

Premix gas burners

Modulating operation



CODE	MODEL
20092672 - 20092651	RX 700 S/PV
20092611 - 20092613	RX 850 S/PV
20082125	RX 1000 S/PV



Original instructions

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1 Information and general warnings

1.1 Information about the instruction manual

1.1.1 Introduction



WARNING

Read these instructions and save for reference!
These installation and operating instructions form part of the unit and must be kept in good and legible conditions on site at all times.

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.



DANGER

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



WARNING

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



CAUTION

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

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 date of installation;

.....

- 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.

1.2.1 Owner's responsibility

Please pay attention to the Safety Warnings contained within this instruction manual. Keep this manual for your records and provide it to your qualified service agency for use in professionally setting up and maintaining your burner.

Your burner will provide years of efficient operation if it is professionally installed and maintained by a qualified service technician. If at any time the burner does not appear to be operating properly, immediately contact your qualified service agency for consultation.

We recommend annual inspection/service of your gas heating system by a qualified service agency.

Failure to follow these instructions, misuse, or incorrect adjustment of the burner could lead to equipment malfunction and result in asphyxiation, explosion or fire.



WARNING

If you smell gas:

- Do not touch any electrical items.
- Open all windows.
- Close all gas supply valves.
- Contact your local gas authority immediately.
- Do not store flammable or hazardous materials in the vicinity of fuel burning appliances.
- Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or death.
- Refer to this manual for instructional or additional information.
- Consult a certified installer, service representative or the gas supplier for further assistance.
- Burner shall be installed in accordance with manufacturers requirements as outlined in this manual, local codes and authorities having jurisdiction.



WARNING

CANADA: The equipment shall be installed in accordance with the Provincial Installation Requirements, or in their absence, the CAN/CGA B149.1 & B149.2 Installation Codes shall prevail. Authorities having jurisdiction should be consulted before installation is made.

USA: This burner must conform with local codes, or, in the absence of local codes, with the Standard: National Fuel Gas Code NFPA 54/ANSI Z223.1 or International Fuel Gas Code, as appropriate.

If an external electrical source is utilized, the conversion burner, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the national Electrical Code, ANSI/NFPA No. 70-1990 and CSA Electrical Code C22.2 No.0 M1982 & C22.2 No 3. 1988. **Authorities having jurisdiction should be consulted before installations are made. The owner is required to retain this manual for future reference.**

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 Technical data

Model		RX 700 S/PV		RX 850 S/PV		RX 1000 S/PV	
Output ⁽¹⁾ Delivery ⁽¹⁾	max.	MBtu/hr kW	2700 781	3250 940	4535 1330		
	min.	MBtu/hr kW	450 132	565 165	800 235		
Fuel	type	Natural gas	Propane	Natural gas	Propane	Natural gas	Propane
- Max. delivery	SCFH	2700	1080	3250	1300	4535	1814
- Gas head pressure at max. delivery ⁽²⁾	"wc	- 0.45	- 0.29	- 0.91	- 0.63	- 1.9	- 0.96
- Supply pressure	"wc	7 - 14	7 - 14	7 - 14	7 - 14	7 - 14	7 - 14
Operation		Modulating					
Standard applications		Boilers: water, steam, thermal oil					
Ambient temperature	°F	32 - 104 (0 - 40 °C)					
Combustion air temperature	°F max	140 (60 °C)					

Tab. A

- (1) Reference conditions: ambient temperature 68 °F (20°C) - Barometric pressure 394" WC - Altitude 329 ft.
 (2) Pressure at test point 6)(Fig. 9 at page 11) with zero pressure in the combustion chamber and maximum burner output.

3.2 Electrical data

Model		RX 700-850 S/PV		RX 700-850 S/PV		RX 1000 S/PV	
Control circuit power supply	V/Ph/Hz	120/1/60					
Main power supply (+/- 10%)	V/Ph/Hz	120/1/60		208-240/1/60		460/3/60	
Fan motor	rpm	4800		4800		6100	
	V	115 (100...130)		230 (208...240)		400(380...480)	
	W	1200		1150		2400	
	HP	1.61		1.54		3.22	
	A	13		5.7		4.0	
Ignition transformer	V1 - V2 I1 - I2	120 V - 2x12 kV 0.51 A - 30 mA					
Electrical power consumption	W	1200		1150		2400	
Electrical control circuit consumption	W max	750		750		750	
Total electrical consumption	W	1950		1900		3150	
Electrical protection		NEMA 1					

Tab. B

3.3 Burner models designation

Model	Code	Voltage	Fan motor starting	Flame safeguard
RX 700 S/PV	20092672	120/1/60	Direct	Burner mounted
	20092651	208-240/1/60		
RX 850 S/PV	20092611	120/1/60	Direct	Burner mounted
	20092613	208-240/1/60		
RX 1000 S/PV	20082125	460/3/60	Direct	Burner mounted

Tab. C

3.4 Packaging - weight - Approximate measurements

The packaging of the burner (Fig. 1) rests on a wooden platform that is particularly suitable for lift trucks. The overall dimensions of the packaging are shown in the Tab. D.

The weight of the burner complete with its packaging is shown in Tab. D.

inch	A	B	C	lbs
All models	55 1/8"	22 13/16"	27 3/8"	220

Tab. D

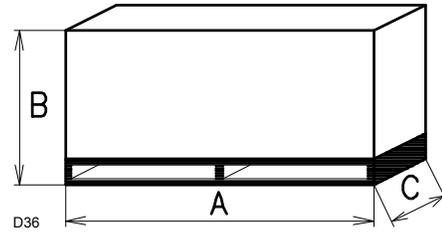


Fig. 1

3.5 Burner dimensions

The maximum dimensions of the burner are given in Fig. 2.

Bear in mind that, in order to inspect the combustion head, the burner must be pulled back.

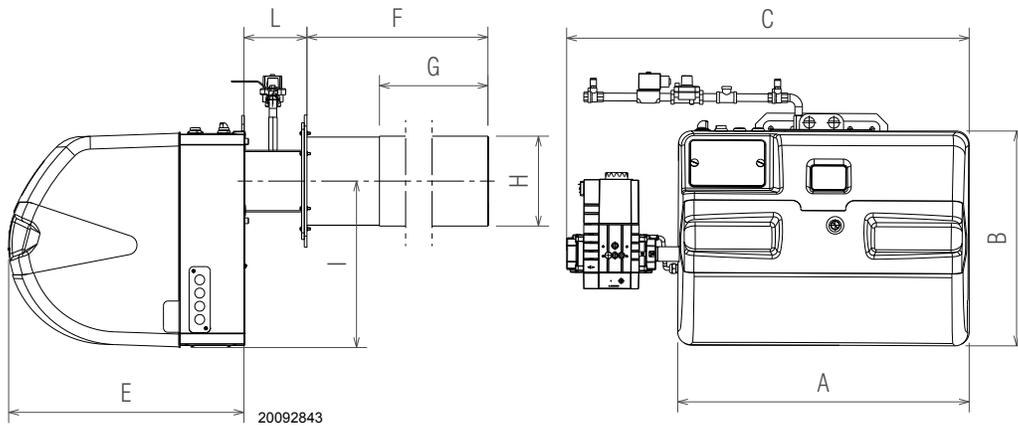


Fig. 2

inch	A	B	E	F	G	H	I	L
RX 700 S/PV	26 1/32"	19 7/32"	21 3/32"	21 19/64"	14 3/16"	8 1/32"	14 27/32"	5 5/16"
RX 850 S/PV	26 1/32"	19 7/32"	21 3/32"	25 31/32"	18 7/8"	8 1/32"	14 27/32"	5 5/16"
RX 1000 S/PV	26 1/32"	19 7/32"	21 3/32"	25 31/32"	18 7/8"	8 1/32"	14 27/32"	5 5/16"

Tab. E

3.6 Firing rates

During operation, burner output varies between:

- a **MAXIMUM OUTPUT**, which must not be greater than the maximum limit given on the diagram,
- and a **MINIMUM OUTPUT**, which must not be lower than the minimum limit in the diagram.



The firing rate value range has been obtained considering an ambient temperature of 68 °F (20 °C), and an atmospheric pressure of 394" WC.

NOx expected emissions on natural gas (expressed in ppm@3% O₂)

Riello Burners	Sub 30		Sub 20		Sub 9	
	CO ₂ (%)	O ₂ (%)	CO ₂ (%)	O ₂ (%)	CO ₂ (%)	O ₂ (%)
All models	8.5 ~ 8.75	5.8 ~ 5.4	8.0 ~ 8.5	6.7 ~ 5.8	7.25 ~ 7.75	8.0 ~ 7.1

Tab. F

RX 700 S/PV

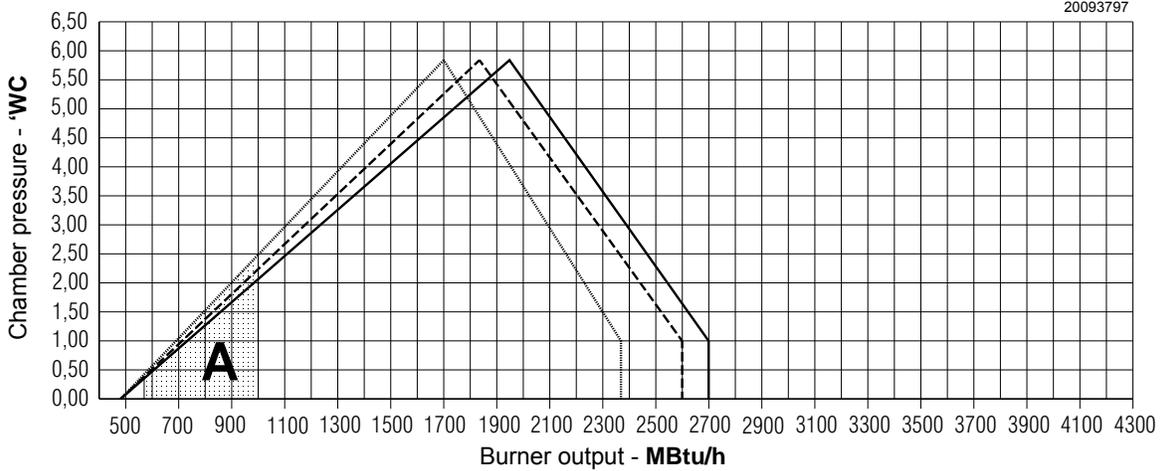


Fig. 3

RX 850 S/PV

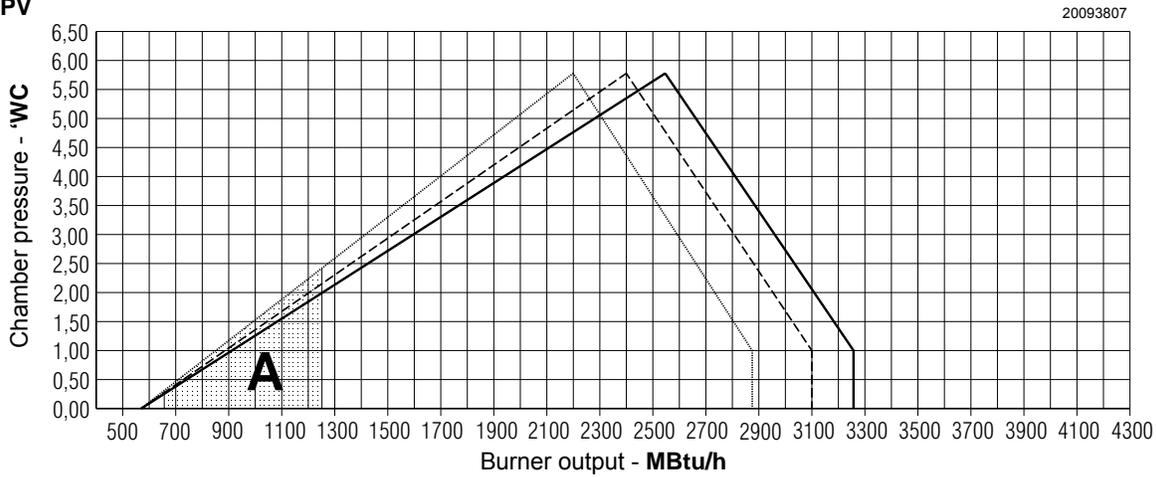


Fig. 4

RX 1000 S/PV

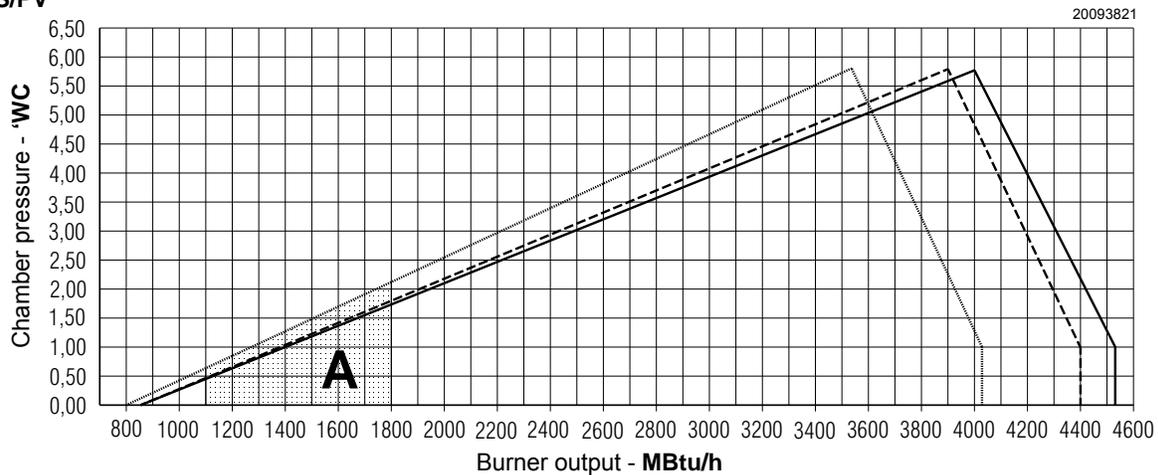


Fig. 5

Key to lay-out

—————	NOX < 30 ppm
- - - - -	NOX < 20 ppm
.....	NOX < 9 ppm
- . - . - .	Ignition

Tab. G

3.7 Output supplied

The diagrams allow you to establish the power output either using the number of revolutions of the fan or using the pressure measured at the pressure test point downstream of the gas valve P2)(Fig. 22 on page 25).

Example RX 700 S/PV:

- natural gas G20 PCS 1010 Btu/ft³
- pressure on point 1 = - 5 "wc (2nd chart)
- burnt output corresponds to 2000 MBtu/h

Going vertically up the 1st diagram, to intersect the dotted line, you can estimate the value of the number of revs on the left hand y-axis: in this case 3600 rpm.

For an exact reading of the number of revs there is a kit for interfacing with the control box.

NOTE:

The values indicated in the diagrams are indicative for a setting in principle.

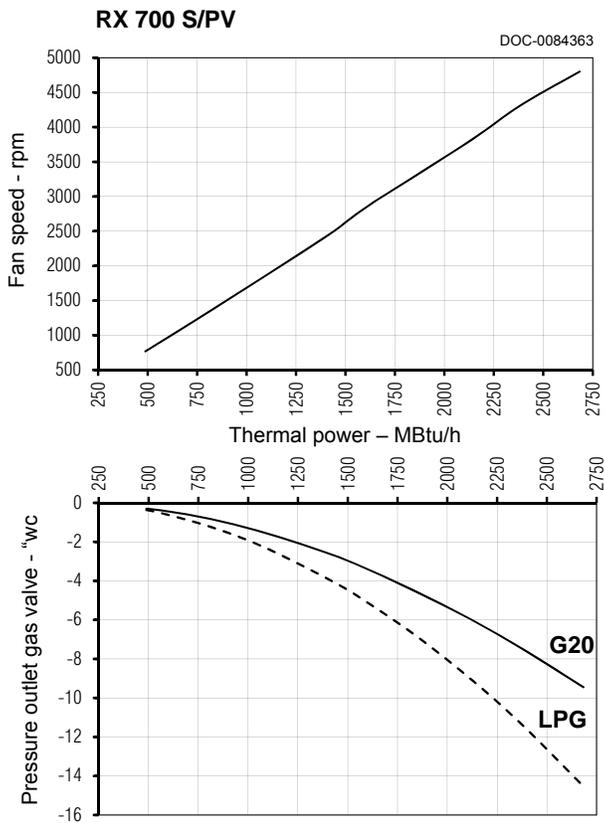


Fig. 6

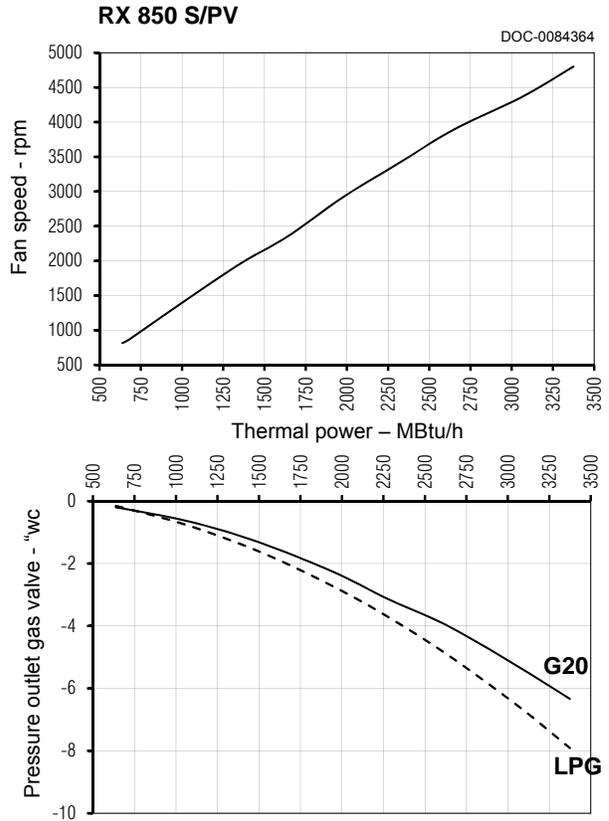


Fig. 7

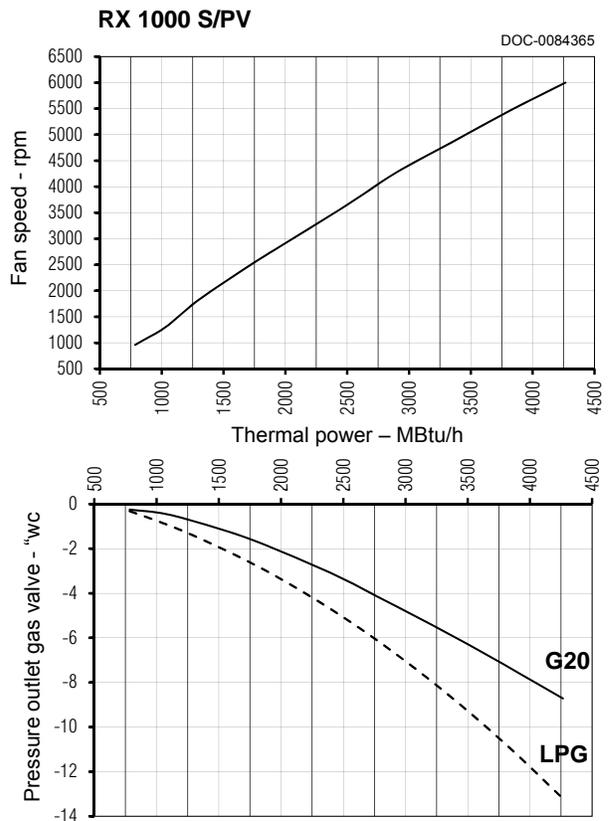


Fig. 8

3.8 Burner description

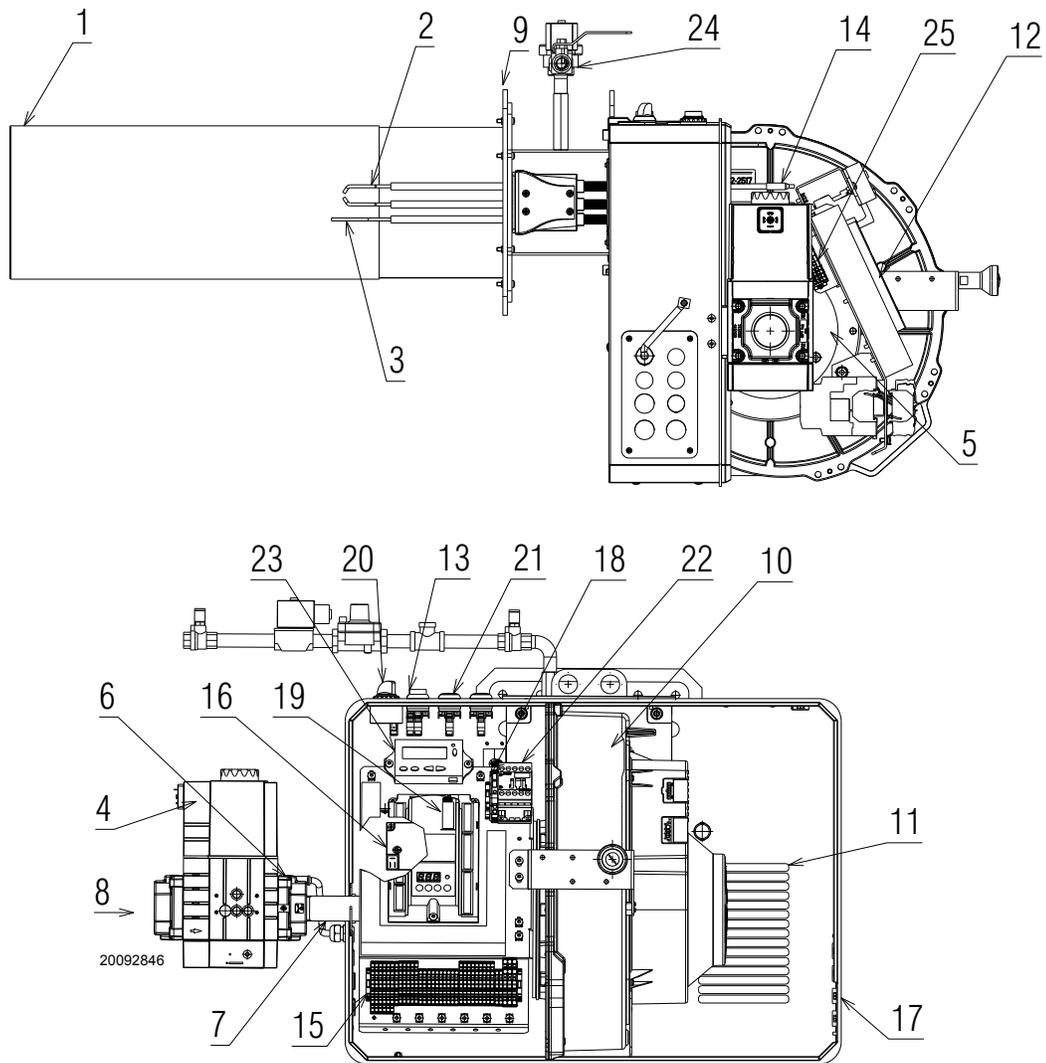


Fig. 9

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Combustion head 2 Ignition electrode 3 Flame sensor probe 4 Gas valve 5 Air/gas mixer in the suction line circuit 6 Gas pressure test point 7 Gas valve conduit - Venturi 8 Gas input 9 Boiler fixing flange 10 Fan 11 Air passage in fan 12 Control box with lockout pilot light 13 Reset button 14 Plug-socket on ionization probe cable 15 Burner terminal strip "X1" 16 Transformer 17 Plate with four hole knock-outs for electrical cable routing 18 Fuse 19 Program module 20 Safety shut off valve 21 Light signalling of mains live state 22 Fan/output relay | <ul style="list-style-type: none"> 23 Display 24 Pilot assembly 25 Burner terminal strip "X2" |
|---|--|

Burner lockout may occur:

- **control box lockout**
If the push-button 13)(Fig. 9) lights up, it indicates that the burner is in lockout. Press the push button to reset.

