GB

Light oil burners

Two stage operation

CODE	MODEL
3473720	PRESS GW
3473784	PRESS GW
3474520	PRESS 1G
3474582	PRESS 1G
3474920	PRESS 2G
3474982	PRESS 2G
3475920	PRESS 3G
3475982	PRESS 3G
3476520	PRESS 4G
3476582	PRESS 4G

20217103 (1) - 08/2024

Translation of the original instructions

1 Information and general warnings

1.1 Information about the instruction manual

1.1.1 Introduction

The instruction manual supplied with the burner:

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

Symbols used in the manual

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

1.1.2 General dangers

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

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

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

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

1.1.3 Other symbols

DANGER: LIVE COMPONENTS

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

DANGER: FLAMMABLE MATERIAL

This symbol indicates the presence of flammable materials.

DANGER: BURNING

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

DANGER: CRUSHING OF LIMBS

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

WARNING: MOVING PARTS

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

DANGER: EXPLOSION

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

PERSONAL PROTECTION EQUIPMENT

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

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

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

ENVIRONMENTAL PROTECTION

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

IMPORTANT INFORMATION

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

➤ This symbol indicates a list.

Abbreviations used

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

1.1.4 Delivery of the system and the instruction manual

When the system is delivered, it is important that:

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

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

.....

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

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

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

1.2 Guarantee and responsibility

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

ATTENTION

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

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

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

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

2 Safety and prevention

2.1 Introduction

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

Specifically:

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

the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the ambient 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.

ATTENTION

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

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

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

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

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

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

In addition:

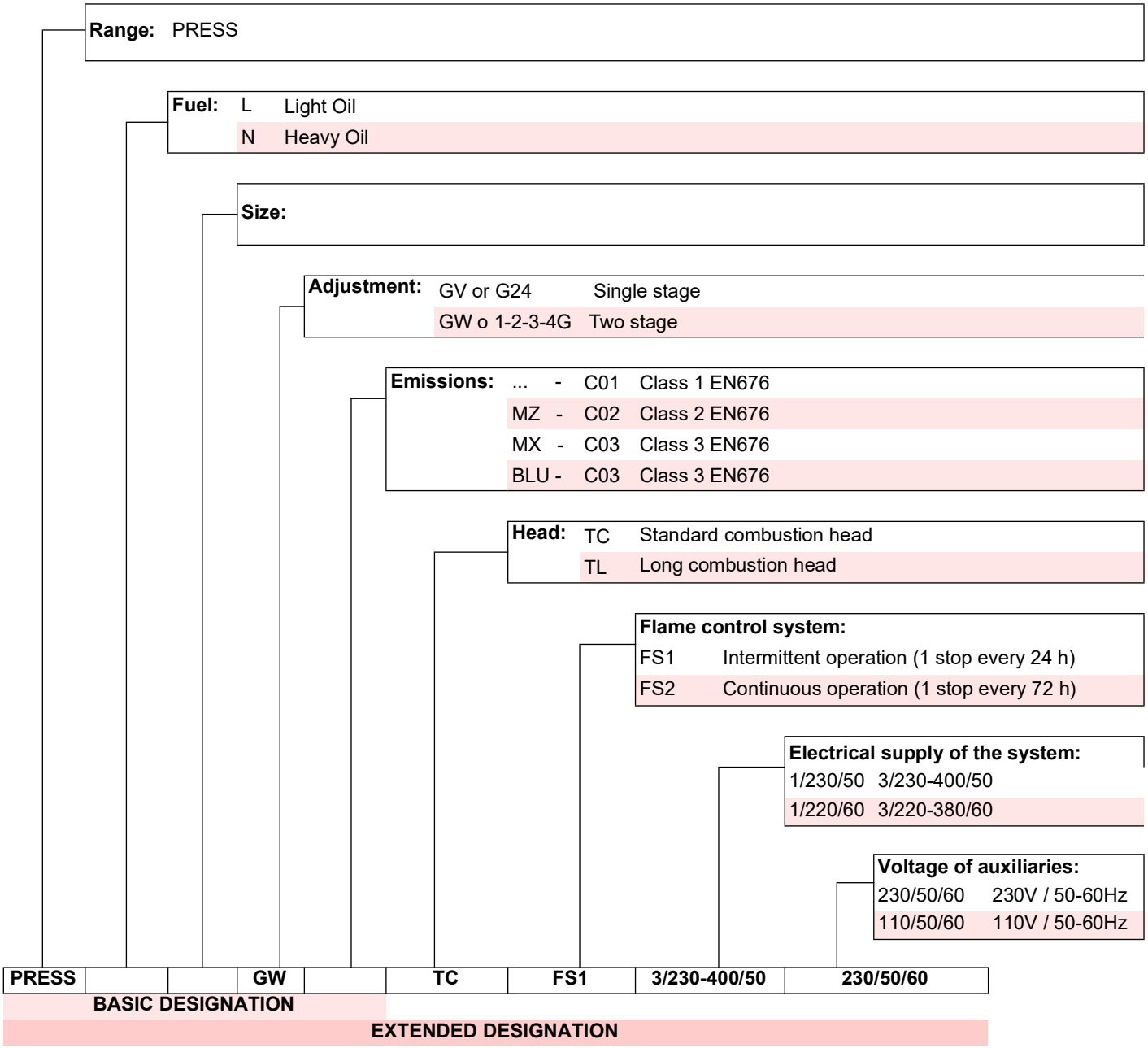
➤ must take all the measures necessary to prevent unauthorised people gaining access to the machine;

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

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

3 Technical description of the burner

3.1 Burner designation



3.2 Models available

Designazione			Tensione	Avviamento	Codice
PRESS GW	TC	FS1	1/230/50	Direct	3473720
PRESS GW	TC	FS1	1/220/60	Direct	3473784
PRESS 1G	TC	FS1	3/230-400/50	Direct	3474520
PRESS 1G	TC	FS1	3/220-380/60	Direct	3474582
PRESS 2G	TC	FS1	3/230-400/50	Direct	3474920
PRESS 2G	TC	FS1	3/220-380/60	Direct	3474982
PRESS 3G	TC	FS1	3/230-400/50	Direct	3475920
PRESS 3G	TC	FS1	3/220-380/60	Direct	3475982
PRESS 4G	TC	FS1	3/230-400/50	Direct	3476520
PRESS 4G	TC	FS1	3/220-380/60	Direct	3476582

Tab. A

3.3 Technical data

MODELLO		PRESS GW	PRESS 1G	PRESS 2G	PRESS 3G	PRESS 4G
Output (1)	kW	107/178 -356	130/190 -534	214/356 - 712	273/534 - 1186	415/830 - 1660
Delivery (1)	kg/h	9/15 - 30	11/16 - 45	18/30 - 60	23/45- 100	35/70 - 140
Fuel		Light oil				
- Net calorific value	kWh/kg Mcal/kg	11.8 10.2				
- density	kg/dm3	0.82 - 0.85				
- viscosity at 20 °C	mm2/s	max 6 (1.5 °E - 6 cSt)				
Operation		• IIntermittent (min. 1 stop every 24 hours). • Two-stage (high and low flame) and single-stage (all - nothing)				
Nozzle	No.	2 (nozzle with return line)				
Standard applications		Boilers: water, steam, diathermic oil				
Ambient temperature	°C	0 - 40				
Combustion air temperature	°C max	60				
Pompa - Portata a 12 bar - Campo di pressione - Temperatura combustibile	 kg/h bar ° C max	AN67 65 10 - 18 60	AN77 90 10 - 18 60		J6 164 10 - 21 70	J7 244 10 - 21 70
Peso del bruciatore (completo di imballo)	kg	37	44	44	55	95

Tab. B

(1) Reference conditions: Room temperature 20°C - Barometric pressure 1000 mbar – Altitude 100 m above sea level.

3.4 Electrical data

MODEL (50 Hz)		PRESS GW	PRESS 1G	PRESS 2G	PRESS 3G	PRESS 4G
CODE		3473720	3474520	3474920	3475920	3476520
Electrical power supply	V HZ	1/230/50	3/230-400/50 1/230/50			
Absorbed electrical power	kW max	0.43	0.6	0.85	2.05	3.8
Protection level	IP	40				

MODEL (60 Hz)		PRESS GW	PRESS 1G	PRESS 2G	PRESS 3G	PRESS 4G
CODE		3473784	3474582	3474982	3475982	3476582
Electrical power supply	V Hz	1/220/60	3/220-380/60 1/220/60			
Absorbed electrical power	kW max	0.4	0.6	1.1	1.9	3.8
Protection level	IP	40				

Tab. C

3.5 Overall dimensions

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

Bear in mind that inspection of the combustion head requires the burner to be opened and the rear part drawn back on the slide bars.

The maximum dimensions of the burner when open are given by measurement I.

D320

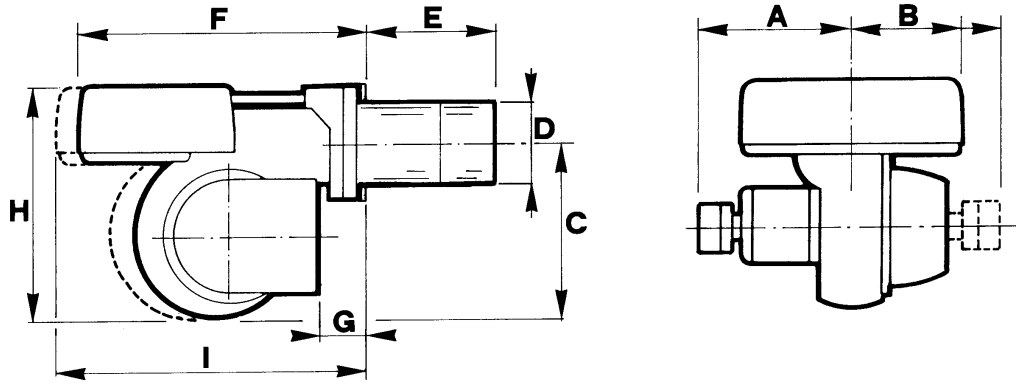


Fig. 1

mm	A	B	C	D	E	F	G	H	I
PRESS GW	234	205	292	140	185	473	59	397	688
PRESS 1G	270	205	292	150	236	473	59	307	688
PRESS 2G	270	205	332	155	237	506	89	437	721
PRESS 3G	406	205	370	175	227	570	88	485	761
PRESS 4G	354	316	445	205	266	720	175	590	942

Tab. D

* It is possible with a spacer upon request

3.6 Standard equipment

Flexible hoses ..... No. 2
Seal for flexible hoses ..... No. 2
Nipples for flexible hoses ..... No. 2
Reducer with gasket for connection of flexible suction hose to pump (PRESS GW-1G-2G) ..... No. 1
Screws to secure the burner flange to the boiler:
- M10 x 25 (PRESS GW-1G-2G) ..... No. 4
- M12 x 40 (PRESS 3G-4G) ..... No. 4
Thermal flange gasket ..... No. 1
Manual ..... No. 1
Spare parts list ..... No. 1

3.7 Firing rates

During operation, burner output varies between:
- ➤ **MINIMUM FLOW RATE**: can drop down to 9 kg/h
- ➤ **MAXIMUM OUTPUT**: must be within the firing rate (Fig. 2).

ATTENTION

The FIRING RATE was obtained with an ambient temperature of 20°C and a barometric pressure of 1000 mbar (approx. 100m above sea level), with the combustion head adjusted as shown on page 27.

