

GB Premixed gas burners

Progressive two-stage or modulating operation



RX

CODE	MODEL	TYPE
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Translation of the original instructions

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1 Declarations

Declaration of conformity in accordance with ISO / IEC 17050-1

Manufacturer: RIELLO S.p.A.
 Address: Via Pilade Riello, 7
 37045 Legnago (VR)
 Product: Premixed gas burner
 Model: RX 700 S/PV
 RX 850 S/PV
 RX 1000 S/PV

These products are in compliance with the following Technical Standards:
 EN 676
 EN 12100
 and according to the European Directives:

GAD	2009/142/EC	Gas Devices Directive
MD	2006/42/EC	Machine Directive
LVD	2006/95/EC	Low Voltage Directive
EMC	2004/108/EC	Electromagnetic Compatibility

Such products are marked as follows:



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

Declaration of Conformity A.R. 8/1/2004 & 17/7/2009 – Belgium

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It is hereby certified that the apparatuses specified below conform with the model of the type described in the CE conformity declaration and they are produced and placed in circulation in conformity with the provisions defined in L.D. dated January 8, 2004 and July 17, 2009.

Product type: Premixed gas burner
 Model: RX 700 S/PV
 RX 850 S/PV
 RX 1000 S/PV

Standard applied: EN 676 and A.R. dated January 8, 2004 - July 17, 2009

Measured value:

RX 700 S/PV	CO max: 17 mg/kWh Max. NOx: 61 mg/kWh
RX 850 S/PV	CO max: 2 mg/kWh Max. NOx: 67 mg/kWh
RX 1000 S/PV	CO max: 13 mg/kWh Max. NOx: 66 mg/kWh

Controlling organisation: TÜV Industrie Service GmbH
 TÜV SÜD Gruppe
 Ridlerstrasse, 65
 80339 München DEUTSCHLAND

Manufacturer's Declaration

RIELLO S.p.A. declares that the following products comply with the NOx emission limits specified by German standard "1. BImSchV release 26.01.2010".

Product	Type	Model	Power
Premixed gas burner	854T3	RX 700 S/PV	135 ÷ 700 kW
	926T1	RX 850 S/PV	170 ÷ 880 kW
	891T3	RX 1000 S/PV	180 ÷ 1075 kW

Legnago, 10.10.2013

Executive Director
 RIELLO S.p.A. - Burner Department

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

2 Information and general warnings

2.1 Information about the instruction manual

2.1.1 Introduction

The instruction manual supplied with the burner:

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

Symbols used in the manual

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

2.1.2 General dangers

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



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



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



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

2.1.3 Other symbols



DANGER: LIVE COMPONENTS

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



DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.



DANGER: BURNING

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



DANGER: CRUSHING OF LIMBS

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



WARNING: MOVING PARTS

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



DANGER: EXPLOSION

This symbol signals places where an explosive atmosphere 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
Pag.	Page
Sec.	Section
Tab.	Table

2.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

- the instruction manual is delivered to the user by the system manufacturer, with the recommendation to keep it in the room where the heat generator is to be installed.
- The instruction manual shows:
 - the serial number of the burner;

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

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

2.2 Guarantee and responsibility

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



WARNING

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

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

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

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

3 Safety and prevention

3.1 Introduction

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

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

It is a good idea to remember the following:

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

In particular:

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

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

- Modification of the burner to alter its performance and destinations is not allowed.
- The burner must be used in exemplary technical safety conditions. Any disturbances that could compromise safety must be quickly eliminated.
- Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.
- Only those parts envisaged by the manufacturer can be replaced.



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

3.2 Personnel training

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

The user:

- undertakes to entrust the machine exclusively to suitably trained and qualified personnel;
- undertakes to inform his personnel in a suitable way about the application and observance of the safety instructions. With that aim, he undertakes to ensure that everyone knows the use and safety instructions for his own duties.
- Personnel must observe all the danger and caution indications shown on the machine.
- Personnel must not carry out, on their own initiative, operations or interventions that are not within their province.
- Personnel must inform their superiors of every problem or dangerous situation that may arise.
- The assembly of parts of other makes, or any modifications, can alter the characteristics of the machine and hence compromise operating safety. The manufacturer therefore declines any and every responsibility for any damage that may be caused by the use of non-original parts.

In addition:



- must take all the measures necessary to prevent unauthorised people gaining access to the machine;
- the user must inform the manufacturer if faults or malfunctioning of the accident prevention systems are noticed, along with any presumed danger situation;
- personnel must always use the personal protective equipment envisaged by legislation and follow the indications given in this manual.

4 Technical description of the burner

4.1 Models available

Designation	Voltage	Code
RX 700 S/PV	230V - 50-60 Hz	20074586
RX 850 S/PV	230V - 50-60 Hz	20074219
RX 1000 S/PV	3N - 400V - 50-60 Hz	20050087

4.2 Burner categories - Countries of destination

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

4.3 Technical data

Model			RX 700 S/PV	RX 850 S/PV	RX 1000 S/PV
Type			854T3	926T1	891T3
Power ⁽¹⁾	min - max	kW	135 ÷ 700	170 ÷ 880	180 ÷ 1075
Delivery ⁽¹⁾	min - max	Mcal/h	116 ÷ 603	147 ÷ 759	155 ÷ 927
Fuels			Natural gas: G20 (methane gas) - G21 - G22 - G23 - G25		
Valve inlet gas pressure ⁽²⁾ - Gas: G20/G25		mbar	15 ÷ 360		
Operation			– Intermittent (min. 1 stop in 24 hours) – Modulating		
Standard applications			Boilers: water, steam, diathermic oil		
Ambient temperature		°C	0 - 40		
Combustion air temperature		°C max	60		
Electrical supply			1N ~ 230V +/-10% 50/60 Hz		3N ~ 400V 50/60 Hz
Fan motor		rpm V kW A	4500 230 V 0.860 4.8		6100 3N ~ 400V 50/60 Hz 2.5 4
Ignition transformer		V1 - V2 I1 - I2	230 V - 2 x 10 kV 0.3 A - 50/60 Hz 0.4 A		
Absorbed electrical power		kW max	1.1	1.1	3
Protection level			IP 20		
Noise levels ⁽³⁾	Sound pressure	dB(A)	82.2		88.2
	Sound power		93.2		99.2

Tab. A

⁽¹⁾ Reference conditions: Room temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m a.s.l.

⁽²⁾ Input gas pressure 8)(Fig. 2) with zero pressure in combustion chamber and at maximum burner output.

⁽³⁾ Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output. The sound power is evaluated, in line with the regulations, on a spherical surface centred on the burner and with a radius of 1 metre.

4.4 Burner weight

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

Model **kg**

4.5 Maximum dimensions

The maximum dimensions of the burner are given in Fig. 1.
Bear in mind that, in order to inspect the combustion head, the burner must be pulled back.

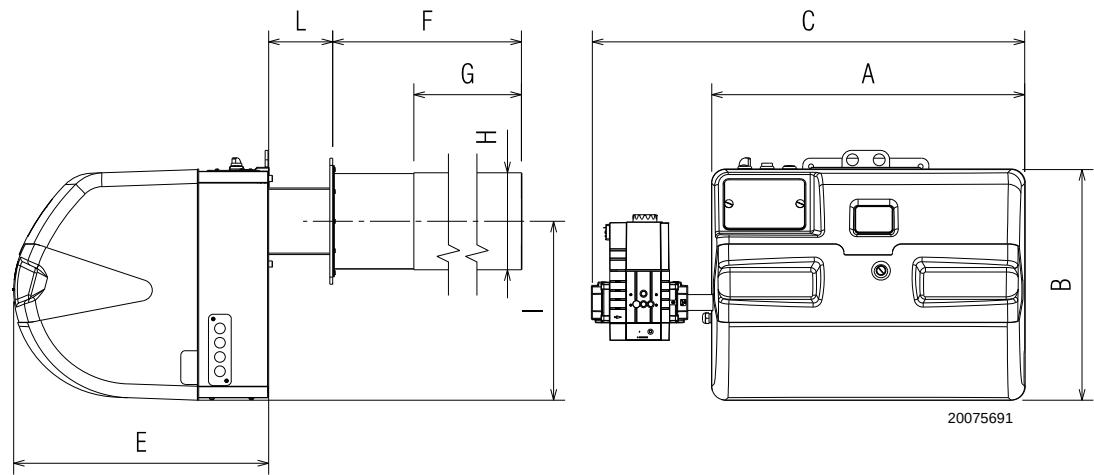


Fig. 1

mm	A	B	C	E	F	G	H	I	L
RX 700 S/PV	660	490	910	520	540	367	200	370	135
RX 850 S/PV					660	460			
RX 1000 S/PV									

Tab. C

4.6 Burner description

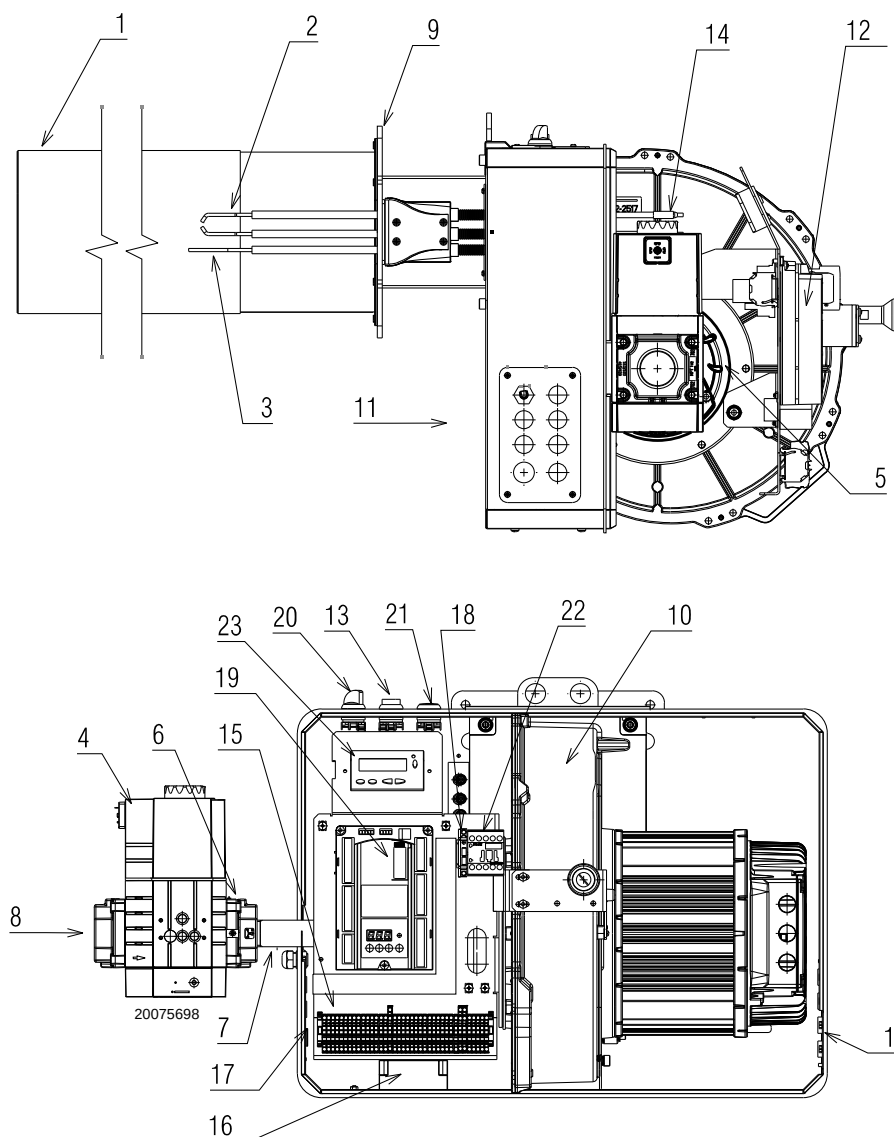


Fig. 2

- | | |
|---|---|
| 1 Combustion head | 16 Transformer |
| 2 Ignition electrode | 17 Plate with 4 holes, useful for passing electrical cables |
| 3 Flame sensor probe | 18 Fuses |
| 4 Gas valve | 19 Programming board |
| 5 Air/gas mixer in the suction line circuit | 20 ON-OFF selector |
| 6 Gas pressure test point | 21 Light signalling of mains live state |
| 7 Gas pipe valve | 22 Fan/output relay three-phase contactor |
| 8 Gas input | 23 Display |
| 9 Boiler fixing flange | |
| 10 Fan | |
| 11 Air passage in fan | |
| 12 Electrical control box | |
| 13 Luminous push-button for reset | |
| 14 Plug-socket on ionisation probe cable | |
| 15 Terminal board for electrical wiring | |



Burner lockout may occur.