3.9 Burner equipment

Gas tube + connector	No. 1
Insulating gasket	No. 1
Instruction booklet	No. 1
Compensation tube	No. 1
Label (only for LPG operation)	No. 1
Hardware for burner assembly:	
M10x50 stainless steel nuts (with or without point)	No. 4
M10x16 zinc-plated washers	No. 4
M10 zinc-plated serrated washers	No. 4
M10 zinc-plated nuts	No. 4

**WARNING**

The equipment shall be installed in accordance with the Provincial Installation Requirements, or in their absence, the CGA B149.1 and B149.2 Installation Codes shall prevail. Authorities having jurisdiction should be consulted before installations are made. The owner is required to retain this manual for future reference.

3.10 Burner controls (LME71...)

Warning notes



WARNING

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

The LME71... are safety devices! Do not open, interfere with or modify the unit.

Riello S.p.A. does not assume responsibility for damage resulting from unauthorized interference! Additional safety notes contained in other chapters of this document must be observed as well!



WARNING

Only qualified personnel are allowed to install and operate the equipment.

Qualified personnel in the context of the safety-related notes contained in this document are persons who are authorized to commission, ground and tag devices, systems and electrical circuits in compliance with established safety practices and standards.

- All activities (mounting, installation and service work, etc.) must be performed by qualified personnel.
- Before making any wiring changes in the connection area, completely isolate the plant from mains supply (all-polar disconnection). Ensure that the plant cannot be inadvertently switched on again and that it is indeed dead. If not observed, there is a risk of electric shock hazard.
- Ensure protection against electric shock hazard by providing adequate protection for the burner control's connection terminals (e. g. with dummy plugs for inputs and outputs not used). If not observed, there is a risk of electric shock hazard.
- The space where the program module (Fig. 11) is located is defined as plugging space and therefore back-off-hand-proof when the program module is not fitted.
- If the housing or the area near the operating panel is damaged, the unit must immediately be put out of operation. If not observed, there is a risk of electric shock hazard.
- Press the buttons on the operating panel only manually without using any tools or pointed objects. If the film of the operating panel is damaged, there is a risk of electric shock hazard.

To ensure safety and reliability of the LME71... system, the following points must also be observed:

- condensation and ingress of humidity must be avoided. Should such conditions occur, make sure that the unit will be completely dry before switching on again! If not observed, there will be a risk of electric shock.
- Static charges must be avoided since they can damage the unit's electronic components when touched.



WARNING

Condensation, formation of ice and ingress of water are not permitted!

If not observed, there is a risk of impairment of safety functions and of electric shock hazard.



S8593

Fig. 10

Program module



S8673

Fig. 11

Mounting notes

- Ensure that the relevant national safety regulations are complied with
- The LME7... basic unit must be secured with fixing screws M4 (UNC32) or M5 (UNC24), observing a maximum tightening torque of 1.8 Nm and using all 3 fixing points. The additional mounting surfaces on the housing are provided to improve mechanical stability. These must fully rest on the mounting surface to which the unit is secured. The flatness of that mounting surface must be within a tolerance band of 0.3 mm.

Installation notes

- Always run the high-voltage ignition cable separate from the unit and other cables while observing the greatest possible distance.
- Do not mix up live and neutral conductors.
- Install switches, fuses and earthing in compliance with local regulations.
- The connection diagrams show the burner controls with earthed neutral conductor.
- Make certain that the maximum permissible current rating of the connection terminals is not exceeded.
- Make certain that strain relief of the connected cables is in compliance with the relevant standards.
- Do not feed external mains voltage to the control outputs of the unit. When testing the devices controlled by the burner control (fuel valves, etc.), the LME71... must not be connected to the units.
- The mechanical coupling between the actuators and the controlling elements for fuel and air, or any other controlling elements, must be rigid.
- Check the connecting lines of the air pressure switch for short-circuits.

Electrical connection of flame detectors

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

- Never run the detector cable together with other cables:
 - line capacitance reduces the magnitude of the flame signal;
 - use a separate cable.
- Observe the permissible detector cable lengths (see Technical Data).
- The mains-powered ionization probe is not protected against electric shock hazard.
- Locate the ignition electrode and the ionization probe such that the ignition spark cannot arc over to the ionization probe (risk of electrical overloads) and that it cannot adversely affect the supervision of ionization.

Description of display and buttons

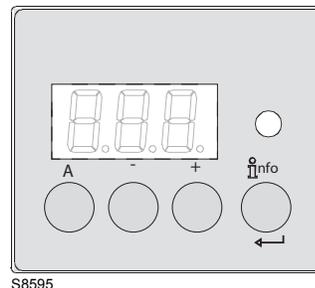
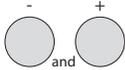


Fig. 12

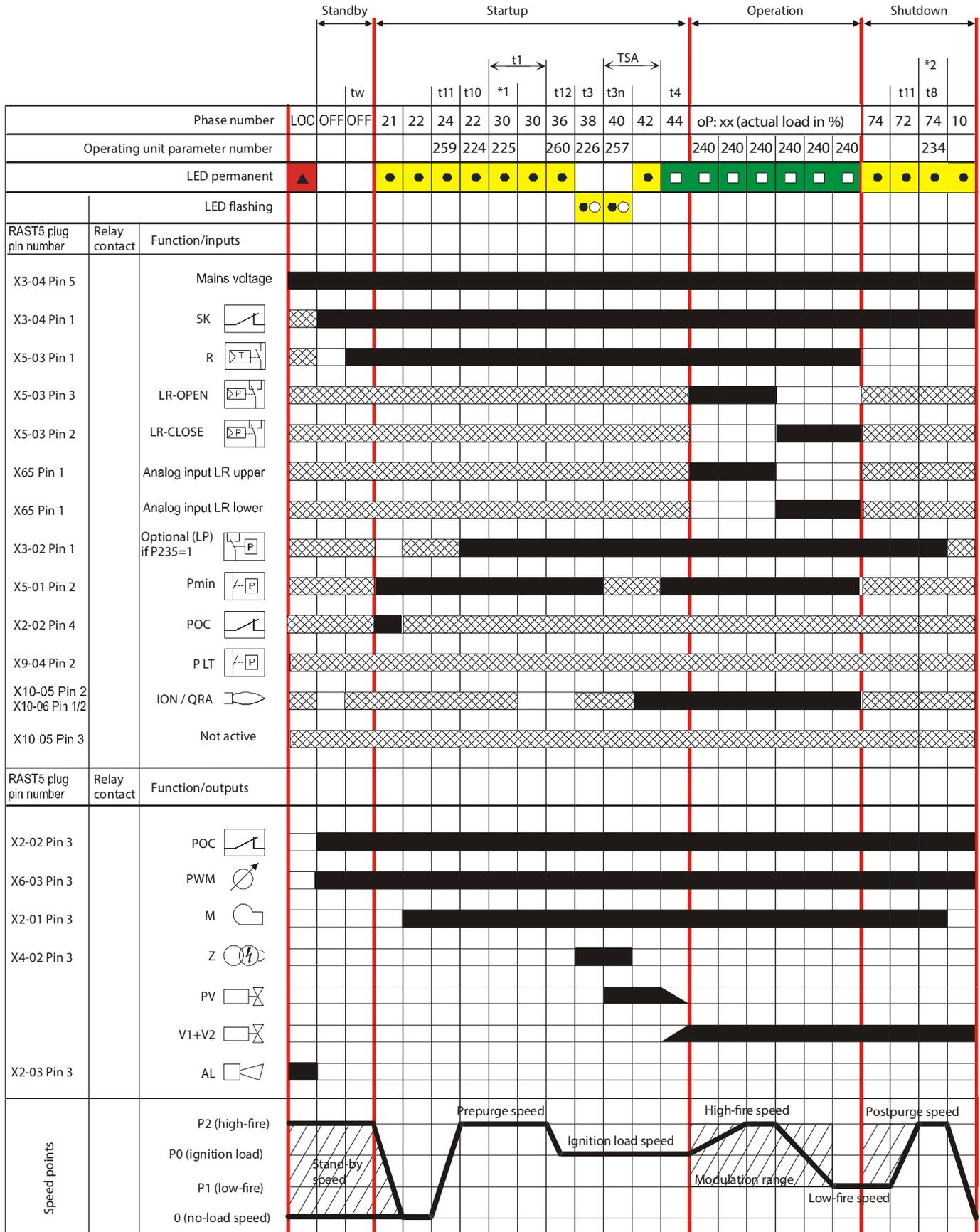
Button	Function
	Button A <ul style="list-style-type: none"> – Display preset output – In lockout position: power value to the time of fault
	Info and Enter Button The lockout reset button (info button) is the key operating element for resetting the burner control and for activating/deactivating the diagnostics functions.
	- Button <ul style="list-style-type: none"> – Display flame signal current 2 or phases display – In lockout position: MMI phase to the time of fault
	+ Button <ul style="list-style-type: none"> – Display flame signal current 1 or phases display – In lockout position: MMI phase to the time of fault
	3 multicolour signal lamp The multicolour signal lamp (red - yellow - green) is the key indicating element for visual diagnostics.
	+ and - Button: escape function Press + and - button simultaneously! <ul style="list-style-type: none"> – No adoption of value – One menu level up – Keep depressed for >1second for backup/re-store function

Tab. H

Technical data

LME71... burner controls	Mains voltage	AC 120 V
	Mains frequency	50 / 60 Hz
	Power consumption	<10 W, typical
	External primary fuse	Max. 6.3 A (slow)
	Safety class	I with parts according to II and III to DIN EN 60730-1
Terminal rating “Inputs”	Under voltage	UMains 120 V
	• Safety shutdown from the operating position takes place should mains voltage drop	< AC 75 V
	• Restart is initiated when mains voltage exceeds	> AC 100 V
	Input currents and input voltages	
	– UeMax	UN +10%
	– UeMin	UN -15%
	– IeMax	1.5 mA peak (peak value)
	– IeMin	0.8 mA peak (peak value)
	Voltage detection	
	– ON	> AC 60 V
– OFF	< AC 40 V	
Terminal rating “Outputs”	Total contact loading:	
	Rated voltage	AC 120 V - 50/60 Hz
	Unit input current X3-04 (safety loop) from:	Max. 5 A
	– fan motor contactor	
	– ignition transformer	
	– fuel valves	
	Individual contact loading:	
	Fan motor contactor X2-01 pin 3	
	– Rated voltage	AC 120 V 50/60 Hz
	– Rated current	2 A (15A max. 0.5 s)
	– Power factor	Cosφ ≥ 0.4
	Alarm output X2-03/3	
	– Rated voltage	AC 120 V 50/60 Hz
	– Rated current	1 A
	– Power factor	Cosφ > 0.6
	Ignition transformer X4-02 pin 3	
	– Rated voltage	AC 120 V 50/60 Hz
	– Rated current	2 A
	– Power factor	Cosφ > 0.4
	Auxiliary output	
	– Rated voltage	AC 120 V 50/60 Hz
	– Rated current	1 A
	– Power factor	Cosφ > 0.6
	Output relay contact 2 pin 2 X2-09 pin 7	
	– Rated voltage	AC 120 V 50/60 Hz
	– Rated current	1 A
	– Power factor	Cosφ > 0.4
Fuel valves/pilot valve X7-01 pin 3		
– Rated voltage	AC 120 V 50/60 Hz	
– Rated current	1 A	
– Power factor	Cosφ > 0.4	
Safety valve X6-03 pin 3		
– Rated voltage	AC 120 V 50/60 Hz	
– Rated current	1.5 A	
– Power factor	Cosφ > 0.6	
Cable lengths	Mains supply line	Max. 100 m (100 pF/m)
Cross-sectional areas	The cross-sectional areas of the mains power lines (L, N, and PE) and, if required, the safety loop (safety limit thermostat, water shortage, etc.) must be sized for rated currents according to the selected external primary fuse. The cross-sectional areas of the other cables must be sized in accordance with the internal unit fuse (max. 6.3 AT).	
Environmental conditions	Operation	DIN EN 60721-3-3
	Climatic conditions	Class 3K3
	Mechanical conditions	Class 3M2
	Temperature range	-40...+60 °C
	Humidity	<95% r.h.

Program sequence



S9220

Fig. 13

Key to lay-out (Fig. 13):

AL	Alarm device
AUX	Auxiliary output
Dbr	Wire link
 (EK1)	Lockout reset button (info button)
EK2	Remote lockout reset button
FSV	Flame signal amplifier
ION	Ionization probe
K...	Relay contact
LED	3-colour signal lamp
LP	Air pressure switch
LR	Load controller
LR-OPEN	Load controller open position
LR-CLOSE	Load controller closed position
M	Fan motor
NT	Power supply unit
P LT	Pressure switch valve proving
Pmax	Max pressure switch
Pmin	Min. pressure switch
POC	Proof of closure
PV	Pilot valve
QRA...	UV flame detector
R	Control thermostat or pressurestat
SA	Actuator
SA-KL	Actuator low-fire
SA-NL	Actuator high-fire
SA-R	Actuator feedback
SA-Z	Actuator closed
SA-ZL	Actuator ignition load
SL	Safety loop
STB	Safety limit thermostat
SV	Safety valve
V1	Fuel valve
V2	Fuel valve
PV	Pilot valve
W	Limit thermostat or pressure switch
Z	Ignition transformer
µC	µC controller
	Input/output signal 1 (ON)
	Input/output signal 2 (OFF)
	Input permissible signal 1 (ON) or 0 (OFF)

Tab. J

Times

TSA	Safety time
tw	Waiting time
t1	Pre-purge time
t3	Pre-ignition time
t3n	Post-ignition time (P257 +0.3 seconds)
Ignition time	6s pilot valve ON - fuel valve OFF 6÷12s pilot valve ON - fuel valve ON >12s pilot valve OFF - fuel valve ON
t4	Interval: end of safety time load controller release
t8	Post-purge time
t10	Specified time air pressure switch state message (time out)
t11	Opening time of actuator (time out)
t12	Closing time of actuator (time out)

Tab. K

Key to phases (Fig. 13 on page 16):

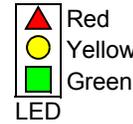
Phase	Function
LOC	Lockout shut down phase
OFF	Standby, waiting for heat request
oP	Part 1: request load controller OPEN Part 2: modulation of fan motor speed toward high-fire Part 3: high-fire reached Part 4: request load controller CLOSED Part 5: modulation of fan motor speed toward low-fire Part 6: low-fired reached
10	Settling time, fan motor standby speed
21	Safety valve ON, air pressure switch in no-load position Check if POC is closed, fan motor speed is reduced to 0
22	Part 1: fan motor ON Part 2: specified time air pressure switch Message (time-out), stabilization of air pressure switch
24	Settling time, fan motor pre-purge speed
30	Part 1: pre-purge time without flame simulation test Part 2: pre-purge time with flame simulation test (2.1 seconds)
36	Speed settling time, fan motor ignition load speed
38	Pre-ignition time
40	Post-ignition time, parameter 257 + 0.3 seconds
42	Flame detection
44	Interval: end of ignition safety time and release of load controller
72	Speed stabilization time, fan motor post-purge speed
74	Part 1: operation is ended, check if post-purging is programmed Part 2: post-purge time
90	Min. pressure switch open --> safety shut down
*1	Valve proving, if P241 = 1 after main ON, lockout or P234 (post-purge time) = 0 second
*2	Valve proving, if P241 = 1 and P234 (post-purge time) >0 second

Tab. L

3.10.1 Indication of diagnostics mode



The lockout reset button (info button) is the key operating element for resetting the burner control and for activating/deactivating the diagnostics functions.



The multicolour signal lamp is the key indicating element for visual diagnostics.

Both lockout reset button and signal lamp are located in the control panel.

There are 2 diagnostics choices:

- 1 Visual diagnostics: Indication of operating state or diagnostics of cause of fault
- 2 Diagnostics: Via BCI to AZL2... display and operating unit

Visual diagnostics:

in normal operation, the different operating states are indicated in the form of colour codes according to the colour code table given below (Tab. M).

Indication of operating state

During start up, state indication takes place according to the Tab. M:

Colour code table for multicolour signal lamp

State	Colour code	Colour
Waiting time, other waiting states	○.....	OFF
Ignition phase, ignition controlled	●○●○●○●○	Blinking yellow
Operation, flame o.k.	■.....	Green
Operation, flame not o.k.	■○■○■○■○	Blinking green
Extraneous light on burner start up	■▲■▲■▲■▲	Green - Red
Under voltage	●▲●▲●▲●▲	Yellow - Red
Fault, alarm	▲.....	Red
Error code output (see Tab. V on page 64)	▲○▲○▲○▲○	Blinking red
Interface diagnostics	▲▲▲▲▲▲▲▲	Red flicker light
Heating request	●.....	Yellow
New program card	●●▲●●▲●●	Yellow Yellow - Red

Tab. M

Key (Tab. M)

- Steady on
- OFF
- ▲ Red
- Yellow
- Green

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.



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



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.



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.



AIR FOR COMBUSTION

Do not install burner in room with insufficient air for combustion. Be sure there is an adequate air supply for combustion if the boiler room is enclosed. It may be necessary to create a window to permit sufficient air to enter the boiler room.

The installer must follow local ordinances in this regard.

CANADA: It is suggested that the installer follow CAN/CGA B149.1 & B149.2 as appropriate.

USA: It is suggested that the installer follow NFPA 54/ANSI Z223.1 or International Fuel Gas Code, as appropriate.

CHIMNEY

Be sure chimney is sufficient to handle the exhaust gases. It is recommended that only the burner be connected to the chimney. Be sure that it is clean and clear of obstructions.

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.



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 suitability 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 10" from the ground.



ELECTRICAL CONNECTIONS

CANADA: all electrical connections should be done in accordance with the C.E.C. Part 1, and all local codes. The system should be grounded.

USA: all electrical connections should be done in accordance with the National Electrical Code, and all local ordinances. The system should be grounded.

CONTROL BURNER OPERATION

Check out the burner and explain its operation to the homeowner. Be sure to leave the Owner's Instruction sheet with the homeowner.

ELECTRICAL CONNECTIONS

In most localities, a number 14 wire should be used inside a metal conduit. The system should be grounded.

A service switch should be placed close to the burner on a fireproof wall in an easily accessible location.

FIRE EXTINGUISHER

If required by local codes, install an approved fire extinguisher.



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



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

4.3 Preliminary checks

Checking the consignment



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.



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



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

4.4 Operating position



- The burner is designed to operate only in positions 1, 2, 4 and 5 (Fig. 14).
- Installation 1 is preferable, as it is the only one that allows the maintenance operations as described in this manual.
- Installations 2, 4 and 5 allow operations to be performed, but make maintenance and inspection of the combustion head more difficult.



- Any other position could compromise the correct operation of the appliance.
- Installation 3 is prohibited for safety reasons.

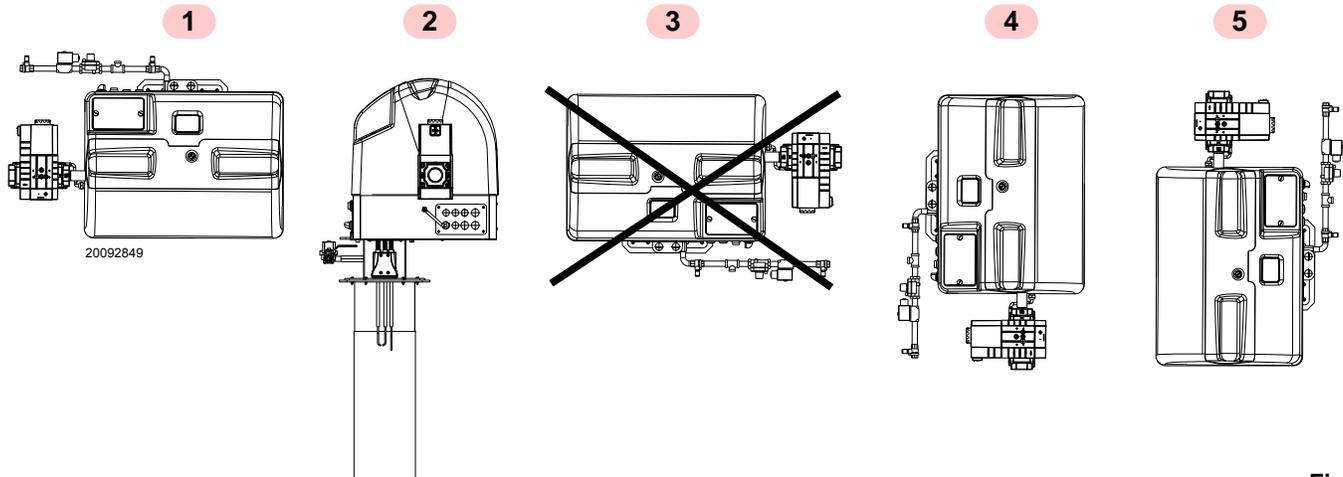


Fig. 14

4.5 Preparing the boiler

4.5.1 Boring the boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 15. The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

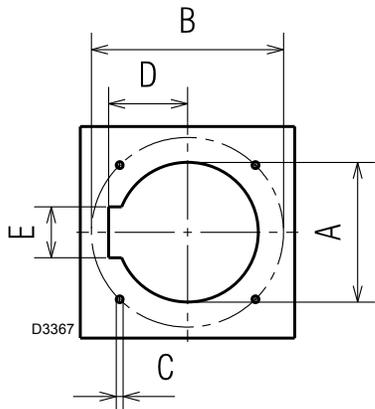


Fig. 15

inch	A	B	C	D	E
RX 700 S/PV	9 ²⁹ / ₆₄ "	12 ⁵¹ / ₆₄ " - 10 ⁵³ / ₆₄ "	M10	5 ⁵ / ₁₆ "	2 ⁶¹ / ₆₄ "
RX 850 S/PV	9 ²⁹ / ₆₄ "	12 ⁵¹ / ₆₄ " - 10 ⁵³ / ₆₄ "	M10	5 ⁵ / ₁₆ "	2 ⁶¹ / ₆₄ "
RX 1000 S/PV	9 ²⁹ / ₆₄ "	12 ⁵¹ / ₆₄ " - 10 ⁵³ / ₆₄ "	M10	5 ⁵ / ₁₆ "	2 ⁶¹ / ₆₄ "

Tab. N

4.5.2 Head length

The length of the head 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.