S10540

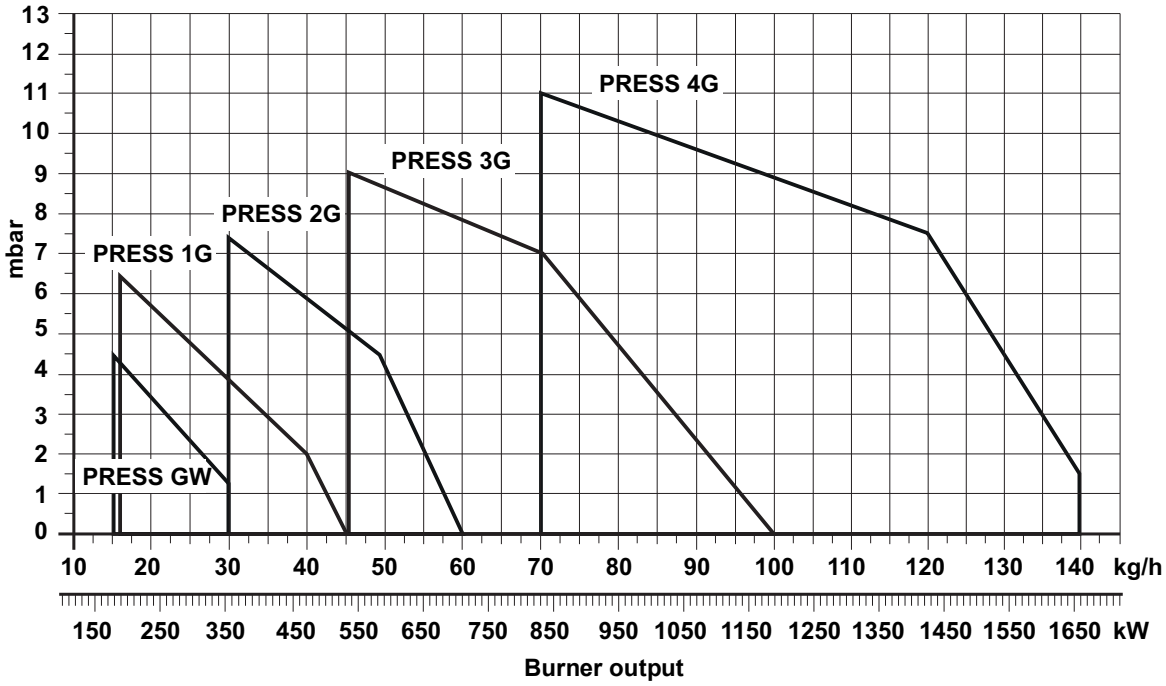


Fig. 2

3.8 Test boiler

The burner/boiler combination does not pose any problems if the boiler is EC approved and its combustion chamber dimensions are similar to those indicated in the diagram (Fig. 3).

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

The firing rates were obtained in special test boilers, according to EN 267 standard.

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

Example:
Output 25 kg/h (297 kW): diameter 50 cm - length 2 m.

D449

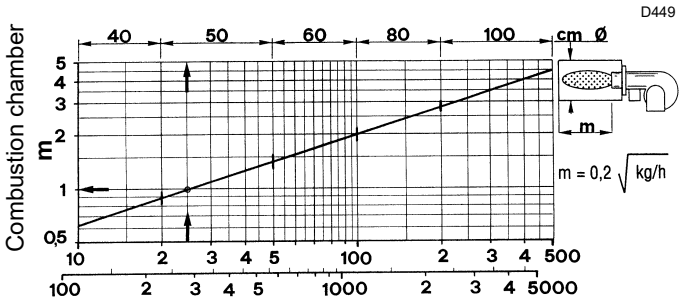
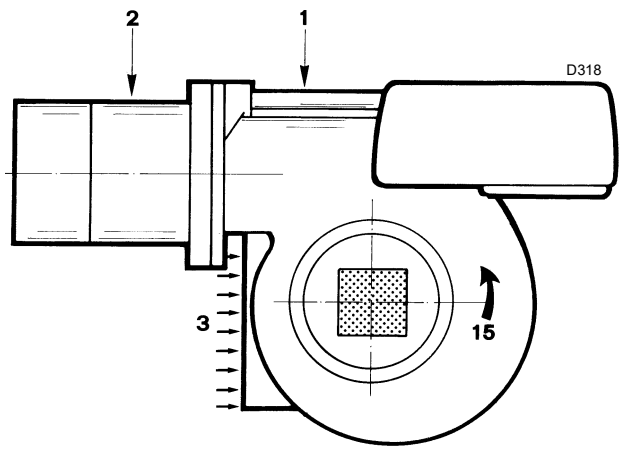


Fig. 3

MODULATING RATIO

The modulating ratio, obtained in test boilers according to standard (EN 267 for light oil) is 4:1 for light oil.

3.9 Burner description



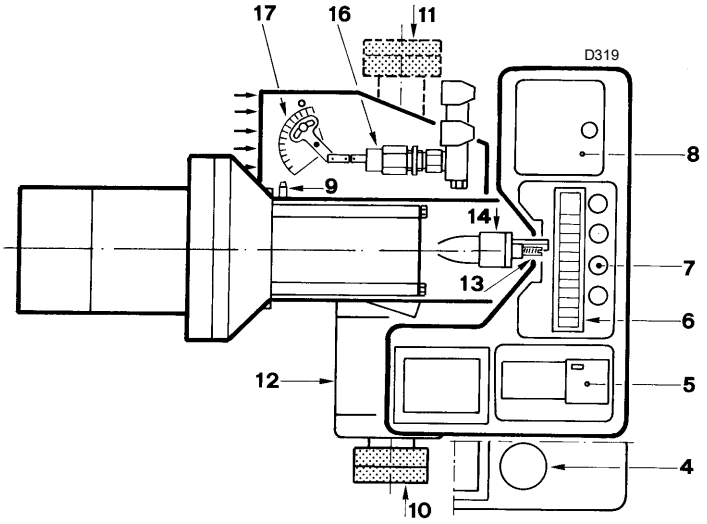


Fig. 4

1 Slide bars for opening the burner and inspecting the combustion head
2 Combustion head
3 Air inlet to fan
4 Motor capacitor
5 Ignition transformer
6 Terminal strip
7 Fairleads for wiring carried out by the installer
8 Control box with lock-out pilot light and lock-out reset button
9 Fan pressure test point
10 Pump (PRESS GW-1G-2G-3G)
11 Pump (PRESS 4G)
12 Fan
13 Electrical motor
14 Screw for combustion head adjustment
15 Flame sensor for flame presence control
16 Fan rotation direction
17 Indexed selector. Opens the fan gate to the value necessary at the burner delivery.

Two types of burner failure may occur:

Control box lock-out: if the control box 8)(Fig. 4) push-button lights up, it indicates that the burner is in lock-out. To reset, press the push-button for a minimum of three seconds.

Motor Trip: (PRESS 1-2-3-4 G): release by pressing the push-button on thermal relay 5)(Fig. 4).

3.10 Flame control

Important notes

ATTENTION

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

The flame control is a safety device! Avoid opening or modifying it, or forcing its operation. Riello S.p.A. cannot assume any responsibility for damage resulting from unauthorised interventions!

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ Before modifying the wiring in the flame control connection area, fully disconnect the system from the power supply (omnipolar separation). Check the system is not powered and cannot be accidentally reconnected. Failure to do this will lead to the risk of electrocution.
- ➤ Protection against electrocution from the flame control and all connected electric components is obtained with the correct assembly.
- ➤ Before any intervention (assembly and installation operations, assistance, etc.), ensure the wiring is in order and that the parameters are correctly set, then make the safety checks.
- ➤ Falls and collisions can negatively affect the safety functions.
  In this case, the flame control must not be operated, even if it displays no evident damage.
- ➤ Press the reset button of the burner lockout command or the reset button (by applying a force of not more than 10 N), without the aid of tools or sharp objects.

For the safety and reliability of the flame control, comply with the following instructions:
– avoid conditions that can favour the development of condensate and humidity. Otherwise, before switching on again, make sure that the entire flame control is perfectly dry!
– Static charges must be avoided since they can damage the flame control's electronic components when touched.

S8906

Fig. 5

Technical data

Mains voltage	AC 220...240 V +10 % / -15 %
Mains frequency	50 / 60 Hz ±6%
Power absorption	20 VA
Protection level	IP20
Safety class	I
Weight	approx. 260 g
Cable length:	
Thermostat cable	Max. 20 m at 100 pF/m
Air pressure switch	Max. 1 m at 100 pF/m
Gas pressure switch	Max. 20 m at 100 pF/m
Remote reset	Max. 20 m at 100 pF/m
CPI	Max. 1 m at 100 pF/m
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.

Mechanical structure

The flame control is made of plastic to resist knocks, heat and flame propagation.
The flame control contains the following components:

- a microprocessor that controls the program sequence, and a relay for controlling the load
- an electronic flame signal amplifier
- a built-in reset button, with 3 signalling colours (LED) for status and error messages.

4 Installation

4.1 Notes on safety for the installation

After carefully cleaning all around the area where the burner is to be installed, and arranging for the environment to be illuminated correctly, proceed with the installation operations.

DANGER

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

ATTENTION

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

DANGER

The combustion air inside the boiler must be free from hazardous mixes (e.g.: chloride, fluoride, halogen); if present, it is highly recommended to carry out cleaning and maintenance more frequently.

4.2 Handling

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

ATTENTION

Burner handling operations can be highly dangerous if not carried out with the greatest attention: distance unauthorised personnel, check integrity and suitability of the means available.
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).
During handling, keep the load at no more than 20-25 cm from the ground.

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

CAUTION

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

4.3 Preliminary checks

Checking the consignment

CAUTION

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

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

Check the identification label of the burner, showing:
- ➤ the model (see **A** in Fig. 6) and the type of burner (**B**);
- ➤ the year of manufacture, in cryptographic form (**C**);
- ➤ the serial number (**D**);
- ➤ the absorbed electrical power (**E**);
- ➤ the types of fuel used and the relative supply pressures (**F**);
- ➤ the minimum and maximum possible output data of the burner (**G**) (see Firing rate).

20188727

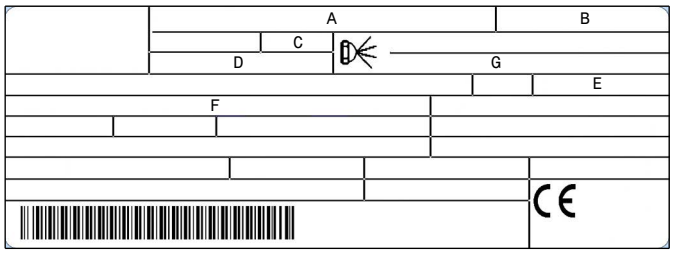


Fig. 6

ATTENTION

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

4.4 Operating position

ATTENTION

➤ The burner is designed to work only in position **1** (Fig. 7).

DANGER

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

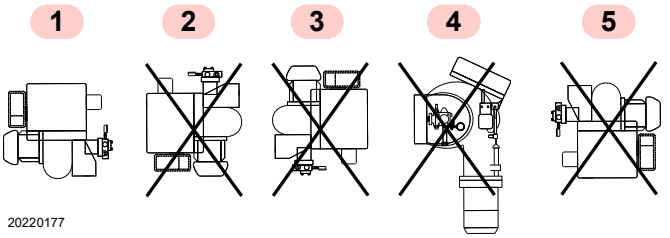


Fig. 7

4.5 Boiler plate

Pierce the closing plate of the combustion chamber, as in Fig. 8. The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

For the combustion head protrusion follow the indications provided by the boiler manufacturer.

Tab. E

MODEL	A	B	C	D
PRESS GW	155	160	160	M10
PRESS 1G	165	160	160	M10
PRESS 2G	165	160	160	M10
PRESS 3G	185	195	195	M12
PRESS 4G	210	230	230	M12

D329

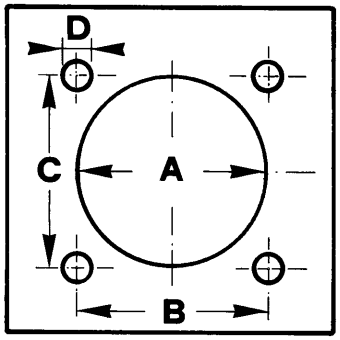


Fig. 8

4.6 Blast tube length

The length of the blast tube must be selected according to the indications provided by the manufacturer of the boiler, and in any case it must be greater than the thickness of the boiler door complete with its fettling. The range of lengths available, L (mm), is as follows:

MODEL	GW	1G	2G	3G	4G
Short	43	94	95	85	-
Standard	185	236	237	227	266
Long	320	369	395	384	426

Tab. F

For boilers with front flue passes 9) or flame inversion chambers, protective fettling in refractory material 7) must be inserted between the boiler's fettling 8) and the blast tube 6) (Fig. 9).

