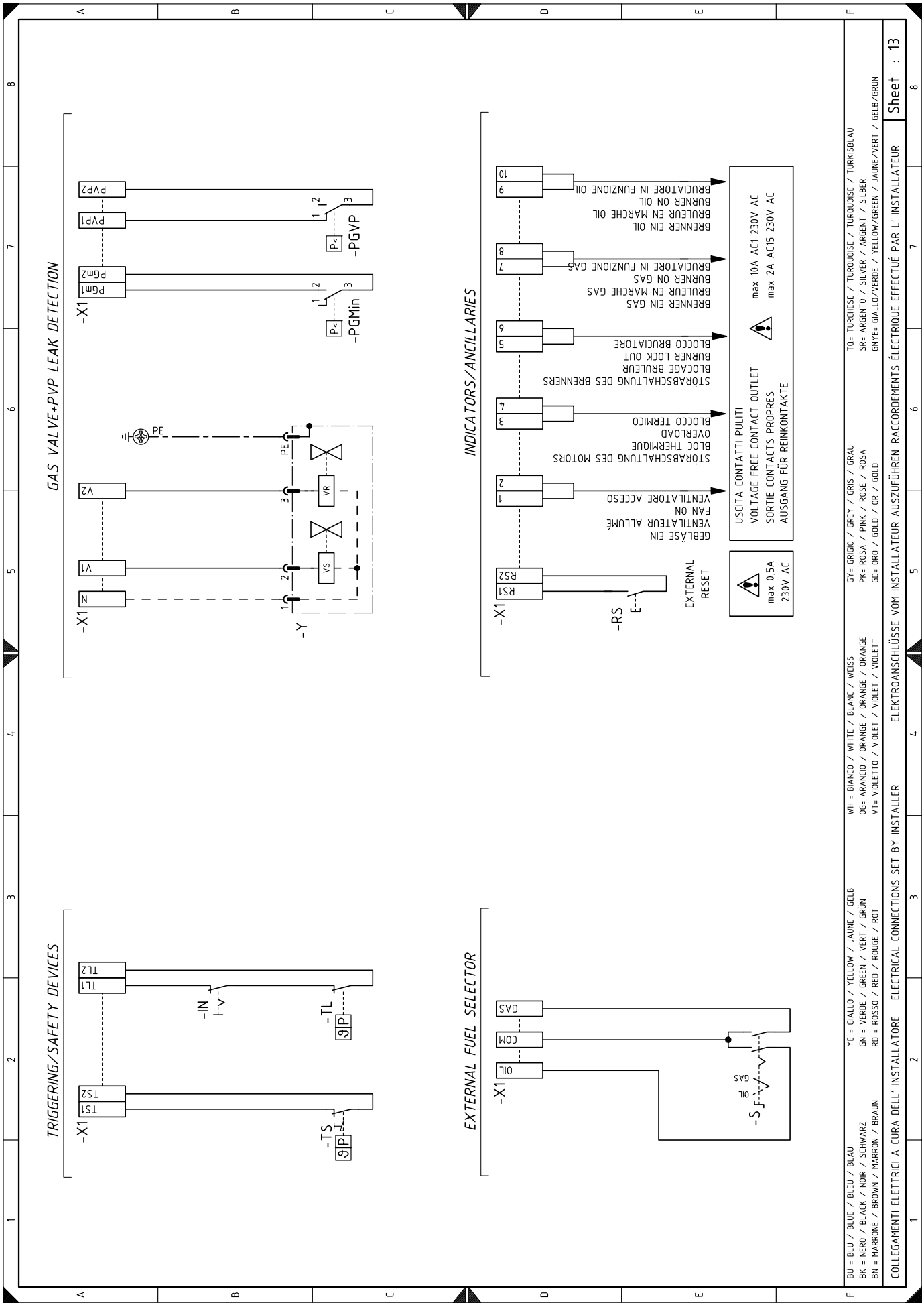
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE
ELECTRICAL CONNECTIONS SET BY INSTALLER
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN
RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 12


GAS VALVE+PVP LEAK DETECTION
-X1
PGm1
PGm2
PVP1
PVP2
-PGMin
-PGVP
P<
-Y
V1
V2
N
PE
VS
VR
INDICATORS/ANCILLARIES
-X1
-RS
EXTERNAL RESET
RS1
RS2
1
2
3
4
5
6
7
8
9
10
VENTILATORE ACCESO
FAN ON
GEBLÄSE EIN
VENTILATEUR ALLUMÉ
BLOCCO TERMICO
BLOC THERMIQUE
OVERLOAD
STÖRABSCHALTUNG DES MOTORS
BLOCCO BRUCIATORE
BURNER LOCK OUT
BLOCAGE BRULEUR
STÖRABSCHALTUNG DES BRENNERS
BRUCIATORE IN FUNZIONE GAS