WARNING

The burners cannot be used on flame inversion boilers.

It is possible to insert a protective device made of refractory material between the combustion head and the boiler refractory.

This protective device must allow the blast tube to be taken out (Fig. 16).



WARNING

Do not insert the protection in line with the electrode unit, as this would compromise its good operation.

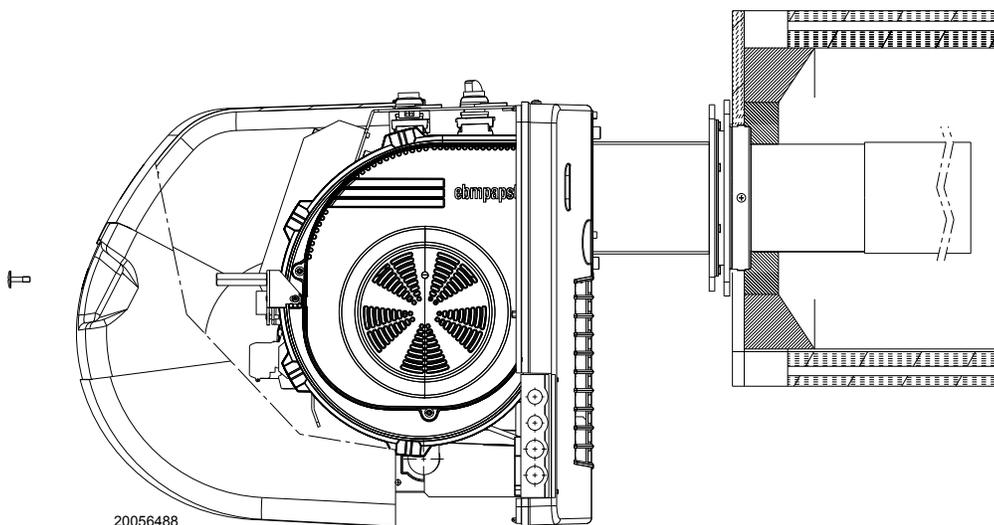


Fig. 16

4.6 Securing the burner to the boiler



Provide an adequate lifting system.

The burners are supplied with the combustion head already assembled.

Before fixing the burner to the boiler is necessary:

- secure the gas train unit to the mixer (Fig. 17).



WARNING

Install the gas train following the instruction in “**Fuel supply**” on page 24.

- Secure the pilot unit to the manifold (Fig. 17);
- tighten the studs 2)(Fig. 18) on the plate 1) and position the refractory gasket 3).
- Fix the flange 5) to the boiler plate and tighten the nuts 4).



WARNING

During this operation, take care not to touch the probe - electrodes unit.

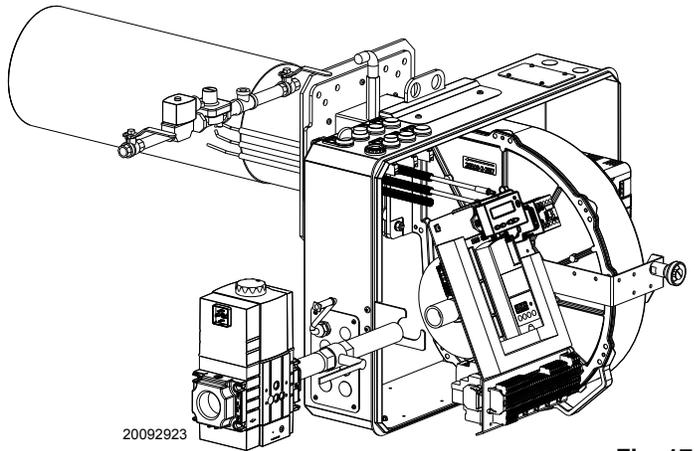


Fig. 17

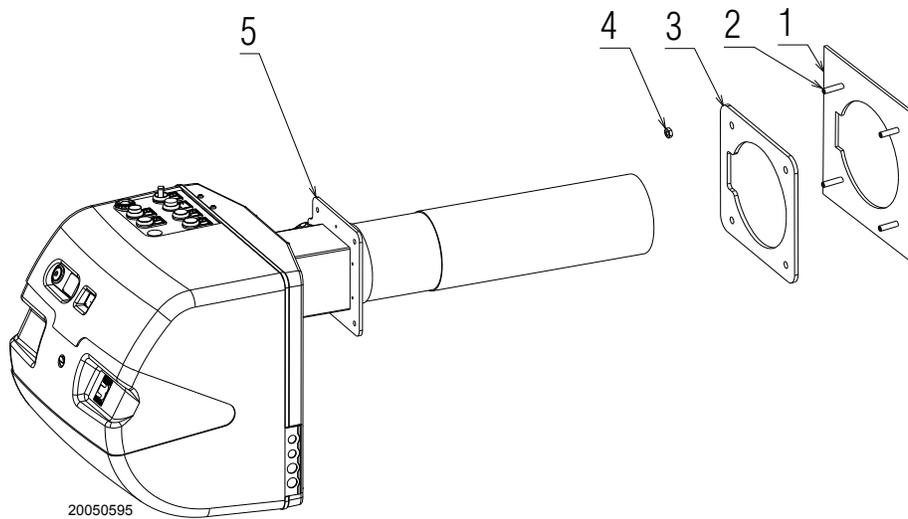


Fig. 18

4.7 Probe-electrodes installation

For the installation of the electrodes proceed as follows:

- take the supplied probe-electrodes unit, unscrew the screws 11) and remove the cover 10)(Fig. 19).
- Fix the unit 17) to the flange 4) with the two screws 16).
- Check for the presence and correct position of the gasket 15).
- Insert the connections 21) into the burner opening 22).
- Put back the cover 10) and secure it with the screws 11).
- Connect the high voltage cables to the transformer, and the ionisation probe lead to the appropriate cable emerging from the control box.

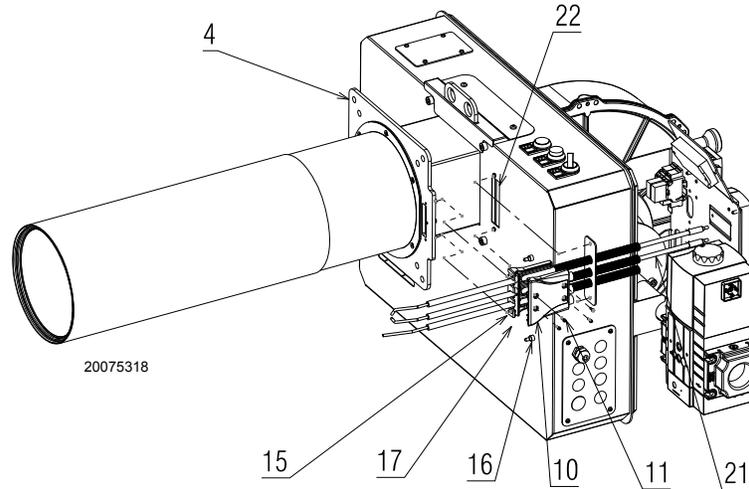


Fig. 19



During the installation, make sure the probe-electrodes unit are correctly positioned as illustrated in Fig. 20.



The seal of the burner-boiler and probe-electrodes unit must be hermetic.

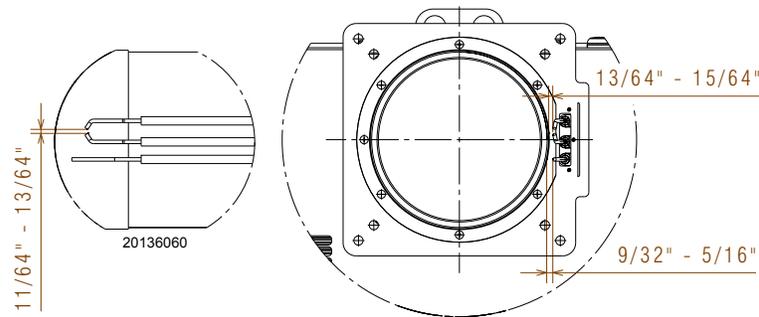


Fig. 20

4.8 Fuel supply



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

Precautions: avoid knocking, attrition, sparks and heat.

Make sure the fuel 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.



WARNING

Put a suitable support on the boiler / generator or on the ground to support the valve so as to avoid the weight resting on the mixer of the burner.

The burners are teamed with one-piece pneumatic proportioning gas valves, via which the amount of gas delivered, and hence the output produced, can be modulated.

A signal reporting pressure detected in the air circuit is carried to the pneumatic gas valve, which delivers an amount of gas in proportion to the airflow produced by the fan.

Air/gas mixer

Gas and combustive air are mixed inside the purging circuit (mixer), starting from the intake inlet.

Through the gas train, fuel is introduced into the intake air current and optimal mixing commences with the aid of a mixer.



WARNING

Pipe (T) between valve-Venturi allows compensation to occur for accidental occlusion of the suction line due to a reduction in gas delivered.

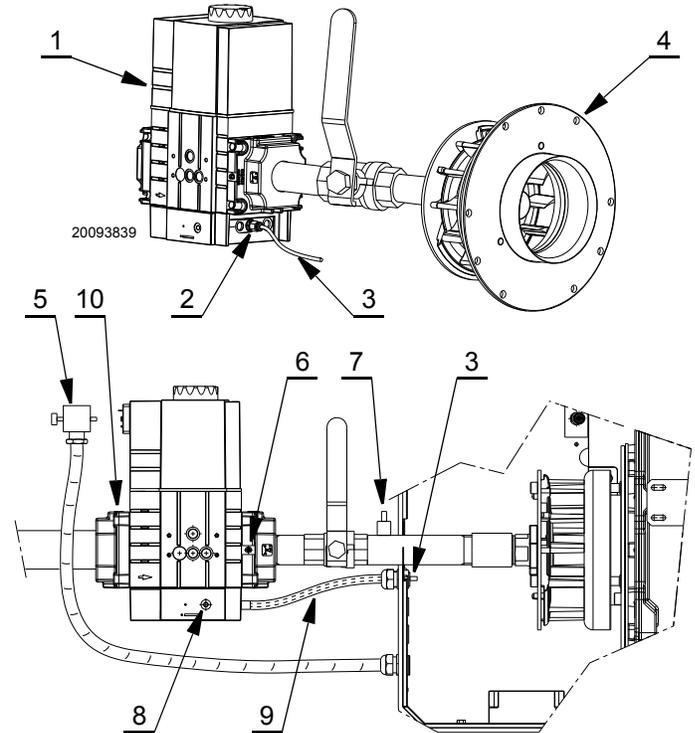


Fig. 21

Key (Fig. 21)

- 1 Gas valve
- 2 Quick coupling
- 3 Compensation pipe (T)
- 4 Air/gas mixer in the circuit of the suction line
- 5 Electronic valve connection (XV1)
- 6 Maximum gas flow adjustment (V1)
- 7 Downstream pressure test point (P2)
- 8 Minimum gas flow adjustment (V2)
- 9 Metallic protective device
- 10 Upstream pressure test point (P1)

4.8.1 Gas line



Before carrying out maintenance, cleaning or checking operations, identify and close the manual shut-off valve on the gas supply drop-line to the burner.



Check that there are no gas leaks.



Beware of train movements: danger of crushing of limbs.



Make sure that the gas train is properly installed by checking for any fuel leaks.



The operator must use appropriate tools for installation.

This has been type-approved in accordance with regulation NFPA 54/ANSI Z223.1 National Fuel Gas Code, NFPA 58 Liquefied Petroleum Gas Code, and International Fuel Gas Code, CAN/CGA B149.1 & B149.2 Installation Codes, and is supplied as standard (Fig. 22).



Recommended pilot gas pressure: 2 - 8 "wc.

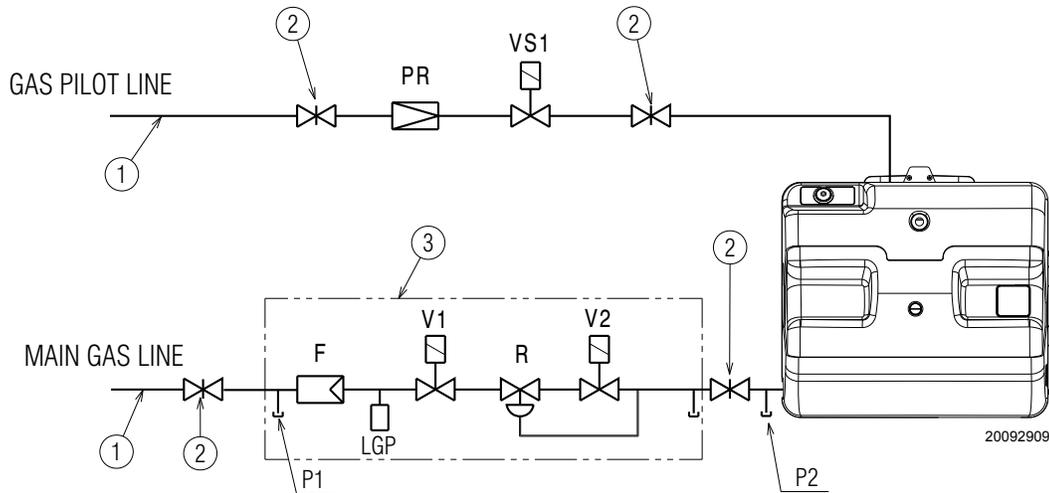


Fig. 22

4.8.2 Gas pilot line

Key (Fig. 22 - Fig. 23)

- 1 Gas supply
- 2 Manual valve
- 3 Valve including:
 - F screen/strainer
 - V1 1st SSOV
 - R pressure regulator
 - V2 2nd SSOV
- L Gas train supplied
- LGP Low gas pressure switch
- P1 Upstream gas pressure test point
- P2 Downstream gas pressure test point
- PR Pressure regulator
- VS1 Safety shut-off valve

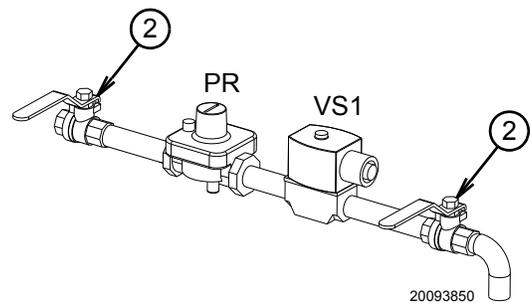


Fig. 23

4.9 Electrical wiring

Notes on safety for the electrical wiring



DANGER

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

Before carrying out any maintenance, cleaning or checking operations:



Before carrying out maintenance, cleaning or checking operations, identify and disconnect the main electrical power to the burner and identify and close the manual shut-off valve on the gas supply drop-line to the burner.



DANGER

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



DANGER

Close the fuel inlet connection.



DANGER

Avoid condensate, ice and water leaks from forming.

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

Use flexible metal conduit in compliance with the National Electrical Code, NFPA 70 and Parts 1 and 2 of the Canadian Electrical Code as appropriate.



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

4.9.1 Supply cables and external connections passage

All the cables to be connected to the burner must be threaded through cable grommets. The use of the cable grommets can take various forms by way of example we indicate the following mode:

- 1 Single phase power supply, thermostat/pressure switch TL
- 2 Thermostat/pressure switch
- 3 Consents/safety
- 4 Available
- 5 Three-phase power supply

Cable lengths

Mains supply line	Max. 100 m (100 pF/m)
Load controller X5-03	Max. 30 m (100 pF/m)
Safety Loop	Max. 30 m (100 pF/m)
Remote reset (lay separate cable)	Max. 30 m (100 pF/m)
Other lines	Max. 30 m (100 pF/m)

Tab. O

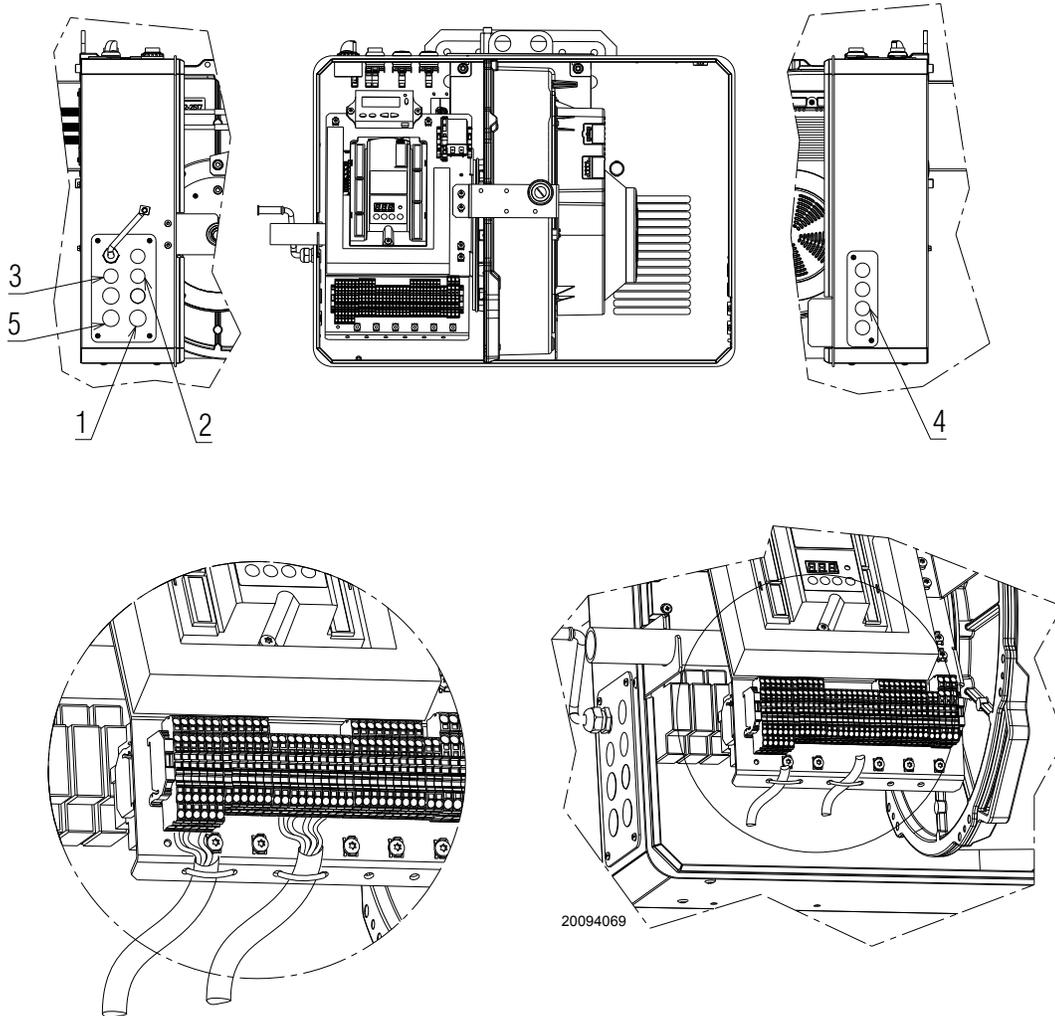


Fig. 24

4.9.2 Factory wiring diagram

Control circuits

Burner operation may be controlled by either 120V or 24V control systems.

The required controls must be connected to the burner as described on the following.

120V control system

The burner provides its own power supply for the control circuits that is switched internal from terminal 1(L) & 2 (N), do not apply power on any other terminal or damaged to the control could occur.

The factory-installed jumper can be removed if a P.O.C device is desired.

24V control system

If firing is to be controlled by a 24V operating system a 24V switching relay wired as shown in the diagram is required (not supplied – sold separately).

The required 24V operating controls must be wired between the thermostat terminals on the 24V-switching relay.

The factory-installed jumper can be removed if a P.O.C device is desired.

NOTE:

If an external electrical source is utilized, the conversion burner, when installed, must be electrically grounded with a solid green wire to Earth Ground, in accordance with local codes or, in the absence of local codes, with the National Electrical Code ANSI/NFPA 70-1990 and the CSA Electrical Code.

