GB

Forced draught gas burners

Modulating operation

CODE	MODEL	TYPE
20205457	RS 68/E O2 ULX	S041T1
20205459	RS 120/E O2 ULX	S042T1
20205460	RS 160/E O2 ULX	S043T1
20205462	RS 200/E O2 ULX	S044T1

20205911 (3) - 01/2024

Translation of the original instructions

1 Information and general warnings

1.1 Information about the instruction manual

1.1.1 Introduction

The instruction manual supplied with the burner:

- ➤ is an integral and essential part of the product and must not be separated from it; it must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. If the manual is lost or damaged, another copy must be requested from the Technical Assistance 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.

1.1.2 General dangers

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

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

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

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

1.1.3 Other symbols

DANGER: LIVE COMPONENTS

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

DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.

DANGER: BURNING

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

DANGER: CRUSHING OF LIMBS

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

WARNING: MOVING PARTS

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

DANGER: EXPLOSION

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

PERSONAL PROTECTION EQUIPMENT

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

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

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

ENVIRONMENTAL PROTECTION

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

IMPORTANT INFORMATION

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

➤ This symbol indicates a list.

Abbreviations used

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

1.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

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

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

.....

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

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

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

1.2 Guarantee and responsibility

The manufacturer guarantees its new products from the installation date, 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;
➤ use of the burner even following an error and/or an irregularity;
➤ 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;
➤ the use of non-original components, including spare parts, kits, accessories and optional;
➤ force majeure.

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

2 Safety and prevention

2.1 Introduction

The burners have been designed and built in compliance with current regulations and directives, applying the known technical 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 users expressly named by the manufacturer; the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the 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.

2.2 Personnel training

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

The user:

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

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

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

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

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

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

In addition:

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

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

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

3 Technical description of the burner

3.1 Burner designation

Range: R

Fuel:		
	S	Natural gas
	L	Light Oil
	LS	Light Oil/Natural gas
	N	Heavy Oil

Size:

Adjustment:		
	BP	Two stage (light oil / proportional valve (gas)
	M	Mechanical cam
	E	Electronic Cam
	EV	Electronic cam and variable speed (with Inverter)
	EVi	Electronic cam with integrated Inverter
	E O_2	Electronic cam and suitable for Oxygen Control (O_2)
	EV O_2	Electronic cam and variable speed (with Inverter) and suitable for Oxygen Control O_2
	P	Proportional air/gas valve

Emissions:			
	...	- C01	Class 1 EN676
	MZ	- C02	Class 2 EN676
	MX	- C03	Class 3 EN676
	BLU	- C03	Class 3 EN676
	FGR		Ultra low NOx - Flue Gas Recirculation
	ULX		Ultra low NOx - Flue Internal Recirculation

Head:		
	TC	Standard combustion head
	TL	Long combustion head

Flame control system:	
FS1	Intermittent operation (1 stop every 24 h)
FS2	Continuous operation (1 stop every 72 h)

Electrical supply of the system:	
3/400/50	3N / 400V / 50Hz
3/230/50	3/230V / 50 Hz

Voltage of auxiliaries:	
230/50/60	230V / 50-60Hz
110/50/60	110V / 50-60Hz

R	S	120	E O2	ULX	TL	FS1/FS2*	3/400/50	230/50/60
BASIC DESIGNATION								
EXTENDED DESIGNATION								

WARNING

*The burner leaves the factory set up for FS1 operation. If FS2 operation is required, refer the specific manual to LMV 5...

3.2 Models available

Designation	Voltage	Start-up	Code
RS 68/E O2 ULX TL FS1	3 ~ 400V - 50Hz	Direct	20205457
RS 120/E O2 ULX TL FS1	3 ~ 400V - 50Hz	Direct	20205459
RS 160/E O2 ULX TL FS1	3 ~ 400V - 50Hz	Direct	20205460
RS 200/E O2 ULX TL FS1	3 ~ 400V - 50Hz	Direct	20205462

Tab. A

3.3 Burner categories

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

Tab. B

3.4 Technical data

Model			RS 68/E O2 ULX	RS 120/E O2 ULX	RS 160/E O2 ULX	RS 200/E O2 ULX
Type			S041T1	S042T1	S043T1	S044T1
Output (1)	Max. Min.	kW	150/350 - 1050	200/610-1400	290/950-1950	370/1350-2400
Fuel			Natural gas: G20 (methane gas) G25			
Gas pressure at max. output (2) - Gas: G20 / G25		mbar	170/230	110/150	175/235	190/255
Operation			– Intermittent (min. 1 stop in 24 hours)			
Standard applications			Boilers: water, steam, diathermic oil			
Ambient temperature		°C	0 - 40			
Combustion air temperature		°C max	60			
Noise levels (3)	Sound pressure Sound power	dB(A)	80.5 91.5	83 94	80.5 91.5	83 94
Weight		kg	67	70	100	104
CE		No.	CE-0123DN1089			

Tab. C

(1) Reference conditions: Room temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m above sea level.
(2) Pressure on the test point with zero pressure in the combustion chamber and at maximum burner output.
(3) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output. The sound power is measured with the “Free Field” method, as per EN 15036, and according to an “Accuracy: Category 3” measuring accuracy, as set out in EN ISO 3746.

3.5 Electrical data

Model		RS 68/E O2 ULX	RS 120/E O2 ULX	RS 160/E O2 ULX	RS 200/E O2 ULX
Main electrical supply Control circuit power supply		3 ~ 400V +/-10% 50Hz 1N ~ 230V +/-10% 50Hz			
Absorbed electrical power	kW max	2.1	2.9	5.5	6.5
Protection level		IP 44			

Tab. D

3.6 Maximum dimensions

The 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 guides.

The dimensions of the open burner are indicated by position U.

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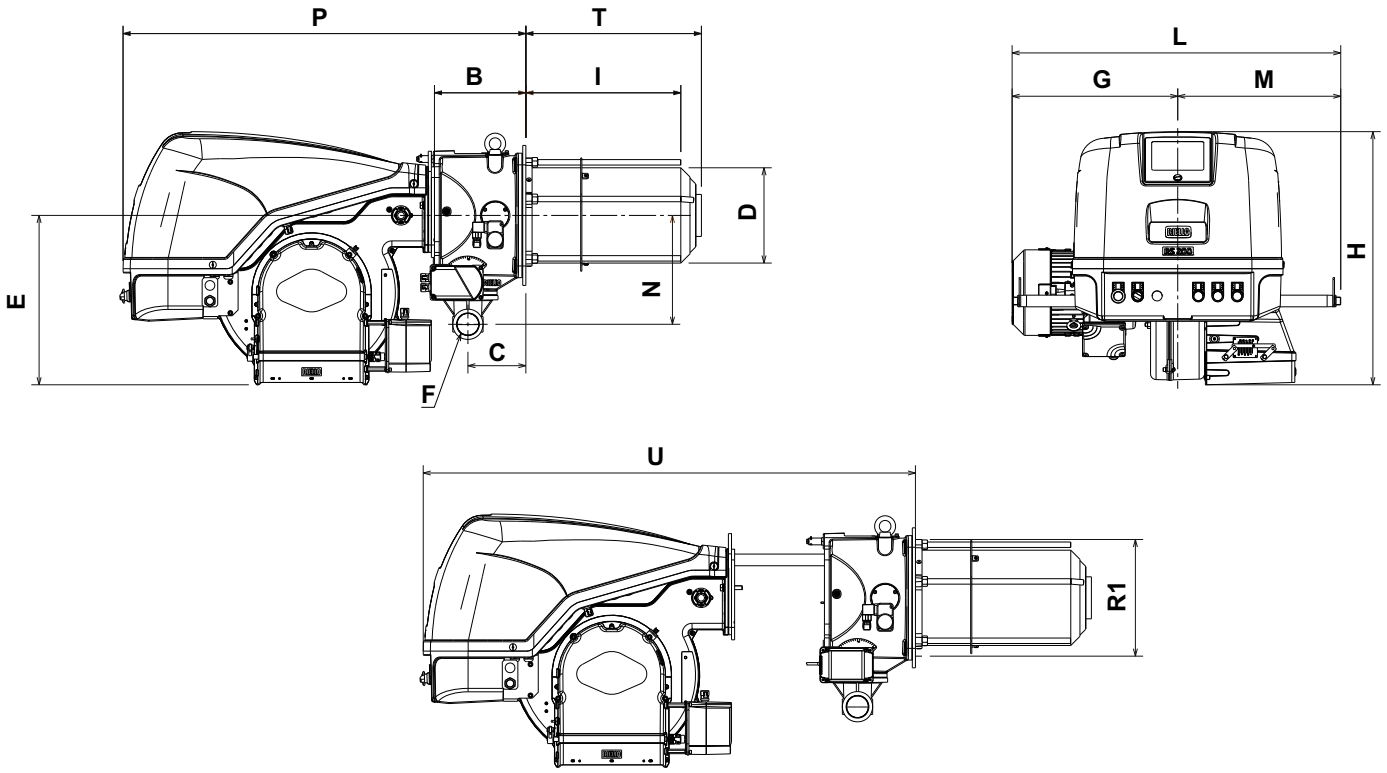


Fig. 1

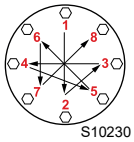
mm	B	C	D	E	F	G	H	I	L	M	N	P	R1	T	U
RS 68	234	149	189	425	2"	303	607	330	539	236	260	861	240	374	1245
RS 120	234	149	189	425	2"	329	607	330	565	236	260	861	240	374	1245
RS 160	234	149	245	436	2"	427	646	400	732	305	280	877	300	453	1446
RS 200	226	141	245	436	2"	426	651	408	845	419	280	1027	278	460	1446

Tab. E

3.7 Burner equipment

Gas train flange . . . . . No. 1
Gasket for gas train flange . . . . . No. 1
Thermal flange gasket . . . . . No. 1
Screws M10x40 to fix the gas train flange . . . . . No. 4
Screws M16x50 to fix the burner flange to the boiler . . . . . No. 4
Central gas discs regulator . . . . . No. 2
Lifting eyebolts . . . . . No. 2
Slide bars extension (only for RS 200/E O2 ULX model). . No. 2
GW 500 gas pressure switch . . . . . No. 1
Instructions . . . . . No. 1
Spare parts list . . . . . No. 1

It is recommended to tighten the screws of the gas flange with a tightening torque of **30** Nm ±10%.



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

To use the GW 500 gas pressure switch (supplied as equipmente) refer to the paragraphs **"Firing rates"** on page 9 e **"Maximum gas pressure switch"** on page 36.

3.8 Firing rates

The **maximum output** must be higher than the following values (Tab. F):

Model	kW
RS 68/E O2 ULX	350
RS 120/E O2 ULX	600
RS 160/E O2 ULX	950
RS 200/E O2 ULX	1350

Tab. F

WARNING

If the chosen maximum output is exactly equal to these values (Tab. F), the central gas calibration must be modified (see **"Central gas adjustment"** on page 23).

If the chosen maximum output is higher than the following values (Tab. G):

Model	kW
RS 68/E O2 ULX	750
RS 120/E O2 ULX	1175
RS 160/E O2 ULX	1320
RS 200/E O2 ULX	1600

Tab. G

WARNING

replace the GW 150 maximum pressure switch (Fig. 7 on page 12) installed on the burner with the GW500 gas pressure switch supplied as equipment.

The **minimum output** must not be lower than the minimum limit of the diagram (Fig. 2, Fig. 3, Fig. 4 and Fig. 5).

WARNING

The firing rate was obtained considering a room temperature of 20°C and an atmospheric pressure of 1013 mbar (approx. 0 m above sea level), with the combustion head adjusted as shown at page 24.

RS 68/E O2 ULX

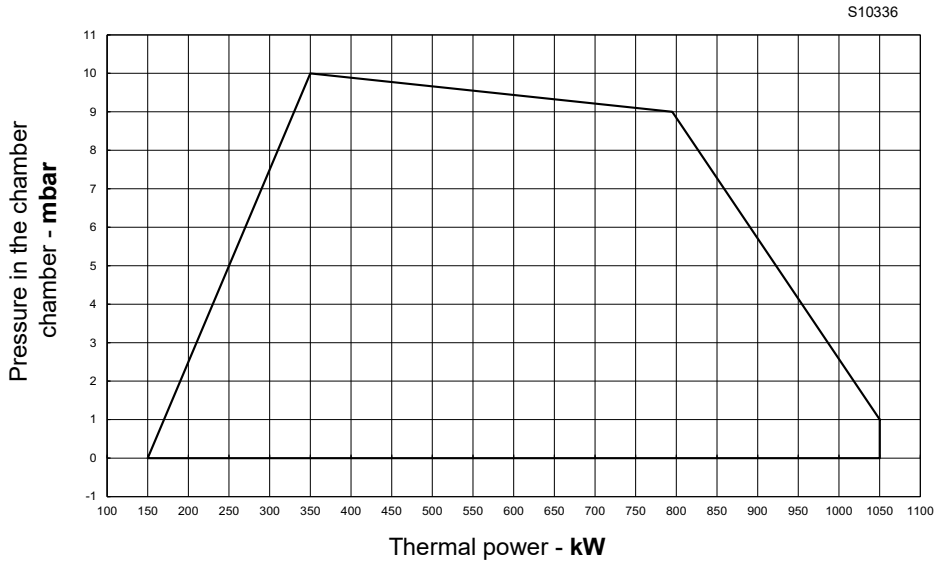

Fig. 2

RS 120/E O2 ULX

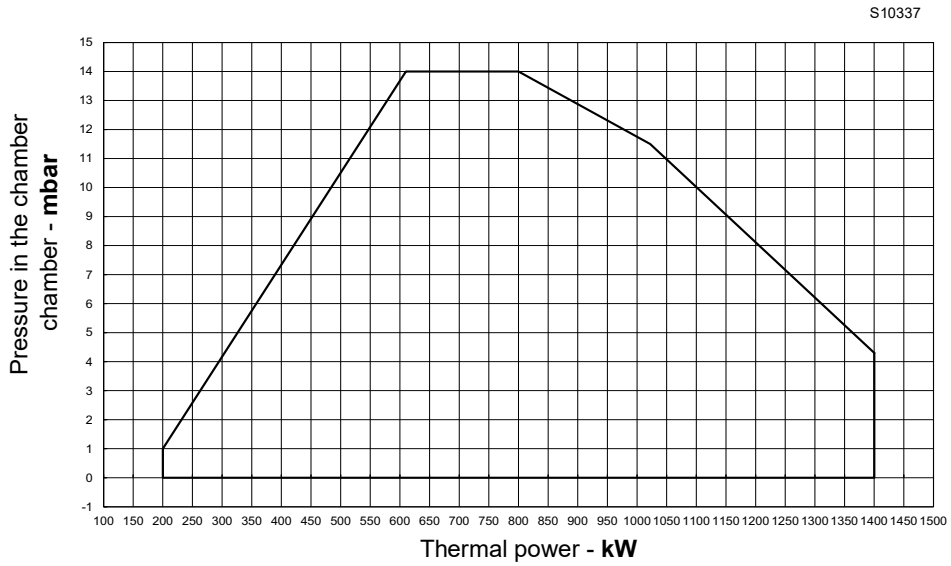

Fig. 3

RS 160/E O2 ULX

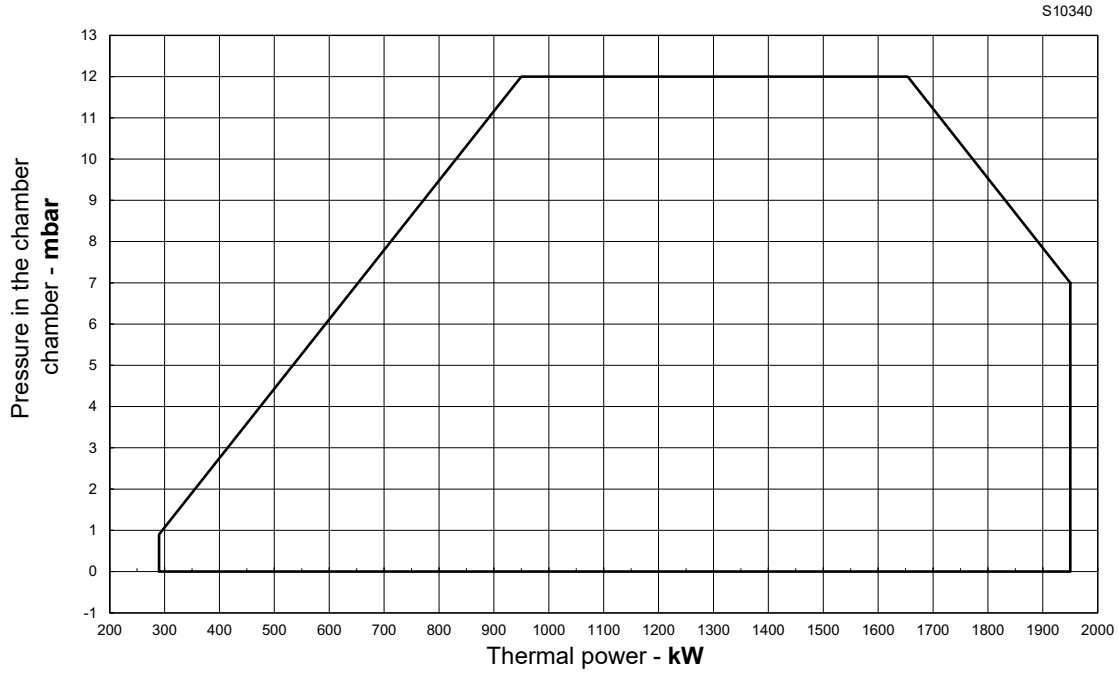

Fig. 4

RS 200/E O2 ULX

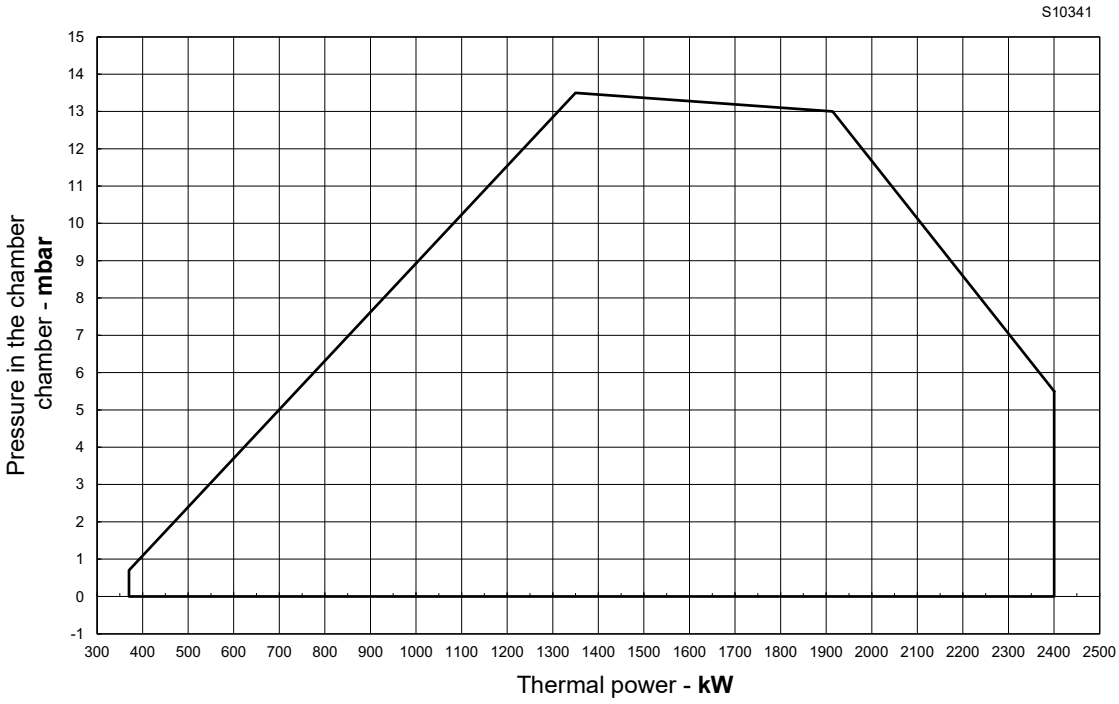

Fig. 5

3.9 Test boiler

The firing rates were obtained in special test boilers, according to EN 676 standard. In Fig. 6 you can see the diameter and length of the test combustion chamber.

Example:
Output 756 kW (650 Mcal/h) - diameter 60 cm, length 2 m.

Although combination is guaranteed when boiler has a CE type-approval, preliminary tests are recommended for boilers or furnaces having a combustion chamber size much different than the one specified in Fig. 6.

