

BLU 7000.1 PR  
BLU 8000.1 PR  
BLU 10000.1 PR  
BLU 12000.1 PR



**Technical data**



**Operating instructions**



**Electric diagrams**



**Spare parts list**



**Gas train manual is separate**



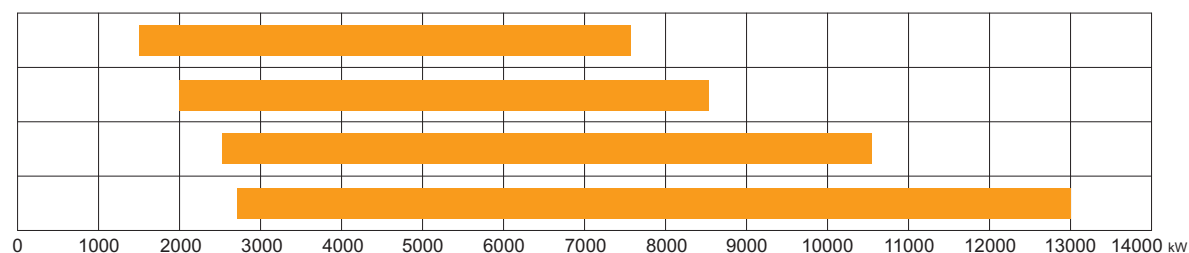
## INDEX

**BLU 7000.1 PR**

**BLU 8000.1 PR**

**BLU 10000.1 PR**

**BLU 12000.1 PR**



**General warnings - Conformity declaration** 3

**Burner designation - Modular delivery system** 4

**Burner description** 5

Electrical control panel 5

Gas train - Kit - Accessories: assembly to the burner 6

**Technical data** 7

**Gas category by country** 7

**Working fields** 8

**Test boiler - Flame dimension** 8

**Overall dimensions** 9

**Gas operating mode - General safety functions** 10

**Installation** 11

Fitting the burner to the boiler 11

Gas line 12

Pilot gas train, kit and accessories connection - Head loss diagram 13

Pressure loss diagrams 14

Electrical connections 18

**Start-up: checking procedure** 19

**Exhaust gas test** 20

**Start-up** 21

Adjusting the max air flow rate 21

Firing head setting 21

Servomotor pre-setting 21

Adjusting the intermediate burner capacity 22

Pressure switch adjustment 22

Servomotor: final setting 22

**Maintenance program** 23

**Troubleshooting instructions** 25

**Operating troubles** 26

**Appendix** 27

Control box - Damper actuators 27

Electrical diagrams 28

Spare parts list 32

## 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 products:

**BLU 7000.1 PR  
BLU 8000.1 PR  
BLU 10000.1 PR  
BLU 12000.1 PR**

conform to the following standards:

EN 676: 2008  
EN 60335-1: 2008  
EN 60335-2-30: 2006  
EN 60335-2-102: 2007  
EN 55014-1: 2008 + A1: 2009  
EN 55014-2: 1998 + A1: 2001 + A2: 2008

These products are built in accordance with the following directives  
2006/42/EC Machinery directive  
2004/108/EC EMC directive  
2006/95/EC Low voltage directive  
2009/142/EC Gas appliances Directive

CE certification, when required, must be done at installation site by the end user

Resana, 20th December 2010  
M. PANIZZON



**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 8000.1 PR TC SGT 230-400-50**

### RANGE NAME BY FUEL TYPE

**BLU** Gas

### MODEL SIZE (Gas: kW; Oil: kg/h)

**BLU 8000.1** 8000 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

**E** 2 stages modulating electronic

### HEAD TYPE

**TC** Short head

**TL** Long head

### FUEL

**LPG** Natural gas

**BIOGAS** Liquid gas

Biogas

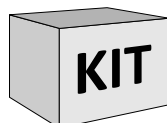
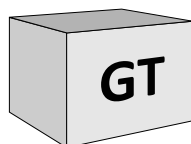
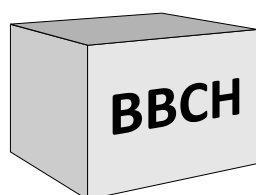
### EQUIPMENT

**SGT** Separate gas train

### ELECTRICAL POWER SUPPLY

**230-400-50** 230-400 Volt, 50 Hz

## 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.

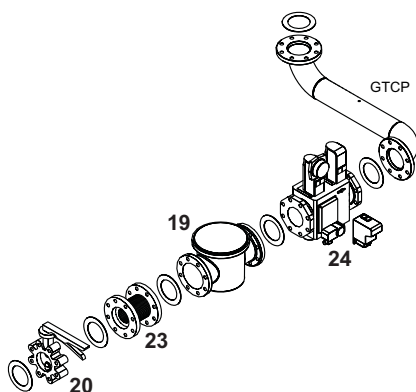
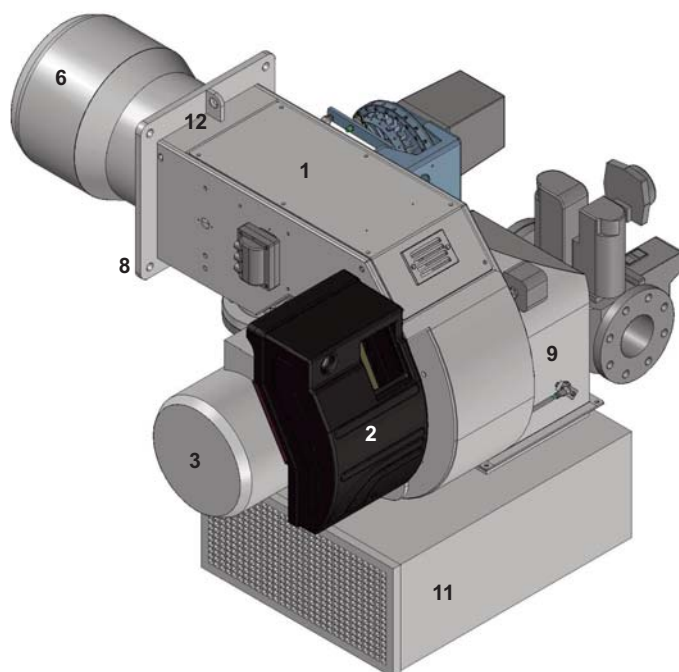
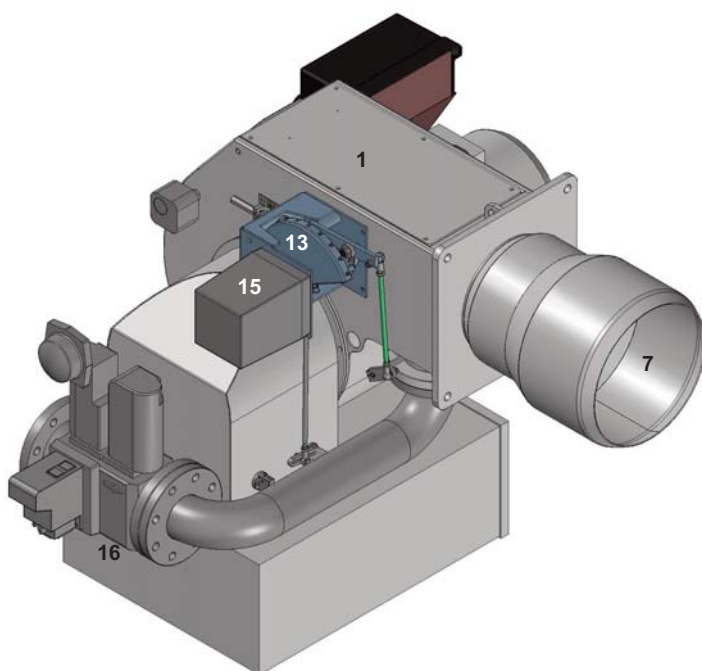
For burners over 1700 kW gas train connection pipe must be ordered.