WIRING DIAGRAM OF DISPLAY

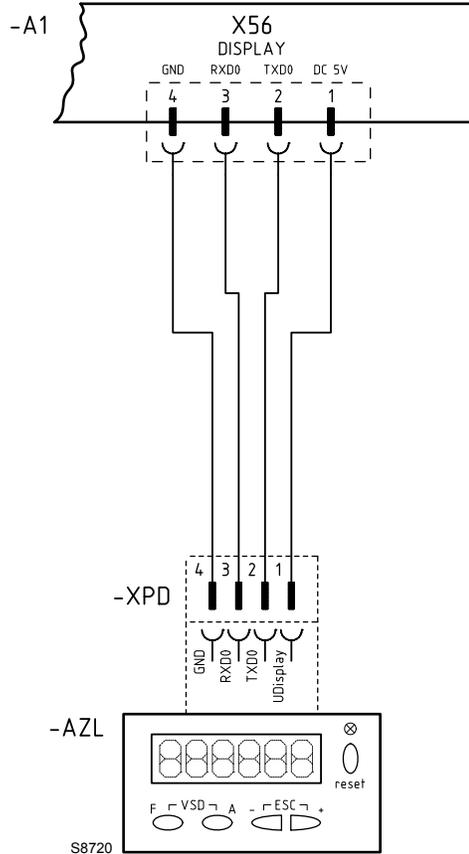


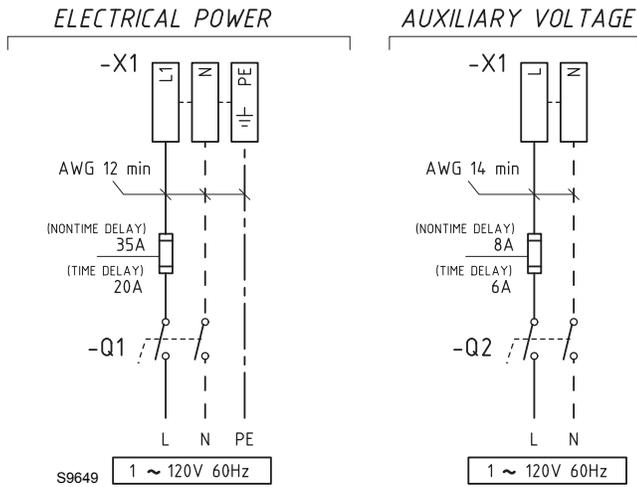
Fig. 25

Key (Fig. 25)

- A1 Control box for the air/fuel ratio
- AZL Operator panel
- XPD Operator panel connector

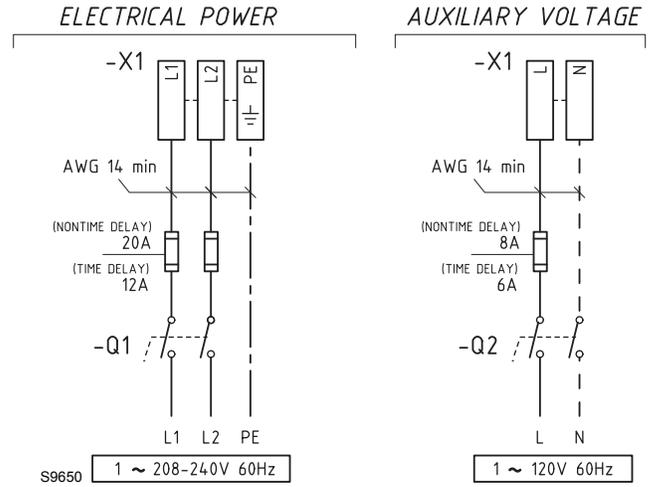
4.9.3 Wiring diagram (customer installation)

RX 700-850 S/PV



⚠ CUSTOMER INSTALLATION
 ⚠ ATTENTION:
 USE COPPER CONDUCTORS ONLY

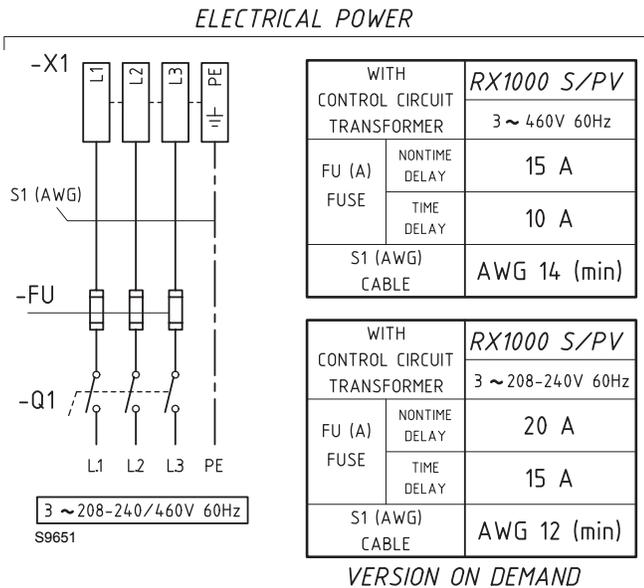
RX 700-850 S/PV



⚠ CUSTOMER INSTALLATION
 ⚠ ATTENTION:
 USE COPPER CONDUCTORS ONLY

⚠ WITHOUT STEPDOWN TRANSFORMER

RX 1000 S/PV



⚠ WITHOUT STEPDOWN TRANSFORMER

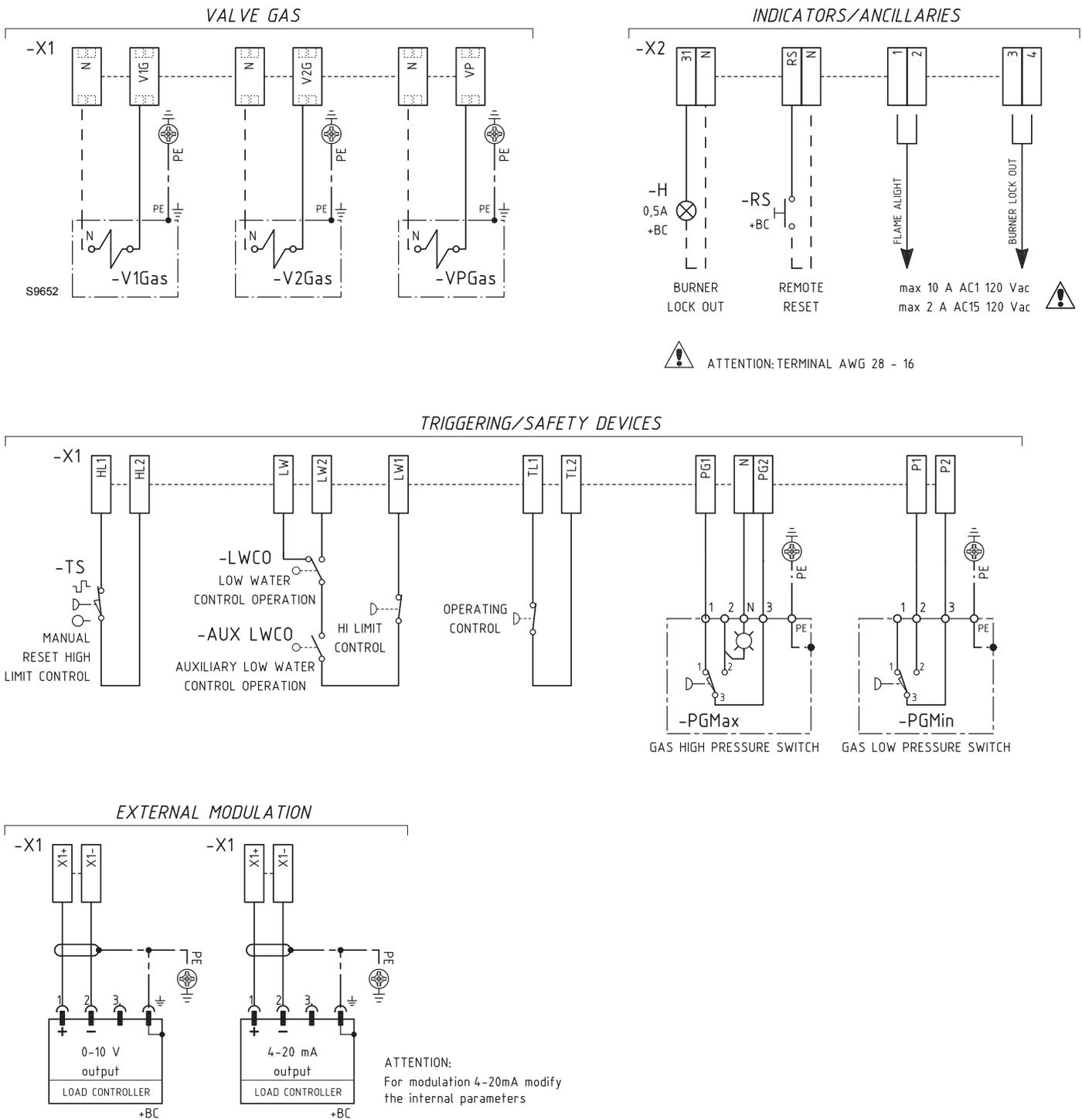


Use only copper conductors.

Key (Fig. 26)

- FU External fuse
- Q1 Three phase disconnecting switch
- Q2 Single phase disconnecting switch
- S1 Cable size
- X1 Burner terminal strip

Fig. 26



⚠ ATTENTION: TERMINAL AWG 28 - 16

Fig. 27

Key (Fig. 27)

- AUX LWCO Auxiliary low water control operation
- H Remote lockout signal
- LWCO Low water control operation
- PGMax Gas high gas pressure switch
- PGMin Gas low gas pressure switch
- Q1 Single phase disconnecting switch
- RS Remote reset
- TS Manual reset high limit control
- V1Gas Fuel valve

- V2Gas Fuel valve
- VPGas Pilot valve
- X1 Burner terminal strip
- X2 Burner terminal strip

4.9.4 Positioning the step-down transformer kit

Place the step-down transformer 1)(Fig. 28) in line with the holes 2) and secure it with the screws.

Install the primary/secondary protection fuses of the step-down transformer on the support rail DIN 3).



WARNING

Carry out the electric wiring.

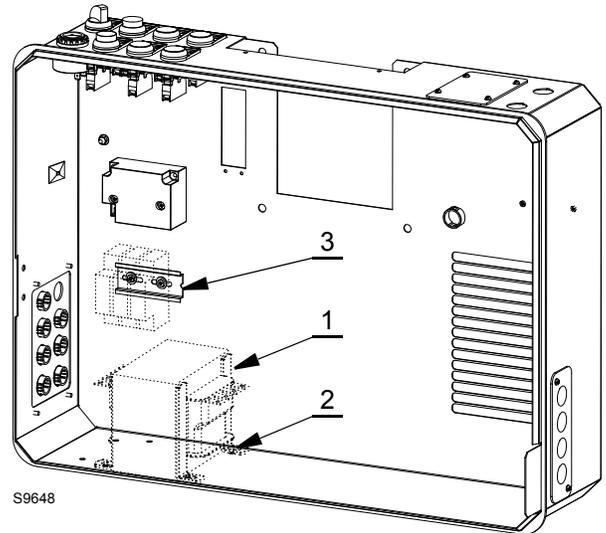


Fig. 28

4.10 Opening sequence of the fuse-holder



DANGER

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

In case of failure or control of the fuse-holder, follow these steps to remove or replace the fuse:

- unhook as indicated in Fig. 29;
- open the component side (check or replace) as indicated in Fig. 30;
- close the component side (Fig. 31);
- hook the component side (Fig. 32).

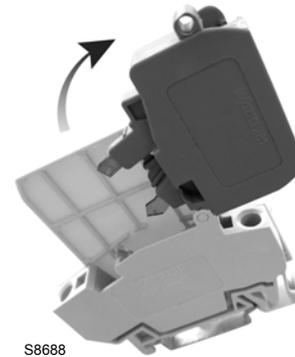


WARNING

After the installation, verify all the safety conditions: pipe-line leakage, draft, adequacy and stability of main flame at all allowable firing rates and sudden changes in firing rate, performance and gas tightness of all safety shut-off valves.



Cover plates, enclosures, and guards must be maintained in place at all times, except during maintenance and servicing.



S8688

Fig. 29



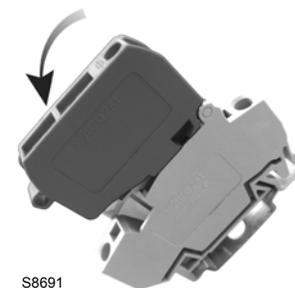
S8689

Fig. 30



S8690

Fig. 31



S8691

Fig. 32

5 Calibration and operation

5.1 Operator panel with LCD AZL 21... display for control box LME 71... with PME 71.901...

Description of the symbols

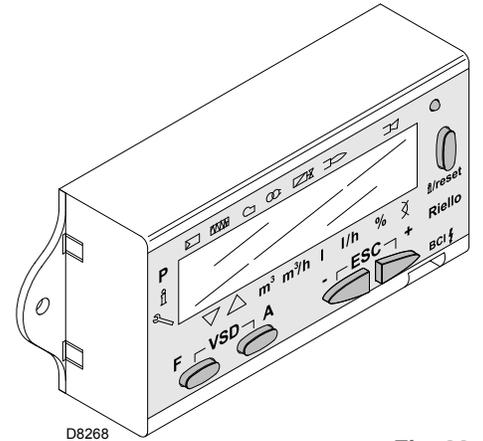
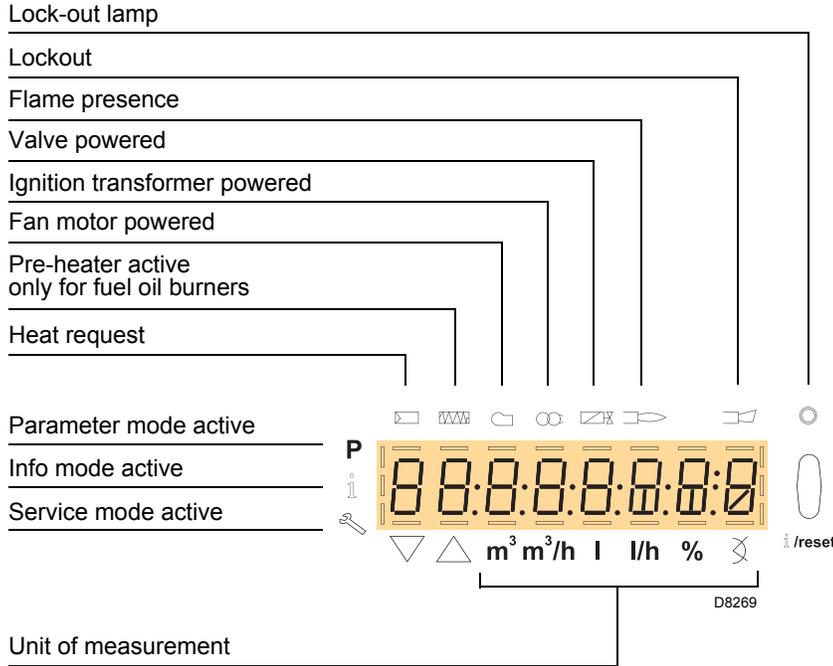


Fig. 33

Key to units of measurement

- m³ cubic metre
- m³/h cubic metre/hour
- l litre
- l/h litre/hour
- % size as percentage

The unit of measurement of the size visualised is identified by the presence of a dash in the corresponding unit of measurement.

Description of the keys

Key	Function
<p>VSD</p> <p>F A</p>	<ul style="list-style-type: none"> - Access to Parameters Mode P <p>(press, at the same time, F and A plus - or +)</p>
<p>i /reset D8273</p>	<ul style="list-style-type: none"> - Enter in Parameters Mode - Reset in the event of a lockout - Access to a lower level of the menu - In Service mode and Info mode, allows: <ul style="list-style-type: none"> * the selection of the parameter (flashing symbol) (press the key for <1s) * access to a lower level of the menu (press the key for 1 - 3 s) * access to a higher level of the menu (press the key for 3 - 8 s) * access to another mode (press the key for > 8 s)
<p>-</p>	<ul style="list-style-type: none"> - Reduction of value - Access to a lower point of the modulation curve - Scrolling of the parameter list
<p>+</p>	<ul style="list-style-type: none"> - Increase of value - Access to a higher point of the modulation curve - Scrolling of the parameter list
<p>ESC</p> <p>- +</p>	<p>Exit function (ESC)</p> <p>(press - and + simultaneously)</p> <ul style="list-style-type: none"> - Non confirmation of the value - Access to a higher level of the menu

Technical data

Operation and display unit		
Unit general information	Operating voltage	DC 5V
	Power absorption	<50 mW (normally)
	Protection level	
	- AZL21...	IP40 according to IEC529
	Safety class	II according to DIN EN 60730-1
Housing	- Material	PC and PC / ABS
	- Colour	RAL 7035 (light grey)
	Fire protection class	
- Transparent parts of the housing	According to UL94 V2 (PC)	
- Coloured parts of the housing	According to UL94 V0 (PC / ABS)	
Inputs/outlets	BCI interface with female RJ11	For Siemens burner commands
Ambient conditions	Operation	DIN EN 60721-3-3
	Climatic conditions	Class 3K3
	Mechanical conditions	Class 3M3
	Temperature range	-20...+60°C
	Humidity	< 95 % RH

The formation of condensation, ice and the infiltration of water must absolutely be avoided!

5.2 Operator panel with LCD display

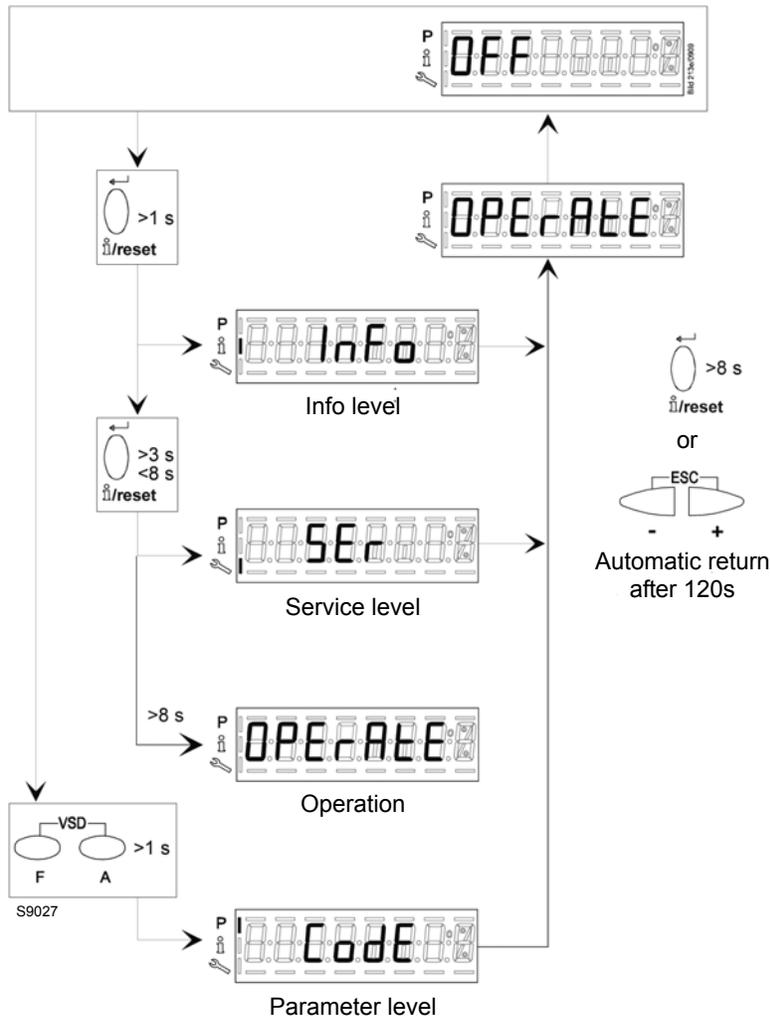


Fig. 34

5.3 Visualisation and programming modes

The operator panel, and especially the display visualisation, has 4 working modes:

- Normal Mode
- Info Mode (**InFo**)
- Service Mode (**Ser**)
- Parameter Mode (**PArA**)

The information for accessing and operating at the various levels is given below.

Normal Mode

Visualises the operation conditions and allows you to modify the operation point of the burner manually.

It does not require any use of the keys of the operator panel.

It allows access to the other visualisation and programming modes.

Some examples in the standard conditions are given below.

5.3.1 Operation



WARNING

Eventual modifications to the parameters and the settings should be set and saved only in the unit's internal memory.

To save the modified settings in the PME7... program module, the backup should be activated manually. Otherwise there is the risk of losing the safety functions.



WARNING

At the first start-up or after replacing the program module, the sequence of the functions and the parameter settings should be checked when the restore process has finished. Otherwise there is the risk of losing the safety functions.



WARNING

If the parameters need to be changed, a backup copy must be made! Otherwise there is the risk of losing the safety functions.

Normal display

Normal display is the standard display during normal operation, which is the higher menu level. From normal display it is possible to pass to the Info, Service or Parameters level.

Display in standby mode.

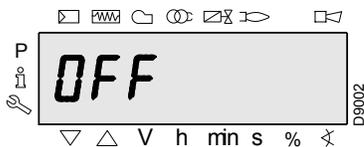


Fig. 35

The unit is in standby mode.

Note:

OFF flashes when the manual switching off function or the manual control are active, and when the regulator is off.

Display during starting/stopping.

Displaying the program phases.



Fig. 36

The unit is in phase 30. The regulator requires heat.

The bar is displayed under the symbols  and .

The individual phases of the program and the components controlled are displayed according to the sequence of the program.

5.3.2 Displaying the operating position

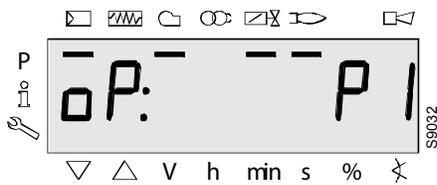


Fig. 37

Displaying **oP: P1** means the 1st stage.
The display after **oP** is specific to the unit.

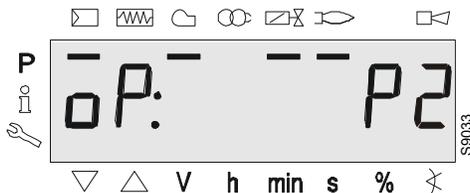


Fig. 38

Displaying **oP: P2** means the 2nd stage.
The display after **oP** is specific to the unit.

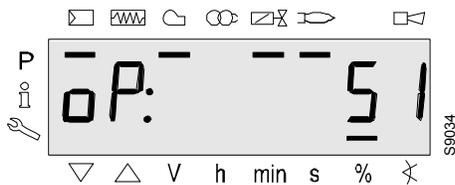


Fig. 39

Displaying **oP**: means modulating operation.
The display after **oP**: is specific to the unit.
The value shown on the display corresponds to the percentage of the speed.
0 RPM = displaying 0%
RPM MAX = displaying 100%

5.3.3 Fault messages, display errors and information

Displaying errors (faults) with lockout



Fig. 40

The display shows **Loc**. The bar under the fault status
The message  is displayed.
The unit is in a lockout position. The corresponding error code is displayed (see chapter Table of blink codes).
Example: Error code 7.

Reset

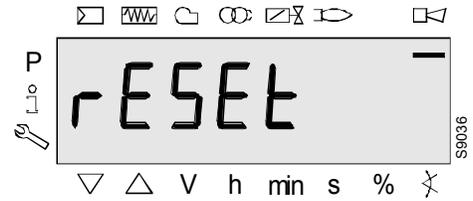
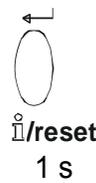


Fig. 41

Pressing  “i/reset” for 1 second displays **rESEt** on the display. When the button is released, the base unit is reset.

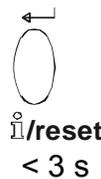
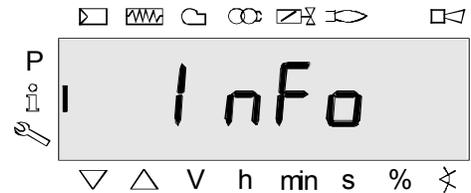


Fig. 42

Pressing  “i/reset” for > 3 seconds, displays **InFo**, **SEr** and then **OPERAtE**.

When the button is released, the base unit is reset.

Note:

for the meaning of the error and the diagnostic codes, see “Error code list with operation via internal LED” on page 62. When an error has been acknowledged, it can still read in the chronology of errors.

From Normal mode, using the keys of the Operator Panel, it is possible to activate one of the three visualisation/programming modes:



Info mode

Visualises the general system information.

The list of the parameters that can be visualised is given in the table below.

To access this level, press the key “i/reset” for 1 - 3 s. Release the key immediately when the display shows “Info”.

List of the parameters that can be visualised (in the sequence in which they are visualised)

Parameter number	Parameter
102	Identification date
103	Identification number
113	Burner identification
164	Number of resettable start-ups
166	Total number of start-ups
170.00	Switching cycles relay contact K12
170.01	Switching cycles relay contact K11
170.02	Switching cycles relay contact K2
170.03	Switching cycles relay contact K1
171	Max. relay commutation cycles
End	

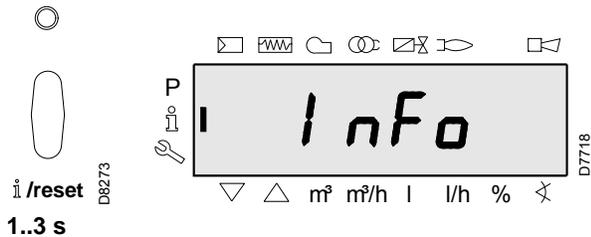


Fig. 43

5.4 Info level

The Info level displays information regarding the unit and general operations.

Note:

From the Info level, it is possible to press left or right arrow keys to display the preceding or subsequent parameter.

Instead of the right arrow key it is also possible to press “i/reset” for <1 second.

Note:

It is possible to press ESC or “i/reset” for > 8 seconds to return to normal display.

By pressing “i/reset” for > 3 seconds or ESC, you go back to the selection of the parameter no. (the number of the parameter blinks).