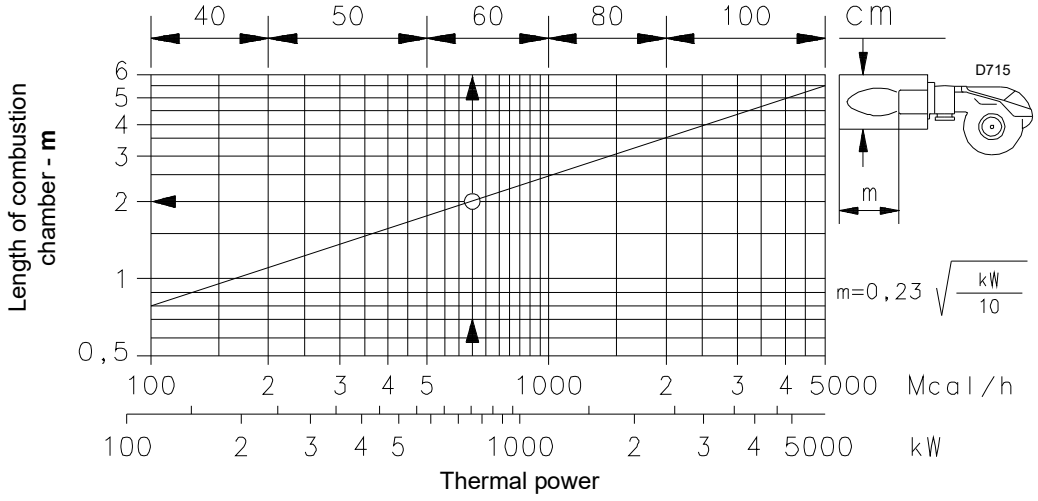

Fig. 6

3.10 Burner description

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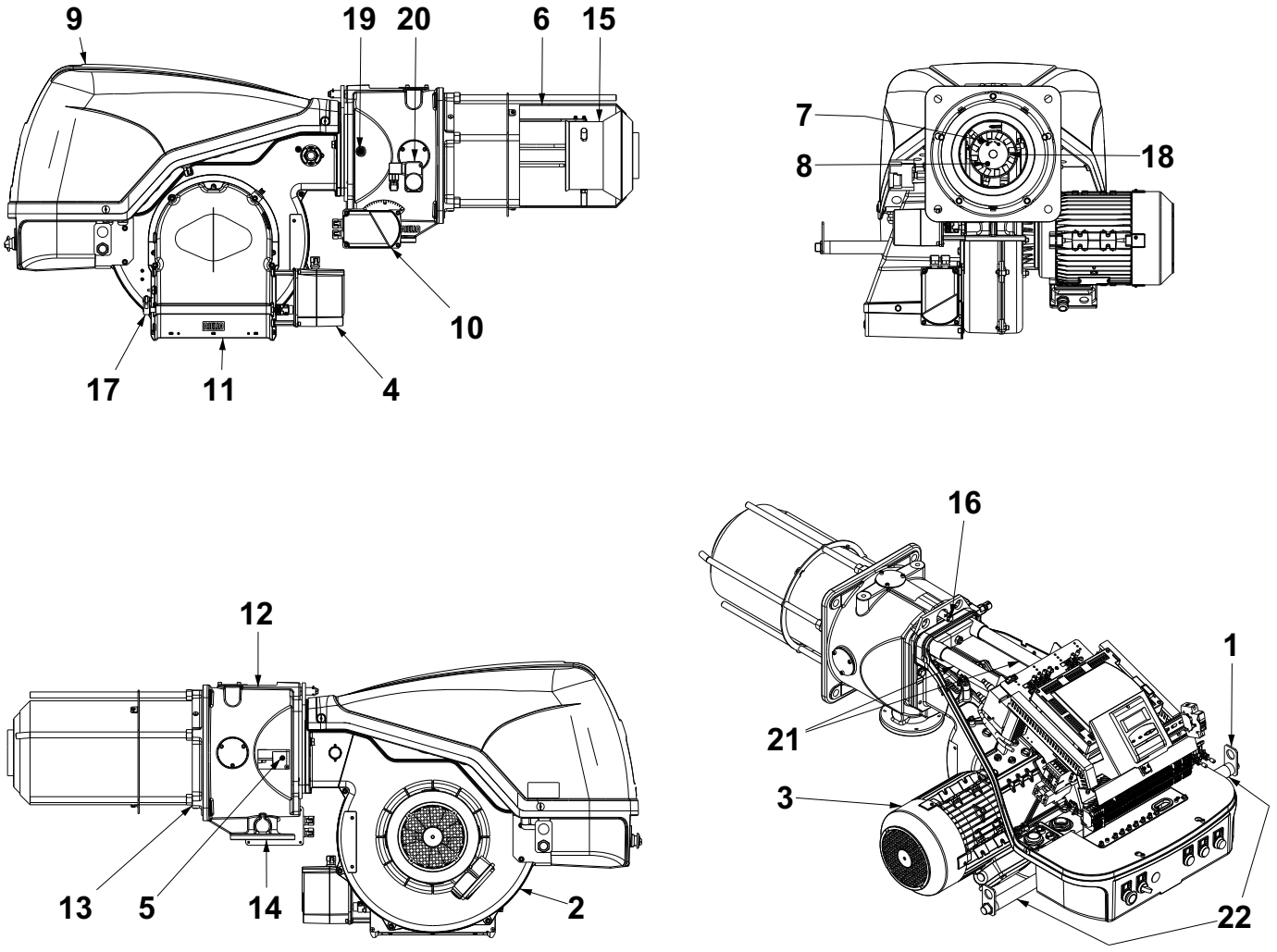

Fig. 7

1 Lifting rings
2 Fan
3 Fan motor
4 Air damper servomotor
5 Combustion head gas pressure test point
6 Combustion head
7 Ignition electrodes
8 Ionisation probe
9 Electrical panel cover
10 Gas butterfly valve servomotor
11 Fan air inlet
12 Pipe coupling
13 Gasket for boiler fixing
14 Gas butterfly valve
15 Shutter
16 Combustion head movement screw
17 Lever for controlling the dampers with graduated scale
18 Flame stability disk
19 Combustion head air pressure test point
20 Maximum gas pressure switch with pressure test point
21 Slide bars for opening the burner and inspecting the combustion head
22 Extensions for slide bars

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

3.11 Electrical panel description

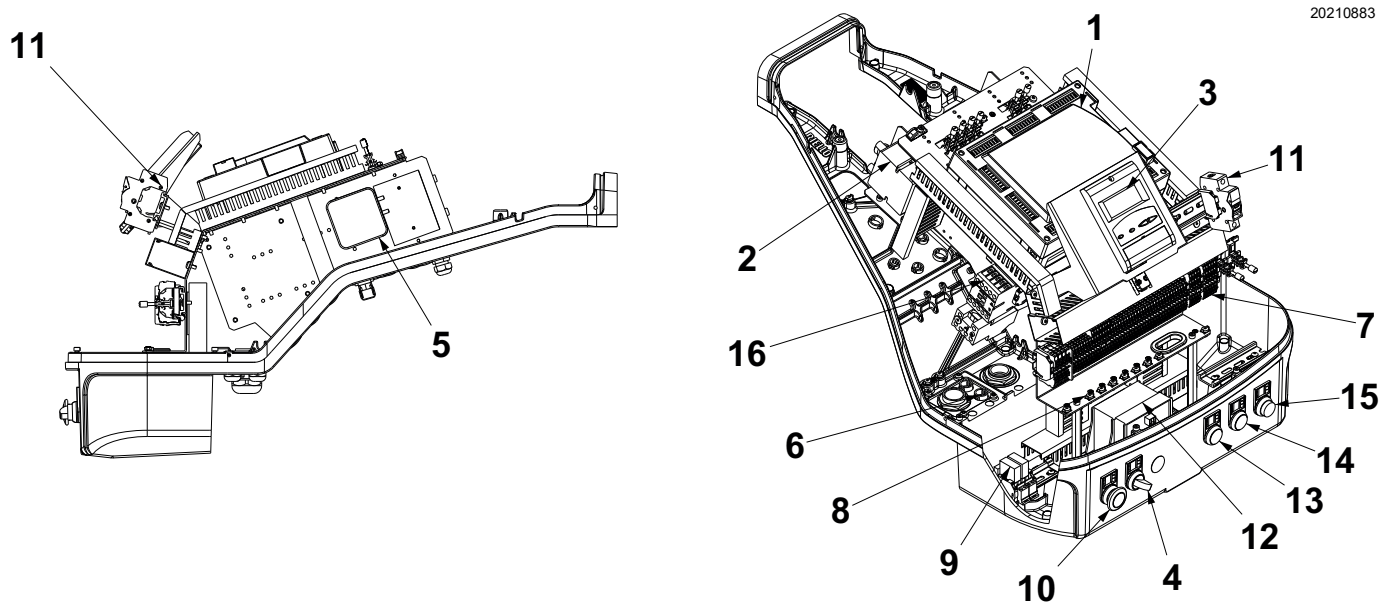

Fig. 8

1 Flame control
2 Transformer
3 Display
4 “ON/OFF” selector
5 Air pressure switch
6 Cable grommets for electrical connections
7 Terminal board for electrical connections
8 Earth screws
9 Relay clean contacts
10 “EMERGENCY STOP” button
11 Auxiliary fuses
12 “T1” transformer for flame control
13 “POWER ON” light signal
14 “OVERLOAD FAN MOTOR” light signal
15 Light signalling burner lockout and reset button
16 Earth screws

3.12 Flame control (LMV52...)

Warnings

WARNING

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

The LMV52... flame control 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... flame control 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 LMV5... 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 must not be operated, even if it displays no evident damage.
- ➤ In programming mode, the position check of actuators and VSD (checking electronic fuel / air ratio control) is different from the check during automatic operation. 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 LMV5... system, the following instructions must also be followed:

– avoid conditions that can favour the development of condensate and humidity. Otherwise, before switching on again, make sure that the entire is perfectly dry!
– Static charges must be avoided since they can damage the ’s electronic components when touched.

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Fig. 9

Mechanical structure

The LMV5... 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 of the LMV5... 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.

Electrical connection of flame sensor

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.

Technical data

LMV52... base	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
	Main fuse of perm. network (external)	Max. 16 AT
	Undervoltage • Safety switch-off from operating position to mains voltage • Restart when mains voltage picks up	 < AC 186 V > AC 188 V
	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 230 V -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 lengths	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. H

3.13 Actuator

Warning notes

WARNING

To avoid injury to persons, damage to property or the environment, the following warning notes should be observed!

Do not open, interfere with or modify the actuators!

- ➤ All activities (mounting, installation and service work, etc.) must be performed by qualified staff.
- ➤ Before making any wiring changes in the connection area of the actuator, completely isolate the burner control from the mains supply (all-polar disconnection).
- ➤ Ensure protection against electric shock hazard by providing adequate protection for the connection terminals and by securing the housing cover.
- ➤ Check to ensure that wiring is in an orderly state.
- ➤ Fall or shock can adversely affect the safety functions. Such units must not be put into operation, even if they do not exhibit any damage.

WARNING

The housing cover may only be removed for short periods of time for wiring or when making the addressing. It must be made certain that dust or dirt will not get inside the actuator while such work is carried out.

Use

The actuator (Fig. 10) is used to drive and position the air damper and the gas butterfly valve, without mechanical leverages but via the interposition of an elastic coupling.

When used in connection with burner controls or electronic fuel / air ratio control, the associated controlling elements are controlled depending on burner output.

Installation notes

- Always run the high-voltage ignition cables separate from the unit and other cables while observing the greatest possible distance.
- The holding torque is reduced when the actuator's power supply is switched off.

WARNING

When servicing or replacing the actuator, take care not to invert the connectors.

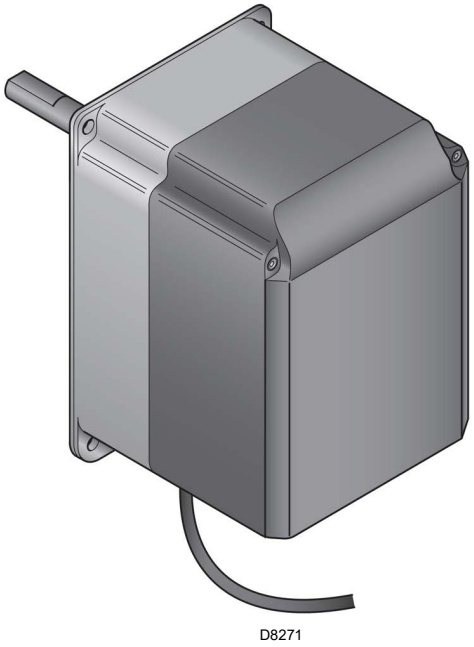


Fig. 10

Technical data

Model	SQM45.295A9
Operating voltage	AC 2 x 12 V via bus cable from the basic 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
Electrical connections	RAST3.5 terminals
Direction of rotation (when facing the shaft)	- Standard: counterclockwise - Reverse: clockwise
Running time (min.) for 90°	10 s.
Holding torque (max.)	1.5 Nm
Nominal torque (max.)	3 Nm
Weight	approx. 1 kg
Environmental conditions:	
Operation Climatic conditions Mechanical conditions Temperature range Humidity	DIN EN 60721-3-1 class 1K3 class 1M2 -20...+60 ×C < 95 % r.h.

Tab. I

WARNING

Condensation, the formation of ice and the entry of water are prohibited!

3.14 PLL52... module (optional)

Warnings

WARNING

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

Avoid opening, modifying or forcing the device.

➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
➤ Falls and collisions can negatively affect the safety functions. In this case, the unit must not be operated, even if it displays no evident damage.

Assembly notes

- Check the relevant national safety standards are respected.

3.14.1 Terminal ratings, cable lengths and cross-sectional areas

Cable lengths / cross-sectional areas	
Electrical connection “X89”	Screw terminals up to max. 2.5 mm^2
Cable lengths	≤ 10 m fino a QGO20...
Cross-sectional areas	Refer to description of QGO20...
Analog inputs	
Air temperature detector	Pt1000 / LG-Ni1000
Flue gas temperature	Pt1000 / LG-Ni1000
QGO20...	Refer to data sheet N7842
Interface	Communication bus for LMV52...

Tab. J

Fig. 11

Technical data

Model	**PLL52...**
Mains voltage “X89-01”	AC 230 V -15%/10%
Safety class	I class with parts according to II class (DIN EN 60730-1)
Mains frequency	50 / 60 Hz ±6 %
Power consumption	Ca. 4 VA
Degree protection	IP54, housing closed
Transformer AGG5.220	
- Primary side	AC 230V
- Secondary side	AC 12 V (3x)
Environmental conditions:	
Storage	DIN EN 60721-3-1
Climatic conditions:	Class 1K3
Mechanical conditions:	Class 1M2
Temperature range:	-20...+60 °C
Humidity:	<95% r.h.
Transport	DIN EN 60721-3-2
Climatic conditions:	Class 2K2
Mechanical conditions:	Class 2M2
Temperature range:	-25...+70 °C
Humidity:	<95% r.h.
Operation	DIN EN 60 721-3-1
Climatic conditions:	Class 3K5
Mechanical conditions:	Class 3M2
Temperature range:	-20...+60 °C
Humidity:	< 95% r.h.

Tab. K

NOTE:
For detailed information, refer to the specific manual of PLL52 module.

WARNING

Condensation, formation of ice and the entrance of water are not permitted!

3.15 Oxygen sensor QGO20 ... (optional)

Warnings

WARNING

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

Avoid opening, modifying or forcing the oxygen sensor.

- All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- Before modifying the wiring in the sensor connection area, fully disconnect the burner control device from the power supply (omnipolar separation).
- Ensure that the sensor cannot be inadvertently switched on again and check this by making a voltage test.
- To avoid the risk of electrocution, protect the connection terminals in a suitable manner and correctly fix the cover.
- During operation, the flange of the sensor connection must be kept closed; all screws must be tightened securely.
- 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.
- Ensure that the device does not get into contact with explosive or inflammable gases.
- There is a risk of burning since the measuring cell works at an operating temperature of 700 °C and other accessible parts can get very hot too (> 60 °C).
- To prevent injury caused by the hot immersion tube, remove the device only after the equipment has cooled down.
- Make certain that the sensor's inlet and outlet are always kept free from dirt.
- Before cleaning the inlet and outlet, allow the sensor to cool down for at least 1 hour.
- Mount the sensor such that the connecting part (head to flange) is free so that the exchange of air is ensured. Otherwise, measurements might get distorted, possibly leading to dangerous situations.
- Ensure that there are no chemicals, such as solvent vapors, near the sensor.

Installation notes

- The flue gas flow passing the measuring cell must be homogeneous, with no or only little turbulence. When mounted too close to air dampers or pipe bends, faulty measurements can occur.
- A number of faults can distort the measurements (this can lead to dangerous situations in connection with oxygen trim control):
  - If the stack is not tight, false air can join the flue gases.
  - In that case, the residual oxygen content indicated by the sensor is higher than it actually is.
  - If the flue gas velocity is low, the sensor's response is slower, since the flue gases take more time to pass the measuring cell. In that case, it is recommended to mount the sensor in an inclined position (refer to the manual).
  - The greater the sensor's distance from the flame, the longer the dead time.

S9895

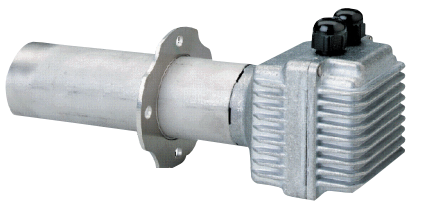


Fig. 12

NOTE:
For further explanations about the wiring connetions, please refer to the manual supplied with the accessory code 20045187.

WARNING

Condensation, formation of ice and the entrance of water are not permitted!

3.15.1 Technical data QGO20

Operating voltage of measuring cell's:	
– QGO20.000D27 – QGO20.000D17	AC 230 V ±15 % AC 120 V °15 % (only with LMV52 ... with PLL52...)
Mains frequency:	50...60 Hz ±6 %
Power consumption:	Max. 90 W, typical value 35 W (controlled)
Permissible mounting position:	Refer to mounting Instructions M7842
Degree of protection:	IP40, to be ensured through installation
Weight (net):	approx. 0.9 kg
Signal lines – Shielded 6-wires cable – Shielding connected to terminal GND of the PL52...	Twisted pairs
Wire diameter	LifYCY3x2x0,2 o LYCY3x2x0,2
Measuring system	Zirconium dioxide measuring cell as an oxygen ion conductor
Permissible flue gas velocity (only with AGO20...)	1...10 m/s
Fuel type	Fuel oil EL or Natural gas H
Measuring range	0.2...20.9 % O_2
Permissible cable length	Max. 100 m
Wire diameter	<10 m
Power supply lines (Net cable) – Cable diameter – Cable type	Min. 1 mm² QGO20.000D27: e.g. NYM 3 x 1,5 QGO20.000D17: UL AWM Style 1015/MTW or CSA-AWM/TEW
Required operating temperature of measuring cell	700 °C ±50 °C
Environmental conditions	
Storage	DIN EN 60721-3-1
Climatic conditions:	Class 1K3
Mechanical conditions:	Class 1M2
Temperature range:	-20...+60 °C
Humidity:	<95% r.h.
Transport	DIN EN 60721-3-2
Climatic conditions:	Class 2K2
Mechanical conditions:	Class 2M2
Temperature range:	-25...+70 °C
Humidity:	<95% r.h.
Operation	DIN EN 60721-3-3
Climatic conditions:	Class 3K5
Mechanical conditions:	Class 3M2
Temperature range: – Flange – Connecting head – Flue gases	 Max. 250 °C Max. 70 °C ≤300 °C
Humidity:	<95% r.h.
Installation altitude:	Max. 2000 m a.s.l.

Tab. L

4 Installation

4.1 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.

4.2 Handling

The packaging of the burner includes a wooden platform, so it is 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 residual packaging, separating the various types of material.

CAUTION

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

4.3 Preliminary checks

Checking the consignment

CAUTION

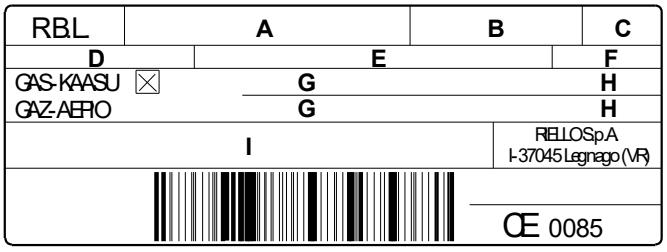
After removing all the packaging, check the integrity of the contents. In the event of doubt, do not use the burner; contact the supplier.

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

Checking the characteristics of the burner

Check the identification label of the burner (Fig. 13), showing:

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



D7738

Fig. 13

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.

4.4 Operating position

WARNING

- The burner is designed to operate only in positions **1**, **2**, **3** and **4** (Fig. 14).
- 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.

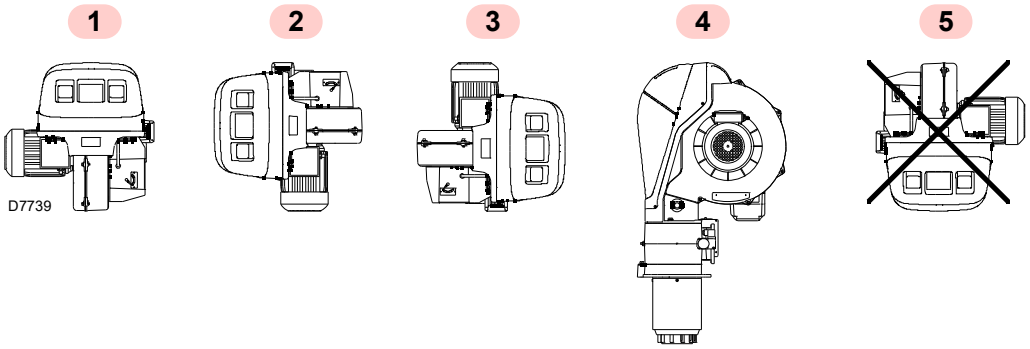


Fig. 14

4.5 Preparing the boiler

4.5.1 Boring the boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 15.

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

4.5.2 Blast tube length

The length of the blast tube must be greater than the thickness of the boiler door complete with its fettling.

For boilers with front flue passes 13)(Fig. 16), a protection in refractory material 11) must be inserted between the boiler fettling 12) and the blast tube 11).

The refractory can have a conical shape (minimum 60°).

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. 16) is not necessary, unless expressly requested by the boiler manufacturer.

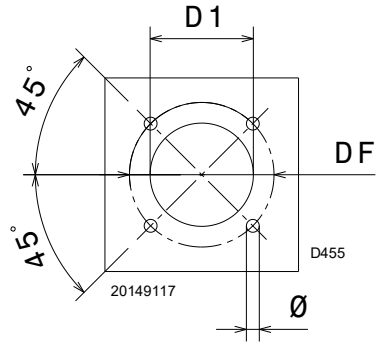


Fig. 15

mm	D1	DF	Ø
RS 68/E O2 ULX	260	325	M 16
RS 120/E O2 ULX	260	325	M 16
RS 160/E O2 ULX	320	368	M 16
RS 200/E O2 ULX	320	368	M 16

Tab. M

4.6 Securing the burner to the boiler

Provide an adequate lifting system of the burner.

