GB

Dual fuel light oil/ gas burners

Progressive two stage or modulating operation

CODE	MODEL
20207998 20208001 20208002	RLAS 280/EV (FGR prepared)
20208031 20208032	RLAS 310/EV (FGR prepared)
20208034 20208035	RLAS 410/EV (FGR prepared)
20208037 20208038	RLAS 510/EV (FGR prepared)
20208040 20208041	RLAS 610/EV (FGR prepared)



Original instructions

1 Information and general instructions . . . 3
1.1 Information about the instruction manual . . . 3
1.1.1 Introduction . . . 3
1.1.2 General dangers . . . 3
1.1.3 Other symbols . . . 3
1.1.4 Delivery of the system and the instruction manual . . . 4
1.2 Guarantee and responsibility . . . 4

2 Safety and prevention . . . 5
2.1 Introduction . . . 5
2.2 Personnel training . . . 5

3 Technical description of the burner . . . 6
3.1 Burner models designation . . . 6
3.2 Technical data . . . 7
3.3 Electrical data . . . 8
3.4 Standard equipment . . . 8
3.5 Burner dimensions . . . 9
3.6 Burner description . . . 10
3.6.1 Panel board description . . . 11
3.7 Firing rate . . . 12
3.7.1 Procedure to refer burner operating condition at an altitude and/or at a combustion supporter air temperature different to the standard values (328 ft above sea level, 68 °F) . . . 13
3.8 Minimum furnace dimensions . . . 13
3.9 AZL display . . . 14
3.10 Flame control (LMV52...) . . . 15
3.11 Servomotor (SQM45.2....) . . . 21
3.12 PLL52... module (optional) . . . 22
3.12.1 Terminal ratings, cable lengths and cross-sectional areas . . . 22
3.13 Oxygen sensor QGO20 ... (optional) . . . 23

4 Installation . . . 24
4.1 Notes on safety for the installation . . . 24
4.2 Handling . . . 24
4.3 Preliminary checks . . . 24
4.4 Operation position . . . 24
4.5 Preparing the boiler . . . 25
4.5.1 Boring the boiler plate . . . 25
4.5.2 Blast tube length . . . 25
4.6 Securing the burner to the boiler . . . 26
4.6.1 Accessibility to the interior of the combustion head . . . 27
4.7 Electrode and ignition pilot adjustment (RLAS 280/EV model) . . . 28
4.8 Electrode and ignition pilot adjustment (RLAS 310 - 410 - 510 - 610/EV model) . . . 28
4.9 Gas butterfly valve . . . 28
4.10 Combustion head setting . . . 29
4.11 Nozzle installation . . . 30
4.11.1 Recommended nozzles . . . 31
4.11.2 Spray lance purge air operating cycle . . . 32
4.11.3 RLAS 280 combustion head configuration . . . 32
4.12 Light oil supply . . . 33
4.12.1 Double-pipe circuit . . . 33
4.12.2 The loop circuit . . . 33
4.12.3 Hydraulic connections . . . 34
4.12.4 Hydraulic circuit layout . . . 34
4.12.5 Pressure variator . . . 34

4.13 Pump . . . 35
4.13.1 Technical data . . . 35
4.13.2 Pump priming . . . 35
4.14 Gas feeding . . . 37
4.14.1 Gas train . . . 37
4.14.2 Gas pressure . . . 38
4.14.3 Pilot - gas train connection . . . 39
4.14.4 Ignition pilot burner . . . 39
4.15 Electrical wiring . . . 40
4.15.1 Notes on safety for the electrical wiring . . . 40
4.15.2 Notes on terminals . . . 40
4.15.3 Supply cables and external connections passage . . . 41
4.15.4 Cable shielding . . . 41
4.16 Installation of shielded cables . . . 42
4.16.1 Inverter connection . . . 43
4.17 Motor protector . . . 44

5 Start-up, calibration and operation of the burner . . . 45
5.1 Notes on safety for the first start-up . . . 45
5.2 Adjustments before first firing . . . 45
5.3 Burner firing . . . 45
5.4 Burner calibration . . . 45
5.5 Burner start-up . . . 46
5.6 Burner firing . . . 46
5.7 Burner ignition . . . 47
5.7.1 Air / gas adjustment and output modulation . . . 47
5.8 Final calibration of the pressure switches . . . 48
5.8.1 Air pressure switch . . . 48
5.8.2 Maximum gas pressure switch . . . 48
5.8.3 Minimum gas pressure switch . . . 49
5.8.4 Low oil pressure switch . . . 49
5.8.5 High oil pressure switch . . . 49
5.8.6 Steady state operation . . . 50
5.9 Firing failure . . . 50
5.10 Flame signal measurement . . . 50
5.11 Final checks (with the burner working) . . . 50

6 Maintenance . . . 51
6.1 Notes on safety for the maintenance . . . 51
6.2 Maintenance programme . . . 51
6.2.1 Maintenance frequency . . . 51
6.2.2 Safety test - with gas ball valve closed . . . 51
6.2.3 Checking and cleaning . . . 51
6.2.4 Safety components . . . 53
6.3 Checking the position of the rpm sensor . . . 54
6.4 Opening the burner . . . 55
6.5 Closing the burner . . . 55

A Appendix - Spare parts . . . 56

B Appendix - Accessories . . . 61

C Appendix - Burner start up report . . . 62

1 Information and general instructions

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



WARNING

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

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

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

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

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

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

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

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

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



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:



➤ 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 models designation

Model	Code	Code RBNA	Voltage	Fan motor starting	Flame safeguard
RLAS 280/EV	20204166	20207998 20208001	3/230/60 3/460/60	Inverter	Burner mounted
	20204934	20208002	3/575/60		
RLAS 310/EV	20204167	20208031	3/460/60	Inverter	Burner mounted
	20204936	20208032	3/575/60		
RLAS 410/EV	20204168	20208034	3/460/60	Inverter	Burner mounted
	20204937	20208035	3/575/60		
RLAS 510/EV	20204169	20208037	3/460/60	Inverter	Burner mounted
	20204938	20208038	3/575/60		
RLAS 610/EV	20204170	20208040	3/460/60	Inverter	Burner mounted
	20204939	20208041	3/575/60		

Tab. A

3.2 Technical data

Model				RLAS 280/EV			RLAS 310/EV		
Output delivery (1)	High	Natural gas	Mbtu/hr (3)	2.600	10.500	9.450*	3.500	13.600	12.240*
		Oil n°2	GPH	18.6	75.0	67.5*	25.0	97.1	87.4*
	Low	Natural gas	Mbtu/hr (3)	1.050			1.375		
		Oil n°2	GPH	10.0			9.8		
Fuel				Oil n°2					
				Natural gas					
Gas max. delivery			SCFH	10.396			13.465		
Operation				Low-high or modulating					
Nozzles				1					
Standard applications				Boilers: water, steam, thermail oil					
Ambient temperature			°F	32 - 104 (0-40°C)					
Combustion air temperature			°F Max.	140 (60°C)					
Noise levels (2) Sound pressure (gas) Sound power (gas)			dBA	82.7 97.0			78.7 93.1		
Noise levels (2) Sound pressure (oil) Sound power (oil)			dBA	83.2 97.5			79.3 93.7		
Maximum inlet atomized pressure			PSI	150					

Model				RLAS 410/EV			RLAS 510/EV			RLAS 610/EV		
Output delivery (1)	High	Natural gas	Mbtu/hr (3)	4.000	16.100	14.490*	5.000	19.200	17.280*	8.590	23.308	20.977*
		Oil n°2	GPH	28.6	115.0	103.5*	35.7	137.1	123.4*	61.4	152	137*
	Low	Natural gas	Mbtu/hr (3)	1.635			2.000			2.270		
		Oil n°2	GPH	11.7			14.3			16.2		
Fuel				Oil n°2								
				Natural gas								
Gas max. delivery			SCFH	15.941			19.010			23.077		
Operation				Low-high or modulating								
Nozzles				1								
Standard applications				Boilers: water, steam, thermail oil								
Ambient temperature			°F	32 - 104 (0-40°C)								
Combustion air temperature			°F Max.	140 (60°C)								
Noise levels (2) Sound pressure (gas) Sound power (gas)			dBA	82.9 97.3			83.6 98.0			89.4 103.7		
Noise levels (2) Sound pressure (oil) Sound power (oil)			dBA	83.4 97.8			84.1 98.5			89.6 104		
Maximum inlet atomized pressure			PSI	150								

Tab. B

(*) Firing rate for providing 125% of the air required for complete combustion at maximum rated input.
(1) Reference conditions: ambient temperature 68 °F (20°C) - Barometric pressure 394" WC - Altitude 329 ft.
(2) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output.
(3) Equivalent Btu values based on 1 USGPH = 140,000 Btu/hr.

3.3 Electrical data

Fan motor and pump motor IE3/NEMA PREMIUM EFFICIENCY

Model		RLAS 280/EV		RLAS 310/EV	
Control circuit power supply	V/Ph/Hz	120/1/60			
Main power supply (+/- 10%)	V/Ph/Hz	230-460/3/60	575/3/60	460/3/60	575/3/60
Electrical power consumption	W	5950	5950	9250	9250
Electrical control circuit consumption	W max	750			
Total electrical consumption	W	6700	6700	10000	10000
Electrical protection		NEMA 3			

Model		RLAS 410/EV		RLAS 510/EV		RLAS 610/EV	
Control circuit power supply	V/Ph/Hz	120/1/60					
Main power supply (+/- 10%)	V/Ph/Hz	460/3/60	575/3/60	460/3/60	575/3/60	460/3/60	575/3/60
Electrical power consumption	W	11050	11050	13050	13050	17350	
Electrical control circuit consumption	W max	750					
Total electrical consumption	W	11800	11800	13800	13800	18100	
Electrical protection		NEMA 3					

Tab. C

Burner VSD start	Power supply	MOCP fuse [A]		Fan motor			Pump motor		
		Fast acting	Time delay	Connection	HP	FLA In [A]	Connection	HP	FLA In [A]
RLAS 280	3PH 208V 60Hz	X	45	YY 3F 208V	7,5	…..	YY 3F 208V	1	4
	3PH 230V 60Hz	60	40	YY 3F 230V		17,8	YY 3F 230V		3
	3PH 460V 60Hz	30	15	Y 3F 460V		8,9	Y 3F 460V		1,5
	3PH 575V 60Hz	25	15	Y 3F 575V		7,1	Y 3F 575V		1,2
RLAS 310	3PH 460V 60Hz	40	20	Δ 3F 460V	10	12	Y 3F 460V	1	1,5
	3PH 575V 60Hz	30	15	Δ 3F 575V		9,6	Y 3F 575V		1,2
RLAS 410	3PH 460V 60Hz	60	35	Δ 3F 460V	12,4	14,5	Y 3F 460V	1	1,5
	3PH 575V 60Hz	X	25	Δ 3F 575V		11,6	Y 3F 575V		1,2
RLAS 510	3PH 460V 60Hz	60	35	Δ 3F 460V	14,8	17,7	Y 3F 460V	1	1,5
	3PH 575V 60Hz	X	25	Δ 3F 575V		14,2	Y 3F 575V		1,2
RLAS 610	3PH 460V 60Hz	80	45	Δ 3F 460V	20,1	23,5	Y 3F 460V	1	1,5
	3PH 575V 60Hz	60	35	Δ 3F 575V		…..	Y 3F 575V		1,2

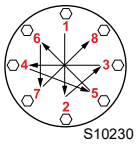
Tab. D

3.4 Standard equipment

Flange gasket. . . . . No. 1
Burner mounting bolt (M18 x 60) . . . . . No. 4
Gas train flange gasket . . . . . No. 2
Gas train flange fixing bolts (M16x70) . . . . . No. 8
Instructions. . . . . No. 1



It is recommended to tighten the screws of the gas flange with a tightening torque of **40** Nm ±10%.



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

3.5 Burner dimensions

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

Bear in mind that inspection of the combustion head requires the burner to be opened by rotating the rear part on the hinge.

The overall dimensions of the burner when open are indicated by A and R.

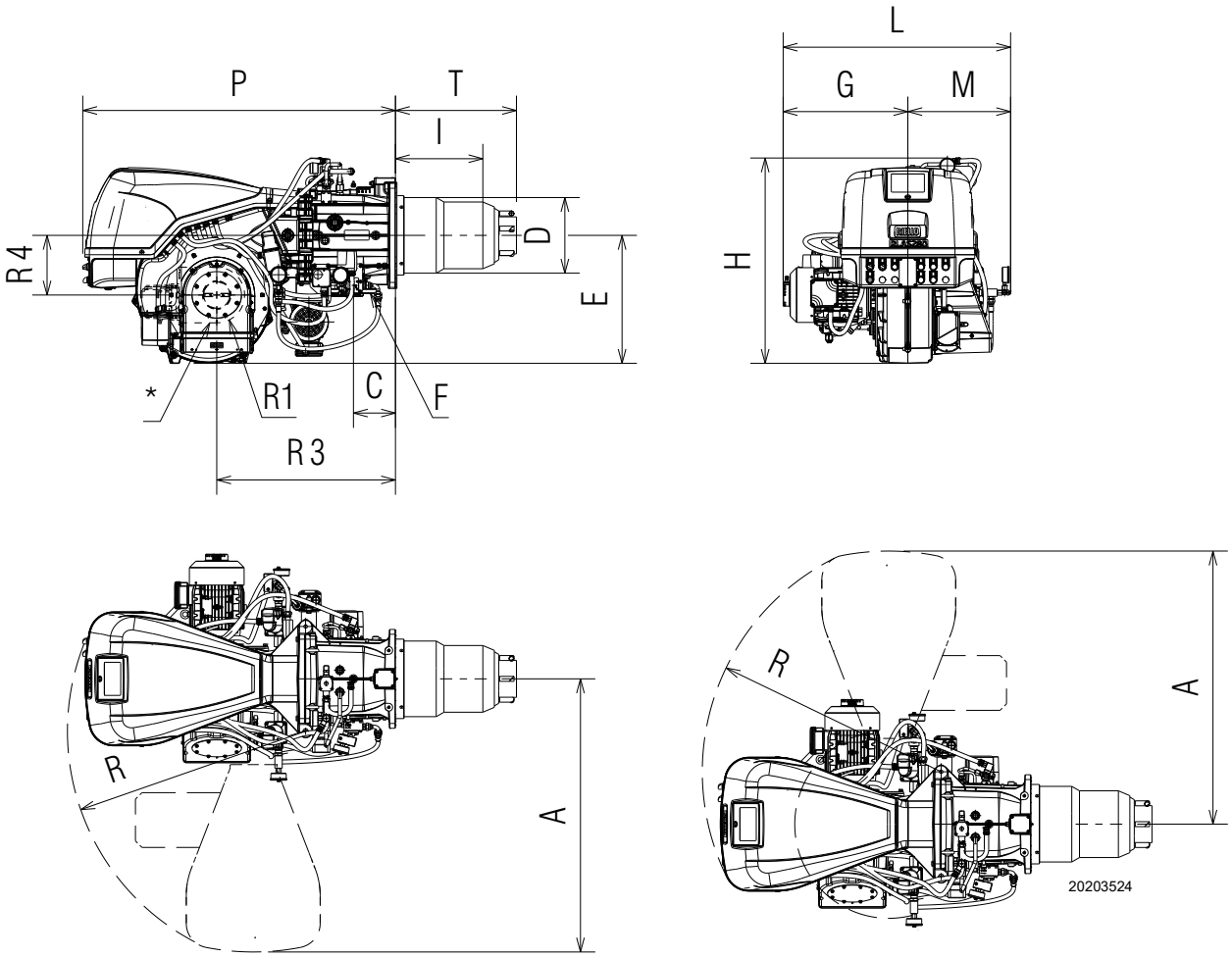


Fig. 1

* FGR VALVE NOT INCLUDED IN THE BURNER

inch	A	C	D	E	F	G	H	I
RLAS 280/EV	43 5/16"	6 11/16"	12 3/64"	20 25/64"	ANSI 3"	19 7/8"	32 31/64"	13 57/64"
RLAS 310/EV	43 5/16"	6 11/16"	12 21/64"	20 25/64"	ANSI 3"	20 23/64"	32 31/64"	14 27/32"
RLAS 410/EV	43 5/16"	6 11/16"	12 21/64"	20 25/64"	ANSI 3"	21 59/64"	32 31/64"	14 27/32"
RLAS 510/EV	43 5/16"	6 11/16"	12 21/64"	20 25/64"	ANSI 3"	21 59/64"	32 31/64"	14 27/32"
RLAS 610/EV	43 5/16"	6 11/16"	12 21/64"	20 25/64"	ANSI 3"	23 15/16"	32 31/64"	14 11/64"

inch	L	M	P	R	R1	R3	R4	T
RLAS 280/EV	36 7/32"	16 11/32"	49 39/64"	35 3/64"	DN100	28 15/32"	9 29/64"	19 1/4"
RLAS 310/EV	36 11/16"	16 11/32"	49 39/64"	35 3/64"	DN100	28 15/32"	9 29/64"	20 17/32"
RLAS 410/EV	38 17/64"	16 11/32"	49 39/64"	35 3/64"	DN125	28 15/32"	9 29/64"	20 17/32"
RLAS 510/EV	38 17/64"	16 11/32"	49 39/64"	35 3/64"	DN125	28 15/32"	9 29/64"	20 17/32"
RLAS 610/EV	40 9/32"	16 11/32"	49 39/64"	35 3/64"	DN150	28 15/32"	9 29/64"	20 23/64"

Tab. E

3.6 Burner description

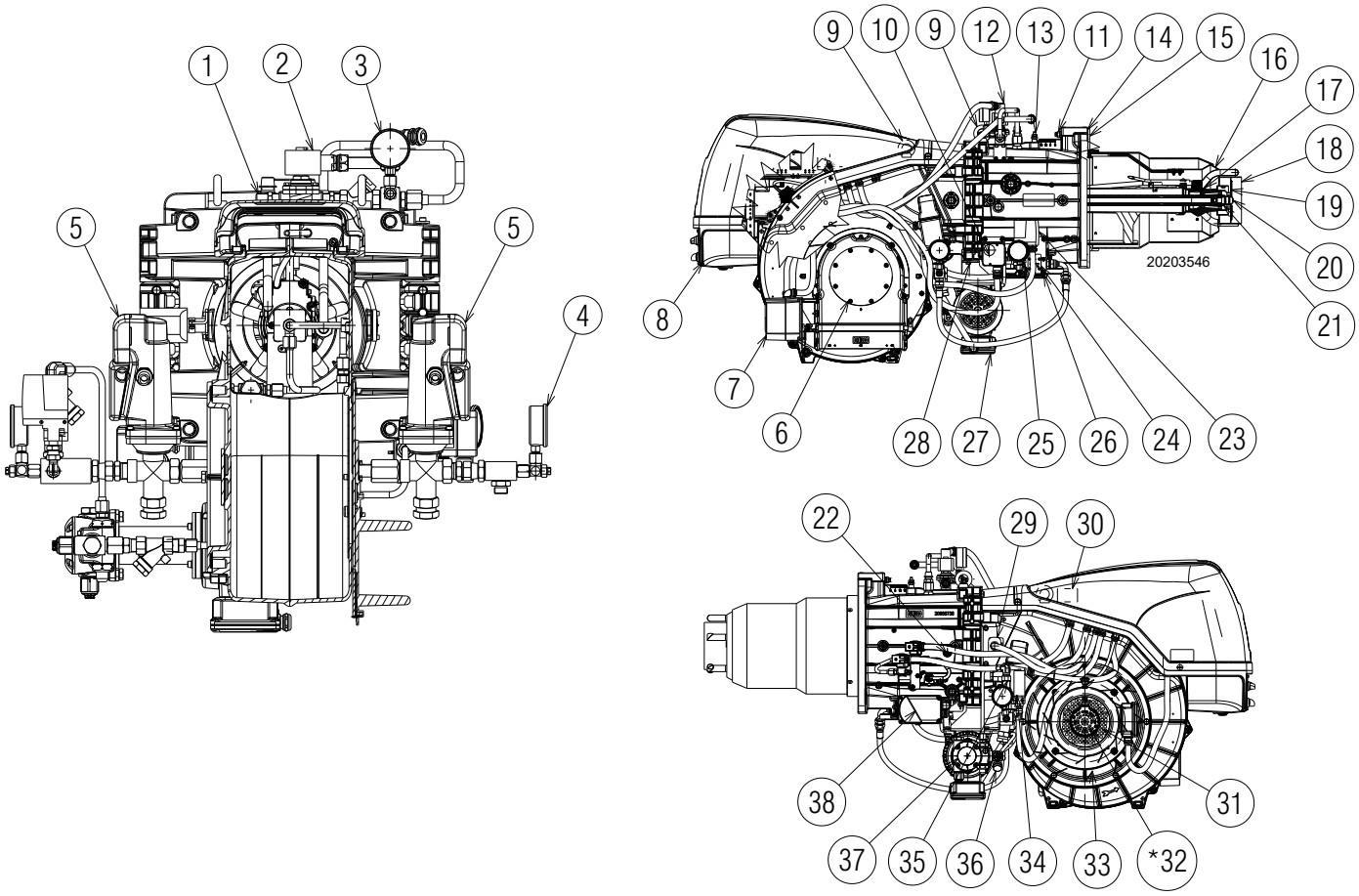


Fig. 2

1 Compressed air valve
2 Air solenoid valve
3 Air inlet pressure gauge
4 Nozzle delivery pressure gauge
5 Oil shut off VOG valve
6 Air inlet to fan
7 Air gate valve servomotor
8 Electric panel board - cover
9 Lifting eyebolts
10 Max gas pressure switch with pressure test point
11 Lever for movement of combustion head
12 Air pressure switch
13 Gas pressure test point
14 Manifold
15 Thermal insulation screen for securing burner to boiler
16 Shutter
17 Ignition pilot
18 Combustion head
19 Flame stability disk
20 Nozzle
21 Atomizing lance DN33
22 Air pressure test point
23 Max oil pressure switch
24 Oil modulator
25 Nozzle return pressure gauge
26 Gas train flange
27 Pump motor
28 Hinge for opening burner
29 Flame detector
30 Air pressure switch (diff.operating type)
31 Fan motor
32 Speed sensor (*only for /EV version)
33 Fan
34 Min oil pressure switch
35 Strainer
36 Check valve
37 Pump
38 Oil modulator and gas butterfly valve servomotor

WARNING

The burner can be opened either on the right or left sides, irrespective of the side from which fuel is supplied. When the burner is closed, the hinge can be re-positioned on the opposite side.