5.4.1 Displaying the Info level

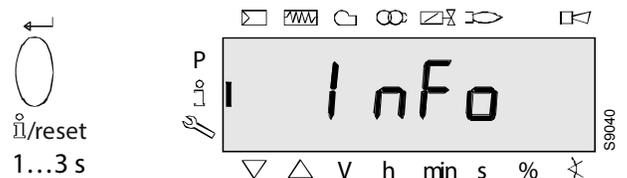


Fig. 45

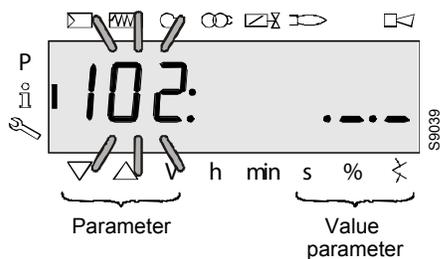


Fig. 44

Note:

No change to the Info level value.

If the display shows. _ _ together with the parameter, the value can be composed of more than 5 figures.

When pressing “i/reset” for > 1 second and < 3 seconds, the value will be displayed.

Press “i/reset” until InFo is displayed.

Releasing “i/reset” takes you to the Info level.

5.5 Displaying the Info values

5.5.1 Identification date

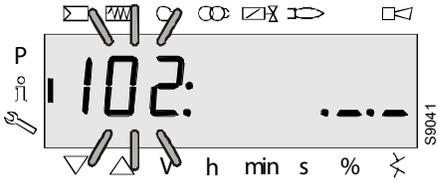


Fig. 46

On the left, the parameter **102** is displayed: blinking.
On the right, **._._** is displayed.

Example: **102: ._. _**

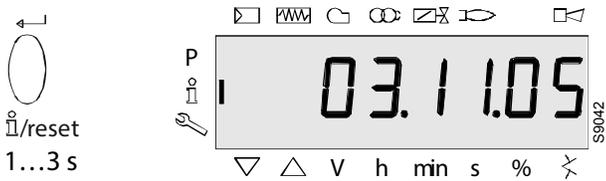


Fig. 47

Press **"i/reset"** for 1-3 seconds to display the date identification **DD.MM.YY**.

Example: Identification date **03.11.05**

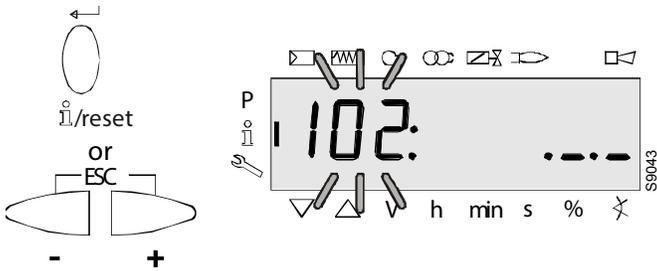


Fig. 48

Press **"i/reset"** or **ESC** to return to the display of the parameters.

5.5.2 Identification number

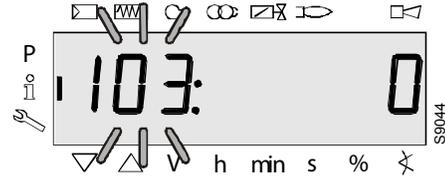
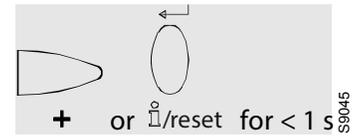


Fig. 50

On the left, the parameter **103** is displayed: blinking.
On the right, the identification number **0** is displayed.

Example: **103: 0**

On to next parameter



Goes back to the previous parameter



Fig. 51

On to next parameter



Fig. 49

5.5.3 Burner identification

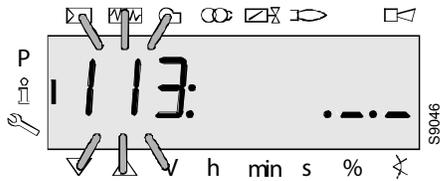


Fig. 52

On the left, the parameter 113 is displayed: blinking.
On the right, ._. is displayed

Example: 113: ._.

On to next parameter



Goes back to the previous parameter



Fig. 56

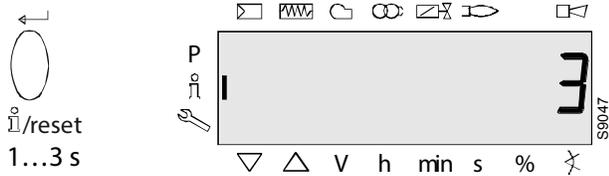


Fig. 53

Press "i/reset" for 1-3 seconds to display the burner identification.

Factory Setting: -----

Example: 3

5.5.4 Number of resettable start-ups

Note:

They can be cancelled for assistance (see Parameter list page)!

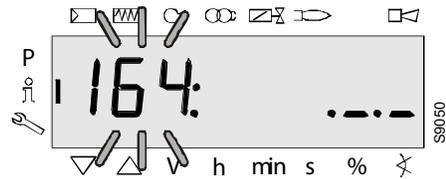


Fig. 57

On the left, the parameter 164 is displayed: blinking.

On the right, the characters ._. are displayed

Example: Parameter 164: ._.



Fig. 54

burnEr Id can only be changed with the software diagnostic tool ACS410 PC.

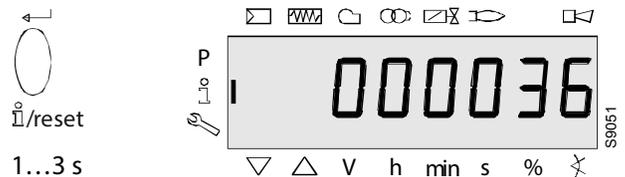


Fig. 58

Press "i/reset" for 1-3 seconds to display the number of starts (resettable). Example: 000036.

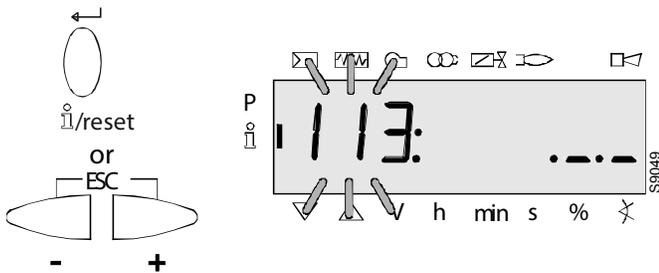


Fig. 55

Press "i/reset" or "ESC" to return to the display of the parameters.

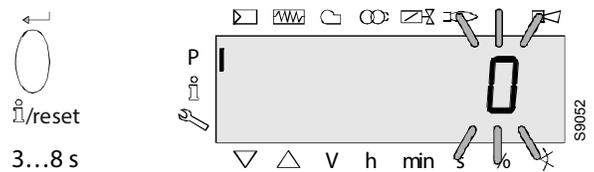


Fig. 59

Press "i/reset" for 3-8 seconds to go to the interval, which can be modified. The number 0 blinks.



Fig. 60

Pressing  "i/reset", the number of starts is reset to 0.

Display: **000000**

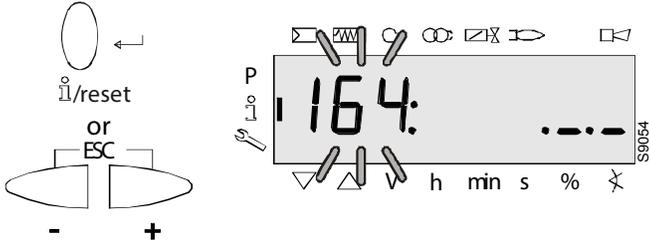


Fig. 61

Press  "i/reset" or  to display the blinking parameter **164** again.

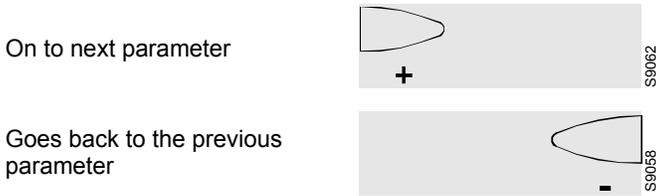


Fig. 62

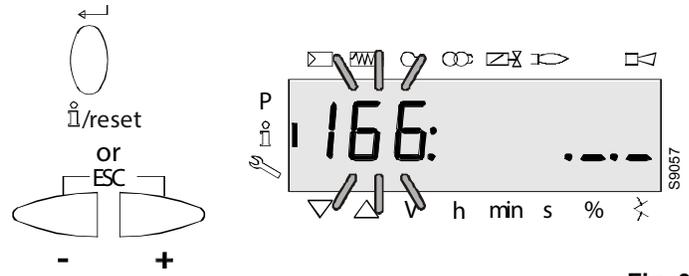


Fig. 65

Press  "i/reset" or  to return to the display of the parameters.

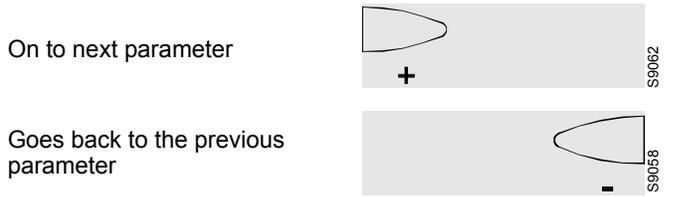


Fig. 66

5.5.5 Total number of start-ups

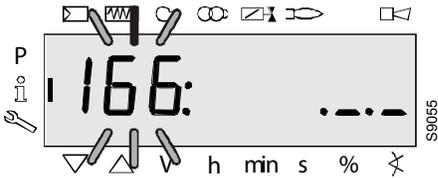


Fig. 63

On the left, the parameter **166** is displayed: blinking.

On the right, the characters **_._.** are displayed

Example: Parameter **166**: **_._.**

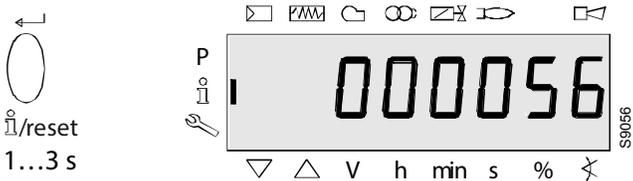


Fig. 64

Press  "i/reset" for 1-3 seconds to display the number of starts.

Example: **000056**

5.5.6 End of the Info level

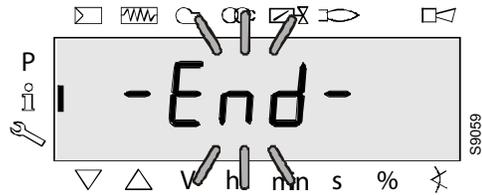


Fig. 67

When this page appears you have reached the end of the Info level.
The display shows **- End -** blinking.

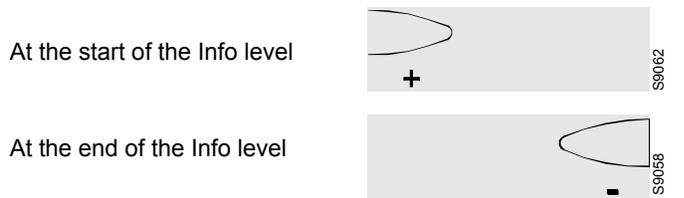


Fig. 68

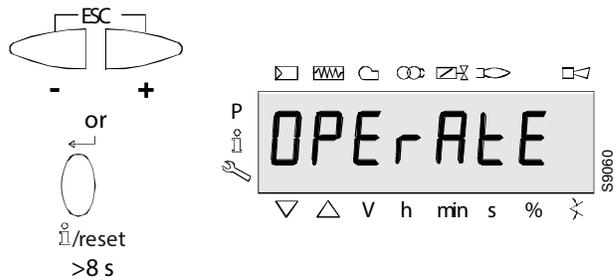


Fig. 69

Press  or  "info" to return to standby mode.

The display shows **OPeRAte**.

When this screen appears you return to the normal display and you can pass to the successive level mode.



Fig. 70 Press  "i/reset" to switch between the Service and Parameter level.

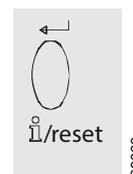


Fig. 71

Service mode

Visualises the log of errors and some technical information regarding the system.

The list of the parameters that can be visualised is given in the table below.

To access this level, press the "i/reset" key for more than 3s. Release the key immediately when the display shows "SEr".



Fig. 72

The list of the parameters that can be visualised is given in the table below.

Parameter number	Parameter
700	Error history
701.00	Current error: Error code
701.01	Current error: Start-up meter reading
701.02	Current error: MMI phase
701.03	Current error: Power value
702.00	Error history former 1: Error code
702.01	Error history o1: Start-up meter reading
702.02	Error history o1: MMI phase
702.03	Error history o1: Power value
-	
-	
-	
711.00	Error history former 10: Error code
711.01	Error history former 10: Start-up meter reading
711.02	Error history former 10: MMI phase
711.03	Error history former 10: Power value
900	Process data
920	Current PWM signal fan
936	Normalized speed
951	Mains voltage
954	Flame intensity
End	

5.6 Service level

The Service level is used to display information about the errors including the error chronology.

Note:

From the Service level, it is possible to press  or  to display the preceding or successive parameter.

Note:

Instead of  it is also possible to press  "i/reset" for <1 second.

Note:

It is possible to press  or  "i/reset" for > 8 seconds for normal display.

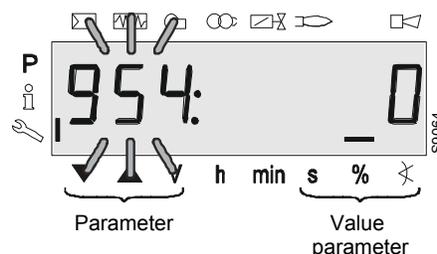


Fig. 73

Note:

No changes to the values of the Service level.

If the characters re displayed by the parameter, the value can be composed of more than 5 figures.

Press  "i/reset" for >1 s and <3 s to display the value.

Press  "i/reset" for >3 s or  to go back to the selection of the parameter number (blinking).

5.6.1 Displaying the Service values

Error history

See Parameter with index, with or without direct display/Example of parameter **701**: Error history

Note:

They can be cancelled for assistance (see Parameter list page)!

Mains voltage

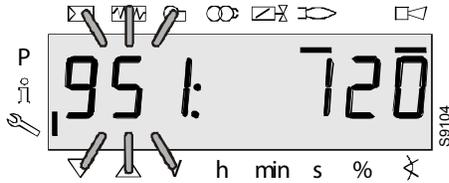


Fig. 74

Parameter **951** is displayed: blinking.

The mains voltage is displayed on the right.

Example: **951: 120**

End of the Service level

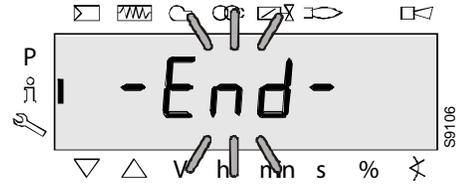


Fig. 78

When this page appears you have reached the end of the Service level.

The display shows **- End -** blinking.

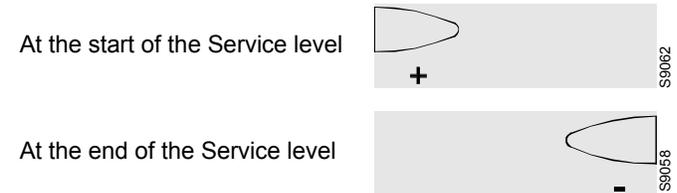


Fig. 79

On to next parameter



Goes back to the previous parameter



Fig. 75

Flame intensity

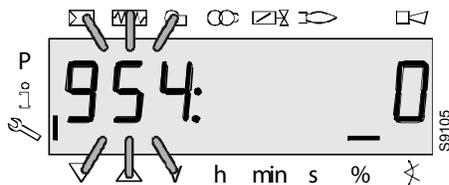


Fig. 76

The display shows the parameter **954**: blinking.

On the right, the flame intensity is displayed in a percentage from 0 to 100%.

Example: **954: 0**

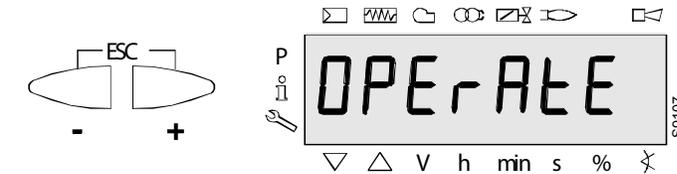


Fig. 80

Press  to return to standby mode.

The display shows **OPERAtE**.

End of the Service level – End –



Goes back to the previous parameter

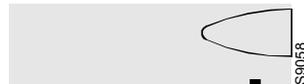


Fig. 77

When this screen appears you return to the normal display and you can pass to the successive level mode.

Parameter mode (PArA)

Displays the complete list of parameters and allows you to modify/program it.

The parameters level is subdivided into groups:

000: InF	Internal parameters Carrying out backup/restore procedure.
100: ParA	General parameters Information and identification data of the system.
200: ParA	Checks on the burner Safety intervention times of the various phases (setting parameters and leak detection control times).
400: Set	Setting work points Adjusting the rpm of the fan on start-up (P0), at the minimum (P1) and at the maximum (P2).
500: ParA	Fan parameters Setting the adjustment field of the number of rpm of the fan at start-up (P0), at the minimum (P1) and at the maximum (P2), ascent/descent ramps.
600: ParA	PWM fan parameters Setting the PWM signal/times adjustment field of the fan. Setting the analogue input signal (3 positions, 0...10V, 0...20mA, 4...20mA, 0-135 Ω) used for the modulation.
700: HISt	Log of the errors: Choice of different visualisation modes for the errors log.
900: dAtA	Process information Displaying the value of the PWM signal (%), the control box power supply voltage and the intensity of the flame signal.
End	

To access this level, refer to "Access procedure with password".

Once the access procedure has been carried out, the display will show "PArA" for a few seconds.



Fig. 82

Select the desired group of parameters with keys "+" and "-", and confirm by pressing the key "i/reset".

Within the group you have chosen, scroll through the list with the keys "+" and "-". At the end of the list, the display shows "End".

To return to Normal visualisation mode, simultaneously press the keys "+" and "-" (esc) twice.

To modify a parameter, refer to "Parameter modification procedure".



All the parameters are checked in the factory. Modification/tampering may compromise the good operation of the burner and cause injury to people or damage to things. In any case, modifications must be carried out by qualified personnel.

5.7 Parameters level

The parameters in the unit's memory can be displayed or modified in the Parameters level.

To pass to the parameters level a password is required.

With the LME7..., the control characteristics of the burner are mainly established by the parameter settings. Each time that the unit is started, the settings of the parameters should be controlled.

The LME7... should never be transferred from one system to another without the parameters matching those of the new system.



The parameters and the settings can be modified only by qualified personnel.

See the list of parameters for controlling the parameters that are read-only or that can also be changed (See "List of parameters PME71.901..." on page 68).

Key:

SO = Service operator (password for service);

OEM = Manufacturer (password for manufacturer).

5.7.1 Entering the password

The OEM password should be composed of 5 characters, the technical one 4 characters.

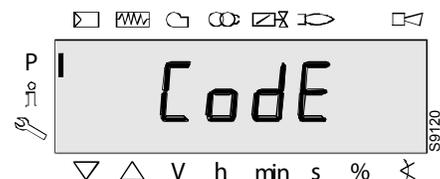
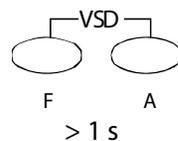


Fig. 83

Press the combination of keys  to display Code.

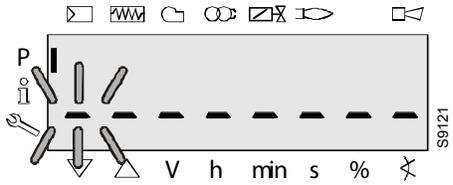


Fig. 84

Releasing the keys, 6 bars appear, the first of which is blinking.

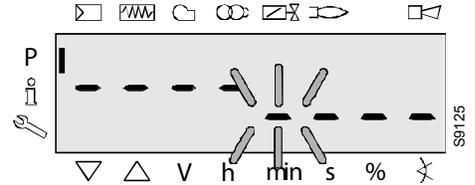
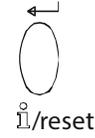


Fig. 90

After entering the last character the password needs to be confirmed by pressing the "i/reset" key.

Press "i/reset" again to finish entering the password.

Example: The password is composed of 4 characters.

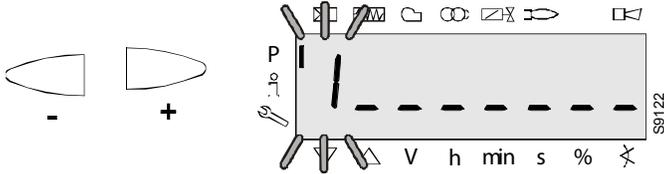


Fig. 85

Press "-" or "+" to select a number or a letter.



Fig. 91

To confirm it has been entered correctly, **PArA** is displayed for a maximum of 2 seconds.

Note:

To enter the password or the burner ID, the following numbers and letters can be used:

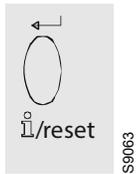


Fig. 86

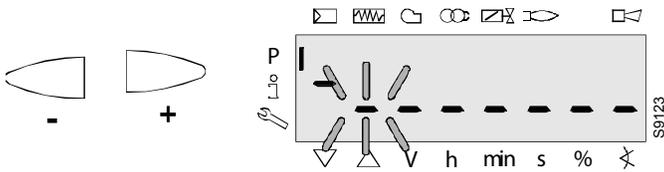


Fig. 87

Press "i/reset" to confirm. The value entered is replaced by the minus sign (-). The next bar starts blinking.

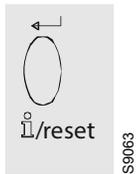


Fig. 88

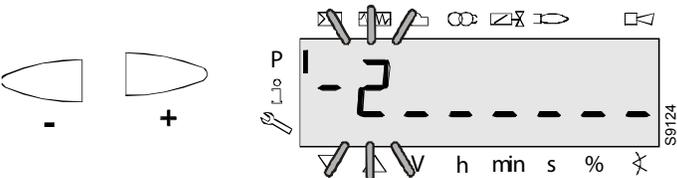


Fig. 89

Press "-" or "+" to select a number or a letter.

1	= 1	A	= A	L	= L
2	= 2	B	= b	C	= n
3	= 3	C	= C	O	= o
4	= 4	D	= d	P	= P
5	= 5	E	= E	R	= r
6	= 6	F	= F	S	= S
7	= 7	G	= G	T	= t
8	= 8	H	= H	U	= u
9	= 9	I	= I	Y	= Y
0	= 0	J	= J		

S9127

Fig. 92

5.7.2 Backup

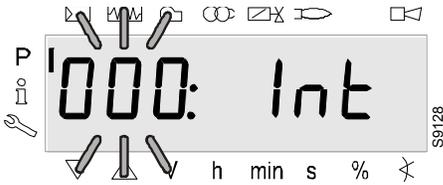


Fig. 93

The parameter **000**:blinks.
Display: Parameter **000**: blinks, the display **Int** does not blink.

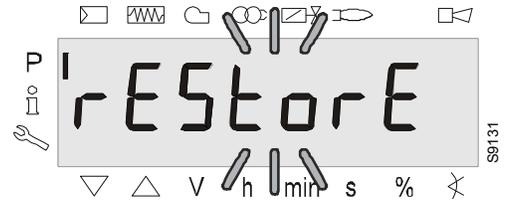


Fig. 98

Press “**i/reset**” for the parameter **rESTorE**. Display: The parameter **rESTorE** blinks.