Divide the combustion head from the rest of the burner, as shown in Fig. 16; you have to:
- ➤ loosen the 4 screws 3) and remove the cover 1);
- ➤ remove screws 2) from the two slide bars 5);
- ➤ disconnect connector of gas servomotor;
- ➤ disconnect the socket of the maximum gas pressure switch 14);
- ➤ remove the 2 screws 4);
- ➤ draw the burner back on the slide bars 5) by about 100 mm;
- ➤ disconnect the electrode and ionisation probe cables, then completely slide out the burner from the slide bars.
- ➤ Fix the flange 9) to the plate of the boiler interposing the insulating flange gasket 8) supplied with the unit.
- ➤ Use the 4 screws supplied, with a tightening torque of 35 ÷ 40 Nm, after protecting their thread with anti-seizing products.

WARNING

The burner-boiler seal must be hermetic; after burner start-up check there is no leakage of flue gases into the external environment.

WARNING

Pay particularly attention to the external gas pipes 15 (Fig. 16) during the burner fixing to the boiler in order to avoid to damage them.

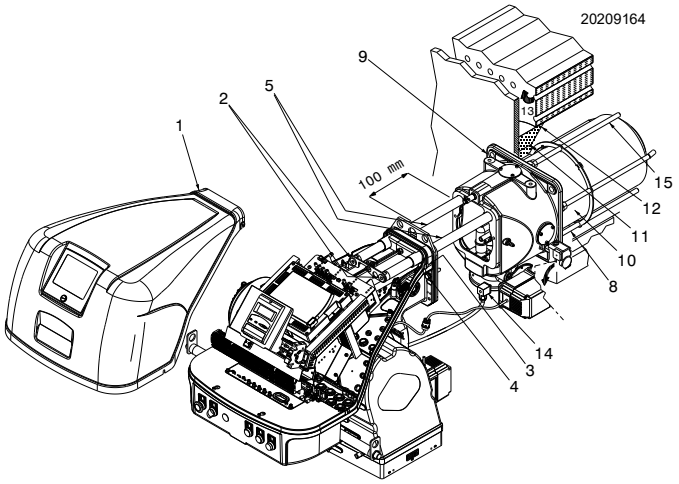


Fig. 16

4.7 Access to head internal part

In order to extract the combustion head, proceed as follows:
- ➤ unscrew the nuts 1) (Fig. 17);
- ➤ extract the internal part 2) of the combustion head.

To reassemble the combustion head, carry out the operations in reverse, tightening the nut 1) at the end.

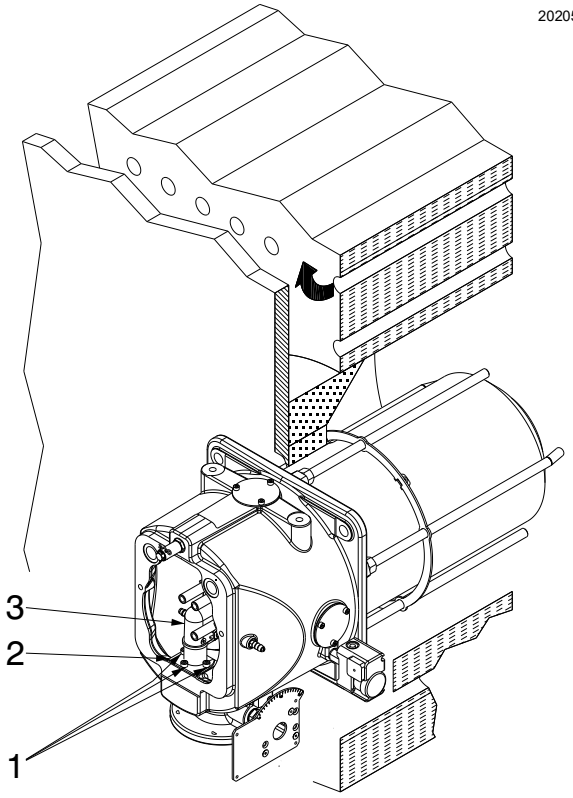


Fig. 17

4.8 Electrode position

WARNING

Before fixing the burner to the boiler, check the correct positioning of the electrodes as in Fig. 18.

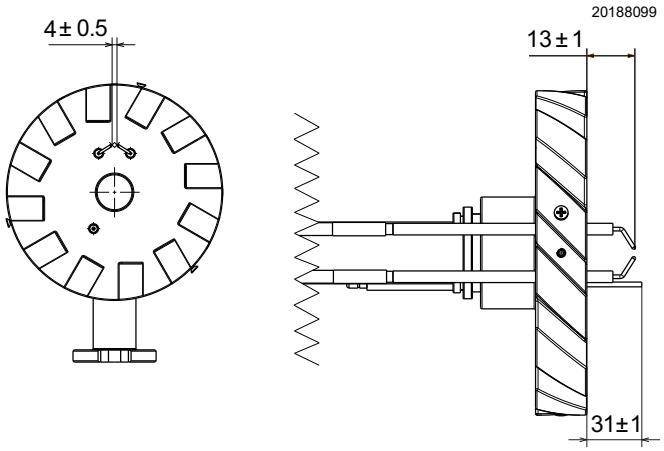


Fig. 18

4.9 Central gas adjustment

As you can see in Fig. 19 the gas flows through the combustion head in two different ways:

- ➤ external gas flows from the pipes 1) that surround the head;
- ➤ central gas flows from the tube 2) and then through the plates 3) behind the flame disc.

4.9.1 Central gas setting

The factory setting for the central gas is with the following passage holes of the disc 1) in Fig. 20.

RS 68 ULX	7 mm
RS 120 ULX	10.5 mm
RS 160 ULX	8 mm
RS 200 ULX	9 mm

If necessary, modify as indicated in the paragraph **"Firing rates"** on page 9 and replace the disc 1) as follows:

- ➤ loosen the screws 2);
- ➤ change the regulator disc 1) with the one supplied as equipment for the following models:

RS 68 ULX	8 mm
RS 120 ULX	12.4 mm
RS 160 ULX	9 mm
RS 200 ULX	12.4 mm

- ➤ tighten the screws 2).

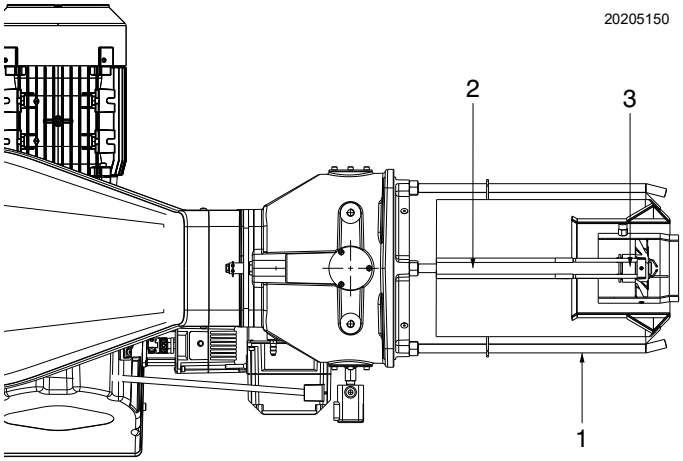


Fig. 19

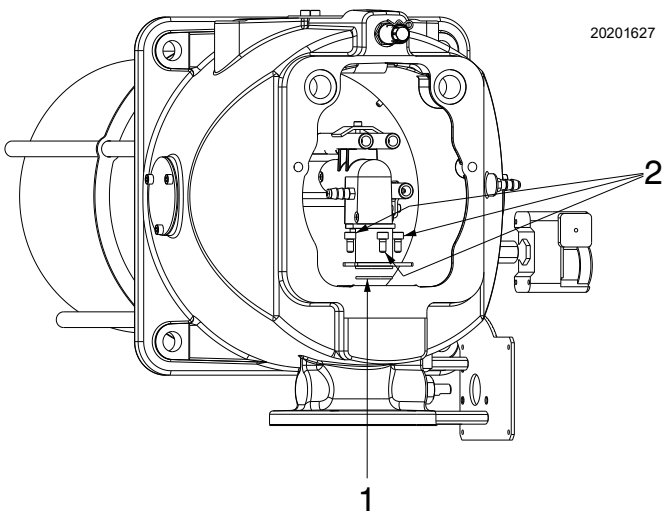


Fig. 20

4.10 Combustion head adjustment

At this point of the installation, the combustion head is fixed to the boiler as shown in Fig. 17 on page 22. It is therefore especially easy to adjust, and this adjustment depends only on the maximum output of the burner.

Turn the screw 1)(Fig. 21) until the notch matches with the front plane 2) of the flange.

The combustion head is opened by turning the screw 1) counterclockwise.

The combustion head is closed by turning the screw 1) clockwise (Fig. 23 on page 25).

WARNING

The burner leaves the factory with the combustion head set to notch 0.

This adjustment allows to secure the moving parts during the transport of the burner.

Before the burner start-up, make the adjustments according to the required output and indicated in the diagram (Fig. 22).

NOTE:
The adjustment can be changed according to the specific application.

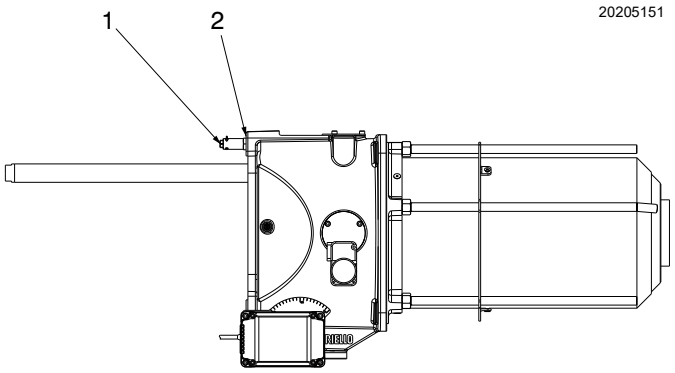
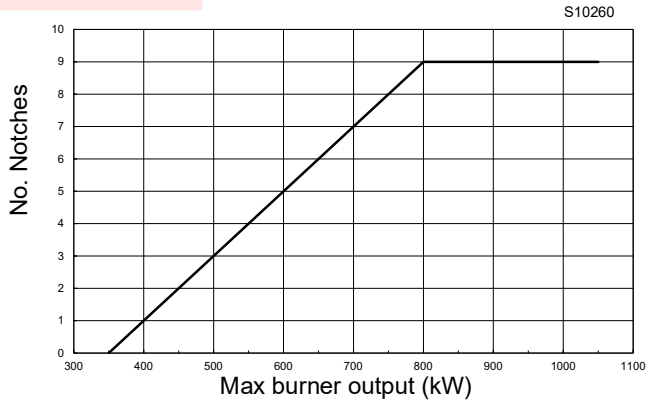
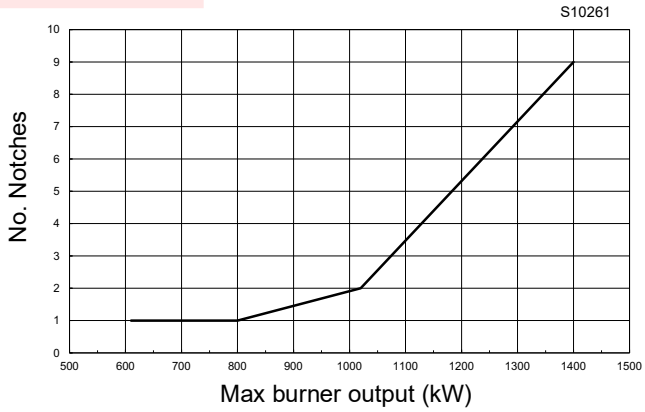


Fig. 21

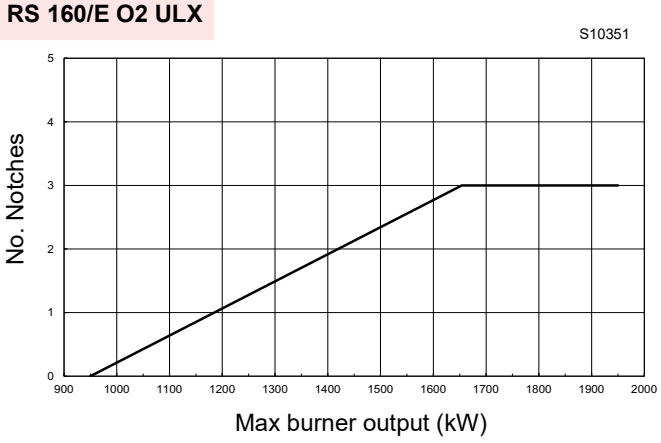
RS 68/E O2 ULX



RS 120/E O2 ULX



RS 160/E O2 ULX



RS 200/E O2 ULX

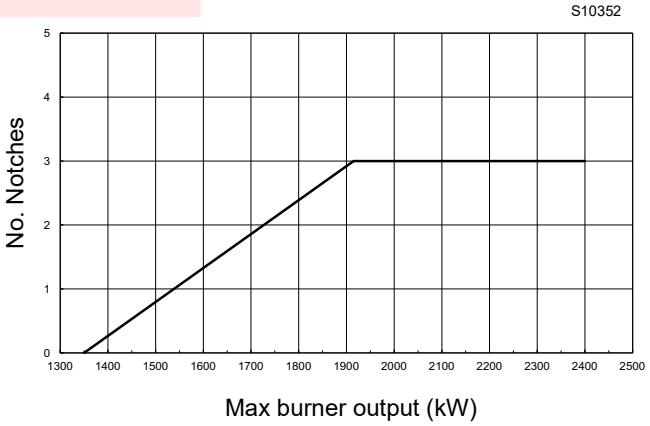


Fig. 22

4.11 Closing the burner

Once the combustion head adjustment is completed:

- ➤ reassemble the burner on the slide bars 3) at about 100 mm from the pipe coupling 4) burner in the position shown in Fig. 16 on page 22;
- ➤ fit the electrode cable and then slide the burner up to the pipe coupling, the burner in the position indicated in Fig. 23;
- ➤ connect the servomotor connector;
- ➤ connect the socket of the maximum gas pressure switch;
- ➤ refit the screws 2)on the slide bars 3);
- ➤ fix the burner to the pipe coupling with the screw 1)(Fig. 23).

WARNING

On closing the burner on the two slide bars, it is advisable to gently pull the high voltage cable outwards until it is slightly taut.

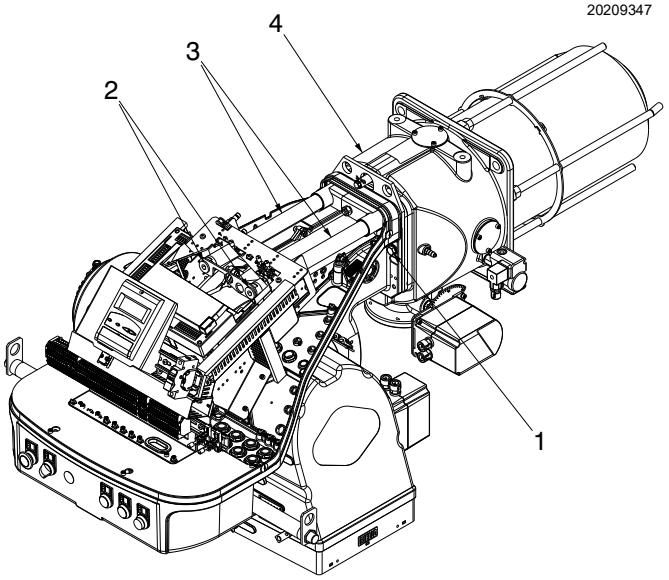


Fig. 23

4.12 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.

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

4.12.1 Gas feeding line (Example) - For functional details refer to the gas train manual

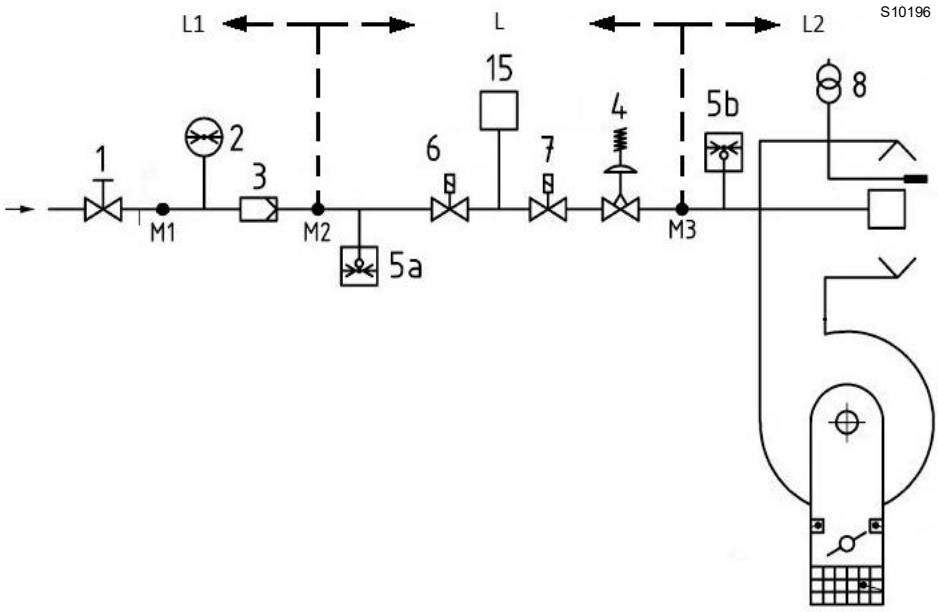


Fig. 24

Key (Fig. 24)

1	Manually operated shut-off valve
2	Pressure gauge
3	Filter
4	Governor
5a	Low pressure protection device
5b	Max gas pressure switch
6	1st safety shut-off valve
7	2nd safety shut-off valve
8	Ignition device
15	Valve proving system
L	Gas train - supplied loose
L1	Installer responsability
L2	Burner
M1	Pressure outlet
M2	Pressure outlet
M3	Pressure outlet

4.12.2 Gas train

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

4.12.3 Gas train installation

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.

4.12.4 Gas pressure

Each diagram indicate the minimum pressure drops depending on the maximum burner output.

The values shown, refer to:
– Natural gas G 20 NCV 9.45 kWh/Sm^3

Calculate the approximate output of the burner in this way:
– subtract the combustion chamber pressure from the gas pressure measured at test point 20)(Fig. 7 on page 12).
– Enter the mbar scale (Fig. 25, Fig. 26, Fig. 27 and Fig. 28) and read the corresponding output by reading on the line.

Example RS 120/E O2 ULX with G20 natural gas:
Fixed Output operation

Gas pressure at test point P1	=	35 mbar
Pressure in combustion chamber	=	5 mbar
35 - 5	=	30 mbar

A pressure of 30 mbar, corresponds to an output of 750 kW with factory setting for central gas.

Example RS 200/E O2 ULX with G20 natural gas:
Fixed Output operation

Gas pressure at test point P1	=	108 mbar
Pressure in combustion chamber	=	8 mbar
108 - 8	=	100 mbar

A pressure of 100 mbar, corresponds to an output of 1750 kW with factory setting for central gas.

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 20)(Fig. 7 on page 12) set the MAX output required from the burner operation:
– find the nearest output value (Fig. 25, Fig. 26, Fig. 27 and Fig. 28).
– Read the pressure at the test point 20)(Fig. 7 on page 12).
– Add this value to the estimated pressure in the combustion chamber.

Example for RS 120/E O2 ULX with G20 natural gas:
Required burner maximum output operation: 750 kW

Gas pressure at an output of 750 kW	=	30 mbar
Pressure in combustion chamber	=	5 mbar
35 + 5	=	35 mbar

Pressure required at test point 20)(Fig. 7 on page 12).

Example for RS 200/E O2 ULX with G20 natural gas:
Required burner maximum output operation: 1750 kW

Gas pressure at an output of 1750 kW with factory setting for central gas regulation	=	100 mbar
Pressure in combustion chamber	=	8 mbar
100 + 8	=	108 mbar

Pressure required at test point 20)(Fig. 7 on page 12).

The output and gas pressure data refer to operation with gas butterfly valve fully open (90°) on the whole firing rate.