CONTROL BOX LOCKOUT:

when the push-button 13)(Fig. 2) lights up, it indicates that the burner is in lockout. Press the push button to reset.

4.7 Burner equipment

Flange for gas train	No. 1	Hardware for burner assembly:	
Screws to secure the valve	No. 4	8 x 50 STAINLESS STEEL nuts (with or without tip)	No. 4

4.8 Firing rates

The **maximum output** should not exceed the maximum limit of the diagram (Fig. 3 - Fig. 4 - Fig. 5).

RX 700 S/PV = 700 kW
 RX 850 S/PV = 880 kW
 RX 1000 S/PV = 1075 kW

The **minimum output** should not be lower than the minimum limit of the diagram (Fig. 3 - Fig. 4 - Fig. 5).

RX 700 S/PV = 135 kW
 RX 850 S/PV = 170 kW
 RX 1000 S/PV = 180 kW

The **Ignition output** should be selected from within area A for the gas G20 - G25.



The firing rate (Fig. 3 - Fig. 4 - Fig. 5) was obtained with an ambient temperature of 20 °C, at a barometric pressure of 1013 mbar (about 0 m a.s.l.).

RX 700 S/PV

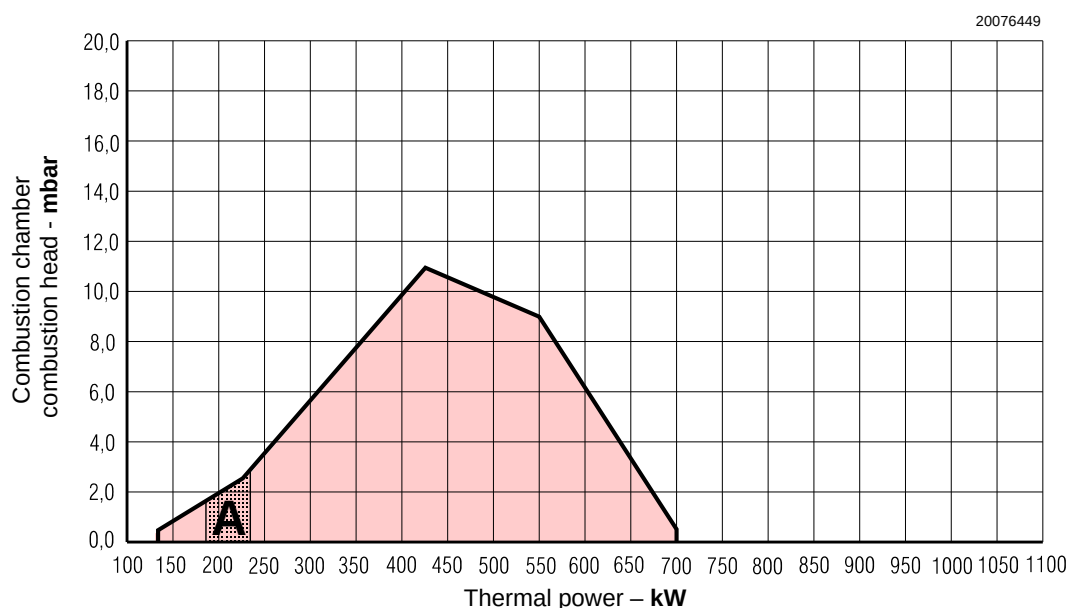


Fig. 3

RX 850 S/PV

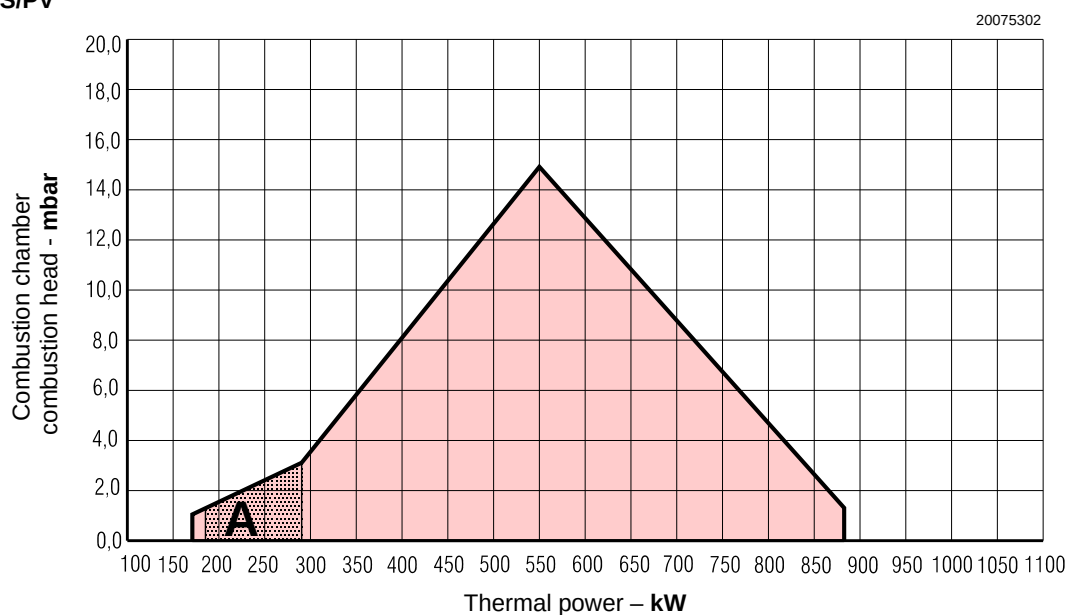


Fig. 4

RX 1000 S/PV

20075304

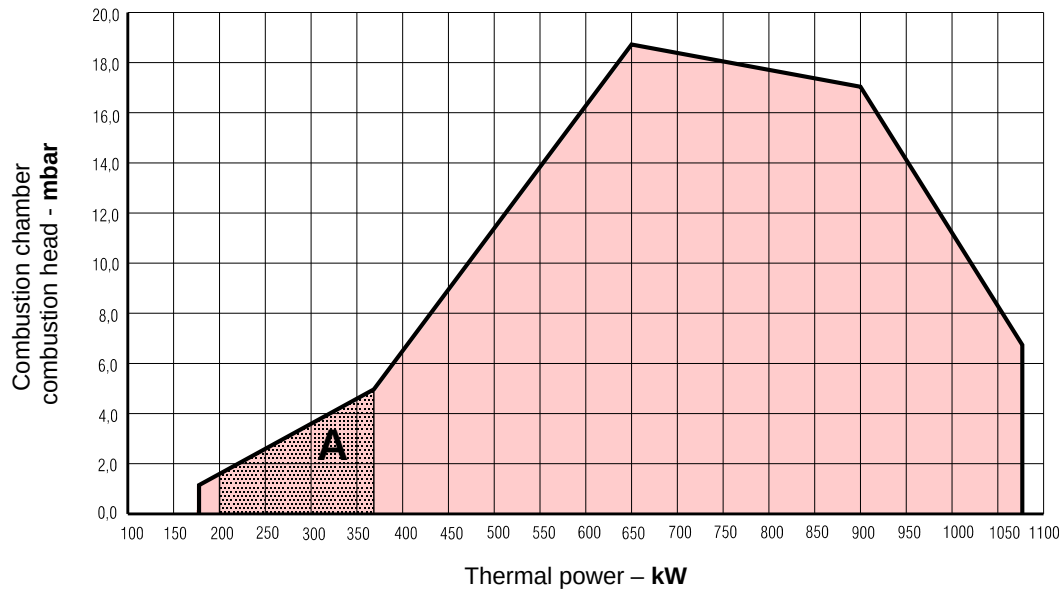


Fig. 5

4.8.1 Test boiler

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

4.8.2 Commercial boilers

The burner-boiler combination does not pose any problems if the boiler is EC approved.

If, however, the burner has to be applied to a commercial boiler that is not EC approved and/or with clearly smaller combustion chamber dimensions, check with the manufacturers.

It is not recommended that this burner for boilers is used with a frontal circulation of the flue gases.

4.9 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. 7) 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. 6

Program module



S8673

Fig. 7

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 mains voltage to the control of the control box. 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

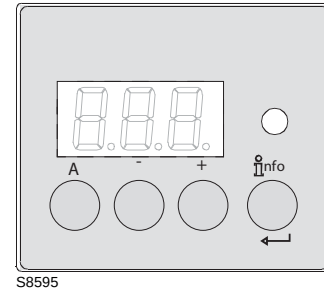
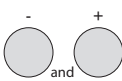