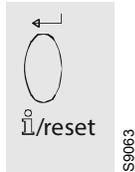


Fig. 94



Fig. 99

Press for the parameter **bAC_UP**.
Display: The parameter **bAC_UP** blinks.

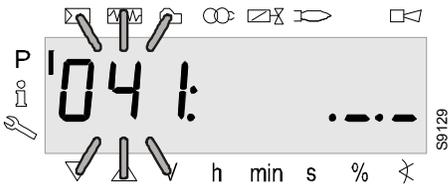


Fig. 95

Press “**i/reset**” for the group of parameters **041**.
Display: Parameter **041**: blinks, the display **..** does not blink.

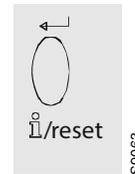


Fig. 100

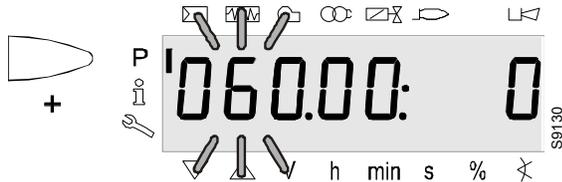


Fig. 96

Press for the parameter **060**.
Display: The parameter **060**: blinks, the index **00**: and the value **0** do not blink.



Fig. 101

Press “**i/reset**” for the backup process.
Display: The value **0**.

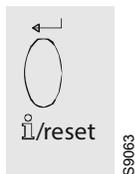


Fig. 97



Fig. 102

Press to shift the value by one position to the left.
Display: The value **0** blinks.

Note:

To detect display faults, the value shifts one position to the left.



Fig. 103

Press for the value 1.
Display: The value 1 blinks.

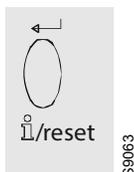


Fig. 104



Fig. 105

Press "i/reset" to start up the backup process.
The display shows **run**.



Fig. 106

After about 3 seconds (depending on the duration of the program sequence), the display shows **bAC End** to indicate the end of the backup process.

Display: **bAC End**.

It will be displayed for 2 minutes, or it can be ended by pressing the key "i/reset".



Fig. 107

<2 min



Fig. 108

The display shows **OFF** when the backup process has finished.



WARNING

Note:

During the backup, all the parameter settings are transferred from the unit's memory to the memory of the program module (PME).

If the parameters need to be changed, a backup copy must be made!

Otherwise there is the risk of losing the safety functions.

5.7.3 Restore



Fig. 109

The parameter **000**: blinks.

Display: Parameter **000**: blinks, the display **Int** does not blink.

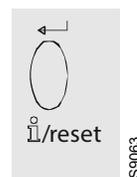


Fig. 110

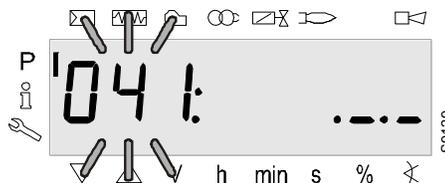


Fig. 111

Press "i/reset" for the group of parameters **041**.

Display: Parameter **041**: blinks, the display **..** does not blink.

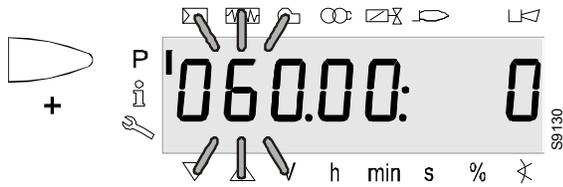


Fig. 112

Press \triangleright for the parameter **060**.

Display: Parameter **060**: blinks, the index **00**: and the value **0** do not blink.

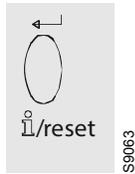


Fig. 113



Fig. 114

Press \circ "i/reset" for the parameter **rESTorE**.

Display: The parameter **rESTorE** blinks.

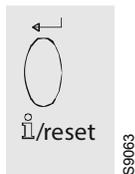


Fig. 115



Fig. 116

Press \circ "i/reset" to detect the restore process.

Display: The value **0**.



Fig. 117

Press \triangleleft to shift the value by one position to the left.

Display: The value **0** blinks.

Note:

To detect display faults, the value shifts one position to the left.



Fig. 118

Press \triangleleft for the value **1**.

Display: The value **1** blinks.

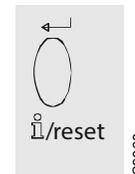


Fig. 119

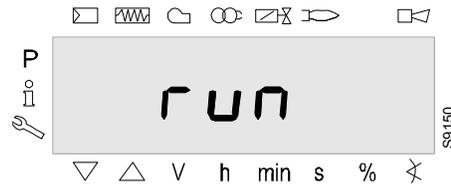


Fig. 120

Press \circ "i/reset" to activate the restore process.

The display shows **run**.



Fig. 121

After about 3 seconds (depending on the duration of the program sequence), the display shows **bAC End** to indicate the end of the restore process.

Display: **rSt End**.

It will be displayed for 2 minutes, or it can be ended by pressing

 "i/reset".



Fig. 122

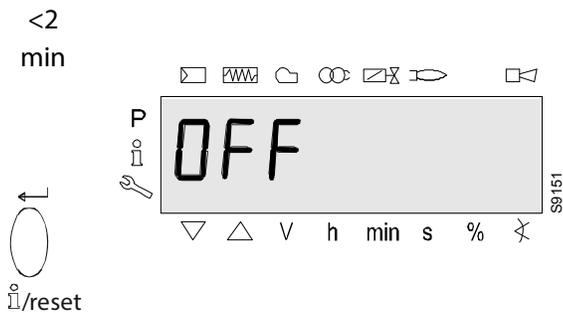


Fig. 123

The displays shows **OFF** when the RESTORE process has finished.



WARNING

Note:

During the RESTORE process, all the parameters and settings are written from the program module onto the memory integrated into the device.

In the meantime it is possible that the previous program sequences, the parameters and the settings in the internal memory could be overwritten!

At the first start-up or after replacing the program module, the sequence of the functions and the parameter settings should be checked when the RESTORE process has finished.

Otherwise there is the risk of losing the safety functions.

5.8 Parameter modes of operation

The parameters memorised in the LME7... burner control can be displayed and modified in the Parameters level.

5.8.1 Parameters without index, with direct display

Example of parameter 225 (pre-purging time) on the Parameters level



Fig. 124

Press **+** for the *pre-purging time*.

Display: Parameter **225**: blinks, the value **3.675** does not blink.

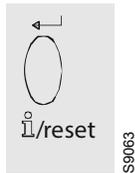


Fig. 125



Fig. 126

Press **i/reset** for the modification mode.

Display: **3.675**.

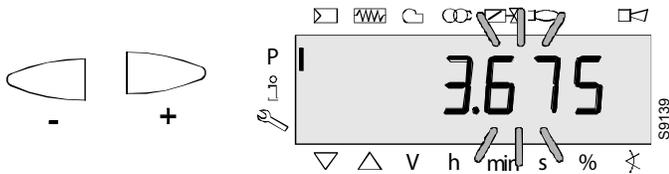


Fig. 127

Press **-** or **+** to move the previous pre-purging time by the mode one place to the left.

Display: the pre-purging time **3.675** blinks.

Note:

To detect display errors, the value appears shifted by one position to the left.

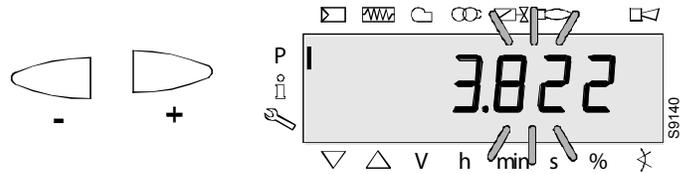


Fig. 128

Press **-** or **+** for the required pre-purging time.

Display: The pre-purging time **3.822** blinks.

Alternative 1:

Delete the change!

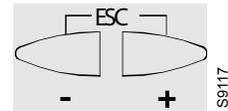


Fig. 129



Fig. 130

Alternative 2:

Adopt the value!

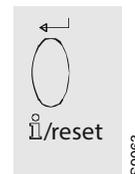


Fig. 131



Fig. 132

Press **i/reset** to go back to the modification mode.

The set value will be adopted.

Note:

To detect display errors, the value appears shifted by one position to the right.

Display: Value **3.822**

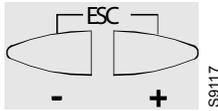


Fig. 133

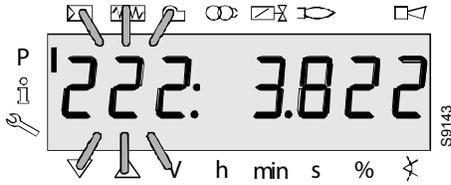
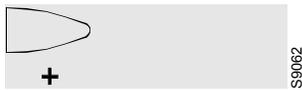


Fig. 134

On to next parameter



Goes back to the previous parameter

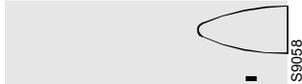


Fig. 135

5.8.2 Parameters without index, without direct display

Example of parameter 224 (air pressure switch specified time) on the Parameters level

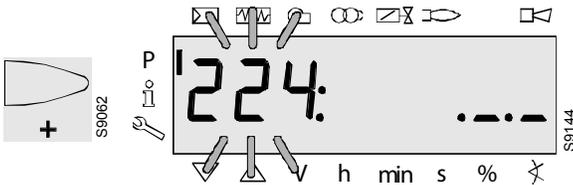


Fig. 136

Press for the specified time for the air pressure signal.

Display: Parameter **224**: blinks, characters **...** do not.

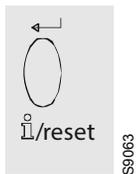


Fig. 137

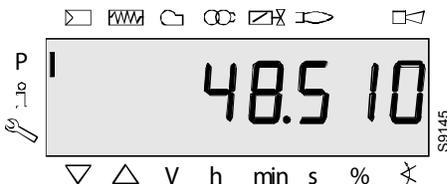


Fig. 138

Press "i/reset" for the modification mode.

Display: **48.510**.

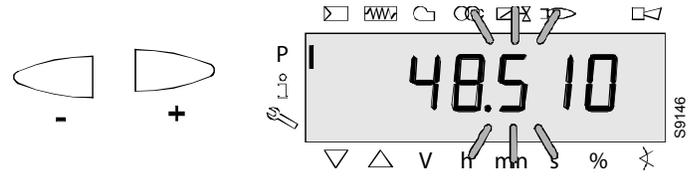


Fig. 139

Press or to change the time previously set by one position to the left.

Display: The specified time **48.510** blinks.

Note

To detect display errors, the value appears shifted by one position to the left.

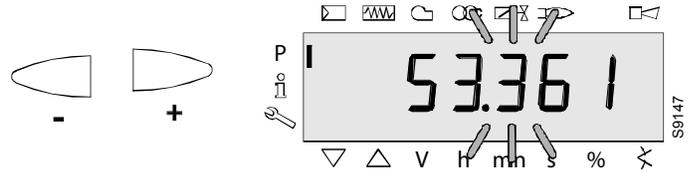


Fig. 140

Press or to set the specified time.

Display: The specified time **53.361** blinks.

Alternative 1:

Delete the change!

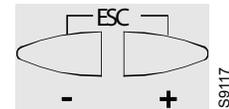


Fig. 141

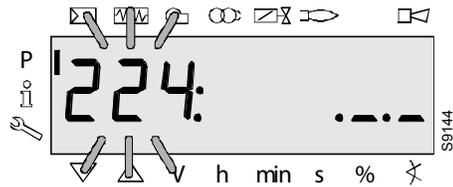


Fig. 142

Alternative 2:

Adopt the change!

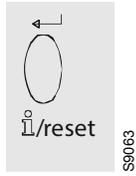


Fig. 143



Fig. 144

Press  "i/reset" to go back to the modification mode.

The set value will be adopted.

Note:

To detect display errors, the value appears again but shifted by one position to the right.

Display: Value **53.361**

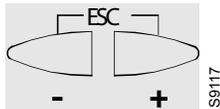


Fig. 145

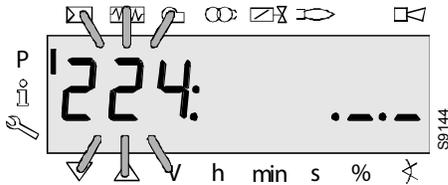


Fig. 146

Press  to return to the Parameter level.

Display: Parameter **224**: blinks, characters **._.** do not.

On to next parameter



Goes back to the previous parameter



Fig. 147

5.8.3 Parameters with index, with or without direct display

Example of parameter 701: Actual error at the Service level
 See chapter *List of error codes!*

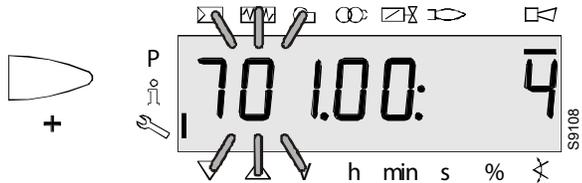


Fig. 148

Press to select the parameter 701.

Display: The parameter 701. blinks, index 00: and the error 4 does not blink.

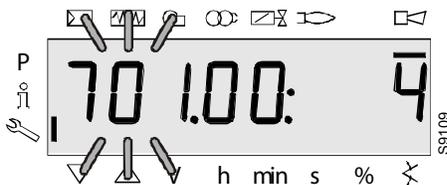


Fig. 149

On the left, the error 701. i displayed blinking, the index 00: does not blink.

On the right, the error code 4 is displayed.

Example:

Parameter 701., index 00:, error code 4.



Fig. 150



Fig. 151

Press for 1-3 seconds to display the index 00: for the blinking error code.

Display: The parameter 701. does not blink, the index 00: blinks, the error 4 does not blink.

At the successive index



S9062

Fig. 152



Fig. 153

Press to select the index.

- .00 = error code
- .01 = start meter reading
- .02 = MMI phase at time of fault
- .03 = current value at the time of the fault

Example:

Parameter 701., index 01:, start meter reading . . .

At the successive index



S9062

Fig. 154



Fig. 155

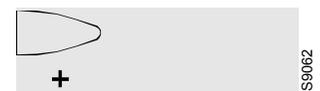
Press to select the index.

- .02 = MMI phase at time of fault

Example:

Parameter 701., index 02:, phase 02 = safety switch off.

At the successive index



S9062

Fig. 156



Fig. 157

Press to select the index.

- .03 = current value at the time of the fault.

Example:
Parameter **701.**, index **03.**, phase **02** = value of the current **60%**.



Fig. 159

Press to return to the index.

Display: The parameter **701.** does not blink, the index **03:** blinks, the characters **..** do not.

At the successive index



Returns to the previous index

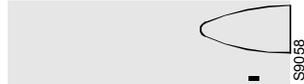


Fig. 160

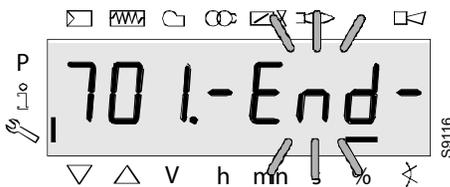


Fig. 161

When this screen appears you have reached the end of the Index level as far as the parameter **701** is concerned.

The display shows **- End -** blinking.

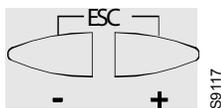


Fig. 162

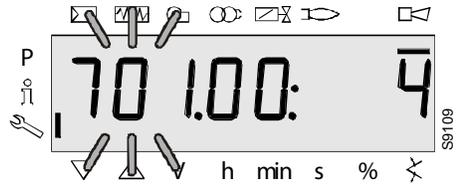


Fig. 163

Press to return to the Parameter level.

Display: The parameter **701.** blinks, the index **01:** and the diagnostic code **4** do not blink.

To the oldest successive error



Fig. 164



Fig. 165

The parameters cover the period up to the first error recorded starting from the deletion of the history (max. to parameter **711.**).

Example:

Parameter **711.**, index **00:** -

At the start of the Service level



At the end of the Service level

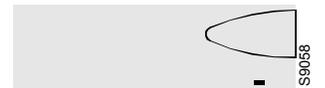


Fig. 166

6 Start-up, calibration and operation of the burner

6.1 Notes on safety for the first start-up



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



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

6.2 Adjustments prior to ignition

The following adjustments must be carried out:

- open the manual valves upline of the gas train;
- bleed the air from the gas pipes using the screw on the socket P1)(Fig. 21 on page 24).
- Adjust the minimum gas pressure switch to the start of the scale.

NOTE:

Make sure that the cover has been correctly installed on the burner (the presence or otherwise of the cover considerably affects the depression values measured at the pressure test point downstream of the valve).

To access the display with cover installed, unscrew the screws 1)(Fig. 167) and remove the glass 2).

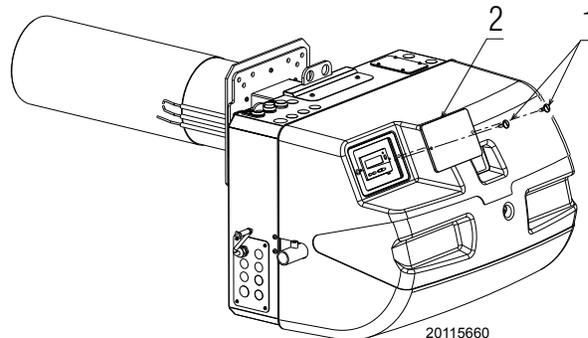


Fig. 167

6.3 Fan adjustment

Modulation is based on variable-speed technology.

The combustion air flow rate can be regulated by varying the motor speed (rpm).

The proportioning gas train delivers the right amount of fuel, depending on the pressure detected in the purging circuit.

So the flow rate supplied is regulated by changing the rotation speed of the motor.

The motor speed can be regulated through an adjustment of the control box.

The adjustments take place on the AZL display on the burner and are carried out using the following parameters:

START	ignition point (P0)	Parameter P 403.00
MIN	minimum point (P1)	Parameter P 403.01
MAX	maximum point (P2)	Parameter P 403.02

NOTE:

The adjustment of the fan (to establish the maximum, minimum and ignition outputs) can occur independently both of the AZL display and the keys and display on board the machine. Below is a description of the procedure to carry out using the AZL display since it allows you to work with the cover installed (final configuration). Points P0, P1 and P2 can be modified within the range defined by the limits set in the parameters 516, 517 and 518 respectively.

6.3.1 Pre-setting of the points P0 (ignition), P1 (minimum) and P2 (maximum)

The burner leaves the factory with a pre-setting of points P0, P1 and P2. Before starting the burner we recommend modifying these point based on the maximum output of the boiler, the minimum output desired and that of the ignition.

To set the points based on the desired outputs, see the charts on page 10.

To modify the points P0, P1 and P2 with the burner off, proceed as follows:

- Electric voltage is available (indicator light "POWER ON" must be on).
- Turn the "ON/OFF" selector to "OFF", standby (OFF).
- Start the programming mode for the technician.
- Keep the buttons "A" and "F" pressed simultaneously for < 5 seconds. "Code" is displayed.
- Entering the password of the technician (SO) using the buttons "+", "-" and "i/reset". See also chapter "Entering the password" on page 43.
- The displays shows **PARA** and then **400:Set**. Confirm by pressing "i/reset";
- The display shows **run**;
- Press simultaneously the keys "+" and "-" (ESC);
- The display shows "**P0: 2000**" (for example 2000 rpm);
- Change the value by pressing simultaneously the keys "A" and "+" to increase the value or keys "A" and "-" to lower the value;
- Confirm by pressing "i/reset";
- The display shows "**P1: 1200**" (for example 1200 rpm);
- Change the value by pressing simultaneously the keys "A" and "+" to increase the value or keys "A" and "-" to lower the value;
- Confirm by pressing "i/reset";

- The display shows “P2: 6100” (for example 6100 rpm);
- Change the value by pressing simultaneously the keys “A” and “+” to increase the value or keys “A” and “-” to lower the value;
- Confirm by pressing “i/reset”;

- Press contemporaneously the keys “+” and “-” (ESC) several times until the display shows “OPERAtE” and then “OFF”;
- At this point it is possible to start the burner.

6.4 Burner start-up

The burner can operate in two different modes:

- 1 Manual operation (to be used for the initial start-up): in this mode the indicators of the display are blinking;
- 2 Automatic operation (for normal work operation): in this mode the indicators of the display are fixed.

6.4.1 First burner start-up (manual operation)

- Electric voltage is available (indicator light “POWER ON” must be on).
- Turn the “ON/OFF” selector to “OFF”, standby (OFF).
- Disconnect the external modulation control (control with 3 points or analogue signal).
- Start the programming mode for the technician.
- Keep the buttons “A” and “F” pressed simultaneously for < 5 seconds. “Code” is displayed.
- Entering the password of the technician (SO) using the buttons “+”, “-” and “i/reset”. See also chapter “Entering the password” on page 43.
- The display passes from **PAR a 400: SEt**. Confirm with the button “i/reset”.
- run is displayed. Confirmation with the **i/reset** button starts the setting mode for minimum load (**P1**), ignition load (**P0**) and nominal load (**P2**).
- The display shows **OFF** blinking.
- “Turn the “ON/OFF” selector to “ON” and make sure that there is a heat request (thermostat on ON).
- LME7 starts and carries out a start-up. The corresponding phases of the program are carried out according to the sequence scheme and the program phases are displayed blinking (Tab. M at page 18).
- The device works up to the end of the Ph30 pre-purging phase, it is brought to the starting load and passes to the display of **P0** (number of rpm ignition load). On the left is displayed **P0** blinking, on the right the current rpm.
- keeping button “A” pressed (the display passes to **0A** and the rpm is indicated blinking) and pressing the button “+” or “-”, it is possible to modify the rpm number of 10 rpm within the pre-set limits (Parameter P403.00).

NOTE:

The value set for P0 should be greater than the value set for P1. The base unit controls the setting values. If the setting rules are violated, the appliance goes into lockout and the error message Loc is displayed: 225.

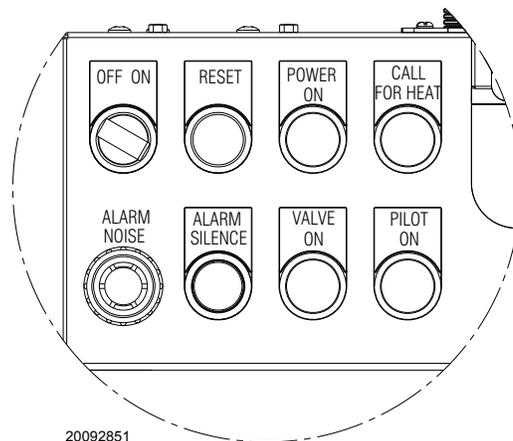


Fig. 168

Key (Fig. 168)

- “OFF/ON” switch
- “RESET” signal button
- “POWER ON” signal
- “CALL FOR HEAT” signal
- “ALARM NOISE” acoustic signal
- “ALARM SILENCE” button
- “VALVE ON” signal
- “PILOT” signal”

- Press “i/reset” to transfer the setting value into the internal memory.
- The burner proceeds with the ignition phase. If at the end of the safety time the flame does not appear, the burner restarts in automatic mode (it carries out a maximum of 3 attempts). The indications of the sequence of the phases on the display continue to blink to signal that we are still in the start-up procedure (manual operation).