3.6.1 Panel board description

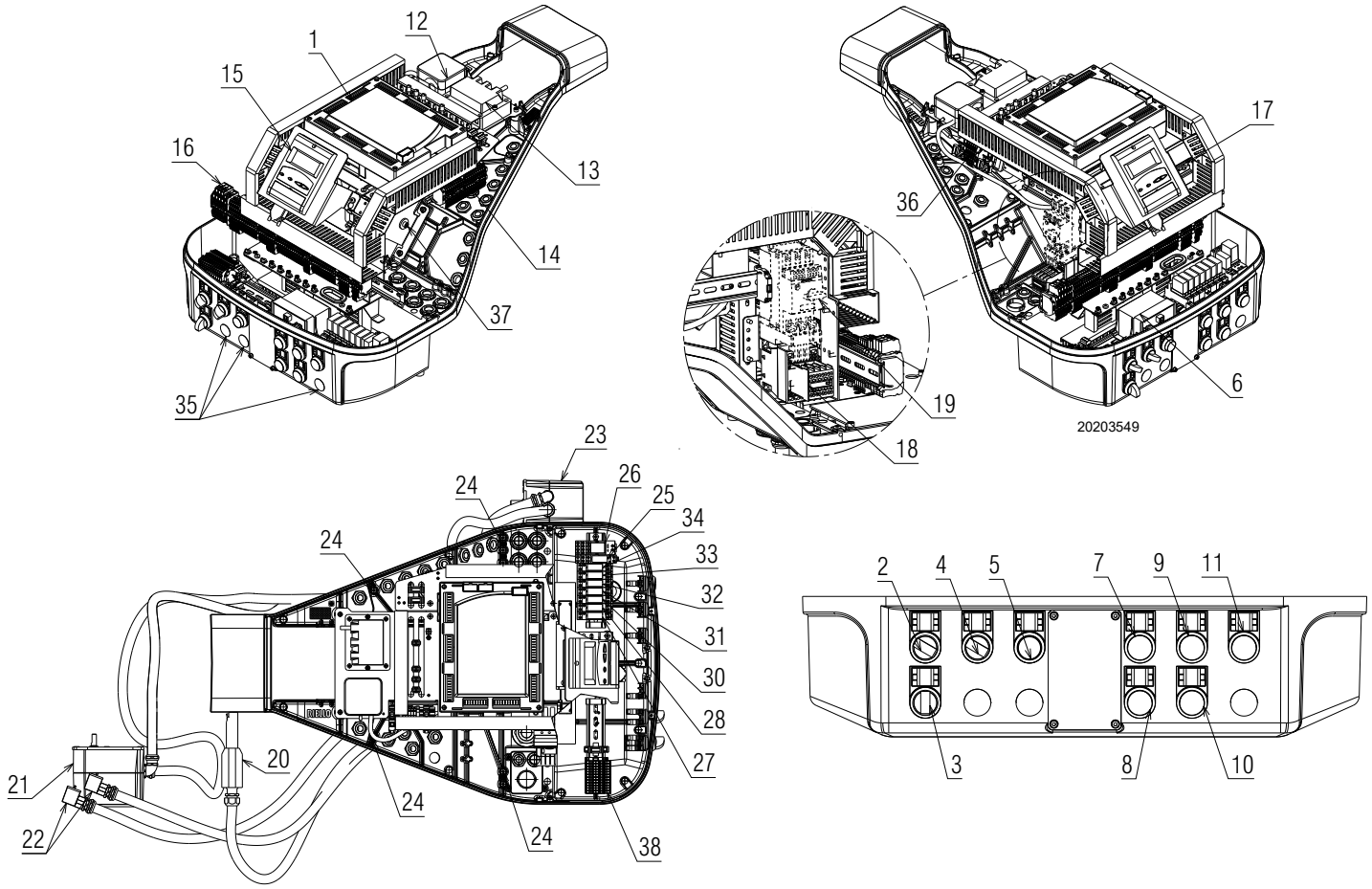


Fig. 3

1 Electronic cam
2 ON/OFF selector
3 OIL/OFF/GAS selector
4 LOCAL/REMOTE selector
5 ALARM SILENCE push-button
6 Transformer for electrical flame control
7 POWER ON light signal
8 IGNITION ON light signal
9 CALL FOR HEAT light signal
10 FUEL ON light signal
11 ALARM signal
12 Air pressure switch
13 Ignition transformer
14 Valve group terminal board
15 Operator panel with LCD display
16 Main terminal supply board - X1
17 Available for circuits fuse
18 Pump motor contactor
19 Pump motor protection
20 Flame sensor
21 Fuel servomotor
22 Purge air valve
23 Air servomotor
24 Earth terminal
25 KO Fuel oil relay
26 KG Fuel gas relay
27 KSV Shut off valve relay
28 KVA Atomizing air valve relay
29 Horn
30 K1 Flame alight relay
31 K2 Remote position relay
32 K3 Alarm silence relay
33 K5 Burner lock out relay
34 K6 VSD lock out relay
35 Available
36 CAN BUS terminal
37 Available for step down transformer
38 Terminal - XVFD LMV5

NOTE

Two types of burner failure may occur:

- **flame control lockout:** the switching on of the button (**red led**) 11) signals that the burner is in lockout. Silence the alarm by pressing the button 5) and reset the error via the display (Fig. 3).
- **Motor lockout**: release the pump motor by pressing the button on the relevant thermal relay. See the inverter manual for the release of the fan motor.

3.7 Firing rate

Maximum output must be selected in the hatched area of the diagram (Fig. 4 - Fig. 5).

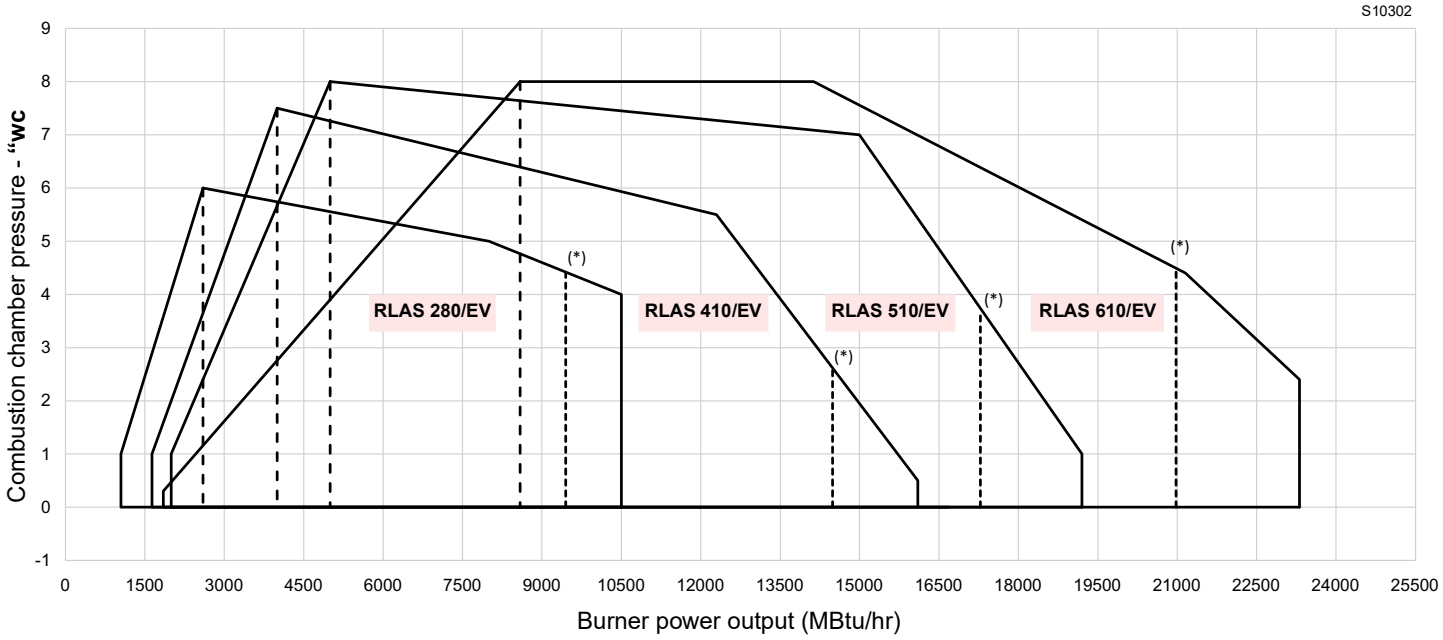
Minimum output must not be lower than the minimum limit shown in the diagram.

WARNING

The firing rate area values have been obtained considering an ambient temperature of 68 °F, and an atmospheric pressure of 29 inHg and with the combustion head adjusted as shown on page 29.

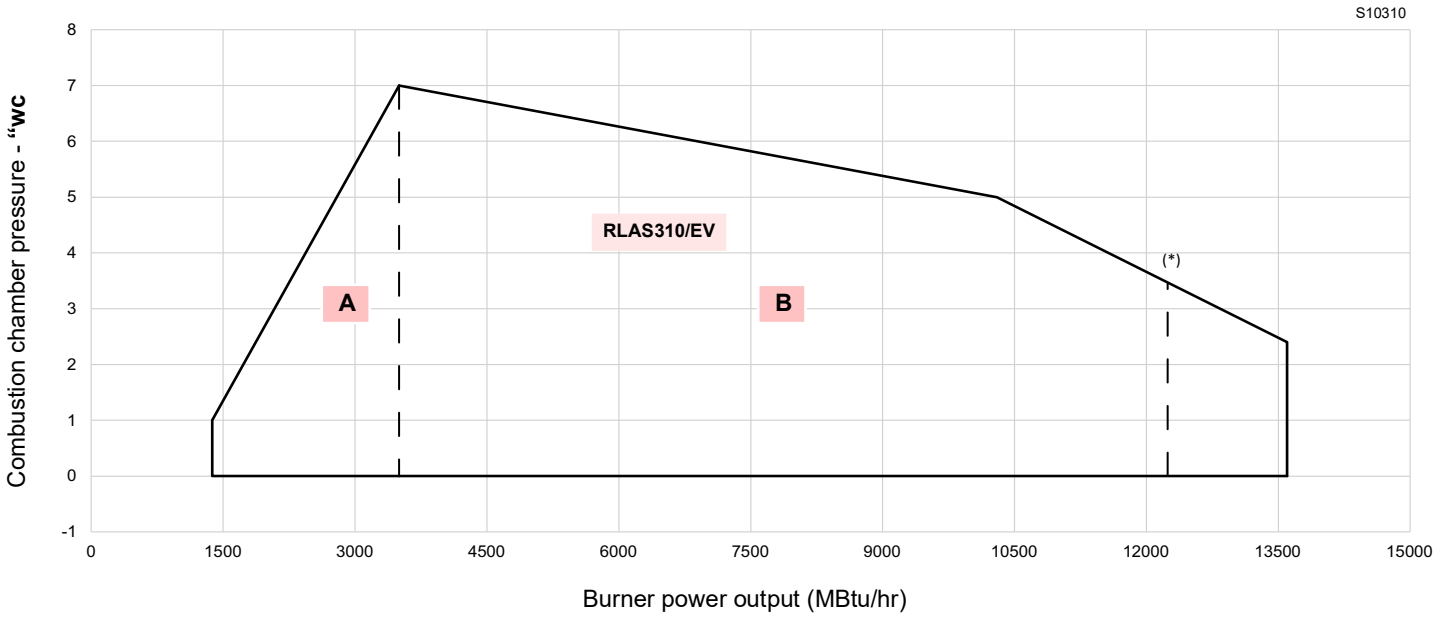
Model	MBtu/hr
RLAS 280/EV	2.600
RLAS 310/EV	3.500
RLAS 410/EV	4.000
RLAS 510/EV	5.000
RLAS 610/EV	8.590

Tab. F



(*) Firing Rate for C-ETL Canadian Listing

Fig. 4



(*) Firing Rate for C-ETL Canadian Listing

Fig. 5

NOTE:
If the machine is chosen for a maximum power included in the "A" range, it is necessary to replace the gas nozzles with the Ø 5.3 mm ones supplied with the burner.

3.7.1 Procedure to refer burner operating condition at an altitude and/or at a combustion supporter air temperature different to the standard values (328 ft above sea level, 68 °F).

				AIR TEMPERATURE								
Altitude	Altitude	bar. press.	bar. press.	**0**	**5**	**10**	**15**	**20**	**25**	**30**	**40**	**°C**
ft a.s.l.	m a.s.l.	inHg	mbar	**32**	**41**	**50**	**59**	**68**	**77**	**86**	**104**	**°F**
0	0	29.5	1013.00	1.087	1.068	1.049	1.031	1.013	0.996	0.980	0.948	
328	100	29	1000.00	1.073	1.054	1.035	1.017	**1.000**	0.983	0.967	0.936	
1.000	305	28.5	977.40	1.049	1.030	1.012	0.994	0.977	0.961	0.945	0.915	
2.000	610	27.5	942.80	1.012	0.994	0.976	0.959	0.943	0.927	0.912	0.883	
3.000	915	26.5	908.20	0.975	0.957	0.940	0.924	0.908	0.893	0.878	0.850	
4.000	1.220	25.5	875.80	0.940	0.923	0.907	0.891	0.876	0.861	0.847	0.820	
5.000	1.525	24.5	843.50	0.905	0.889	0.873	0.858	0.844	0.829	0.816	0.790	
6.000	1.830	23.7	811.85	0.871	0.856	0.841	0.826	0.812	0.798	0.785	0.760	
7.000	2.135	22.7	779.80	0.837	0.822	0.807	0.793	0.780	0.767	0.754	0.730	
8.000	2.440	21.7	747.80	0.803	0.788	0.774	0.761	0.748	0.735	0.723	0.700	

Tab. G

F - correction factor of discharge head and delivery in relation to temperature and altitude.

Reference conditions:

- Air temperature 68 °F (20 °C)
- Barometric pressure 29 inHg (1000 mbar)
- Altitude 328 ft a.s.l. (100 m a.s.l.)

Example

Using the Tab. G , for an altitude of 3,000 ft and an air temperature of 68 °F, an **F** factor value is obtained equal to 0.908; if the capacity at the boiler furnace is Qfoc = 4,500 Mbtu/h, the correct output will be equal to:

Qburner = Qfoc / F = 4,500 / 0.908 = 4,956 Mbtu/h

3.8 Minimum furnace dimensions

The firing rates were set in relation to certified test boilers.

Fig. 6 indicates the diameter and length of the test combustion chamber.

Example RLAS 510/EV:

Output 19200 MBtu/hr: diameter 39.4 inch - length 16.5 ft.

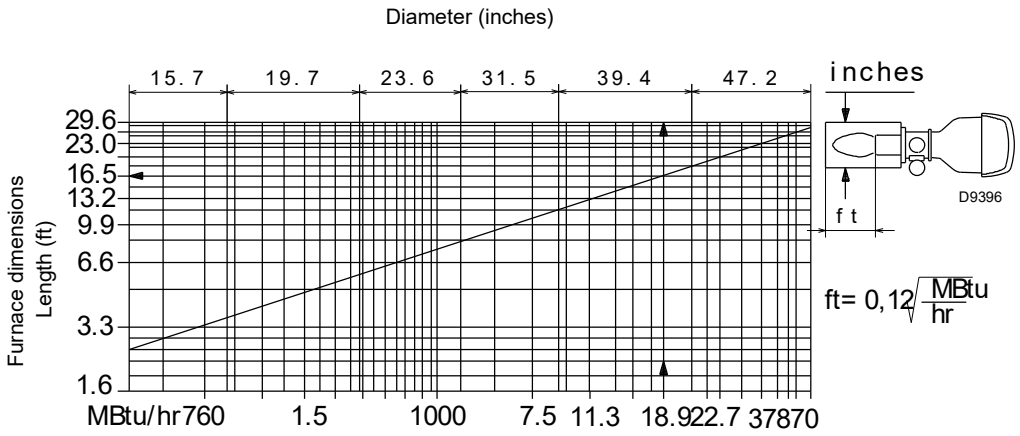


Fig. 6

3.9 AZL display...

Warnings

WARNING

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

The AZL... display 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!

The electronic cam is operated and programmed through the AZL5 interface... or with the aid of a PC.

The AZL5 has a backlit LCD display with clear reading of the menu text and diagnostics.

The Modbus function of the AZL display integrates the electronic cam LMV5 and through data management allows the diagnostic of the burner.

The display shows the operating status, the types of errors and lockouts. Used to parametrize and monitor data.



S9232

Fig. 7

Technical data

Operating voltage	AC 24 V - 15% / +10%
Power consumption	< 5W (typical)
Protection level of the container – Rear – Front	 IP00 according to IEC 529 IP54 according to IEC 529 (if installed)
Safety class	I with parts II and III according to DIN EN 60730-1
Battery - Manufacturer:	**Type reference:**
VARTA DURACELL SANYO ELECTRIC, Osaka/ Japan RENATA AG, Itingen/CH	CR 2430 (LF-1/2 W) DL 2430 CR 2430 (LF-1/2 W) CR 2430

Tab. H

3.10 Flame control (LMV52...)

Warnings

WARNING

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

The 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.



D9301

Fig. 8

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ Before modifying the wiring in the 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 flame control 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 flame control 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 flame control, 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 flame control is perfectly dry!
– Static charges must be avoided since they can damage the flame control's electronic components when touched.

Mechanical structure

The flame control 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 flame control incorporates the following components:

- Burner control with gas valve proving system
- Electronic fuel / air ratio control with a maximum of 6 actuators
- Optional PID temperature / pressure controller (load controller)
- Optional VSD module Mechanical design

Electrical connection of ionization probe and flame detector

It is important to achieve practically disturbance- and loss-free signal transmission:

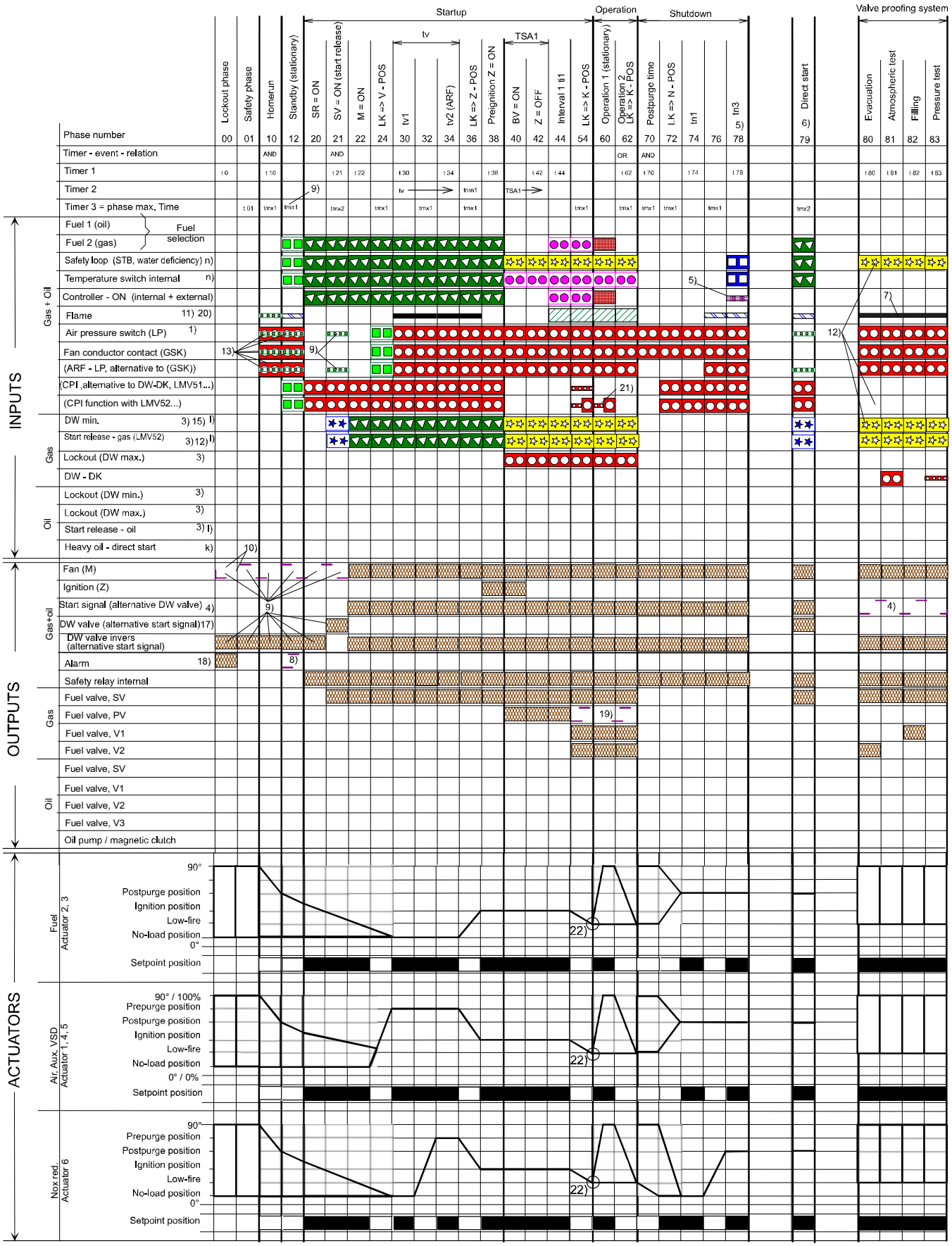
- Never run the detector cables together with other cables:
  – Line capacitance reduces the magnitude of the flame signal.
  – Use a separate cable.
- Observe the permissible cable lengths.