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

D330

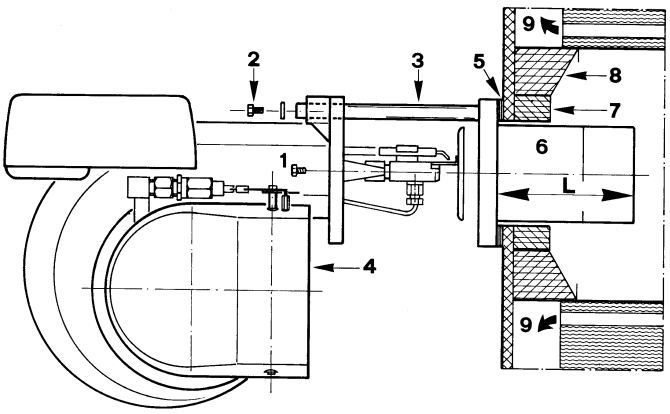


Fig. 9

4.7 Securing the burner to the boiler

Provide an adequate lifting system.

Be careful as some drops of fuel may leak out during this phase.

Disassemble the blast tube 6) from the burner by proceeding as follows:

- ➤ remove the screws 2) from the two slide bars 3);
- ➤ remove the screws 1) that secure the blast tube 6) to the burner 4);
- ➤ now disassemble the blast tube complete with the slide bars;
- ➤ Fasten the blast tube 6) to the boiler plate, inserting the gasket provided 5). Use the 4 screws provided after having protected the thread with antiscruffing products (high-temperature grease, compounds, graphite). The burner-boiler seal must be airtight.
- ➤ Re-assemble the burner 4) on the slide bars 3) and re-insert the screws 2).
- ➤ Leave the burner open as shown in Fig. 9 on page 12.

ATTENTION

The seal between burner and boiler must be airtight.

4.8 Nozzle installation

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

ATTENTION

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

CAUTION

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

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

4.8.1 Choice of the nozzles

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

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

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

The deliveries of the 1st and 2nd stages must be contained within the value range indicated on page 6.

Use nozzles with atomization angles of 60° and, if possible, at a pressure of 12 bar.

The two nozzles usually have equal deliveries, but the 1st stage nozzle may have the following specifications if required:

– a delivery less than 50% of the total delivery whenever the back-pressure peak must be reduced at the moment of firing;
– a delivery higher than 50% of the total delivery whenever the combustion during the 1st stage must be improved.

Example: PRESS 1G model:

Boiler output = 270 kW - efficiency 90%

Output required by the burner =

270 : 0.9 = 300 kW;

300 : 2 = 150 kW per nozzle;

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

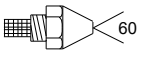
1° = 3,00 GPH - 2° = 3.00 GPH,

or the following two different nozzles:

1° = 2.50 GPH - 2° = 3.50 GPH, or

1° = 3.50 GPH - 2° = 2.50 GPH.

4.8.2 Recommended nozzles



D339

	GPH	kg/h (1) 10 bar	kg/h (1) 12 bar	kg/h (1) 14 bar	kW 12 bar
PRESS GW	2.00	7.7	8.5	9.2	100.8
	2.25	8.6	9.5	10.4	112.7
	2.50	9.6	10.6	11.5	125.7
	3.00	11.5	12.7	13.8	150.6
	3.50	13.5	14.8	16.1	175.5
	4.00	15.4	17.0	18.4	201.6
PRESS 1G	2.00	7.7	8.5	9.2	100.8
	2.25	8.6	9.5	10.4	112.7
	2.50	9.6	10.6	11.5	125.7
	3.00	11.5	12.7	13.8	150.6
	3.50	13.5	14.8	16.1	175.5
	4.00	15.4	17.0	18.4	201.6
	4.50	17.3	19.1	20.7	226.5
	5.00	19.2	21.2	23.0	251.4
	5.50	21.1	23.3	25.3	276.3
PRESS 2G	4.00	15.4	17.0	18.4	201.6
	4.50	17.3	19.1	20.7	226.5
	5.00	19.2	21.2	23.0	251.4
	5.50	21.1	23.3	25.3	276.3
	6.00	23.1	25.5	27.7	302.4
	6.50	25.0	27.6	30.0	327.3
	7.00	26.9	29.7	32.3	352.3
PRESS 3G	6.00	23.1	25.5	27.7	302.4
	6.50	25.0	27.6	30.0	327.3
	7.00	26.9	29.7	32.3	352.3
	7.50	28.8	31.8	34.6	377.2
	8.30	31.9	35.2	38.3	417.5
	9.50	36.5	40.3	43.8	478.0
	10.50	40.4	44.5	48.4	527.8
	12.00	46.1	50.9	55.3	603.7
PRESS 4G	9.50	36.5	40.3	43.8	478.0
	10.50	40.4	44.5	48.4	527.8
	12.00	46.1	50.9	55.3	603.7
	13.80	53.1	58.5	63.6	693.8
	15.30	58.2	64.9	70.5	769.7
	17.50	67.3	74.2	80.7	880.0

(1) Light oil:
– density 0.84 kg/dm^3
– viscosity 4.2 cSt/20°C
– temperature 10°C

Tab. G

4.8.3 Ugelli alternativi

The spray patterns in relation to the leading brands of nozzle on sale are shown in Tab. H.

The nozzle deliveries indicated in the Tab. G on page 14 are the rated values. In reality, the delivery may differ by +/- 10% due to the reasons below:
– tolerance values indicated by the manufacturer;
– temperature variation: delivery decreases with a rise in temperature and vice-versa;
– variations in fuel viscosity: delivery decreases with a decrease of viscosity and vice-versa.

A burner's exact delivery can only be determined by weighing. Suck the fuel from a recipient mounted on a weighing machine, or attach hoses to the nozzles and weigh the fuel that flows out.

A liter counter can be applied to the pump's suction line if a single-pipe supply system has been provided.

NOTE:
Nozzle Manufacturers discourage opening of the nozzle to clean its internal parts and especially its calibrated hole. The filter, on the other hand, may be cleaned or replaced as required. Grip the nozzle on its hexagonal part when handling.

Spray	Delevan	Monarch	Danfoss	Steinen
Hollow	A	PL	H	H - PH
Solid	B	AR	S	Q
Universal	W	NS - PLP	B	SS
Semi-solid	E	R	-	S

Tab. H

4.9 Nozzle assembly

The nozzle for first stage operation is the one located under the ignition electrodes Fig. 13 on page 15.

With the burner open on the slide bars as shown in Fig. 9 on page 12, unscrew and remove the plastic plug 1)(Fig. 10) and screw the nozzle 1)(Fig. 11) into the same place using a 16 mm wrench. Lastly, close the burner by screwing in the two screws 1)(Fig. 12).

ATTENTION

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

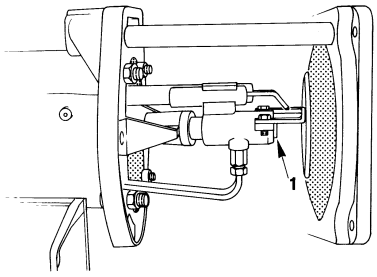


Fig. 10

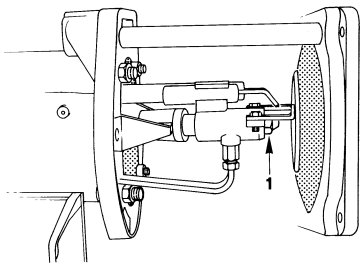


Fig. 11

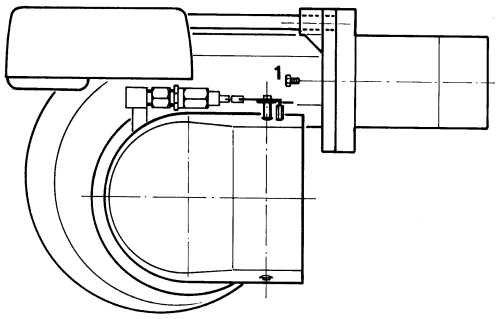


Fig. 12

4.10 Electrodes positioning

ATTENTION

Check that the electrodes are positioned correctly, as in Fig. 13, complying with the dimensions indicated.

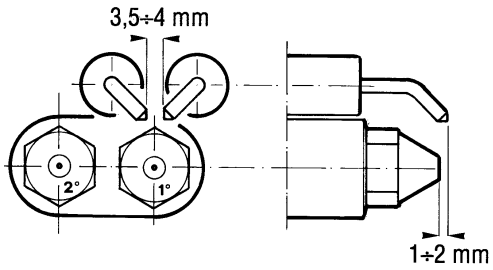


Fig. 13

4.11 Light oil supply

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

Precautions: avoid knocking, attrition, sparks and heat.

Make sure the fuel shut-off valve is closed before performing any operation on the burner.

ATTENTION

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

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

There are three types of fuel hydraulic circuits:
– double-pipe circuits (the most common);
– single-pipe circuits;
– loop circuits.

According to the burner/tank layout, either of two fuel supply systems can be used:
– siphon-type (with the tank higher than the burner);
– suction-type (with the tank lower than the burner).

4.11.1 Double-pipe siphon-type systems (A)

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

4.11.2 Double-pipe suction-type systems (B)

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

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

ATTENTION

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

Any obstruction would cause the pump seals to break.

Oil pipes must be completely airtight.

L m

+H - H m	PRESS GW Ø mm			PRESS 1G PRESS 2G Ø mm			PRESS 3G Ø mm			PRESS 4G Ø mm		
	8	10	12	10	12	14	12	14	16	12	14	16
+ 4	35	90	152	63	144	150	71	139	151	44	88	158
+ 3	30	80	152	55	127	150	62	123	151	38	77	140
+ 2	26	69	152	48	111	150	53	106	151	33	66	121
+ 1	21	59	130	40	94	150	45	90	151	27	56	103
+ 0.5	19	53	119	37	86	150	40	82	151	24	50	94
0	17	48	108	33	78	150	36	74	137	21	45	85
- 0.5	15	43	97	29	70	118	32	66	123	18	40	76
- 1	13	37	86	25	62	133	28	58	109	15	34	66
- 2	9	27	64	17	45	118	19	42	81	9	23	48
- 3	4	16	42	10	29	88	10	26	53	-	13	30
- 4	-	6	20	-	12	58	-	10	25	-	-	12

Tab. I

D396

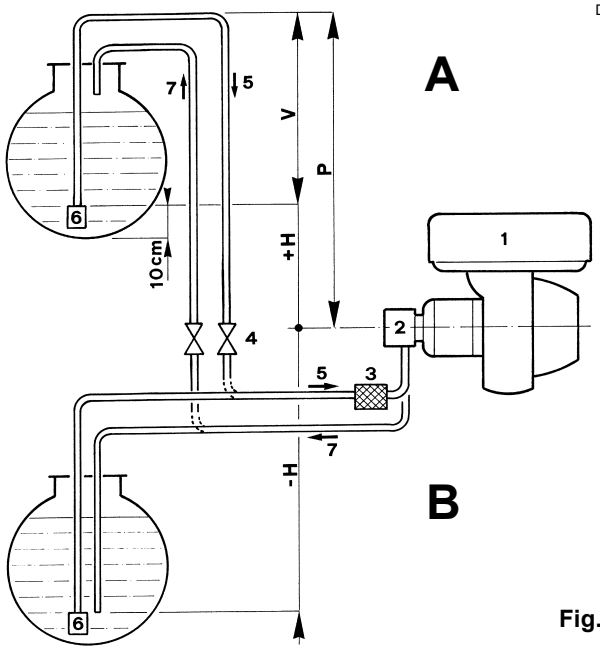


Fig. 14

Key

H = Pump/Foot valve height difference
L = Piping length
values calculated for light oil:
- viscosity: 6 cSt / 20 °C
- density: 0.84 kg/dm^3
- temperature: 0°C
- maximum altitude: 200 m (s.l.m.)