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.

Turn the screw V1 of the gas valve lightly towards the “+” sign (Fig. 170 at page 57). If, however, at the end of the safety time the burner starts but then switches off, the burner goes into lockout and the display shows **Loc:7** blinking (disappearance of the flame when in operation).

Press “i/reset”, the display shows **400:Set**. Exit the manual operation mode by several times pressing “ESC” (press the keys “+” and “-” contemporaneously). The display shows **Loc:7** fixed. Press “i/reset” to unblock the LME7.

(List of error codes Tab. U at page 63).

NOTE:

To go back to manual mode it is necessary to turn the “ON/OFF” selector to “OFF” and repeat the first start-up sequence with the technician programming mode. If the selector remains on “ON” the burner restarts in automatic mode (it normally carries out all the ignition phases without stopping, at the end of the pre-purging time, at point P0).

- Turn the screw V1 towards the “+” sign (Fig. 170 at page 57).
- The burner is ignited, the program continues to the minimum load position P1. On the left is displayed P1 blinking, on the right the current rpm.
- keeping button “A” pressed (the display passes to 1A and the rpm is indicated blinking) and pressing the button “+” or “-”, it is possible to modify the rpm number of 10 rpm within the limits pre-set by the OEM (Parameter P403.01).
- Check the appearance of the flame, if possible, or the value of the CO and CO₂ to understand whether the burner has been sufficiently calibrated (first maximum calibration). If necessary use the screw V2 of the gas valve (turn towards the “+” sign to increase the gas, towards the “-” sign to decrease the gas) (Fig. 170 at page 57).

NOTE:

After the control box has remained in the same setting phase for some time (example point P1), the display exits from the regulation of the number of revs. To re-enter it is necessary to carry out the procedure with access using the technician's password (SO).

- With the button “i/reset” the setting value is confirmed in the internal memory.
- **oP: P1** is displayed quickly. The fan rpm passes to the value for the nominal load P2. On the left is displayed P2 blinking, on the right the current rpm.
- Keeping button “A” pressed (the display passes to 2A and the rpm is indicated blinking) and pressing the button “+” or “-”, it is possible to modify the rpm number of 10 rpm within the limits pre-set by the OEM (Parameter P403.02).
- Check the appearance of the flame, if possible, or the value of the CO and CO₂ to understand whether the burner has been sufficiently calibrated (first maximum calibration). If necessary use the screw V1 of the gas valve (turn towards the “+” sign to increase the gas, towards the “-” sign to decrease the gas) (Fig. 170 at page 57).
- With the button “i/reset” the setting value is confirmed in the internal memory.
- From here the speeds of the low flame P1 or the high flame P2 can be changed as described above, or else it is possible to end the setting process and pit the burner in automatic mode by pressing several times “ESC” (press “+” or “-” and connect the external modulation control (control with 3 points or analogue signal). In the automatic operation position the output requisites of the external load regulator are valid.

NOTE:

To memorise the settings in the PME... program module it is necessary to carry out a manual backup. See “Backup” on page 45.



Eventual modifications to the parameters and the settings should be set and saved in the memory on-board the unit.

To save the modified settings of the PME7... program module, the backup should be activated manually. If this is not respected you risk losing the safety functions.



At the first start-up, or else after replacing the program module, it is necessary to check, immediately after the reset process, the sequence of the functions and the settings of the parameters. If this is not respected you risk losing the safety functions.



If the parameters have been changed, you need to make a backup! If this is not respected you risk losing the safety functions.

6.4.2 Checking the modulating operation (automatic operation)



Before setting the burner in modulating operation carry out the procedure of “Pre-setting the points P0 (ignition), P1 (minimum) and P2 (maximum)” (Paragraph 6.3.1 on page 54) and of “First burner start-up” (Paragraph 6.4.1 on page 55).

- Electric voltage is available (indicator light “POWER ON” must be on).
- Turn the “ON/OFF” selector to “ON”.
- Make sure that the external modulation control (control with 3 points or analogue signal) is connected and working correctly.

NOTE:

When the burner is operating the AZL display shows “oP:” meaning modulating operation. The display after “oP:” indicates the value in percentage of the speed. The speed corresponding to 100% is that of point P2 (maximum speed).

To calculate approximately the number of fan revolutions from the percentage “oP” it is necessary to multiply the speed set at point P2 by the percentage read (for example, with P2=6000rpm and oP=20% the speed of the fan is about 1200rpm).

If the speed set at point P2 is modified (to lower the burner output, for example) also the current value, equal to “oP”, is modified (e.g.. P2=5000 rpm and oP=20% the fan speed is about 1000 rpm).

6.5 Burner adjustment

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

The burner application at the generator, the adjustment and the testing must be carried out in compliance with the instruction manual of the generator itself, including the control of the concentration of CO and CO₂ in the flue gases and of their temperature.

Check in sequence:

- max output
- min output
- ignition output

The **MAX output** should be equal to the value requested by the boiler used. To increase or decrease its value use the external modulation control.

Measure the gas delivery on the counter to precisely establish the burnt output.

Using a smoke analyser, measure the value of the CO₂ or the O₂ in order to optimise the burner calibration.

The correct values are: CO₂ 8.2 - 9% (for methane).

To correct these values act on the gas valve in the following way:

- to increase the gas delivery and the CO₂: turn the V1 screw towards the "+" sign (Fig. 170);
- to reduce the gas delivery and the CO₂: turn the V1 screw towards the "-" sign (Fig. 170);

The **MIN output** should be equal to the value requested by the boiler used. To increase or decrease its value use the external modulation control.

Measure the gas delivery on the counter to precisely establish the burnt output.

Using a smoke analyser, measure the value of the CO₂ or the O₂ in order to optimise the burner calibration.

The correct values are: CO₂ 7.8 - 8.5% (for methane).

To correct these values act on the gas valve in the following way:

- to increase the gas delivery and the CO₂: turn the V2 screw towards the "+" sign;
- to reduce the gas delivery and the CO₂: turn the V2 screw towards the "-" sign.

The **IGNITION output** can be found within area A highlighted in the firing rate (Fig. 5 on page 9). To raise or lower its value, adjust the parameter P0) using the display (Fig. 33 on page 33).



Do not change the adjustments of the valve.

6.5.1 Optimum calibration values

	MIN output		MAX output	
	CO ₂ (%)	O ₂ (%)	CO ₂ (%)	O ₂ (%)
Methane	8	6.6	8.5	5.7
LPG	9.5	6.4	10	5.6

Tab. P

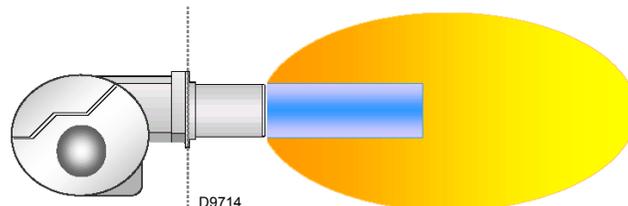


Fig. 169

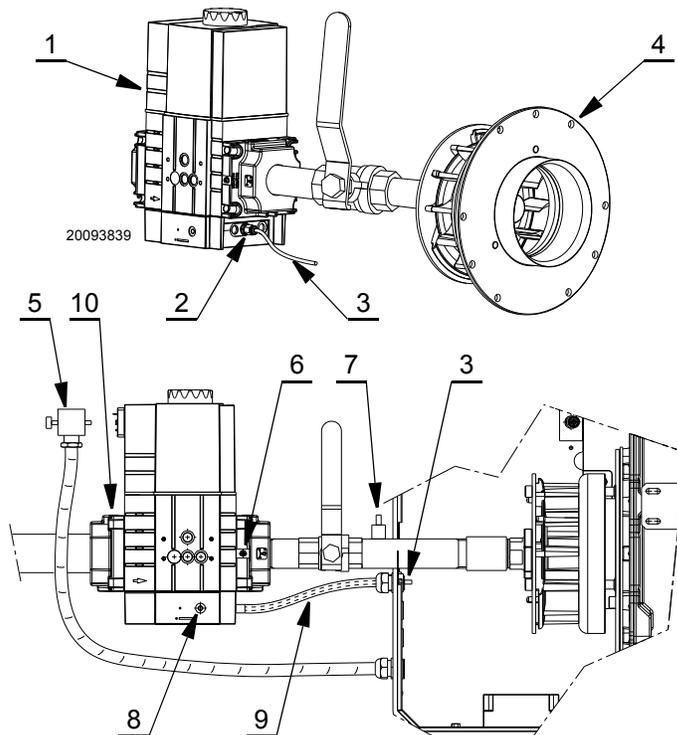


Fig. 170

Key (Fig. 170)

- 1 Gas valve
- 2 Quick coupling
- 3 Compensation pipe (T)
- 4 Air/gas mixer in the circuit of the suction line
- 5 Electronic valve connection (XV1)
- 6 Maximum gas flow adjustment (V1)
- 7 Downstream pressure test point (P2)
- 8 Minimum gas flow adjustment (V2)
- 9 Metallic protective device
- 10 Upstream pressure test point (P1)

6.6 Switching off the burner

Turn the “ON/OFF” switch to “OFF” (Fig. 168 on page 55).

Disable the electrical supply. If the burner is off for long periods, close the manual gas gates.



WARNING

Turning the “ON/OFF” switch to “OFF” position during the burner post-ventilation phase, the equipment shuts down after a few seconds (ERROR LOC:83).

6.7 Load controller inputs

Selecting the default output analogue source/phases input with 3 positions (P654)

The following input signals can be selected and managed using the parameter P654.

- 3 positions phase input (ASZxx.3x feedback potentiometer necessary/depending on the sequence of the program)

- 0...10 V
- 0...135 Ω
- 0...20mA
- 4...20 mA with lockout at I <4 mA (AZL2...: Loc: 60)

NOTE:

For the connections, see the wiring diagrams.

6.8 Combustion head

The combustion head comprises a highly heat resistant cylinder whose surface features numerous holes, encased in a metal “mesh”.

The air-gas mixture is pushed inside the cylinder and out of the head through the holes in the perimeter.

Combustion starts when the air-gas mixture is ignited by a spark generated by the electrode.

The metal “mesh” is the combustion head's most essential element since it improves burner performance considerably.

The flame developed on the surface of the head is perfectly retained and adheres to the mesh when operating at the maximum setting.

This allows modulating ratios as high as 6:1, avoiding the danger of flashback when modulating is at its minimum.

The flame features an extremely compact geometry, meaning that there is no risk of contact between the flame and parts of the generator, consequently eliminating the possible problem of poor combustion.

The flame's structure means that smaller combustion chambers can be developed, designed to exploit this particular feature.



CAUTION

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

7 Maintenance

7.1 Notes on safety for the maintenance

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

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



DANGER

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

Before carrying out any maintenance, cleaning or checking operations:



DANGER

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



DANGER

Close the fuel interception tap.



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

7.2 Maintenance programme

7.2.1 Maintenance frequency



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

7.2.2 Checking and cleaning



The operator must use the required equipment during maintenance.

Combustion

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

Significant differences with respect to the previous measurements indicate the points where most 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.

Burner

Check that there are not excess wear or loosen screws.
Clean the outside of the burner.

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.

Electrical wiring

Check that the burner and gas train electrical connections are correct.

Boiler

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

Gas leaks

Make sure that there are no gas leaks in the following areas:

- on the meter-burner pipework
- on the mixer/valve connection
- on the burner fastening flange where the seal is fitted.

Electrode unit

Make sure neither the electrodes nor probe feature marked warping or oxidation on surfaces. Make sure distances are still in line with those indicated in this manual, readjusting to the right values where necessary. Where necessary, remove oxide from the surface of the probe with abrasive paper.

Gas train

Check valve setting and proportionality of operation by analysing flue gases. Check the valve/manifold compensation pipe.

Gas filter

Change the gas filter when it is dirty.

Combustion

In case the combustion values found at the beginning of the intervention do not respect the standards in force or, in any case, do not correspond to a proper combustion, contact the Technical Assistant in order to carry out the necessary adjustments.

NOx expected emissions on natural gas (expressed in ppm@3% O₂)

Sub 30		Sub 20		Sub 9	
CO ₂ (%)	O ₂ (%)	CO ₂ (%)	O ₂ (%)	CO ₂ (%)	O ₂ (%)
8.5 ~ 8.75	5.8 ~ 5.4	8.0 ~ 8.5	6.7 ~ 5.8	7.25 ~ 7.75	8.0 ~ 7.1

Tab. Q

7.2.3 Measuring circuit for detector current measurement



Simultaneous operation of QRA... and ionization probe is not permitted!
If not observed, there is a risk of impairment of safety functions.

The minimum current necessary for the control box operation is 1 μA. The burner normally supplies a higher current value, so that no check is needed.

Anyway, if you want to measure the ionisation current, you need to open the connector (CN1) fitted on the red wire and insert a microammeter.

Check of signal flame

Display value:

MIN 1 μA = 20%
MAX 40 μA = 100%



This display is only possible in operating mode or standby!

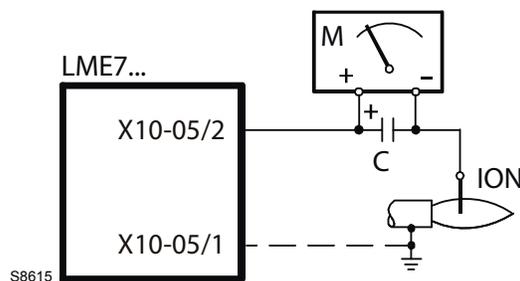


Fig. 171

Key (Fig. 171)

- C Electrolytic condenser 100...470 μF; DC 10...25 V
- ION Ionization probe
- M Microammeter Ri max. 5,000 Ω

7.3 Safety components

The safety components must be replaced according to the limit of the lifetime cycles indicated in the Tab. R.

The lifetime cycles specified, are not referred to the warranty time indicated in the delivery and payment conditions.

Safety component	Lifetime cycle
Control box	10 years or 250,000 operating cycles
Flame sensor	10 years or 250,000 operating cycles
Solenoid valves	10 years or 250,000 operating cycles
Pressure switches	10 years or 250,000 operating cycles
Gas pressure regulator	15 years
Servomotors (electronic cam)	10 years or 250,000 operating cycles
Solenoid oil valves	10 years or 250,000 operating cycles
Oil regulator	10 years or 250,000 operating cycles
Fuel pipes/ connectors (metallic)	10 years
Hoses	5 years or 30,000 pressure cycles
Fan wheel	10 years or 500,000 startings

Tab. R

7.4 Recommended preventive maintenance schedule

Operation and maintenance instructions are intended for general applications.

For specific operating and maintenance instructions, consult the equipment manufacturer.

Test/Inspection	Frequency
Check gages, monitors, and indicators	DAILY
Check instrument and equipment settings	DAILY
Check burner flame	DAILY
Check igniter	WEEKLY
Check flame signal strength	WEEKLY
Check flame failure detection system	WEEKLY
Check firing rate control	WEEKLY
Make aural and visual check of pilot and main fuel valves	WEEKLY
Check flue, vent, stack, or outlet dampers	MONTHLY
Test low draft, fan air pressure, and damper position interlocks	MONTHLY
Check low-fire start interlock	MONTHLY
Test high and low gas pressure interlocks	MONTHLY
Recalibrate all indicating and recording gages	SEMI-ANNUALLY
Check flame failure detection system components	SEMI-ANNUALLY
Check firing rate control	SEMI-ANNUALLY
Check piping and wiring of all interlocks and shutoff valves	SEMI-ANNUALLY
Inspect burner components	SEMI-ANNUALLY
Flame failure detection system, test for hot refractory hold-in	ANNUALLY
Replace flame rod in accordance with manufacturer's instructions	ANNUALLY
Conduct a combustion test	ANNUALLY
Check all coils and diaphragms; test other operating parts of all safety shutoff and control valves	ANNUALLY
Test fuel valve interlock switch in accordance with manufacturer's instructions	ANNUALLY
Perform leakage test on pilot and main gas valves	ANNUALLY
Test purge air switch in accordance with manufacturer's instructions	ANNUALLY
Test low-fire start interlock in accordance with manufacturer's instructions	ANNUALLY
For gas-fired burners, check sediment trap and gas strainers	AS REQUIRED
Flame failure detection system, test for hot refractory hold in	AS REQUIRED

Tab. S

7.5 Opening and closing the burner



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



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



Close the fuel inlet connection.



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

8 Operation, indication, diagnostics

8.1 Control sequence in the event of fault

If lockout occurs, the outputs for the fuel valves, the burner motor and the ignition equipment are immediately deactivated (<1 second).

Cause	Response
Mains voltage failure	Restart
Voltage below undervoltage threshold	Safety shutdown
Voltage above undervoltage threshold	Restart
Extraneous light before safety time	Lockout
Extraneous light during waiting time	Start prevention, lockout after approx. 30 seconds at the latest
No flame at the end of safety time	Lockout end of safety time
Loss of flame during operation	Factory setting: lockout Can be parameterized: (depending on program module 1 x repetition)
Air pressure switch has welded in the operating position	Start prevention, lockout after 30 seconds
Air pressure switch has welded in the no-load position	Lockout at the end of the specified time
No air pressure signal on completion of the specified time	Lockout, with breakdown time ≥ 0.3 seconds
POC contact is open during startup	Lockout, approx. 5 seconds after temperature thermostat or pressurestat or temperature or pressure switch on
Pressure switch-min: failure during operation	Shutdown and start prevention

Tab. T

In the event of lockout, the LME71... remains locked and the red fault signal lamp lights up. The burner control can immediately be reset. This state is also maintained in the event of mains failure.

8.2 Error code list with operation via internal LED

Error code	Clear text	Possible cause
bAC Er3	Fault of compatibility program module to basic unit during backup process	Program sequence of program module does not match the basic unit
Err PrC	Fault of program module	<ul style="list-style-type: none"> - Error in data content of program module - No program module fitted
Loc 2	No establishment of flame at the end of the safety time	<ul style="list-style-type: none"> - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner, no fuel - Faulty ignition equipment
Loc 3	Air pressure faulty (air pressure switch welded in no-load position), decrease to specified time (air pressure switch) response time)	<ul style="list-style-type: none"> - Air pressure switch faulty - Loss of air pressure signal after specified time - Air pressure switch is welded in no-load position
Loc 4	Extraneous light	Extraneous light when burner startup
Loc 5	Air pressure faulty, air pressure switch welded in working position	<ul style="list-style-type: none"> - Time out air pressure switch - Air pressure switch is welded in working position
Loc 6	Fault of actuator	<ul style="list-style-type: none"> - Actuator faulty or blocked - Faulty connection - Wrong adjustment
Loc 7	Loss of flame Too many losses of flame during operation (limitation of repetitions)	<ul style="list-style-type: none"> - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner
Loc 8	---	Free
Loc 9	---	Free

Error code	Clear text	Possible cause
Loc 10	Error not relatable (application), internal error	Wiring error or internal error, output contacts, other faults
Loc 12	Valve proving	Fuel valve 1 leak
Loc 13	Valve proving	Fuel valve 2 leak
Loc 14	POC error	Error valve closure control POC
Loc 20	Gas pressure switch min open	Gas shortage
Loc 22	Safety loop open	<ul style="list-style-type: none"> – Gas pressure switch-max open – Safety limit thermostat cut out
Loc 60	Analog power source 4...20 mA, I < 4 mA	Wire breakage
Loc: 83	Faulty PWM fan	<ul style="list-style-type: none"> – PWM fan does not reach the target speed within the pre-set period of time, or – After reaching the target speed, the PWM fan leaves the tolerance band again (P650) for a time exceeding the tolerance time speed deviation (P660)
Loc 138	Restore process successful	Restore process successful
Loc 139	No program module detected	No program module identified
Loc 167	Manual locking	Manual locking
Loc: 206	AZL2... incompatible	Use the latest version
Loc: 225	Faulty PWM fan	<ul style="list-style-type: none"> – Fan speed dropped below the minimum prepurge PWM (P675.00) after reaching the prepurge speed, or – After reaching the ignition load speed, the maximum ignition load PWM (P675.01) was exceeded
Loc: 226	Faulty PWM fan	Parameterization error: <ul style="list-style-type: none"> – Speed low-fire > speed high-fire, or – Low-fire = 0 rpm, or – Maximum speed = 0 rpm
Loc: 227	Faulty PWM fan	One or several parameters violate the minimum/maximum limit
rSt Er1	Error in compatibility program module to basic unit during restore process	Program sequence of program module does not match the basic unit
rSt Er2	Error in compatibility program module to basic unit during restore process	Hardware of basic unit does not match the program module
rSt Er3	Error during the restore process	<ul style="list-style-type: none"> – Program module faulty – Program module removed during restore process

Tab. U

8.3 Resetting of burner control

When a lockout occurs, the burner control can be immediately released by pressing the "RESET" button.

NOTE:

For the meaning of the diagnostic codes and errors, see the chapter "Error code list with operation via internal LED" on page 62.

8.3.1 Diagnostics of cause of fault

After lockout, the red fault signal lamp remains steady on. In that condition, visual diagnostics of cause of fault according to the error

code table can be activated by pressing the lockout reset button (info button) for more than 3 seconds.

Pressing the lockout reset button (info button) again for at least 3 seconds, interface diagnostics will be activated.

If, by accident, interface diagnostics has been activated, in which case the slightly red light of the signal lamp flickers, it can be deactivated by pressing again the lockout reset button (info button) for > 3 seconds.

The instant of switching over is indicated by a yellow light pulse.

Error code table

Red blink code of fault signal lamp	Possible cause
2 x blinks	No establishment of flame at the end of the safety time – Faulty or soiled fuel valves – Faulty or soiled flame detector – Poor adjustment of burner, no fuel – Faulty ignition equipment
4 x blinks	Extraneous light on burner startup
5 x blinks	Time supervision air pressure switch – Air pressure switch welded in working position
7 x blinks	Too many losses of flame during operation (limitation of repetitions) – Faulty or soiled fuel valves – Faulty or soiled flame detector – Poor adjustment of burner
8 x blinks	Free
9 x blinks	Free
10 x blinks	Wiring error or internal error, output contacts, other faults
12 x blinks	Valve proving – Fuel valve 1 leaking
13 x blinks	Valve proving – Fuel valve 2 leaking
14 x blinks	Error in connection with valve closure control POC
15 x blinks	Error code ≥ 15 (e.g. depending on type of program module) Error code 20: Failure of gas pressure switch-min Error code 22: Error of safety loop

Tab. V

During the time the cause of fault is diagnosed, the control outputs are deactivated

- Burner remains shut down
- External fault indication (alarm) at terminal X2-03, pin 3 steady on

Diagnostics of cause of fault is quit and the burner switched on again by resetting the burner control.

Press the lockout reset button (info button) for about 1 second (< 3 seconds).

8.3.2 First startup with a new program module or in case of replacement of program module



Alternately



- Display shows alternately **rSt** and **PrC**.
- Display shows the replacement of the program module.
- Signal lamp blinks red once and yellow twice alternately.