Kits and accessories are managed and delivered separately.

### Component type

|             |                                                      |
|-------------|------------------------------------------------------|
| <b>BBCH</b> | Burner Body with Combustion Head (without gas train) |
| <b>GTCP</b> | Gas Train Connection pipe                            |
| <b>GT</b>   | Gas Train (delivered separately)                     |

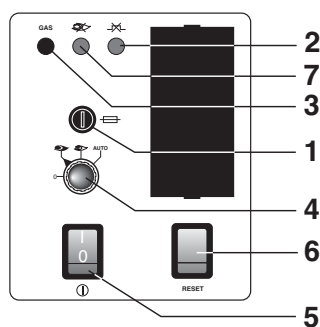
## BURNER DESCRIPTION



### LEGENDA

- |                             |                                 |
|-----------------------------|---------------------------------|
| 1. Housing                  | 12. Lifting eyebolts            |
| 2. Electrical control panel | 13. Mechanical cam gas          |
| 3. Blower motor             | 15. Servomotor for gas and air  |
| 5. Hinge flange             | 16. Gas train                   |
| 6. Blast tube               | 19. Gas filter                  |
| 7. Burner head              | 20. Ball valve                  |
| 8. Burner fixing flange     | 23. Antivibration coupling      |
| 9. Air flap regulation      | 24. Tightness control           |
| 11. Silencer                | GTCP. Gas train connection pipe |

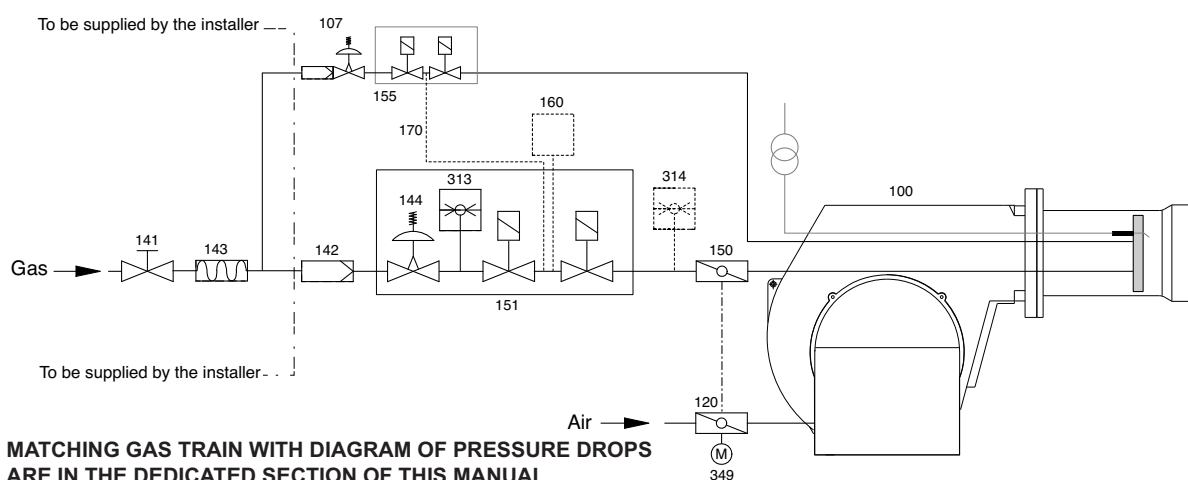
## Control panel



- |                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|
| 1 - Fuse                                                                                                     |
| 2 - Thermal lock-out lamp                                                                                    |
| 3 - Working lamp                                                                                             |
| 4 - Selector :                                                                                               |
| 0 Locking of devices for operating at intermediate outputs                                                   |
|  Operation at max. output |
|  Operation at min. output |
| <b>AUTO</b> Automatic operation                                                                              |
| 5 - Main switch I / O                                                                                        |
| 6 - Lockout disable push button                                                                              |
| 7 - Lock-out lamp                                                                                            |

## 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                    |        |           |
|                                                          | 2. Ball valve                       |        | ACS       |
|                                                          | 3. Antivibration coupling           |        | ACS       |
|                                                          | 5. Min gas pressure switch          | EXPORT | GAS TRAIN |
|                                                          | 6. Safety gas valve + 10. Actuator  |        |           |
|                                                          | 7. Working gas valve + 11. Actuator |        |           |
|                                                          | 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-RWF40    | KITPRES50           |                   |
| Compulsory EN676      | Compulsory > 1200 kW | Probe-...      | KITPRES150          |                   |
|                       |                      |                |                     |                   |