Fig. 8

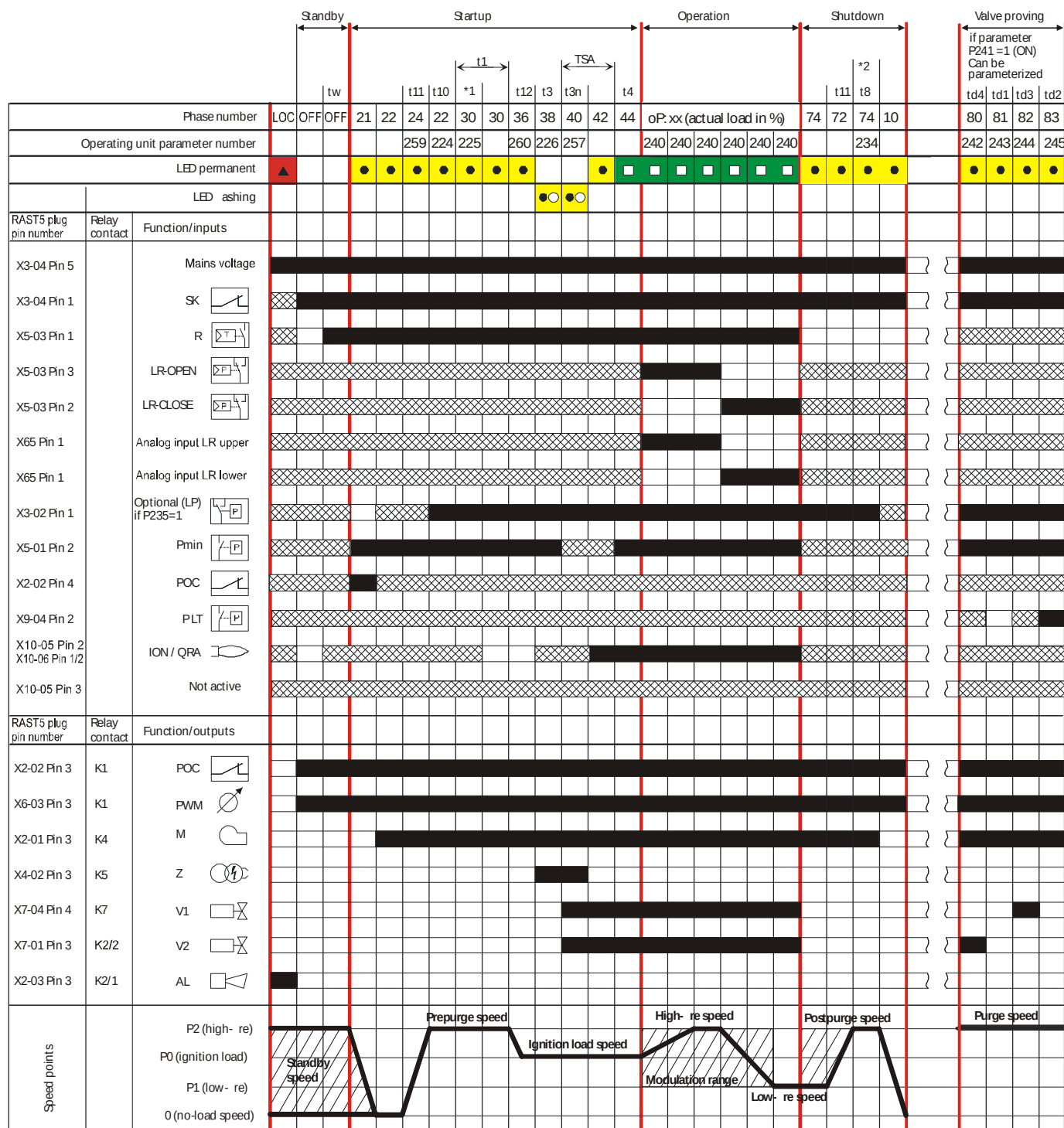
Button	Function
	Button A – Display preset output – In lockout position: power value to the time of fault
	Info and Enter Button The lockout reset button (info button) is the key operating element for resetting the burner control and for activating/deactivating the diagnostics functions.
	- Button – Display flame signal current 2 or phases display – In lockout position: MMI phase to the time of fault
	+ Button – Display flame signal current 1 or phases display – In lockout position: MMI phase to the time of fault
	3 multicolor signal lamp The multicolor signal lamp (red - yellow - green) is the key indicating element for visual diagnostics.
	+ and - Button: escape function Press + and - button simultaneously! – No adoption of value – One menu level up – Keep depressed for >1 second for backup/restore function

Tab. D

Technical data

LME71... burner controls	Mains voltage	AC 230 V
	Mains frequency	50 / 60 Hz +/- 6%
	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 230 V
	• Safety shutdown from the operating position takes place should mains voltage drop	< AC 165V
	• Restart is initiated when mains voltage exceeds	> AC 195V
	Input currents and input voltages	
	– UeMax	UN +10%
	– UeMin	UN -15%
	– IeMax	1 mA peak (peak value)
	– IeMin	0.5 mA peak (peak value)
	Voltage detection	
	– ON	> AC 120V
	– OFF	< AC 80V
Terminal rating "Outputs"	Total contact loading:	
	Rated voltage	AC 230 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 230 V 50/60 Hz
	– Rated current	2 A (15A max. 0.5 s)
	– Power factor	$\cos\varphi \geq 0.4$
	Alarm output X2-03/3	
	– Rated voltage	AC 230 V 50/60 Hz
	– Rated current	1A
	– Power factor	$\cos\varphi > 0.6$
	Ignition transformer X4-02 pin 3	
	– Rated voltage	AC 230 V 50/60 Hz
	– Rated current	2A
	– Power factor	$\cos\varphi > 0.4$
	Auxiliary output	
	– Rated voltage	AC 230 V 50/60 Hz
	– Rated current	1A
	– Power factor	$\cos\varphi > 0.6$
	Output relay contact 2 pin 2 X2-09 pin 7	
	– Rated voltage	AC 230 V 50/60 Hz
	– Rated current	1A
	– Power factor	$\cos\varphi > 0.4$
	Fuel valves/pilot valve X7-01 pin 3	
	– Rated voltage	AC 230 V 50/60 Hz
	– Rated current	1A
	– Power factor	$\cos\varphi > 0.4$
	Safety valve X6-03 pin 3	
	– Rated voltage	AC 230 V 50/60 Hz
	– Rated current	1.5A
	– Power factor	$\cos\varphi > 0.6$
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



S8594

Fig. 9

Key Fig. 9:

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-color 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	Pressure switch-max
Pmin	Pressure switch-min
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
V2a	Fuel 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. F
Times

TSA	Safety time
tw	Waiting time
t1	Prepurge time
t3	Preignition time
t3n	Postignition time (P257 +0.3 seconds)
t4 (dependent on application)	Interval: end of safety time ñ fuel valve 1 ON Interval: end of safety time ñ fuel valve 2 ON Interval: end of safety time ñ load controller release
t5	Interval: Pilot valve OFF - load controller release
t8	Postpurge time
t9 (dependent on application)	Interval: Fuel valve 1 ON - pilot valve OFF Interval: Fuel valve 2 ON - pilot valve OFF
t10	Specified time air pressure switch state message (timeout)
t11	Opening time of actuator (timeout)
t12	Closing time of actuator (timeout)
t22	2nd safety time
td1	Test atmospheric pressure
td2	Test gas pressure
td3	Gas valve filling test
td4	Gas valve evacuating test

Tab. G

Key to Phases (Fig. 9):

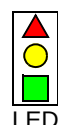
Phase number	Function
LOC	Lockout shutdown phase
OFF	Standby, waiting for heat request
oP	Part 1: request load controller OPEN
	Part 2: modulation of fan motor speed toward high-fire
	Part 3: high-fire reached
	Part 4: request load controller CLOSED
	Part 5: modulation of fan motor speed toward low-fire
	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 (timeout), stabilization of air pressure switch
24	Settling time, fan motor prepurge speed
30	Part 1: prepurge time without flame simulation test
	Part 2: prepurge time with flame simulation test (2.1 seconds)
36	Speed stabilization time at MAX speed
38	Preignition time
40	Postignition 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 postpurge speed
74	Part 1: operation is ended, check if postpurging is programmed
	Part 2: postpurge time
80	Test space is evacuated
81	Atmospheric pressure test
82	Test space is filled
83	Gas pressure test
90	Pressure switch-min open --> safety shutdown
*1	Valve proving, if P241 = 1 after main ON, lockout or P234 (postpurge time) = 0 second
*2	Valve proving, if P241 = 1 and P234 (postpurge time) >0 second

Tab. H

4.9.1 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 multicolor 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 color codes according to the color code table given below (Tab. I).

Indication of operating state

During startup, state indication takes place according to the Tab. I:

Color code table for multicolor signal lamp

State	Color code	Color
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 startup	■ ▲ ■ ▲ ■ ▲ ■ ▲	Green - Red
Undervoltage	● ▲ ● ▲ ● ▲ ● ▲	Yellow - Red
Fault, alarm	▲.....	Red
Error code output (see Error code Tab. W)	▲ ○ ▲ ○ ▲ ○ ▲ ○	Blinking red
Interface diagnostics	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	Red flicker light
Heating request	●.....	Yellow
New program card	● ● ▲ ● ● ▲ ● ●	Yellow Yellow - Red

Tab. I

Key (Tab. I)

..... Steady on

○ OFF

▲ Red

● Yellow

■ Green

5 Installation

5.1 Notes on safety for the installation

After carefully cleaning all around the area where the burner will be installed, and arranging the correct lighting of the environment, proceed with the installation operations.



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.

5.2 Handling

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



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 20-25cm from the ground.



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.

5.3 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.

RBL	A		B	C
D	E			F
GAS-KAASJ	☒	G	H	
GAZ-AEFO		G	H	
I				RELLOSpA I-37045 Legnago (VR)
				
CE				

D10411

Fig. 10

Checking the characteristics of the burner

Check the identification label of the burner (Fig. 10), showing:

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



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

5.4 Operating position



- The burner is designed to operate only in positions **1**, **2**, **4** and **5** (Fig. 11).
- 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.
- All the positions require the installation of the gas valve with coils pointing upwards or horizontal (Fig. 11).



- Any other position could compromise the correct operation of the appliance.
- Installation **3** is prohibited for safety reasons.
- Installation with the coils pointing downwards is absolutely forbidden.

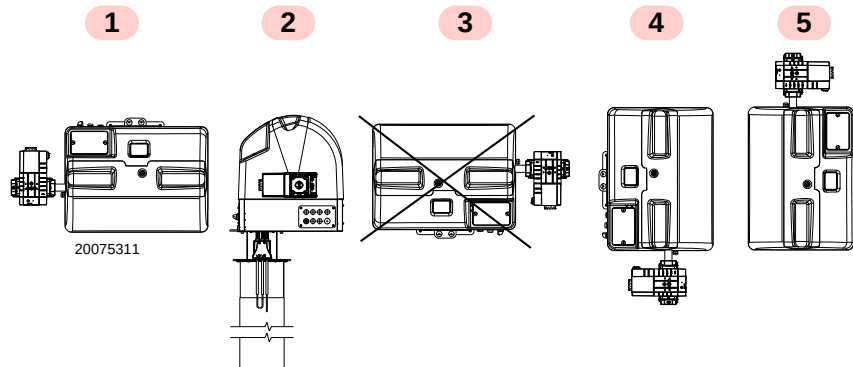


Fig. 11

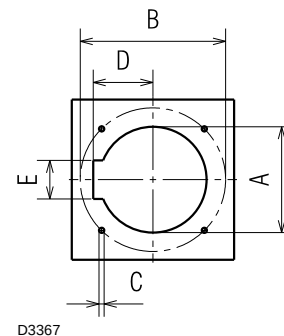
5.5 Preparing the boiler

5.5.1 Boring the boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 12. The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

mm	A	B	C	D	E
RX 700 S/PV					
RX 850 S/PV	220	325 ÷ 275	M10	135	75
RX 1000 S/PV					

Tab. J



D3367

Fig. 12

5.5.2 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 the non combustion zone must be greater than the thickness of the boiler door, complete with refractory.