Press for >3 seconds to start data download from the program module.
Signal lamp blinks yellow.

- The process of 3 seconds is supported by a short flash of the yellow signal lamp.

Note:

If you press for <3 seconds, data download does not start. To start the restore process again, the LME7... must be reset by switching mains ON/OFF.



Display shows run during download (restore process) of the program sequence.



Alternately



- Display shows alternately **End** and **rSt**.
- Display shows the end of data exchange.

After 2 minutes, the unit changes to **Loc 138**



Alternately



- After the restore process, the unit is automatically in the lockout position (LOC 138) and must be reset for operation!



Press for >1 second to reset the unit.

Display: **OFF**



WARNING

On first startup or after exchange of the program module, the sequence of functions and parameter settings must be checked upon completion of the restore process.

8.4 Manual restore


 and

 > 1s



Press  and  simultaneously for >1 second (Escape) for starting the manual restore process. Parameter **PrC** appears.

Display: **PrC**


 or




Press  and  for parameter **rSt**.

Display: **rSt**


 1...3s



run appears during download (restore process) of program sequence.



Alternately



After the restore process, the unit is automatically in the lockout position (LOC 138) and must be reset for operation!

After 2 minutes, the unit changes to **Loc 138**




Alternately



After the restore process, the unit is automatically in the lockout position (LOC 138) and must be reset for operation!



 > 1 s



Press   for >1 second to reset the unit.

Display: **OFF**

8.4.1 Errors during the restore process



Alternately with



or



or



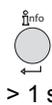
Display shows alternately **rSt** and **Er1**, **Er2** or **Er3**.

For meaning of a possible cause, see chapter “**Error code list with operation via internal LED**” on page 62

NOTE:

During the restore process, all settings and parameters are written from the program module to the basic unit's onboard memory. In the process, it is possible that previous program sequences, parameters and settings in the onboard memory will be overwritten!

8.4.2 Reset



When pressing  for 1...3 seconds, OFF is displayed.
When the button is released, the basic unit is reset.

NOTE:

For meaning of the error and diagnostic codes, see chapter “**Error code list with operation via internal LED**” on page 62.

9 List of parameters PME71.901...

The following pages have the Menus and the list of parameters for setting up the LCD AZL 2... Display for the LME 71... control box with PME 71.901...

The values shown in the "Factory setting" column, in the table below, are only given as a guide (Control box not programmed).

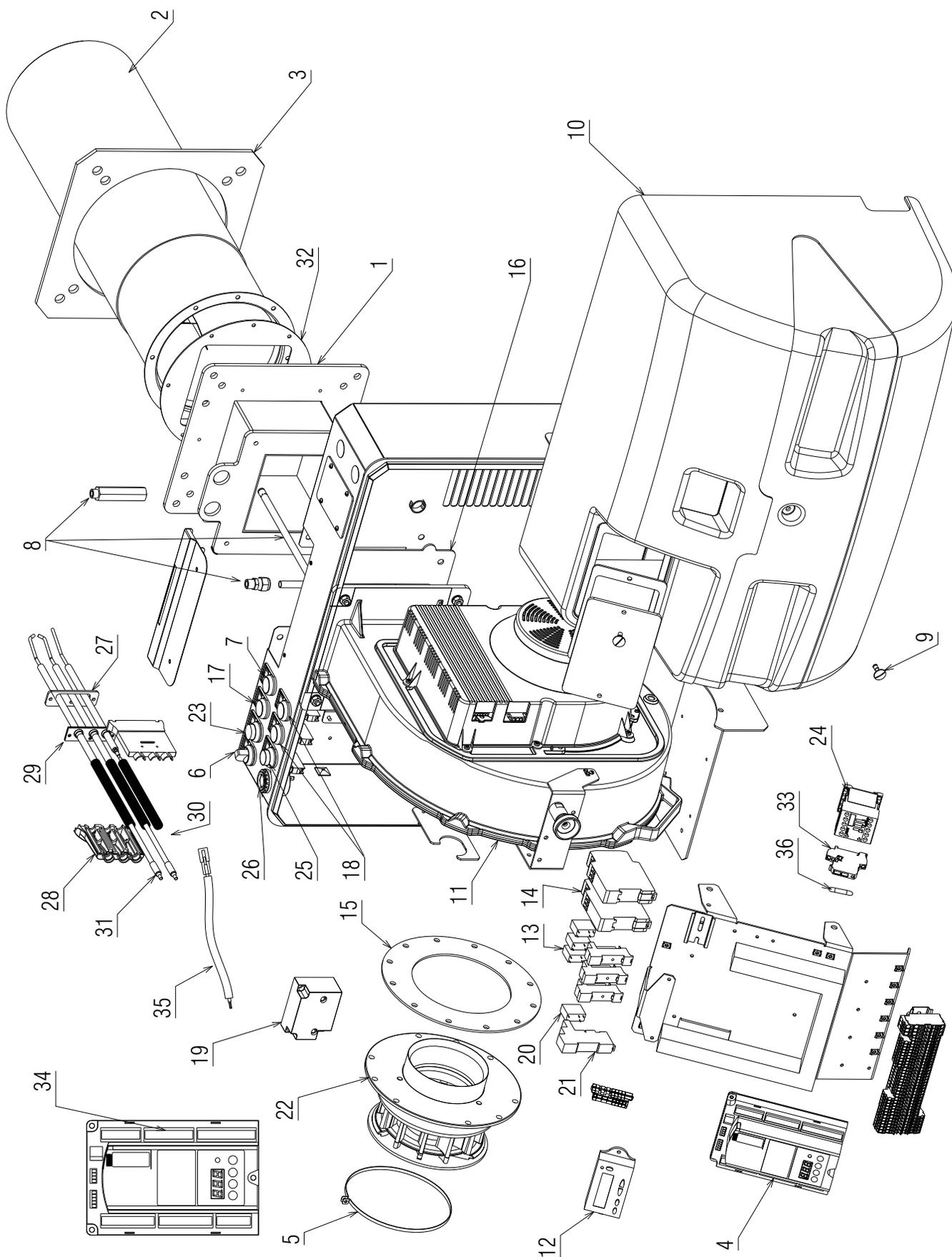
Parameter		Modification	Values interval		Resolution	Factory setting	Password reading level to level	Password writing level to level
Nr.	Description		Min.	Max.				
000	Internal parameter							
41	Password for heating engineering (4 characters)	Modification	xxxx	xxxx	---	---	---	OEM
42	Password OEM (5 characters)	Modification	xxxxx	xxxxx	---	---	---	OEM
60	Backup/Restore	Modification	Restore	Backup	---	---	---	SO
100	General notes							
102	Identification date	Reading only	---	---	---	---	Info	---
103	Identification number	Reading only	0	9999	1	0	Info	---
113	Burner identification	Modification	x	xxxxxxxx	1	burnErd	Info	SO
123	Step control min output.	Modification	1%	10%	0.1	2	SO	SO
140	Displaying the unit operation mode and displaying AZL2... 1 = standard (program phase) 2 = flame 1 (QRA.../ION) 3 = flame 2 (QRB.../QRC...) @ not used 4 = output active (output value)	Modification	1	4	1	4	SO	SO
164	Number of resettable start-ups	Resettable	0	999999	1	0	Info	Info
166	Total number of start-ups	Reading only	0	999999	1	0	Info	---
170.00	Switching cycles relay contact K12	Reading only	0	999999	1	0	Info	---
170.01	Switching cycles relay contact K11	Reading only	0	999999	1	0	Info	---
170.02	Switching cycles relay contact K2	Reading only	0	999999	1	0	Info	---
170.03	Switching cycles relay contact K1	Reading only	0	999999	1	0	Info	---
171	Max. relay commutation cycles	Reading only	0	999999	1	0	Info	---
200	Burner Control							
224	Air pressure switch special time	Modification	0s	13.818 s	0.294 s	13.818 s	SO	OEM
225	Pre-purging time - 2.1 seconds	Modification	0s	1237 s	4.851 s	29.106 s	SO	OEM
226	Spark pre-ignition time	Modification	1.029 s	37.485 s	0.147 s	6.174 s	SO	OEM
230	Interval: End of the safety time - resetting of the load regulator	Modification	3.234 s	74.97 s	0.294 s	9.408 s	SO	OEM
234	Post-purging time	Modification	0s	1237 s	4.851 s	19.404 s	SO	OEM
235	Air pressure switch input 0 = inactive 1 = active	Modification	0	1	1	0	SO	OEM
240.00	Repetitions meter Limit value of flame loss during operation	Modification	0	2	1	0	SO	OEM
240.01	Repetitions meter Limit value of No flame at the end of the safety time	Modification	0	1	1	1	SO	OEM
241.00	Valves Seal Control 0 = OFF 1 = ON	Modification	0	1	1	1	SO	OEM
241.01	Valves Seal Control 0 = during pre-purging 1 = during post-purging	Modification	0	1	1	1	SO	OEM
241.02	Valves Seal Control 0 = according to P241.01 1 = during pre-purging and post-purging	Modification	0	1	1	0	SO	OEM
242	Evacuation of valve seal control test area	Modification	0s	2.648 s	0.147 s	2.648 s	SO	OEM
243	Atmospheric pressure valve seal control time test	Modification	1.029 s	37.485 s	0.147 s	10.290 s	SO	OEM
244	Filling the valve seal control test area	Modification	0s	2.648 s	0.147 s	2.648 s	SO	OEM
245	Gas pressure valve seal control time test	Modification	1.029 s	37.485 s	0.147 s	10.290 s	SO	OEM
257	Post-ignition time -0,3 seconds	Modification	0s	13.23 s	0.147 s	2.205 s	SO	OEM
400	Ratio control (operation)							
403.00	Fan speed: Ignition load speed (P0)	Modification	800 rpm	900 rpm	10 rpm	3000 rpm	SO	SO
403.01	Fan speed: Low flame speed (P1)	Modification	800 rpm	900 rpm	10 rpm	1200 rpm	SO	SO

Parameter		Modification	Values interval		Resolution	Factory setting	Password reading level to level	Password writing level to level
Nr.	Description		Min.	Max.				
403.02	Fan speed: High flame speed (P2)	Modification	800 rpm	900 rpm	10 rpm	5700 rpm	SO	SO
500	Ratio control							
503.00	Speed without PWM fan flame: Standby speed	Modification	0 rpm	9000 rpm	10 rpm	0 rpm	SO	SO
503.01	Speed without PWM fan flame: Speed of impurity purge	Modification	800 rpm	9000 rpm	10 rpm	5700 rpm	SO	SO
516.00	Limit of ignition load speed (P0): Minimum limit	Modification	800 rpm	9000 rpm	10 rpm	800 rpm	SO	OEM
516.01	Limit of ignition load speed (P0): Maximum limit	Modification	800 rpm	9000 rpm	10 rpm	9000 rpm	SO	OEM
517.00	Limit of low flame speed (P1): Minimum limit Modification	Modification	800 rpm	9000 rpm	10 rpm	800 rpm	SO	OEM
517.01	Limit of low flame speed P1: Maximum limit	Modification	800 rpm	9000 rpm	10 rpm	9000 rpm	SO	OEM
518.00	Limit of high flame speed P2: Minimum limit	Modification	800 rpm	9000 rpm	10 rpm	800 rpm	SO	OEM
518.01	Limit of high flame speed P2: Maximum limit	Modification	800 rpm	9000 rpm	10 rpm	9000 rpm	SO	OEM
519	Maximum fan speed	Modification	3000 rpm	9000 rpm	10 rpm	5830 rpm	SO	OEM
522	Low flame acceleration @ high flame	Modification	2,058 s	74.970 s	0.294 s	14,994 s	SO	OEM
523	High flame acceleration @ low flame	Modification	2,058 s	74.970 s	0.294 s	14,994 s	SO	OEM
558	Mode: Information UDS status 0 = PC tool mode 1 = PWM mode 2 = actuator mode 3 = internally 4 = internally 5 = internally	Reading only	0	5	1	0	SO	---
559	PWM mode 0 = open loop control 1 = PID control 2 = safety mode (PWM limits)	Modification	0	2	1	1	SO	OEM
560	Mode: Control of pneumatic ratio 0 = OFF 1 = PWM fan 2 = air damper actuator	Reading only	0	2	1	1	SO	---
600	Output setting							
644	Number of pulses for rotation	Modification	2	5	1	3	SO	OEM
646	Time of speed control adjustment	Modification	1.029 s	2,058 s	0.147 s	2,058 s	SO	OEM
650.00	Speed tolerance range: Stopping speed	Modification	1%	5%	1%	1%	SO	OEM
650.01	Speed tolerance range: Rapid stopping speed	Modification	1%	10%	1%	3%	SO	OEM
654	Analogue input (feedback potentiometer ASZxx.3x required) 0 = input passage 3 positions 1 = 0...10 V 2 = 0...135 Ω 3 = 0...20 mA 4 = 4...20 mA with lockout at I <4 mA 5 = 4...20 mA	Modification	0	5	1	1	SO	SO
658.00	PWM fan values: PWM starting	Modification	1%	100%	1%	25%	SO	OEM
658.01	PWM fan values: Min. operating interval PWM	Modification	0%	20%	1%	0%	SO	OEM
658.02	PWM fan values: Max. operating interval. PWM	Modification	80%	100%	1%	100%	SO	OEM
659.00	Ramp time of fan: Min. low-fire to high-fire	Reading only	0s	74.970 s	0.294 s	2,058 s	SO	---
659.01	Ramp time of fan: Max. from high flame to low flame	Reading only	0s	74.970 s	0.294 s	74.970 s	SO	---
659.02	Ramp time of fan: Min. high-fire to low-fire	Reading only	0s	74.970 s	0.294 s	2,058 s	SO	---
659.03	Ramp time of fan: Max. high-fire to low-fire	Reading only	0s	74.970 s	0.294 s	74.970 s	SO	---
660	Tolerance time speed deviation	Reading only	0s	37.85 s	0.147 s	4.998 s	SO	---
674	Neutral interval (control offset permitted)	Modification	0 rpm	255 rpm	1 rpm	40 rpm	SO	OEM
675.00	PWM: Min. PWM with pre-purging, SEC	Modification	0%	100%	1%	86%	SO	OEM
675.01	PWM: Max. PWM with ignition load, SEC	Modification	0%	100%	1%	34%	SO	OEM
676	Gain factor speed control	Reading only	0	255	1	112	SO	---
677	Integral action time speed control	Reading only	0s	37.485 s	0.147 s	0.441 s	SO	---
678	Derivative action time speed control	Reading only	0s	37.485 s	0.147 s	0s	SO	---
679.00	Constant time speed control PT1: Min. speed interval from high flame to low flame	Modification	0s	37.485 s	0.147 s	6,027 s	SO	OEM
679.01	Constant time speed control PT1: Average speed interval from high flame to low flame	Modification	0s	37.485 s	0.147 s	6,027 s	SO	OEM

Parameter		Modification	Values interval		Resolution	Factory setting	Password reading level to level	Password writing level to level
Nr.	Description		Min.	Max.				
679.02	Constant time speed control PT1: Upper speed interval from high flame to low flame	Modification	0s	37.485 s	0.147 s	6,027 s	SO	OEM
679.03	Constant time speed control PT1: Total speed interval from high flame to low flame	Modification	0s	37.485 s	0.147 s	6,027 s	SO	OEM
680.00	Speed interval for constant time PT1: Upper speed interval threshold	Modification	800 rpm	9000 rpm	10 rpm	4000 rpm	SO	OEM
680.01	Speed interval for constant time PT1: Lower speed interval threshold	Modification	800 rpm	9000 rpm	10 rpm	2000 rpm	SO	OEM
700	Error history							
701.00	Current error: Error code	Reading only	2	255	1	---	Service	---
701.01	Current error: Start-up meter reading	Reading only	0	999999	1	---	Service	---
701.02	Current error: MMI phase	Reading only	---	---	---	---	Service	---
701.03	Current error: Power value	Reading only	0%	100%	1	---	Service	---
702.00	Error history former 1: Error code	Reading only	2	255	1	---	Service	---
702.01	Error history o1: Start-up meter reading	Reading only	0	999999	1	---	Service	---
702.02	Error history o1: MMI phase	Reading only	---	---	---	---	Service	---
702.03	Error history o1: Power value	Reading only	0%	100%	1	---	Service	---
.								
.								
.								
711.00	Error history former 10: Error code	Reading only	2	255	1	---	Service	---
711.01	Error history former 10: Start-up meter reading	Reading only	0	999999	1	---	Service	---
711.02	Error history former 10: MMI phase	Reading only	---	---	---	---	Service	---
711.03	Error history former 10: Power value	Reading only	0%	100%	1	---	Service	---
900	Process data							
920	Current PWM signal fan	Reading only	0%	100%	1%	---	Service	---
936	Normalized speed	Reading only	0%	100%	0.01%	---	Service	---
951	Mains voltage	Reading only	0 V	LME 71.000 A1: 175 V LME 71.000 A2: 350 V	1 V	---	Service	---
954	Flame intensity	Reading only	0%	100%	1%	---	Service	---

Tab. W

A Appendix - Spare parts



N.	CODE	20092672	20092651	20092611	20092613	20082125	DESCRIPTION	*
1	20092987	•	•	•	•	•	ASSEMBLY MANIFOLD	
2	20092990	•	•				COMBUSTION HEAD	
2	20092991			•	•	•	COMBUSTION HEAD	
3	20005512	•	•	•	•	•	FLANGE GASKET	A
4	20052441	•	•	•	•	•	CONTROL BOX	B
5	20094089			•	•		MIXER RING	
6	20027021	•	•	•	•	•	SELECTOR SWITCH	
7	20036019	•	•	•	•	•	WHITE SIGNAL LIGHT	A
8	20094105	•	•				PILOT TUBE	
8	20094107			•	•	•	PILOT TUBE	
9	3003766	•	•	•	•	•	SCREW	
10	20087050	•	•	•	•	•	COVER	B
11	20094083	•	•				VENTILATION ASSEMBLY	
11	20088083		•	•			VENTILATION ASSEMBLY	
11	20087051				•		VENTILATION ASSEMBLY	
12	20010967	•	•	•	•	•	DISPLAY	
13	3020128	•	•	•	•	•	RELAY	C
14	20073824	•	•	•	•	•	TIMER	B
15	20087581	•	•	•	•	•	SEAL	C
16	20093107	•	•	•	•	•	SEAL	C
17	20036017	•	•	•	•	•	GREEN SIGNAL LIGHT	A
18	20027020	•	•	•	•	•	YELLOW SIGNAL LIGHT	A
19	20052445	•	•	•	•	•	TRANSFORMER	B
20	3020068	•	•	•	•	•	RELAY	C
21	20043289	•	•	•	•	•	BASE	C
22	20094088	•	•				VENTURI	
22	20087584			•	•	•	VENTURI	
23	3013354	•	•	•	•	•	SIGNAL BUTTON	C
24	20094104	•	•				RELAY	C
24	20133291		•	•	•	•	3 POLE CONTACTOR	C
25	20010962	•	•	•	•	•	SIGNAL BUTTON	C
26	20031413	•	•	•	•	•	HORN	
27	3020280	•	•	•	•	•	SEAL	C
28	20049619	•	•	•	•	•	COVERING	
29	20049648	•	•	•	•	•	ELECTRODES ASSEMBLY	B
30	3020425	•	•	•	•	•	PROBE CONNECTION	A
31	3012393	•	•	•	•	•	ELECTRODE CONNECTION	A
32	20005511	•	•	•	•	•	SEAL	C
33	20079389	•	•	•	•	•	FUSE HOLDER	
34	20123734	•	•	•	•	•	CONNECTORS ASSEMBLY	B
35	20122099	•	•	•	•	•	PROBE CONNECTION	A
36	3014106	•	•	•	•	•	FUSE	A

*

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

Output power regulator kit for modulating operation

With the modulating operation, the burner continually adapts the power to the heat request, ensuring a high level of stability for the parameter controlled: temperature or pressure.

Two components should be ordered:

- the output power regulator to be installed on the burner;
- the probe to install on the heat generator.

Output regulator	
Type	Code
RWF55.5	20093954

Probe type	Range (°C) (bar)	Probe Code
Temperature	Water NI 1000 RTD	C5332020
	Air NI 1000 RTD	C5332021
	Water QAE 2020 RTD	C5332027
Pressure	0 - 15 PSI	C5332040
	0 - 60 PSI	C5332041
	0 - 150 PSI	C5332042
	0 - 200 PSI	C5332043
	0 - 300 PSI	C5332044

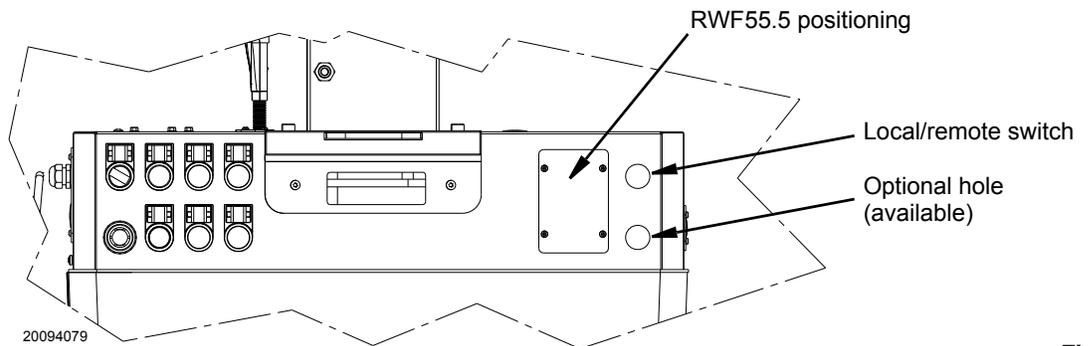


Fig. 1

Label for LPG operation

Apply the adhesive label as shown in Fig. 2, only for LPG operation.

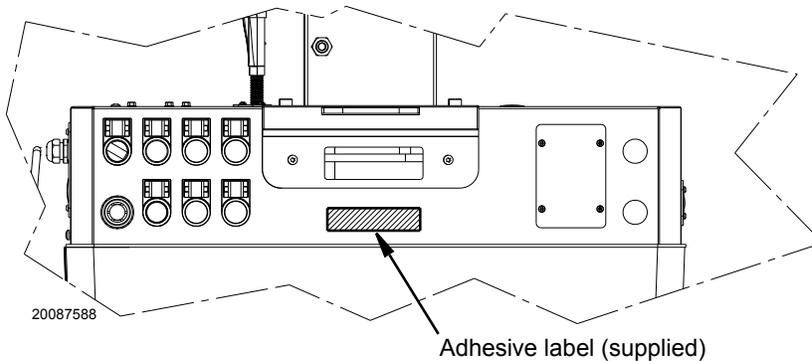


Fig. 2

Kit OCI410 interface for ACS410 software

Burner	Code
RX 700 S/PV RX 850 S/PV RX 1000 S/PV	20096826



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

Interface between burner control and PC. Facilitates viewing, handling and recording setting parameters on site in connection with the ACS410 software.

C Appendix - Burner start up report

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

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:	_____		

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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