RS 68/E O2 ULX

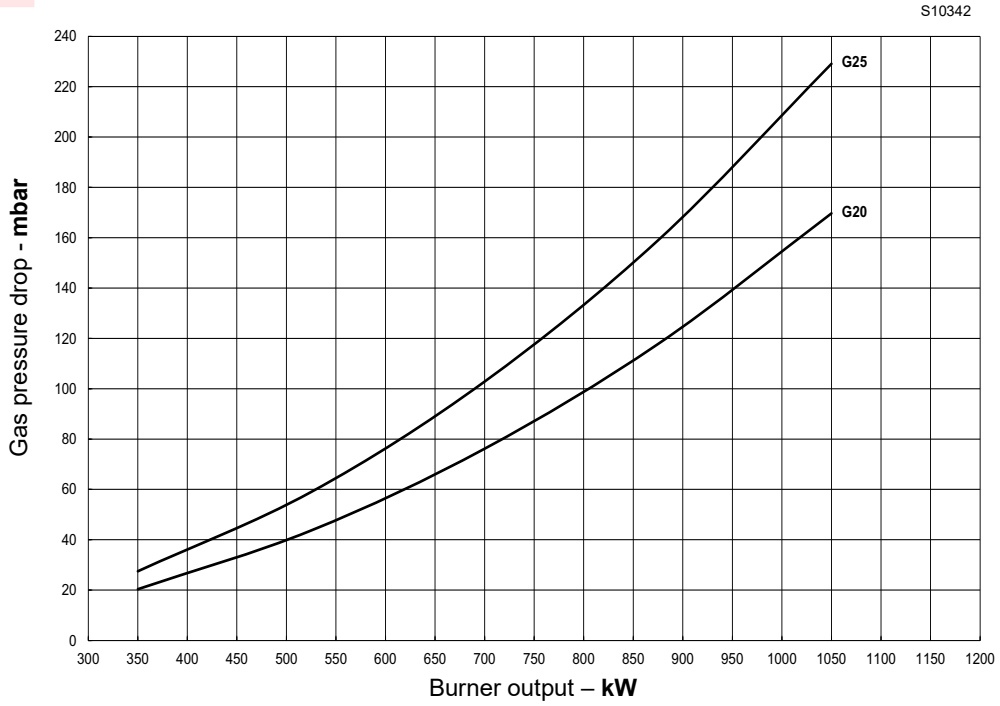


Fig. 25

RS 120/E O2 ULX

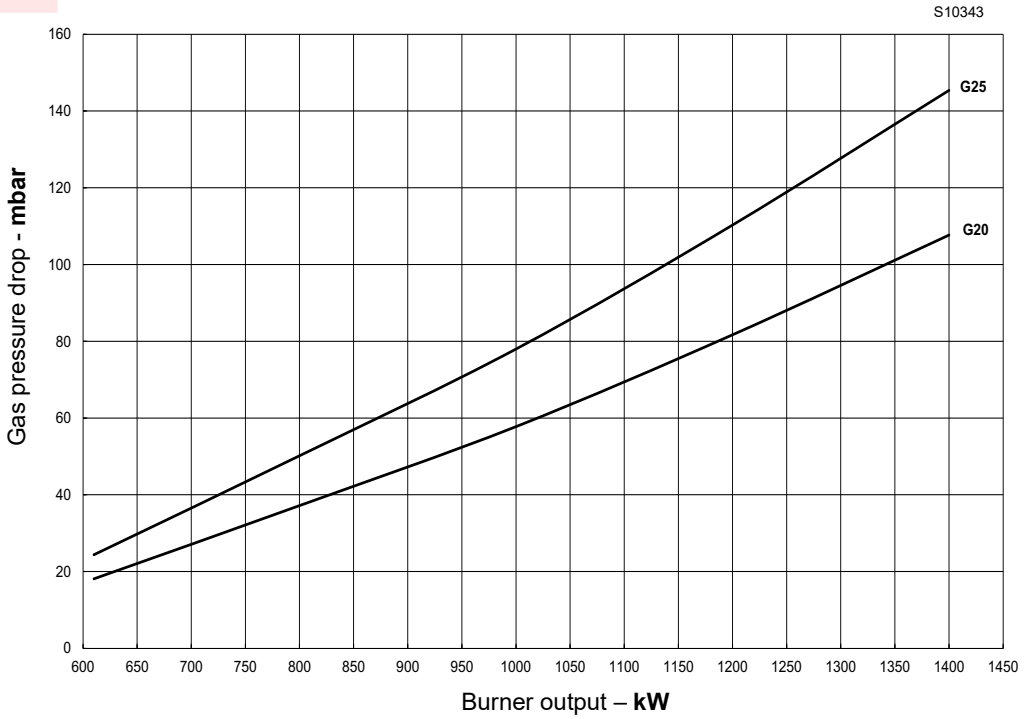


Fig. 26

RS 160/E O2 ULX

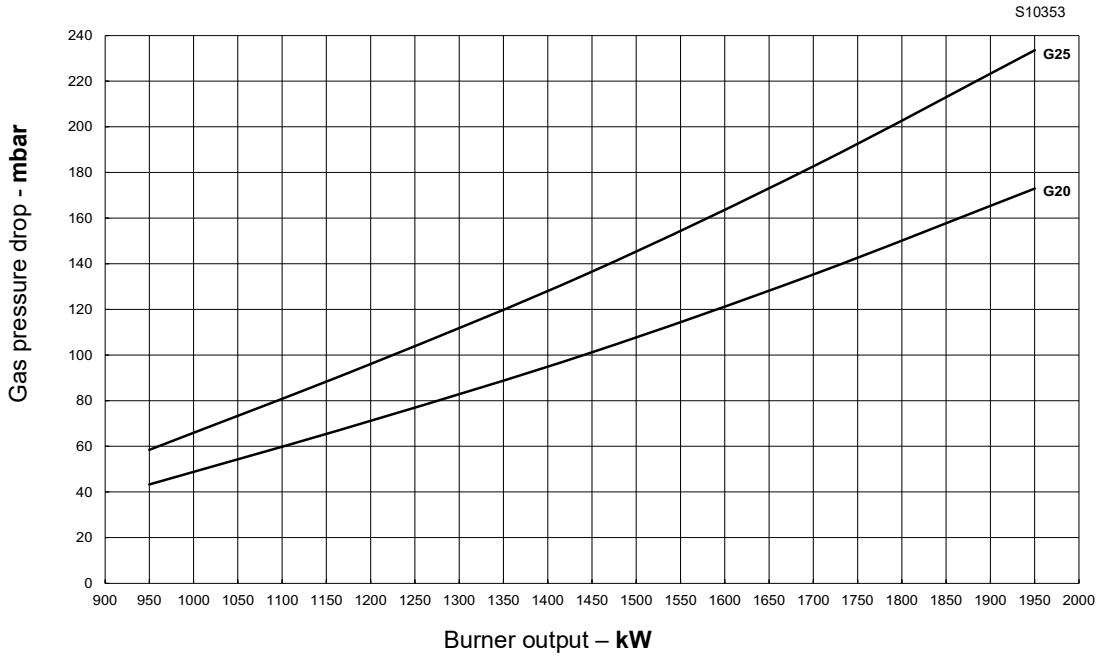


Fig. 27

RS 200/E O2 ULX

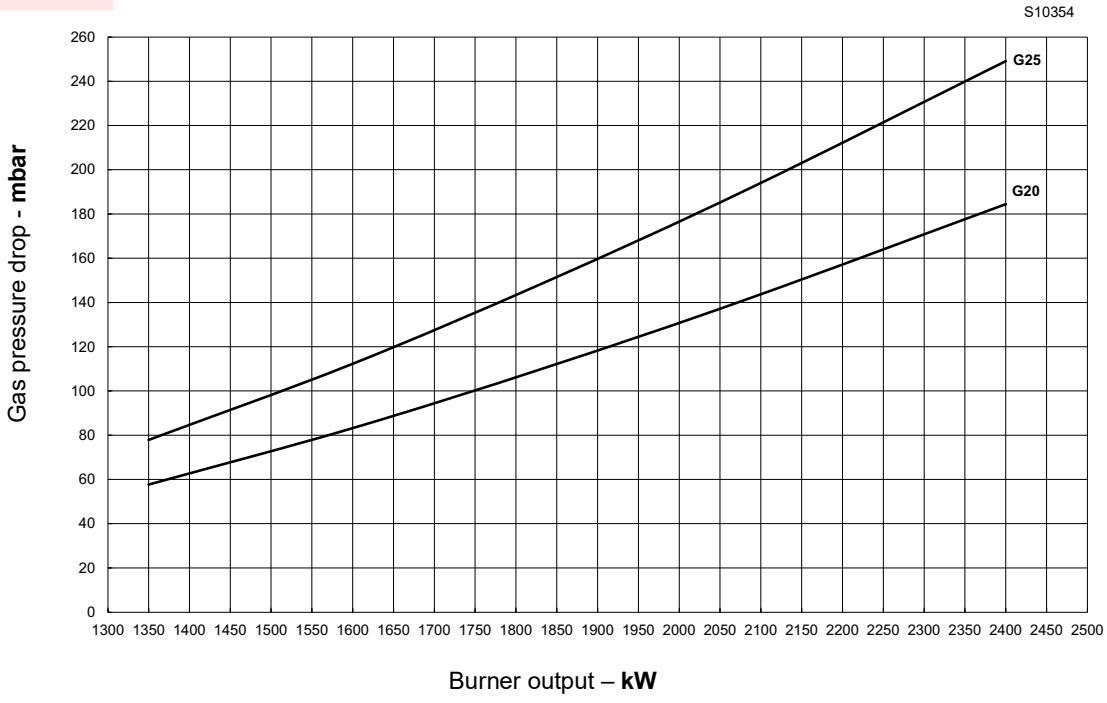


Fig. 28

4.13 Electrical wiring

Notes on safety for the electrical wiring

- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be made in accordance with the regulations currently in force in the country of destination and by qualified personnel. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- The burners equipped with LMV5... can operate in FS1 or FS2 mode (continuous/intermittent operation), see specific manual LMV5... . Refer to the following notes for the type of operation that has been set.
- The FS1 burners have been set for intermittent operation. This means that the burner should compulsorily be stopped at least once every 24 hours to enable the electric to check its own safety and efficiency at start-up. Normally the boiler's thermostat/pressure switch ensures that the burner stops. If this is not the case, a time switch should be fitted in series to TL to stop the FS1 burner at least once every 24 hours. Refer to the wiring diagrams.
- The FS2 burners have been set for continuous operation. This means that the burner should compulsorily be stopped at least once every 72 hours to enable the electric to check its own safety and efficiency at start-up. Normally, burner stopping is guaranteed by the boiler's thermostat/pressure switch. If this is not the case, a time switch should be fitted in series to TL to stop the FS2 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 a multiple pole switch with at least a 3 mm gap between the contacts (overvoltage category III), as envisaged by the present safety standards.
- Do not touch the device with wet or damp body parts and/or in bare feet.
- Do not pull the electric cables.
- Check the electric wiring inside the boiler complies with the national and local safety regulations.
- Live and neutral should not be mixed up (this could cause dangerous malfunctions, a loss of protection against electric shocks, etc..).
- Make sure the cable grommets of the connected cables comply with the relevant standards (e.g. EN60730 and EN60 335).
- 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.

Before carrying out any maintenance, cleaning or checking operations:

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

Close the fuel interception tap.

Avoid condensate, ice and water leaks from forming.

If the hood 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.

4.13.1 Supply cables and external connections passage

All the cables to be connected to the burner must be threaded through cable grommets. The use of the cable grommets can take various forms; by way of example see Fig. 29.

Key (Fig. 29)
1 Electrical supply - Bore for M32
2 Consents and safety devices - Bore for M20
3 Minimum gas pressure switch - Bore for M20
4 VPS gas valve leak detection control kit- Bore for M20
5 Gas train - Bore for M20
6 Available - Bore for M20
7 Available - Bore for M16
8 Available - Bore for M32

Cable grommets used in the factory:
A Rpm sensor
B Maximum gas pressure switch
C Servomotors

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

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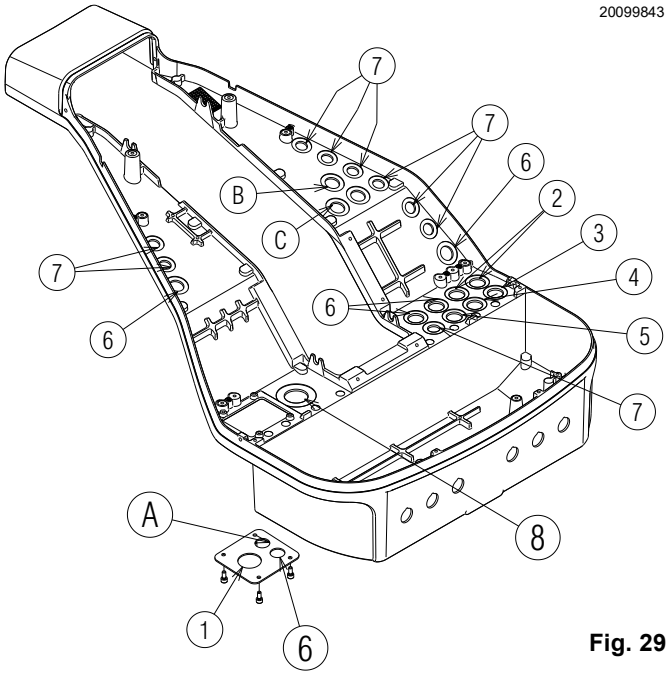

Fig. 29

4.14 Calibration of the thermal relay

The thermal relay serves to avoid damage to the motor due to an excessive absorption increase or if a phase is missing.

For calibration 2), see the table in the wiring diagram.

To reset, in case of an intervention of the thermal relay, press the "RESET" button 1) of Fig. 30.

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

CAUTION

The automatic reset (Position “A” of button 1) can be dangerous. This operation is not foreseen in the burner operation, always leave the button to “H”. **Therefore, do not position the “RESET” button 1) on “A”.**

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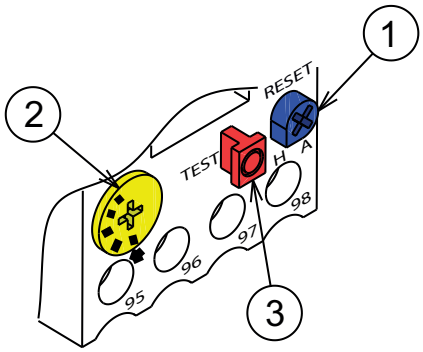


Fig. 30

5 Start-up, calibration and operation of the burner

5.1 Notes on safety for the first start-up

WARNING

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

WARNING

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

WARNING

Before igniting the burner, see the paragraph "Safety test - with gas feeding closed" on page 41.

5.2 Adjustments prior to ignition

Combustion head adjustment has already been described in the section **"Combustion head adjustment"** on page 24.

In addition, the following adjustments must also be made:

- ensure that the gas supply company has carried out the supply line vent operations, eliminating air or inert gases from the piping.
- Slowly open the manual valves situated upstream of the gas train.
- Adjust the minimum gas pressure switch (Fig. 35 on page 37) to the start of the scale.
- Adjust the maximum gas pressure switch (Fig. 34 on page 36) to the end of the scale.
- Adjust the air pressure switch (Fig. 33 on page 36) to the start of the scale.
- Adjust the pressure switch for the valve leak detection control device (PVP Kit)(Fig. 36 on page 37), if present, according to the instructions supplied with the Kit itself.
- Check the gas supply pressure by connecting a pressure gauge to the pressure test point 1)(Fig. 31) of the minimum gas pressure switch: it must be lower than the maximum allowed pressure of the gas train, as shown on the characteristics label.

An excessive gas pressure can damage the components of the gas train and lead to a risk of explosion.

- Bleed the air from the piping of the gas train, connecting a plastic tube to the pressure test point 1)(Fig. 26) 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 at which voltage is supplied. This operation is unnecessary if each of the two solenoids is equipped with an indicator light that signals voltage passing through.

CAUTION

Before starting up the burner, it is good practice to adjust the gas train so that ignition takes place in conditions of maximum safety, i.e. with gas delivery at the minimum.

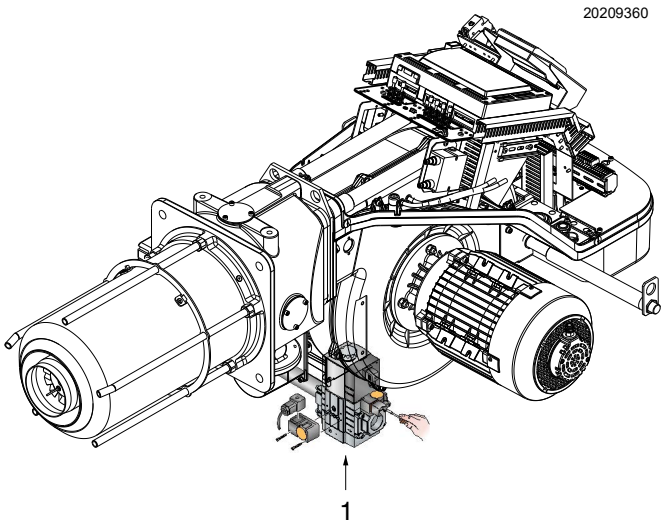


Fig. 31

5.3 Burner start-up

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

Close the thermostats/pressure switches and turn the switch 4)(Fig. 8 on page 13) to position “**(1) - ON**”.

DANGER

Check that the lamps or testers connected to the solenoid valves, or the pilot lights on the solenoid valves, indicate that no voltage is present.

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

As the burner is not fitted with a device to check the sequence of the phases, the rotation of the motor may be incorrect.

As soon as the burner starts place yourself in front of the cooling fan of the fan motor and check that it turns anticlockwise. See Fig. 32.

If this is not the case:

– set the switch 4)(Fig. 8 on page 13) to “**(0) - OFF**” and wait until the flame control carries out the switching off phase;
– disconnect the burner form the power supply;
– invert the phases on the three-phase power supply.

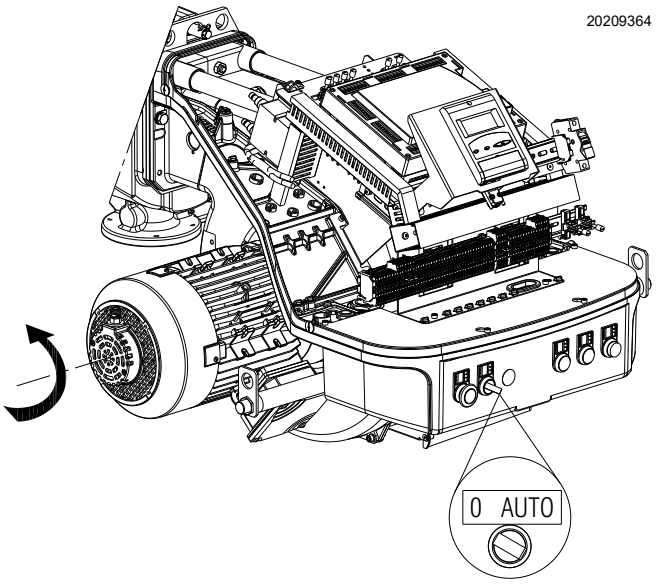


Fig. 32

5.4 Air / fuel adjustment

Air/fuel synchronisation is carried out with the relevant air and gas servomotors by logging a calibration curve by using the electronic cam.
It is advisable, to reduce the loss and for a wide calibration field, to adjust the servomotors to the maximum of the output used, the nearest possible to the maximum opening (90°).

The choking of the air, taking into account the maximum combustion output, takes place by varying the adjustment of the combustion head (see **"Combustion head adjustment"** on page 24).
On the gas butterfly valve, the fuel step according to the burner output required, with servomotor completely open, is carried out by the pressure stabiliser on the gas train.

5.4.1 Air adjustment for maximum output

➤ Adjust the servomotor to maximum opening (nearly 90°) so that the air butterfly valves are entirely open.

5.4.2 Air/fuel adjustment and output modulation system

The air/gas regulator and output modulation system equipping **RS/E** series burners performs a number of integrated functions to optimise burner function, in both individual installations and in combination with other units (e.g. double furnace boiler or multiple heat generators in parallel).
The basic system functions control:

1 The dosage of the air and fuel through positioning using direct servocommands of the relevant valves eliminating the possible play in the calibration systems with mechanical cam lever mechanisms, used on traditional modulating burners.
2 The modulation of the burner output in accordance with the load required by the system, with maintenance of the pressure or temperature of the boiler at the operating values set.
3 The sequence (cascade adjustment) of more than one boiler through the suitable connection of the various units and the activation of the internal software of the individual systems (option).

Further interfaces and communication functions with computers, for remote control or integration in central supervision systems are available on the basis of the configuration of the system.


WARNING

The first start up and every further internal setting operation of the adjustment system or the expansion of the base functions require access by means of password and are to be carried out by service personnel who are especially trained for the internal programming of the instrument and the specific application created with this burner.

5.4.3 Burner adjustment

The optimum adjustment of the burner requires an analysis of flue gases at the boiler outlet.
Adjust in sequence:
1 - Output upon ignition
2 - MAX output
3 - MIN output
4 - Intermediate outputs between Min. and Max.
5 - Air pressure switch
6 - Maximum gas pressure switch
7 - Minimum gas pressure switch

5.4.4 Output upon ignition

Ignition must occur at a lower output than the max. operation output. Regulations provide that the ignition output of this burner must be equal to or less than 1/3 of the MAX operation output.
Example:
MAX operation output of 600 kW.
The ignition output must be equal to or less than 200 kW with ts = 3s
In order to measure the ignition output:

➤ disconnect the plug-socket on the ionisation probe cable (the burner will fire and then go into lockout after the safety time has elapsed);
➤ perform 10 consecutive ignitions with 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:

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

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

Example for gas G20 (9.45 kWh/Sm^3):
ignition output 200 kW corresponding to

$$\frac{200}{9.45} = 21.16\ Sm^3/h$$

After 10 ignitions with their lockouts, the delivery indicated on the meter must be equal to or less than:

$$Vg = \frac{21.16 \times 10 \times 3}{3600} = 0{,}176\ Sm^3$$

Air adjustment
The adjustment of the air is carried out by changing the angle of the air damper changing the degrees of the air servomotor inside the electronic cam programme.

5.4.5 Maximum output

The MAX output must be set within the firing rate (Fig. 5 on page 10).

Adjustment of gas delivery
Measure the gas delivery on the gas meter.
As an indicative guide it can be taken from Fig. 25, Fig. 26, Fig. 27 e Fig. 28 on page 29, just read the gas pressure on the pressure gauge (shown in Fig. 31 on page 32) and follow the instructions given on page 27.

– If it is necessary to reduce it, lower the output gas pressure via the pressure adjuster located beneath the gas valve.
– If delivery needs to be increased, increase the adjuster outlet gas pressure.

Air adjustment
If necessary vary the degrees of the air servomotor.

Indication for the burner ignition

In Tab. N the calibrations of the air and gas servomotors at the ignition point for each model are summarized according to the change of the maximum burnt power.

Ignition point - RS 68 ULX -			
Maximum power input (kW)	1050	800	350
Gas motor/butterfly setting	8°	8°	10°
Air servomotor/damper setting	20°	18°	15°
Ignition point - RS 120 ULX -			
Maximum power input (kW)	1450	1030	560
Gas motor/butterfly setting	6°	7°	10°
Air servomotor/damper setting	14°	14°	15°
Ignition point - RS 160 ULX -			
Maximum power input (kW)	1950	1650	950
Gas motor/butterfly setting	1°	1°	10°
Air servomotor/damper setting	1°	1°	2°
Ignition point - RS 200 ULX -			
Maximum power input (kW)	2400	1910	1350
Gas motor/butterfly setting	10°	10°	10°
Air servomotor/damper setting	3°	3°	2°

Tab. N

To determine the calibrations to use at the first start, proceed as follows::

1 Determine the maximum power required by the burner.
2 Open the combustion head as indicated in Fig. 21 on page 24.
3 Calculate the pressure required downstream of the gas train: this value is given by the sum of the boiler back pressure at the maximum burnt power and the pressure drop read on the diagrams of Fig. 25, Fig. 26, Fig. 27 and Fig. 28 on page 29.
4 Set the air and gas servomotors as suggested in Tab. N. If the maximum power falls between two indicated values, take an intermediate value between the two according to the opening degrees of the air and gas servomotors.