BURNER ON GAS
BRULEUR EN MARCHE GAS
BRENNER EIN GAS
BRUCIATORE IN FUNZIONE OIL
BURNER ON OIL
BRULEUR EN MARCHE OIL
BRENNER EIN OIL
USCITA CONTATTI PULITI
VOLTAGE FREE CONTACT OUTLET
SORTIE CONTACTS PROPRES
AUSGANG FÜR REINKONTAKTE
max 10A AC1 230V AC
max 2A AC15 230V AC
max 0,5A
230V AC
TRIGGERING/SAFETY DEVICES
-X1
TS1
TS2
TL1
TL2
-TS
-TL
-IN
9P
EXTERNAL FUEL SELECTOR
-X1
OIL
COM
GAS
-SF
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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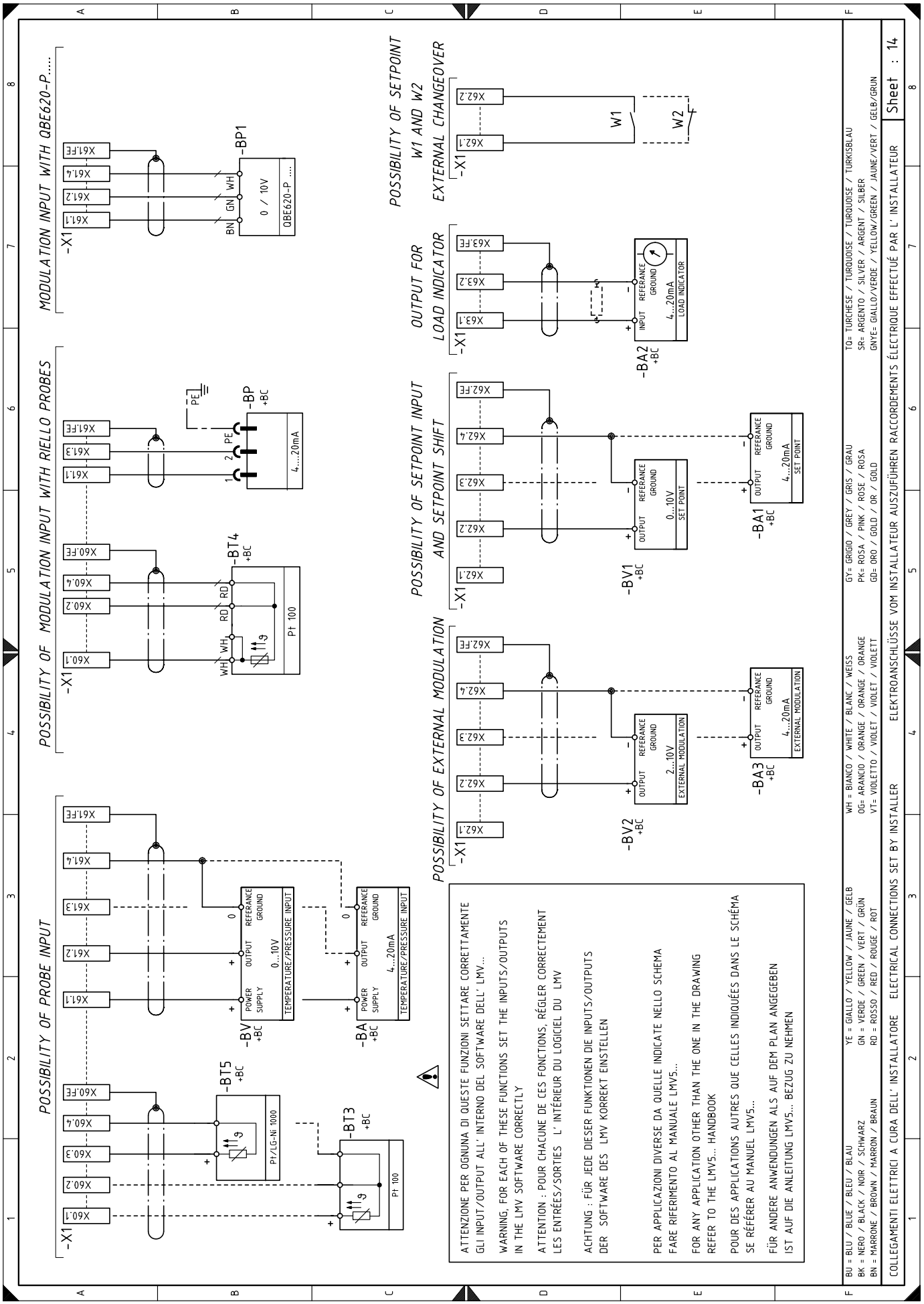
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 13


MODULATION INPUT WITH QBE620-P.....
