

BLU TS 5000.1 PRE HT
BLU TS 6000.1 PRE HT



Technical data



Operating instructions



Electric diagrams



Spare parts list



Gas train manual is separate

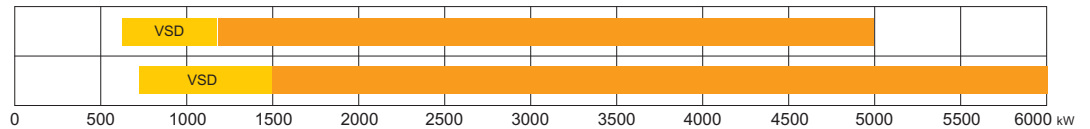


420010836600

INDEX

BLU TS 5000.1 PRE

BLU TS 6000.1 PRE



General warnings - Conformity declaration	3
Burner designation - Modular delivery system	4
Burner description	5
Gas train - Kit - Accessories: assembly to the burner	6
Technical data	7
Gas category by country	7
Test boiler - Flame dimension	8
Overall dimensions air flange	8
Overall dimensions	9
Gas operating mode - General safety functions	10
Installation	11
Fitting the burner to the boiler	11
Gas line	12
Kit and accessories connection - Head loss diagram	13
Pressure loss diagrams	14
Electrical connections	16
Start-up: checking procedure	17
Exhaust gas test	18
Start-up	19
Adjusting the max air flow rate	19
Firing head setting	19
Servomotor pre-setting	19
Adjusting the intermediate burner capacity	20
Pressure switch adjustment	20
Maintenance program	21
Troubleshooting instructions	23
Operating troubles	24
Appendix	25
Control box - Damper actuators	25
Electrical diagrams	26
Spare parts list	28

GENERAL WARNINGS - CONFORMITY DECLARATION

BLU burners are designed for the combustion of natural gas or LPG with kit. The design and function of the burners meet the standard EN676. They are suitable for use with all heat generators complying with standard within their respective performance range. Any other type of application requires the approval of ECOFLAM.

Installation, start-up and maintenance must only be carried out by authorised specialists and all applicable guidelines and regulations must be complied with.

BURNER DESCRIPTION

BLU burners are progressive mechanical fully automatic monoblock devices. Emissions values may differ, depending on combustion chamber dimensions, combustion chamber load and the firing system (three-pass boilers, boilers with reverse firing).

PACKAGING

The burner, the gas train and all the additional components are supplied in a modular system of packages according to the configuration ordered that based on the country of installation shall follow the applicable standards and the local rules and code of practise.

The following standards should be observed in order to ensure safe, environmentally sound and energy-efficient operation:

EN 676
Forced-draught gas burners

EN 60335-1, -2-102
Specification for safety of household and similar electrical appliances, particular requirements for gas burning appliances

GAS LINES

When installing the gas lines and gas train, the general EN676 directives and guidelines must be observed.

EN676 compulsory kit and accessories in order to comply to the safety regulations. Additional accessories and kits shall be installed by the installer in accordance to the local safety regulations and codes of practise.

INSTALLATION LOCATION

The burner must not be operated in rooms containing aggressive vapours (e.g. spray, perchloroethylene, hydrocarbon tetrachloride, solvent, etc.) or tending to heavy dust formation or high air humidity. Adequate ventilation must be provided at the place of installation of the furnace system to ensure a reliable supply with combustion air.

Declaration of conformity for gas burners

We,
Ecoflam Bruciatori S.p.A.

declare under our sole responsibility that the gas burners named

BLU

conform to the following standards:

EN 676	EN 50156-1
EN 55014-1	EN 55014-2
EN 60335-1	EN 60335-2-102
EN 61000-6-2	EN 61000-6-3

These products bear the CE mark in accordance with the stipulations of the following directives:
2014/35/UE Low Voltage Directive
2014/30/UE EMC Directive
2006/42/EC Machine directive
2011/65/EU RoHS2 directive
2009/142/CEE Gas Appliance Directive

*February, 2016 / Mr. Ruben Cattaneo
R&D manager*




BURNER SELECTION: Type of operation and configuration must be done by professional personnel in order to grant correct working of the burner. Installation, start-up and maintenance must be carried out by authorised specialists and all applicable guidelines and regulations (including local safety regulations and codes of practise) must be observed.

We accept no responsibility for damage arising from:

- inappropriate use;
- incorrect installation and/or repair on the part of the buyer or any third party, including the fitting of non-original parts;
- non authorised modifications made on the burner.

Final delivery and instructions for use

The firing system installer must supply the operator of the system with operating and maintenance instructions on or before final delivery. These instructions should be displayed in a prominent location at the point of installation of the heat generator, They should include the address and telephone number of the nearest customer service centre.

Notes for the operator

The system should be inspected by a specialist at least once a year. Depending on the type of installation, shorter maintenance intervals may be necessary. It is advisable to take out a maintenance contract to guarantee regular servicing.

Ecoflam burners have been designed and built in compliance with all current regulations and directives.

All burners comply to the safety and energy saving operation regulations within the standard of their respective performance range. The quality is guaranteed by a quality and management system certified in accordance with ISO 9001:2008.



BURNER DESIGNATION

BLU TS 6000.1 PRE TC

RANGE NAME BY FUEL TYPE

BLU TS Gas

MODEL SIZE

BLU TS 6000 6000 kW

EMISSIONS

LN Standard Class 2 - GAS EN676 (<120 mg/kWh)
Low NOx Class 3 - GAS EN676 (<80 mg/kWh)

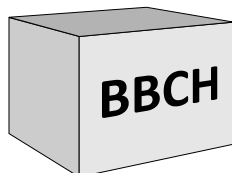
OPERATION TYPE

PAB 2 stages soft start
PR 2 stages progressive mechanical
PRE 2 stages modulating electronic

HEAD TYPE

TC Short head
TL Long head

MODULAR DELIVERY SYSTEM



Gas burners

All gas burners are delivered in separate set/box, i.e. burner body including combustion head and separate gas train with separate additional kit and accessories that shall complete the gas train or the burner according to the applicable standard. Kit and accessories are delivered separately.

Gas train - GTCP - KITS - Accessories

All gas and dual fuel burners gas trains are delivered separately in different models and configuration.

Export configuration gas train completion are available but it is mandatory for the local installer in this case to comply to the local safety regulations.

For burners over 1700 kW gas train connection pipe must be ordered.

Kits and accessories are managed and delivered separately.

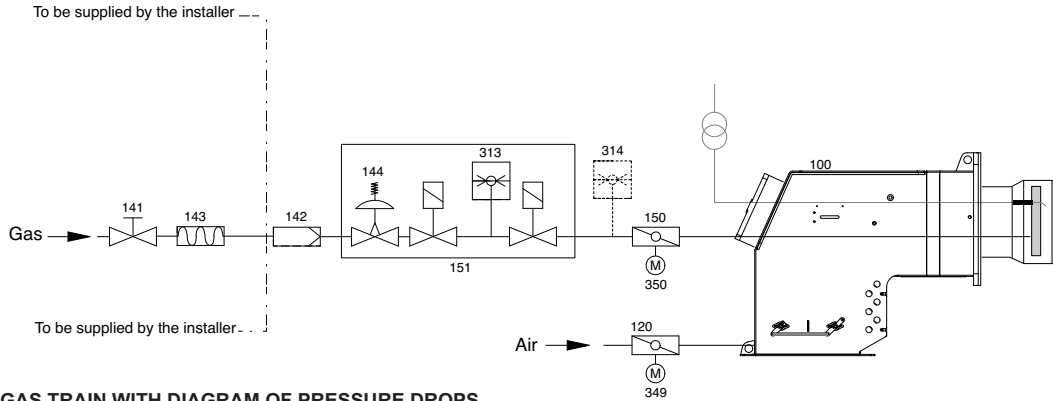
Component type

BBCH	Burner Body with Combustion Head (without gas train)
GTCP	Gas Train Connection pipe
GT	Gas Train (delivered separately)

BURNER DESCRIPTION

BURNER DESCRIPTION

Gas train - Kit - Accessories: assembly to the burner



MATCHING GAS TRAIN WITH DIAGRAM OF PRESSURE DROPS ARE IN THE DEDICATED SECTION OF THIS MANUAL

Ecoflam gas trains are delivered separately for all gas and dual fuel burners and are available in different configurations: **Double gas valves with actuators and regulator VGD Siemens and min pressure switch + ACS gas filter**

VGD 20.503 Rp 2" / VGD 40.065 - 40.080 - 40.100 - 40.125			
	1. Main gas pipe	EXPORT	ACS
	2. Ball valve		ACS
	3. Antivibration coupling		GAS TRAIN
	5. Min gas pressure switch		
	6. Safety gas valve + 10. Actuator		
	7. Working gas valve + 11. Actuator		EN676
	8. Gas leakage control		KITTC *
	9. Gas filter	ACS	
	KIT - MAX Gas pressure switch	KITPRES	
	ACS - Gas train connection pipe	GTCP **	

! GTCP-...* WARNING: in order to fit the gas train, the corresponding connection pipe must be ordered (GTCP size and fitting depend on the burner and the gas train selected).

HOW TO INSTALL THE GAS TRAIN INTO THE BURNER AND CALCULATE THE OVERALL DIMENSIONS: refer to the dimension page and the gas train manual for all detailed information

! WARNING: EN676 compulsory kit and accessories in order to comply to the safety regulations. Additional accessories and kits shall be installed by the installer in accordance to the local safety regulations and codes of practise.