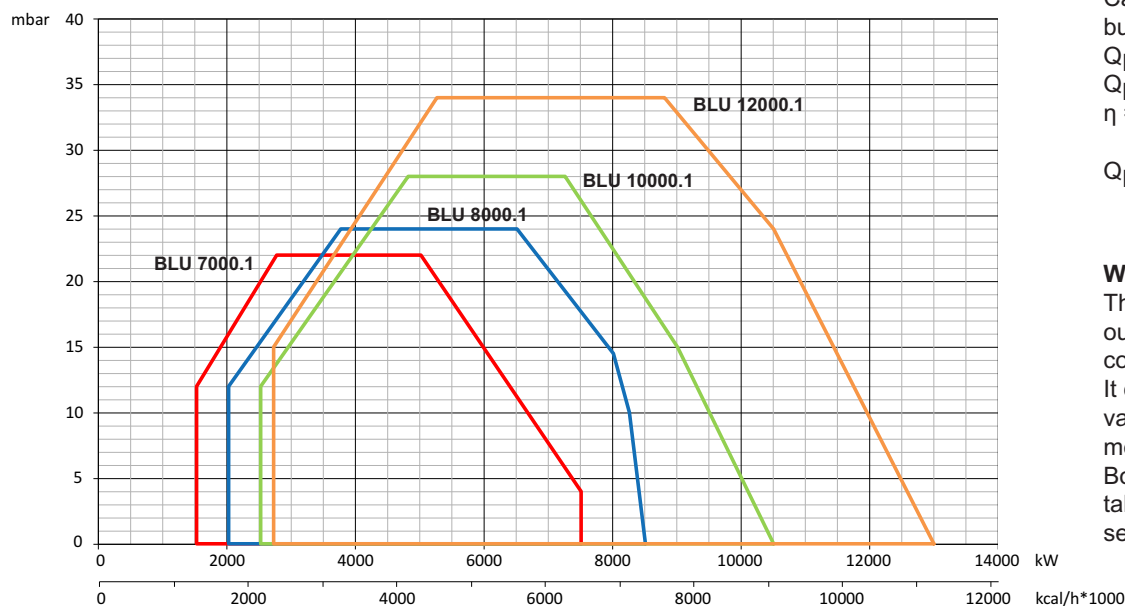
## TECHNICAL DATA

| MODEL                                 |                    | BLU 7000.1                                                                                                                                                                 | BLU 8000.1 | BLU 10000.1 | BLU 12000.1 |
|---------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|-------------|
| Thermal power max.                    | kW                 | 7.500                                                                                                                                                                      | 8.500      | 10.500      | 13.000      |
|                                       | kcal/h             | 6.450.000                                                                                                                                                                  | 7.310.000  | 9.030.000   | 11.180.000  |
| Thermal power min.                    | kW                 | 1.500                                                                                                                                                                      | 2.000      | 2.500       | 2.700       |
|                                       | kcal/h             | 1.290.000                                                                                                                                                                  | 1.720.000  | 2.150.000   | 2.322.000   |
| Operation mode                        | Type               | Progressive mechanical gas - Modulating with PID                                                                                                                           |            |             |             |
| Regulation ratio nominal              | Type               | 1+4 GAS                                                                                                                                                                    |            |             |             |
| Fuel                                  | Type               | G20 (L.C.V. 8.570 kcal/Nm <sup>3</sup> ), G25 (L.C.V. 7.370 kcal/Nm <sup>3</sup> )<br>G31 (L.C.V. 22.260 kcal/Nm <sup>3</sup> ), G30 (L.C.V. 29.320 kcal/Nm <sup>3</sup> ) |            |             |             |
| Emission class                        | std                | Standard Class 2 - GAS EN676 (<120 mg/kWh)                                                                                                                                 |            |             |             |
| Control unit                          | Type               | LFL / LGK                                                                                                                                                                  |            |             |             |
| Gas train                             | GT                 | VGD separate gas train + Filter + KIT Tightness control + Other KIT/ACS                                                                                                    |            |             |             |
| Gas connection                        | GTCP               | Gas connection range DN65 to DN125 depending on the gas train selected                                                                                                     |            |             |             |
| NATURAL GAS pressure                  | mbar               | 60÷700                                                                                                                                                                     | 85÷700     | 115÷700     | 175÷700     |
| LPG pressure                          | mbar               | 125÷700                                                                                                                                                                    | 185÷700    | 110÷700     | 160÷700     |
| Air regulation                        | Type               | Air flap                                                                                                                                                                   | Air flap   | Air flap    | Air flap    |
| Air flap control with servomotor      | Model              | SQM50                                                                                                                                                                      |            |             |             |
| Air pressure switch                   | mbar               | 1...10 mbar                                                                                                                                                                |            |             |             |
| Flame monitoring                      | Type               | Ionization                                                                                                                                                                 |            |             |             |
| Ignitier                              | Model              | COFI                                                                                                                                                                       |            |             |             |
| Motor                                 | kW                 | 15                                                                                                                                                                         | 18,5       | 22          | 37          |
| Rpm                                   | N°                 | 2.800                                                                                                                                                                      | 2.800      | 2.800       | 2.800       |
| Voltage                               | V/Hz               | 230/400 V - 50 Hz                                                                                                                                                          |            |             |             |
| Tot. power consumption operation      | W                  | 16.500                                                                                                                                                                     | 20.000     | 23.500      | 38.500      |
| Weight body BBCH                      | Kg                 |                                                                                                                                                                            |            |             |             |
| Electrical panel protection level     | IP                 | IP40                                                                                                                                                                       | IP40       | IP40        | IP40        |
| Sound pressure level without silencer | dB(A)<br>Lab tests | 94,1                                                                                                                                                                       | 94,6       | 95,6        | 96,3        |
| Sound pressure level with silencer    |                    | 86,9                                                                                                                                                                       | 87,8       | 88,1        | 88,9        |
| Ambient temperature storage           | Min/Max            | -20°...+70° C                                                                                                                                                              |            |             |             |
| Ambient temperature use               |                    | -10°...+60° C                                                                                                                                                              |            |             |             |

## GAS CATEGORY BY COUNTRY

| Gas category | Country |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|--------------|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 2,3 Family   | AT      | BE | BG | CH | CY | CZ | DE | DK | EE | ES | FI | FR | GB | GR | HU | IE | IS | IT | LT | LU | LV | MT | NL | NO | PL |
|              | PT      | RO | SE | SI | SK | AL | HR | MK | TR | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |

## WORKING FIELDS



Calculation of burner output  
 $Q_F$  = Burner output (kW)  
 $Q_N$  = Rated boiler output (kW)  
 $\eta$  = Boiler efficiency (%)

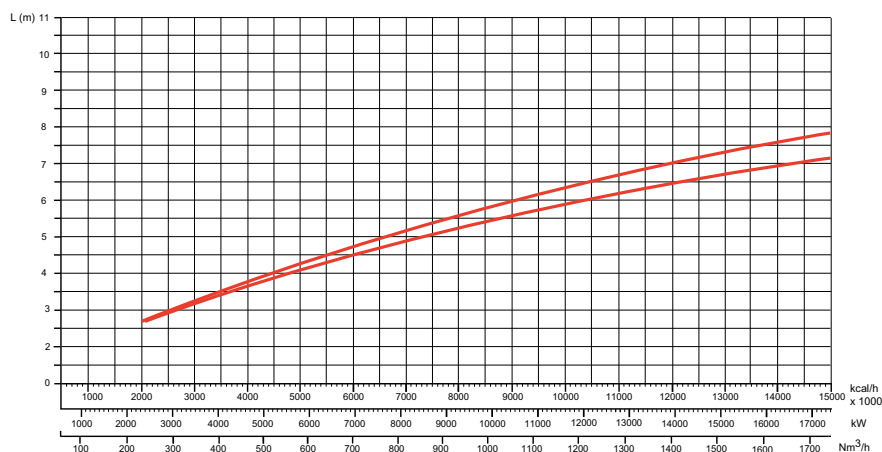
$$Q_F = \frac{Q_N}{\eta} \times 100$$

### Working fields

The working field shows burner output as a function of combustion chamber pressure. It corresponds to the maximum values specified by EN 676 measured at the test fire tube. Boiler efficiency should be taken into consideration when selecting the burner.