Technical data

LMV52... basic unit	Mains voltage	AC 120 V -15 % / +10 %
	Mains frequency	50 / 60 Hz ±6 %
	Power consumption	< 30 W (typically)
	Safety class	I, with parts according to II and III to DIN EN 60730-1
Terminal loading 'Inputs'	Unit fuse F1 (internally)	6.3 AT
	Perm. mains primary fuse (externally)	Max. 16 AT
	Undervoltage • Safety shut-down from operating position at mains voltage • Restart on rise in mains voltage	 < AC 96 V > AC 100 V
	Oil pump / magnetic clutch (nominal voltage) • Nominal current • Power factor	 1.6A cosφ > 0.4
	Air pressure switch test valve (nominal voltage) • Nominal current • Power factor	 0.5A cosφ > 0.4
Terminal loading 'Outputs'	**Total contact loading:** • Mains voltage • Input current of unit (safety loop) total load on contacts resulting from: - Fan motor contactor - Ignition transformer - Valve - Oil pump / magnetic clutch	 AC 120 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	 1 A cosφ > 0.4
	Ignition transformer (nominal voltage) • Nominal current • Power factor	 1.6 A cosφ > 0.2
	Fuel valve gas (nominal voltage) • Nominal current • Power factor	 1.6 A cosφ > 0.4
	Fuel valve oil (nominal voltage) • Nominal current • Power factor	 1.6 A 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 % r.h.

Tab. I

Operation sequence of the burner (GAS OPERATION)



D9507

Fig. 9

Operation sequence of the burner (OIL OPERATION)

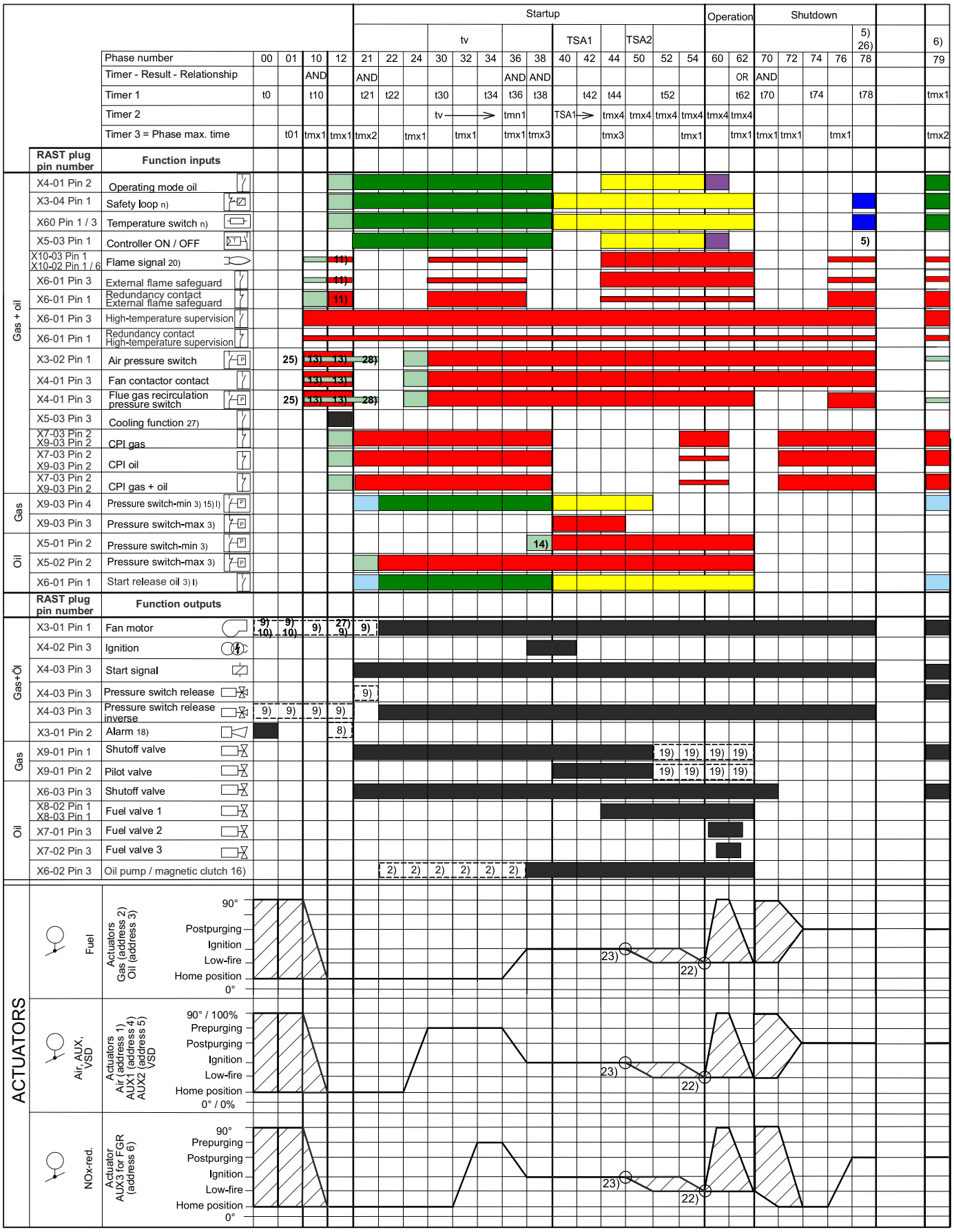


Fig. 10

Key to the sequence diagrams:

Depending on the parameter, valve proving takes place:
between phase 62 and phase 70 or/and
between phase 30 and phase 32.

Signal ON	Signal OFF	Next phase
		01 → 00, Rep = 0 12, Rep > 0
		Parameter direct start Checking with controller on Deviation → 10 No Rep. decrement
		10
		70
		Without VP70 with VP80
		62
		Stop, up to Ph – max. time → 01
		Stop, up to Ph – max. time → 10
	 0-3 s.	01 → 00, Rep = 0 12, Rep > 0
	 0-30 s.	01 → 00, Rep = 0 12, Rep > 0
 0-3 s.		01 → 00, Rep = 0 12, Rep > 0
		Param. → 79 10
		Input: don´t care
		Output: OFF Output: ON

Assignment of times:

t0	Postpurge lockout position
t01	Max. time safety phase
t10	Min. time home run
t21	Min. time start release
t22	Fan runup time t30 Prepurge time part 1
t34	Prepurge time part 3
t36	Min. ON time oil pump
t38	Preignition time gas / oil
t42	Preignition time OFF
t44	Interval 1 gas / oil
t62	Max. time low-fire
t70	Afterburn time
t74	Postpurge time 1 gas / oil (tn1)
t78	Postpurge time 3 gas / oil (tn3)
t80	Valve proving evacuate time
t81	Leakage test time atmospheric pressure
t82	Leakage test filling test
t83	Leakage test time gas pressure
tmn1	Min. time extraneous light test (5 s.) after skip over of prepurge
tmx1	Max. damper running time
tmx2	Max. time startup release
tmx3	Max. time circulation heavy oil
tn	Postpurge time
TSA1	Safety time 1
TSA2	Safety time 2
tv	Prepurge time gas / oil

Key to the sequence diagrams:

1) Parameter: With / without pressure switch
2) Parameter: Short / long preignition time for oil only Short / long oil pump – ON – time
3) Delayed shutdown within TSA1 + TSA2
4) Parameter: Output as startup signal / pressure switch relief valve
5) Parameter: Normal / direct startup
   Normal startup ⟶ sequential phase = 10
   Direct startup ⟶ sequential phase = 79 (when R = ON)
6) Sequential phase = 24
7) Only with valve proving during startup
8) Parameter: With / without alarm on prevention of startup
9) Parameter: With continuous purging the shown output signals are inverted
10) Fan controlled as before
    Running time when LOCK OUT = T_FanLockout LF
11) Parameter: With / without extraneous light test in STANDBY
12) With valve proving during startup phase 10
13) Parameter: Normal / continuous purging
    Normal purging: Checking for off in 10, stop to Ph-max time ⟶ 01
    Continuous purging: Checking for on in 10 and 12, Stop up to phase-max time ⟶ 01
14) Parameter: “OilPressureMin”, “akt_from_ts“ ⟶ no check before TSA1 (LO, HO) or TSA2 (LOgp, HOgp)
15) Parameter: “GasPressureMin“, “deakt_xOGP“ ⟶ pressure switch-min can be deactivated for oil programs with gas pilot
16) Parameter: “OilPumpCoupling“, “direct_coupl“ ⟶ shutoff valve oil has to be connected to output “Oil pump / magnetic clutch“.
    Output is active when fan is on and for another 15 s after fan is switched off
17) Parameter: “Start / pressure switch valve“, “PS_Reli_Inv“ ⟶ Output pressure switch valve will be logically inverted
18) Parameter: “Alarm act / deact“, “deactivated“ ⟶ The alarm output can temporarily be deactivated (for current error only)
19) Parameter: Only with LMV52...: Continuous pilot gas / oil: Activated ⟶ Pilot valve is also activated in operation
20) Parameter: Only with LMV52...: Extraneous light, pilot phase, operating phase gas / oil ⟶ Separate flame supervision possible
21) Parameter: Only with LMV52...: pressure switch valve proving / CPI or StartReleaseGas ⟶ Parameter-dependent ON / OFF test
    CPI Gas: OFF test for gas trains only
    CPI Oil: OFF test for oil trains only
    CPI Gas+Oil: OFF test for gas and oil trains
22) Parameter: After LMV52... software version 04.50 and AZL5... software version 04.40, dependent on parameter *StartPktOperation*



Permissible positioning range



In Standby: actuator can travel within the permissible positioning range, but is always driven to the home position. Must be in the home position before changing the phase.

0°	Position as supplied (0°)
90°	Actuator fully open (90°)
AGR	Fuel gas recirculation
CPI	Closed position indication
DP	Pressure tester
PS-VP	Pressure switch – valve proving
FCC	Fan contactor contact
LF	Air damper
APS	Air pressure switch
N	Postpurging
SR	Safety relay
SLT	Safety limit thermostat
TL	Temperature limiter

Repetition counter:

k) Heavy oil
l) Restricted startup behavior
n) Restricted safety loop

3.11 Servomotor (SQM45.2....)

Important notes

WARNING

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

Avoid opening, modifying or forcing the actuators.

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

Assembly notes

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

Installation notes

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

WARNING

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

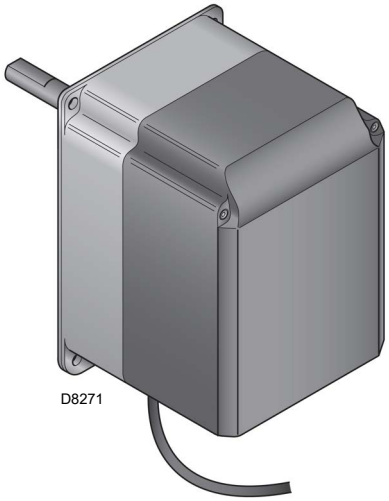


Fig. 11

Technical data

Operating voltage	AC 2 x 12V via bus cable from the base unit or via a separate transformer
Safety class	extra low-voltage with safe isolation from mains voltage
Power absorption	9...15 VA
Protection level	to EN 60 529, IP 54, provided adequate cable entries are used
Cable connection	RAST3,5 connectors
Rotation direction	- Anticlockwise (standard) - Clockwise (inverted rotation)
Rated torque (max.)	3 Nm
Static torque (max.)	1.5 Nm
Operation time (min.) for 90°	10 s.
Weight	approx. 1 kg (2.2 lb)
Environmental conditions:	
Operation	DIN EN 60 721-3-3
Climatic conditions	Class 3K3
Mechanical conditions	Class 3M3
Temperature range	-20...+60 °C
Humidity	< 95% RH

Tab. J

3.12 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.

3.12.1 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. K


S9902

Fig. 12

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. L

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!

3.13 Oxygen sensor QGO20 ... (optional)

Warnings

WARNING

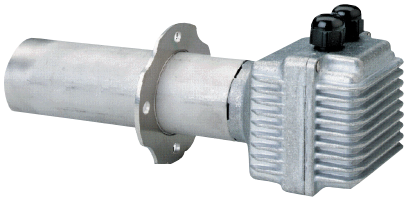
To avoid accidents, material or environmental damage, observe the following instructions!

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. 13

NOTE:

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

WARNING

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

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

WARNING

The handling operations for the burner can be highly dangerous if not carried out with the greatest attention: keep any unauthorised people at a distance; check the integrity and suitableness of the available means of handling.
Check also that the area in which you are working is empty and that there is an adequate escape area (i.e. a free, safe area to which you can quickly move if the burner should fall).
When handling, keep the load at not more than 1" 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.

Release the burner from the wooden platform by removing the bolts/nuts/screws that secure the burner to the platform.

Handle the burner following the safety standards and regulations of the laws in force and using the eyebolts supplied as equipment.

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.

WARNING

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

WARNING

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

4.4 Operation position

The burner is designed to operate only in the 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.

Any other position could compromise the correct operation of the appliance.

Installation **5** is prohibited for safety reasons.

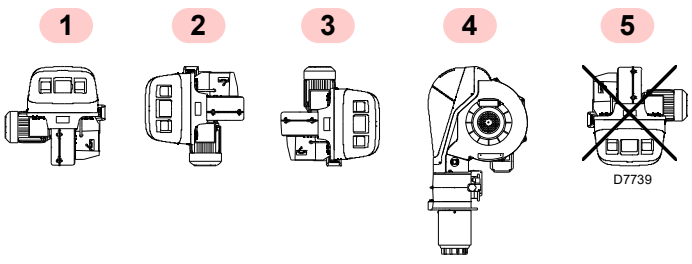


Fig. 14

4.5 Preparing the boiler

4.5.1 Boring the boiler plate

Drill the combustion chamber locking plate as shown in Fig. 15. The position of the threaded holes can be marked using the thermal screen supplied with the burner.

4.5.2 Blast tube length

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

For boilers with front flue passes 1)(Fig. 22 on page 29) or flame inversion chamber, a protection in refractory material 5) must be inserted between the boiler fettling 2) and the blast tube 4).

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 2)-5)(Fig. 22 on page 29) is not necessary, unless expressly requested by the boiler manufacturer.

Inch	D1	DF	Ø
RLAS 280/EV	13 1/4"	17 13/16"	M18
RLAS 310/EV	13 1/4"	17 13/16"	M18
RLAS 410/EV	13 1/4"	17 13/16"	M18
RLAS 510/EV	13 1/4"	17 13/16"	M18

Tab. M

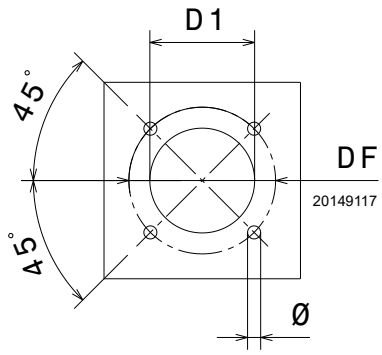


Fig. 15

4.6 Securing the burner to the boiler

Prepare a suitable lifting system using the rings 3)(Fig. 16), after removing the fixing screws 2) of the casing 1).

➤ Fit the heat insulation supplied onto the blast tube 4)(Fig. 16).
➤ Fit the entire burner onto the boiler hole prepared previously, and fasten with the screws supplied.

WARNING

The seal between burner and boiler must be air-tight.

WARNING

The manufacturer declines **any and every responsibility** for any possible lifting movements, different from those indicated in **this manual.**

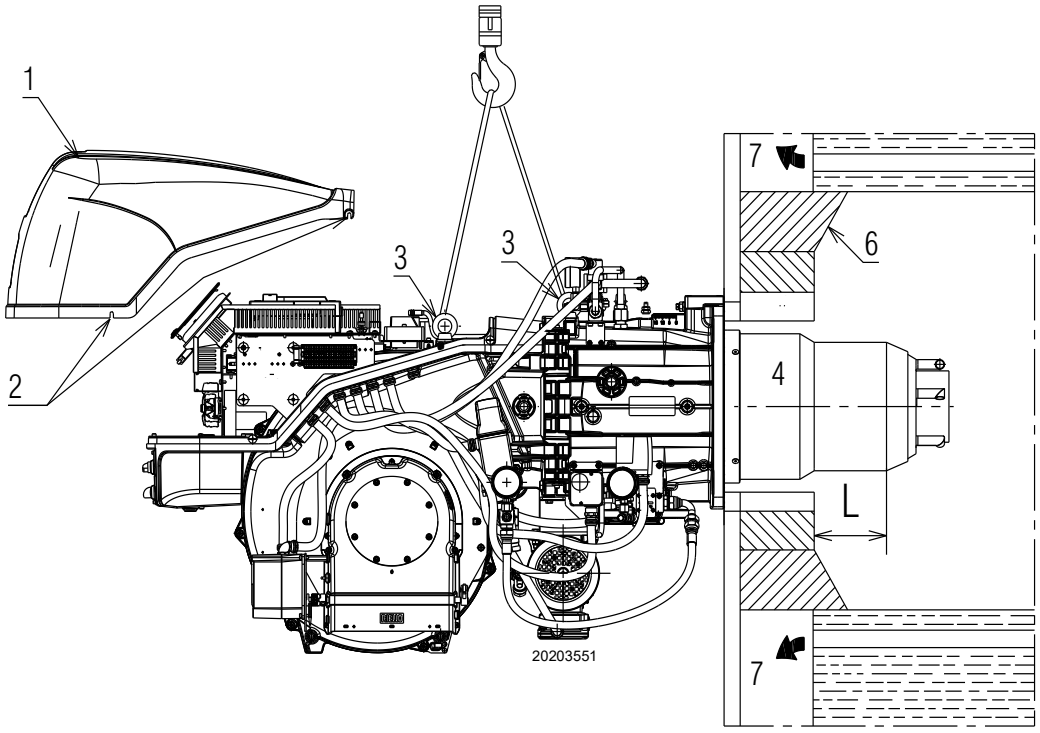


Fig. 16

	L
RLAS 280/EV	Max 5 $^{45}/_{64}$"
RLAS 310/EV	Max 0 $^{19}/_{32}$"
RLAS 410/EV	Max 0 $^{19}/_{32}$"
RLAS 510/EV	Max 0 $^{19}/_{32}$"
RLAS 410/EV	Max 0 $^{19}/_{32}$"

Tab. N

4.6.1 Accessibility to the interior of the combustion head

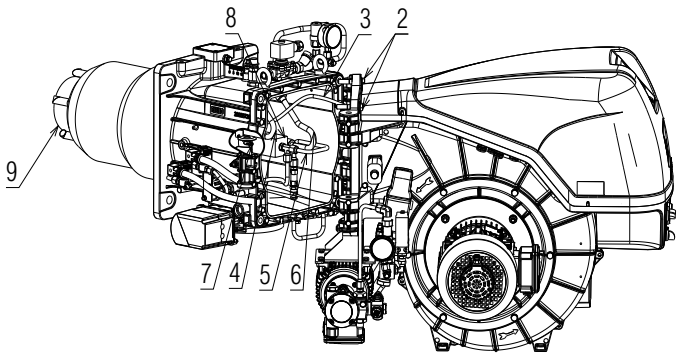
In order to reach inside the combustion head (Fig. 17) proceed as follows:

- ➤ Disconnect oil pipe 1);
- ➤ Unscrew the fixing screws 2) of the manifold;
- ➤ Open the burner on hinge;
- ➤ Open partially of about 5.90 inch
- ➤ Disconnect the cable of pilot electrode 3);
- ➤ Open the burner;
- ➤ Release the ignition pilot fitting 4);
- ➤ Disconnect the oil pipe 5) and the air pipe 6);
- ➤ Unscrew the lockout screw 7) of oil/air lance 8);
- ➤ Extract the oil/air lance from the combustion head 9);
- ➤ Remove the combustion head 9) from the pipe coupling.