Gas governor / Filter	Tightness control	Modulation Kit	Max Pressure switch	Other accessories
FGDR - FILTER	KITTC- Model	KITMD-RWF50	KITPRES50	
Compulsory EN676	Compulsory > 1200 kW	Probe-...	KITPRES150	

TECHNICAL DATA

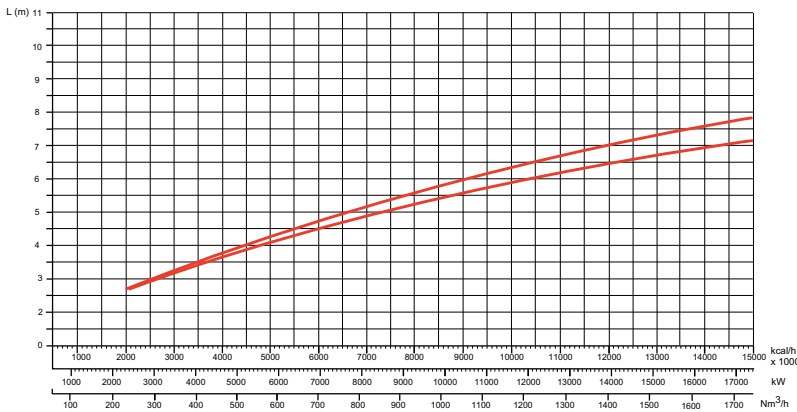
MODEL		BLU TS 5000.1	BLU TS 6000.1
Thermal power max.	kW	5.000	6.000
	kcal/h	4.300.000	5.160.000
Thermal power min.	kW	1.200	1.500
	kcal/h	1.032.000	1.290.000
Operation mode	Type	Modulating with PID	
Regulation ratio nominal	Type	1+4 GAS	
Fuel	Type	G20 (L.C.V. 8.570 kcal/Nm ³), G25 (L.C.V. 7.370 kcal/Nm ³) G31 (L.C.V. 22.260 kcal/Nm ³), G30 (L.C.V. 29.320 kcal/Nm ³)	
Emission class	std	Standard Class 2 - GAS EN676 (<120 mg/kWh)	
Control unit	Type	ETAMATIC OEM	
Gas train	GT	VGD separate gas train + Filter + KIT Tightness control + Other KIT/ACS	
Gas connection	GTCP	Gas connection range RP50 to DN125 depending on the gas train selected	
NATURAL GAS pressure	mbar	35+500	50+500
LPG pressure	mbar	65+500	90+500
Air regulation	Type	Air flap	Air flap
Air flap control with servomotor	Model	LAMTEC	
Air pressure switch	mbar	1...10 mbar	
Flame monitoring	Type	UV cell	
Ignitier	Model	COFI	
Voltage	V/Hz	230/400 V - 50 Hz	
Weight body BBCH	Kg		
Loose form	IP	IP55	IP55
Sound pressure level without silencer	dB(A) Lab tests		
Ambient temperature storage	Min/Max	-20°...+70° C	
Ambient temperature use		-10°...+60° C	

GAS CATEGORY BY COUNTRY

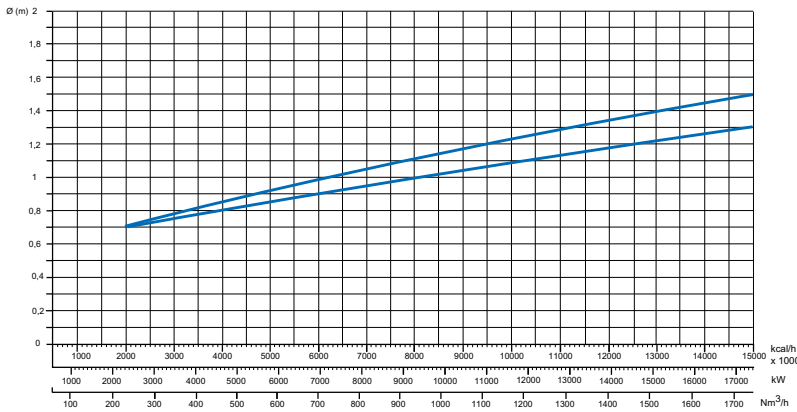
Gas category	Country																								
II _{2R3R}	BE	CH	CZ	DE	DK	ES	FI	FR	GB	GR	HU	IE	IT	LU	NL	PT	SE	EE	LT	LV	NO	PL	SK	SI	-
II _{2H3B/P}	AT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I _{3R}	CY	MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TEST BOILER - FLAME DIMENSIONS

FLAME LENGHT GAS BURNERS



FLAME DIAMETER GAS BURNERS



The burner/boiler matching does not pose any problems if the boiler is CE type-approved. If the burner must be combined with a boiler that has not been CE type-approved and/or its combustion chamber dimensions are clearly smaller than those indicated in diagram, consult the manufacturer. The firing rates were set in relation to special test boilers, according to EN676 - EN267 regulations.

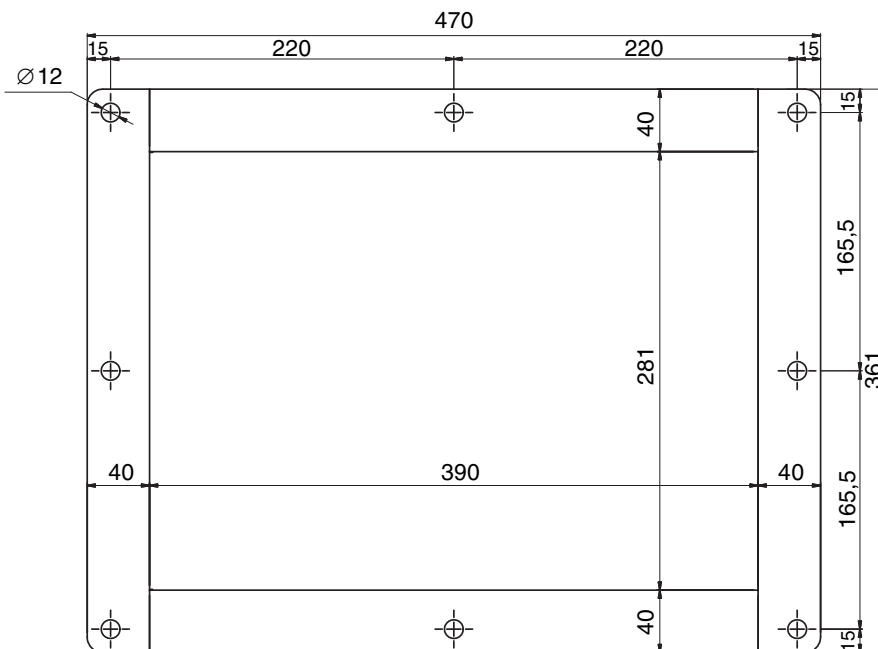
The sizes are indicative and depend on the configuration, to the combustion chamber pressure and to the draught. The values have been taken out from tests executed with flame tubes.

The dimensions of the flame are made in test boiler in laboratory without resistance therefore exists max and min length that take into account the difference in length that comes from the boiler backpressure.

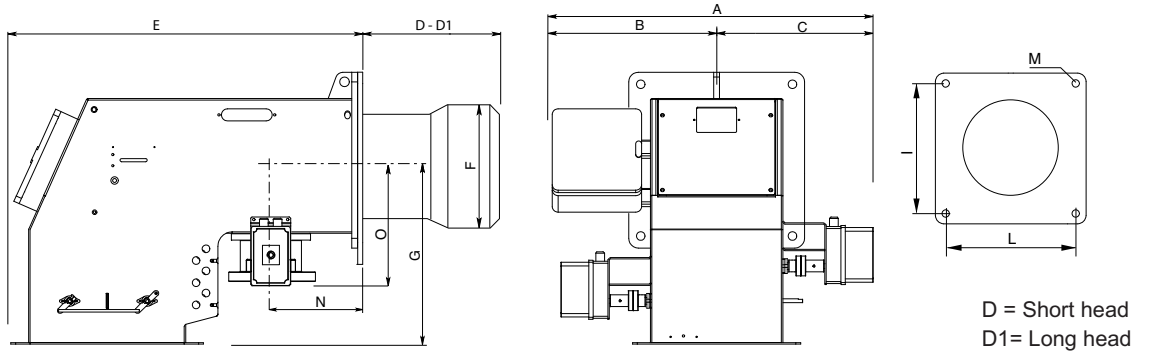
Example:
 Burner thermal output = 8000 kW;
 L flame (m) = 5 m (medium value)
 D flame (m) = 1 m (medium value)

WARNING: Some flame modifications can be done in our FLEXSHOP in the factory in order to shape the flame and adapt it to some special boiler or application.

OVERALL DIMENSIONS AIR FLANGE



OVERALL DIMENSIONS

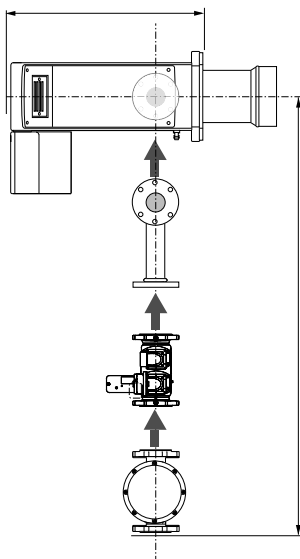


Dimensions (mm)

Model	A	B	C	D	D1	E	F	G	I	L	M	N	O
BLU TS 5000.1 PRE	810	475	335	375	575	880	320	404	330	330	M16	195	250
BLU TS 6000.1 PRE	810	475	335	375	575	880	360	404	330	330	M16	195	250

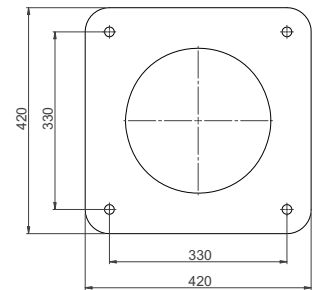
HOW TO INSTALL THE GAS TRAIN INTO THE BURNER AND CALCULATE THE OVERALL DIMENSIONS:

refer to the dimension page and the gas train manual for all detailed information



Burner-boiler mounting flange

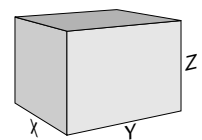
Fixing hole dimensions are "I" and "L" as per dimension table. Boiler hole shall be done according to the blast tube dimension "F" plus 15-25 mm in order to be able to extract it during maintenance.



WARNING: Please follow the suggested dimension for the hole on the boiler flange in order to fit the burner. Make sure that between the boiler and the blast tube proper insulation is fitted.