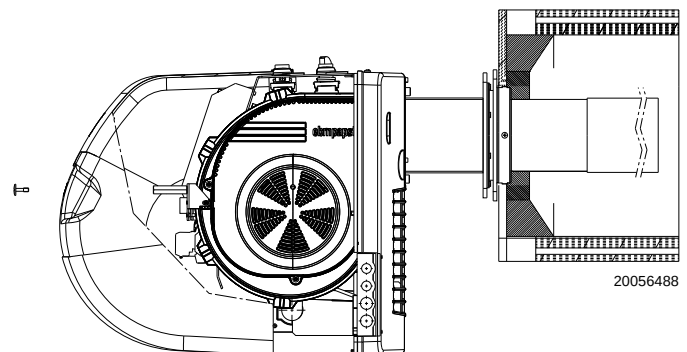


The burners cannot be used on flame inversion boilers.

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. 13).



Do not insert the protection in line with the elec-



20056488

Fig. 13

5.6 Securing the burner to the boiler



Provide an adequate lifting system.

The burners are supplied with the combustion head already assembled.



WARNING

The seal between burner and boiler must be airtight.



WARNING

Make sure the probe and electrodes are correctly positioned as in Fig. 14.



WARNING

If possible, secure the the electrodes after installing the burner on the boiler.

For the installation of the electrodes proceed as follows (Fig. 15) - (Fig. 16):

- take the supplied electrodes unit and remove the cover 10 unscrewing the screws 11).
- Fix the electrodes 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 opening 22).
- Put back the cover 10) and secure it with the screws 11); connect the high voltage cables to the transformer 23), and the ionisation probe lead to the appropriate cable emerging from the control box. Before fixing the burner to the boiler, make sure the probe and electrodes are positioned correctly as in Fig. 14. Secure the ramp unit 20 to the mixer 18.
- Warning: use a suitable sealant and check the gas seal (Fig. 17).
 - Tighten the studs 2) on the plate 1).
 - Position the refractory gasket 3).
 - Fix the flange 4)(Fig. 15) to the boiler plate and tighten the nuts 4). During this operation, take care not to touch the electrode unit.

The seal of the burner-boiler and electrode unit must be hermetic. Install the gas ramp following the instruction in "Fuel supply" on page 21.

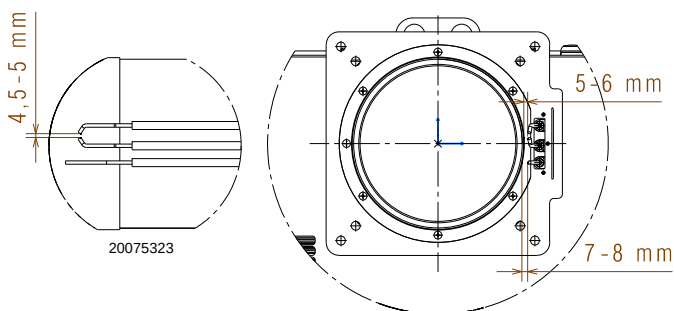


Fig. 14

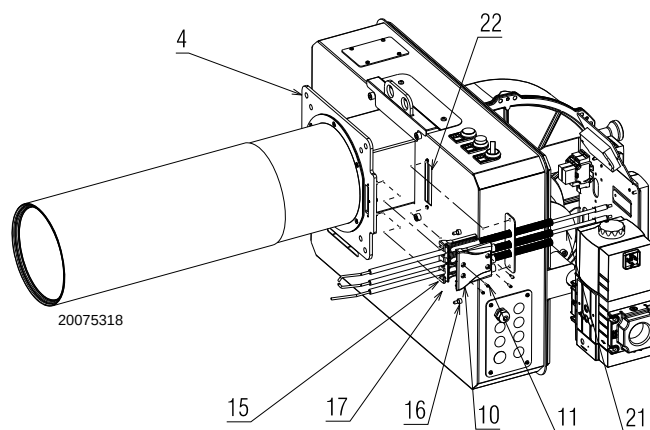


Fig. 15

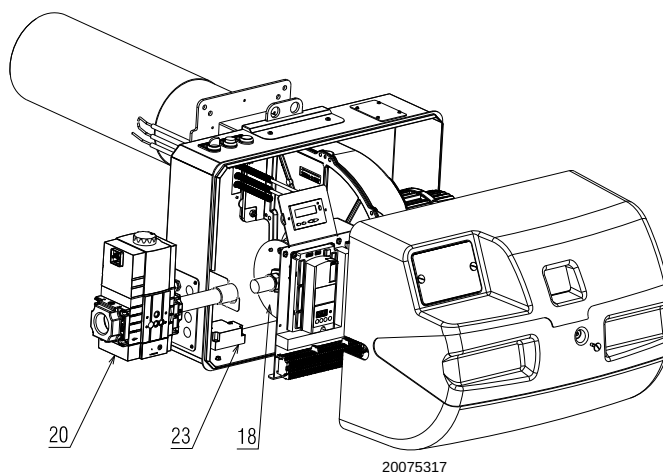
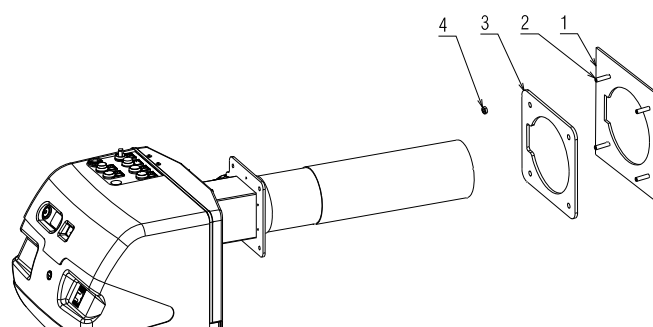


Fig. 16



5.7 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.

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 combusive 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.

NOTE:

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

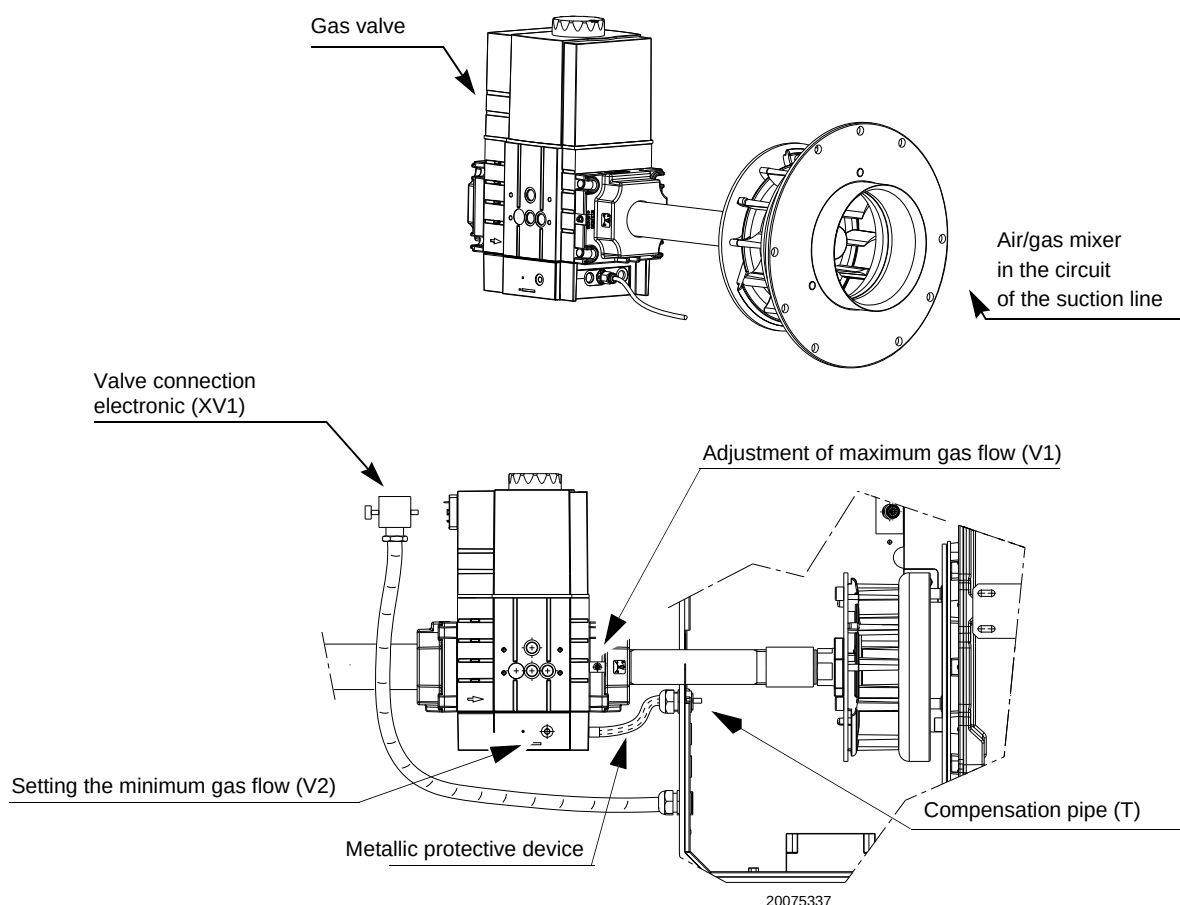


Fig. 18

5.7.1 Gas train

This has been type-approved together with the burner, in accordance with regulation EN 676, and is supplied as standard (Fig. 19).

Key (Fig. 19)

- 1 Gas input pipe
- 2 Manual valve
- 3 Vibration damping joint
- 4 Pressure gauge with push-button cock
- 5 Valve including:
 - filter (replaceable)
 - working valve

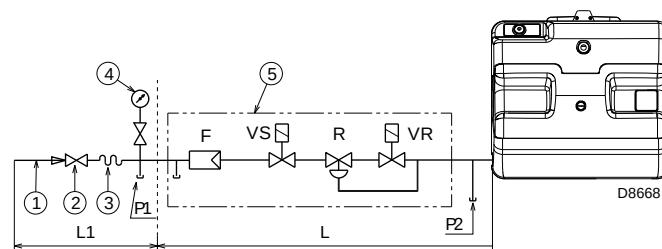


Fig. 19

5.8 Electrical wiring
Notes on safety for the electrical wiring


- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be made in accordance with the regulations currently in force in the country of destination and by qualified personnel. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- The 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.



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



Turn off the fuel interception tap.



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.



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

5.8.1 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.

Secure the cables to the support bracket using cable ties.