At the first ignition it is not recommended to use an air servomotor setting that exceeds the suggested setting by 10% .

5.4.6 Minimum output

The MIN output must be set within the firing rate (Fig. 5 on page 10).

5.5 Final calibration of the pressure switches

5.5.1 Air pressure switch

Adjust the air pressure switch (Fig. 33) after having performed all other burner adjustments with the air pressure switch set to the start of the scale.

With the burner working 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.

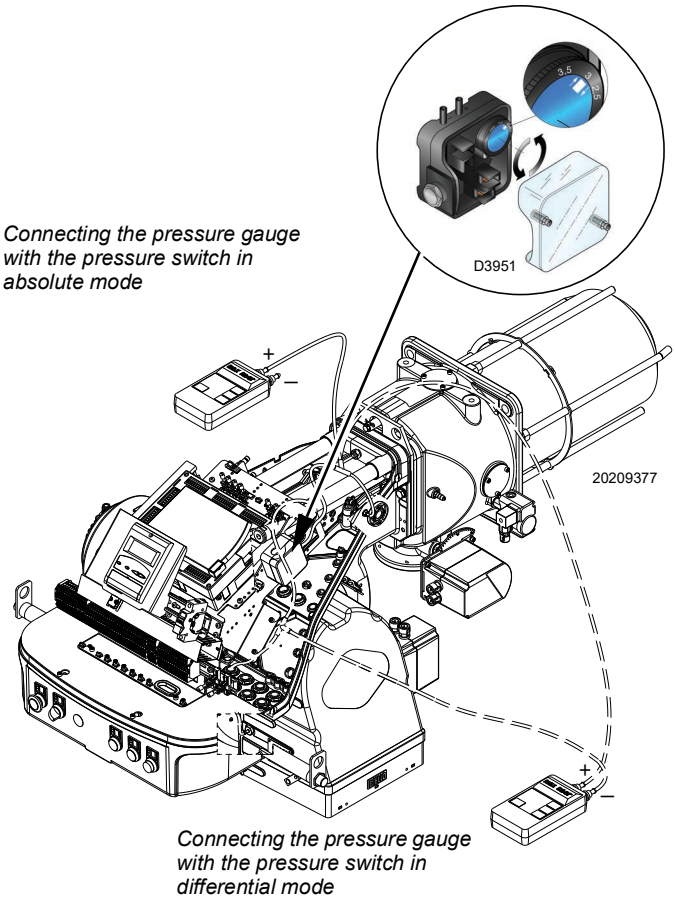
Slowly turn the appropriate knob clockwise until the burner goes into lockout.

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. 33. The standard configuration is that with the air pressure switch connected in absolute mode. Note the presence of a “T” connection, not supplied.

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 also, the pressure gauge must be connected in differential mode, as shown in Fig. 33.



Connecting the pressure gauge with the pressure switch in absolute mode

Connecting the pressure gauge with the pressure switch in differential mode

Fig. 33

5.5.2 Maximum gas pressure switch

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

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

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

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

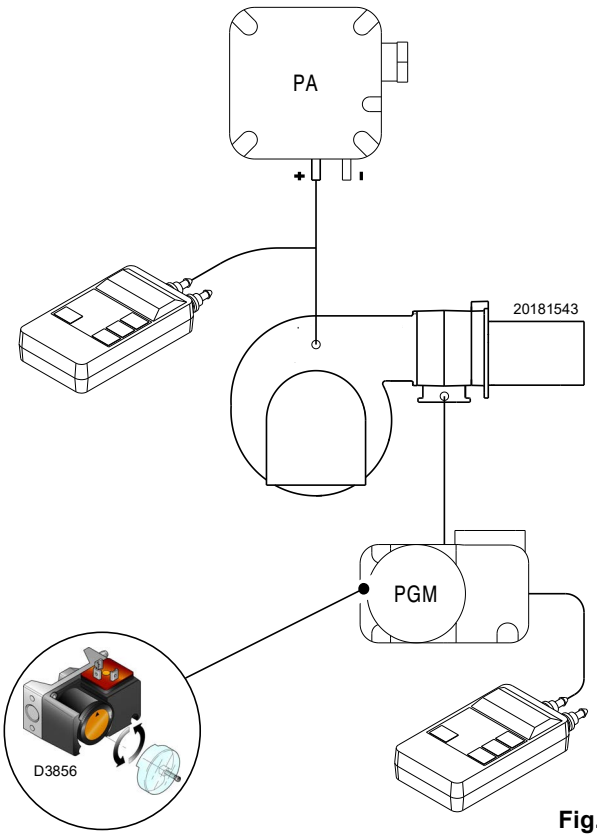


Fig. 34

5.5.3 Minimum gas pressure switch

Adjust the minimum gas pressure switch (Fig. 35) after having adjusted the burner, the gas valves and the gas train stabiliser. With the burner operating at maximum output:

– install a pressure gauge downstream of the gas train stabiliser (for example at the gas pressure test point on the burner combustion head);
– choke slowly the manual gas cock until the pressure gauge detects a decrease in the pressure read of about 0.1 kPa (1 mbar). In this phase, verify the CO value which must always be less than 100 mg/kWh (93 ppm).
– Increase the adjustment of the gas pressure switch until it intervenes, causing the burner shut-down;
– remove the pressure gauge and close the cock of the gas pressure test point used for the measurement;
– open completely the manual gas cock.

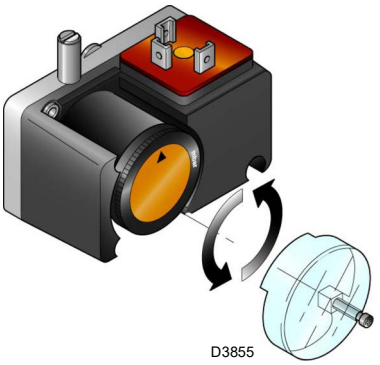


Fig. 35

5.5.4 PVP pressure switch kit

Adjust the pressure switch for the valve leak detection control device (PVP Kit)(Fig. 36), if present, according to the instructions supplied with the Kit itself.

WARNING

1 kPa = 10 mbar

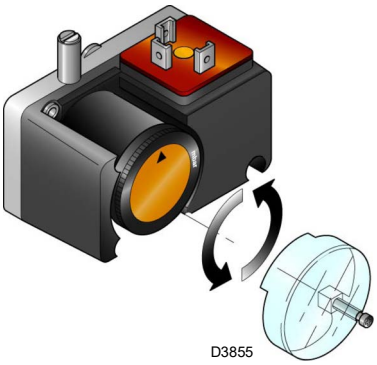


Fig. 36

5.6 Operation

Once the start-up cycle is completed, the servomotor command moves on to the thermostat/pressure switch TR that controls the pressure or the temperature in the boiler.

➤ If the temperature or the pressure is low, the burner progressively increases the output as far as the MAX value.
➤ If the temperature or the pressure increases, the burner progressively reduces the output as far as the MIN value. The sequence repeats endlessly.
➤ The burner stops when the heat request is less than the heat supplied by the burner at MIN output.
➤ The thermostat/pressure switch TL opens, the flame control carries out the switching off phase.
➤ The air damper closes completely to reduce heat losses to a minimum.

5.7 Motor lockout

If the motor does not start, it could be because of a thermal relay intervention due to its incorrect calibration or problems with the motor or the main power supply, to release press the button of the thermal relay, see **"Calibration of the thermal relay"** on page 31.

5.8 Ignition failure

If the burner does not switch on, there is a lockout within 3s of the electrical supply reaching the gas valve.
It may be that the gas does not arrive at the combustion head within the safety time of 3s.
In this case increase gas ignition flow rate. The arrival of gas to the pipe coupling is displayed on the pressure gauge, as shown in (Fig. 38 on page 42).

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.

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.

5.9 Burner flame goes out during operation

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

5.10 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 switch "**0-AUTO**" of Fig. 32 on page 33.

5.11 Final checks (with burner operating)

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

Tab. O

WARNING

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

5.12 Description of O_2 trim control (optional)

A special feature of the LMV52… is control of the residual O_2 content to increase the boiler's efficiency. The LMV52… uses a QGO20…, an external PLL52…, and the standard components of the LMV51… The PLL52… is a detached measuring module for the O_2 sensor and for 2 temperature sensors (Pt1000 / LG-Ni1000). The module communicates with the LMV52… via CAN bus.

The following generic diagram shows the system (Fig. 37).

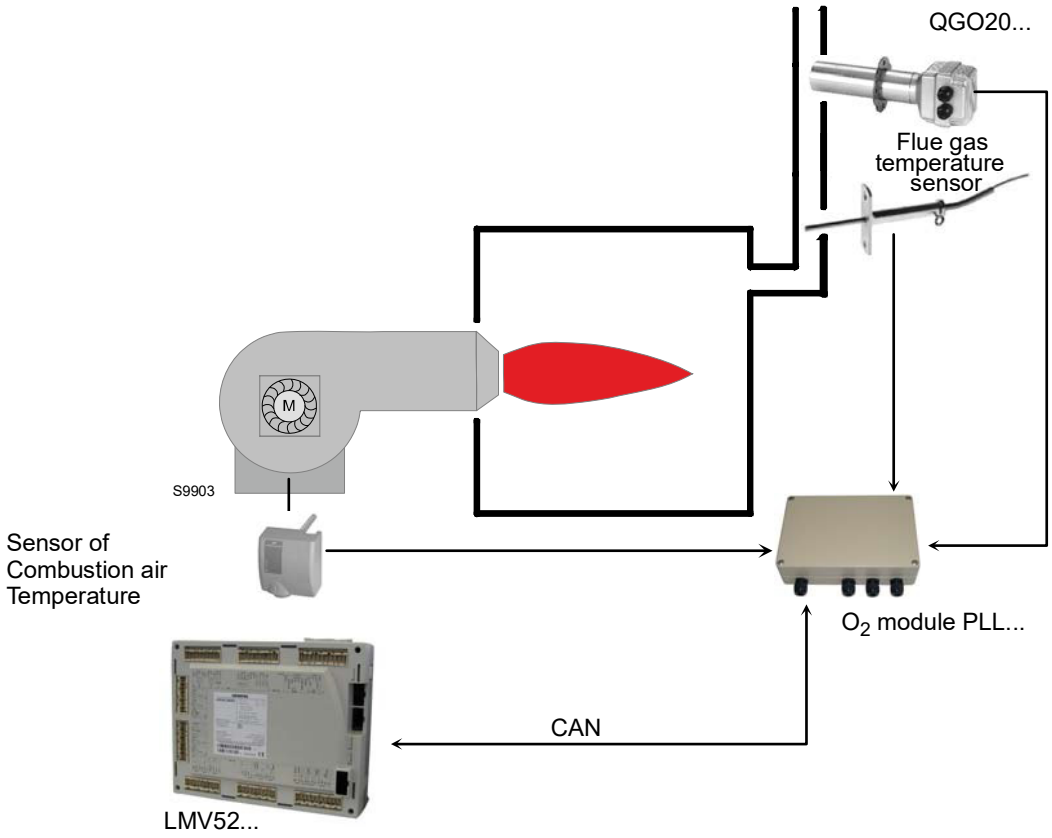


Fig. 37

5.12.1 Operating principle of O_2 trim control

The residual O_2 control system reduces the amount of combustion air depending on the control deviation (O_2 setpoint minus actual of O_2). The amount of combustion air is normally influenced by several actuators and, if used, by a VSD. **Reduction of the amount of air is reached by reducing the «air rate» of the air-regulating actuators.**

For that purpose, the damper positions of these actuators are calculated from some other load point on the ratio control curves. Hence, due to the parameterized ratio control curves, the air-regulating actuators are in a fixed relation to one another.

O_2 trim control is supported by **precontrol. It calculates the air rate reduction such that changes in burner load do not require the O_2 trim controller to interfere.** Consideration is given to a number of measured values that are ascertained when the burner is set. This means that the controller only becomes active when environmental conditions (temperature, pressure) change, and not when the burner load changes.

WARNING

The installation and setting of the system must be carried out by qualified personnel, as indicated in the specific documentation of the device.

6 Maintenance

6.1 Notes on safety for the maintenance

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

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

DANGER

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

Before carrying out any maintenance, cleaning or checking operations:

DANGER

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

DANGER

Close the fuel interception tap.

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

6.2 Maintenance programme

6.2.1 Maintenance frequency

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

6.2.2 Safety test - with gas feeding closed

For its safe commissioning it is very important to make sure that the electrical wiring has been carried out correctly between the gas valves and the burner.

To this end, after checking that the connections have been made in conformity with the burner's wiring diagram, a starting cycle should be carried out with the gas tap closed (dry test).

1 The manual gas valve should be closed with the locking/releasing device (“lock-out / tag out” procedure).
2 Make sure the limit electric contacts of the burner close
3 Make sure the contact of the minimum gas pressure switch closes
4 Proceed with a tentative start up of the burner.

The starting cycle should occur with the following phases:

– Starting the fan motor for pre-purging
– Carrying out the gas valve leak detection control, if applicable
– Completing the pre-purging
– Reaching the ignition point
– Power supply of the ignition transformer
– Power supply the gas valves.

Since the gas is closed, the burner will not be able to start and its control box will stop or go into a safety lockout.

The effective supplying of the gas valves can be checked with the insertion of a tester; some valves are fitted with light signals (or closure/opening position indicators) that are activated when the electrical supply arrives.

WARNING

IF THE ELECTRICAL SUPPLY OF THE GAS VALVES OCCURS AT AN UNEXPECTED MOMENT, DO NOT OPEN THE MANUAL VALVE, DISCONNECT THE ELECTRICAL SUPPLY, CHECK THE WIRING; CORRECT THE ERRORS AND CARRY OUT THE ENTIRE TEST AGAIN.

6.2.3 Checking and cleaning

The operator must use the required equipment during maintenance.

Combustion
The optimum calibration of the burner requires 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.

Combustion head
Open the burner and make sure that all the components of the combustion head are undamaged, not deformed due to high temperature, free of ambient dirt or dust, free of rusted materials and adequately positioned.

Make sure that the gas outlet holes for the start-up, on the combustion head distributor, are free of dirt or rust deposits. If in doubt, disassemble the elbow (Fig. 39 on page 43).

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

Burner
Clean the outside of the burner.

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

Gas filter
Replace the gas filter when it is dirty.

Flame inspection window
Clean the glass of the flame inspection window.

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

Electric current to the flame sensor

Clean the ionization probe from any dust.
Check the mechanical integrity of the component and the flame signal measured by the control box.

Combustion
If the combustion values found at the start of the intervention do not satisfy current standards or anyway indicate a poor state of combustion (consult the table below), contact the Technical Assistance Service for the necessary adjustments.

EN 676		Air excess			
		Max. output $\lambda \leq 1.2$		Min. output $\lambda \leq 1.3$	
GAS	CO_2 theoretical max. 0% O_2	CO_2 % Calibration		CO	NO_X
		$\lambda = 1.2$	$\lambda = 1.3$	mg/kWh	mg/kWh
G 20	11.7	9.7	9.0	≤ 100	≤ 170
G 25	11.5	9.5	8.8	≤ 100	≤ 170

Tab. P

Electric current to the flame sensor

Clean the ionization probe from any dust.

Check the mechanical integrity of the component and the flame signal measured by the control box.

6.2.4 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. 38.

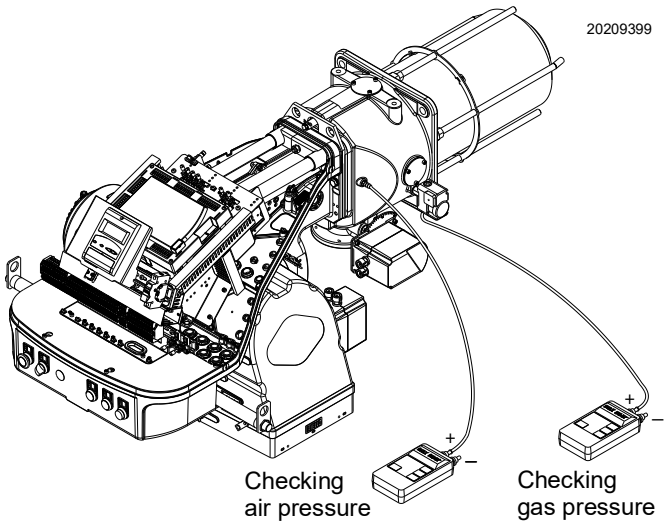


Fig. 38

6.2.5 Safety components

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

Safety component	Life cycle
Flame control	10 years or 250,000 operation cycles
Gas valves (solenoid)	10 years or 250,000 operation cycles
Pressure switches	10 years or 250,000 operation cycles
Pressure adjuster	15 years
Servomotor (electronic cam) (if present)	10 years or 250,000 operation cycles
Oil valve (solenoid) (if present)	10 years or 250,000 operation cycles
Oil regulator (if present)	10 years or 250,000 operation cycles
Oil pipes/ couplings (metallic) (if present)	10 years
Fan impeller	10 years or 500,000 start-ups

Tab. Q

6.3 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.

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

- ➤ Loosen the 4 screws 1)(Fig. 39) and remove the cover 2);
- ➤ assemble the two extensions supplied on the slide bars 4) and tighten the screws 7);
- ➤ disconnect the connector of the gas servomotor;
- ➤ disconnect the socket from the maximum gas pressure switch;
- ➤ remove the screws 3) and move the burner backwards by about 100 mm on the slide bars 4);
- ➤ disconnect the probe and electrode leads and then pull the burner fully back.

At this point it is possible to extract the inner part 5) after having removed the screw 6).

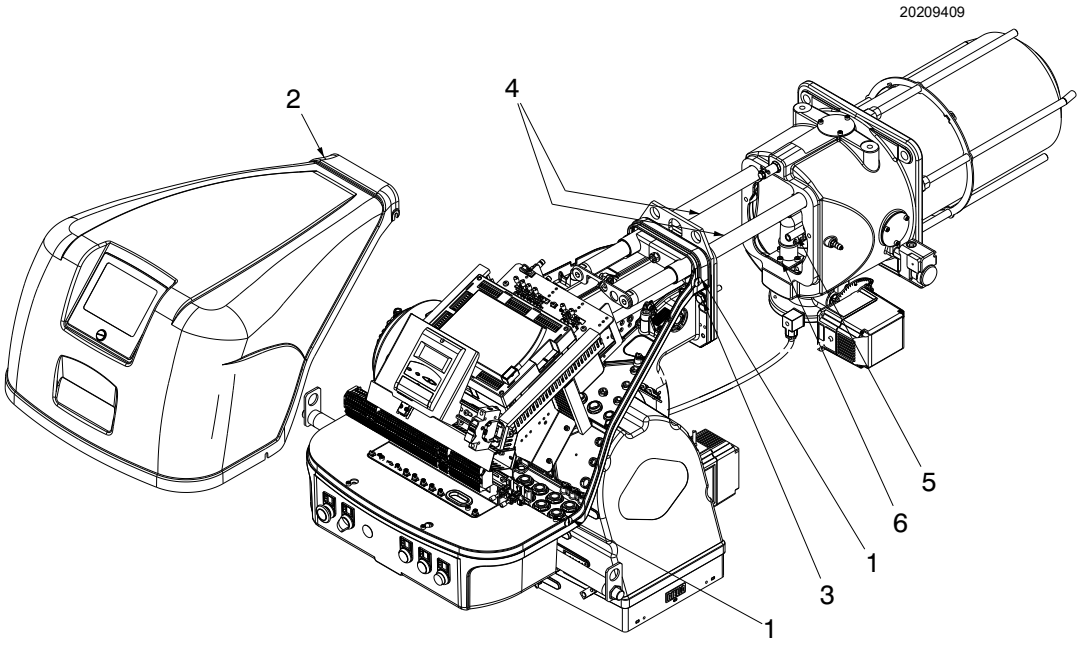


Fig. 39

6.4 Closing the burner

- ➤ Push the burner up to approximately 100 mm from the pipe coupling;
- ➤ reconnect the cables and slide in the burner until it comes to a stop;
- ➤ connect the servomotor connector;
- ➤ connect the socket of the maximum gas pressure switch;
- ➤ replace the screws 3) and carefully pull the probe and electrode cables outwards until they are slightly taut;
- ➤ disassemble the two extensions from the guides 4).

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

A Appendix - Accessories

Kit for modulating operation

Parameter to be checked		Probe	
	Adjustment field	Type	Code
Temperature	- 100 ÷ 500° C	PT 100	3010110
Pressure	0 ÷ 2.5 bar	4 ÷ 20 mA	3010213
	0 ÷ 16 bar	4 ÷ 20 mA	3010214
	0 ÷ 25 bar	4 ÷ 20 mA	3090873

Soundproofing chamber kit

Burner	Type	dB(A)	Code
RS 68-200/E O2 ULX	C4/5	10	3010404

Continuous purging kit

Burner	Code
RS 68-200/E O2 ULX	3010094

PVP kit (Pressure Valve Proving)

Burner	Code
RS 68-200/E O2 ULX	3010344

Software interface kit (ACS 450)

Burner	Code
RS 68-200/E O2 ULX	3010388

fficiency kit with oxygen control kit

Burner	Code
RS 68-200/E O2 ULX	3010377

Oxygen control kit

Burner	Code
RS 68-200/E O2 ULX	20045187

Additional transformer kit

Burner	Code
RS 68-200/E O2 ULX	20044177

Gas trains in compliance with EN 676

Please refer to manual.