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
POSSIBILITY OF PROBE INPUT
POSSIBILITY OF EXTERNAL MODULATION
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
OUTPUT FOR LOAD INDICATOR
POSSIBILITY OF SETPOINT W1 AND W2 EXTERNAL CHANGEOVER
-X1
-BP1
QBE620-P ....
0 / 10V
-BP
4....20mA
-BT4
Pt 100
-BT5
Pt/Ni-Ni 1000
-BT3
-BV
-BA
TEMPERATURE/PRESSURE INPUT
-BV2
EXTERNAL MODULATION
-BA3
-BV1
SET POINT
-BA1
-BA2
LOAD INDICATOR
W1
W2
ATTENZIONE PER OGNUNA DI QUESTE FUNZIONI SETTARE CORRETTAMENTE GLI INPUT/OUTPUT ALL' INTERNO DEL SOFTWARE DELL' LMV...
WARNING, FOR EACH OF THESE FUNCTIONS SET THE INPUTS/OUTPUTS IN THE LMV SOFTWARE CORRECTLY
ATTENTION : POUR CHACUNE DE CES FONCTIONS, RÉGLER CORRECTEMENT LES ENTRÉES/SORTIES L' INTÉRIEUR DU LOGICIEL DU LMV
ACHTUNG : FÜR JEDE DIESER FUNKTIONEN DIE INPUTS/OUTPUTS DER SOFTWARE DES LMV KORREKT EINSTELLEN
PER APPLICAZIONI DIVERSE DA QUELLE INDICATE NELLO SCHEMA FARE RIFERIMENTO AL MANUALE LMV5...
FOR ANY APPLICATION OTHER THAN THE ONE IN THE DRAWING REFER TO THE LMV5... HANDBOOK
POUR DES APPLICATIONS AUTRES QUE CELLES INDIQUÉES DANS LE SCHÉMA SE RÉFÉRER AU MANUEL LMV5...
FÜR ANDERE ANWENDUNGEN ALS AUF DEM PLAN ANGEGEBEN IST AUF DIE ANLEITUNG LMV5... BEZUG ZU NEHMEN
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
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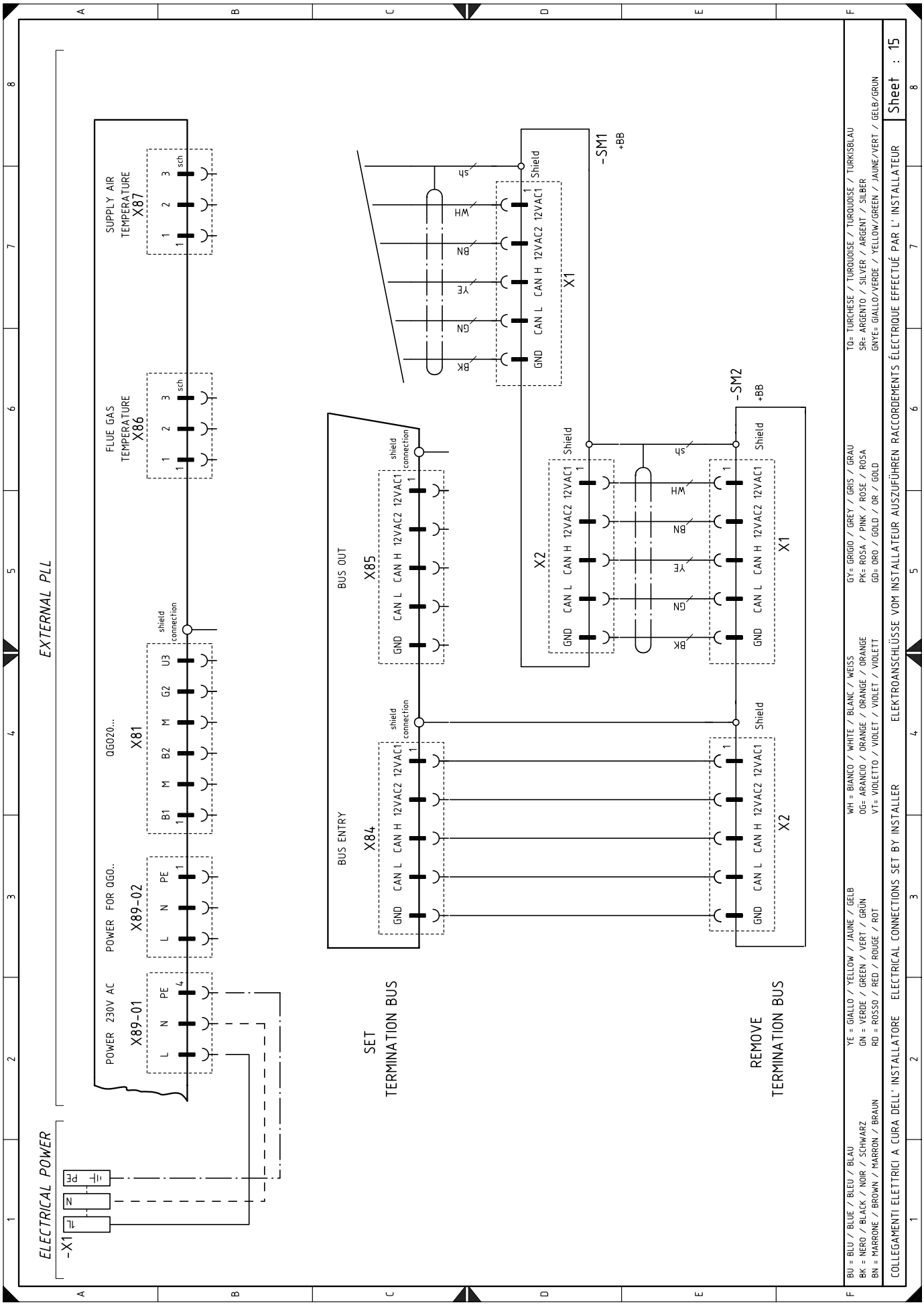
Sheet : 14


EXTERNAL PLL
ELECTRICAL POWER
-X1
POWER 230V AC
X89-01
POWER FOR QGO..
X89-02
QGO20...
X81
B1 M B2 M G2 U3
shield connection
FLUE GAS TEMPERATURE
X86
SUPPLY AIR TEMPERATURE
X87
1 2 3 sch
BUS ENTRY
X84
GND CAN L CAN H 12VAC2 12VAC1
SET TERMINATION BUS
BUS OUT
X85
-SM1
+BB
X1
GND CAN L CAN H 12VAC2 12VAC1 Shield
X2
-SM2
REMOVE TERMINATION BUS
BK GN YE BN WH sh
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 15

Key to electrical panel layout

+BB	Burner components
+BC	Boiler components
A1	Control box
AZL	Display and calibration unit
BA	Probe with output under current DC 4....20 mA