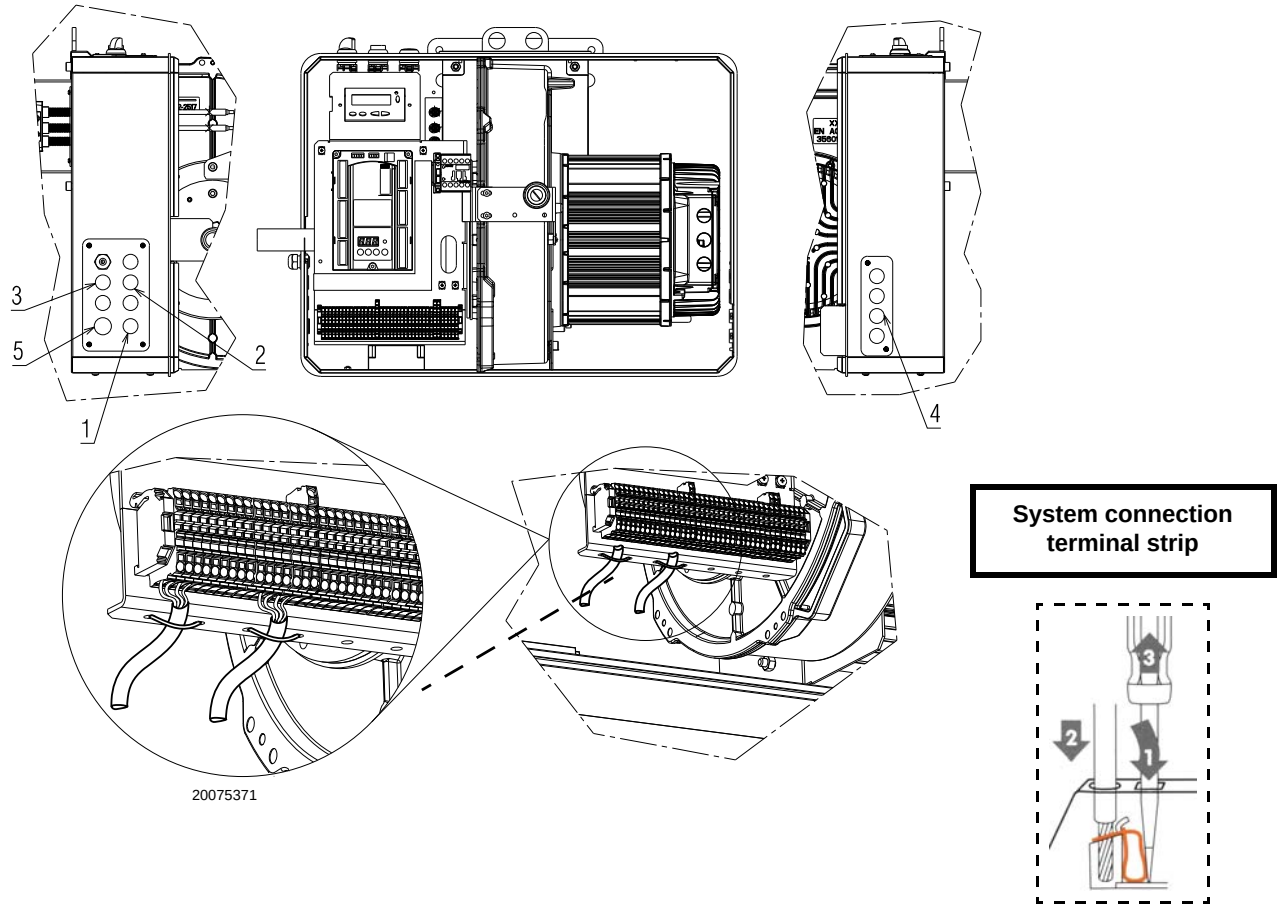


Fig. 20

Key (Fig. 20)

- 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. K

5.8.2 Opening sequence of the fuse-holder

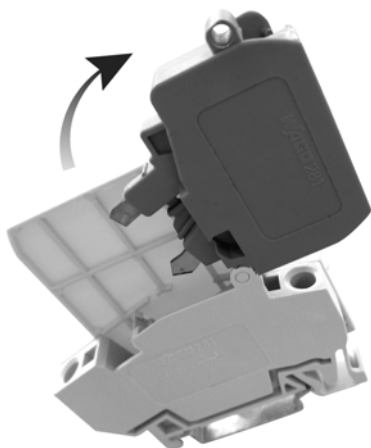
In case of failure or control of the fuse-holder, follow these steps to remove or replace the fuse:



DANGER

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

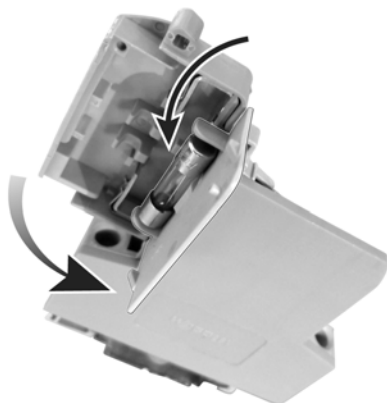
Unhook as indicated in Fig. 21.



S8688

Fig. 21

Open the component side (check or replace) as indicated in Fig. 22.



S8689

Fig. 22

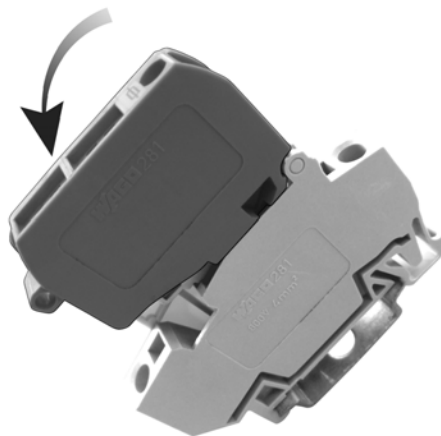
Close the component side (Fig. 23).



S8690

Fig. 23

Hook the component side (Fig. 24).



S8691

Fig. 24



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.

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 before first firing

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 (Fig. 18).
- Adjust, if present, the min. gas pressure switch to the start of the scale.

6.3 Burner start-up

Proceed as follows:

- close the thermostat and switch on the burner's power;
- light signal "**POWER ON**" must be switched on.
- Turn the selector "**OFF/ON**" on position "**ON**".

The burner starts up in pre-purging mode at maximum speed.

Subsequently, the START value speed decreases and start-up occurs. If the fan starts up but at the end of the safety time the flame does not appear, burner goes into lockout mode.

Reset and wait for a new start-up attempt.

If ignition continues to not occur, it may be the case that the gas is not arriving at the combustion head within the safety time of 3s.

6.3.1 Gas valve adjustment

Adjusting the gas flow rate is carried out using the two screws V1 and V2 (Fig. 26).

To alter the maximum output of gas use screw V1:

- to increase the output: turn the screw clockwise (tighten);
- to reduce the output: turn the screw anticlockwise (unscrew).

To alter the minimum output of gas act on the screw V2 on the gas valve.

Use the screw with the tool:

- to increase the output: turn the screw clockwise (tighten);
- to reduce the output: turn the screw anticlockwise (unscrew).

Definition of the adjustments for the fan.

Adjustments are carried out from the control box:

START: determines the air in the start phase;

MIN: determines the minimum modulation;

MAX: determines the maximum modulation.

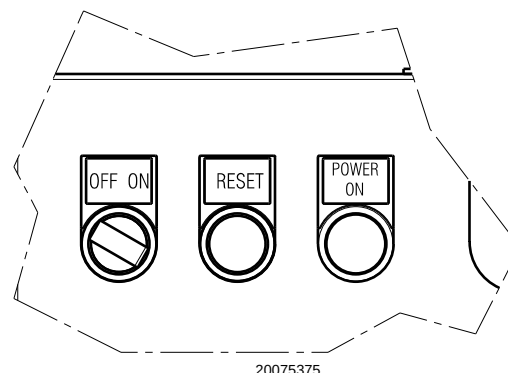


Fig. 25

Key (Fig. 25)

- "**OFF/ON**" switch
- "**RESET**" signal button
- "**POWER ON**" signal

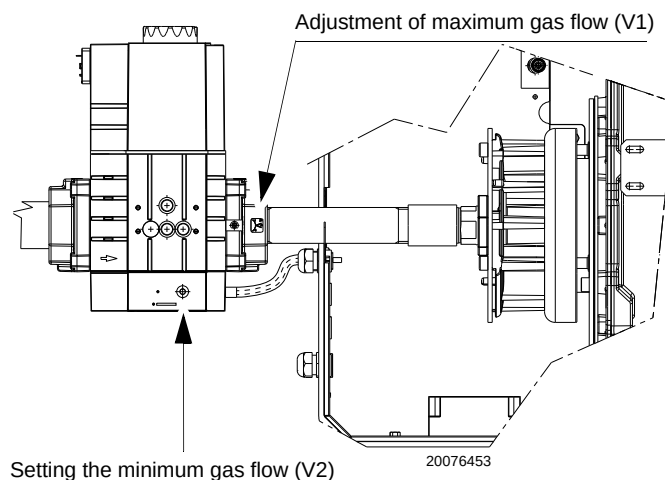


Fig. 26

6.4 Fan adjustment

Modulation is based on variable-speed technology.

Combustion air delivery can be adjusted by varying the motor's speed (rpm).

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

Hence the output delivered is adjusted by varying the motor's speed of rotation. The speed of the motor can be adjusted setting the control box.

The adjustments, via the onboard operating panel (Fig. 27), are carried out by means of the positions:

START	determines the ignition position	(P0)
MIN	determines the minimum modulation	(P1)
MAX	determines the maximum modulation	(P2)

6.5 Burner shut down

Switch off power supply. If burner is switched off for extended periods, close manual gas cocks.

Proceed as follows (Fig. 27):

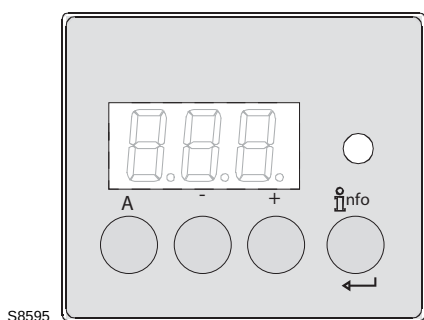


Fig. 27

- keep the button and or simultaneously depressed for > 5 seconds;
- display shows **OFF** blinking.



If there is no operating action for >30 seconds, the LME7... changes automatically to standard mode. This means that adaptation of the working points must be started again.

- Heat request (temperature controller) ON.
- Basic unit is started and runs through the startup phase. Then, the unit runs through the respective program phases in accordance with the program sequence; the numbers appear blinking.
- The unit proceeds to the end of the prepurge phase (P30), goes to the start load position and then displays **P0** (ignition load speed). In the process, the display shows alternately **P0** and a 3-digit number.

NOTE:

The 3-digit number shows the setting value for parameter **P0/P1** or **P2** as the speed and must be multiplied by 10.

- By pressing and or the speed can be changed in step sizes of 10 rpm within the limits predefined by the OEM (**P0max**, **P0min**).

NOTE:

the setting value of P0 must be greater than the setting value of P1. The basic unit checks the setting values. If setting rules are violated, the unit goes to lockout and displays error message Loc: 225.

- Press to transfer the setting value to the onboard memory.
- The startup phase proceeds. The burner is ignited. The program proceeds to lowfire position **P1**. In the process, the display shows alternately **P1** and the speed.

- By pressing and or the speed can be changed in step sizes of 10 rpm within the limits predefined by the OEM (**P1max**, **P1min**).

- Press to transfer the setting value to the onboard memory.
- The burner proceeds to high-fire position **P2**. In the process, the display shows alternately **P2** and the speed.

- By pressing and or the speed can be changed in step sizes of 10 rpm within the limits predefined by the OEM (**P2max**, **P2min**).

- Press to transfer the setting value to the onboard memory.

- By pressing ESC (press or simultaneously) the setting process is ended and the burner changes to the operating position.
- In the operating position, the output predefined by the external load controller applies.

NOTE:

To store the settings in the PME... program module, a manual backup is required.

Manual backup

and > 1s



Press and simultaneously for >1 second (Escape) to start a manual backup process. Parameter **PrC** appears. Display: **PrC**

or



Press or for parameter **bAC**. Display: **bAC**



Run appears during download (backup process) of the program sequence.