To close, repeat the procedure in reverse order.



Be careful as fuel may leak during this phase.



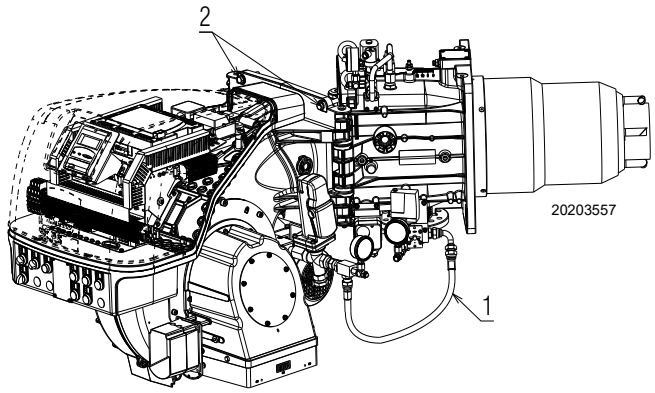


Fig. 17

4.7 Electrode and ignition pilot adjustment (RLAS 280/EV model)

Place the pilot and electrodes as shown in Fig. 18.

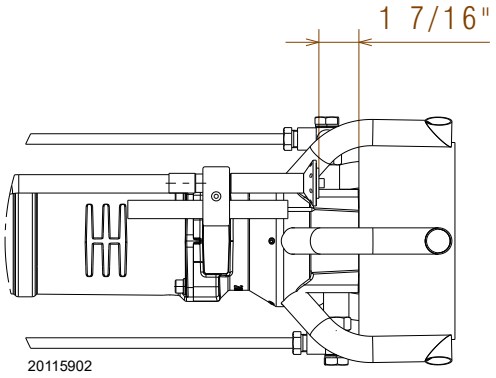


Fig. 18

4.8 Electrode and ignition pilot adjustment (RLAS 310 - 410 - 510 - 610/EV model)

Place the electrode and the ignition pilot observing the dimensions in Fig. 19.

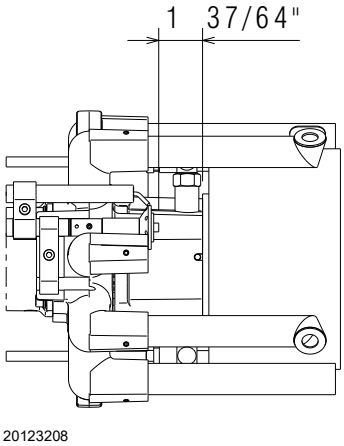


Fig. 19

4.9 Gas butterfly valve

If necessary, replace the gas butterfly valve.

The correct position is shown in Fig. 21 on page 29.

4.10 Combustion head setting

Rotate the screw 1)(Fig. 22) until the notch you have found corresponds with the front surface of the screw itself.

The combustion head is opened by turning the screw 1)(Fig. 22) anticlockwise.

The combustion head is closed by turning the screw 1)(Fig. 22) clockwise.

WARNING

The burner leaves the factory with the combustion head adjusted to notch 0 (Fig. 22).

This adjustment allows you to secure the moving parts when the burner is being transported.

Before starting the burner, carry out the adjustments for the output required.

NOTE:
Depending on the specific application, the adjustment can be modified.

The combustion head can be adjusted within the following fields:

	Mbtu/hr	Setting
RLAS 280/EV	2600	0
	10500	12
RLAS 310/EV	3500	0
	13600	11
RLAS 410/EV	4000	0
	16100	8
RLAS 510/EV	5000	0
	19200	11
RLAS 610/EV	8590	0
	23.308	4

Tab. O

No adjustment can be made outside these intervals.

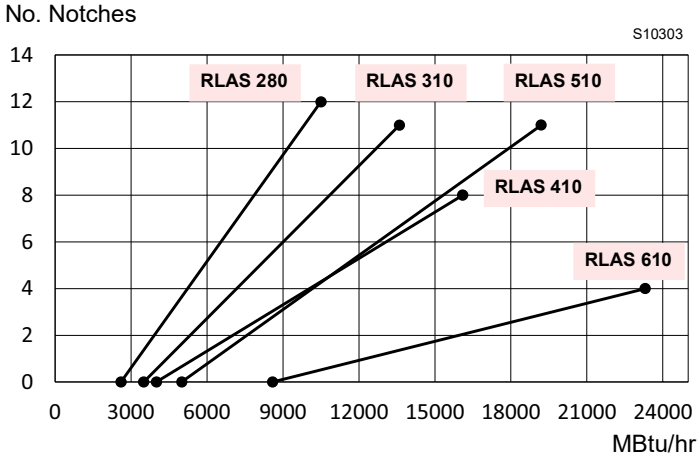


Fig. 20

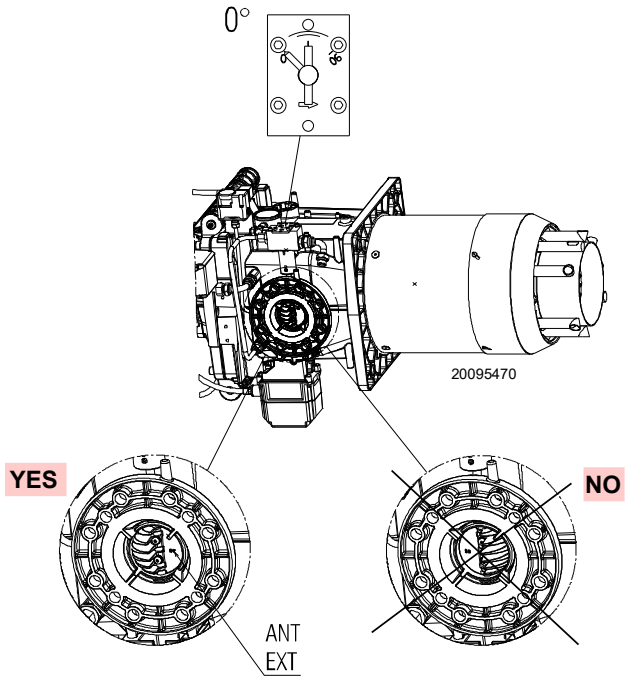


Fig. 21

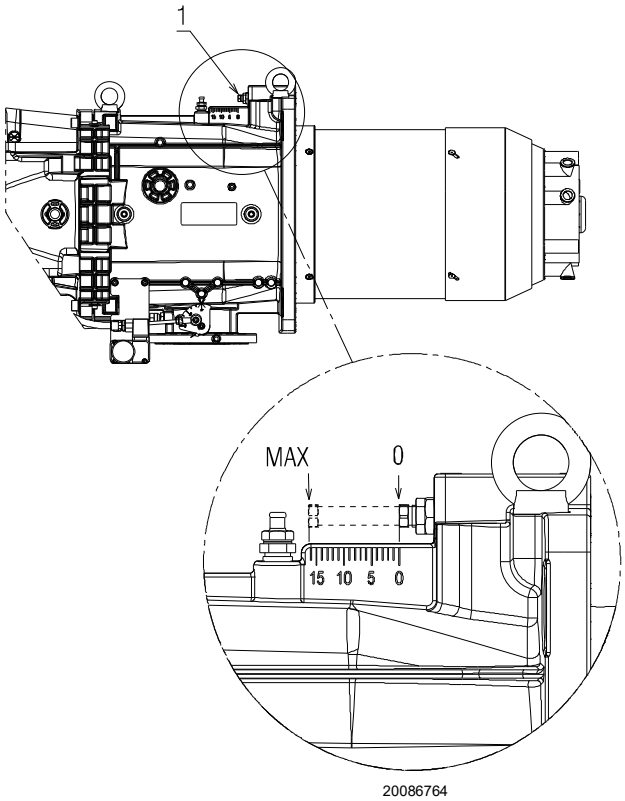


Fig. 22

4.11 Nozzle installation

In order to guarantee that emissions do not vary, recommended and/or alternative nozzles specified by the Manufacturer in the Instruction and warning booklet should be used.

WARNING

It is advisable to replace nozzles every year during regular maintenance operations.

CAUTION

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

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

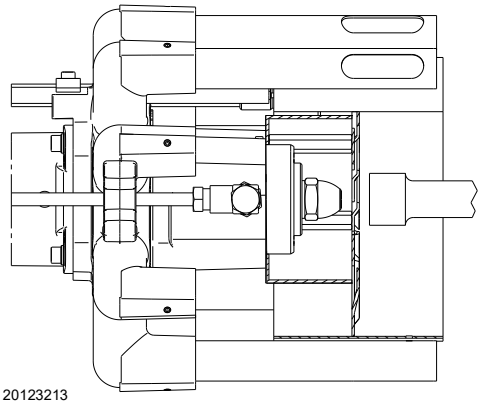


Fig. 23

– Fit the nozzle with the box spanner, fitting the spanner through the central hole in the flame stability disk (Fig. 23).
– Nozzles with no fuel shut-off needle must be fitted on the nozzle holder.
– To set the delivery range within which the nozzle must work, nozzle return line fuel pressure must be adjusted according to Tab. P.

WARNING

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

4.11.1 Recommended nozzles

Intermediate flow rates may be obtained by choosing the nozzle with a nominal flow rate slightly higher than that actually required.

AIR ATOMISER NOZZLE SELECTION

RLAS					Mbtu/hr (GCV)	Nozzle FLUIDICS		Fuel				Air
								175 PSI Supply				Pressure
								High fire		Low fire		
280	310	410	510	610		Type	Size	PSI	GPH	PSI	GPH	PSI
X					2600	**12 AG 60°**	40		19		3.7	
X	X				3500		50		25		5	
X	X	X			4000		60		29		5.7	
X	X	X			4500		70		32		6.4	
X	X	X	X		5500		80		39		7.9	
X	X	X	X		6500		90		46		9.3	
X	X	X	X		7500		100		54		10.7	
X	X	X	X	X	8500		115		61		12.1	
X	X	X	X	X	9500		130	87	68	29	13.6	43.5
X	X	X	X	X	10500	**15 AG 60°**	145		75		15	
	X	X	X	X	11500		160		82		16.4	
	X	X	X	X	12500		180		89		17.9	
	X	X	X	X	14500		200		104		19.4	
		X	X	X	16500		225		118		22.1	
			X	X	18500		250		132		25	
				X	19500		275		139		27.4	
				X	21280		300		152		29.3	

Tab. P

The AG-Jet atomiser unit has the following feature:
1 Nozzle type 12/15 AG (Fluidics)

The delivery range and pulverisation angles are given by the variants that are available for the element 1).

The recommended air pressure at the air line inlet is 48 PSI (see Fig. 28 on page 34).

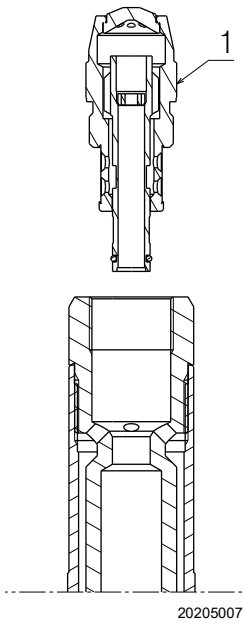


Fig. 24

4.11.2 Spray lance purge air operating cycle

The burner is equipped with an automatic lance cleaning system, which is carried out at the end of the burner shutdown cycle during oil operation.

The factory-set time is 10 seconds.

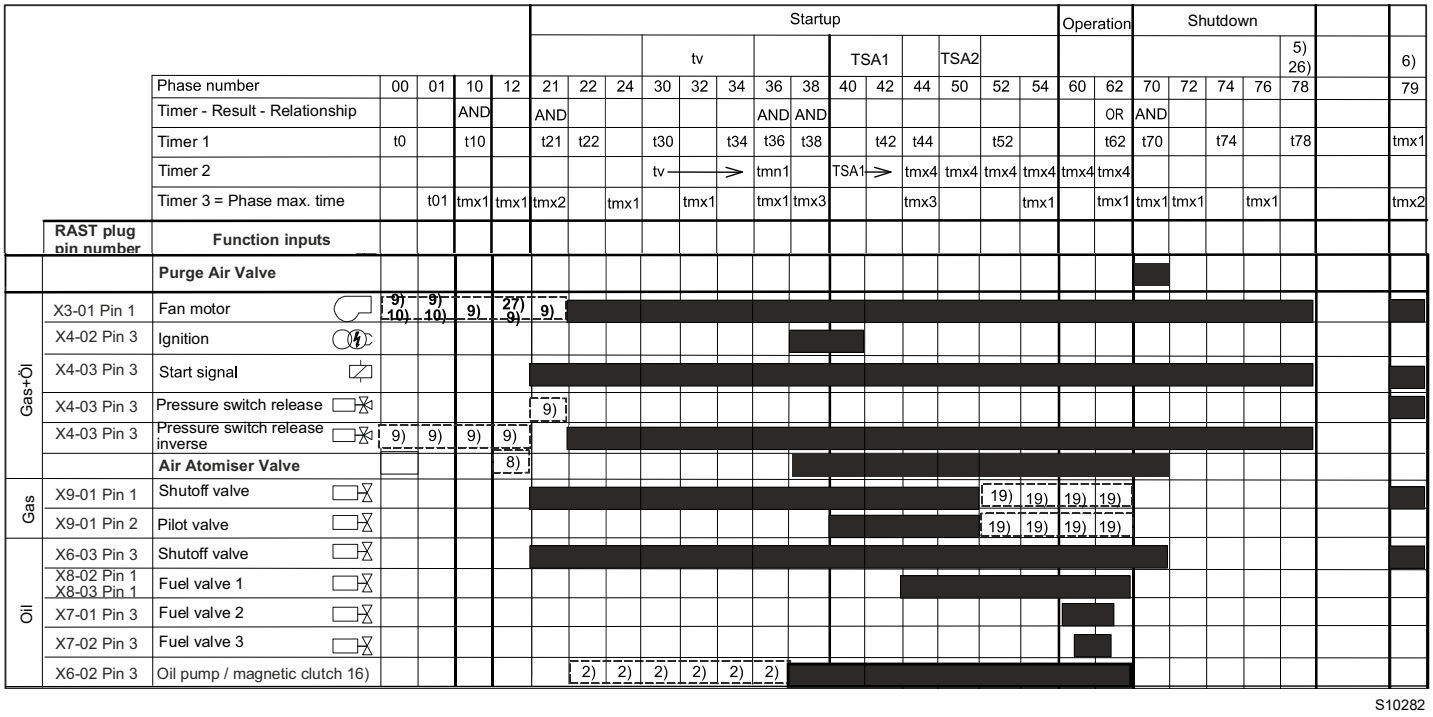
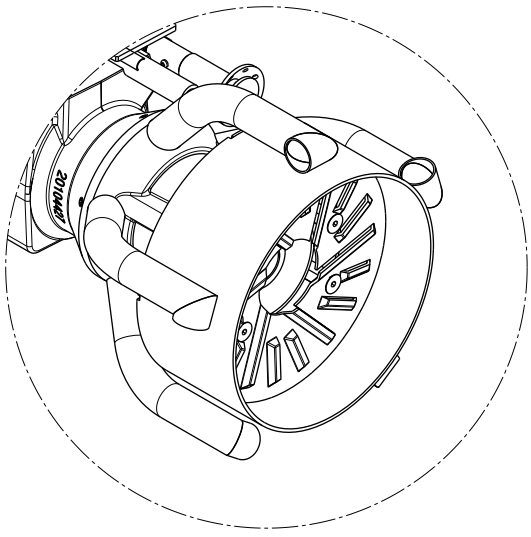


Fig. 25

4.11.3 RLAS 280 combustion head configuration

STD Configuration with tangential pipes



OPT Configuration with radial pipes

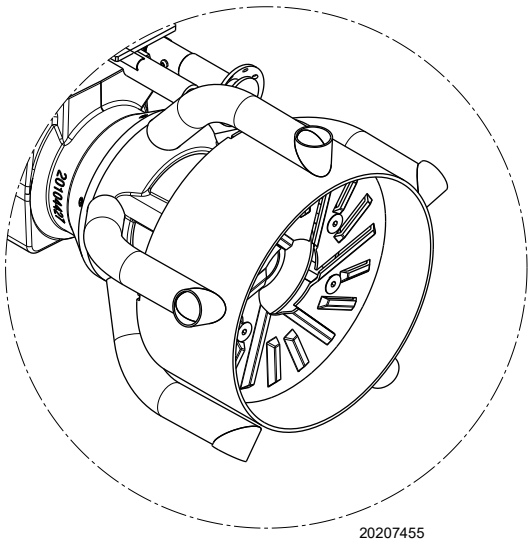


Fig. 26

NOTE:
Radial pipes are supplied with the burner; for their use please contact Riello technical service.

4.12 Light oil supply

Explosion danger due to fuel leaks in the presence of a flammable source.
Precautions: avoid knocking, attrition, sparks and heat.
Make sure that the fuel interception tap is closed before performing any operation on the burner.

WARNING

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

4.12.1 Double-pipe circuit

The burner is equipped with a self-priming pump which is capable of feeding itself within the limits listed in the Tab. Q.

The tank higher than the burner A
The distance "P" must not exceed 33 ft in order to avoid subjecting the pump's seal to excessive strain; the distance "V" must not exceed 4 meters in order to permit pump self-priming even when the tank is almost completely empty.

The tank lower than the burner B
Pump depression values higher than 0.45 bar (35 cm Hg) must not be exceeded because at higher levels gas is released from the fuel, the pump starts making noise and its working life-span decreases. It is good practice to ensure that the return and suction lines enter the burner from the same height; in this way it will be more improbable that the suction line fails to prime or stops priming.

4.12.2 The loop circuit

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

A branch connection from the loop goes to feed the burner.

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

+/- H (ft)	L (ft)	
	Ø 1/2"	Ø 5/8"
+ 13	197	263
+ 10	164	230
+ 6.6	132	197
+ 4.8	115	181
+ 3.3	99	164
+ 1.6	82	148
0	66	132
- 1.6	59	115
- 3.3	49	99
- 4.8	43	82
- 6.6	33	66
- 10	16	33
- 13	-	20

Tab. Q

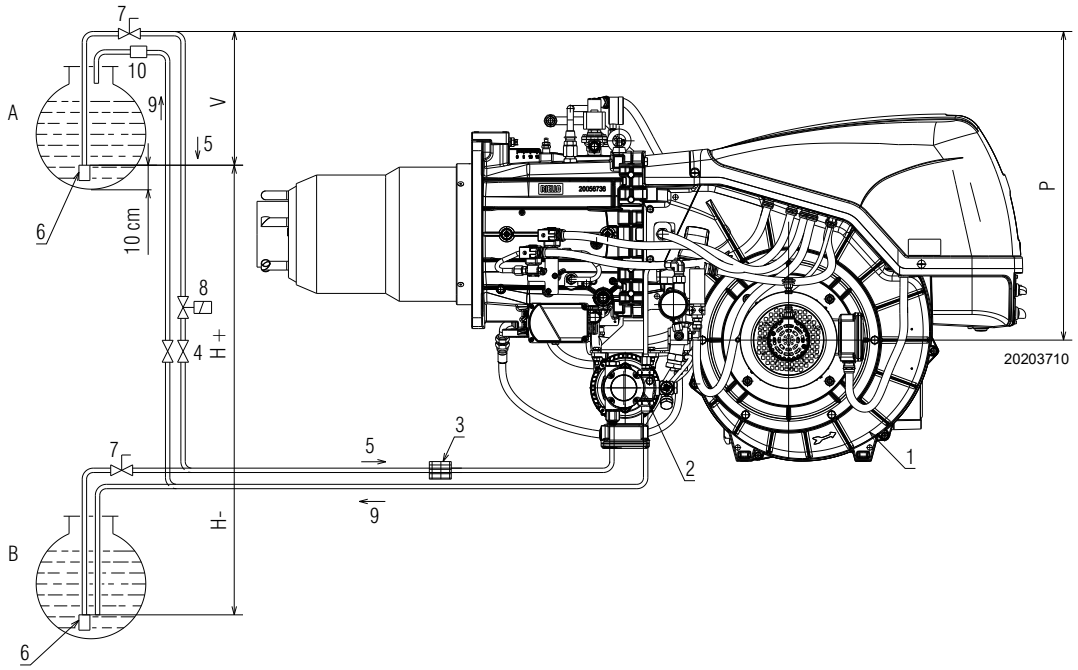


Fig. 27

Key (Fig. 27)
1 Burner
2 Pump
3 Filter
4 Manual on/off valve
5 Suction line
6 Foot valve
7 Rapid closing manual valve remote controlled (only Italy)
8 On/off solenoid valve (only Italy). See layout of electric panel board. Electrical connections set by installer (SV)
9 Return line
10 Check valve (only Italy)

H Pump/foot valve height difference
L Piping length
Ø Inside pipe diameter

4.12.3 Hydraulic connections

CAUTION

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

WARNING

Follow the instructions below:

- ➤ tighten the flexible hoses with the supplied gaskets.
- ➤ Take care that the hoses are not stretched or twisted during installation.
- ➤ Place the pipes so that they are not crushed or are in contact with hot parts of the boiler and so it is possible to open the burner.
- ➤ Finally, connect the other end of the flexible hoses to the suction and return pipes.