Packaging (only burner)

Model	X	Y	Z	kg
BLU TS 5000.1	1140	1370	940	
BLU TS 6000.1	1140	1370	940	



GAS OPERATING MODE - GENERAL SAFETY FUNCTIONS

START-UP MODE

As soon as the furnace system is required to supply heat, the burner control circuit will close and the program flow started. When the program has come to its end, the burner will be turned on.

An automatic test is made for the tightness of the gas valves prior to each burner start. The air damper is in its closed position when the burner is out of operation.

The electric actuator will open the closed air damper to its full-load position so that the burner will ventilate the furnace and the exhaust hoods with the specified air rate.

Shortly after the pre-ventilation process has been started the lack-of-air cut-out must change over to operating position within a certain time, i.e. the minimum air pressure setting must be reached and maintained until the burner is turned off. At the end of the specified pre-ventilation time the air damper will be moved into its partial-load position in a linked control concept with the gas damper.

The ignition transformer will be started.

At the end of the pre-ignition time the ignition gas solenoid valves will be opened to allow gas to flow into the pilot burner.

The ignition electrodes incorporated in the pilot burner will ignite the ignition gas.

The flame sensor gives flame signal to

control box so that the safety shut-off valves will be opened.

The gas will be fed to the gas nozzles via the gas damper while combustion air is supplied by the fan.

Gas and air will be intensively mixed in the mixing unit and ignited by the pilot flame with a specified safety period (minimum furnace heat generating rate).

After the safety period has run down the pilot burner will be turned off.

Attention:

If there are shut-off dampers in the flue gas tract they must be completely open. Otherwise there will be a high danger of low-speed detonation or explosion!

GAS OPERATING MODE

After the flame has developed the load regulator will be enabled which brings the burner into its operating position.

The load regulator will now control the burner automatically between its partial-load and full-load stages. Depending on the heat demand, the electric actuator of the compound control system will be fed with the OPEN or CLOSE command via the regulator and thus increase or

decrease the gas and air flow rates.

This compound control system will vary the positions of the gas control valve and air damper and thus regulate the gas flow rate in a linked concept with the air flow rate. The burner can either be controlled by a 2-stage sliding or, if a respective controller is provided, a stepless control concept.

The stepless control will allow the burner to be operated at any desired stage between its partial-load and full-load positions.

The burner will always be turned off out of its partial-load position.

The air damper will be closed when the burner is out of operation and will thus prevent cold air flowing through the burner chamber, heat exchanger and chimney. The interior cooling losses will thus be greatly minimized.

GENERAL SAFETY FUNCTIONS

In case a flame does not develop when starting the burner (fuel release) the burner will shut off at the end of the safety period (shut-off on trouble).

A shut-off on trouble will also occur in the case of flame failure during operation, air flow failure during the pre-ventilation phase and pressure failure during the whole period of burner operation.

Any failure of the flame signal at the end of the safety period and a flame signal during

the pre-ventilation phase (external light control) will result in a shut-off on trouble with the automatic furnace controller being locked.

The trouble is indicated by the trouble signal lamp lighting up.

The automatic furnace controller can be unlocked immediately after a shut-off on trouble by pressing the unlocking key. The program unit will return to its starting position and proceed with the restart of the burner.

A voltage failure will result in a regular shut-off of the burner. Upon voltage recovery there may be an automatic restart unless another interlock is provided, e.g. by the safety system. In any case of trouble the fuel oil supply will be shut off right away. The program unit will stop at the same time causing also the trouble location indicator to stop. The symbols will indicate the kind of trouble.

INSTALLATION

Fitting the burner to the boiler

! WARNING: handling and moving operations must be carried out by specialised personnel. Use the eyebolts to lift the burner in order that it will not overturn and fall down.

To perform the installation of the burner into the boiler drill the boiler plate according to the dimension given on this manual and place the burner towards it by lifting and moving the burner by means of eyebolts.

Place the gasket on the burner flange and install the burner into the boiler by fixing nuts into the bolts. The space between the blast tube and the boiler lining must be sealed with appropriate insulating material.

Burner blast tube insertion depth and brickwork

Unless otherwise specified by the boiler manufacturer, heat generators without a cooled front wall require brickwork or insulation 5 as shown in the illustration. The brickwork must not protrude beyond the leading edge of the blast tube, and should have a minimum conical angle of 60°. Gap 6 must be filled with an elastic, non-combustible insulating material. For boilers with reverse firing, the minimum burner tube insertion depth A as specified in the boiler manufacturer's instructions must be observed.

On boilers the blast tube insertion depth should be observed as per the boiler manufacturer's instructions.

Reverse flame boiler :

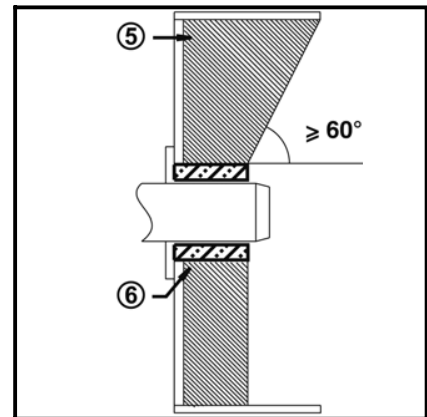
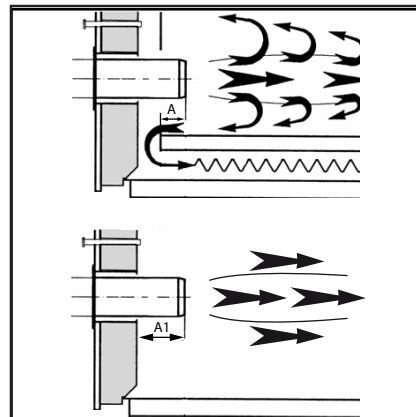
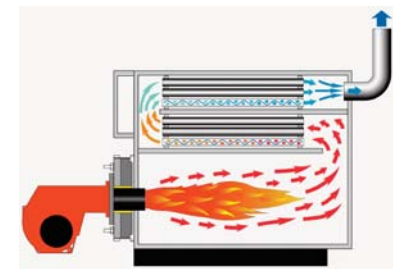
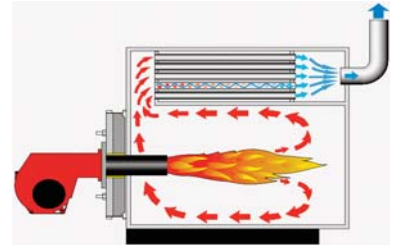
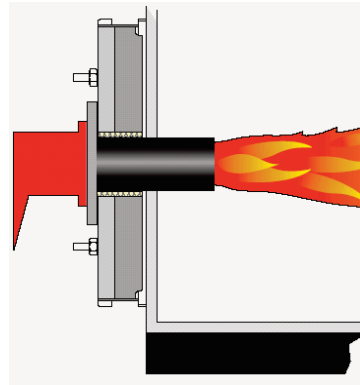
A = 50-100 mm.

Three pass boilers :

A1 = 50-100 mm.

Exhaust system

To avoid unfavourable noise emissions, right-angled connectors should not be used on the flue gas side of the boiler.



BURNER LINING

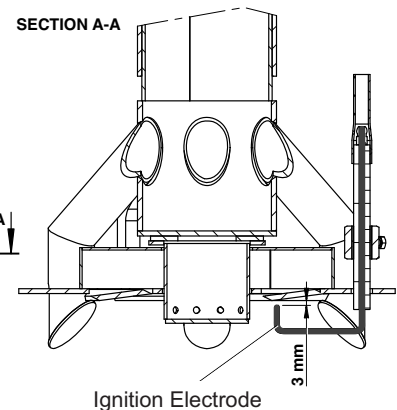
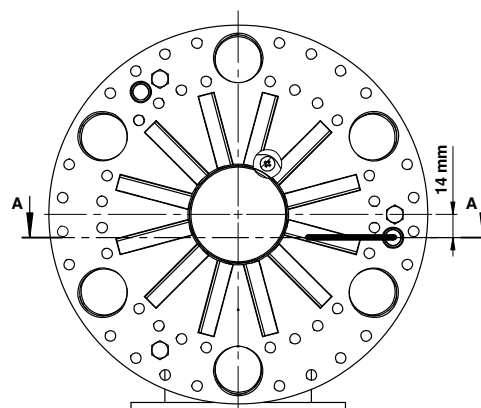
Check before burner installation:

1. Depending on the type of boiler (reverse flame or three pass) check the burner blast tube installation depth according to the data specified by the boiler manufacturer or consult the burner producer.

2. Check the ignition electrodes on the burner head as per factory setting (see figures). The setting of the mixing and ignition unit according to the boiler output will be performed during commissioning procedure.

3. Check that the head is preset at 50%.

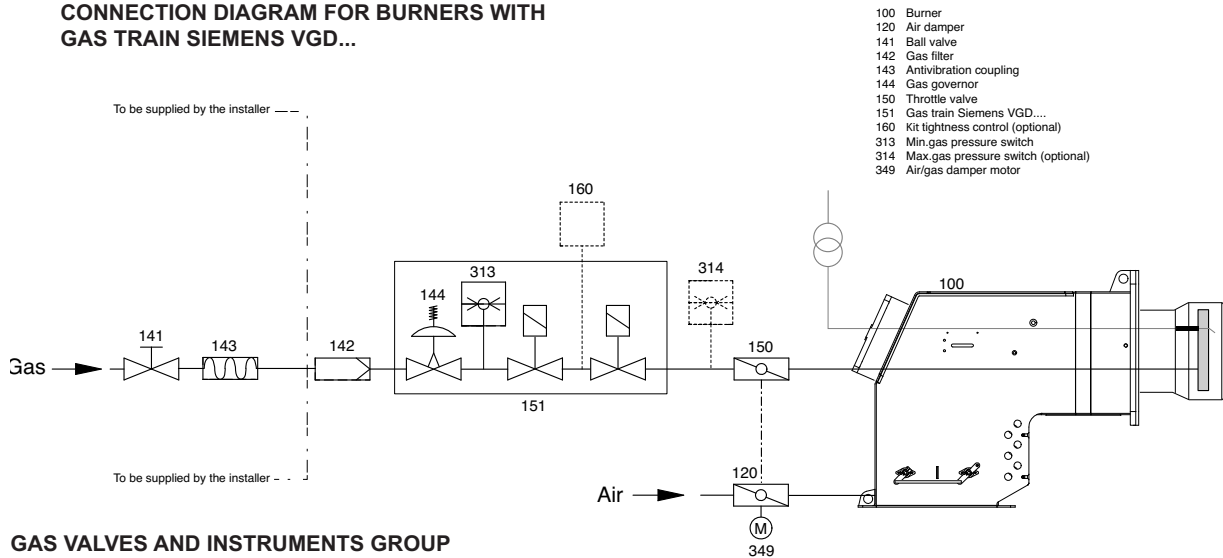
Position of the electrodes



INSTALLATION

Gas line

CONNECTION DIAGRAM FOR BURNERS WITH GAS TRAIN SIEMENS VGD...