Alternately



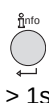
Display shows alternately **End** and **bAC**.

Display shows the end of data exchange.



Display appears for 2 minutes or can be finished by pressing

When the backup process is completed, the display shows **OFF**.



Press  for >1 second to reset the unit.

Display: **OFF**

Tab. L



WARNING

If any parameters are changed, a backup must be made!

6.6 Gas valve adjustment

The adjustment of the output of gas is achieved by using the two screws V1 and V2 (Fig. 18).

To alter the maximum output of gas use screw V1:

- to increase the output: turn the screw clockwise (tighten);
- to reduce the output: turn the screw anticlockwise (unscrew).

To alter the minimum output of gas act on the screw V2 on the gas valve.

Remove the protection screw and act on the intern screws with a hex key:

- to increase the output: turn the screw clockwise (tighten);
- to reduce the output: turn the screw anticlockwise (unscrew).

6.7 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 CO and CO₂ concentration in the flue gases and of their temperature.

Check in sequence:

- max output
- min output
- ignition output

MAX output should match the value required by the boiler that is used. To increase or decrease its value, adjust the integrated operator panel (P2) located on the control box.

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

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

- to increase the gas delivery and the CO₂: turn the screw V1 (Fig. 18) clockwise (tighten);
- to reduce the gas delivery and the CO₂: turn the screw V1 (Fig. 18) anticlockwise (unscrew).

MIN output should match the value required by the boiler that is used. To increase or decrease its value, adjust the integrated operator panel (P1) located on the control box.

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%.

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

- to increase the gas delivery and the CO₂: turn the screw V2 clockwise (tighten);
- to reduce the gas delivery and the CO₂: turn the screw V2 anticlockwise (unscrew).

6.7.1 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. M

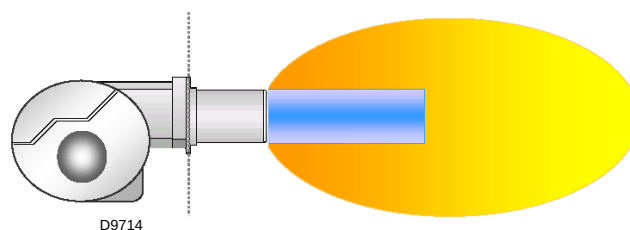


Fig. 28

6.8 Check of modulating operation

The burner leaves the factory set to 0-10 V signal for the modulating operation.

6.8.1 Display of preset output

Display is possible only when:

- in operating mode or standby,
- program sequence for modulating operation via analog preset output.





Press  for display of the relative current position of the actuator.

Signal lamp blinks green.

Display shows **.0P**.



1...3s



Press  (1...3 seconds) for display of the relative current position.

Signal lamp blinks green.

The **relative** value **.57** of the current position is displayed.

Example: value **.57**

PME7... with PWM fan:

Current speed 0 rpm = 0% display

Current speed corresponds to the rated load speed = 100% display



> 3s



When pressing  for >3 seconds, the point after the number begins to blink. When the button is released, the value is displayed for 2 minutes.

Signal lamp blinks green.

Then, the normal display appears.

Display: value **57**, point **.** blinks

Tab. N

6.8.2 Load controller inputs

Selection source preset output analog/3-position step input (P654)

The following input signals can be selected and handled via parameter P654.

- 3-position step input (feedback potentiometer ASZxx.3x required/depending on the program sequence)
- 0...10 V
- 0...135 Ω
- 0...20mA
- 4...20 mA with lockout at I < 4 mA (AZL2...: Loc: 60)

6.9 Operator panel with LCD display

Description of the symbols

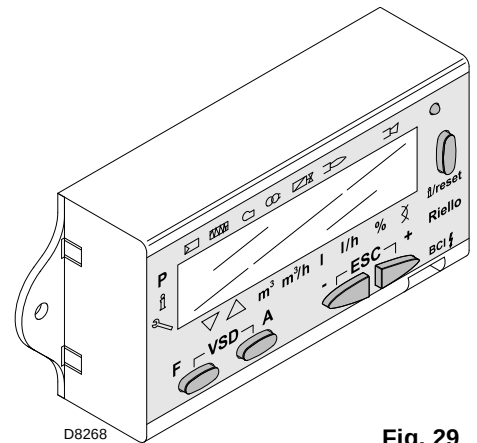
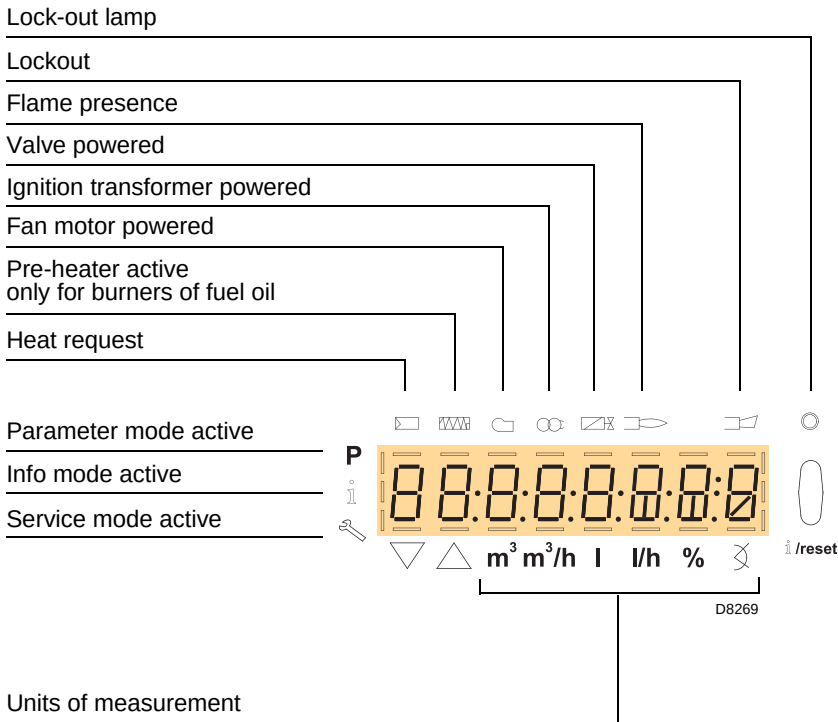


Fig. 29

Key to units of measurement

- m^3 cubic metre
- m^3/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
	- Access to Parameters Mode P (press, at the same time, F and A plus - or +)
	- 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: * 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 - 3s) * access to a higher level of the menu (press the key for 3 - 8s) * access to another mode (press the key for > 8s)
	- Reduction of value - Access to a lower point of the modulation curve - Scrolling of the parameter list
	- Increase of value - Access to a higher point of the modulation curve - Scrolling of the parameter list
	Exit function (ESC) (press - and + simultaneously) - Non confirmation of the value - Access to a higher level of the menu

Technical data

Display and operating unit		
General unit data	Operating voltage	DC 5V
	Power consumption	<50 mW (typically)
	Degree of protection	
	- AZL21...	IP40 to IEC529
	Safety class	II to DIN EN 60730-1
	Housing	
	- Material	PC and PC / ABS
	- Color	RAL 7035 (light-grey)
	Flame protection class	
	- Transparent housing parts	To UL94 V2 (PC)
	- Colored housing parts	To UL94 V0 (PC / ABS)
Inputs/outputs	BCI interface with RJ11 female	For Siemens burner controls
Environmental conditions	Operation	DIN EN 60721-3-3
	Climatic conditions	Class 3K3
	Mechanical conditions	Class 3M3
	Temperature range	-20...+60°C
	Humidity	< 95 % r.h.

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

6.9.1 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.

7.1 Notes on safety for the maintenance

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

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



DANGER

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

Before carrying out any maintenance, cleaning or checking operations:



DANGER

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



DANGER

Turn off the fuel interception tap.



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

7.2 Maintenance programme

7.2.1 Maintenance frequency



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

7.2.2 Checking and cleaning



The operator must use the required equipment during maintenance.

Combustion

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.

Clean and grease the adjustable profile of the cams.

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.

Gas leaks

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

Gas filter

Change the gas filter when it is dirty.

Measuring circuit for detector current measurement



WARNING

Simultaneous operation of 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 μ A. 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.

Flame check

Display value:

MIN 1 μ A = 20%

MAX 40 μ A = 100%



WARNING

This display is only possible in operating mode or standby!

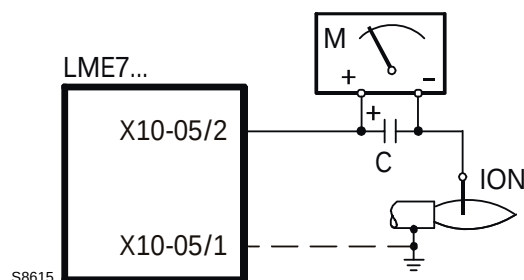


Fig. 30

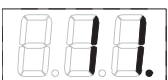
Key (Fig. 30)

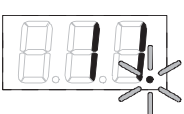
C Electrolytic condenser 100...470 μ F; DC 10...25 V

Display of flame current ION or QRA...



 Press  for display of the flame signal amplifier.
 Signal lamp blinks green.
 Display shows **FL.1**



 Press  (1...3 seconds), the flame signal current is displayed.
 Signal lamp blinks green.
 Example: **11**



 When pressing  (>3 seconds), the point after the number begins to blink.
 When the button is released, the value is displayed for 2 minutes.
 Signal lamp blinks green.
 Then, the normal display appears.
 Display: Point . blinks,
 value **11** does not.

Tab. O

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.

EN 676		Excess air		CO
		Max. output. $\lambda \leq 1.2$	Max. output. $\lambda \leq 1.3$	
GAS	Theoretical max CO ₂ 0 % O ₂	CO ₂ % Calibration		mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$	
G 20	11.7	9.7	9	≤ 1000
G 25	11.5	9.5	8.8	≤ 1000
G 30	14.0	11.6	10.7	≤ 1000
G 31	13.7	11.4	10.5	≤ 1000

Tab. P

7.3 Opening and closing the burner



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



Turn off the fuel interception tap.



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



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

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 components, 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 lock	MONTHLY
Check low-fire start lock	MONTHLY
Test high and low gas pressure locks	MONTHLY
Recalibrate all adjustment components	SEMI-ANNUALLY
Check flame failure detection system components	SEMI-ANNUALLY
Check firing rate control	SEMI-ANNUALLY
Check piping and wiring of all locks 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 lock 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. Q

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.

8.1 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).

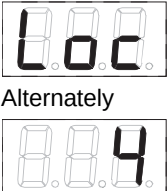
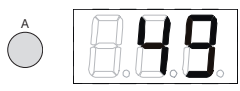
Cause	Response
Mains voltage failure	Restart
Voltage below undervoltage threshold	Safety shutdown
Voltage above undervoltage threshold	Restart
Extraneous light before safety time	Lockout
Extraneous light during waiting time	Start pre-purging, lockout after approx. 30 seconds at the latest
No flame at 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 pre-purging, 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 pressure switch closing
Pressure switch-min: failure during operation	Shutdown and start pre-purging

Tab. R

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 Fault status messages, display of errors

8.2.1 Display of errors (faults) with lockout

 Alternately	Display shows alternately Loc and 4. Unit is in the lockout position. The current error code is displayed and the signal lamp is blinking red. Example: error code 4
	Press  or  for display of the phase, where the fault appeared. Signal lamp blinks red. Example: phase P02
	Only with modulation via analog signal Press  for display of the output position/actuator position where the error occurred. Signal lamp lights up red. Example: output position/actuator position 49.