## TEST BOILER - FLAME DIMENSIONS

FLAME LENGTH GAS BURNERS

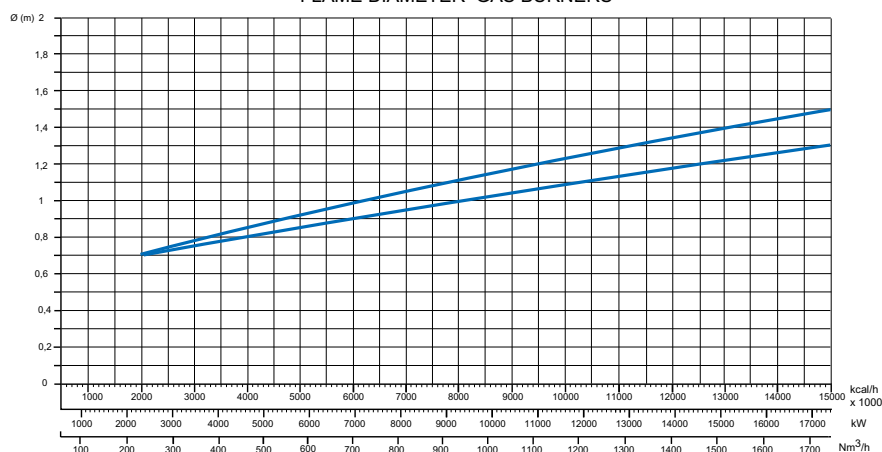


The burner/boiler matching does not pose any problems if the boiler is CE type-approved.

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.

FLAME DIAMETER GAS BURNERS



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.

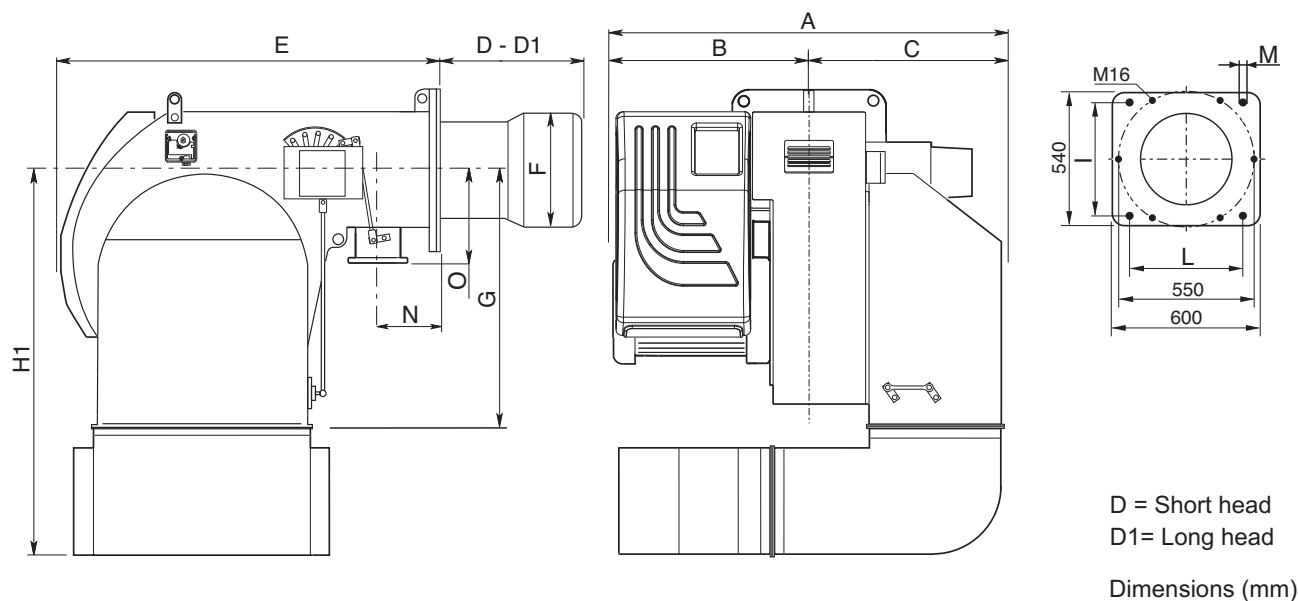
The dimensions of the flame are made in test boiler in laboratory without resistance therefore exists max and min length that take into account the difference in length that comes from the boiler backpressure.

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.

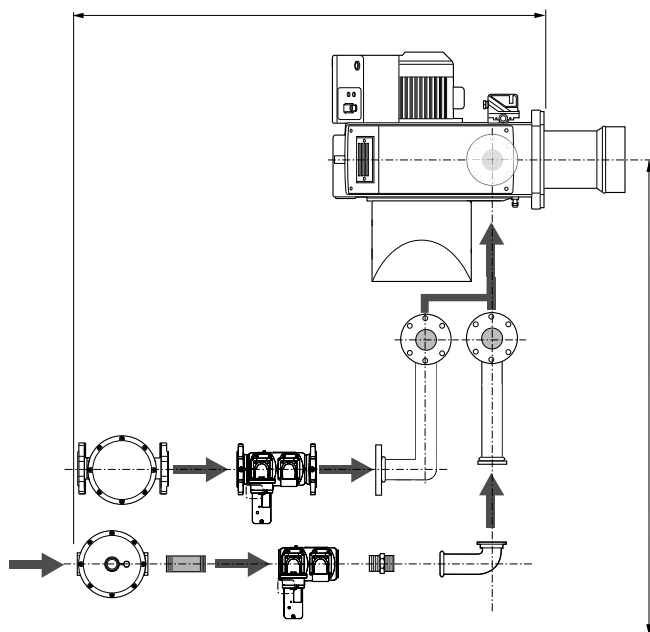
## OVERALL DIMENSIONS



|             | A    | B   | C   | D   | D1 | E    | F   | G   | H1   | I   | L   | M   | N   | O   |
|-------------|------|-----|-----|-----|----|------|-----|-----|------|-----|-----|-----|-----|-----|
| BLU 7000.1  | 1210 | 585 | 625 | 470 | -  | 1212 | 420 | 775 | 1270 | 460 | 460 | M20 | 195 | 232 |
| BLU 8000.1  | 1280 | 655 | 625 | 470 | -  | 1212 | 420 | 775 | 1270 | 460 | 460 | M20 | 195 | 232 |
| BLU 10000.1 | 1310 | 685 | 625 | 470 | -  | 1212 | 420 | 775 | 1270 | 460 | 460 | M20 | 195 | 232 |
| BLU 12000.1 | 1420 | 795 | 625 | 470 | -  | 1212 | 450 | 775 | 1270 | 460 | 460 | M20 | 195 | 232 |