GAS VALVES AND INSTRUMENTS GROUP

The gas valves and instruments group used with the furnace will be selected according to the specific requirements to be met by a burner system.

The following factors must be taken into account:

- burner output
- furnace back pressure
- gas pressure loss of the burner head
- gas pressure losses of the gas valves and instruments group

NOTE: Only gas trains assembled by the burner manufacturer and approved in accordance with the burner test specifications.

EN676 compulsory kit and accessories in order to comply to the safety regulations. Additional accessories and kits shall be installed by the installer in accordance to the local safety regulations and codes of practise.

GAS CONNECTION PRESSURE

A minimum connection pressure must be available upstream of the burner gas valve to ensure the proper functioning of the burner.

WARNING: *the total gas pressure loss must always be smaller than the available gas flow pressure.*

For the installation of the valves and instruments group take care to observe the mounting instructions supplied by their manufacturers (these are packed with the equipment).

The gas line installed to the burner must be dimensioned in accordance with the throughput rate and the available pressure.

For selecting the nominal bore "DN" of the gas valves and instruments group care should be taken to observe the flue resistance of the boiler and the gas pressure loss of the burner and valves and instruments group.

GAS VALVES AND INSTRUMENTS GROUP

The gas valves and instruments group can be connected directly to the gas feed line.

Take care to observe the correct order of installation and direction of flow (arrow on housing).

Check the valves and instruments and connection pieces for absence of dirt particles and foreign matter before installation and initial operation. To provide effective conditions for start-up make sure the distance between the burner and the gas stop valve is as short as possible.

LEAK TEST

The gas line upstream of the burner gas valves and instruments group must be installed in accordance with the applicable regulations, checked for absence of leaks, vented and certified accordingly by the gas installation company. The screwed unions and flanged joints must be checked for proper tightness (by making a pressure test). The leak test must be made under pressure using approved foaming agents which do not cause corrosion. For steam boiler furnaces the result of the leak test must be duly certified.

VENTING

Prior to taking the burner into operation or after any repair work make sure to vent the complete gas feed line and the gas valves and instruments group into the open atmosphere (e.g. by means of a hose) taking care to avoid any hazards.

In no case should the gas line be vented into the heating or furnace chambers. Make use of a test burner to check the gas-carrying spaces are free from an inflammable gas mixture.

SUPPORT

The valves and instruments group must be supported with a telescopic jacking member or similar during and after installation (e.g. on filter and valve).

JOINT

It is recommended to provide an easy to disconnect joint (with planar sealing faces) to facilitate repair work on the boiler (furnace) and allow the boiler door to be swivelled out if required.

INSTALLATION



KITPRES... Maximum pressure switch assembly

Maximum pressure switch is provided as a kit and shall be assembled into the main gas train according to the instructions of the gas train separate manual.

KITMD-RWF50 PID regulator

All progressive burner can be turned modulating with the installation of the PID that regulates the output combined with a probe.

Modulation Kit	Max Pressure switch
KITMD-RWF50	KITPRES50
Probe-...	KITPRES150

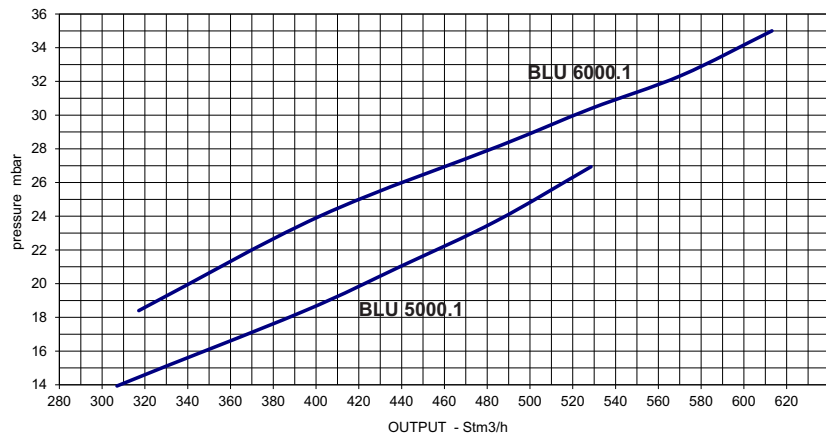



GAS PRESSURE LOSS DIAGRAM: combustion head - platform 380

The diagram provides combustion head pressure loss. To have pressure loss combined with the different type of gas train you must refer to the pressure loss diagrams.

WARNING:

Note that the head loss diagram is only indicative and does vary depending on the setting of the head.

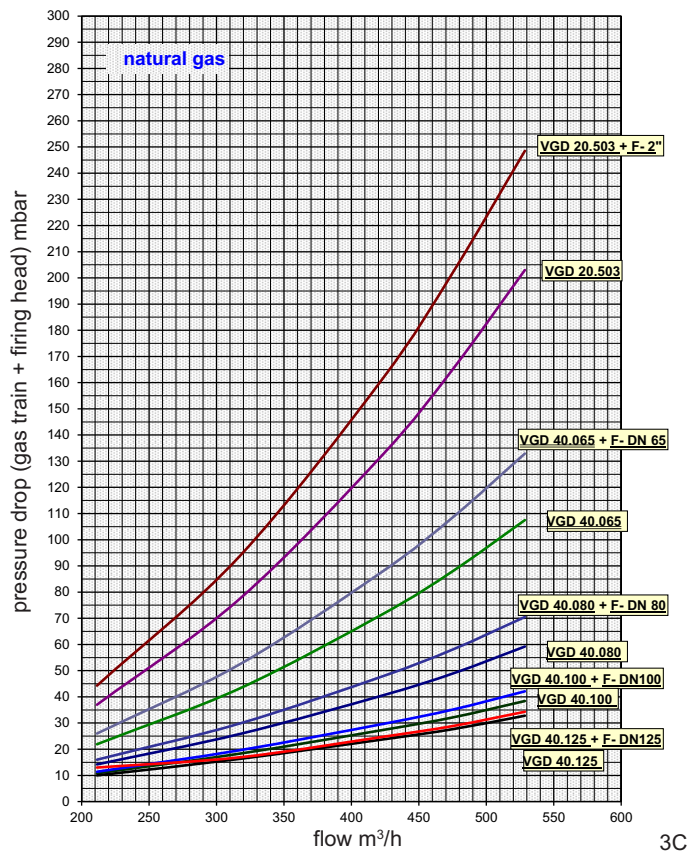


INSTALLATION

Gas pressure loss diagrams

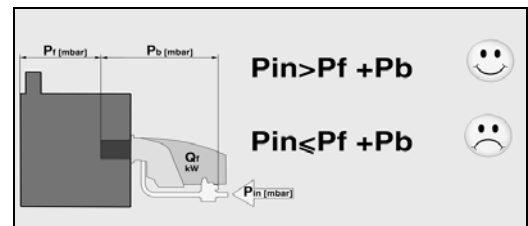
! PRESSURE DROP includes: "COMBUSTION HEAD + GAS TRAIN + GAS GOVERNOR & FILTER" as per EN676 Standard.
Back pressure of boiler (or other applications) must be added/included in order to have the total min pressure drop.

Burner	Gas train	Advisable gas governor & filter	Spring color	Inlet gas pressure MIN [mbar]	Inlet gas pressure MAX [mbar]	Diagram
BLU 5000.1 PR MULTICALOR 500.1 MULTIFLAM 500.1	VGD 40.125	no	yellow	33	500	3C
		FILTER DN 125		35		
	VGD 40.100	no	yellow	40	500	
		FILTER DN 100		45		
	VGD 40.080	no	yellow	60	500	
		FILTER DN 80		75		
	VGD 40.065	no	yellow	110	500	
		FILTER DN 65		140		
	VGD 20.503	no	yellow	210	500	
		FILTER 2"		250		



LEGENDA

- Pf: Back pressure of furnace
- Pb: Pressure of burner (combustion head + complete gas train)
- Pin: Minimum inlet pressure



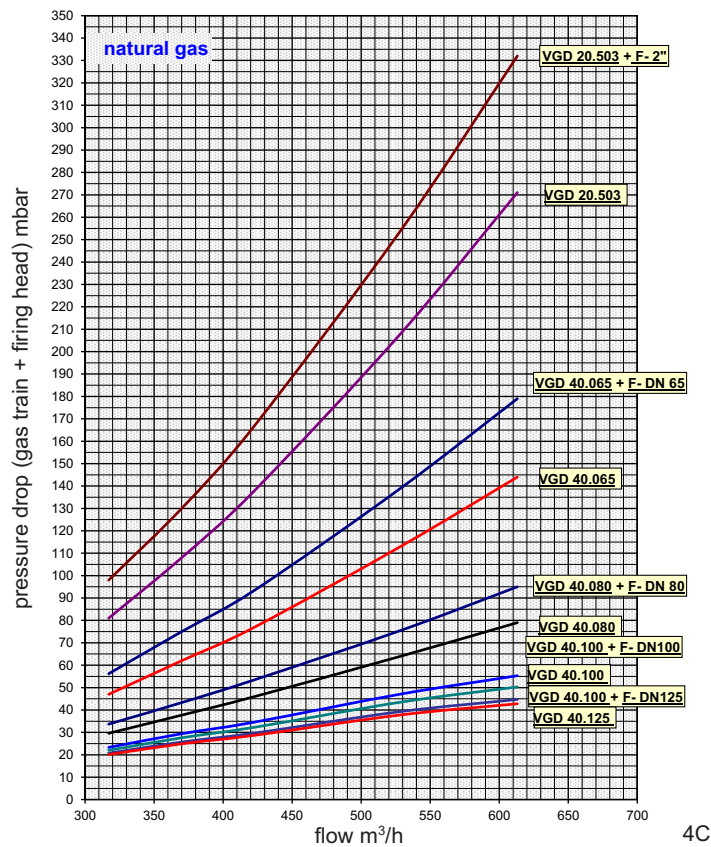
INSTALLATION

Gas pressure loss diagrams



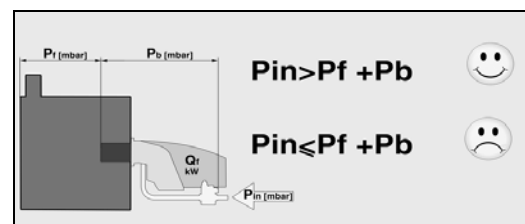
PRESSURE DROP includes: "COMBUSTION HEAD + GAS TRAIN + GAS GOVERNOR & FILTER" as per EN676 Standard.
Back pressure of boiler (or other applications) must be added/included in order to have the total min pressure drop.