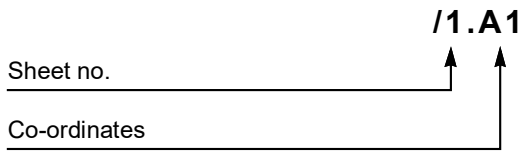
ATTENZIONE

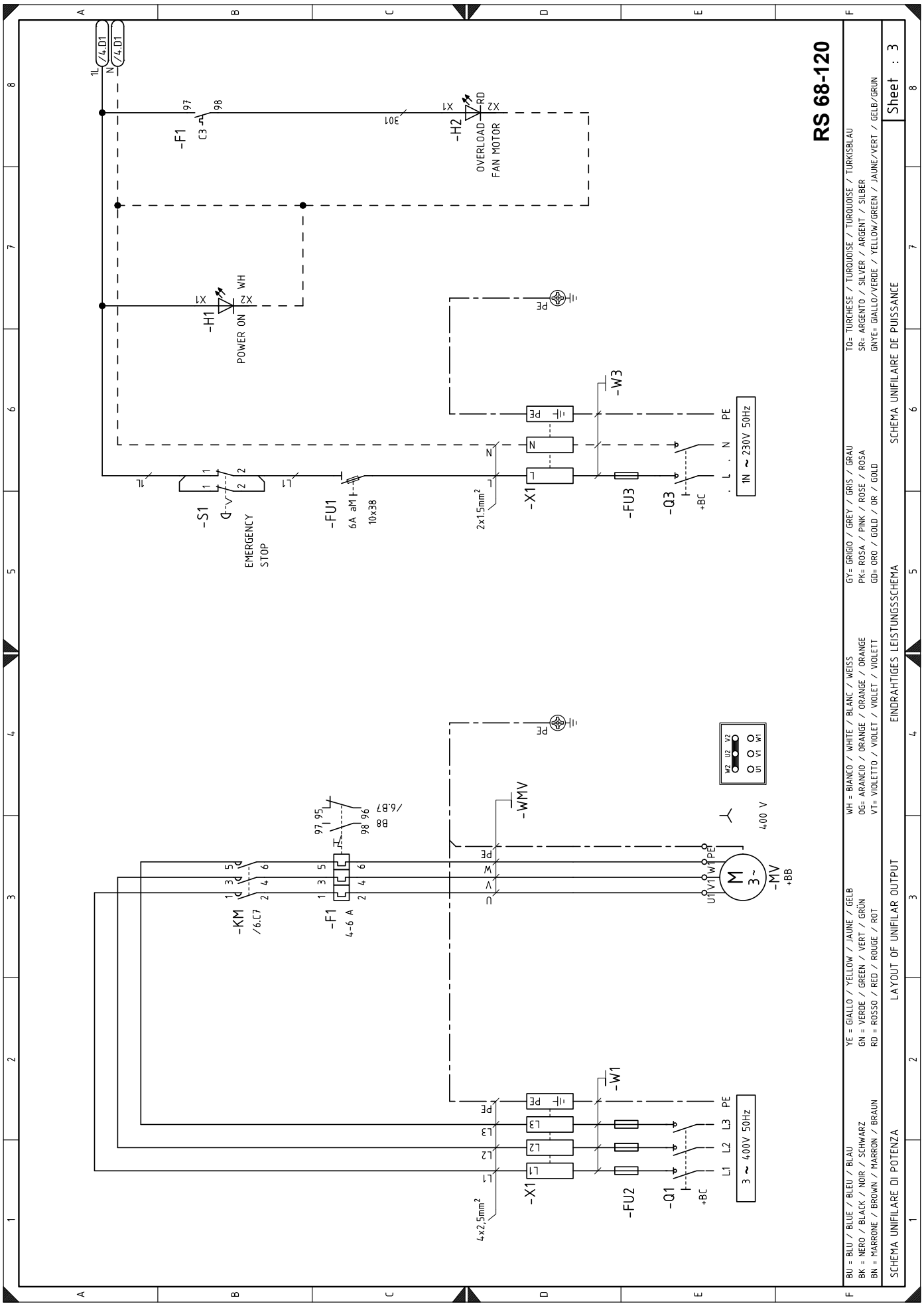
The installer is responsible for the addition of any safety device not foreseen in this manual.

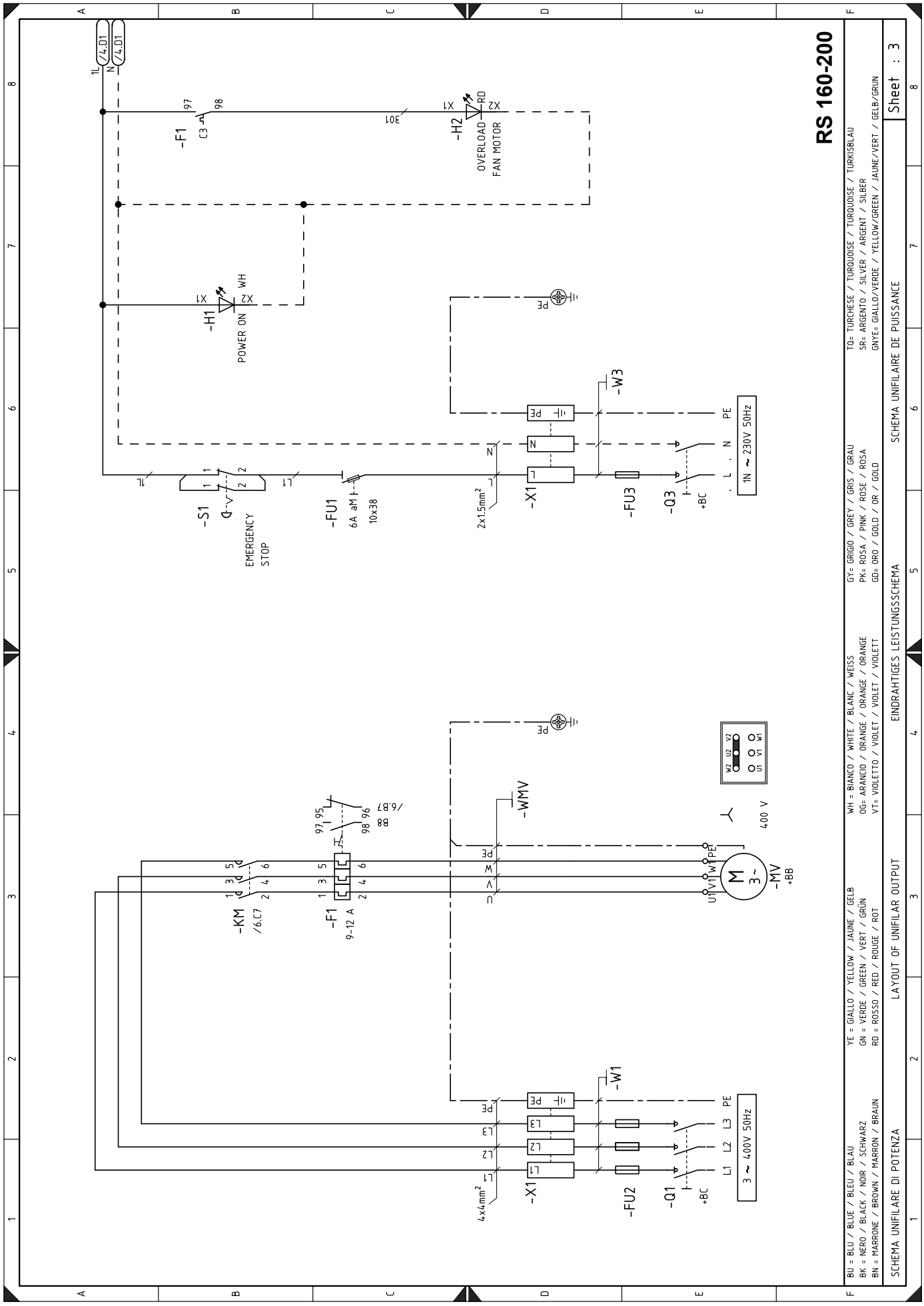
B Appendix - Electrical panel layout

1	**Index of layouts**
2	Reference indication
3	Layout of unifilar output
4	LMV 52 ... operational layout
5	LMV 52 ... operational layout
6	LMV 52 ... operational layout
7	LMV 52 ... operational layout
8	LMV 52 ... operational layout
9	LMV 52 ... operational layout
10	LMV 52 ... operational layout
11	Electrical wiring that is the responsibility of the installer
11B	Electrical wiring that is the responsibility of the installer
12	Electrical wiring that is the responsibility of the installer
13	Electrical wiring that is the responsibility of the installer
14	Electrical wiring that is the responsibility of the installer

2 Indication of references




RS 68-120
Sheet : 3
SCHEMA UNIFILARE DI POTENZA
LAYOUT OF UNIFILAR OUTPUT
EINDRAHTIGES LEISTUNGSSCHEMA
SCHEMA UNIFILAIRE DE PUISSANCE
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
-F1
-H2
OVERLOAD FAN MOTOR
-H1
POWER ON
-S1
EMERGENCY STOP
-FU1
6A aM
10x38
-X1
-W3
-Q3
-FU3
1N ~ 230V 50Hz
-KM
-WMV
-MV
400 V
-W1
-Q1
-FU2
3 ~ 400V 50Hz
2x1.5mm²
4x2,5mm²


RS 160-200
SCHEMA UNIFILARE DI POTENZA
LAYOUT OF UNIFILAR OUTPUT
EINDRAHTIGES LEISTUNGSSCHEMA
SCHEMA UNIFILAIRE DE PUISSANCE
Sheet : 3
1N ~ 230V 50Hz
3 ~ 400V 50Hz
400 V
-F1
-H1
POWER ON
-H2
OVERLOAD
FAN MOTOR
-S1
EMERGENCY
STOP
-FU1
6A aM
10x38
-X1
-W3
-FU3
-Q3
-KM
-F1
9-12 A
-WMV
-MV
-W1
-FU2
-Q1
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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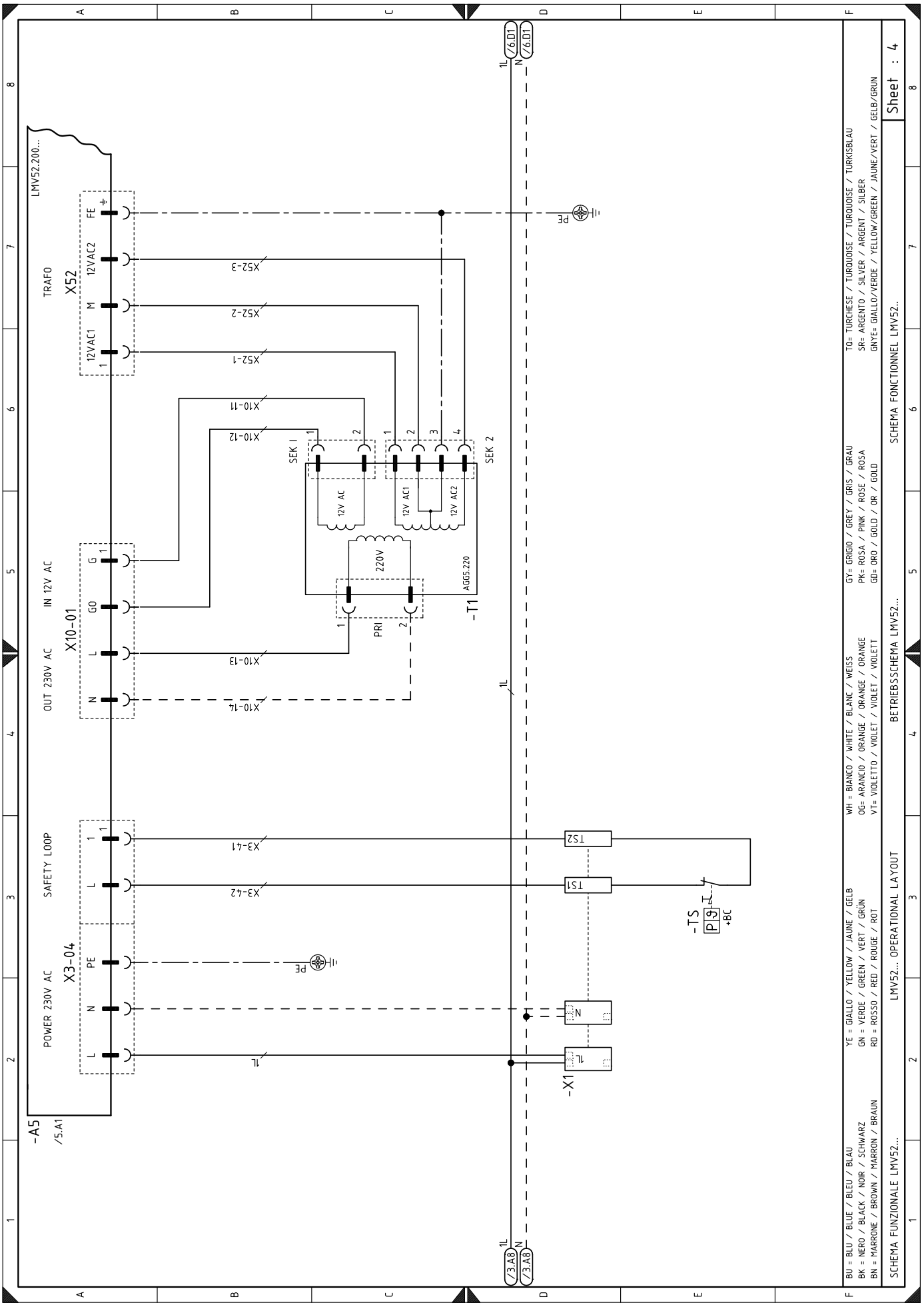
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN


LMV52.200...
TRAFO
X52
12VAC1
M
12VAC2
FE
X52-3
X52-2
X52-1
X10-11
X10-12
SEK 1
SEK 2
12V AC
12V AC1
12V AC2
220V
PRI
AGG5.220
-T1
X10-01
IN 12V AC
OUT 230V AC
G
GO
L
N
X10-13
X10-14
SAFETY LOOP
X3-04
POWER 230V AC
PE
X3-41
X3-42
TS2
TS1
-TS
P 9
+BC
-X1
-A5
/5.A1
/6.D1
/3.A8
BU = BLU / BLUE / BLEU / BLAU
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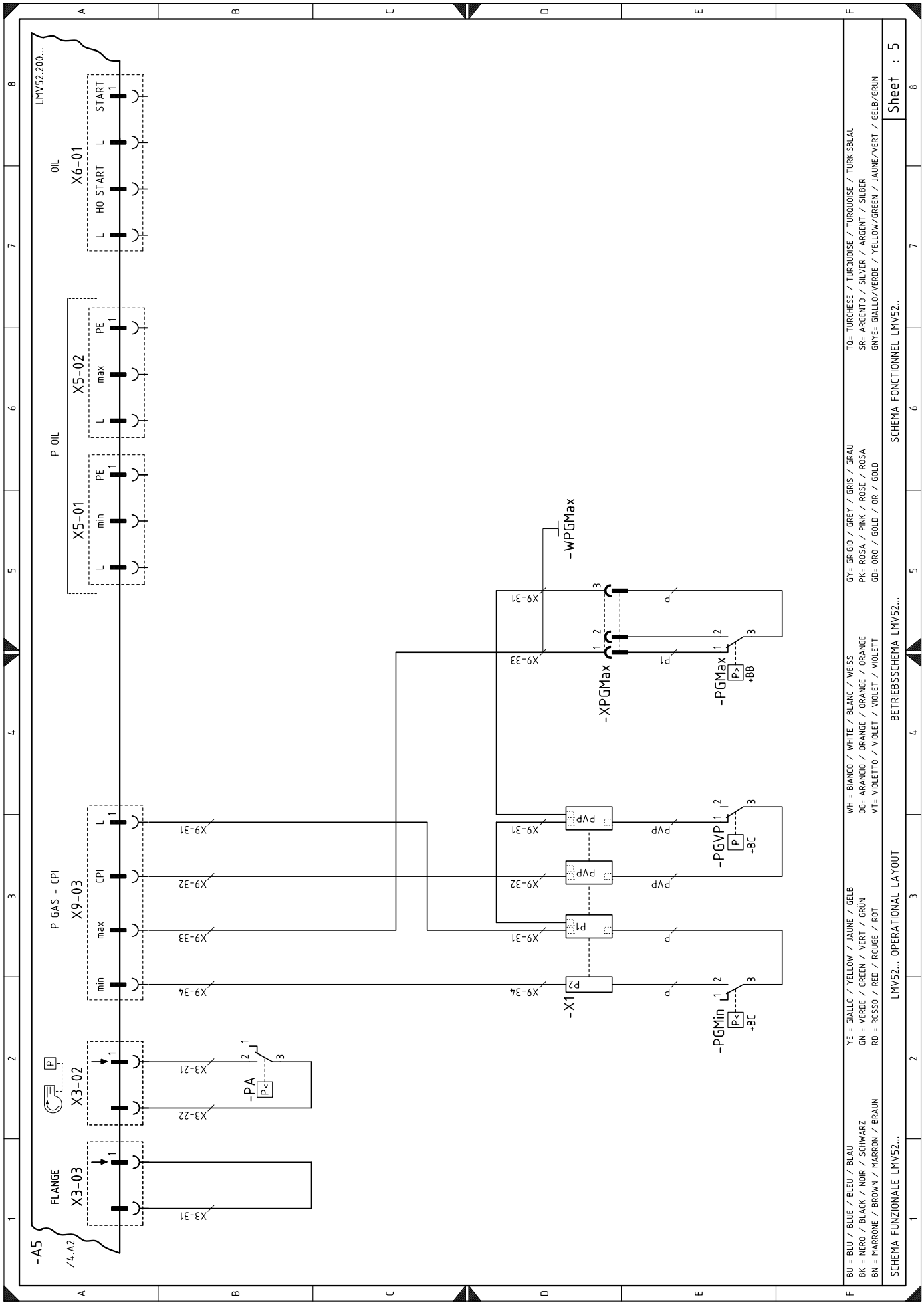
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 4


LMV52.200...
OIL
X6-01
L HO START L START 1
P OIL
X5-02
L max PE 1
X5-01
L min PE 1
P GAS - CPI
X9-03
min max CPI L 1
X3-02
X3-03
FLANGE
-A5
/4.A2
-PA
P<
-WPGMax
-XPGMax
-PGMax
P>
+BB
-PGVP
P
+BC
-PGMin
P<
+BC
-X1
X9-31
X9-32
X9-33
X9-34
X3-21
X3-22
X3-31
PVP
P1
P2
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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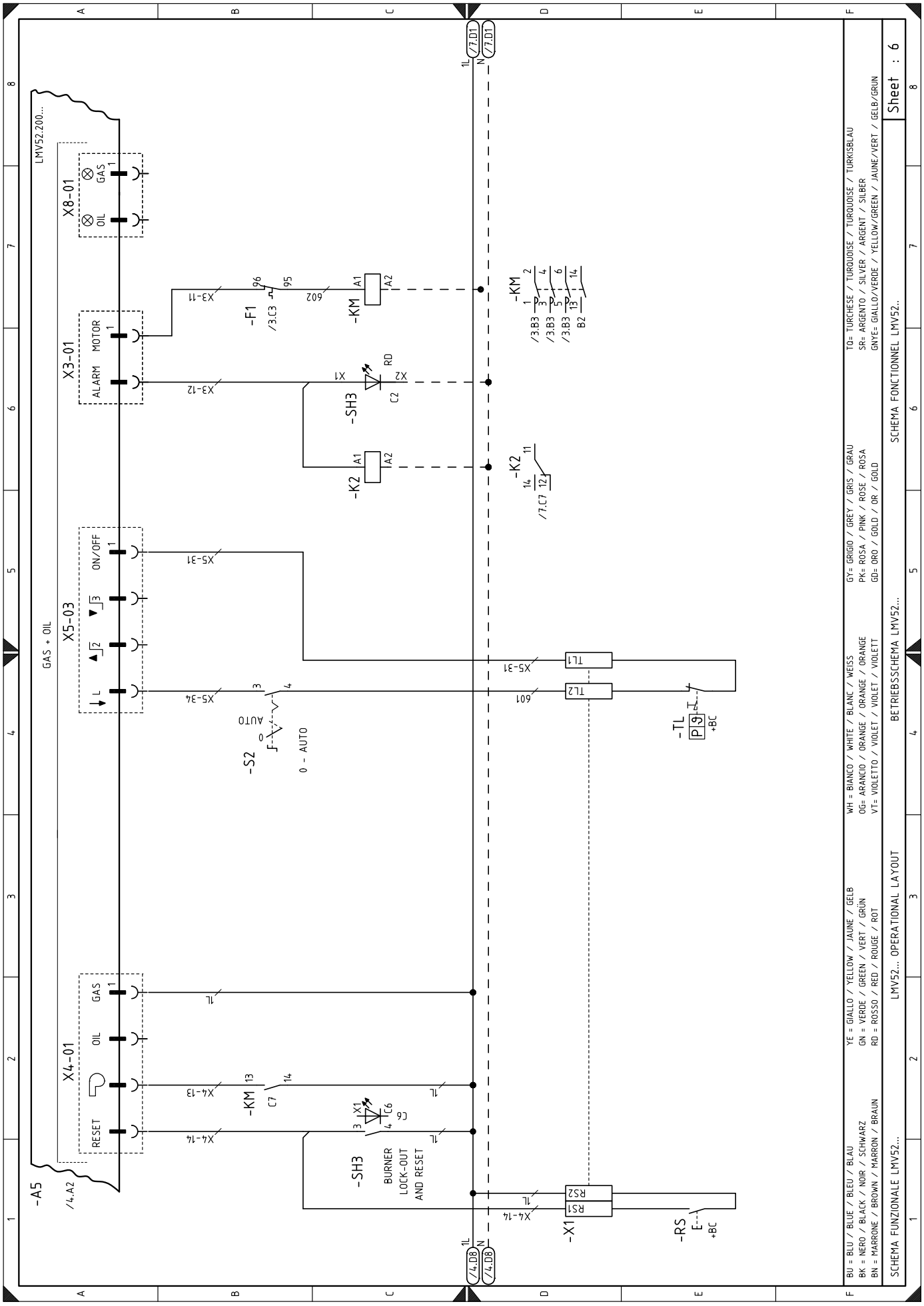
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 5