Tab. S

8.3 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	– Error in data content of program module – No program module fitted
Loc 2	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
Loc 3	Air pressure faulty (air pressure switch welded in no-load position), decrease to specified time (air pressure switch) response time)	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	Time out air pressure switch – Air pressure switch is welded in working position
Loc 6	Fault of actuator	– Actuator faulty or blocked – Faulty connection – Wrong adjustment
Loc 7	Loss of flame Too many losses of flame during operation (limitation of repetitions)	– Faulty or soiled fuel valves – Faulty or soiled flame detector – Poor adjustment of burner
Loc 8	---	Free
Loc 9	---	Free
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	– 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	– 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	– 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: – 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 re-	Hardware of basic unit does not match the program module

8.4 Resetting the burner control

When lockout occurs, the burner control can immediately be reset.



For reset the unit, press  for 1...3 seconds. When the button is released, **OFF** is displayed. The basic unit is reset.

The LME71... can only be reset when all contacts in the line are closed and when there is no undervoltage.

Tab. U

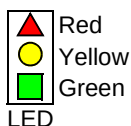
NOTE:

For meaning of the error and diagnostic codes, see chapter "Error code list with operation via internal LED" on page 37.

8.5 Operation



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



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

Visual diagnostics:

In normal operation, the different operating states are indicated in the form of color codes according to the color code Tab. I.

8.5.1 Manual adjustment

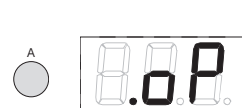
Display is possible only when:

- in operating mode or standby,
- program sequence for modulating operation via analog pre-set output and with connected actuator with potentiometer for position feedback to the LME7...

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

There are 2 diagnostics choices:

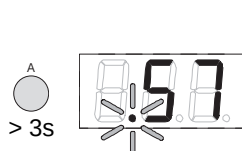
- 1 Visual diagnostics: Indication of operating state or diagnostics of cause of fault.
- 2 Diagnostics: via BCI to AZL2... display and operating unit.



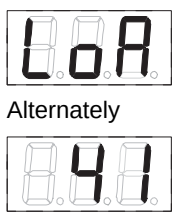
Press  for the relative current position of the actuator or the relative current speed of the PWM fan. Signal lamp blinks green. Display shows **.oP**.



Press  (1...3 seconds) for display of the relative current position or the current speed. Signal lamp blinks green. The **relative** value **.57** of the current position is displayed. Actual speed 0 rpm = 0% display Current speed corresponds to the rated load speed = 100% display Example: value **.57**



When pressing  for >3 seconds, the point after the number begins to blink. When the button is released, the value is displayed for 2 minutes. Signal lamp blinks green. Then, the normal display appears. Display: value **57**, point . blinks

Alternately

Press  for >3 seconds to display alternately LoA and 41.

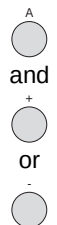
The **relative** value **41** of the current position or current speed is displayed.

Current speed 0 rpm = 0% display

Current speed corresponds to the rated load speed = 100% display.

The actual value (example **41%**) is displayed and the signal lamp blinks green.

Example:
Position of actuator or the current speed **41%** (based on range between high-fire and 0° or 0 rpm).




Press  simultaneously with  or  to adjust the fan speed between low-fire (x%) and high-fire (100%).

Release the buttons when the required position or speed is reached. Signal lamp blinks s green.

Example: value **43**



Alternately

Display shows alternately **LoA** and **43**.

Signal lamp blinks green.

Example: Required position of actuator or current speed **43%**




Press  and  simultaneously (Escape) to return to normal operation.

Display: **oP**

When manual adjustment is completed, the actuator or the PWM fan returns to the analog preset output!

Tab. V

NOTES

- When the program phase (e.g. P10 - shutdown) changes during manual adjustment, the display blinks
- Manual adjustment mode remains active until Escape switches the basic unit back to normal operation or until the basic unit is reset via mains ON/OFF. This means that in the case of a new heat request and after startup, the actuator or the PWM fan is driven to the position or speed of the manually preset value.

8.5.2 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
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. W

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).

8.5.3 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.
- Notes:
- 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.

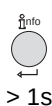
After 2 minutes, the unit changes to **Loc 138**



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.

8.6 Manual restore


 and

 > 1s

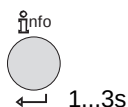


Press  and  simultaneously simultaneously for >1 second (Escape) for starting the manual restore process. Parameter **PrC** appears.
Display: **PrC**


 or




Press  and  for parameter **rSt**.
Display: **rSt**



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!


 > 1s



Press  for >1 second to reset the unit.
Display: **OFF**

8.6.1 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 37.

Tab. Z

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!

8.6.2 Reset



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

Tab. AA

NOTE:

For meaning of the error and diagnostic codes, see chapter "Error code list with operation via internal LED" on page 37.

9 Appendix - Accessories

Output power regulator kit for modulating operation

Output power regulator kit RWF40

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.

Parameter to be checked		Probe		Output regulator	
	Adjustment field	Type	Code	Type	Code
Temperature	- 100...+ 500°C	PT 100	3010110	RWF40	3010212
Pressure	0...2.5 bar 0...16 bar	Output probe 4...20mA	3010213 3010214		

Software diagnostics kit

Burner	Code
RX 700 S/PV RX 850 S/PV RX 1000 S/PV	in progress

A special kit is available that, by an optical link to a PC, shows the burner life together with operating hours, type and number of lock-outs, number of motor rpm's and safety parameters.

To view diagnostics, proceed as follows:

- connect the kit (supplied separately) to the appropriate socket on the control box. Reading of the information begins when the software programme included in the kit starts.



WARNING

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

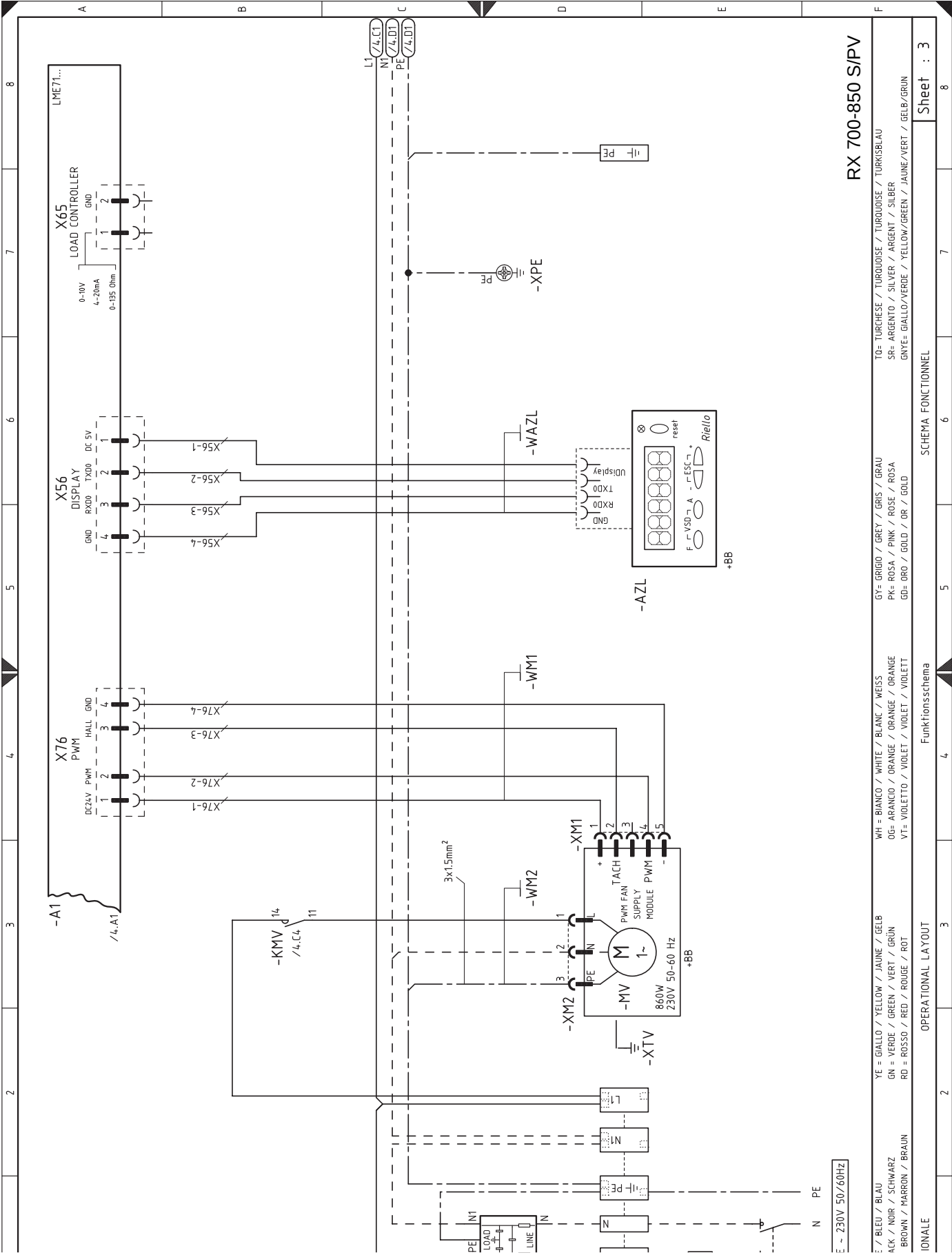
10 Appendix - Electrical panel layout

1	Index of layouts
2	Indication of references
3	Functional diagram
4	Functional diagram
5	Functional diagram
6	Functional diagram
7	Electrical wiring that the installer is responsible for
8	Electrical wiring that the installer is responsible for
9	Electrical wiring that the installer is responsible for