Burner	Gas train	Advisable gas governor & filter	Spring color	Inlet gas pressure MIN [mbar]	Inlet gas pressure MAX [mbar]	Diagram
BLU 6000.1 PR MULTICALOR 600.1 MULTIFLAM 600.1	VGD 40.125	no	yellow	45	500	4C
		FILTER DN 125		50	500	
	VGD 40.100	no	yellow	55	500	
		FILTER DN 100		60	500	
	VGD 40.080	no	yellow	80	500	
		FILTER DN 80		100	500	
	VGD 40.065	no	yellow	150	500	
		FILTER DN 65		180	500	
	VGD 20.503	no	yellow	275	500	
		FILTER 2"		340	500	



LEGENDA

- Pf: Back pressure of furnace
- Pb: Pressure of burner (combustion head + complete gas train)
- Pin: Minimum inlet pressure



INSTALLATION

Electrical connections



WARNING: Electrical wiring must be carried out with electrical supply disconnected and with burner switch in position OFF. Electrical supply must correspond to the one shown on the burner label.

APPLICABLE STANDARD

The electrical connection work comprising all the installation materials, terminals and earth connections must be carried out in accordance with the applicable regulations. For the electrical installation of the burner care must be taken to observe the circuit diagram made out for the furnace system.

The electrical connection of the burner and gas valves and instruments shall be entrusted to authorized specialists only.

NOTE: For the installation of the connection cables care must be taken to provide cable loops of sufficient length to allow for the swing-out of the boiler door and burner.

Make sure after the completion of the electrical connection work to check the wiring of the electrical system of the burner. This should include a check of the direction of rotation of the burner motor (fan).

GENERAL WARNINGS:

All applicable electrical safety regulations must be followed. Failure to correctly dimension the suitable input power and earth the equipment may cause damages to person and compromise the correct function of the burner therefore the electrical system shall be checked by qualified personnel.

The manufacturer declines all responsibility for modifications or connections different from those shown in the electrical scheme.

Adapters, multiple plugs and extension cables may not be used for the equipment's power supply.

An omnipolar switch in accordance with current safety regulations is required for the mains supply connection.

ELECTRICAL CONNECTION

1) of the burner

- Built-in electrical cabinet

Use cable gland in order to secure the required level of protection. All the links, power and control, are connected to the terminal block of the cabinet. Provide cables in sufficient length to secure the rotation of the burner body according to the assembly.

Check and adjust the size of the contactors and thermal relays and the wires section according to the motor and supply voltage specs.

ATTENTION: Wiring is not supplied.

2) of the gas train

- Connect the plugs pending to the valve: either on the cabinet, or on the coupling case on the body of the burner.

The burners are produced with connections suitable for power supply 380-400 V three-phase.

The burners with electric motors of an output lower or equal to 3 kW can be adapted to 220-230 V (please follow the instructions on the backside); motors with higher output can only work 380-400 V three-phase.

In case of request of burners different from the above mentioned standard, it is recommended to make specific mention in the order.

Instructions: how to adapt electric motors of an output lower or equal to 3 kW to 220-230 V power supply

It is possible to change the voltage of the burner by operating as follows:

1. change the connection inside the electric box of the motor, from star to delta (see picture 1);
2. change the setting of the thermal relay, referring to the absorption values indicated in the motor nameplate. If necessary, replace the thermal relay with another one of suitable scale.

This operation is not possible on motors above 3 kW.

For more information, please contact the Elco staff.

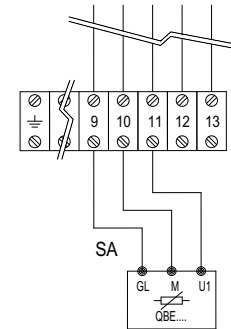
ATTENTION : The support of UV-cell A must be connected with the pipe to the fan ventilator before heat exchanger (this pipe is very important in order to put the fresh air into the UV-cell). If you not connected this pipe the UV-cell can be damaged.

LEGENDA

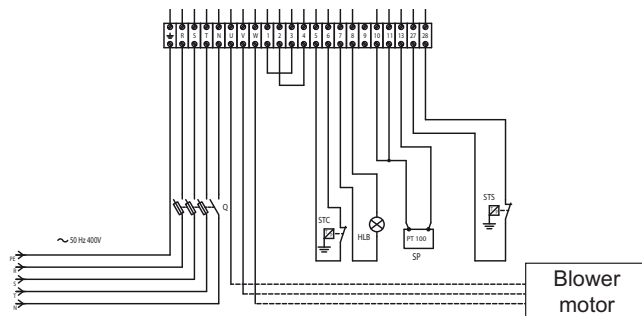
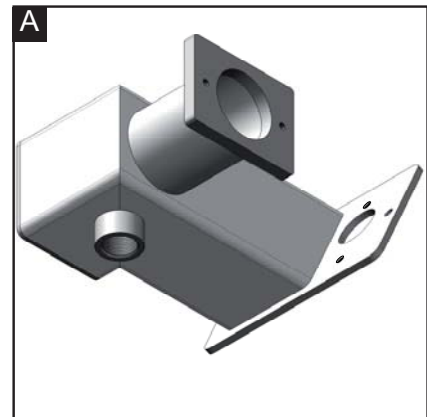
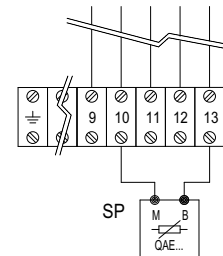
HLB: lock-out lamp
 STAB: two stages thermostat
 HLF: burner on flame lamp
 STC: boiler thermostat
 STS: safety thermostat
 SA: active probe
 SP: passive probe

PROBES CONNECTION

ACTIVE PROBE CONNECTION (FOR MODULATING VERSION)



PASSIVE PROBE CONNECTION (FOR MODULATING VERSION)



START-UP: CHECKING PROCEDURE

CHECKS BEFORE COMMISSIONING:

- That the burner is assembled in accordance with the instructions given here.
- That the burner is pre-set in accordance with the values in the adjustment table.
- Setting the combustion components.
- All electrical connections must be correct.
- Check the burner motor for correct direction of rotation.
- The heat generator must be ready for operation, and the operating regulations for the heat generator must be observed.
- The heat generator and heating system must be filled with water and the circulating pumps must be in operation.
- The temperature regulator, pressure regulator, low water detectors and any other safety or limiting devices that might be fitted must be connected and operational.
- The exhaust gas duct must be unobstructed and the secondary air system, if available, must be operational.
- An adequate supply of fresh air must be guaranteed.
- Make a test of the all gas-carrying elements for absence of leaks.
- With burner in starting position check that air damper is in "CLOSED" position.
- Check that automatic furnace controller is unlocked and in its original position.
- A standard-compliant measuring point must be available, the exhaust gas duct up to the measuring point must be free of leaks to prevent anomalies in the measurement results.

GAS START-UP

- Connect the measuring instruments for the gas head pressure on the test connection downstream of the gas damper and the air pressure on the burner test connection.
- Open the gas shut-off valve before the gas-armatures and test the gas pressure on the pressure gauge
- Set the "Manual-Automatic" selector switch to "Manual".

If the valves are tested for absence of leaks, this should be continued until a positive result is obtained. If a valve is found to leak, the program will not step forward to the automatic furnace controller. The burner will start according to the program flow of the see control box.

Prior to the initial fuel feed start make a functional test of the burner program flow:

Gas system:

- Shortly open the gas shut-off valve in the valve group until pressure is available and close again.
- Start burner and check program flow for correct start-up sequence:
 1. Fan.
 2. Pre-ventilation damper.
 3. Check air pressure.
 4. Partial-load damper.
 5. Ignition.
 6. Valves open.
 7. Safety lock-out after expiry of safety period (see control box) or shut-off because of gas supply failure.
- Unlock the see control box.

EXHAUST GAS TEST

To ensure an economically efficient and trouble-free operation of the system it will be necessary to adjust the burner specifically in accordance with the furnace system. This is achieved by means of a fuel-combustion air compound control unit which adjusts the burner to ensure a proper combustion. Exhaust gas tests are required for this purpose.

The percentage CO₂ and O₂ and the exhaust gas temperature will have to be measured to determine the efficiency and combustion quality.

Prior to any measurement make sure to check the boiler and exhaust gas system for absence of leaks.

Secondary air will falsify the measured results

Check that the exhaust gases have a residual oxygen (O₂) content as low as possible and a carbon dioxide (CO₂) content as high as possible.

The carbon monoxide content of the exhaust gases must be below the currently applicable specifications in all load stages. In the fuel oil combustion mode the permissible soot number in the exhaust gas is not allowed to be exceeded

DETERMINING THE VOLUMETRIC GAS FLOW RATE

The thermal furnace output of a boiler (Q_F) is the amount of heat supplied with the gas in a unit of time.