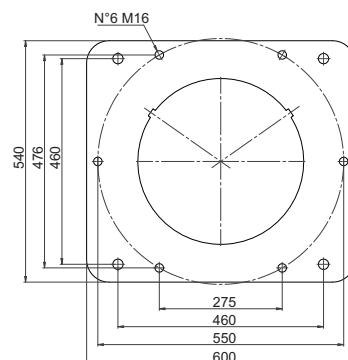
### HOW TO INSTALL THE GAS TRAIN INTO THE BURNER AND CALCULATE THE OVERALL DIMENSIONS:

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



### Burner-boiler mounting flange

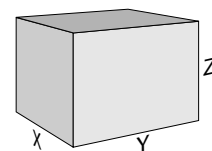
Fixing hole dimensions are "I" and "L" as per dimension table. Boiler hole shall be done according to the blast tube dimension "F" plus 15-25 mm in order to be able to extract it during maintenance.



**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)

|             | X    | Y    | Z    | kg |
|-------------|------|------|------|----|
| BLU 7000.1  | 1750 | 2380 | 1460 |    |
| BLU 8000.1  | 1750 | 2380 | 1460 |    |
| BLU 10000.1 | 1750 | 2380 | 1460 |    |
| BLU 12000.1 | 1750 | 2380 | 1460 |    |



## 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 ionization probe 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.

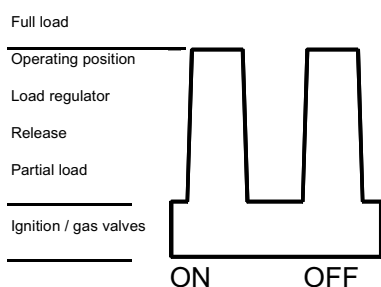
The stepless control will allow the burner to be operated at any desired stage between its partial-load and full-load positions.

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

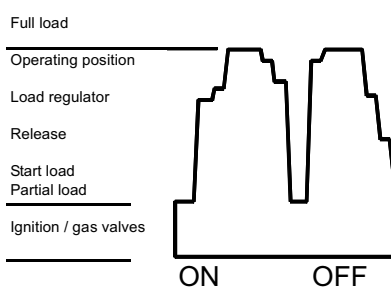
The air damper will be closed when the burner is out of operation and will thus prevent cold air flowing through the burner chamber, heat exchanger and chimney. The interior cooling losses will thus be greatly minimized.

### Gas control:

#### 2-stage sliding



#### Stepless



### 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 control box being locked.

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

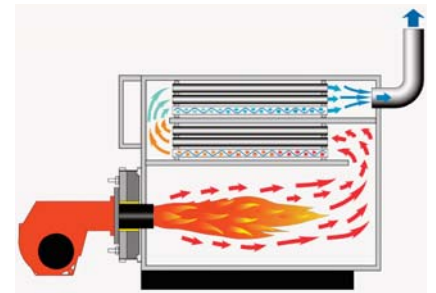
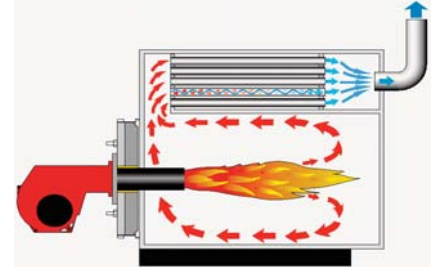
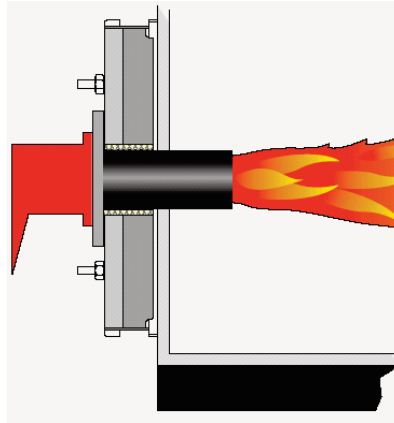
### Fitting the burner to the boiler



**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.

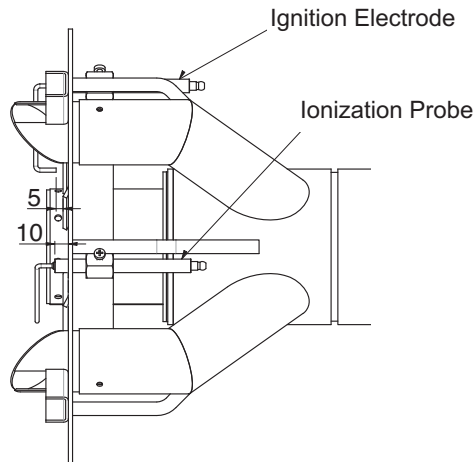
Place the gasket on the burner flange and install the burner into the boiler by fixing nuts into the bolts.  
The space between the blast tube and the boiler lining must be sealed with appropriate insulating material.