Ø = Internal diameter of the tube. Copper tubes Øi 14 mm could be replaced by steel tubes G 1/2" ; copper tubes Øi 16 and 18 mm could be replaced by steel tubes G 3/4 ".

1 = Burner
2 = Pump
3 = Filter
4 = Manual ON/OFF valve
5 = Suction line
6 = Foot valve
7 = Return line

Useful suggestions for both systems (A) and (B)

- Use copper pipes whenever possible.
- Any curves used in the system should be made with the widest possible radius.
- Use biconic connectors at both ends of the pipe.
- Whenever the burner is installed in areas with extremely cold winter climates (temperatures lower than -10°C), we recommend insulating both the tank and the piping. Avoid the smallest of the three pipe diameters provided in the Table and lay the piping along the most sheltered route possible. The paraffin in the fuel begins to solidify below 0°C, and the filters and nozzle begin to clog accordingly.
- Install a filter on the suction lines with a transparent plastic bowl if possible in order to permit the regular flow of fuel and quick checking of the state of the filter.
- The return pipe does not require an on/off valve, but if the user desires to insert one, a lever-type valve should be selected which clearly indicates when the valve is open or closed (if the burner starts with the return pipe closed, the sealing organ located on the pump shaft will break).
- The opening of the burner or the boiler door must not twist the flexible hoses that connect the copper pipes to the pump.
- If more than one burner is operating in the same room, each one must be equipped with its own suction pipe; the return pipe may be shared by all, providing it is sufficiently sized.
- The suction line must be perfectly airtight. In order to check the seal, close the pump's return line. Install a union T on the vacuum meter attachment. On one branch of this T install a pressure gauge and on the other branch inject air at a pressure of 1 bar. After the air injection, the gauge must remain at a constant pressure.

4.11.3 Single-pipe systems

There are two solutions possible: (Fig. 15):

– Pump external by-pass (**A**) (recommended)
Connect the two flexible hoses to an automatic degassing unit. The pump by-pass screw must not be removed.

– Pump internal by-pass (**B**).
The pumps are equipped with a screw 6)(Fig. 29 on page 27), which is accessible through the return line connector, which when removed opens the return pipe to the suction line. The pump return line connector must be plugged.
This solution is possible only with low pump depression values (max. 0.2 bar) and perfectly-sealed piping.

4.11.4 The loop circuit

This is composed by piping that leaves from the tank and returns to the same with an auxiliary pump that circulates the fuel under pressure. A branch connection from the loop goes to feed the burner. This circuit is extremely useful whenever the burner pump does not succeed in self-priming because the tank distance and/or height difference are higher than the values listed in the Tab. I on page 16.

Contact our Engineering Department for further information regarding single-pipe systems and the loop circuit.

Altitudine. L'altitudine ha un effetto determinante sulla potenza di aspirazione della pompa. Ad altitudini superiori a 200 metri sul livello del mare, il dislivello, in metri, tra la pompa e la valvola di fondo deve essere corretto del fattore "**F**", vedi Tab. J, in modo da ottenere il dislivello equivalente con quale determinare la lunghezza massima delle tubazioni, ovvero:

se si tratta di un sistema di tipo aspirante:

(equivalente) **He** = (reale) **H + F**

se si tratta di un sistema a sifone:

(equivalente) **He** = (reale) **H - F**

dove: **F** = (altitudine reale) **(m - 200) / 1000**

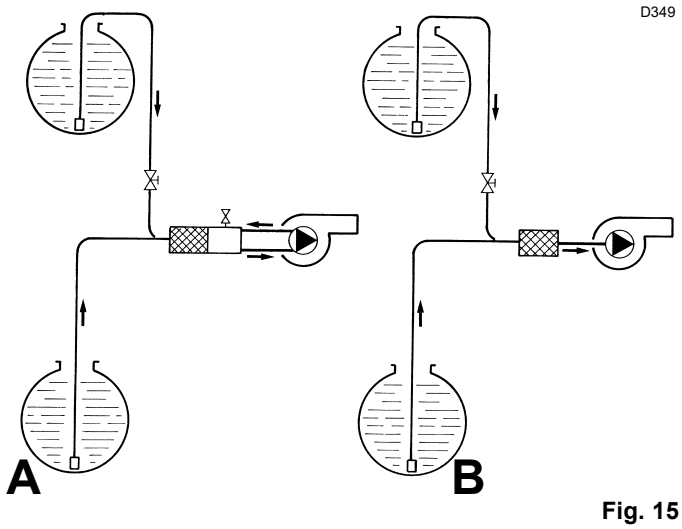


Fig. 15

m	200	300	600	900	1200	1500	1800	2100
F	0	0,1	0,4	0,7	1	1,3	1,6	1,9

Tab. J

m Height in meters above sea level

F Compensation factor

Example:

Suction type system ..... H = 2 meters

Piping diameter ..... Ø = 10 mm

Altitude	m	200	1200
F		0	1
H	m	2	2 + 1 = 3
Piping lenght	m	**27**	**16**

Tab. K

4.11.5 Hydraulic connections

CAUTION

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

The hydraulic circuit feeding system must be designed according to the indications provided in the paragraph “Light oil supply” page 16.

Remove the plugs from the suction and return pump connectors and screw in the flexible hoses, the connectors, and the gaskets provided in their place as shown in (Fig. 16).

ATTENTION

– The opening of the burner or the boiler door must not twist or strain the flexible hoses.
– During the installation, hoses must not be stressed with twisting.
– Arrange the hoses in such a way that they are never stepped on or come into contact with the hot surfaces of the boiler.

Use two wrenches to screw in the flexible hoses/nipples: one to grip the flexible hose connector and the other to grip the nipple in order to apply the opposite force.

PRESS GW -1G - 2G

D341

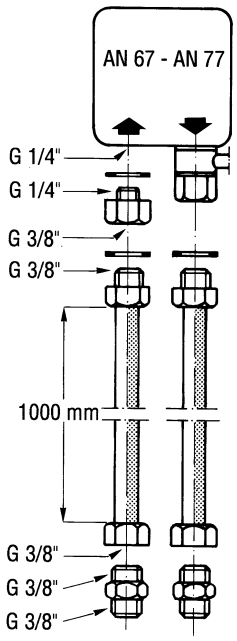


Fig. 16

PRESS 3G - 4G

D342

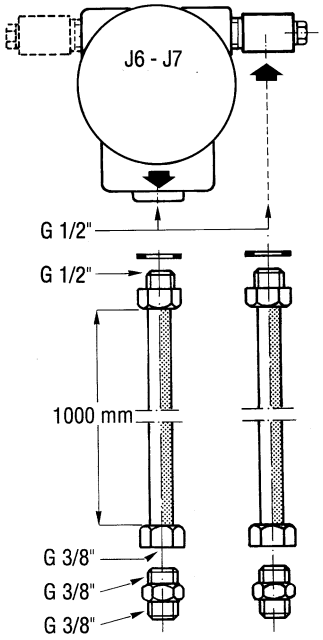


Fig. 17

4.12 Pump

4.12.1 Technical data

Burner		PRESS GW	PRESS 1G PRESS 2G	PRESS 3G	PRESS 4G
Pump		**AN67**	**AN77**	**J6**	**J7**
Min. delivery rate at 12 bar pressure	kg/h	65	90	164	244
Delivery pressure range	bar	10 - 18	10 - 18	10 - 21	10 - 21
Max. suction depression	bar	0.45	0.45	0.45	0.45
Viscosity range	mm^2/s (cSt)	2 - 75	2 - 75	2.8 - 200	2.8 - 200
Maximum light oil temperature	°C	60	60	70	70
Max. suction and return pressure	bar	2	2	1.5	1.5
Pressure calibration in the factory	bar	12	12	12	12

Tab. L

4.12.2 Priming pump

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

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

- The pumps are equipped with a by-pass that connects return line and suction line. The pumps are installed on the burner with the by-pass closed by screw 6) (Fig. 29 on page 27). When single-pipe fuel supply systems without degassing units (B)P.34 are used, this screw, accessible from the return connector 2), must be removed. In this way, the excess in the delivery discharged by the pressure regulator into the return line passes into the suction line. The pump will break immediately if it is run with the return line closed and the by-pass screw inserted.
- Moreover check that the valves on the suction line are opened and that there is sufficient fuel in the tank.
- In order the self-priming to occur, it is necessary to loosen the plug of the pressure gauge connection on the pump (or the pressure gauge if applied) in order to bleed the air contained in the suction line and bring the pump delivery pressure to zero.
- Do not illuminate the flame sensor; otherwise the burner will not start.
- Start the burner by closing the control device and the main switch of the electrical line. The pump must rotate in the direction indicated by the arrow marked on the cover or on the pump body.
- The pump is delivered from the factory already full of fuel and with its return and suction connections plugged. This stops the gear unit rusting and permits the pump to prime upon first starting.
- When the light oil begins to flow from the pressure gauge connection, the pump is primed. At this point, immediately turn off the burner. The time needed for this operation depends on the diameter and length of the suction hose. If at the first burner ignition the pump fails to prime and the burner locks out, wait for approx. 40 seconds, reset the burner, then repeat the starting operation as many times as necessary.

NOTE:

The above-mentioned operation is possible because the pump is already full of fuel when it leaves the factory. If the pump has been drained, fill it with fuel through the opening on the vacuometer prior to starting; otherwise, the pump will seize. Whenever the length of the suction piping exceeds 20-30 meters, the supply line must be filled using a separate pump.

- The vacuum meter attachment is located upstream from the pump filter and consequently it is not able to detect a clogged filter.
- Water must be prevented from accumulating on the bottom of the tank, due to infiltration or condensation, and subsequently reaching the pump. Water in the pump will lead to rusting and eventually the pump will have to be renewed.

PUMP		AN67
1	Suction	G 1/4”
2	Return	G 1/4”
3	Pressure gauge connection	G 1/8”
4	Vacuometer connection	G 1/8”
5	Pressure adjustment screw:	
	Right rotation	Pressure increase
	Left rotation	Pressure decrease
G	Cylindrical thread	

ATTENTION

The connector to be screwed into the cylindrical thread **G** must be equipped with a sealing washer.

Do not screw a connector with a conical thread (NPTF) into the cylindrical thread **G**.

PRESS GW:
SUNTEC AN67

D376

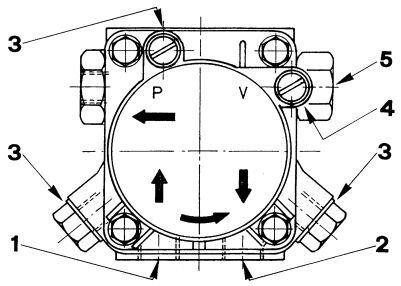


Fig. 18

PRESS 1G - 2G:
SUNTEC AN77

D377

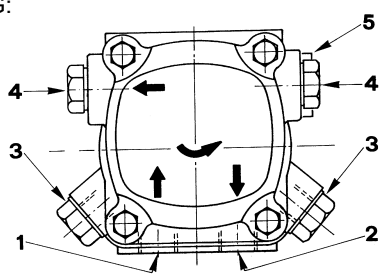


Fig. 19

PRESS 3G:
SUNTEC J6

D379

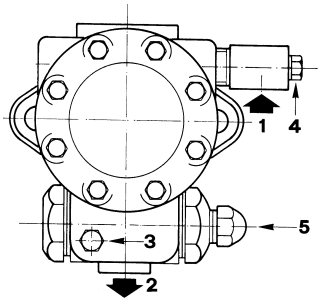


Fig. 20

PRESS 4G:
SUNTEC J7

D379

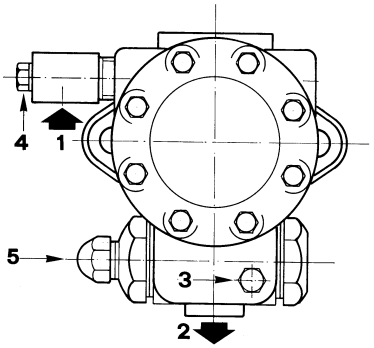


Fig. 21

5 Electrical system

5.1 Electrical connections

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 flame control to perform checks of its own start-up efficiency. Normally, burner stopping is guaranteed by the boiler's thermostat/pressure switch.
- ➤ If this is not the case, a time switch should be fitted in series to TL to stop the burner at least once every 24 hours. Refer to the wiring diagrams.
- ➤ The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel. Do not use the gas tubes as an earthing system for electrical devices.
- ➤ The electrical system must be suitable for the maximum power absorption of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for that level of power absorption.
- ➤ For the main power supply of the device from the electricity mains:
  - do not use adapters, multiple sockets or extensions;
  - make provisions for an omnipolar switch with a gap between the contacts of at least 3 mm (over-voltage category III), as required by current safety regulations.
- ➤ Do not touch the device with wet or damp body parts and/or in bare feet.
- ➤ Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:


DANGER

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


DANGER

Close the fuel shut-off valve.