When taking the burner into operation the volumetric fuel flow rate should be selected according to the nominal thermal capacity of the boiler.

Example:

Nom. thermal output	Q _N	1000 kW
Boiler efficiency	η _K	0,88
Calorific value of gas	H _U	9,1 kWh/m ³
Gas pressure	p _U	100 mbar
Barometer reading	p _{amb}	980 mbar
Gas temperature relative	t _{gas}	15°C
Gas temperature absolute	T	(t _{gas} +273)
Standard atmospheric pressure	p _n	1013 mbar

$$Q_F = \frac{Q_N}{\eta_K} = \frac{1000}{0,88} = 1136 \text{ kW}$$

Volumetric gas flow rate at STP:

$$v_{Bn} = \frac{Q_N}{H_U \cdot \eta_K} = \frac{1000}{9,1 \cdot 0,88} = 125 \text{ m}^3/\text{h}$$

Volumetric gas flow rate in operating condition:

$$v_{BB} = v_{Bn} \frac{T}{273} = \frac{p_n}{p_{amb} + p_u} =$$

$$= 125 \frac{273+15}{273} \frac{1013,25}{980+100} = 123,9 \text{ m}^3/\text{h}$$

Recommended combustion parameters

Fuel	Recommended (%) CO ₂	Recommended (%) O ₂
Natural gas	10 ÷ 9	3,1 ÷ 4,8
Light oil	13 ÷ 11,5	3,3 ÷ 5,3
Heavy oil	12,5 ÷ 11	4,2 ÷ 6,2

WARNING: if the installation is above sea level the output of the burner vary base on the diagram.

The regulation of the burner in this case shall take into account the reduced power of the burner due to the missing air.

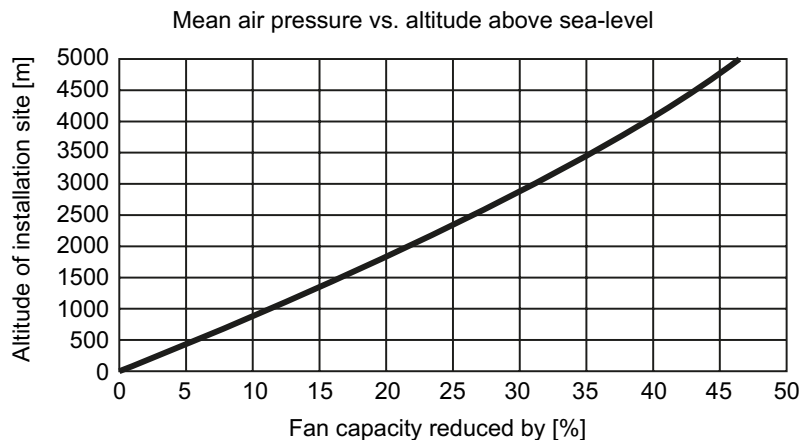
Ratio between O₂- and CO₂- for natural gas H (CO₂max = 11,7%)

Ratio between O₂- and CO₂- for light oil EL (CO₂max = 15,40%)

Ratio between O₂- and CO₂- for heavy oil S (CO₂max = 15,60%)

$$O_2 = 21 \frac{CO_2\text{max} - CO_2\text{gem}}{CO_2\text{max}} = \%$$

CO₂ gem = % CO₂ measured on dry flue gases



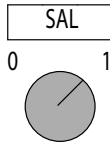
START-UP

Select the gas operation in order to proceed with start up on the gas side. On the selector put the operation on minimum capacity.

MAIN SWITCH

0 - OFF

1 - ON



KMV contactor: check the air fan motor rotation. If not correct invert the two phases on the power supply.



KMV

START UP THE BURNER

The control box starts the pre-purge cycle, the fan motor and opens the air flaps in full open position.

At the end of pre-purging, the control box drives the servomotor into the ignition position and starts the ignition transformer.

After a few seconds the control box opens the main valves and the burner goes in the low flame.

In case of faulty ignition, the control box switches the burner into safety condition, in such a case you must rearm the burner.

Gradually increase burner output from the low flame to the high flame and set gas servomotor curve in order to have a stable flame. Refer to LAMTEC manual attached.

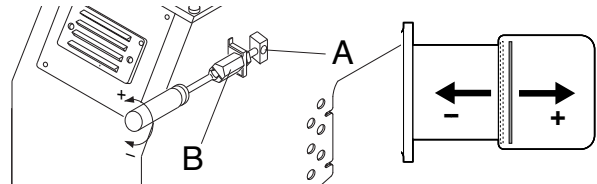
Adjusting the maximum air flow rate

Air and Gas adjustment are accomplished through LAMTEC parameters setting. Refer to LAMTEC manual attached.

Firing head setting

The ring head is pre-adjusted at the 50% from the factory. The setting fully open enables to reach the full power of the burner and full close to reach the minimum power of the burner.

The optimal position depends on the output that we need to reach but the default setting shall be modified only when you are not able to reach the suggested combustion value by adjusting the air flow in the maximum flame.



Servomotor STM40... - Air damper motor pre-setting

Air adjustment is accomplished through LAMTEC parameters setting. Refer to LAMTEC manual attached.



START-UP

Adjusting the intermediate burner capacity

Gas adjustment is accomplished through LAMTEC parameters setting. Refer to LAMTEC manual attached.

WARNING: the variable profile of the cam shall have a normal proportional curvature in order to have good combustion values and reduce its mechanical stress breakdown.

Pressure switch adjustment

AIR PRESSURE SWITCH CALIBRATION

The air pressure switch is provided for monitoring the pressure of the combustion air fan. Unscrew screws A and B and remove cover C.

After the air and gas setting you have to calibrate the air switch with the burner working on the low flame by slowly turning the relative knob clockwise until the burner locks out. Read the value and then decrease it by 15%.

Set the pressure switch to the minimum by turning knob D to position 1.

Start the burner and keep in low flame running, while checking that combustion is correct. Through a small cardboard, progressively obstruct the air intake until to obtain a CO₂ increase of 0,5±0,8% or else, if a pressure gauge is available, connected to pressure port E, until reaching a pressure drop of 1 mbar (10 mm of W.G.).

Slowly increase the adjustment value of the air pressure switch until to have the burner lockout. Remove the obstruction from the air intake, screw on the cover C and start the burner by pressing the control box rearm button.

WARNING: the air pressure switch shall prevent the air pressure to go below 80% from the adjustment value in order to prevent the CO in the fumes to exceed 1% (10000 ppm). Using the analyser try to close the air inlet and check that the burner locks out before exceeding CO value of 1% in the fumes.

MIN GAS PRESSURE SWITCH

The gas pressure switch has the function to check that the gas pressure before the gas valve does have the minimum pressure to make the burner running correctly.

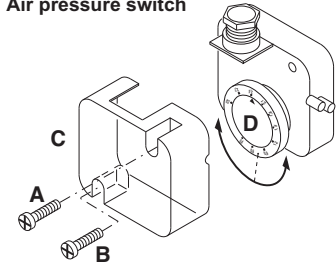
Unscrew off and remove cover M. - Set knob N to a value equal to 60% of gas nominal feed pressure (i.e. for natural gas nom. pressure = 20 mbar, set knob to a value of 12 mbar; for LPG nom. pressure of G30/G31- 30/37 mbar, set knob to a value of 18 mbar).

MAX GAS PRESSURE SWITCH (KIT)

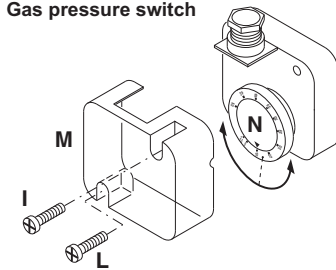
The maximum gas pressure switch has the function to check that the gas pressure after the gas train and before the head does not exceed the pre-set limits.

Max gas pressure switch: it is available as a kit for different pressure.

Air pressure switch



Gas pressure switch



MAINTENANCE PROGRAM



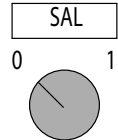
Burner and boiler servicing must only be carried out by authorised and qualified personnel at least once a year. Depending on the type of installation, shorter maintenance intervals may be necessary. The system operator is advised to take out a maintenance contract to guarantee regular servicing.
WARNING: Use original spare parts.

SAFETY WARNINGS:

1. Turn off the power supply and protect the system from accidental start-up
2. Cut gas supply
3. Make sure there is no residual power in the system and that the actions in points 1 and 2 have been completed.
4. Before opening the burner casing, ensure that the fan motor has stopped completely

MAIN SWITCH

- 0 - OFF
- 1 - ON



Failure to observe any of these instructions will result in the risk of death or injury!

WORKS RECOMMENDED AS PART OF ANNUAL BURNER MAINTENANCE:

- Emergency stop button function check
- Check burner start characteristics
- Run burner test and input measurement in the boiler room
- Clean the combustion components and replace defective parts if necessary
- Check the combustion head components and make sure that all components are in good condition otherwise replace them
- Replace ignition electrodes and nozzle if necessary and check their correct position after any intervention
- Flame monitor and automatic combustion control unit function check
- Clean the fan wheel and the blower and grease rotating parts if necessary
- Perform visual inspection of gas lines in the boiler room and check the gas flow
- Clean the gas filter cartridge with air periodically, replace it if necessary
- After the cleaning of the components of the gas train perform the leakage test
- Make visual inspection of the burner's electrical components and eliminate malfunctions if necessary
- Burner safety devices function check (air pressure/gas pressure switches)
- Commissioning the burner and correct the adjustment values if necessary

NOTES ON REASSEMBLING: Perform the described step in reverse order and make sure to refit components as they were originally assembled and the system is free from leaks. Use only original spare parts.