4.12.4 Hydraulic circuit layout

Key (Fig. 28)

1 Pump suction
2 Pump pressure regulator
3 Filter
4 Oil pressure gauge
5 Min. Oil pressure switch
6 Safety valve
7 Discharge valve
8 Control valve
9 Oil modulator
10 Air solenoid valve
11 Air pressure switch ”Factory set @ 36 PSI (2.5 bar)”
12 Air pressure gauge
13 Nozzle
14 Max oil pressure switch
15 Compressor with tank
16 Solenoid valve
17 Adjustment valve
18 Silencer
19 Air governor
P Pressure gauge connection
V Vacuometer connection

OPERATION

Pre-purging phase: valves 6) closed.

Ignition and operation phase: valves 6) opened.

Stop: all valves closed.

4.12.5 Pressure variator

The pressure variator (Fig. 29), incorporated in the oil circuit valve group, makes it possible to vary the pressure on the nozzle line depending on the output required.
The pressure on the nozzle line is adjusted by varying a section by means of the rotation of the servomotor, which also controls the gas butterfly valve at the same time.

- ➤ Regulator to 0° (minimum opening) = minimum pressure on nozzle line.
- ➤ Regulator to 90° (maximum opening) = maximum pressure on nozzle line.

The servomotor is controlled by the electronic cam; thanks to this device, it is possible to set different curves for oil and gas on the same servomotor (also for the air damper servomotor.

- ➤ When **adjusting the gas**, it is recommended to adjust the servomotor to about 90° to reduce leaks from the gas butterfly valve.
- ➤ When **adjusting the oil**, the adjustment is done based on the nozzle fitted and on the required degree of modulation; in a situation of minimum firing rate, a rotation of 20° can be enough.

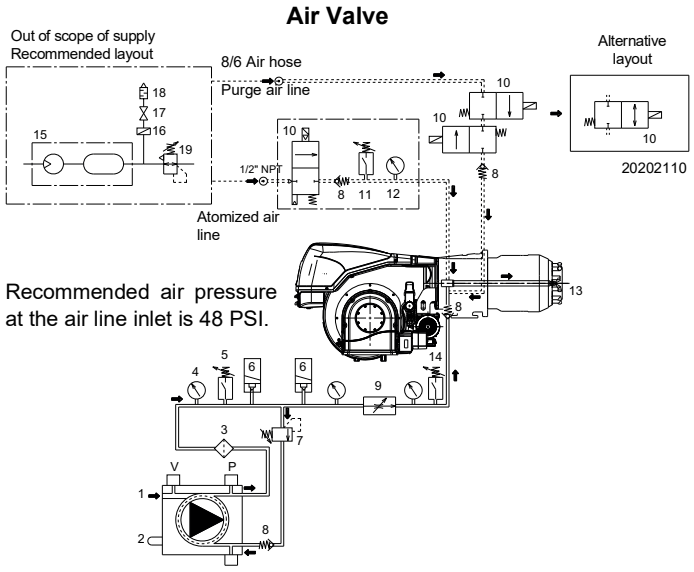


Fig. 28

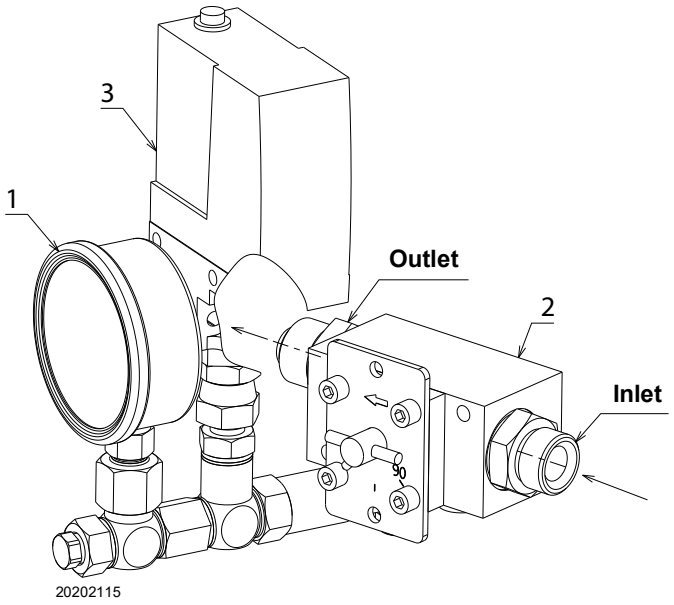


Fig. 29

Key (Fig. 29)

1 Outlet pressure gauge
2 Position indicator (0 ÷ 90) of the pressure variator
3 Max oil pressure switch

4.13 Pump

4.13.1 Technical data

Pump	SUNTEC TA3	SUNTEC J7
Min. delivery rate at 15 bar / 217.5 psi pressure	585 kg/h - 185 gph	260 kg/h - 82 gph
Delivery pressure range	7 ÷ 40 bar / 102 ÷ 580 psi	10 ÷ 21 bar / 145 ÷ 305 psi
Max. suction depression	0.45 bar / 6.5 psi	0.45 bar / 6.5 psi
Viscosity range	2 ÷ 75 cSt	3 ÷ 75 cSt
Max. light oil temperature	150°C / 302°F	90°C / 194°F
Max. suction and return pressure	5 bar / 72 psi	1.5 bar / 22 psi
Pressure calibration in the factory	30 bar / 435 psi	12 bar / 174 psi

Tab. R

4.13.2 Pump priming



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

Obstructions in the line could cause the sealing organ located on the pump shaft to break.
(The pump leaves the factory with the by-pass closed).

– For self-priming to take place, screw 2)(Fig. 30) for the J7 pump or the screw 5)(Fig. 31) for the TA pump, must be loosened in order to bleed off the air contained in the suction line.
– The pump can be considered to be primed when the gas oil starts coming out of the screw 2)(Fig. 30) for the J7 pump or of the screw 5)(Fig. 31) for the TA pump.

The time required for this operation depends upon the diameter and length of the suction tubing.
If the pump fails to prime at the first starting of the burner and the burner locks out, wait approx. 15 seconds, reset the burner, and then repeat the starting operation as often as required.
After 5 or 6 starting operations allow 2 or 3 minutes for the transformer to cool.



The a.m. operation is possible because the pump is already full of fuel when it leaves the factory.
If the pump has been drained, fill it with fuel through the opening on the vacuum meter prior to starting; otherwise, the pump will seize.
Whenever the length of the suction piping exceeds 65-100 ft, the supply line must be filled using a separate pump.

Pump J7 (only for RLAS 280/EV)

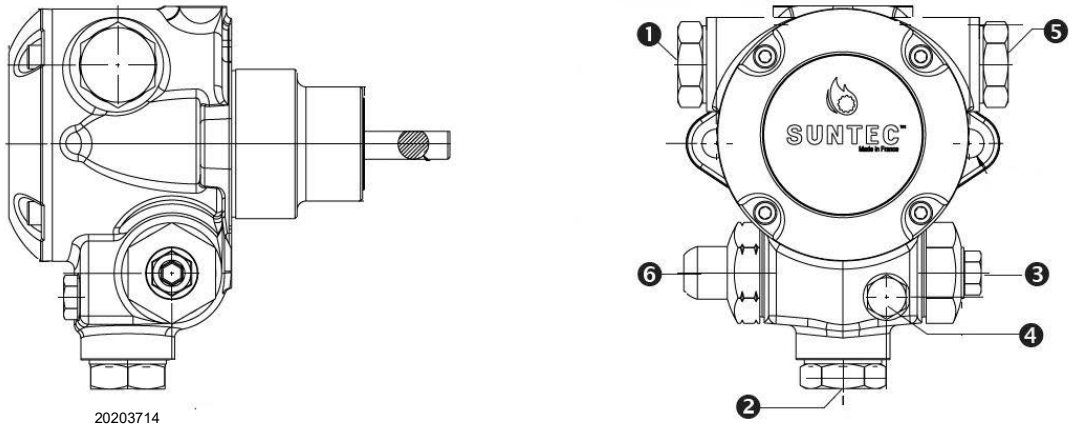


Fig. 30

Key (Fig. 30)

1	Suction or vacuum gauge port	G 1/2”
2	Return and internal by-pass plug	G 1/2”
3	Nozzle out	G 1/4”
4	Pressure gauge port	G 1/8”
5	Vacuum gauge port or suction	G 1/2”
6	Pressure adjustment	

Pump TA3 (only for RLAS 310-410-510-610/EV)

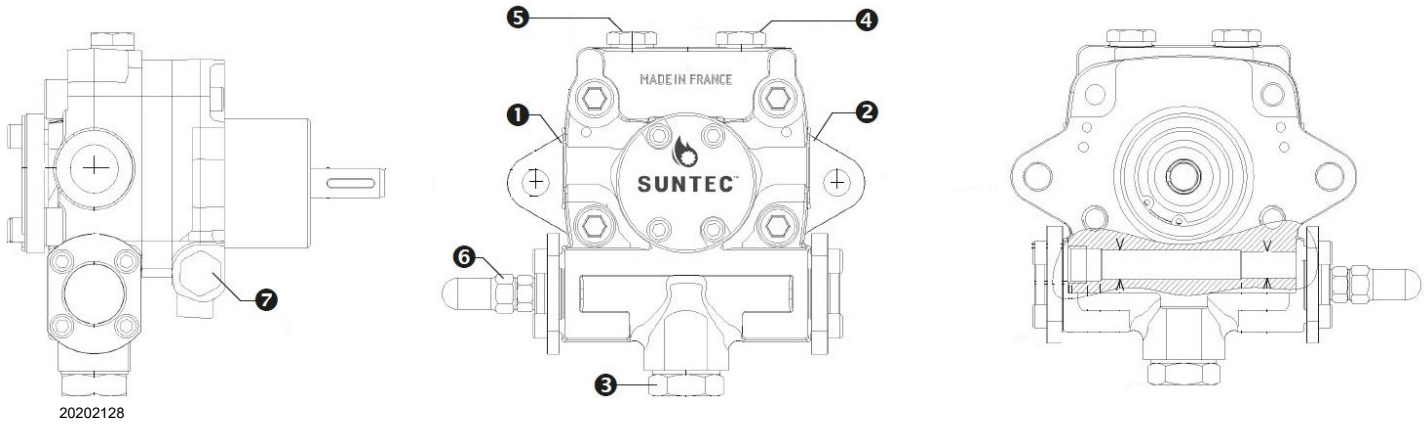


Fig. 31

Key (Fig. 31)

1	Suction	G 1/2”
2	Nozzle out	G 1/2”
3	Return	G 1/2”
4	Pressure gauge port	G 1/4”
5	Vacuum or inlet pressure gauge port & internal by-pass plug	G 1/4”
6	Pressure adjustment	
7	Preheater cavity	

4.14 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.

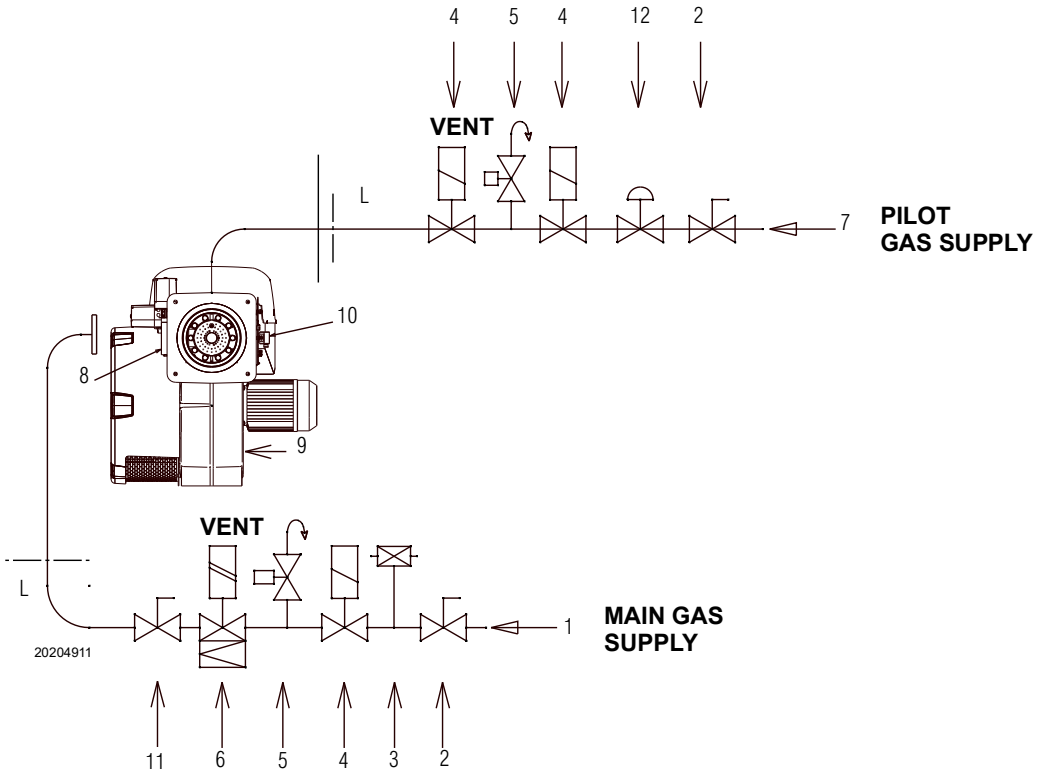


Fig. 32

Key (Fig. 32)

1 Gas input pipe for main burner
2 Manual valve
3 Min gas pressure switch
4 Safety shut-off valve
5 NO vent valve
6 Regulating shut off valve
7 Gas input pipe for pilot
8 Gas adjustment butterfly valve
9 Burner
10 Max gas pressure switch
11 Manual valve (for seal control)
12 Pilot regulator

4.14.1 Gas train

Burner scope of supply.



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



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.

4.14.2 Gas pressure

WARNING

The pressure at the head of the burner from refers to zero in the combustion chamber; to obtain true pressure, measured by a U-type manometer, add the counter-pressure of the boiler.

The charts show the pressure drops along the gas supply line, depending on the maximum burner delivered output.

The values shown refer to:
Natural gas

RLAS 280/EV

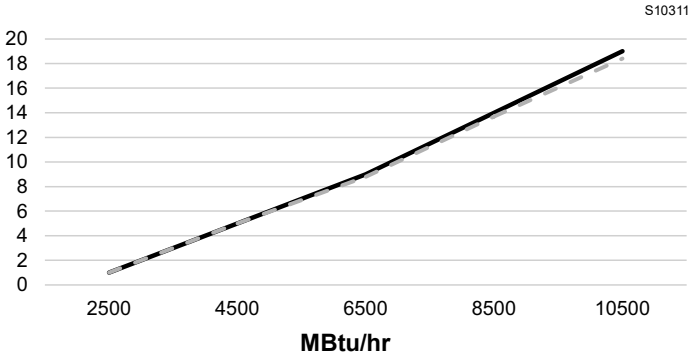


Fig. 33

RLAS 310/EV

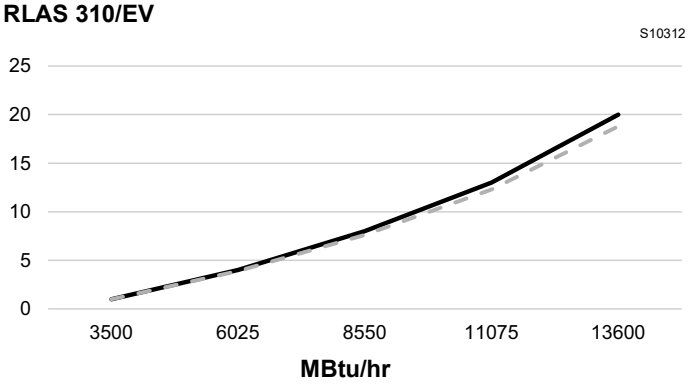


Fig. 34

RLAS 410/EV

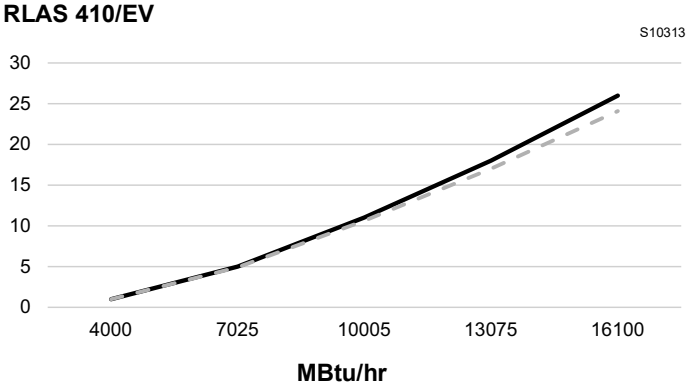


Fig. 35

RLAS 510/EV

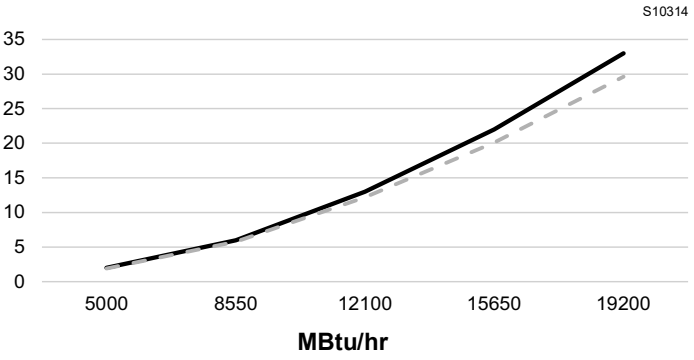


Fig. 36

RLAS 610/EV

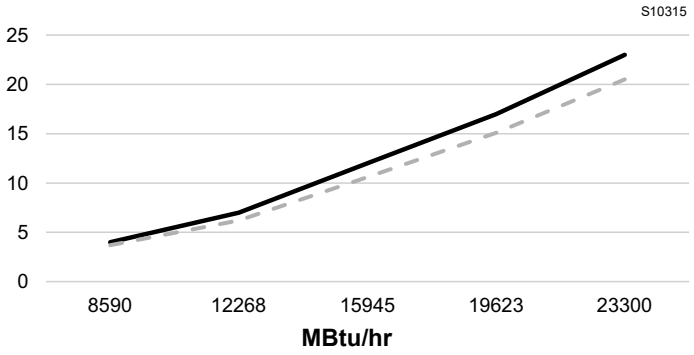


Fig. 37

Dotted line

Combustion head pressure drop.
Gas pressure measured at test point 13) (Fig. 2 on page 10), with:

- Combustion chamber at 0 mbar. If the pressure is higher, add it to the value read in the figure;
- Combustion head adjusted as in page 29.

Solid line

Pressure drop downstream of the safety valves and upstream of the gas butterfly valve.

To calculate the approximate output at which the burner operates:

– subtract the pressure in the combustion chamber from the pressure of the gas at test point 13)(Fig. 2 on page 10).
– Enter the mbar scale (Fig. 33 - Fig. 34 - Fig. 35 - Fig. 36 - Fig. 37 for G20) and read the corresponding output on the dotted line.

WARNING

The data of thermal output and combustion head gas pressure are related to full open (90°) gas butterfly valve.

4.14.3 Pilot - gas train connection

The burner is fitted with a dedicated gas train that is fixed to the pipe coupling.

WARNING

Supply pressure: see gas train specification.

4.14.4 Ignition pilot burner

For proper operation, adjust gas pressure (measured at pressure test point 1)(Fig. 38) as follows:

Model	Gas	"WC	SCFH
RLAS 280/EV	Natural gas	11 - 15	200 - 240
RLAS 310/EV	Natural gas	11 - 15	200 - 240
RLAS 410/EV	Natural gas	11 - 15	200 - 240
RLAS 510/EV	Natural gas	11 - 15	200 - 240
RLAS 610/EV	Natural gas	11 - 15	200 - 240
RLAS 280/EV	LPG	6 - 8	210 - 250
RLAS 310/EV	LPG	6 - 8	210 - 250
RLAS 410/EV	LPG	6 - 8	210 - 250
RLAS 510/EV	LPG	6 - 8	210 - 250
RLAS 610/EV	LPG	6 - 8	210 - 250

Tab. S

WARNING

Check pilot flame stability before starting up the main burner.

In the case of ignition problems check:

➤ correct positioning of the ignition electrode;

➤ the gas pressure, according to indications.