DANGER

Avoid condensate, ice and water leaks from forming.

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

Use flexible cables according to EN 60 335-1 standard.

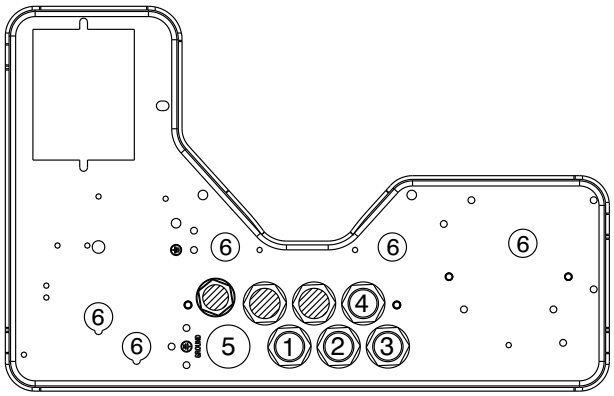
5.1.1 Electrical cable fastening

All cables to be connected to the burner terminal strip 6) (Fig. 4 on page 9) should pass through fairleads 7)(Fig. 4 on page 9). The fairleads and precut holes can be used in various ways. One example is given in Fig. 22.

To ensure that the IP 40 protection classification is maintained, close all unused fairlead fitting holes.

20219981

PRESS GW



PRESS 1-2-3-4 G

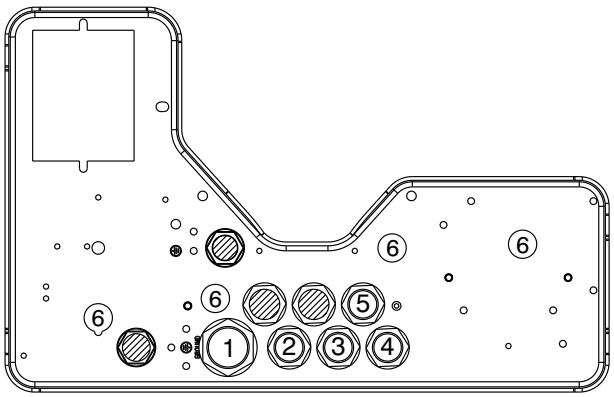


Fig. 22

PRESS GW

1	Single-phase power supply	Pg 13.5
2	Control device TL	Pg 13.5
3	Control device TR	Pg 13.5
4	Spare fairlead	Pg 13.5
5	Fitting hole for fairlead, if required	Pg 21
6	Fitting hole for fairlead, if required	Pg 11

PRESS 1G - 2G- 3G - 4G

1	Three-phase power supply	Pg 21
2	Single-phase power supply	Pg 13.5
3	Control device TL	Pg 13.5
4	Control device TR	Pg 13.5
5	Spare fairlead	Pg 13.5
6	Fitting hole for fairlead, if required	Pg 11

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

6 Start-up, calibration and operation of the burner

6.1 Notes on safety for the first start-up

ATTENTION

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.

ATTENTION

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

6.2 Burner operation

The PRESS G model burners can work in two ways: one-stage and two-stage.

In **one-stage operation**, only one control device is provided: TL (see the wiring diagram). The burner fires in the 1st stage, where it remains for 7 seconds before passing to the 2nd stage when commanded by the flame control 8)(Fig. 4 on page 9). When the boiler temperature or pressure exceeds the values set on the control device TL, the burner shuts down.

In **two-stage operation**, two control devices are provided: TL and TR. The burner fires in the 1st stage but passes to the 2nd stage only if control device TR is closed. Once the temperature or pressure value set on control device TR has been reached, the burner returns to the 1st stage.

The burner shuts down only when the boiler temperature or pressure exceeds the value set on control device TL, even if the burner is still operating in the 1st stage.

Two-stage operation ensures reduced boiler temperature or pressure fluctuation and consequently lower operating costs.

6.2.1 Minimum 1st stage delivery (MIN.)

The minimum 1st stage delivery must be selected within the range of the values listed on page 8.

Example:

for the PRESS 1G Model, the selection may range from 11 - 22.5 kg/h.

It is not necessary to know the pressure in the combustion chamber in the 1st stage.

6.2.2 Maximum 2nd stage delivery (MAX.)

The maximum 2nd stage delivery must be selected within the range listed on page 8.

This area is known as the FIRING RATE and provides the maximum delivery of the burner according to the combustion chamber pressure.

Example:

for the PRESS 1G Model, this area is delimited by:

– the 16 - 45 kg/h delivery line
– the 0 + 6.5 mbar combustion chamber pressure line
– the combustion chamber maximum pressure curve.

The work point may be found by plotting a vertical line from the desired delivery and a horizontal line from the pressure in the combustion chamber.

The intersection of these two lines is the work point which must lie within the FIRING RATE area.

Example:

if the PRESS 1G Model has a delivery of 30 kg/h at a combustion chamber pressure of 4 mbar, the work point will be found on the maximum pressure curve.

The delivery of the burner to be coupled to the boiler must be selected in the MAX. area - in other words, within the FIRING RATE.

The burner can also operate in depression combustion chambers.

6.3 Adjustments prior to ignition (light oil)

ATTENTION

It is recommended to adjust first the light oil burner and then the gas burner.

Carry out the fuel change with burner off.

The optimum calibration of the burner requires an analysis of the flue gases at the boiler outlet and interventions on the following points.

6.3.1 Nozzle

See information on page 14.

6.3.2 Pump pressure

No pre-calibration is necessary for the pump, which is set by the Manufacturer at 12 bar. This pressure must be checked and adjusted (if necessary) after the burner ignition

The only operation necessary in this phase is the application of a pressure gauge on the specific pump connection indicated on page 19.

6.4 Combustion head setting

The setting of the combustion head depends exclusively on the delivery of the burner in the 2nd stage - in other words, the combined delivery of the two nozzles selected on page 14.

Set the screw 1)(Fig. 23) in such way that its rear surface corresponds to the notch number shown in diagram Fig. 25.

Example:

The burner with two 3.00 GPH nozzles and 12 bar pump pressure.

Find the delivery of the 5.00 GPH nozzle in Tab. G on page 14, 12.7 + 12.7 = 25.4 kg/h.

Diagram (Fig. 25) indicates that for a delivery of 25.4 kg/h the burner model PRESS 1G requires the combustion head to be set to approx. 3 notches, as shown in Fig. 24.

D2460

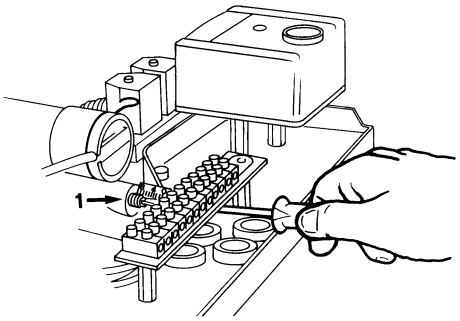


Fig. 23

D336

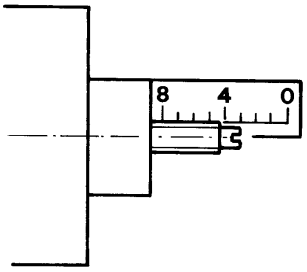


Fig. 24

D337

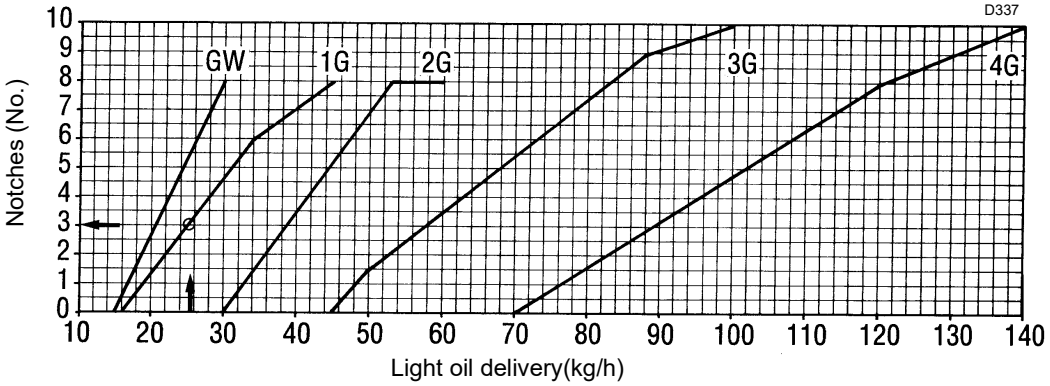


Fig. 25

6.5 Air damper adjustment

1st stage:

The air gate valve 1) is set using the indexed selector 4).

Loosen the screw 3) and the nut 2) and shift the indexed selector 4) so that the index finger 7) corresponds to the required notch setting indicated in Tab. M according to the 1st stage nozzle's delivery.

Example

The PRESS 1G Model burner - 3.00 GPH nozzle.

The indexed selector must be set to notch 2.

2nd stage:

The air gate valve 1) must be set using the cylinder 6). This setting must be adapted case by case to the burner's delivery and combustion chamber pressure.

The first time the burner is fired, the hydraulic cylinder setting should be left as originally set by the manufacturer: at approximately half of its full stroke.

In summary, the operations and settings that must be performed prior to firing the burner for the first time are as follows:
– choice of the two nozzles;
– setting of the combustion head;
– setting of the fan's air gate valve for the 1st stage.

The following require no adjustment operations and may remain as they are provided:
– pump pressure;
– setting of the fan's air gate valve for the 2nd stage.

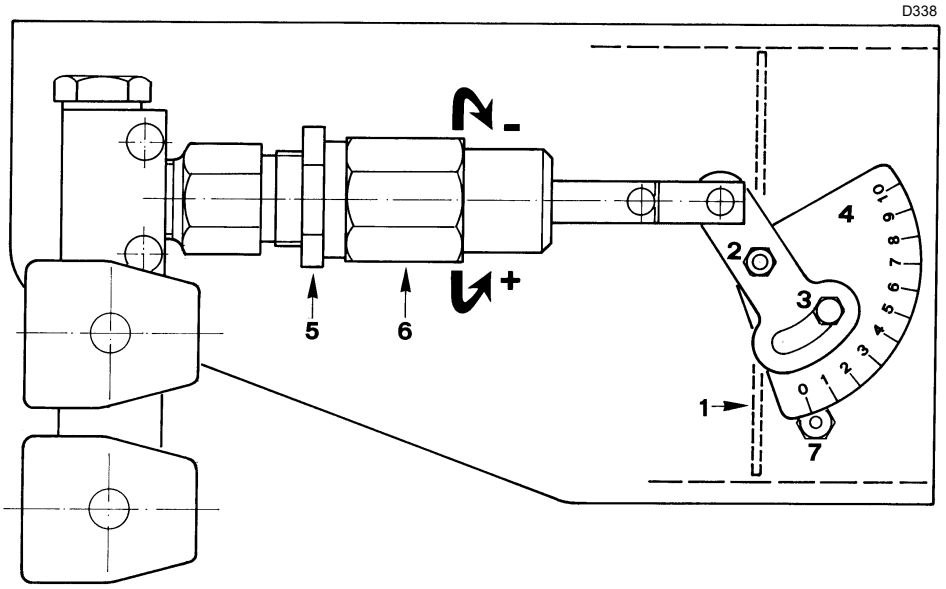


Fig. 26

PRESS GW		PRESS 1G		PRESS 2G		PRESS 3G		PRESS 4G	
GPH	N°	GPH	N°	GPH	N°	GPH	N°	GPH	N°
2.00	1.5	2.00	1	4.00	1	6.00	1.5	9.5	1.5
2.25	1.5	2.25	1	4.50	1	6.50	2	10.50	2
2.50	2	2.50	1.5	5.00	1.5	7.00	2	12.00	2
3.00	2.5	3.00	2	5.50	2	7.50	2.5	13.80	2.5
3.50	3	3.50	2.5	6.00	2	8.30	2.5	15.30	2.5
4.00	3	4.00	2.5	6.50	2.5	9.50	3	17.50	3
-	-	4.50	2.5	7.00	3	10.50	3.5	-	-
-	-	5.00	3	-	-	12.00	4	-	-
-	-	5.50	3	-	-	-	-	-	-

Tab. M

6.6 Burner ignition

Once the pump is primed, screw the plug or pressure gauge tightly onto the pump outlet and close the control devices.