LMV52.200...
GAS + OIL
-A5
/4.A2
X8-01
X3-01
X5-03
X4-01
-F1
/3.C3
-KM
-SH3
-K2
-S2
-TL
-X1
-RS
-KM
/3.B3
/3.B3
/3.B3
B2
/7.C7
0 - AUTO
BURNER
LOCK-OUT
AND RESET
/7.D1
/4.D8
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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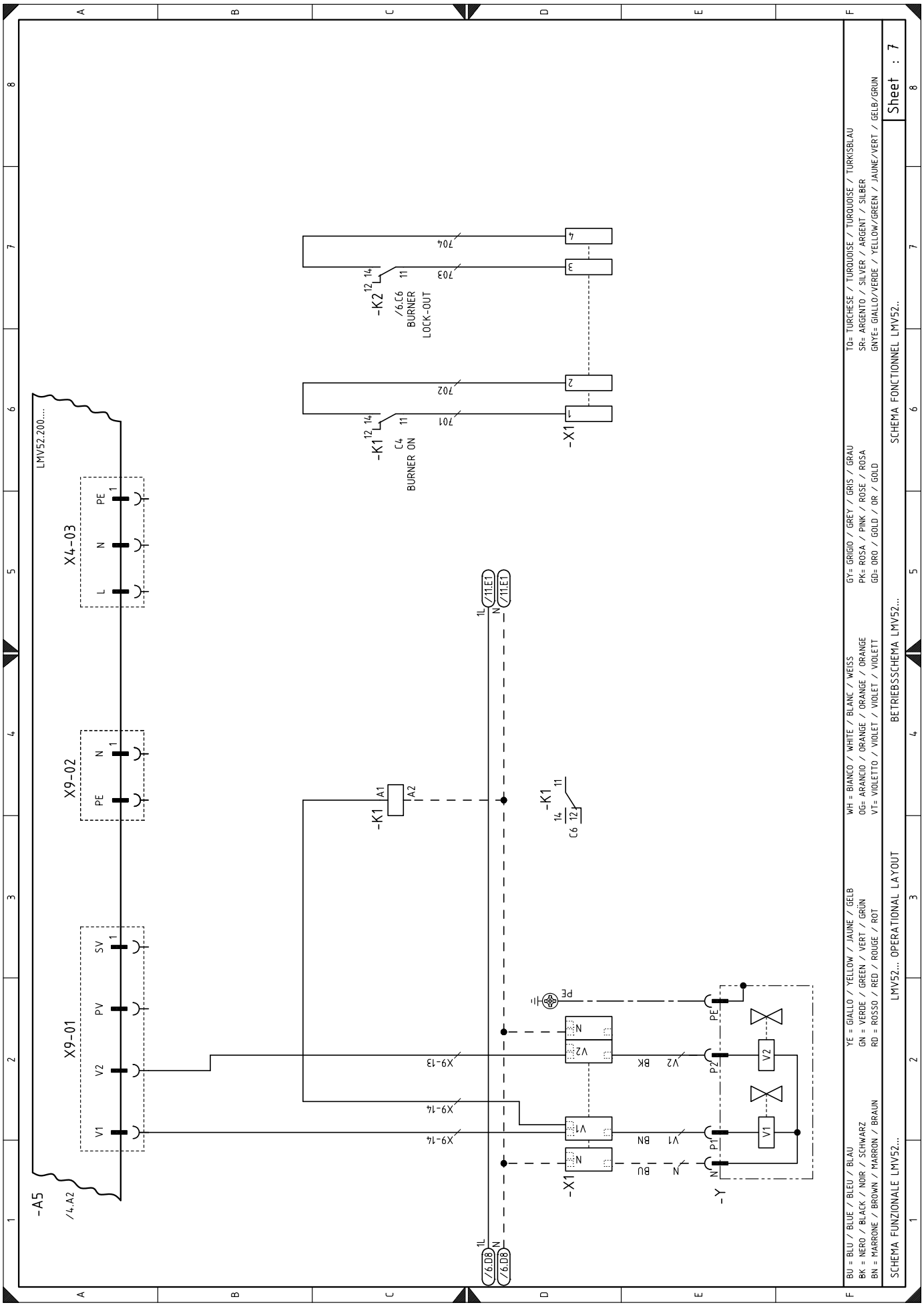
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 6


SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52..
Sheet : 7
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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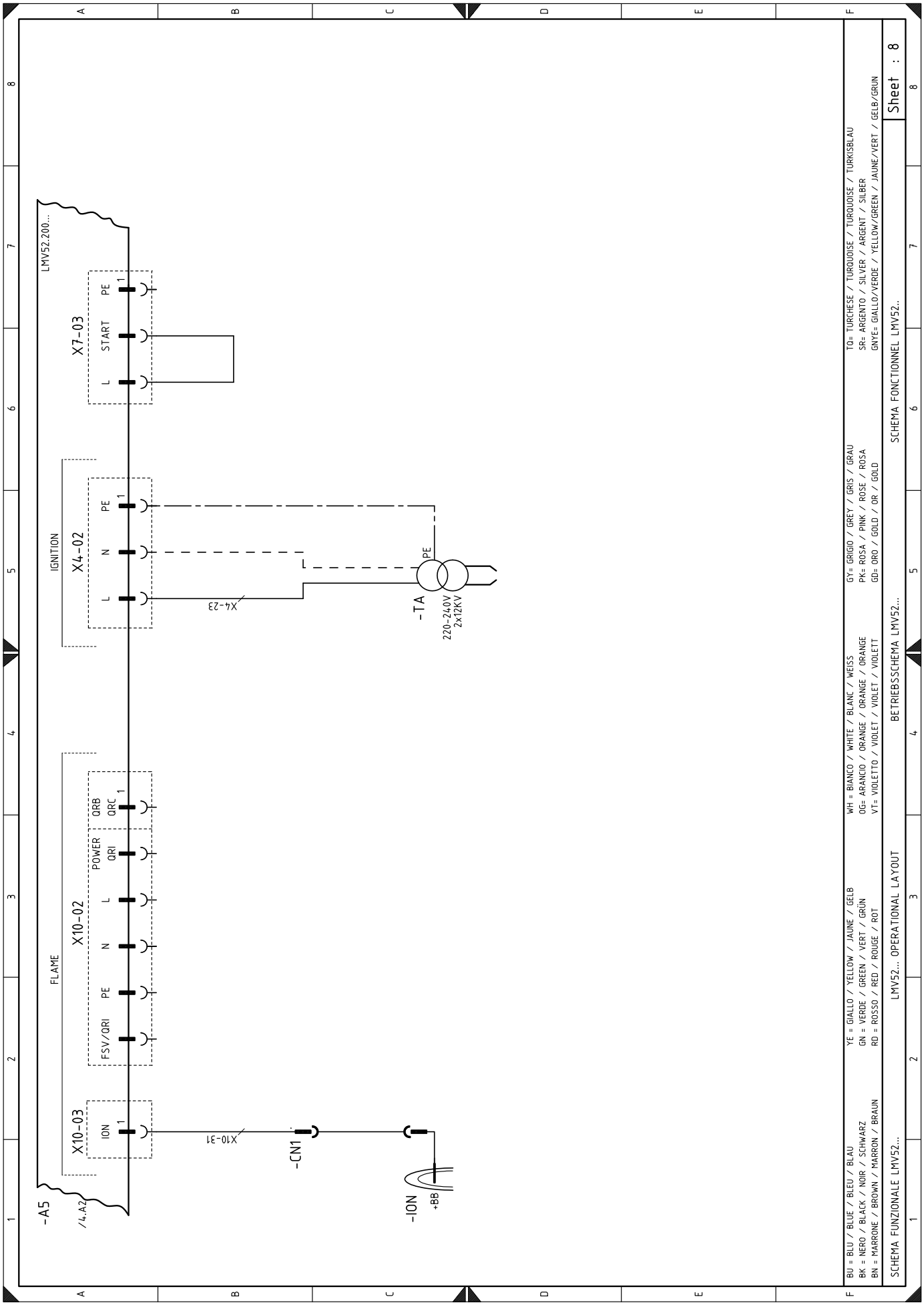
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
LMV52.200....
-A5
/4.A2
X4-03
X9-02
X9-01
-K1
-K2
-X1
-Y
BURNER ON
BURNER LOCK-OUT


LMV52.200...
X7-03
START
PE
L
X4-02
IGNITION
PE
N
L
X4-23
-TA
220-240V
2x12KV
X10-02
FLAME
POWER
QRB
QRC
QRI
FSV/QRI
PE
N
L
X10-03
ION
X10-31
-CN1
-ION
+BB
-A5
/4.A2
BU = BLU / BLUE / BLEU / BLAU
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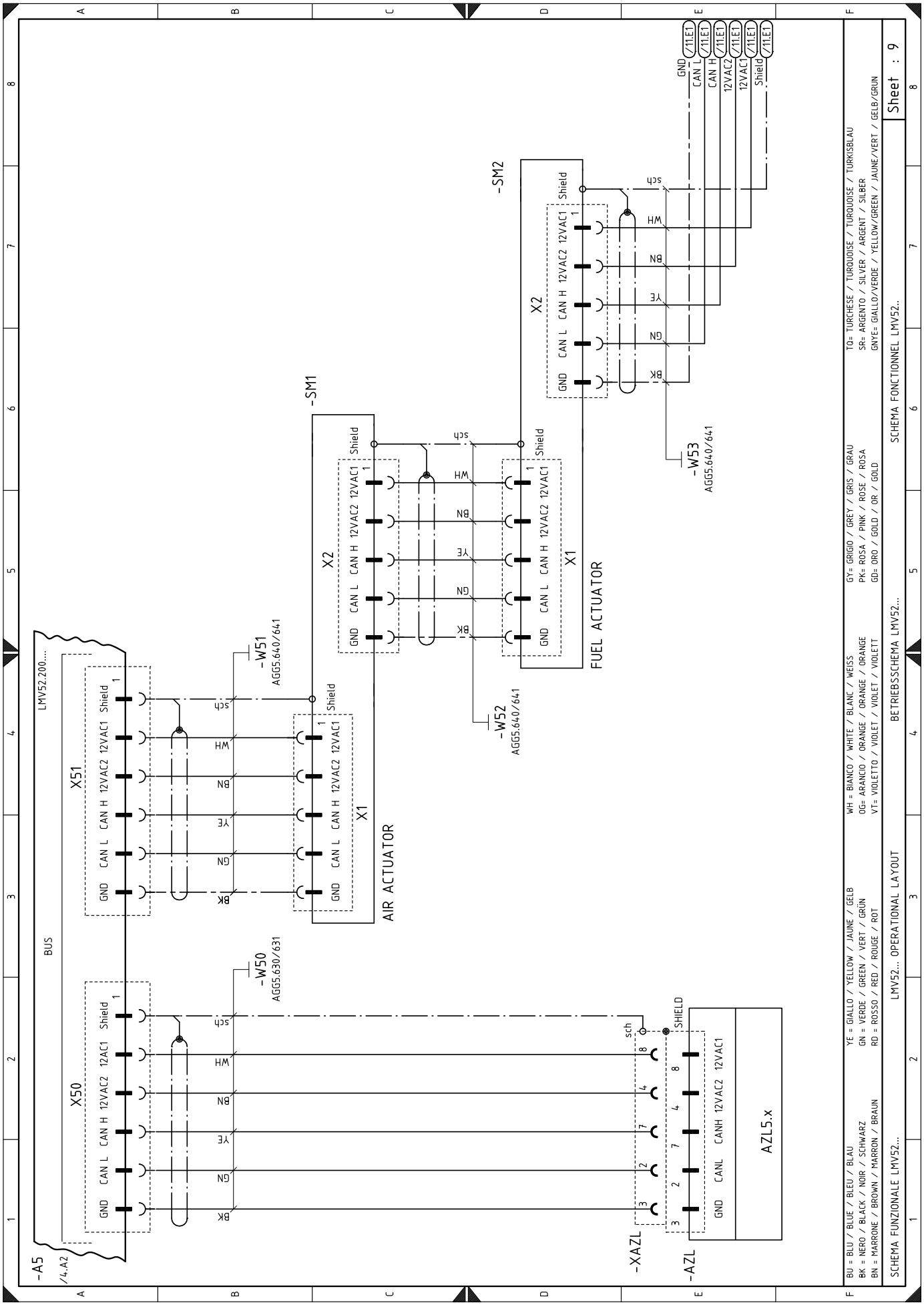
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 8


-A5
/4.A2
LMV52.200...
BUS
X50
X51
GND CAN L CAN H 12VAC2 12AC1 Shield
GND CAN L CAN H 12VAC2 12VAC1 Shield
-W50
AGG5.630/631
-W51
AGG5.640/641
-W52
AGG5.640/641
-W53
AGG5.640/641
-SM1
-SM2
X1
X2
AIR ACTUATOR
FUEL ACTUATOR
GND CAN L CAN H 12VAC2 12VAC1 Shield
sch WH BN YE GN BK
-XAZL
-AZL
SHIELD
GND CANL CANH 12VAC2 12VAC1
AZL5.x
GND /11.E1
CAN L /11.E1
CAN H /11.E1
12VAC2 /11.E1
12VAC1 /11.E1
Shield /11.E1
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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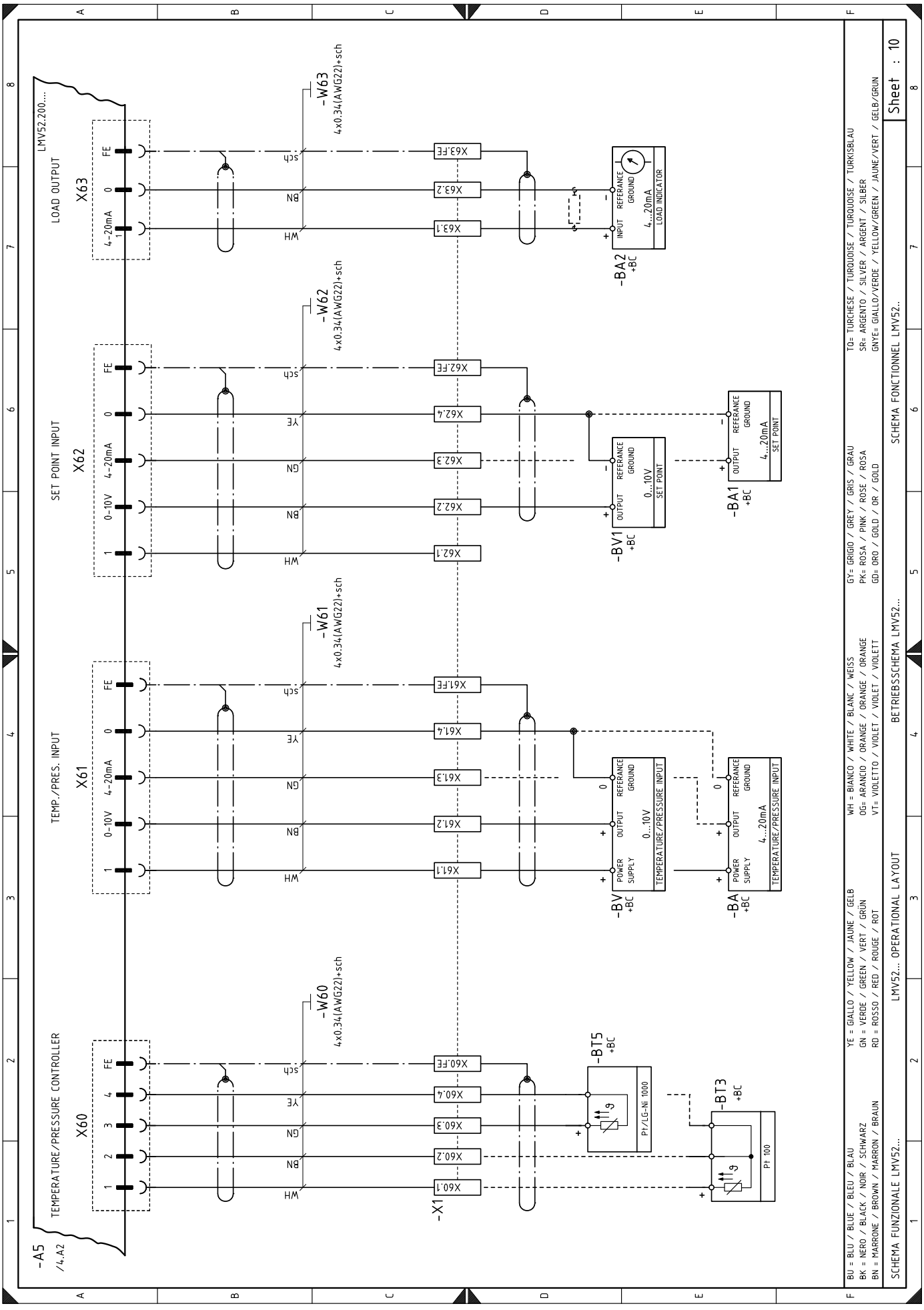
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52..
Sheet : 9