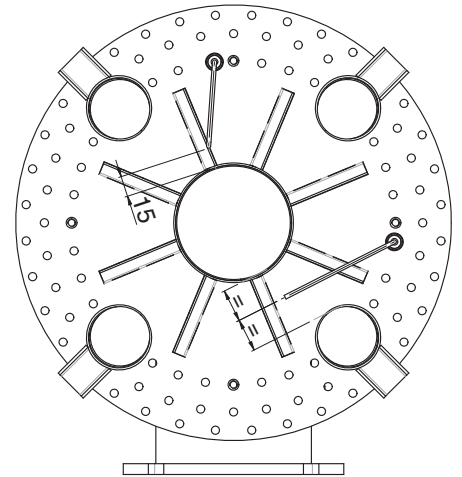
### BURNER LINING

#### 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



### MAIN SWITCH

0 - OFF

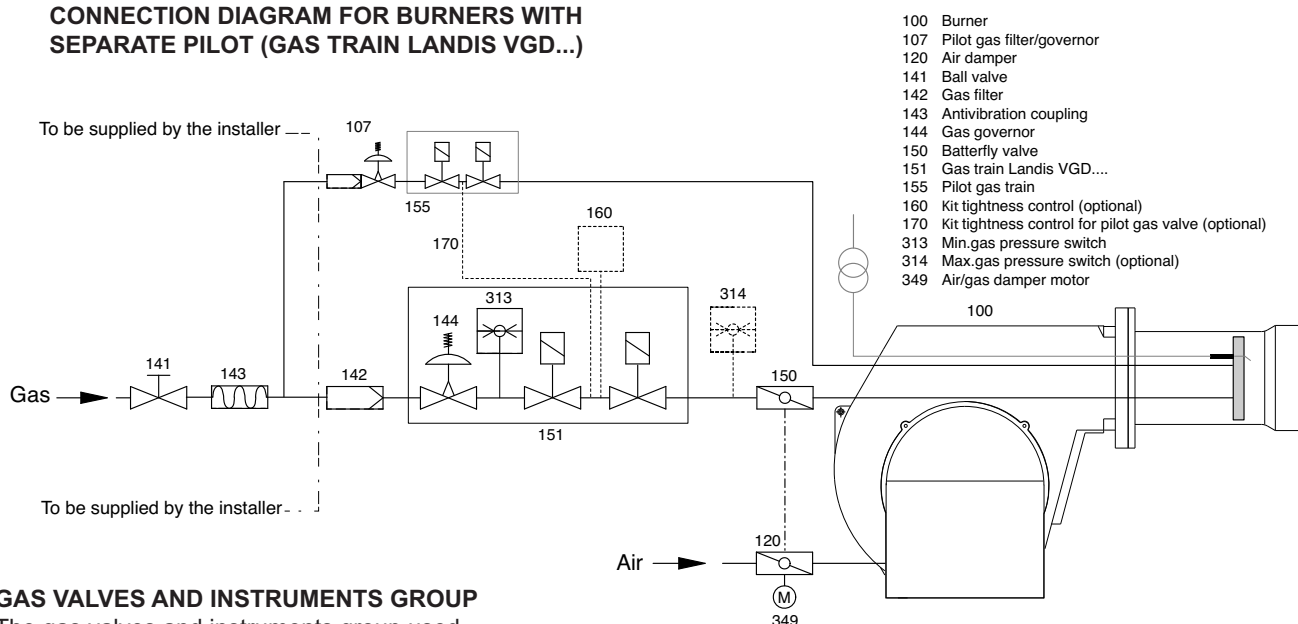
1 - ON



## INSTALLATION

### Gas line

#### CONNECTION DIAGRAM FOR BURNERS WITH SEPARATE PILOT (GAS TRAIN LANDIS 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

### Pilot gas train, kit and accessories connection - head loss diagram

#### PILOT GAS TRAIN CONNECTION

The pilot gas train is already installed to the burner and shall be connected to the main gas supply line preferably with flexible pipe. The pilot gas train is composed of n° 2 safety valves and n°1 gas governor and filter. Max inlet pressure 1 bar.

**WARNING:** Pilot gas train must be connected according to the drawing of the gas line.

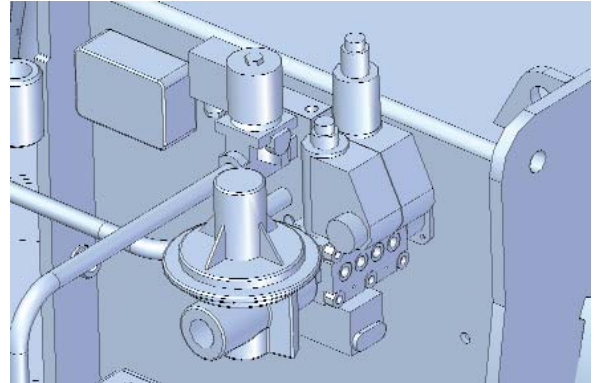
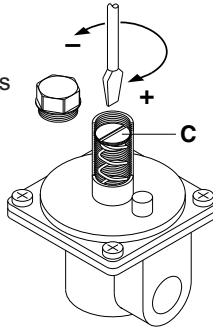
#### GAS VALVES ADJUSTMENT

**Note :** the pilot valves are pre-adjusted in the factory. To increase or reduce the gas flow act on the gas governor.

#### GAS GOVERNOR ADJUSTMENT

The gas governor, with built-in filter, must be installed so as to stabilise the outlet gas pressure and to avoid that eventual impurities reach the gas valve. To increase gas pressure, remove the cover of governor and turn screw C. Unscrew screw C to reduce pressure, then fit the cover.

**Note:** the inlet gas pressure must not be higher than the specified max. gas pressure.



#### KITTC- Tightness control

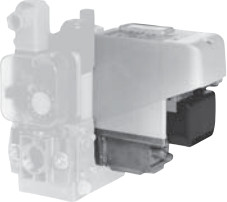
Tightness control is provided as a kit and shall be assembled into the main gas train according to the instructions of the gas train separate manual.

#### 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-RWF40 PID regulator

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

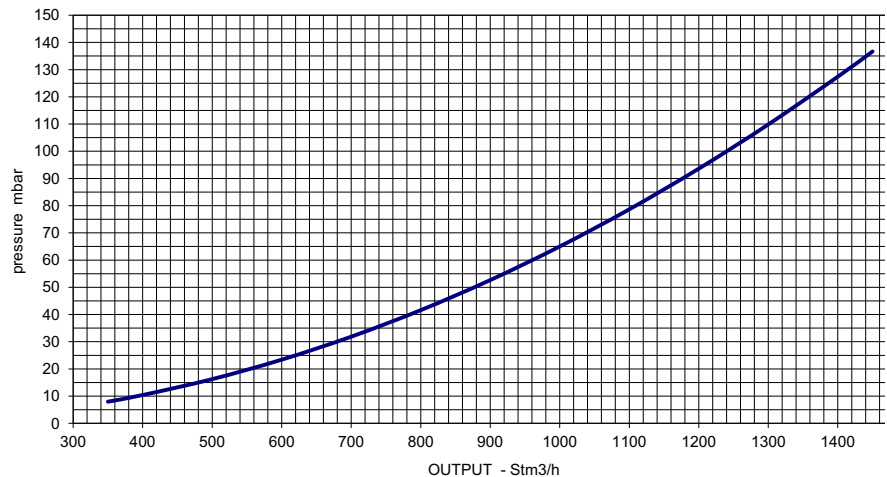
| Tightness control                                                                   | Modulation Kit                                                                       | Max Pressure switch                                                                   |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| KITTC- Model                                                                        | KITMD-RWF40                                                                          | KITPRES50                                                                             |
| Compulsory > 1200 kW                                                                | Probe-...                                                                            | KITPRES150                                                                            |
|  |  |  |

#### GAS PRESSURE LOSS DIAGRAM: combustion head - platform 630

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.