During the first ignition, when switching from the 1st to the 2nd stage, there is a momentary drop in fuel pressure caused by the filling of the 2nd stage nozzle pipe. This drop in fuel pressure can cause the lock-out of PRESS GW-1G-2G models, which is sometimes accompanied by pulsations.

6.7 Burner adjustment

The burner ignition must generate a noise similar to that generated during the operation. If one or more pulsations or a delay during the ignition occurs compared to the opening of the light oil solenoid valve, refer to the paragraph "Faults - Possible causes - Solutions" on page 33.

6.7.1 Pump pressure

12 bar: this is the pressure calibrated in the factory which is usually sufficient for most purposes. Sometimes, this pressure must be adjusted to:

10 bar: in order to reduce fuel delivery. This adjustment is possible only if the surrounding temperature remains above 0°C. Never calibrate to pressures below 10 bar, at which pressures the cylinder may have difficulty in opening;

14 bar: in order to increase fuel delivery or to ensure firings even at temperatures of less than 0°C.
In order to adjust pump pressure, use the relevant screw 5) indicated in Fig. 18 on page 20.

6.7.2 1st stage fan air gate valve

Sometimes it might be necessary to adjust the calibration performed previously, especially in the case of two-stage operation burners. Keep the burner operating in the 1st stage by opening the control device TR or by removing the jumper on the terminal block. Adjust the air gate valve 1) by using the indexed selector 4) after having loosened the screw 3) and the nut 2)(Fig. 26 on page 25).

6.7.3 2nd stage fan air gate valve

Adjust the air gate 1) by using the hexagon nut 6) after having loosened the ring nut 5) (Fig. 26 on page 25).

Burner starting and operation phases are indicated on page 27.

6.8 Operation sequence of the burner

6.8.1 Burner starting program

When the control device TL closes, the control box programmes the starting phase. The indications for the start-up cycle are given on page 28.

0 s. The control device TL closes.

2 s. The motor starts.

3 s. The ignition transformer is connected. Pre-purging begins with the 1st stage air delivery.

The pump 3) sucks the fuel from the tank through the piping 1) and the filter 2) and pumps it under pressure to delivery. The piston 4) rises and the fuel returns to the tank through the piping 5) - 7). The screw 6) closes the by-pass heading towards suction and the solenoid valves 8) and 11), de-energized, close the passage to the nozzles.

25 s. The solenoid valves 8) and 17) open and the fuel passes through the piping 9) and filter 10) and is then sprayed out through the nozzle, igniting when it comes into contact with the spark. This is the 1st stage flame.

30 s. The ignition transformer switches off. If the control device TR is closed or has been replaced by a jumper wire, the 2nd stage solenoid valve 11) is opened and the fuel enters the valve 12) and raises the piston which opens two passages: one to piping 13), filter 14), and the 2nd stage nozzle, and the other to the cylinder 15) that opens the fan air gate valve in the 2nd stage.

39 s. The starting cycle comes to an end.

20220175

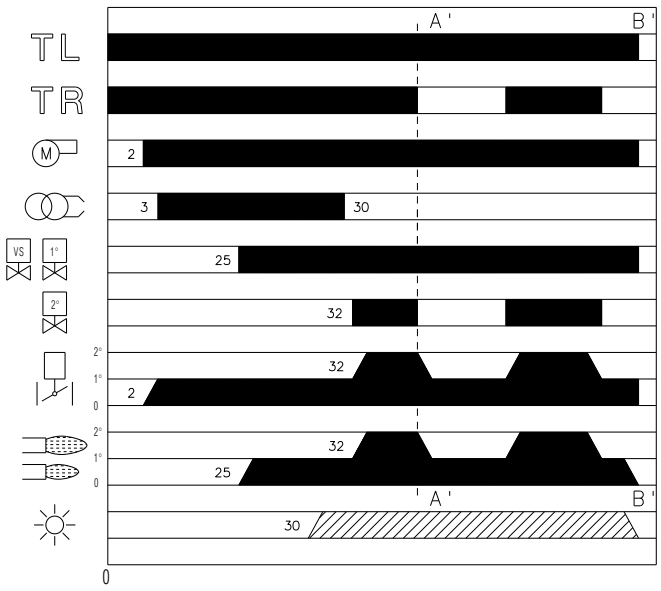


Fig. 27

20220172

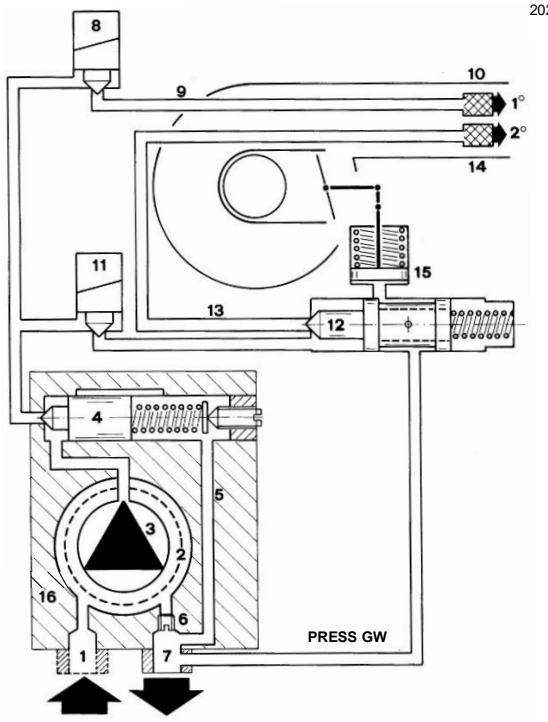


Fig. 28

20220171

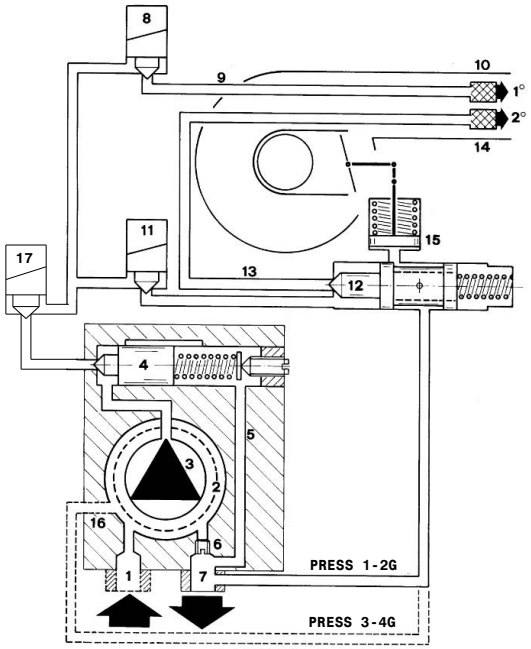


Fig. 29

6.9 Final checks

➤ **Block the flame sensor and turn off the remote controls:** the burner must start and then stop in lockout after approximately 5 s after start-up.

➤ **Free the flame sensor and turn off the remote controls:** the burner must stop in lockout.

➤ **Block the flame sensor when the burner is operating:** the flame must turn off and the burner stop in lockout within 3 s.

➤ **Turn on the remote control TL followed by TS while the burner is operating**: the burner must stop.

ATTENTION

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

6.9.1 Steady state operation

System equipped with one control device TR.

Once the starting cycle has come to an end, the command of the 2nd stage solenoid valve passes on to the control device TR that controls boiler temperature or pressure.

- ➤ When the temperature or the pressure increases until the control device TR opens, the burner passes from the 2nd to the 1st stage of operation.
- ➤ When the temperature or pressure decreases until the control device TR closes, the burner passes from the 1st to the 2nd stage of operation, and so on.
- ➤ The burner stops when the demand for heat is less than the amount of heat delivered by the burner in the 1st stage. In this case, the control device TL opens, and the solenoid valve 8) closes, the flame immediately goes out. The fan's air gate valve remains in the 1st stage position.

Systems not equipped with control device TR (which has been replaced by a jumper)

The burner is fired as described in the case above. If the temperature or pressure increase until control device TL opens, the burner shuts down (Section A-A in the diagram). When the solenoid valve 11) de-energizes, the piston 12) closes the passage to the 2nd stage nozzle and the fuel contained in the cylinder 15) is discharged into the return piping 7) for the PRESS GW-1-2 G Models and into the suction line 16) for the PRESS 3-4 G.

6.9.2 Firing failure

If the burner does not fire, it goes into lock-out within 5 s of the opening of the 1st stage valve and 30 s after the closing of control device TL.

The flame control red pilot light will light up.

6.9.3 Burner flame goes out during operation

If the flame accidentally goes out during operation, the burner will go into lockout after 3 repetitions within 1s.

6.10 Burner start-up cycle diagnostics

During start-up, indication is according to the Tab. N:

Sequences used	Color code	Color
Waiting time (tw), other waiting states	○	OFF
Oil: Oil pre-heater ON Gas: Pre-purging	●	Yellow
Ignition phase, ignition controlled	○ ● ○ ● ○ ● ○ ● ○ ● ○	Flashing yellow
Operation, regular flame	■	Green
Operation, poor flame (when detector current drops below the recommended value for reliable operation)	○ ■ ○ ■ ○ ■ ○ ■ ○ ■ ○	Flashing green
Undervoltage	● ▲ ● ▲ ● ▲ ● ▲ ● ▲ ● ▲	Yellow-Red
Error, alarm	▲	Red
Extraneous light in standby	■ ▲ ■ ▲ ■ ▲ ■ ▲ ■ ▲ ■	Green-red
Error code output (refer to *Error code table*)	○ ▲ ○ ▲ ○ ▲ ○ ▲ ○ ▲ ○	Flashing red

Key

..... Steady ON

○ OFF

▲ Red

● Yellow

■ Green

Tab. N

6.11 Resetting the flame control and using diagnostics

The flame control features a diagnostics function through which any causes of malfunctioning are easily identified (indicator: **RED LED**).

To use this function, you must wait at least 10 seconds once it has entered the safety condition (lock-out), and then press the reset button.

The flame control generates a sequence of pulses (1 second apart), which is repeated at constant 3-second intervals.

Once you have seen how many times the light pulses and identified the possible cause, the system must be reset by holding the button down for between 1 and 3 seconds.

RED LED on wait at least 10s	Lock-out	Press reset for > 3s	Pulses	Interval 3s	Pulses
■			●●●●		●●●●

The methods that can be used to reset the flame control and use diagnostics are given below.

6.11.1 Resetting the flame control

To reset the flame control, proceed as follows:

– Hold the button down for between 1 and 3 seconds.
  The burner restarts after a 2-second pause once the button is released.
  If the burner does not restart, you must make sure the limit thermostat is closed.

6.11.2 Visual diagnostics

Indicates the type of burner malfunction causing lockout.

To view diagnostics, proceed as follows:

– Hold the button down for more than 3 seconds once the red LED (burner lockout) remains steadily lit.
  A yellow light pulses to tell you the operation is done.
  Release the button once the light pulses.
  The number of times it pulses tells you the cause of the malfunction, according to the coding system indicated in the table on page 33.