-A5
/4.A2
TEMPERATURE/PRESSURE CONTROLLER
X60
LMV52.200...
LOAD OUTPUT
X63
SET POINT INPUT
X62
TEMP./PRES. INPUT
X61
-W60
4x0.34(AWG22)+sch
-W61
4x0.34(AWG22)+sch
-W62
4x0.34(AWG22)+sch
-W63
4x0.34(AWG22)+sch
-X1
-BT5 +BC
Pt/LG-Ni 1000
-BT3 +BC
Pt 100
-BV +BC
-BA +BC
TEMPERATURE/PRESSURE INPUT
-BV1 +BC
-BA1 +BC
-BA2 +BC
LOAD INDICATOR
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
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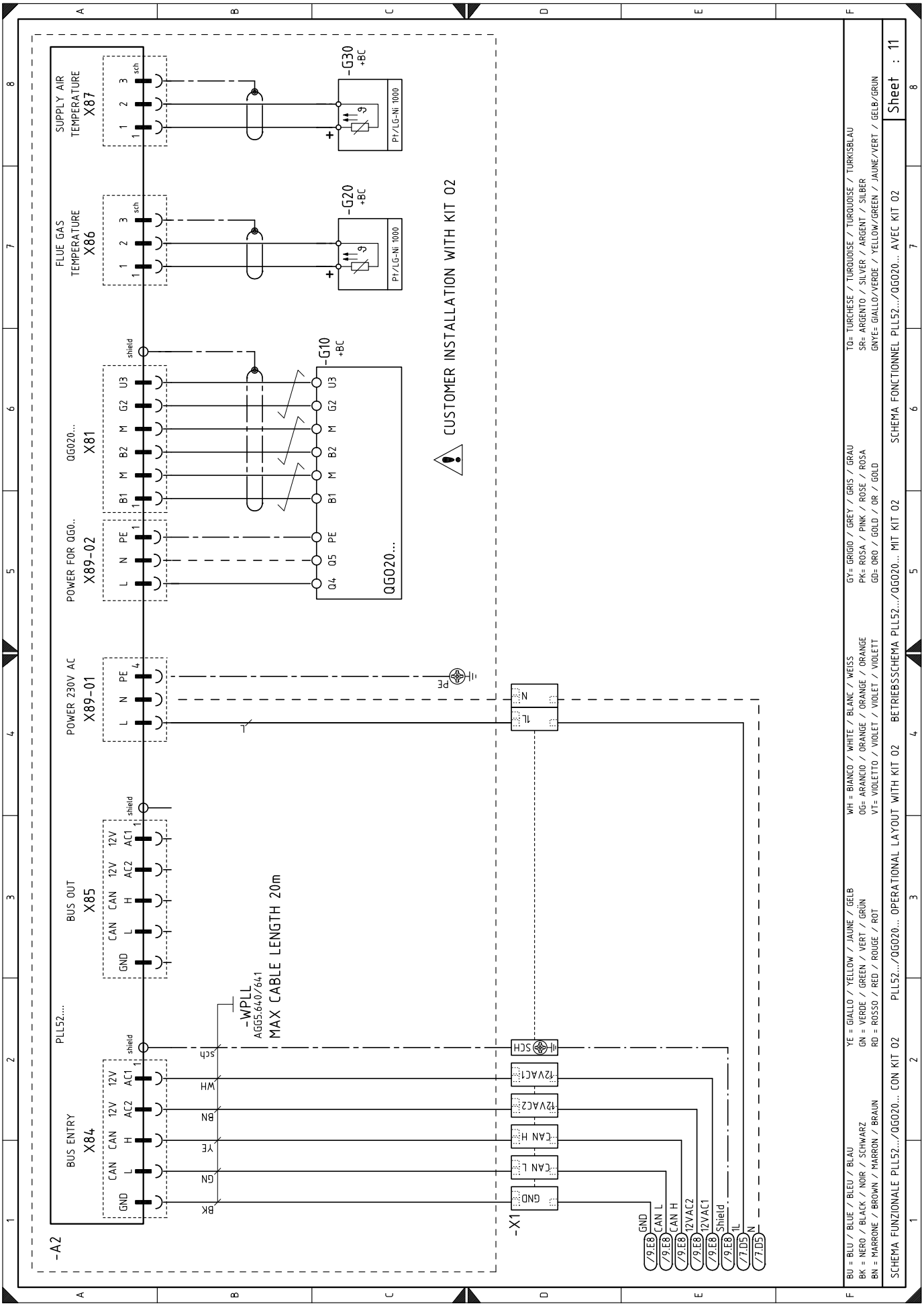
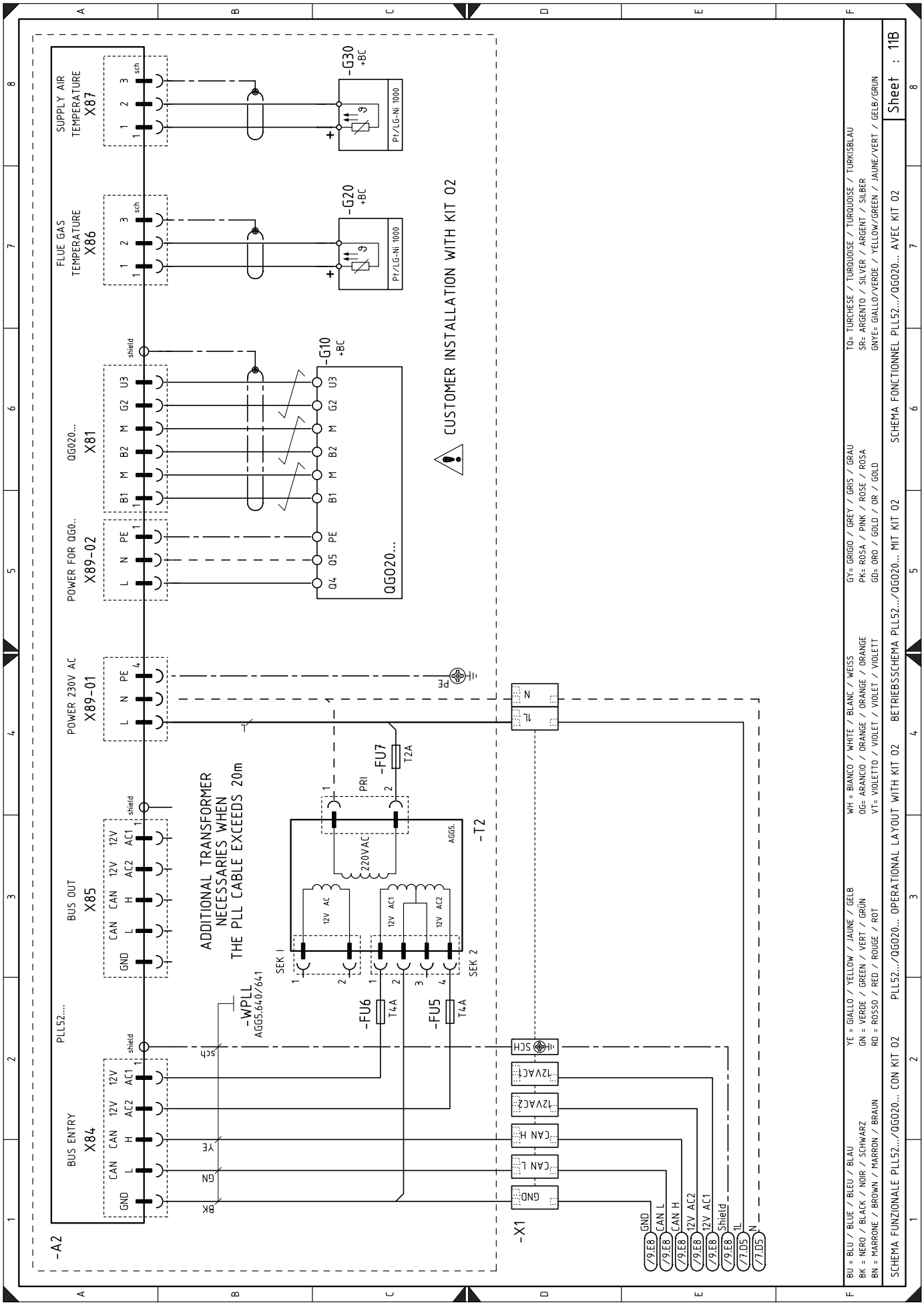
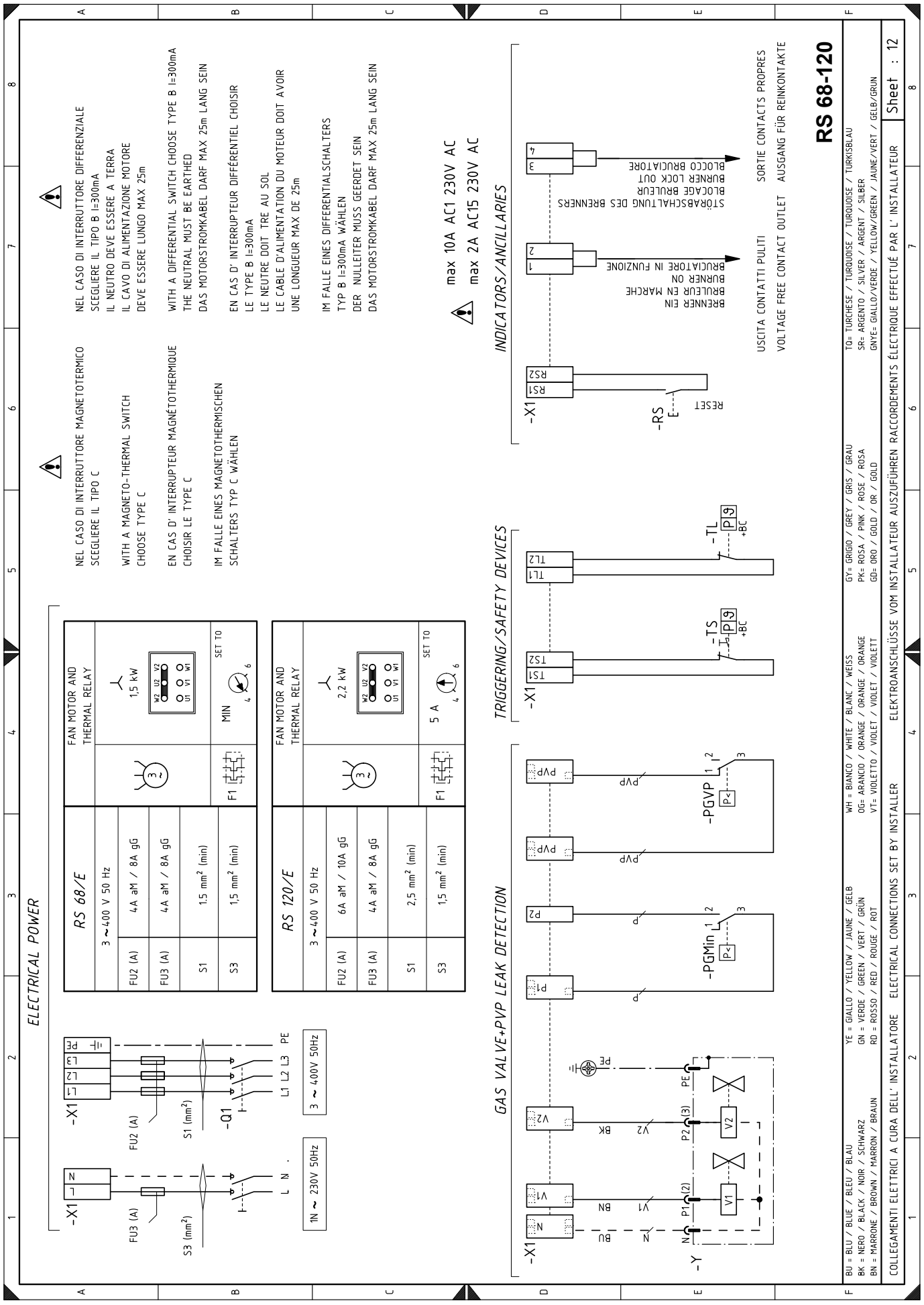
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
SCHEMA FUNZIONALE LMV52...
LMV52... OPERATIONAL LAYOUT
BETRIEBSSCHEMA LMV52...
SCHEMA FONCTIONNEL LMV52...
Sheet : 10


-A2
BUS ENTRY
X84
PLL52.....
BUS OUT
X85
POWER 230V AC
X89-01
POWER FOR QG0..
X89-02
QG020...
X81
FLUE GAS
TEMPERATURE
X86
SUPPLY AIR
TEMPERATURE
X87
-G10
-G20
-G30
QG020....
CUSTOMER INSTALLATION WITH KIT 02
-WPLL
AGG5.640/641
MAX CABLE LENGTH 20m
-X1
GND
CAN L
CAN H
12VAC2
12VAC1
Shield
1L
N
SCHEMA FUNZIONALE PLL52.../QG020... CON KIT 02
PLL52.../QG020... OPERATIONAL LAYOUT WITH KIT 02
BETRIEBSSCHEMA PLL52.../QG020... MIT KIT 02
SCHEMA FONCTIONNEL PLL52.../QG020... AVEC KIT 02
Sheet : 11


-A2
BUS ENTRY X84
BUS OUT X85
POWER 230V AC X89-01
POWER FOR QG0.. X89-02
QG020... X81
FLUE GAS TEMPERATURE X86
SUPPLY AIR TEMPERATURE X87
-G10 +BC
-G20 +BC
-G30 +BC
Pt/LG-Ni 1000
CUSTOMER INSTALLATION WITH KIT 02
QG020...
ADDITIONAL TRANSFORMER NECESSARIES WHEN THE PLL CABLE EXCEEDS 20m
-WPLL AGG5.640/641
-T2
-FU5 T4A
-FU6 T4A
-FU7 T2A
220VAC
-X1
PLL52....
SCHEMA FUNZIONALE PLL52.../QG020... CON KIT 02
PLL52.../QG020... OPERATIONAL LAYOUT WITH KIT 02
BETRIEBSSCHEMA PLL52.../QG020... MIT KIT 02
SCHEMA FONCTIONNEL PLL52.../QG020... AVEC KIT 02
Sheet : 11B


ELECTRICAL POWER
RS 68/E
3 ~400 V 50 Hz
FU2 (A) 4A aM / 8A gG
FU3 (A) 4A aM / 8A gG
S1 1,5 mm² (min)
S3 1,5 mm² (min)
FAN MOTOR AND THERMAL RELAY
1,5 kW
SET TO MIN
F1
RS 120/E
3 ~400 V 50 Hz
FU2 (A) 6A aM / 10A gG
FU3 (A) 4A aM / 8A gG
S1 2,5 mm² (min)
S3 1,5 mm² (min)
FAN MOTOR AND THERMAL RELAY
2,2 kW
SET TO 5 A
F1
-X1
-Q1
FU2 (A)
FU3 (A)
S1 (mm²)
S3 (mm²)
L1 L2 L3 PE
3 ~ 400V 50Hz
L N
1N ~ 230V 50Hz
NEL CASO DI INTERRUTTORE MAGNETOTERMICO
SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH
CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE
CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN
SCHALTERS TYP C WÄHLEN
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
max 10A AC1 230V AC
max 2A AC15 230V AC
INDICATORS/ANCILLARIES
-X1
-RS
RESET
BRENNER EIN
BRULEUR EN MARCHE
BURNER ON
BRUCIATORE IN FUNZIONE
STÖRABSCHALTUNG DES BRENNERS
BLOCAGE BRULEUR
BURNER LOCK OUT
BLOCCO BRUCIATORE
USCITA CONTATTI PULITI
SORTIE CONTACTS PROPRES
VOLTAGE FREE CONTACT OUTLET
AUSGANG FÜR REINKONTAKTE
TRIGGERING/SAFETY DEVICES
-TL
-TS
GAS VALVE+PVP LEAK DETECTION
-PGMin
-PGVP
-Y
RS 68-120
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
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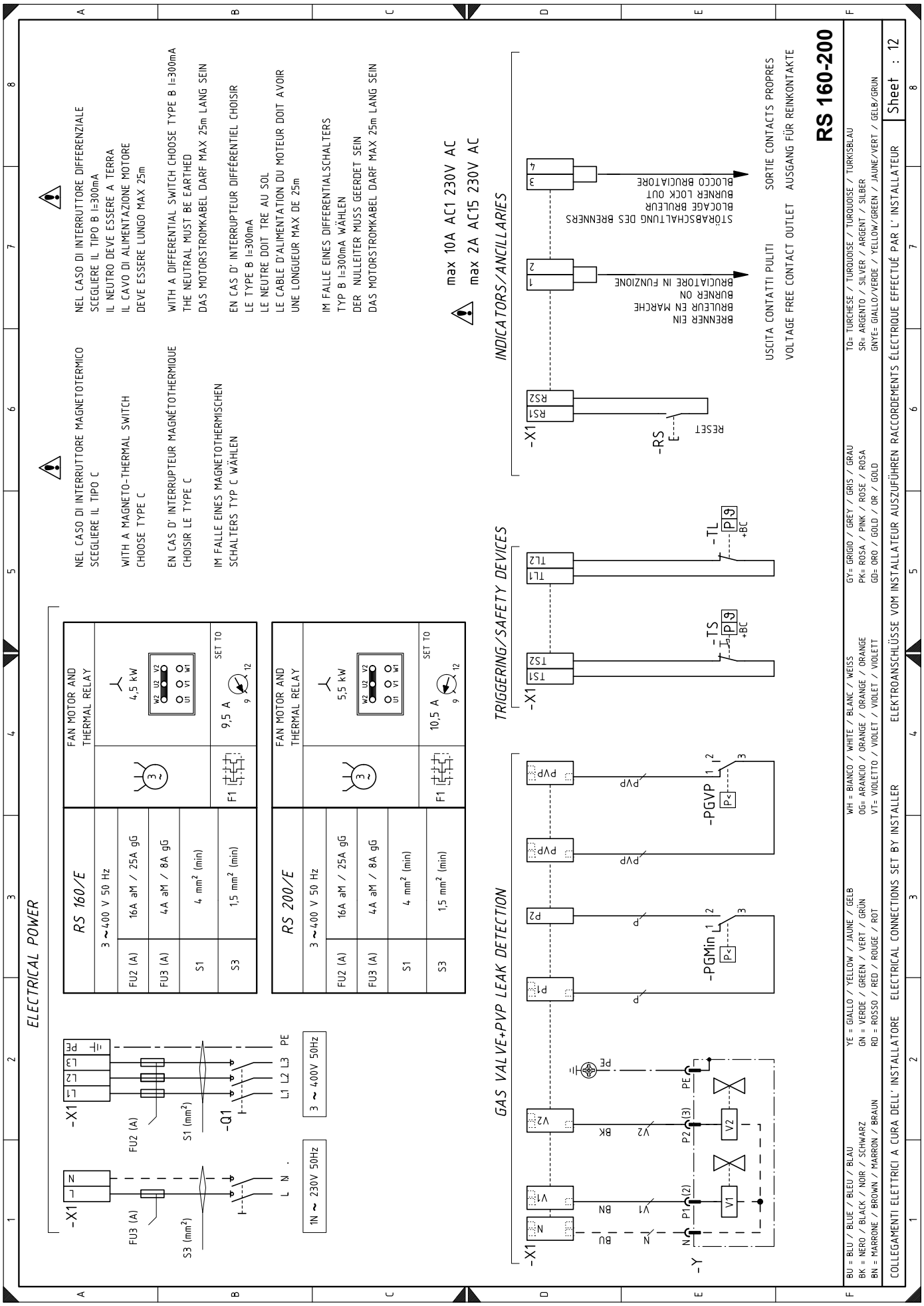
WH = BIANCO / WHITE / BLANC / WEISS
OG= ARANCIO / ORANGE / ORANGE / ORANGE
VT= VIOLETTO / VIOLET / VIOLET / VIOLETT
GY= GRIGIO / GREY / GRIS / GRAU
PK= ROSA / PINK / ROSE / ROSA
GD= ORO / GOLD / OR / GOLD
TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / 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 : 12


ELECTRICAL POWER
RS 160/E
3 ~ 400 V 50 Hz
FU2 (A) 16A aM / 25A gG
FU3 (A) 4A aM / 8A gG
S1 4 mm² (min)
S3 1,5 mm² (min)
FAN MOTOR AND THERMAL RELAY
4,5 kW
9,5 A
SET TO
F1
RS 200/E
5,5 kW
10,5 A
-X1
-Q1
FU2 (A)
FU3 (A)
S1 (mm²)
S3 (mm²)
L1 L2 L3 PE
3 ~ 400V 50Hz
1N ~ 230V 50Hz
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SCEGLIERE IL TIPO C
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CHOOSE TYPE C
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RS 160-200
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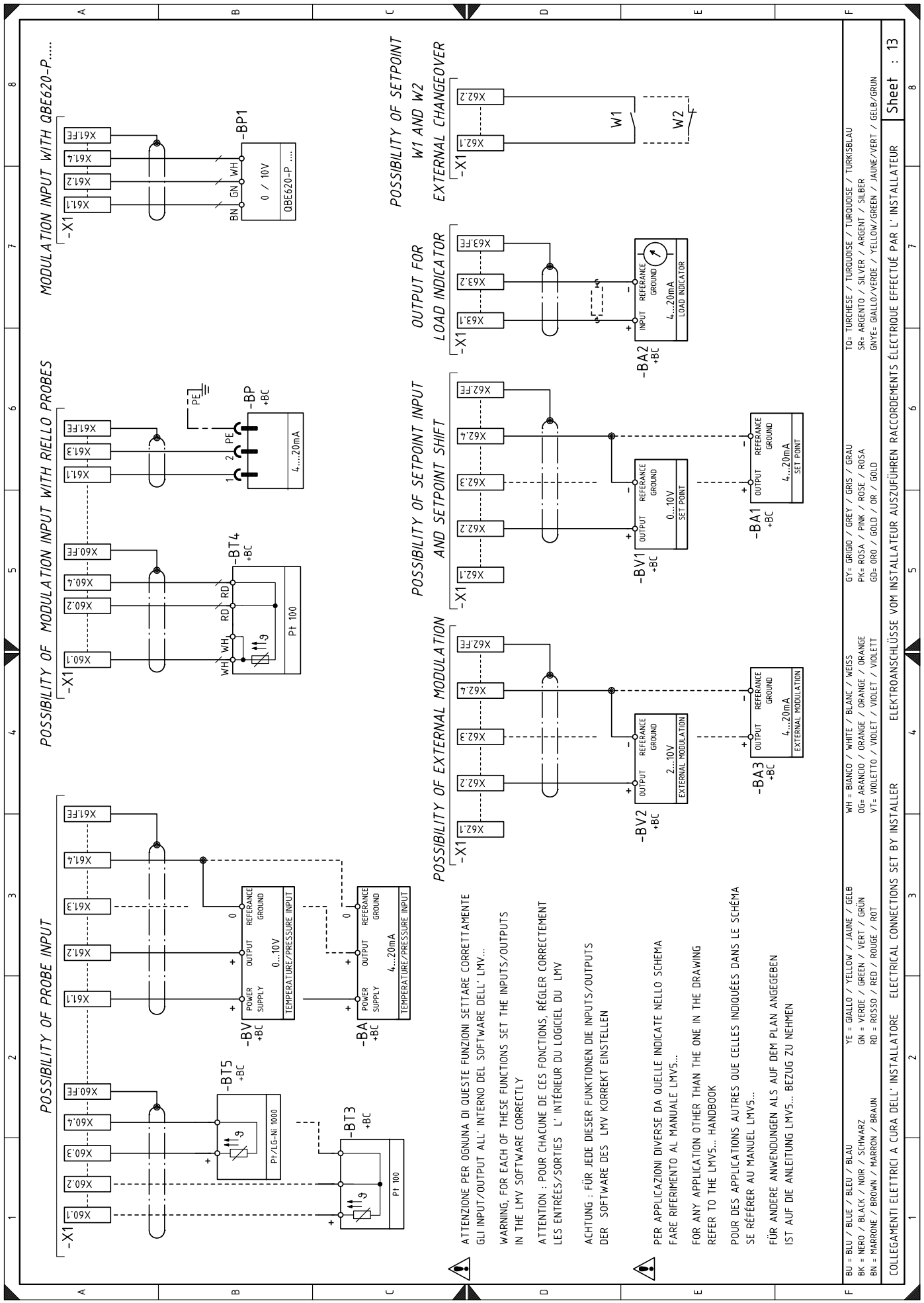
MODULATION INPUT WITH QBE620-P.....
-BP1
QBE620-P ....
0 / 10V
POSSIBILITY OF MODULATION INPUT WITH RIELLO PROBES
-BP
4....20mA
-BT4
Pt 100
POSSIBILITY OF PROBE INPUT
-BT5
Pt/LG-Ni 1000
-BT3
Pt 100
-BV
TEMPERATURE/PRESSURE INPUT
0...10V
-BA
4...20mA
POSSIBILITY OF EXTERNAL MODULATION
POSSIBILITY OF SETPOINT INPUT AND SETPOINT SHIFT
-BV2
EXTERNAL MODULATION
2...10V
-BV1
SET POINT
0...10V
-BA3
-BA1
SET POINT
4...20mA
POSSIBILITY OF SETPOINT W1 AND W2 EXTERNAL CHANGEOVER
W1
W2
OUTPUT FOR LOAD INDICATOR
-BA2
LOAD INDICATOR
4...20mA
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
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Sheet : 13

Wiring layout key

A1	Electronic cam
A2	O2 module PLL.. type
AZL	Display and calibration unit
BA	Output probe in current
BA1	Device with output undercurrent, for modifying remote setpoint
BA2	Load indicator
BA3	Input in current DC 4...20 mA
BP	Pressure probe
BP1	Pressure probe
BT3	Probe Pt100, 3 wires
BT4	Probe Pt100, 3 wires
BT5	PT/LG-Ni1000 probe
BV	Output probe in voltage
BV1	Output devicein voltage to modify remote setpoint
CN1	Ionisation probe connector
F1	Thermal relay fan motor
FU	Auxiliary circuits safety fuse
GF	Inverter
G2	Rpm sensor
G10	O2 sensor OGO20 type
G20	Combustion fume temperature sensor probe
G30	Air temperature control probe
H	Burner working lighting signal output
H1	Light signalling of mains live state
H2	Fan motor lock-out warning lamp
ION	Ionisation probe
K1	Clean contacts output relay burner switched on
K2	Clean contacts output relay burner lockout
KM	Fan motor contactor
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
RS	Burner reset switch
SM1	Air servomotor
SM2	Gas servomotor
S1	Emergency stop button
S2	Automatic / off selector
SH3	Burner reset button and light signalling of lock-out signal
TA	Ignition transformer
TL	Limit thermostat/pressure switch
TS	Safety thermostat/pressure switch
T1	Electronic cam transformer
T2	Additional transformer
Y	Gas regulator valve + gas safety valve
X1	Main terminal supply board
XAZL	Plug for on board display
XPGMax	Maximum gas pressure switch connector

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