DRAW UP A MEASUREMENT REPORT ACCORDING TO THE LOCAL REGULATION AND CODES OF PRACTISE OF THE COUNTRY

EXHAUST GAS LOSS

Exhaust gas loss by way of free heat will occur as a result of the temperature difference between the fuel-air mixture entering the furnace chamber and the gases discharged. Any increase in the excess of air and the resultant higher exhaust gas volume will cause the exhaust gas loss to rise. The exhaust gas loss can be calculated as follows:

$$q_A = (t_A - t_L) \frac{A_1}{CO_2} + B$$

- q_A = exhaust gas loss [%]
- t_A = exhaust gas temperature [°C]
- t_L = combustion air temperature [°C]
- CO_2 = volumetric content of carbon dioxide [%]

	Light oil EL	Heavy oil S	Natural gas	Town gas	LPG
A1	0,50	0,490	0,370	0,350	0,420
B	0,007	0,007	0,009	0,011	0,008

Example

Data measured in natural gas mode:
 CO₂ content of exhaust gases: 10,8%
 Exhaust gas temperature: 195°C
 Air intake temperature: 22°C

The exhaust gas loss can be calculated as follows:

$$q_{Af} = (195-22) \left(\frac{0,37}{10,8} + 0,009 \right) = 7,48\%$$

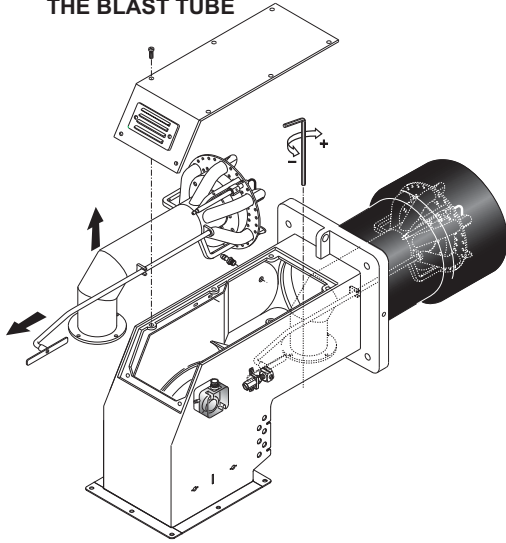
Data measured in fuel oil mode:
 CO₂ content of exhaust gases: 12,8%
 Exhaust gas temperature: 195°C
 Air intake temperature: 22°C

The exhaust gas loss can be calculated as follows:

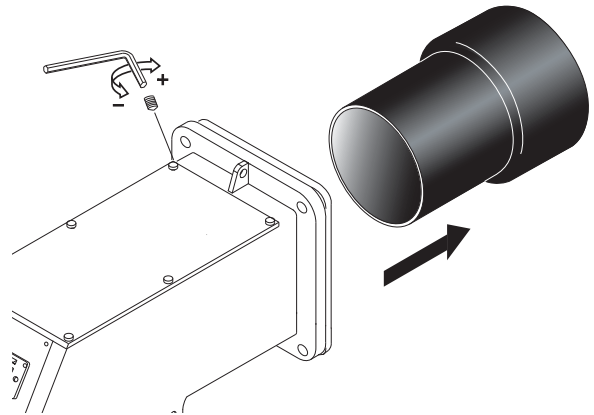
$$q_{Af} = (195-22) \left(\frac{0,49}{12,8} + 0,007 \right) = 7,83\%$$

MAINTENANCE PROGRAM

REMOVING THE BLAST TUBE



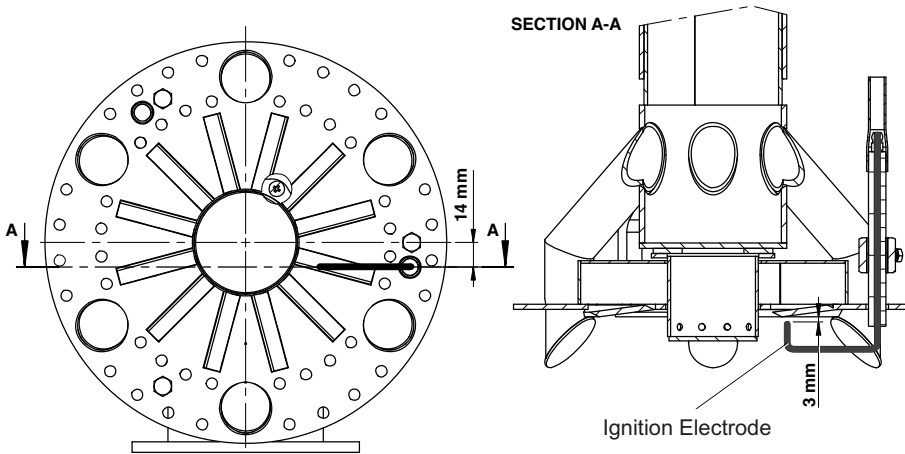
REMOVING THE FIRING HEAD



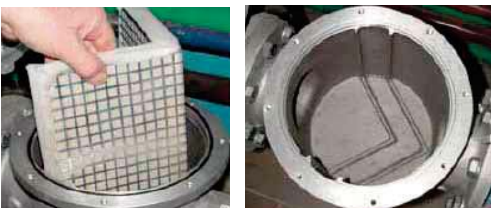
POSITION OF ELECTRODES

ATTENTION:

Check the position of the electrodes after any intervention as wrong position could cause ignition troubles.



GAS FILTER CLEANING



TROUBLESHOOTING INSTRUCTIONS

For Setting and Error Lists refer to LAMTEC manual attached.

OPERATING TROUBLE

In case of operating trouble it should be checked whether the system is in proper working order.

Make a check for the following:

1. Availability of fuel.

Availability of gas in the line at sufficiently high pressure.

Availability of fuel oil in the tank (for dual fuel burner).

Correct position of fuel selector switch.

2. Availability of electric power in the burner system.

3. Proper functional order and setting of all control and safety instruments such as temperature controller, safety limiter, water failure cut-out, electrical limit switches, etc. If the trouble is not found to be due to any of the above-mentioned points it will be necessary to test the burner functions very carefully.

Prevailing conditions:

The burner will be found to be out of operation and in faulty and interlocked position.

Proceed with searching for the cause of the trouble and eliminate it. Unlock the control box by pressing the fault eliminate key and start the burner.

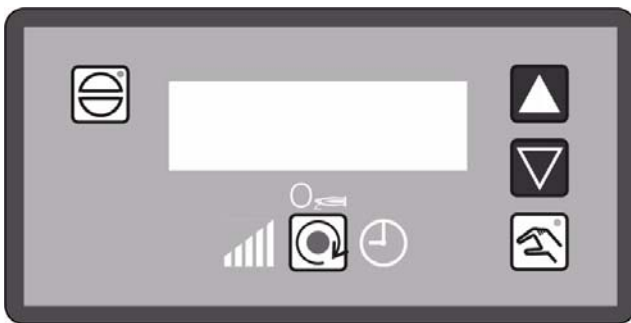
Do not press the fault eliminate key longer than 10 seconds.

The start-up program will be initiated and should be carefully monitored.






The possible cause of the fault may be quickly found by reference to the fault indicator of the control box and watching the start-up and operating program.

APPENDIX

Control box - Display



Intent of the keys:

-  → Reset
-  → Load / Fault history up
-  → Load / Fault history down
-  → Load / Fault history down
-  → Manual operation on / off

- Compound
- O₂
- Flame intensity
- Operating hours



Select operating modes*: UEAN ↔ PARA ↔ O₂¹⁾ ↔ AUTO ↔ SPLO*

Select operating parameters Status ↔ load rating ↔ setpoint ↔ Actual value feedback ²⁾ ↔ Digital inputs

* UEAN = Monitoring processor display

PARA = Parameterisation

AUTO = Automatic

EINS = Setting

SPLO = Clear memory

¹⁾ only, if parameter is active

²⁾ only with Burner Control FA1

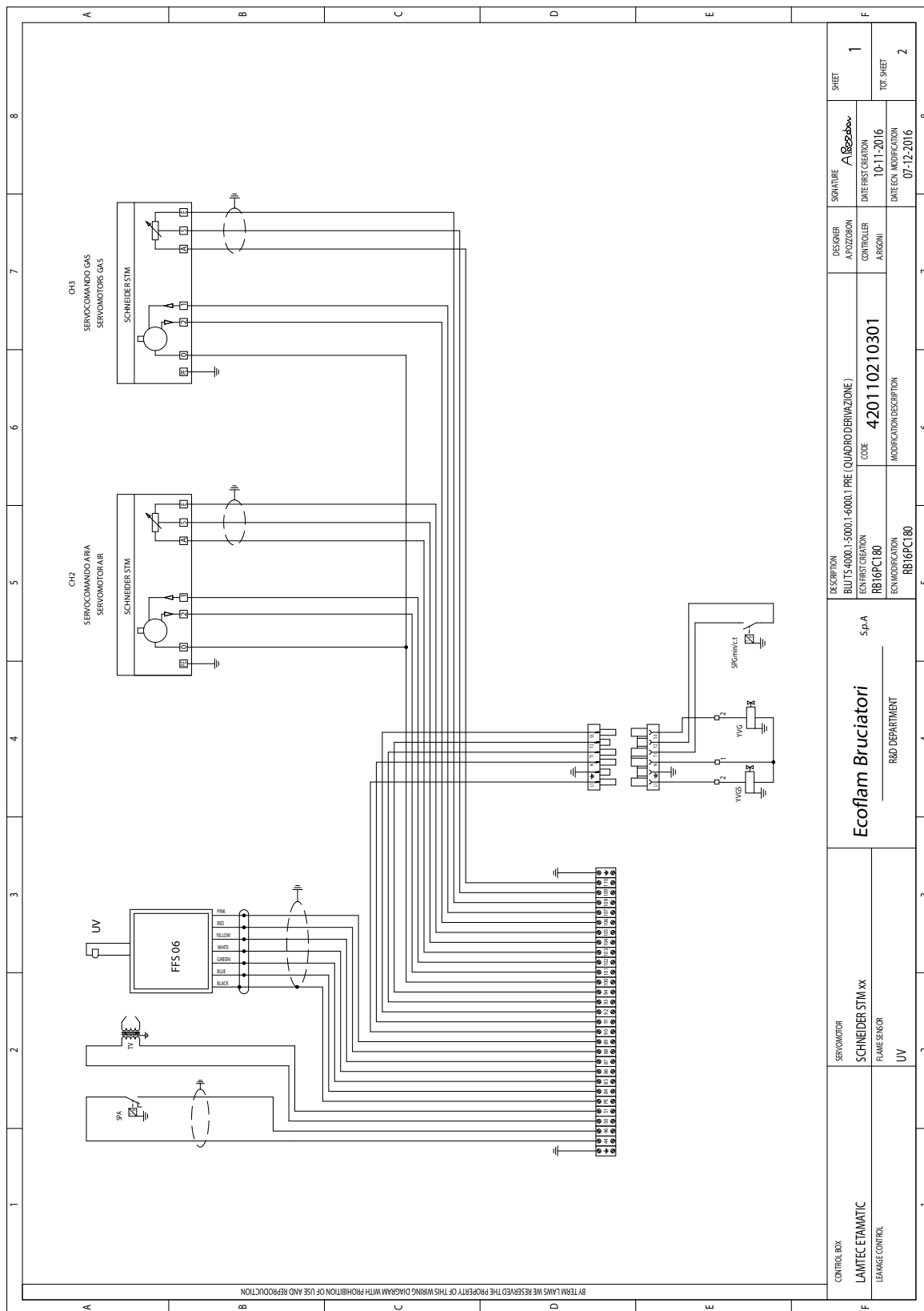
Refer to LAMTEC manual attached.