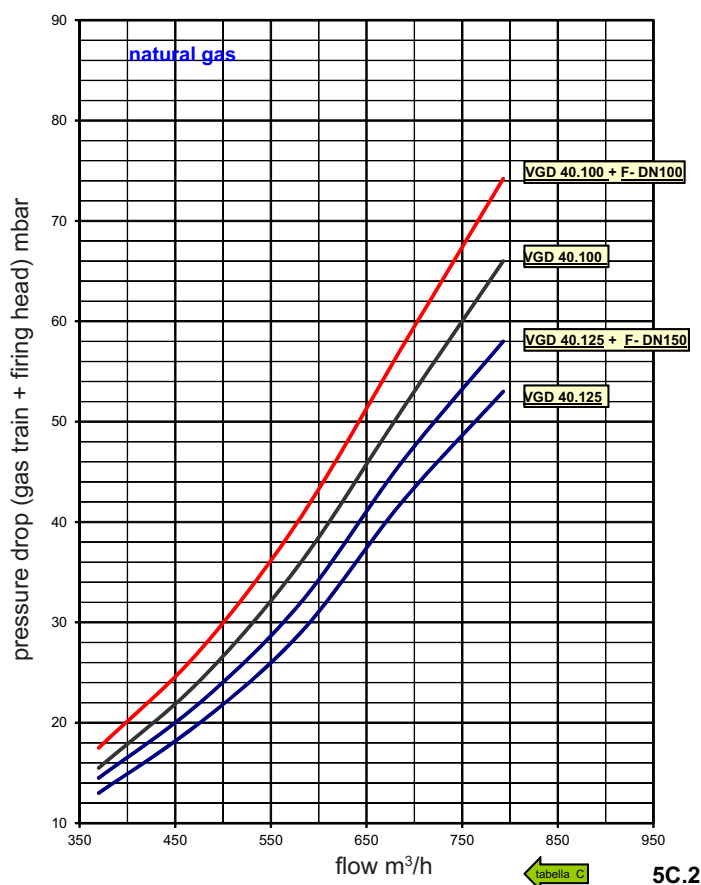
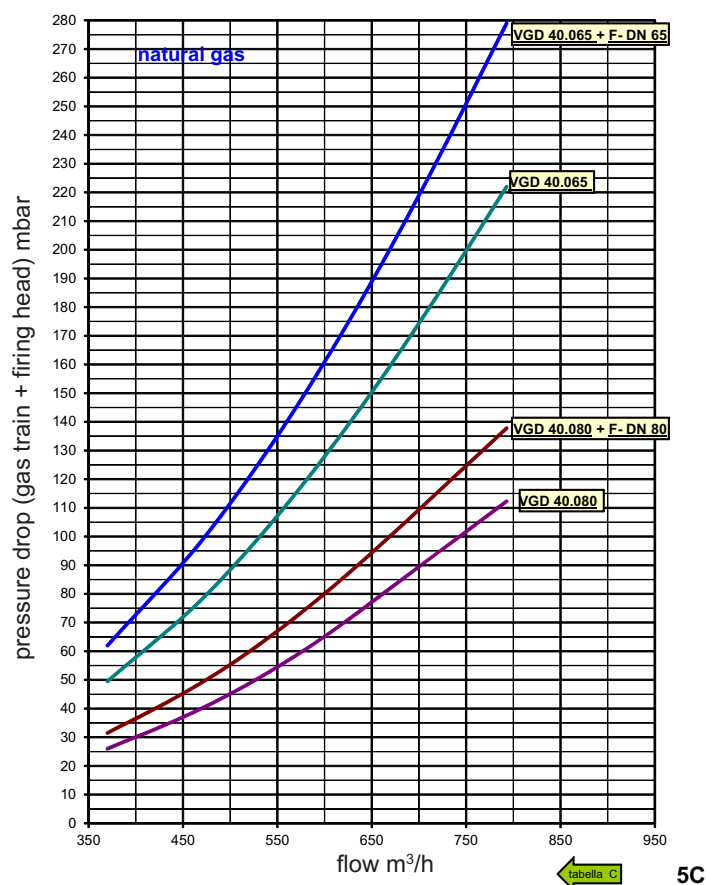
# INSTALLATION

## 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 7000.1 PR<br>MULTICALOR 700.1<br>MULTIFLAM 700.1 | VGD 40.125 | no                              | yellow       | 55                            | 700                           | 5C      |
|                                                      |            | FILTER DN 125                   |              | 60                            | 700                           |         |
|                                                      | VGD 40.100 | no                              | yellow       | 70                            | 700                           |         |
|                                                      |            | FILTER DN 100                   |              | 75                            | 700                           |         |
|                                                      | VGD 40.080 | no                              | yellow       | 115                           | 700                           | 5C.2    |
|                                                      |            | FILTER DN 80                    |              | 140                           | 700                           |         |
|                                                      | VGD 40.065 | no                              | yellow       | 225                           | 700                           |         |
|                                                      |            | FILTER DN 65                    |              | 280                           | 700                           |         |

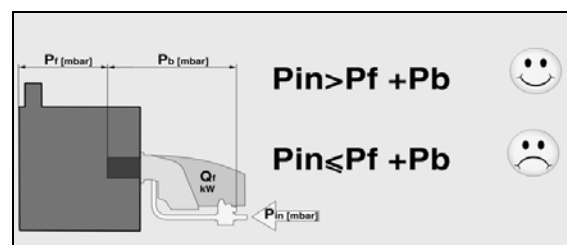


### LEGENDA

Pf: Back pressure of furnace

Pb: Pressure of burner (combustion head + complete gas train)