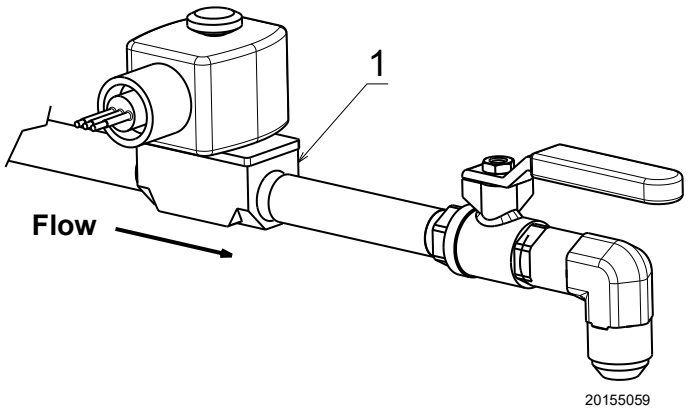


Fig. 38

4.15 Electrical wiring

4.15.1 Notes on safety for the electrical wiring

DANGER

- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be made in accordance with the regulations currently in force in the country of destination and by qualified personnel. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- The burner has been type-approved for intermittent operation (FS1). This means that it should as a rule be stopped at least once every 24 hours to enable the flame control to perform checks of its own start-up efficiency. Normally, burner stopping is guaranteed by the boiler's thermostat/pressure switch.
  If this is not the case, a time switch should be fitted in series to TL to stop the burner at least once every 24 hours. Refer to the wiring diagrams.
- The burner is factory set for FS1 operation (1 stop every 24 hours); it can be converted to FS2 operation (continuous - 1 stop every 72 hours), by changing the parameters using the menu of the AZL Display.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel. Do not use the gas tubes as an earthing system for electrical devices.
- The electrical system must be suitable for the maximum power absorption of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for that level of power absorption.
- For the main power supply of the device from the electricity mains:
  - do not use adapters, multiple sockets or extensions;
  - make provisions for an omnipolar switch with a gap between the contacts of at least 3 mm (over-voltage category III), as required by current safety regulations.
- Do not touch the device with wet or damp body parts and/or in bare feet.
- Do not pull the electric cables.

4.15.2 Notes on terminals

On the electrical panel there terminals with a “spring” system. The opening of these terminals must be made via a suitable tool, using a flat-blade screwdriver of the correct size.
The clamp uses a pressurised opening system.

Clamp opening

- insert the correct screwdriver into the opening, pushing down until the hole for the cable is completely open.
- Insert the previously stripped cable and remove the screwdriver. Make sure the cable is securely fastened Fig. 39.

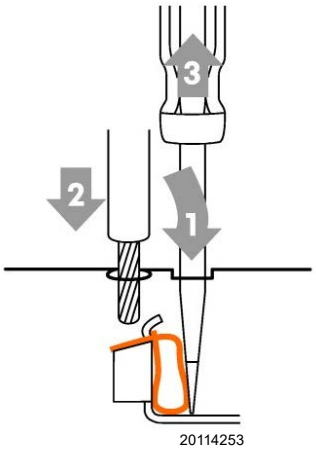


Fig. 39

Before carrying out any maintenance, cleaning or checking operations:

DANGER

Turn off the burner's electrical supply using the main system switch.

DANGER

Turn off the fuel interception tap.

DANGER

Avoid condensate, ice and water leaks from forming.

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

The use of the cable grommets can take various forms. By way of example we indicate the following mode (according to UL795).

4.15.3 Supply cables and external connections passage

All the cables to be connected to the burner are fed through the grommets. See Fig. 40.

The use of the cable grommets can take various forms. By way of example we indicate the following mode (according to **UL795**):

1 Three phase power supply with 3/4 inch cable grommet
2 Available: single phase power supply and other devices with 1/2 inch cable grommet
3 Available: consents/safety, minimum gas pressure switch, gas valves and other devices with 3/8 inch cable grommet
4 Available: hole for M20
5 Available for ground terminals
6 Available for inverter three phase power supply with 3/4 inch cable grommet.

A Variable speed sensor
B Maximum gas pressure switch
C Flame sensor
D Pump motor
E Air servomotor
F Air pressure switch and atomizing pressure switch
G Oil valve
H Oil pressure switch
I Plug for M20
L Motor earth cable
M Air valve
N Fuel servomotor



WARNING

The control panel is in compliance with UL508A.



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

4.15.4 Cable shielding



WARNING

It is very important to shield the motor cable 1) as shown in Fig. 41.

It is very important to fix the cable shielding as shown in Fig. 41.

The connection from the Inverter to LMV52.... must be done as shown in Fig. 41.

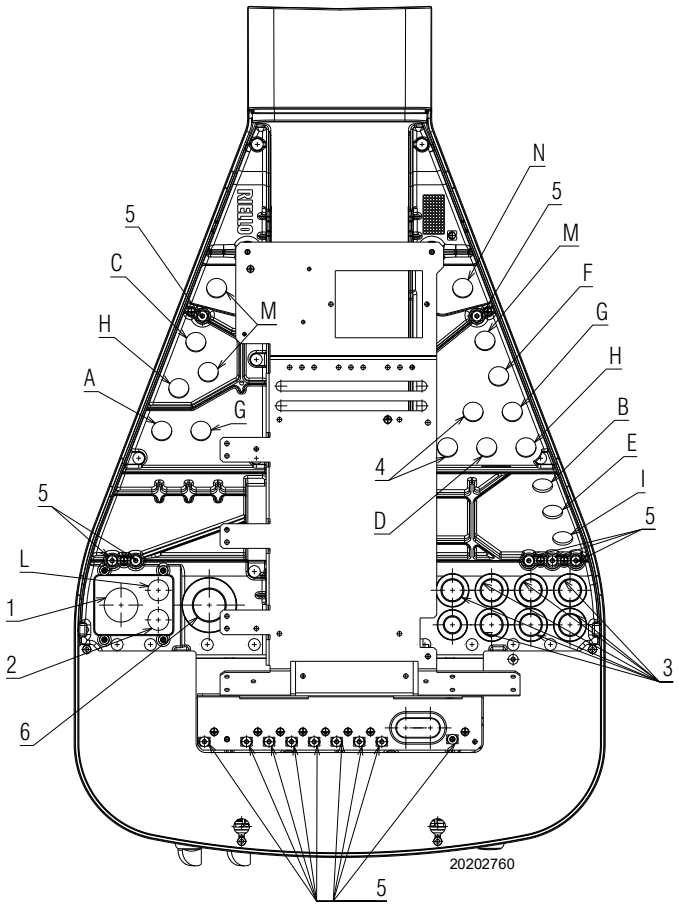


Fig. 40

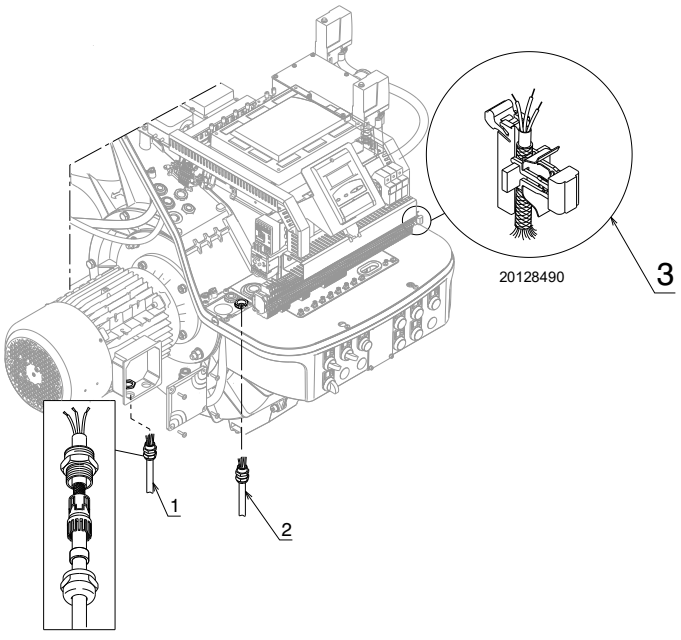


Fig. 41

Key (Fig. 41)
1 Motor supply cable
2 Single phase supply cable
3 Clamp for connection of controls cable shielding from Inverter

4.16 Installation of shielded cables

In the case of clamp type **A**:

- ➤ unscrew the screw until space is created for inserting the shielding of the shielded cable A1)(Fig. 42);
- ➤ insert the shielded cable with the shielding inside the clamp A2);
- ➤ screw in the screw until it is completely tightened on the shielding A3).

WARNING

Do not overtighten.

In the case of clamp type **B**:

- ➤ pull the indicated tabs upwards and lift until locked in the open position B1)(Fig. 42);
- ➤ insert the shielded cable with the shielding inside the clamp B2);
- ➤ put pressure on the indicated part until the clamp closes automatically on the shielding B3).

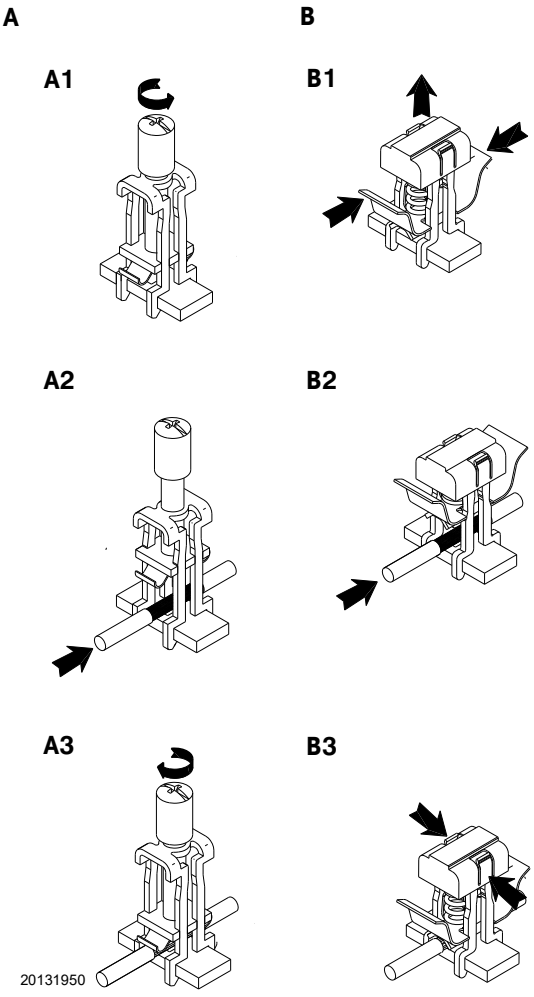


Fig. 42

4.16.1 Inverter connection

WARNING

Following, it is reported an example how to connect the Inverter.
For further information, please refer to the relevant Inverter instruction manual.

Typical installation

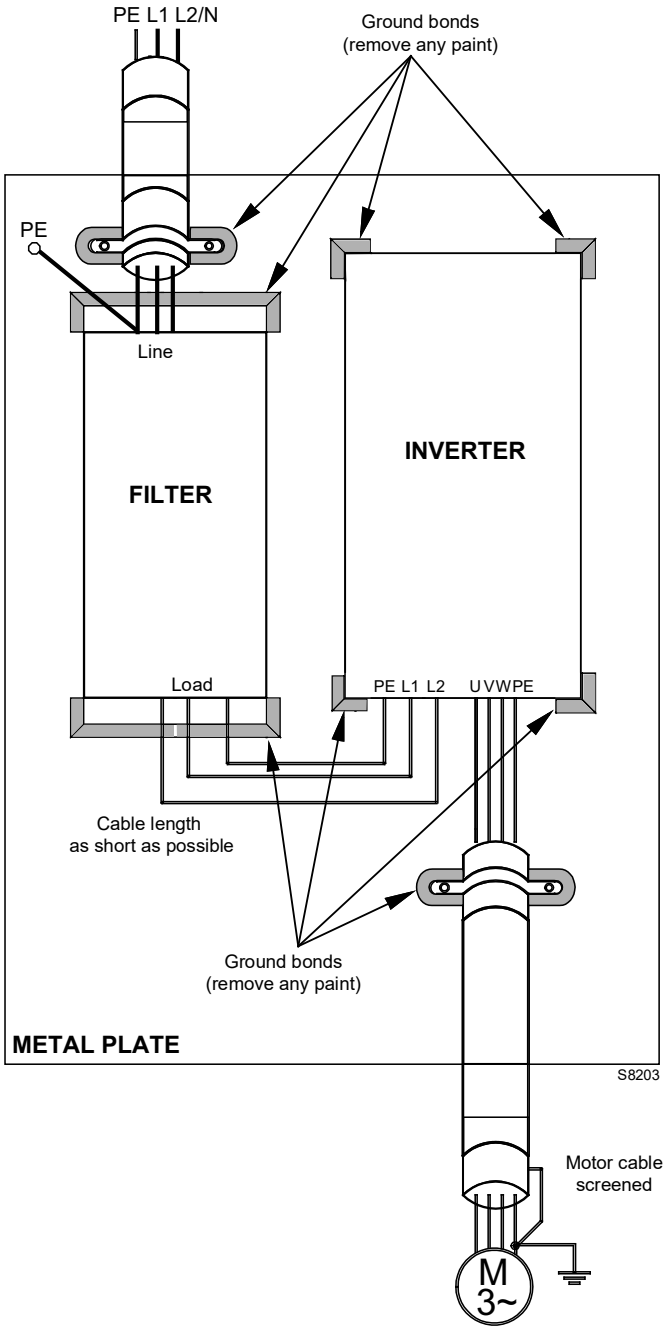


Fig. 43

Treatment of cables

Countermeasures against cable noise

The treatment of cables is the most important countermeasure. The machinery manufacturers are requested

to examine the current structure of the cable lead - in.

- ➤ Use cables with woven screen
- ➤ The screen of the cable should be earthed with a large area.
- ➤ It is desirable to earth the screen of the cable by clamping the cable to the earth plate.
- ➤ The screen must be earthed on both side of the cable (take care for good earthing system).

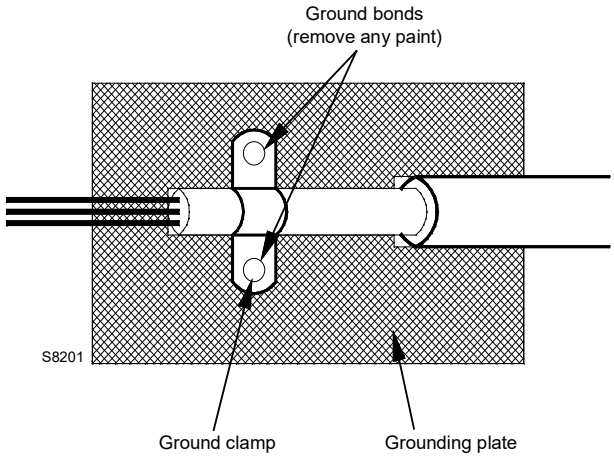


Fig. 44

Examples:

Number 1,2,3 show not proper ways to earth a cable screen.

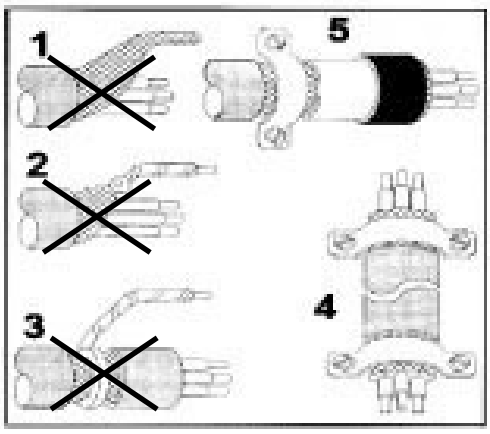


Fig. 45

4.17 Motor protector

To reset, in the case of an intervention of the motor protector, turn into position "ON" the rotatory handle.

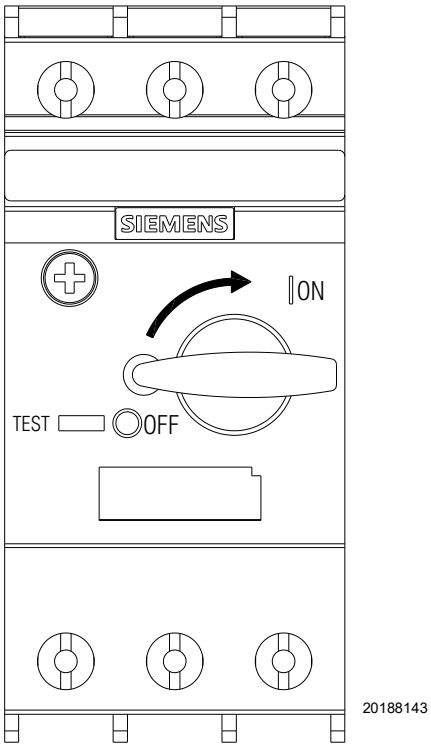


Fig. 46

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

Refer to paragraph "Safety test - with gas ball valve closed" on page 51 before the first start-up.

5.2 Adjustments before first firing

Adjustment of the combustion head has been illustrated on page 29.

In addition, the following adjustments must also be made:

- open manual valves up-stream from the gas train.
- Purge the air from the gas line.
- Adjust the low gas pressure switch to the start of the scale (Fig. 52 on page 49).
- Adjust the high gas pressure switch to the upper limit of the scale (Fig. 51 on page 48).
- Adjust the air pressure switch to the zero position of the scale (Fig. 50 on page 48).
- Fit a U-type manometer (Fig. 47) to the gas pressure test point on the sleeve.
  The manometer readings are used to calculate MAX. burner power using the Tab. S on page 39.

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.

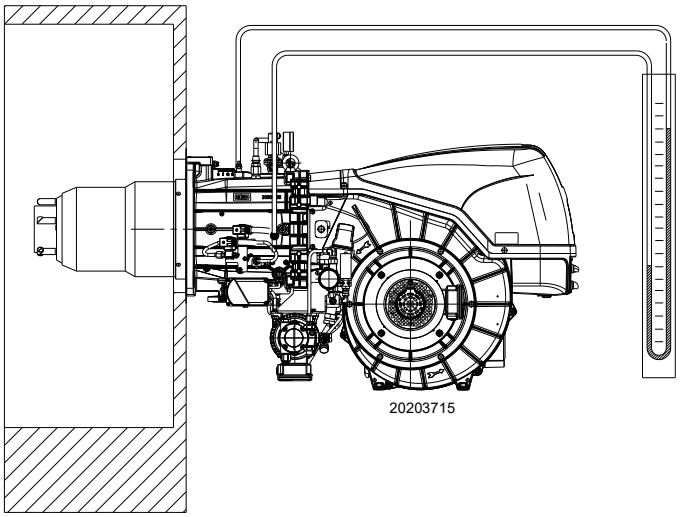


Fig. 47

5.3 Burner firing

Having completed the checks indicated in the previous heading, the pilot of the burner should fire.

If the motor starts but the flame does not appear and the flame safeguard goes into lock-out, reset and wait for a new firing attempt.

Pilot adjustment has been illustrated on Fig. 19 on page 28.

Having adjusted the pilot, reconnect the main valve and ignite the main flame; it might require several attempts to purge the air from the gas lines or to adjust the valve with little gas.

Once the burner has fired, now proceed with calibration operations.

5.4 Burner calibration

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

Adjust successively:

- Firing output
- Maximum burner output
- Minimum burner output
- Intermediate outputs between low and high fire
- Air pressure switch
- Minimum gas pressure switch

5.5 Burner start-up

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

Close the thermostats/pressure switches.

Close the thermostats/pressure switches and turn the switch of Fig. 48 to position “LOCAL”.

DANGER

Make sure that the lamps or testers connected to the solenoids, or indicator lights on the solenoids themselves, show that no voltage is present.

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

WARNING

When the burner starts, check the direction of the motor rotation, as indicated in Fig. 48.

If the burner is not equipped with a device to check the phases sequence, the motor could rotate incorrectly.

As soon as the burner starts up, look at the cooling fan of the fan motor and check it is rotating anti-clockwise.

If this is not the case:

- ➤ place the switch of Fig. 48 in position **“OFF”** and wait for the flame control to carry out the switch-off phase;
- ➤ disconnect the electrical supply from the burner;
- ➤ invert the phases on the inverter output.

NOTE:

for further information, please refer to the specific instruction of the flame control.

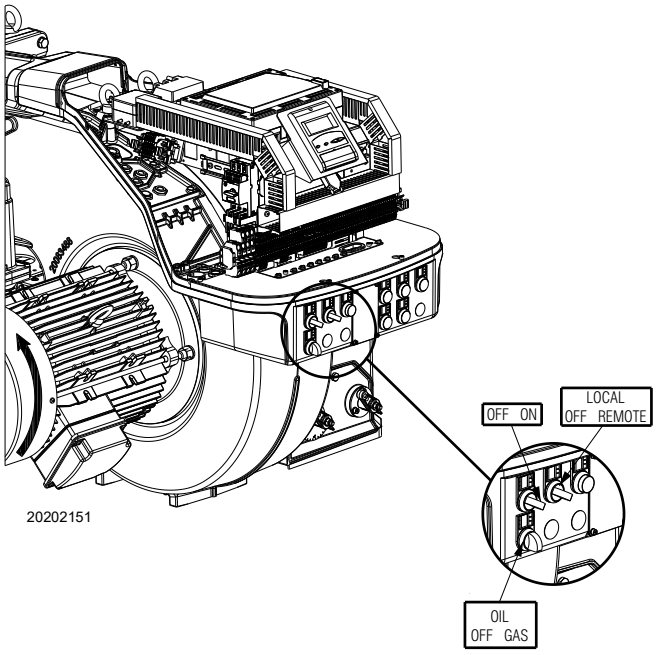


Fig. 48

5.6 Burner firing

Having completed the checks indicated in the previous heading, the ignition pilot of the burner should fire.