BA1	Device with output under current DC 4....20 mA to modify remote setpoint
BA2	Load indicator
BA3	Probe for external modulation DC 4...20 mA
BP	Pressure probe
BP1	Pressure probe
BT3	Probe Pt100, 3 wires
BT4	Probe Pt100, 3 wires
BT5	Probe PT7LG-Ni1000
BV	Output probe in voltage DC 0....10V
BV1	Output probe in voltage DC 0...10V to modify remote setpoint
BV2	Probe for external modulation 2...10V
FU1	Protection fuse
F1	Inverter power supply fuses
F3	Single-phase line fuses
G2	Rpm sensor
GF	Inverter
H1	Green indicator light “POWER ON”
H2	Red indicator light “FAN MOTOR OVERLOAD”
K1	Relay K1 (clean contacts “FAN ON”)
K2	Relay K2 (clean contacts “OVERLOAD”)
K3	Relay K3 (clean contacts “BURNER LOCK-OUT”)
K4	Relay (clean contacts “OIL OPERATION”)
K5	Relay K5 (clean contacts “GAS OPERATION”)
KMP	Pump motor relay
IN	Manual stop switch
MP	Pump motor
MV	Fan motor
PA	Air pressure switch
PE	Burner earth
PGMax	Maximum gas pressure switch
PGMin	Minimum gas pressure switch
PGVP	Gas pressure switch for valve leak detection control device
PoilMin	Minimum oil pressure switch
Q1	Inverter line disconnect switch
Q3	Single-phase line disconnecting switch
QRI	Flame sensor QRI
RS	Remote burner reset button
S	External fuel selector
SH3	Burner reset button and lockout signal
SM1	Air servomotor
SM2	Gas servomotor
S1	Emergency stop button
S2	“OFF/ON” selector
S3	“OIL-EXT-GAS” selector
TA	Ignition transformer
T1	Control box power supply transformer
TL	Thermostat/limit pressure switch
TS	Safety thermostat/pressure switch
V1	Oil valve 1st stage
V2	Oil valve 2nd stage
VS	Oil safety valve
XPGMax	Maximum gas pressure switch connector
XPoilMin	Minimum oil pressure switch connector
XAZL	Display and calibration unit connector
XVS	Oil safety valve connector
XV1	Oil valve 1st stage connector
XV2	Oil valve 2nd stage connector
X1	Terminal board
X2	Oil valve terminal board
Y	Gas valves group

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