Always switch off the power supply before installing or removing the control unit. Do not attempt to open or carry out repairs on the control unit.

APPENDIX

Electrical diagrams



APPENDIX

Electrical diagrams

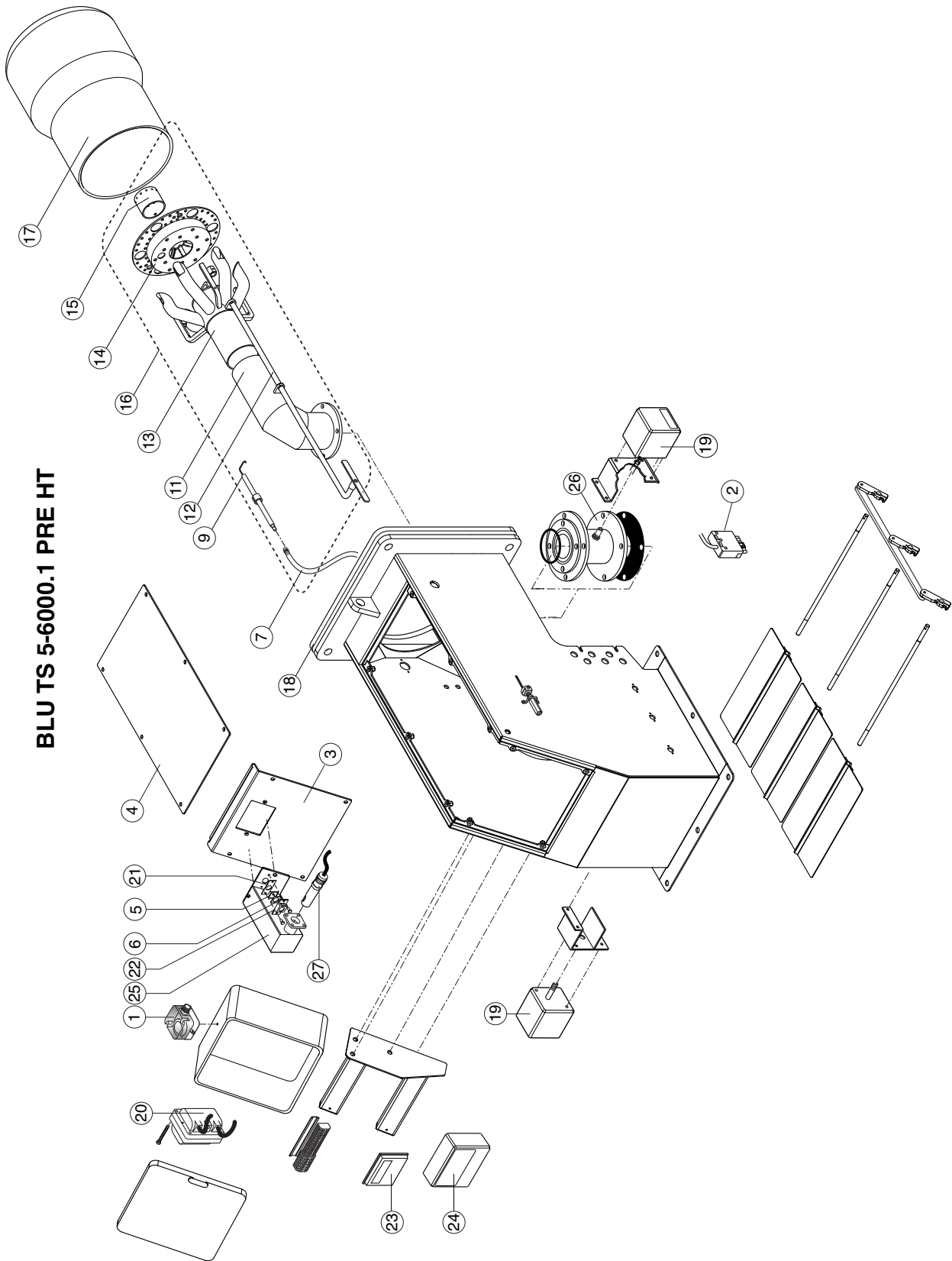
TV		TRASFORMATORE TRANSFORMER TRANSFORMATEUR TRANSFORMADOR
UV		FOTOCELLULA CELLULE UV FOTOCELULA
SPA		PRESSOSTATO ARIA AIR PRESSURE SWITCH CELLULE UV FOTOCELULA
YWG		PRESSOSTATO ARIA AIR PRESSURE SWITCH PRESSOSTATO ARIE
YWGS		ELETTROVALVOLA GAS DI PRIMA FAMMA FIRST FLAME GAS VALVE ELECTROVAVLE GAZ PRIME ALLUMEE ELECTROVAVULA GAS DE 1ª LLAMA
SP CI		ELETTROVALVOLA GAS DI SICUREZZA SAFETY GAS VALVE ELECTROVAVLE GAZ DE SECURITE ELECTROVAVULA GAS DE SEGURIDAD
		PRESSOSTATO PER CONTROLLO DI TENUTA LEAKAGE CONTROL PRESSOSTATO E CONTROLLO DI FIANCHEMI PRESSOSTATO GAS CONTROL DE ESTANQUIDAD

CONTROL BOX	CONTROL BOX	DESCRIPTION	DESIGNER	SCHEMATIC	SHEET
LAMTEC ETAMATIC	SP-A	BLU TS 4000.1-5000.1-6000.1 PRE (QUADRO DERIVAZIONE)	A-POZZORON	Abbezzo	2
LEAKAGE CONTROL	Sp.A	ECON FIRST CREATION	CONTROLLER	DATE FIRST CREATION	TOT SHEET
	R&D DEPARTMENT	RB16PC180	ARGENT	10-11-2016	2
		ECON MODIFICATION		DATE ECON MODIFICATION	
		RB16PC180		07-12-2016	
		MODIFICATION DESCRIPTION			

APPENDIX

Spare parts

BLU TS 5-6000.1 PRE HT



APPENDIX

Spare parts list

N°	DESCRIPTION		BLU TS 5000.1 PRE	BLU TS 6000.1 PRE
			code	code
1	AIR PRESSURE SWITCH	LGW10A2P		65323047
2	WIELAND PLUG	6 pin		65322072
3	DOWN COVER			65325217
4	UP COVER			65325218
5	GLASS			65321883
6	GASKET	28x28		65321948
7	IGNITION CABLE	TC		65322004
		TL		65320946
8	IONIZATION CABLE			-
9	IGNITION ELECTRODE			65320891
10	IONIZATION PROBE			-
11	GAS PIPE	TC		65321664
		TL		65321665
12	ROD	TC		65324492
		TL		65324434
13	FIRING HEAD			65321666
14	DISC			65320742
15	TOOTH	G20/25		65321608
16	INNER ASSEMBLY			
17	BLAST TUBE	TC		840050326800
		TL		
18	GASKET ISOMART			65321128
19	AIR DAMPER MOTOR	STM40 Q15.51/8 2N		13019360
20	IGNITION TRANSFORMER	COFI 820 PM		65323227
21	GASKET	30x50		65321949
22	GLASS COVER			65321884
23	DISPLAY	LAMTEC		65311162
24	CONTROL BOX	ETAMATIC OEM		65310418
25	PEED WINDOM FRAME			840050174800
26	THROTTLE GROUP			840090112000
27	UV CELL	LAMTEC FFS08-UV1		65312274

TC = SHORT HEAD TL = LONG HEAD

Ecoflam

Ecoflam Bruciatori S.p.A.

Via Roma, 64 - 31023 Resana (TV) - Italy

Tel. +39 0423 719500

Fax +39 0423 719580

<http://www.ecoflam-burners.com>

e-mail: export@ecoflam-burners.com

Società soggetta alla direzione e al coordinamento di Ariston Thermo S.p.A.

Via A. Merloni, 45 - 60044 Fabriano (AN) - CF 01026940427

Ecoflam Bruciatori S.p.A. reserves the right to make any adjustments, without prior notice, which is considered necessary or useful to its products, without affecting their main features

Ecoflam Bruciatori S.p.A. si riserva il diritto di apportare ai prodotti le modifiche che riterrà necessarie o utili, senza pregiudicare le caratteristiche principali.

La maison Ecoflam Bruciatori S.p.A. se réserve le droit d'apporter les modifications qu'elle jugera nécessaires ou utiles à ses produits sans pour autant nuire à leurs caractéristiques principales

Ecoflam Bruciatori S.p.A. se reserva el derecho a introducir en sus productos todas las modificaciones que considere necesarias o utiles, sin perjudicar sus características

"Ecoflam Bruciatori S.p.A." оставляет за собой право вносить в конструкцию оборудования любые необходимые изменения без особого предупреждения