Set switch 1)(Fig. 49) to “LOCAL”.

Set switch 2)(Fig. 49) to the correct fuel.

If the motor starts but the flame does not appear and the flame safeguard goes into lock-out, reset and wait for a new firing attempt.

Check the control/ adjustment of the pilot (valve).

Having adjusted the pilot, reconnect the main valve and ignite the main flame; it might require several attempts to purge the air from the gas lines or to adjust the valve with little gas.

Once the burner has fired, now proceed with calibration operations.

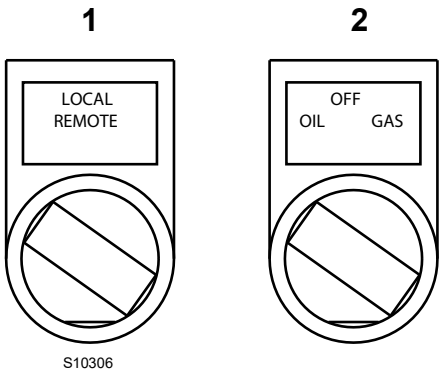


Fig. 49

5.7 Burner ignition

Once the above steps are complete, the burner should light.

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

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

The arrival of gas at the pipe coupling is indicated by the U-type pressure gauge (Fig. 47).

If further burner lockouts occur, refer to the “Release procedure” given in the equipment manual supplied.

Once the burner has ignited, proceed with the global adjustment of the burner.

5.7.1 Air / gas adjustment and output modulation

The air/gas regulator and output modulation system equipping **RLAS** 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.

The first start-up and curve synchronisation manual is supplied with the burner.

At request, the complete manual for the control and setting of all parameters is available.

5.8 Final calibration of the pressure switches

5.8.1 Air pressure switch

For the **RLAS 280**, model the air pressure switch is connected in differential mode and is activated by both the negative pressure of the air intake and the positive pressure from the fan.

For the **RLAS 310-410-510**, models the air pressure switch is connected in absolute mode and is activated by the positive pressure from the fan (Fig. 50).

Adjust the air pressure switch (Fig. 50) after having performed all other burner adjustments with the air pressure switch set to the min. of the scale.

With the burner operating at low fire, adjust the pressure switch by slowly turning the relative knob clockwise until the burner locks out.

Then turn the knob counter-clockwise about 20% of the set point and start-up the burner again to ensure the set point is correct.

If the burner locks out again, turn the knob counter-clockwise a little bit more.

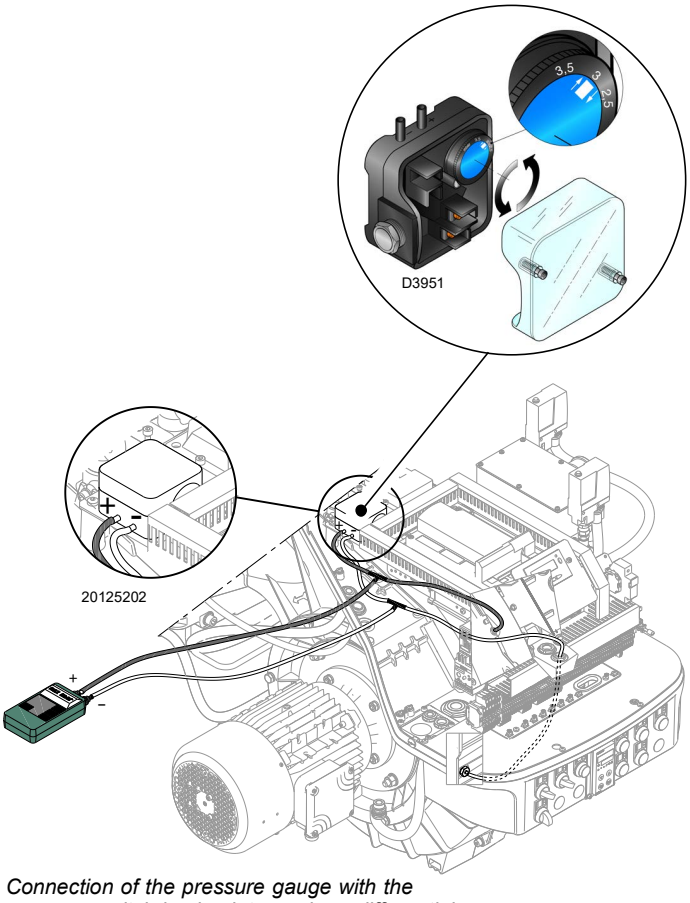
5.8.2 Maximum gas pressure switch

Adjust the maximum gas pressure switch (Fig. 51) 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.



Connection of the pressure gauge with the pressure switch in absolute mode or differential mode for RLAS 280

Fig. 50

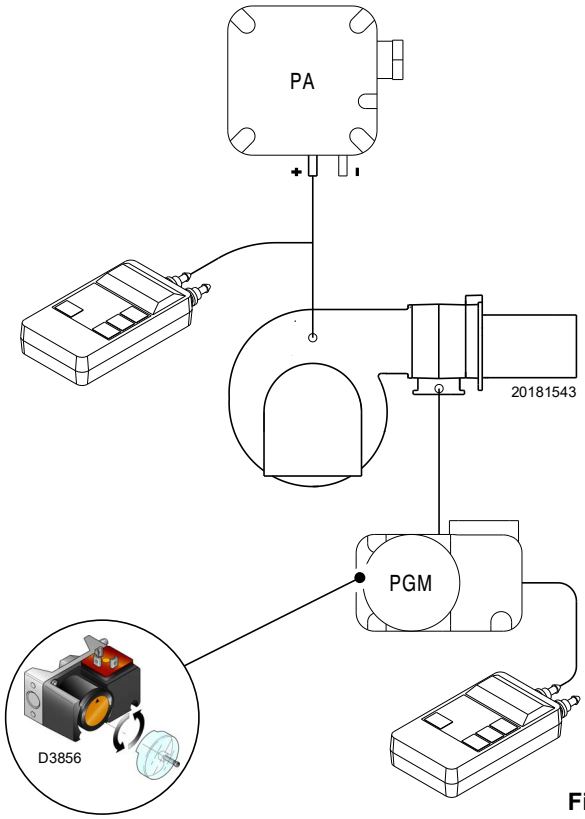


Fig. 51

5.8.3 Minimum gas pressure switch

Adjust the minimum gas pressure switch (Fig. 52) after having adjusted the burner, the gas valves and the gas train stabiliser. With the burner operating at maximum output:

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

WARNING

1 kPa = 10 mbar

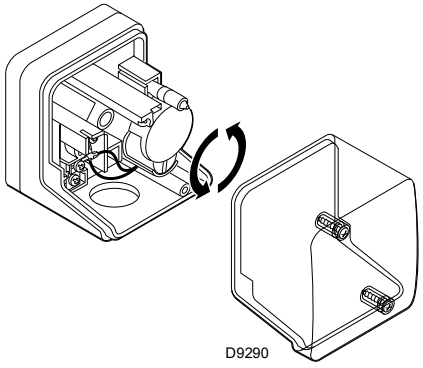


Fig. 52

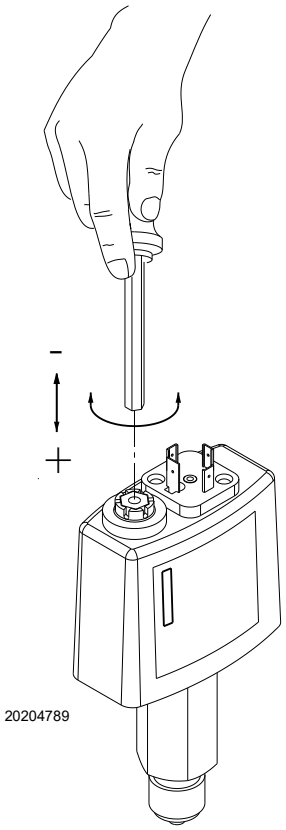


Fig. 53

5.8.4 Low oil pressure switch

The low oil pressure switch is factory set to 145 PSI (10 bar) (Fig. 53).

If the oil pressure goes down this value in the delivery piping, the pressure switch stops the burner.

5.8.5 High oil pressure switch

The high oil pressure switch is factory set to 130 PSI (9 bar).

If the oil pressure goes over this value in the delivery piping, the pressure switch stops the burner.

For the adjustment see Fig. 54.

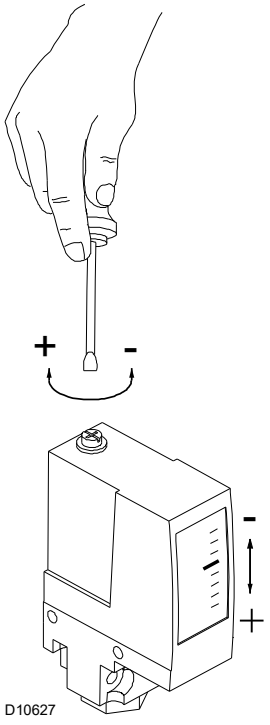


Fig. 54

5.8.6 Steady state operation

At the end of the starting cycle, the servomotor control then passes to load control for boiler pressure or temperature.

- ➤ If the temperature or pressure is low (and the load control is consequently closed), the burner progressively increases output up to MAX.
- ➤ If subsequently the temperature or pressure increases until the load control opens, the burner progressively decreases output down to MIN.
- ➤ The burner shuts off when demand for heat is less than the heat supplied by the burner in the MIN output.
- ➤ The servomotor returns to the 0° angle. The air damper closes completely to reduce thermal dispersion to a minimum.

Every time output is changed, the servomotor automatically modifies oil delivery (pressure regulator) and air delivery (fan damper).

5.9 Firing failure

- ➤ If the burner does not fire, it goes into lock-out within 5 sec. of the opening of the light oil valve.
- ➤ If the flame should go out for accidental reasons during operation, the burner will lock out in 1 s.

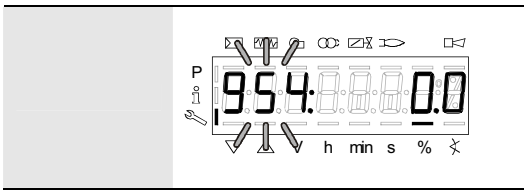
5.10 Flame signal measurement

Check the flame signal through the parameter 954, as indicated in Fig. 55. The displayed value is expressed in percentage.

The value during the operation must be higher than 24%. If at the burner start-up the value is higher or equal of 18%, the burner locks out due to the extraneous light.

For further and specific information, please refer to the specific instruction manual.

The display (Fig. 55) shows parameter **954**: flashing on the left. On the right, the flame's intensity is displayed as a percentage. Example: **954: 0.0**



S8171

Fig. 55

5.11 Final checks (with the burner working)

➤ Open the control limit operation ➤ Open the high limit operation	⇨	The burner must stop
➤ Rotate the maximum gas pressure switch knob to the minimum end-of-scale position ➤ Rotate the air pressure switch knob to the maximum end of scale position ➤ Rotate the maximum oil pressure switch at the minimum of the scale	⇨	The burner must stop in lockout
➤ Switch off the burner and disconnect the voltage ➤ Disconnect the minimum gas pressure switch ➤ Rotate the minimum low oil pressure switch at the maximum of the scale	⇨	The burner must not start
➤ Cover the flame sensor	⇨	The burner must stop in lockout due to firing failure

Tab. T

WARNING

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

6 Maintenance

6.1 Notes on safety for the maintenance

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

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



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

Before carrying out any maintenance, cleaning or checking operations:



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



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 ball valve closed

It is fundamental to ensure the correct execution of the electrical connections between the gas solenoid valves and the burner to perform safely the commissioning.

For this purpose, after checking that the connections have been carried out in accordance with the burner's electrical diagrams, an ignition cycle with closed gas ball valve -dry test- must be performed.

1 The manual ball gas valve must be closed
2 The electrical contacts of the burner limit switch need to be closed
3 Ensures closed the contact of the low gas pressure switch
4 Make a trial for burner ignition

The start-up cycle must be as follows:

– Starting the fan for pre-ventilation
– Performing the gas valve seal control, if provided
– Completion of pre-ventilation
– Arrival of the ignition point
– Power supply of the ignition transformer
– Electrical Supply of solenoid gas valves

Since the manual gas ball valve is closed, the burner will not light up and its flame control will go to a safety lockout condition.

The actual electrical supply of the solenoid gas valves can be verified by inserting a tester.
Some valves are equipped with light signals (or close/open position indicator) that turn on at the same time as their power supply.



IF THE ELECTRICAL SUPPLY OF THE GAS VALVES OCCURS AT UNEXPECTED TIMES, DO NOT OPEN MANUAL GAS BALL VALVE, SWITCH OFF POWER LINE; CHECK THE WIRES; CORRECT THE ERRORS AND REPEAT THE COMPLETE TEST.

6.2.3 Checking and cleaning



The operator must use the required equipment during maintenance.

Combustion
Carry out an analysis of the combustion discharge gases. Significant differences with respect to the previous check indicate the points where more care should be exercised during maintenance.

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

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

Check for excess wear or loose screws. Also make sure that the screws securing the electrical leads in the burner connections are fully tightened.

Clean the outside of the burner.

Flame inspection window

Clean the flame inspection window 1)(Fig. 56).

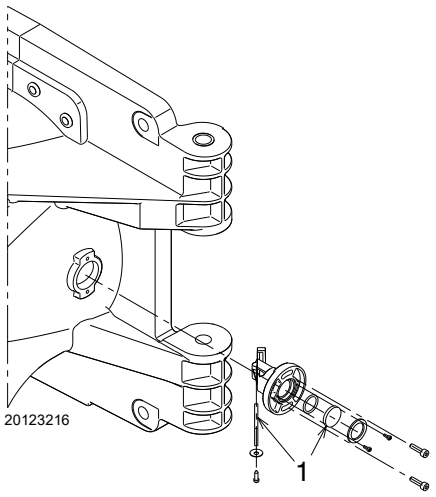


Fig. 56

Measurement of flame sensor

Measurement of the sensor's signal (Fig. 57) with a Voltmeter is not normally required since the flame signal's intensity is shown on the AZL...display and operating unit.

Min. value for a good work: 3.5 Vdc (AZL display flame approx. 50%).

If the value is lower, it can depend on:
– sensor positioned incorrectly;
– low current (lower than 96V);
– bad regulation of the burner.

To measure power, use a voltmeter with a 10 Vdc scale, connected as illustrated in Fig. 57.

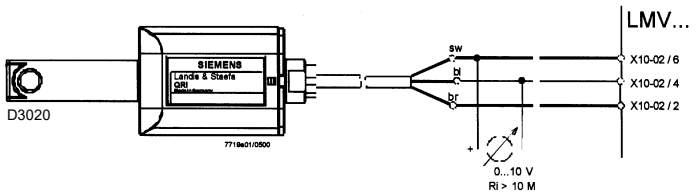


Fig. 57

Boiler

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

GAS OIL OPERATION

Nozzles
It is advisable to replace nozzles once a year during periodical maintenance.
Do not clean the nozzle openings; do not even open them.

Hoses
Check that these are in good conditions.

Filters (Fig. 58)
Check the filtering baskets on line 1) and at nozzle 2) present in the system.
Clean or replace if necessary.
If rust or other impurities are observed inside the pump, use a separate pump to lift any water and other impurities that may have deposited on the bottom of the tank.

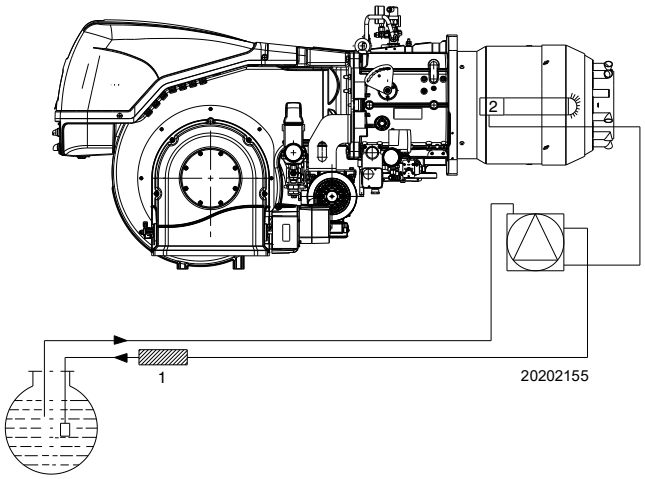


Fig. 58

Fuel tank
Approximately every 5 years, suck any water on the bottom of the tank using a separate pump.

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.

GAS OPERATION

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.

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.

6.2.4 Safety components

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

Safety component	Life cycle
Flame control	10 years or 250,000 operation cycles
Flame sensor	10 years or 250,000 operation cycles
Gas valves (solenoid)	10 years or 250,000 operation cycles
Pressure switches	10 years or 250,000 operation cycles
Pressure adjuster	15 years
Servomotor (electronic cam) (if 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. U

6.3 Checking the position of the rpm sensor

To calibrate the rpm sensor 6)(Fig. 59), proceed as follows:
- ➤ remove the cover 1) unscrewing the screws 2);
- ➤ unscrew or screw the nuts 3) - 5) and the rpm detection disc 4) so that its distance from the sensor 6) is about 2 mm.;
- ➤ support the rpm detection disc 4) to the nut 5) and fix it by the lock nut 3);
- ➤ close the cover 1) screwing the screws 2).

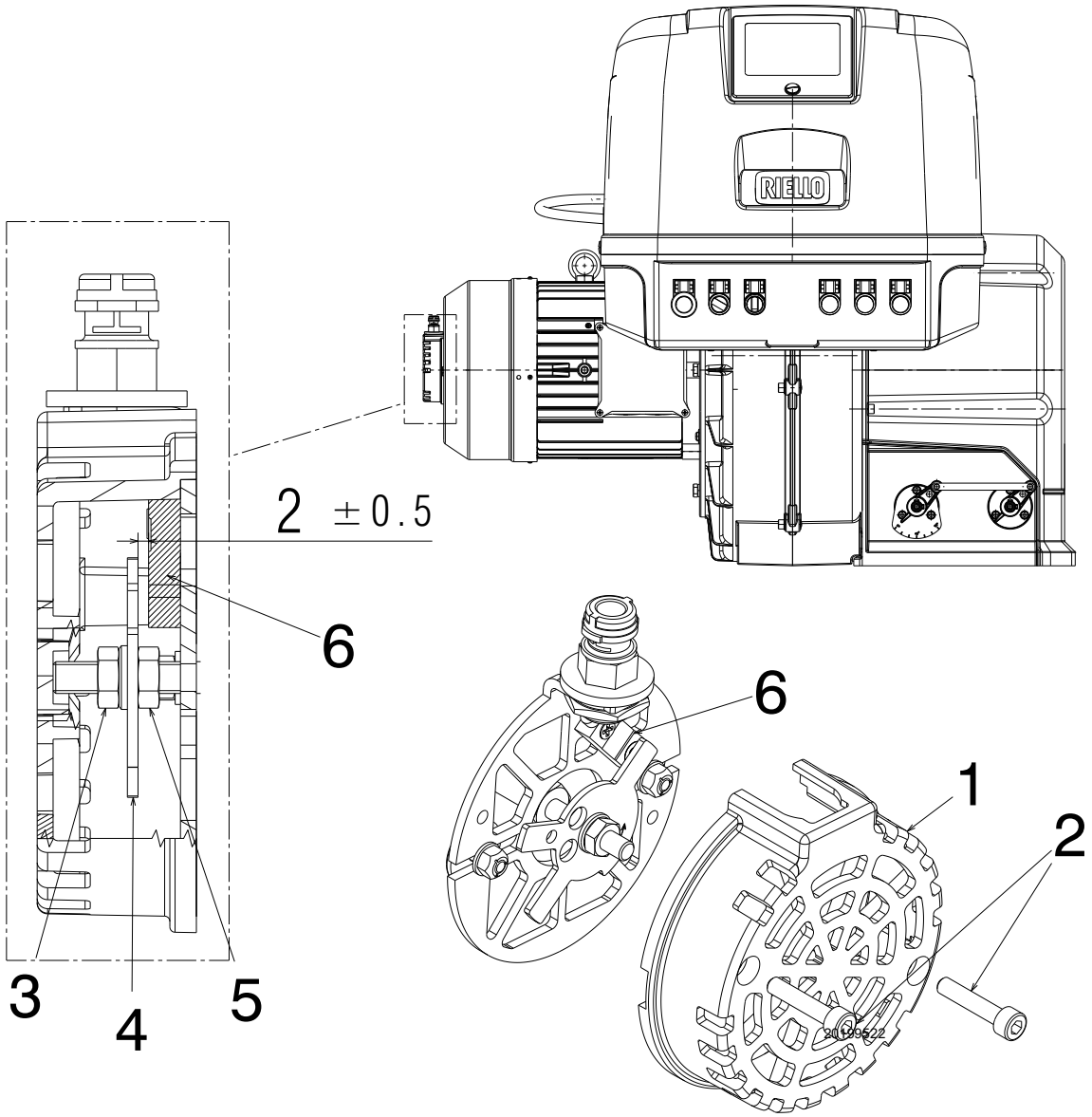


Fig. 59

Key (Fig. 59)

1 Cover
2 Screws for cover fixing
3 Lock nut
4 Rpm detection disc
5 Lower nut
6 Rpm sensor

6.4 Opening the burner



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



Close the fuel interception tap.