6.11.3 Software diagnostics

Reports burner life by means of an optical link with the PC, indicating hours of operation, number and type of lock-outs, serial number of flame control etc ...

To view diagnostics, proceed as follows:

– Hold the button down for more than 3 seconds once the red LED (burner lockout) remains steadily lit.
  A yellow light pulses to tell you the operation is done.
  Release the button for 1 second and then press again for over 3 seconds until the yellow light pulses again.
  Once the button is released, the red LED will flash intermittently with a higher frequency: only now can the optical link be activated.

Once the operations are done, the flame control's initial state must be restored using the resetting procedure described above.

Button pressed for	Flame control
Between 1 and 3 seconds	Flame control reset without viewing visual diagnostics.
More than 3 seconds	Visual diagnostics of lockout condition: (Led pulses at 1-second intervals).
More than 3 seconds starting from the visual diagnostics condition	Software diagnostics by means of optical interface and PC (hours of operation, malfunctions etc. can be viewed)

The sequence of pulses issued by the flame control identifies the possible types of malfunction, which are listed in the table on page 33.

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.

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

Before carrying out any maintenance, cleaning or checking operations:

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

Close the fuel shut-off valve.

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

7.2 Maintenance programme

7.2.1 Maintenance frequency

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

7.2.2 Checking and cleaning

The operator must use the required equipment during maintenance.

Combustion

Carry out an analysis of the combustion flue gases. Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.
If the combustion values measured before starting maintenance do not comply with applicable Standards or do not indicate efficient combustion, consult the table below or contact our Technical Support Service to implement the necessary adjustments.

EN 267	Air excess		CO
	Max. output $\lambda \leq 1.2$	Min. output $\lambda \leq 1.3$	
Theoretical max CO_2 0 % O_2	CO_2 % Calibration		mg/kWh
	$\lambda = 1.2$	$\lambda = 1.3$	
15.2	12.6	11.5	≤ 100

Tab. O

Burner

Make sure that the screws are well secured.

Combustion head

Check to make sure that all the parts of the combustion head are in good condition, positioned correctly, free of all impurities, and that no deformation has been caused by operation at high temperatures.

Nozzle

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

Do not clean the nozzle openings.

Flexible hoses

Check to make sure that the hoses are still in good condition.

Fuel tank

Approximately every 5 years, or whenever necessary, suck any water or other impurities present on the bottom of the tank using a separate pump.

Pump

The delivery pressure must be stable between 10 and 14 bar.

The depression must be less than 0.45 bar.

Unusual noise must not be evident during pump operation.

If the pressure is unstable, or the pump runs noisily, the flexible hose must be detached from the line filter and the fuel must be sucked from a tank located near the burner. This measure permits the cause of the anomaly to be traced to either the suction piping or the pump.

If the pump is found to be responsible, check to make sure that the filter is not dirty. The vacuometer is installed upstream from the filter and consequently will not indicate whether the filter is clogged or not.

Contrarily, if the problem lies in the suction line, check to make sure that the filter is clean and that air is not entering the piping.

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.

Flame sensor

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

Filters

Check the following filter boxes:

- on line 1) - in the pump 2) - at the nozzle 3) (Fig. 30)
Clean or replace if required.

If rust or other impurities are observed inside the pump, use a separate pump to lift any water and other impurities that may have deposited on the bottom of the tank.

Then clean the insides of the pump and the cover sealing surface.

Light oil fuel supply line

If the previous checks have suggested that air may be entering the circuit somewhere, pressurize the circuit piping.

Plug the pump's return line connector 1) after removing the flexible hose.

Install a union T 2) on the vacuum meter attachment. On one branch of the T install the pressure gauge 3) and on the other branch 4) inject air at a pressure of 1 bar. After the injection of air has stopped, the gauge reading should remain stable. The suction piping must be equipped with a foot valve 5) (Fig. 31).

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.

Lastly, check the condition of the flue gas stack.

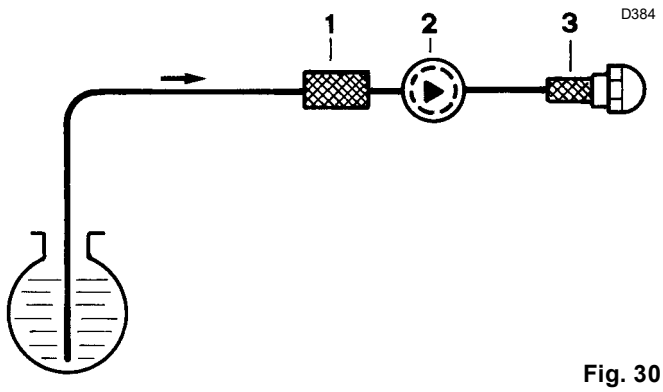


Fig. 30

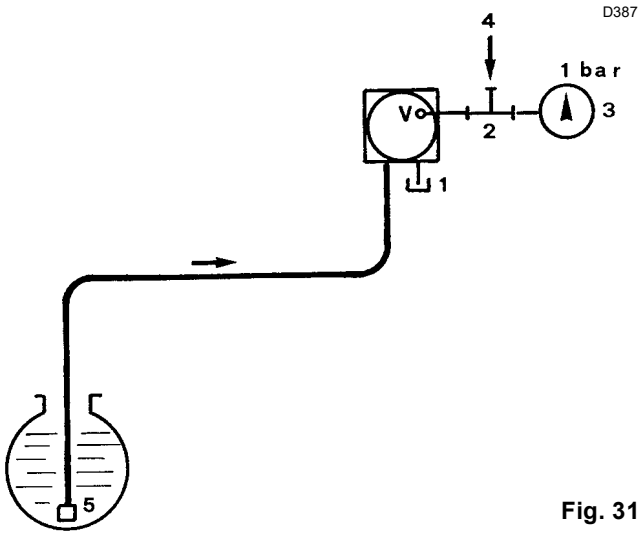


Fig. 31

7.2.3 Safety components

The safety components should be replaced at the end of their life cycle indicated in the following table.

The specified life cycles do not refer to the warranty terms indicated in the delivery or payment conditions.

Safety component	Life cycle
Flame control	10 years or 250.000 operation cycles
Flame sensor	10 years or 250.000 operation cycles
Gas valves (solenoid)	10 years or 250.000 operation cycles
Pressure switches	10 years or 250.000 operation cycles
Pressure adjuster	15 years
Servomotor (electronic cam)	10 years or 250.000 operation cycles
Oil valve (solenoid)	10 years or 250.000 operation cycles
Oil regulator	10 years or 250.000 operation cycles
Pipes/ oil fittings (metallic)	10 years
Fan impeller	10 years or 500.000 start-ups

Tab. P

7.3 Opening the burner

DANGER

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

DANGER

Close the fuel shut-off valve.

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

D397

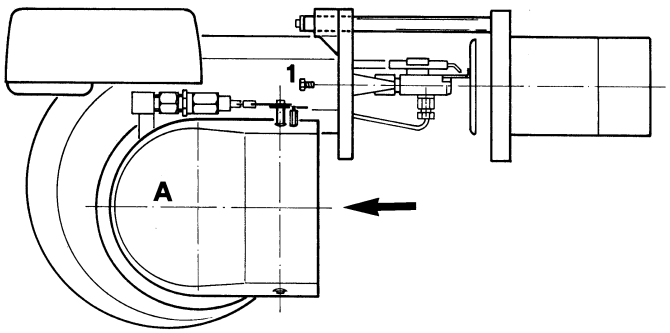


Fig. 32

To open the burner, proceed as follows:
➤ unscrew the screws 1);
➤ pull back part A while keeping it slightly lifted.

7.4 Closing the burner

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

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

8 Faults - Possible causes - Solutions

Find a list of faults, causes and possible solutions for a set of failures that may occur and result in irregular burner operation or no functioning at all.

If a burner malfunction is detected, first of all:
– check that the electrical wiring is adequately connected;
– check whether fuel is delivered;
– check that every adjustment parameter is adequately set.


ATTENTION

In the event of a burner lockout, more than two consecutive burner reset operations could cause damage to the installation. On the third lockout, contact the Aftersales Service.


DANGER

If further lockouts or burner faults occur, interventions must only be made by qualified, authorised personnel (as indicated in this manual, and in compliance with the laws and regulations currently in force).

SIGNAL	FAULT	POSSIBLE CAUSE	SOLUTION
No blink	The burner does not start	No electrical power supply	Close all switches - Check fuses
		A limit or safety control device is open	Adjust or replace
		Flame control lock-out	Reset flame control (no sooner than 10 s after the lockout)
		Pump is jammed	Replace
		Erroneous electrical connections	Check connections
		Defective flame control	Replace
		Defective electrical motor	Replace
1 pulse ●	1 flash (followed by a further blink code): output contact error	2 yellow flashes: Fan (M)	Check
		3 yellow flashes: Ignition (Z)	Check
		4 yellow flashes: Fuel valve (V1)	Check
		5 yellow flashes: Fuel valve (V2)	Check
		6 yellow flashes: Fuel valve (V3) / load controller (LR) release	Check
		7 yellow flashes: Oil pre-heater (OW)	Check
2 pulses ●●	After pre-purge and the safety time, the burner goes to lockout at the end of the safety time	No fuel in tank; water on tank bottom	Top up fuel level or suck up water
		Inappropriate head and air damper adjustments	Adjust
		Fuel solenoid valves fail to open (1st stage or safety)	Check connections; replace coil
		1st nozzle clogged, dirty, or deformed	Replace
		Dirty or poorly adjusted firing electrodes	Adjust or clean
		Grounded electrode due to broken insulation	Replace
		High voltage cable defective or grounded	Replace
		High voltage cable deformed by high temperature	Replace and protect
		Ignition transformer defective	Replace
		Erroneous valves or transformer electrical connections	Check
		Defective flame control	Replace
		Pump unprimed	Prime pump
		Pump/motor coupling broken	Replace
		Pump suction line connected to return line	Correct connection
		Valves up-line from pump closed	Open
		Filters dirty: line - pump - nozzle	Clean
		Defective sensor flame or flame control	Replace sensor flame or flame control
		Sensor flame dirty	Clean
		1st stage operation of cylinder is faulty	Change the cylinder
		Motor lockout	Reset thermal relay
		Defective motor command remote control device	Substitute it
		2-phase power supply thermal relay trips	Reset thermal relay
		Incorrect motor rotation direction	Change motor electrical connections

SIGNAL	FAULT	POSSIBLE CAUSE	SOLUTION
4 pulses ●●●●	The burner starts and then goes into lockout	Sensor flame short-circuit	Replace sensor flame
		Light is entering or flame is simulated	Eliminate light or replace flame control
7 pulses ●●●●●●●	Flame detachment	Poorly adjusted head	Adjust
		Poorly adjusted or dirty firing electrodes	Adjust
		Poorly adjusted fan air gate: too much air	Adjust
		1st nozzle is too big (pulsation)	Reduce 1st nozzle delivery
		1st nozzle is too small (flame detachment)	Increase 1st nozzle delivery
		1st nozzle dirty, or deformed	Replace
		Pump pressure not suitable	Adjust it: between 10 - 14 bar
		1st stage nozzle unsuited to burner or boiler	See Nozzle Table; reduce 1st stage nozzle
		Defective 1st stage nozzle	Replace
	The burner does not pass to 2nd stage	Control device TR does not close	Adjust or replace
		Defective flame control	Replace
		2nd stage solenoid valve coil defective	Replace
		Piston jammed in valve unit	Replace entire unit
	Fuel passes to 2nd stage but air remains in 1st	Low pump pressure	Increase
		2nd stage operation of cylinder is faulty	Change cylinder
	Burner stops at transition between 1st and 2nd stage. Burner repeats starting cycle.	Nozzle dirty	Renew nozzle
		Sensor flame dirty	Clean
		Excess air	Reduce
	Uneven fuel supply	Check if cause is in pump from tank or fuel supply system	Feed burner located near burner
	Internally rusted pump	Water in tank	Suck water from tank bottom with separate pump
	Noisy pump, unstable pressure	Air has entered the suction line	Tighten connectors
		- Depression value too high (higher than 35 cm Hg):	
		Tank/burner height difference too great	Feed burner with loop circuit
		Piping diameter too small	Increase
		Suction filters clogged	Clean
		Suction valves closed	Open
		Paraffin solidified due to low temperature	Add additive to fuel
	Pump unprimes after prolonged pause	Return pipe not immersed in fuel	Bring to same height as suction pipe
		Air enters suction piping	Tighten connectors
	Pump leaks fuel	Leakage from sealing organ	Replace pump
	Smoke in flame - dark Bacharach	Not enough air	Adjust head and fan air damper
		Nozzle worn or dirty	Replace
		Nozzle filter clogged	Clean or replace
		Erroneous pump pressure	Adjust to between 10 - 14 bar
		Flame stability disc dirty, loose, or deformed	Clean, tighten in place, or replace
		Boiler room air vents insufficient	Increase
	- yellow Bacharach	Too much air	Adjust head and fan air damper
	Dirty combustion head	Nozzle or filter dirty	Replace
		Unsuitable nozzle delivery or angle	See recommended nozzles
		Loose nozzle	Tighten
		Impurities on flame stability spiral	Clean
		Erroneous head adjustment or not enough air	Adjust; open gate valve
		Blast tube length unsuited to boiler	Contact boiler manufacturer
8 pulses ●●●● ●●●●	Errore preriscaldatore	Oil pre-heater lockout	Check
		Time check of oil pre-heater	Check