2 Indication of references

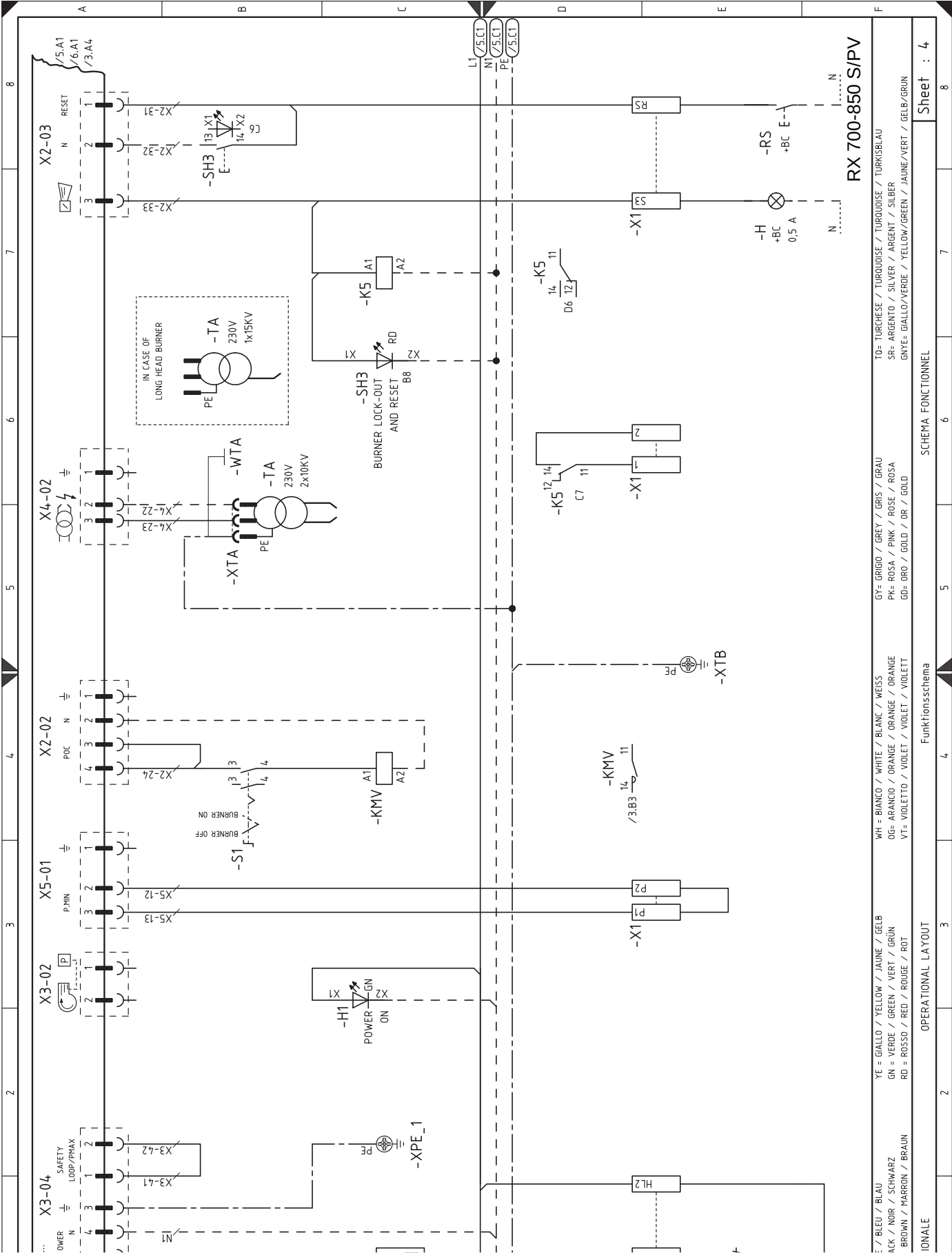
Sheet no. **/1.A1**

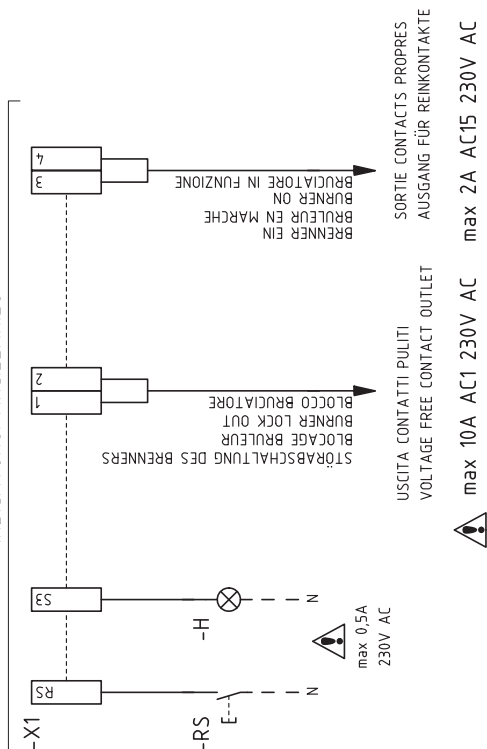
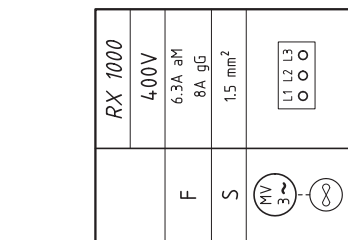
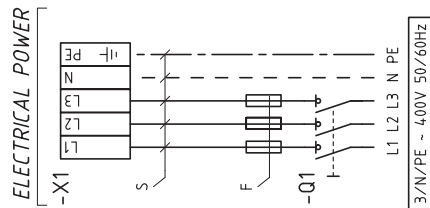
Co-ordinates **/1.A1**



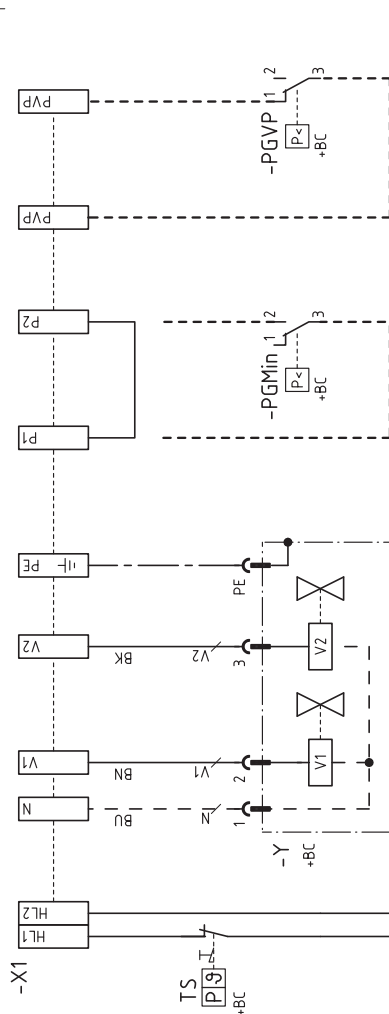
RX 700-850 S/PV

OPERATIONAL LAYOUT		Funktionschema		SCHEMA FONCTIONNEL		Sheet : 3	
2	3	4	5	6	7	8	





TRIGGERING/SAFETY DEVICES



ATTENZIONE:
Per l'attivazione del controllo di tenuta
modificare i parametri interni.

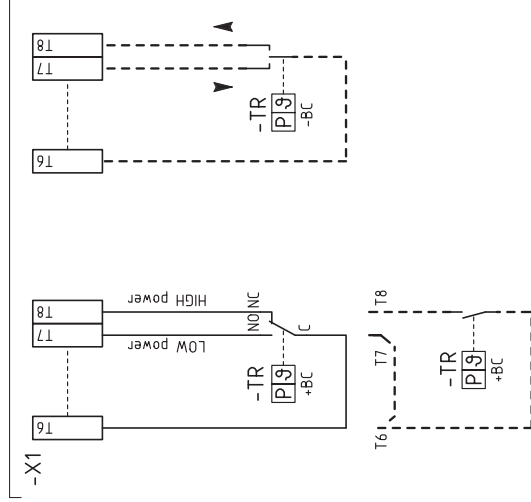
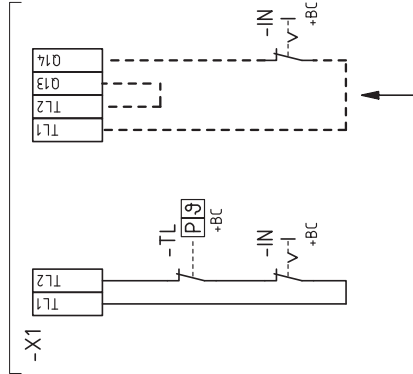
ATTENTION:
In case of gas valve proving
modify the internal parameters.

ATTENTION: Pour activer le contrôle d'étanchéité modifier les paramètres internes.

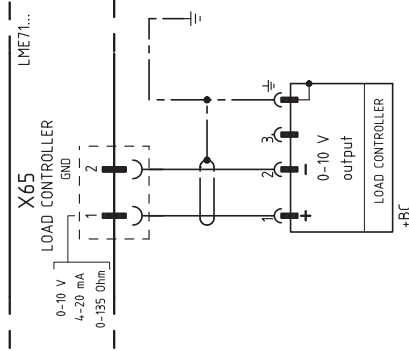
ACHTUNG:
Um die Dichtheitskontrolle zu aktivieren
die internen Parameter ändern.

RX 1000 S/PV

YE = GIALLO / YELLOW / JAUNE / GELB	WH = BIANCO / WHITE / BLANC / WEISS	GY = GRIGIO / GREY / GRIS / GRAU	TO = TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
GN = VERDE / GREEN / VERT / GRÜN	OG = ARANCIO / ORANGE / ORANGE / ORANGE	PK = ROSA / PINK / ROSE / ROSA	SR = ARGENTO / SILVER / ARGENT / SILBER
RD = ROSSO / RED / ROUGE / ROT	VT = VIOLETT / VIOLET / VIOLET / VIOLETT	GD = ORO / GOLD / OR / GOLD	GNYE = GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
BROWN / MARRON / BRAUN			
ELECTRICAL CONNECTIONS SET BY INSTALLER			
ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L'INSTALLATEUR			
2	3	4	5
Sheet : 7			
8			



POSSIBILITY OF EXTERNAL MODULATION



ATTENZIONE:
Per modulazione 0-10V o 4-20mA
modificare i parametri interni

ATTENTION:
For modulation 0-10V or 4-20mA
modify the internal parameters

ATTENTION:
Pour modulation 0-10V ou 4-20mA
modifier les paramètres intérieurs

ACHTUNG:
Für Modulation 0-10V oder 4-20mA
ändern die Innenparameter

[illegible]

WIRING LAYOUT KEY

A1	- Control box LME7...
AZL	- Display and operating unit
B	- Suppressor
BA	- Input under current 4...20 mA DC
BA1	- Input under current 4...20 mA DC to modify the setpoint
BP	- Pressure probe
BP1	- Pressure probe
BR	- Remote setpoint voltage divider
BT1	- Thermocouple probe
BT2	- Probe Pt100 with 2 wires
BT3	- Probe Pt100 with 3 wires
BT4	- Probe Pt100 with 3 wires
BTEXT	- External probe for the climatic compensation of the setpoint
BV	- Probe with voltage output
BV1	- Device with voltage output
B1	- Internal output power regulator RWF40
+BB	- Components on burner
+BC	- Components on boiler
CN1	- Ionisation probe connector
F	- Fuse
FU	- Control box fuse
H	- Lock-out signal burner external
H1	- Signal light for burner on
KMV	- Fan motor contactor/relay
K5	- Burner lock-out voltage free contact relay
K6	- Fuelled burner ON clean contacts output relay
ION	- Ionisation probe
MV	- Fan motor
PGMin	- Minimum gas pressure switch
PGVP	- Gas pressure switch for leak detection control device
Q1	- Contactor main
RS	- Reset button external burner
SH3	- Burner reset button and lockout warning
S1	- Contactor ON/OFF burner
TA	- Ignition transformer
TL	- Limit thermostat/pressure switch
TR	- Safety thermostat/pressure
TS	- Adjustment thermostat/pressure
VS	- Gas safety valve
VR	- Gas needle valve operation
Y	- Gas train
X...	- Control box connectors
X1	- Main supply terminal strip
XM...	- Fan motor connectors
XPB	- Burner earth
XPE...	- Main earth
XP1	- RWF 40 kit socket
XRWF	- Output power regulator RWF40 terminal strip
XTA	- Earth transformer
XTV	- Fan earth