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

For the burner opening, see see “Accessibility to the interior of the combustion head” on page 27.

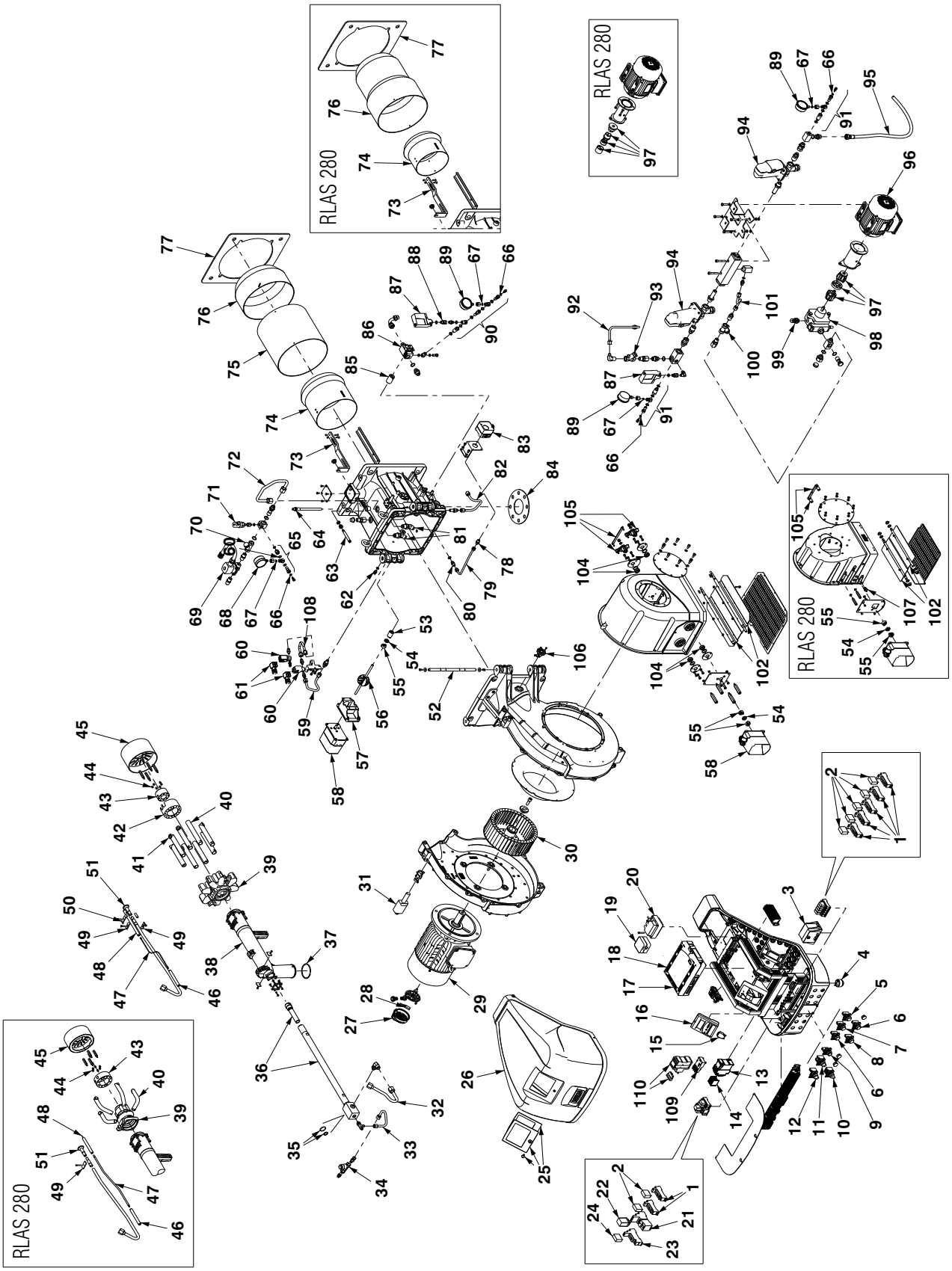
6.5 Closing the burner

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



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

A Appendix - Spare parts



N.	CODE	20207998 RLAS 280/EV 3/230/60	20208001 RLAS 280/EV 3/460/60	20208002 RLAS 280/EV 3/575/60	20208031 RLAS 310/EV 3/460/60	20208032 RLAS 310/EV 3/575/60	20208034 RLAS 410/EV 3/460/60	20208035 RLAS 410/EV 3/575/60	20208037 RLAS 510/EV 3/460/60	20208038 RLAS 510/EV 3/575/60	20208040 RLAS 610/EV 3/460/60	20208041 RLAS 610/EV 3/575/60	DESCRIPTION	*
1	**3012841**	•	•	•	•	•	•	•	•	•	•	•	BASE	
2	**20010969**	•	•	•	•	•	•	•	•	•	•	•	RELAY	C
3	**3013284**	•	•	•	•	•	•	•	•	•	•	•	TRANSFORMER	B
4	**20031413**	•	•	•	•	•	•	•	•	•	•	•	HORN	
5	**20027018**	•	•	•	•	•	•	•	•	•	•	•	RED SIGNAL LIGHT	A
6	**20036017**	•	•	•	•	•	•	•	•	•	•	•	GREEN SIGNAL LIGHT	A
7	**20036019**	•	•	•	•	•	•	•	•	•	•	•	WHITE SIGNAL LIGHT	A
8	**20027020**	•	•	•	•	•	•	•	•	•	•	•	YELLOW SIGNAL LIGHT	A
9	**20010962**	•	•	•	•	•	•	•	•	•	•	•	BUTTON	
10	**20028411**	•	•	•	•	•	•	•	•	•	•	•	SELECTOR SWITCH	
11	**20027422**	•	•	•	•	•	•	•	•	•	•	•	SELECTOR SWITCH	
12	**20027021**	•	•	•	•	•	•	•	•	•	•	•	SELECTOR SWITCH	
13	**20124411**	•	•	•	•	•	•	•	•	•	•	•	CONTACTOR	C
14	**20124632**	•	•	•	•	•	•	•	•	•	•	•	CONTACTS	C
15	**3014113**	•	•	•	•	•	•	•	•	•	•	•	PLUG	
16	**3013283**	•	•	•	•	•	•	•	•	•	•	•	DISPLAY	
17	**20014365**	•	•	•	•	•	•	•	•	•	•	•	ELECTRONIC CAM	C
18	**20013932**	•	•	•	•	•	•	•	•	•	•	•	CONNECTORS ASSEMBLY	B
19	**3012948**	•	•	•	•	•	•	•	•	•	•	•	AIR PRESSURE SWITCH	A
20	**3012956**	•	•	•	•	•	•	•	•	•	•	•	TRANSFORMER	B
21	**20028400**	•	•	•	•	•	•	•	•	•	•	•	BASE	
22	**20030708**	•	•	•	•	•	•	•	•	•	•	•	RELAY	C
23	**20043289**	•	•	•	•	•	•	•	•	•	•	•	BASE	
24	**3020068**	•	•	•	•	•	•	•	•	•	•	•	RELAY	C
25	**20089209**	•	•	•	•	•	•	•	•	•	•	•	VIEWING PORT	
26	**20086561**	•	•	•	•	•	•	•	•	•	•	•	COVER	B
27	**20199582**	•	•	•	•	•	•	•	•	•	•	•	PROTECTION	C
28	**20202970**	•	•	•	•	•	•	•	•	•	•	•	SENSOR	A
29	**20201364**	•	•										MOTOR	C
29	**20207183**			•									MOTOR	C
29	**20013155**				•								MOTOR	C
29	**20042608**					•							MOTOR	C
29	**20013156**						•						MOTOR	C
29	**20124287**							•					MOTOR	C
29	**20124588**								•				MOTOR	C
29	**20124359**									•			MOTOR	C
29	**20207174**										•		MOTOR	C
29	**20207131**											•	MOTOR	C

N.	CODE	20207998 RLAS 280/EV 3/230/60	20208001 RLAS 280/EV 3/460/60	20208002 RLAS 280/EV 3/575/60	20208031 RLAS 310/EV 3/460/60	20208032 RLAS 310/EV 3/575/60	20208034 RLAS 410/EV 3/460/60	20208035 RLAS 410/EV 3/575/60	20208037 RLAS 510/EV 3/460/60	20208038 RLAS 510/EV 3/575/60	20208040 RLAS 610/EV 3/460/60	20208041 RLAS 610/EV 3/575/60	DESCRIPTION	*
30	**20006192**	•	•	•									FAN	C
30	**3003614**				•	•							FAN	C
30	**20124069**						•	•	•	•			FAN	C
30	**3006155**										•	•	FAN	C
31	**3013279**	•	•	•	•	•	•	•	•	•	•	•	IR SENSOR	A
32	**20204935**	•	•	•	•	•	•	•	•	•	•	•	TUBE	C
33	**20204941**	•	•	•	•	•	•	•	•	•	•	•	TUBE	C
34	**20206632**	•	•	•	•	•	•	•	•	•	•	•	NEEDLE VALVE	B
35	**20204942**	•	•	•	•	•	•	•	•	•	•	•	PISTON SEALS	B
36	**20204999**	•	•	•									LANCE	B
36	**20204943**				•	•	•	•	•	•	•	•	LANCE	B
37	**3020191**	•	•	•	•	•	•	•	•	•	•	•	O-RING SEAL	B
38	**20199043**	•	•	•	•	•	•	•	•	•			ELBOW	
38	**20204945**										•	•	ELBOW	
39	**20205000**	•	•	•									GAS DISTRIBUTOR	
39	**20204995**				•	•	•	•	•	•			GAS DISTRIBUTOR	
39	**20109358**										•	•	GAS DISTRIBUTOR	
40	**20205003**	•	•	•									TUBE	C
40	**3013493**				•	•	•	•	•	•			TUBE	C
40	**20074992**										•	•	TUBE	C
41	**20109355**				•	•	•	•	•	•			TUBE	C
41	**20073788**										•	•	TUBE	C
42	**20123941**				•	•	•	•	•	•			AIR DIFFUSER	C
42	**20109349**										•	•	AIR DIFFUSER	C
43	**20123937**	•	•	•									AIR DIFFUSER	C
43	**20204951**				•	•	•	•	•	•	•	•	SPRAY NOZZLE	
44	**20195505**	•	•	•							•	•	NOZZLE	A
44	**20204997**				•	•							NOZZLE	A
44	**20123916**						•	•	•	•			NOZZLE	A
45	**20123947**	•	•	•									DIFFUSER DISC	A
45	**3013548**				•	•	•	•	•	•			DIFFUSER DISC	A
45	**20135065**										•	•	DIFFUSER DISC	A
46	**20013160**	•	•	•	•	•	•	•	•	•	•	•	INSULATOR	A
47	**3013794**	•	•	•									CONNECTION	A
47	**3012722**				•	•	•	•	•	•	•	•	CONNECTION	A
48	**20118164**	•	•	•									ELECTRODE	A
48	**20032433**				•	•	•	•	•	•	•	•	ELECTRODE	A
49	**3012626**	•	•	•									PLATE	
49	**20129610**				•	•	•	•	•	•	•	•	U BOLT	
50	**20138121**				•	•	•	•	•	•			U BOLT	

N.	CODE	20207998 RLAS 280/EV 3/230/60	20208001 RLAS 280/EV 3/460/60	20208002 RLAS 280/EV 3/575/60	20208031 RLAS 310/EV 3/460/60	20208032 RLAS 310/EV 3/575/60	20208034 RLAS 410/EV 3/460/60	20208035 RLAS 410/EV 3/575/60	20208037 RLAS 510/EV 3/460/60	20208038 RLAS 510/EV 3/575/60	20208040 RLAS 610/EV 3/460/60	20208041 RLAS 610/EV 3/575/60	DESCRIPTION	*
51	**20129663**	•	•	•	•	•	•	•	•	•	•	•	PILOT DIFFUSER	C
52	**20073807**	•	•	•	•	•	•	•	•	•	•	•	HINGE	
53	**20204955**	•	•	•	•	•	•	•	•	•	•	•	COUPLING	A
54	**3013938**	•	•	•									DISC	A
54	**20090029**				•	•	•	•	•	•	•	•	DISC	A
55	**3013937**	•	•	•	•	•	•	•	•	•	•	•	HUB	
56	**20075918**	•	•	•	•	•	•	•	•	•	•	•	GAS REGULATOR	C
57	**20097084**	•	•	•	•	•	•	•	•	•	•	•	SUPPORT	
58	**3013253**	•	•	•	•	•	•	•	•	•	•	•	SERVOMOTOR	B
59	**20204961**	•	•	•	•	•	•	•	•	•	•	•	PIPE	
60	**20202926**	•	•	•	•	•	•	•	•	•	•	•	SOLENOID VALVE	B
61	**3006954**	•	•	•	•	•	•	•	•	•	•	•	SOCKET	C
62	**3005447**	•	•	•	•	•	•	•	•	•	•	•	TEST POINT	
63	**20075916**	•	•	•	•	•	•	•	•	•	•	•	SCREW	
64	**20052434**	•	•	•	•	•	•	•	•	•	•	•	PRESSURE GAUGE	
65	**20144627**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	C
66	**3007169**	•	•	•	•	•	•	•	•	•	•	•	O-RING	B
67	**20124923**	•	•	•	•	•	•	•	•	•	•	•	O-RING	B
68	**20157479**	•	•	•	•	•	•	•	•	•	•	•	PRESSURE GAUGE	
69	**20157488**	•	•	•	•	•	•	•	•	•	•	•	NEEDLE VALVE	B
70	**20023125**	•	•	•	•	•	•	•	•	•	•	•	NON-RETURN VALVE	B
71	**20157475**	•	•	•	•	•	•	•	•	•	•	•	PRESSURE SWITCH	B
72	**20204962**	•	•	•	•	•	•	•	•	•	•	•	AIR PIPE	
73	**20075043**	•	•	•									SQUARE	
73	**20073784**				•	•	•	•	•	•			SQUARE	
73	**20109250**										•	•	SHUTTER	C
74	**20075041**	•	•	•									SHUTTER	C
74	**20073783**				•	•							SHUTTER	C
74	**20074988**						•	•	•	•			SHUTTER	C
74	**20141201**										•	•	SHUTTER	C
75	**20073781**				•	•	•	•	•	•			CYLINDER	C
75	**20075118**										•	•	CYLINDER	C
76	**20075037**	•	•	•									CYLINDER	C
76	**3013314**				•	•	•	•	•	•			CYLINDER	C
76	**20109247**										•	•	CYLINDER	C
77	**3013328**	•	•	•	•	•	•	•	•	•	•	•	GASKET	A
78	**20144594**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	C
79	**20096543**	•	•	•	•	•	•	•	•	•	•	•	TUBE	
80	**3006723**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	C
81	**20033240**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	C

N.	CODE	20207998 RLAS 280/EV 3/230/60	20208001 RLAS 280/EV 3/460/60	20208002 RLAS 280/EV 3/575/60	20208031 RLAS 310/EV 3/460/60	20208032 RLAS 310/EV 3/575/60	20208034 RLAS 410/EV 3/460/60	20208035 RLAS 410/EV 3/575/60	20208037 RLAS 510/EV 3/460/60	20208038 RLAS 510/EV 3/575/60	20208040 RLAS 610/EV 3/460/60	20208041 RLAS 610/EV 3/575/60	DESCRIPTION	*
82	**20204964**	•	•	•	•	•	•	•	•	•	•	•	PIPE	
83	**20014103**	•	•	•	•	•	•	•	•	•	•	•	GAS PRESSURE SWITCH	A
84	**20202927**	•	•	•	•	•	•	•	•	•	•	•	SEAL	B
85	**20204966**	•	•	•	•	•	•	•	•	•	•	•	COUPLING	A
86	**20202931**	•	•	•	•	•	•	•	•	•	•	•	MODULATOR	B
87	**3012384**	•	•	•	•	•	•	•	•	•	•	•	OIL PRESSURE SWITCH	A
88	**3013462**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	C
89	**3006140**	•	•	•	•	•	•	•	•	•	•	•	PRESSURE GAUGE	
90	**20204984**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	C
91	**20204990**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	C
92	**20205006**	•	•	•									TUBE	C
92	**20204991**				•	•	•	•	•	•	•	•	TUBE	C
93	**20029233**	•	•	•	•	•	•	•	•	•	•	•	OIL FILTER	B
94	**20029212**	•	•	•	•	•	•	•	•	•	•	•	SAFETY VALVE	C
95	**3012857**	•	•	•	•	•	•	•	•	•	•	•	HOSE	A
96	**20031015**	•	•		•		•		•		•		MOTOR	C
96	**20062588**			•		•		•		•		•	MOTOR	C
97	**20205008**	•	•	•									DRIVE COUPLING	A
97	**20041421**				•	•	•	•	•	•	•	•	DRIVE COUPLING	A
98	**3006369**	•	•	•									PUMP	C
98	**3006158**				•	•	•	•	•	•	•	•	PUMP	C
99	**3003225**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	C
100	**20029257**	•	•	•	•	•	•	•	•	•	•	•	NON-RETURN VALVE	B
101	**20205011**	•	•	•									TUBE	C
101	**20204993**				•	•	•	•	•	•	•	•	TUBE	C
102	**20205016**	•	•	•									AIR DAMPER	
102	**20144750**				•	•	•	•	•	•	•	•	AIR DAMPER	
104	**3012795**				•	•	•	•	•	•	•	•	BEARING	
105	**20205018**	•	•	•									LIFTING ASSEMBLY	
105	**20133154**				•	•	•	•	•	•	•	•	LIFTING ASSEMBLY	
106	**3013933**	•	•	•	•	•	•	•	•	•	•	•	INSPECTION WINDOW	
107	**3012088**	•	•	•									CONNECTOR	C
108	**20206640**	•	•	•	•	•	•	•	•	•	•	•	TUBE	C
109	**20189400**	•	•	•	•	•	•	•	•	•	•	•	CONNECTOR	
110	**20209618**	•											AUTOMATIC SWITCH	
110	**20209620**		•	•	•	•	•	•	•	•	•	•	AUTOMATIC SWITCH	

*

ADVISED PARTS

A = Spare parts for minimum fittings
A+B = Spare parts for basic safety fittings
A+B+C = Spare parts for extended safety fittings

B Appendix - Accessories

LPG kit

Burner	Code
RLAS 280/EV (FGR prepared)	20121154
RLAS 310/EV (FGR prepared)	20205385
RLAS 410/EV (FGR prepared)	20205384
RLAS 510/EV (FGR prepared)	
RLAS 610/EV (FGR prepared)	20204649

Gas train according to UL Standards



WARNING

The installer is responsible for the supply and installation of any required safety device(s) not indicated in this manual.

C Appendix - Burner start up report

Model number:		Serial number:	
Project name:		Start-up date:	
Installing contractor:		Phone number:	

GAS OPERATION

Gas Supply Pressure:		CO_2: Low Fire		High Fire	
Main Power Supply:		O_2: Low Fire		High Fire	
Control Power Supply:		CO: Low Fire		High Fire	
Burner Firing Rate:		NO_X: Low Fire		High Fire	
Manifold Pressure:		Net Stack Temp - Low Fire:		High Fire	
Pilot Flame Signal:		Comb. Efficiency - Low Fire:		High Fire	
Low Fire Flame Signal:		Overfire Draft:			
High Fire Flame Signal:					

OIL OPERATION

Oil supply pressure:		CO_2: Low Fire		High Fire	
Oil suction pressure:		O_2: Low Fire		High Fire	
Control Power Supply:		CO: Low Fire		High Fire	
Burner Firing Rate:		NO_X: Low Fire		High Fire	
Low Fire Flame Signal:		Net Stack Temp - Low Fire:		High Fire	
High Fire Flame Signal:		Comb. Efficiency - Low Fire:		High Fire	
Low Fire Nozzle Size:		Overfire Draft:			
High Fire Nozzle Size:		Smoke number:			

CONTROL SETTINGS

Operating Setpoint:		Low Oil Pressure:	
High Limit Setpoint:		High Oil Pressure:	
Low Gas Pressure:		Flame Safeguard Model Number:	
High Gas Pressure:		Modulating Signal Type:	

NOTES

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Subject to modifications