SIGNAL	FAULT	POSSIBLE CAUSE	SOLUTION
10 pulses 		Connection or internal fault	
		Presence of electromagnetic disturbance	Use the radio disturbance protection kit

Tab. Q

A Appendix - Accessories

Soundproofing box kit

Burner	Type	dB(A)	Code
PRESS GW - 1G	C1/3	10	3010403
PRESS 2G - 3G			
PRESS 4G	C4/5	10	3010404

Degassing unit kit

Burner	Filter	Code
PRESS GW	with filter	3010055
PRESS 1-2G		
PRESS 3-4G (*)		

(*) For burner deliveries higher than 80 kg/h, install two parallel degassing units.

Long combustion head kit

Burner	Length (mm)	Code
PRESS GW	320	3000581
PRESS 2G	403	3000538
PRESS 3G	412	3000851
PRESS 4G	426	3000555

Protection kit (electromagnetic interferences)

Burner	Code
All models	3010386

PC interface kit

Burner	Code
All models	3002719

Spacer kit

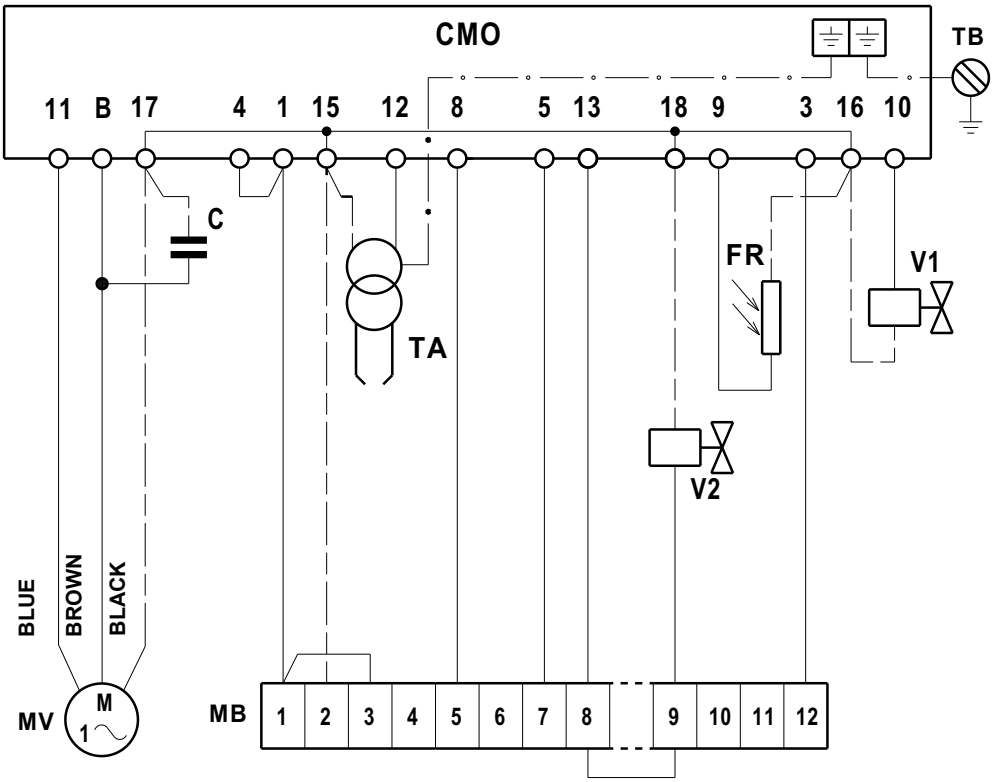
Burner	Code
All models	3000755

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

B Appendix - Electrical panel layout

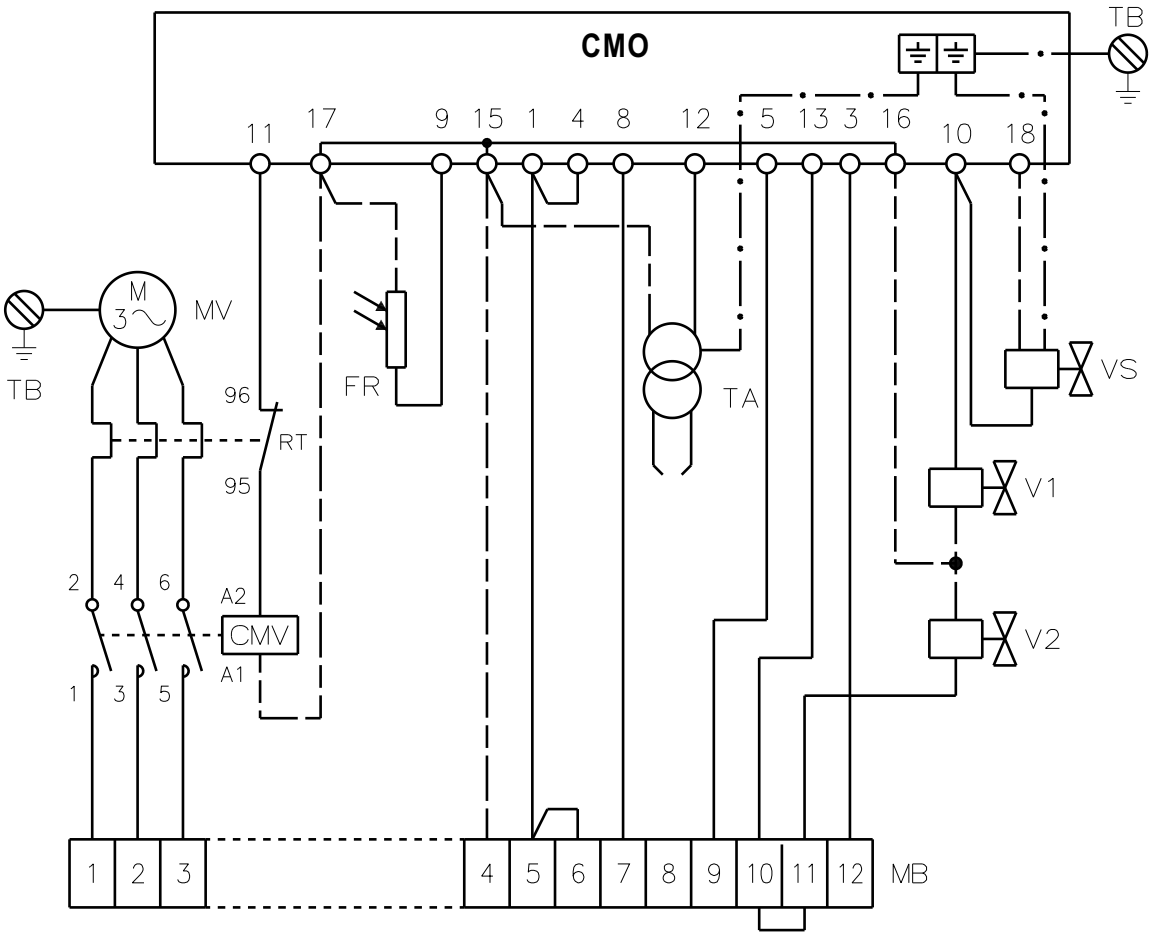
PRESS GW

20220024



PRESS 1-2-3-4G

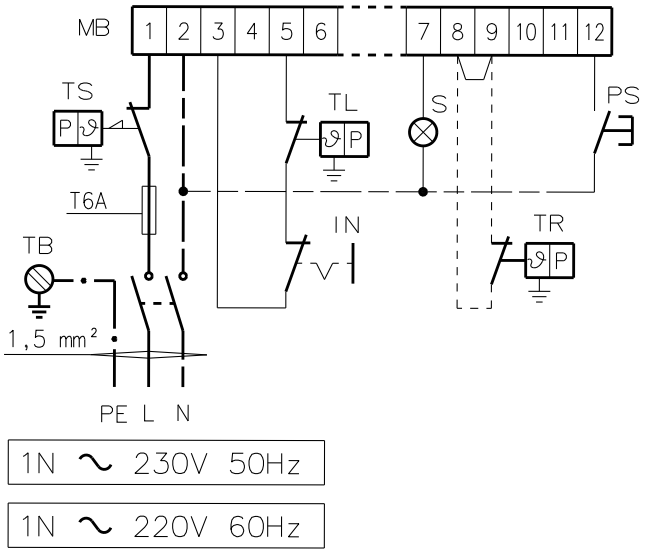
20220025



ELECTRICAL CONNECTION (SET BY THE INSTALLER)

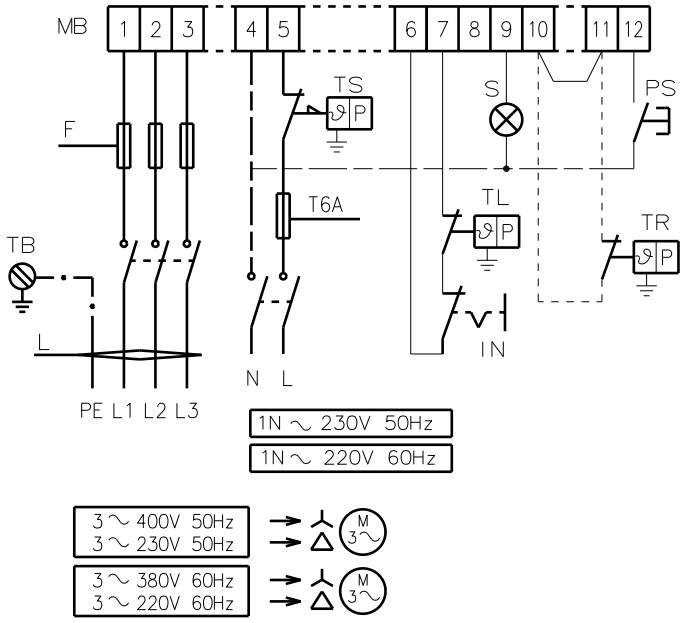
PRESS GW

20220293



PRESS 1-2-3-4G

20220294



Key to layout

C	Capacitor
CMV	Motor contactor
CMO	Flame control
FR	Flame sensor
MB	Burner terminal board
MV	Fan motor
RT	Thermal relay
TA	Ignition transformer
TB	Burner earth
V1	1st stage valve
V2	2nd stage valve

PRESS		1G		2G		3G		4G	
V		230	400	230	400	230	400	230	400
F	A	T6	T6	T6	T6	T16	T10	T25	T16
L	mm^2	1,5	1,5	1,5	1,5	1,5	1,5	2,5	1,5

RIELLO S.p.A.
I-37045 Legnago (VR)
Tel.: +39.0442.630111
http:// www.riello.it
http:// www.riello.com