Pin: Minimum inlet pressure

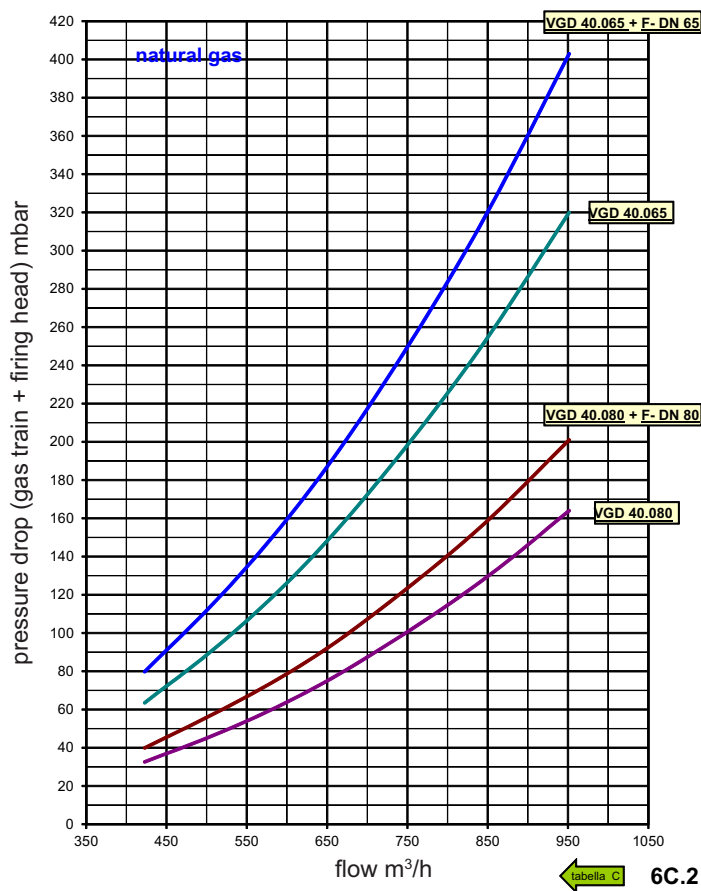
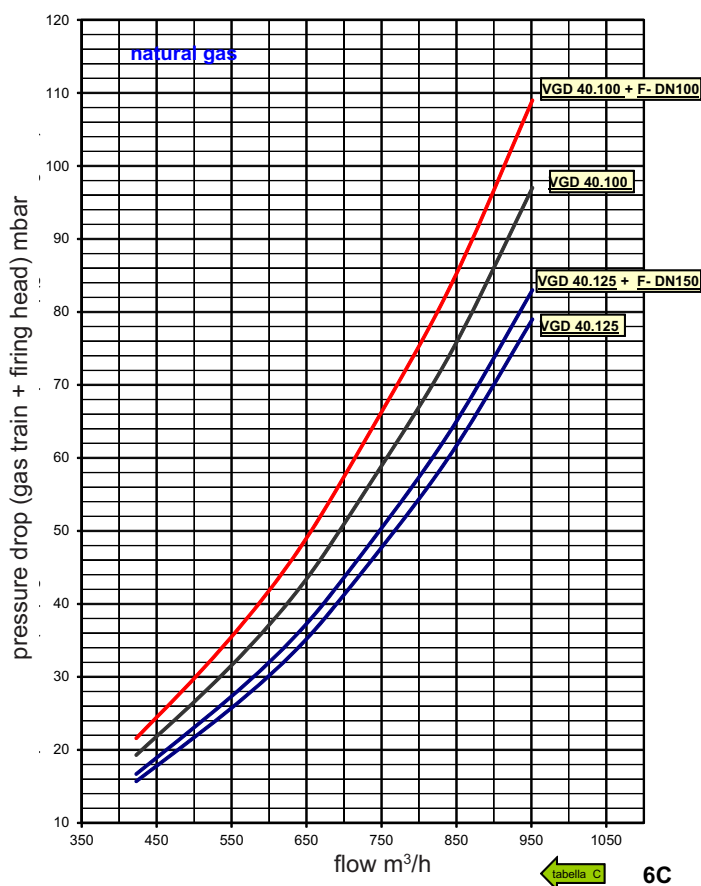


# INSTALLATION

## 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 8000.1 PR<br>MULTICALOR 800.1<br>MULTIFLAM 800.1 | VGD 40.125 | no                              | yellow       | 80                            | 700                           | 6C      |
|                                                      |            | FILTER DN 125                   |              | 85                            | 700                           |         |
|                                                      | VGD 40.100 | no                              | yellow       | 100                           | 700                           |         |
|                                                      |            | FILTER DN 100                   |              | 110                           | 700                           |         |
|                                                      | VGD 40.080 | no                              | yellow       | 170                           | 700                           | 6C.2    |
|                                                      |            | FILTER DN 80                    |              | 210                           | 700                           |         |
|                                                      | VGD 40.065 | no                              | yellow       | 320                           | 700                           |         |
|                                                      |            | FILTER DN 65                    |              | 410                           | 700                           |         |

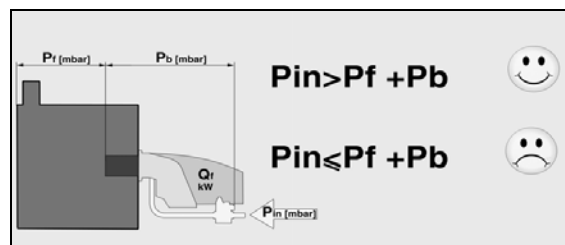


### LEGENDA

Pf: Back pressure of furnace

Pb: Pressure of burner (combustion head + complete gas train)

Pin: Minimum inlet pressure

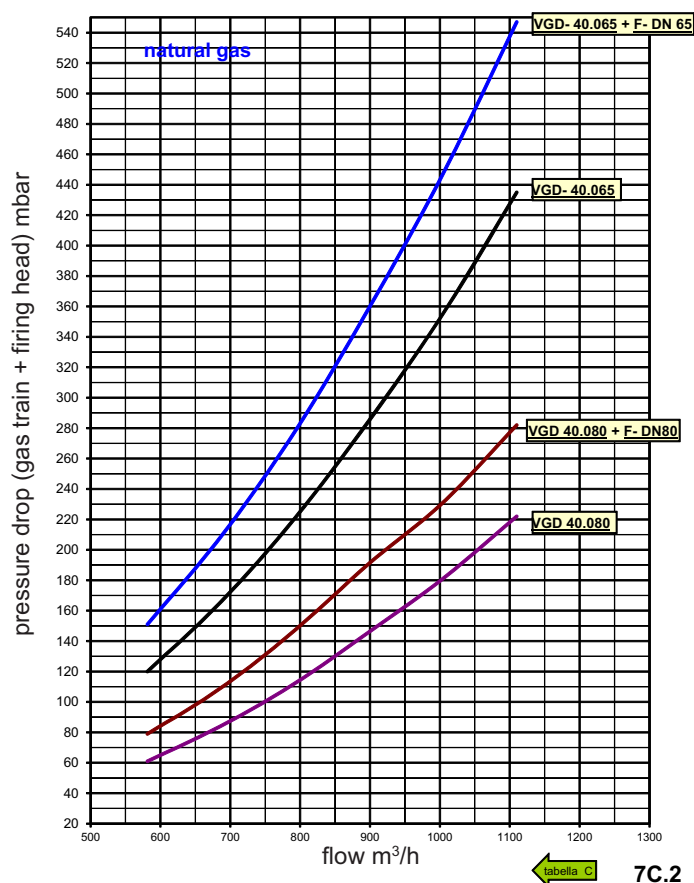
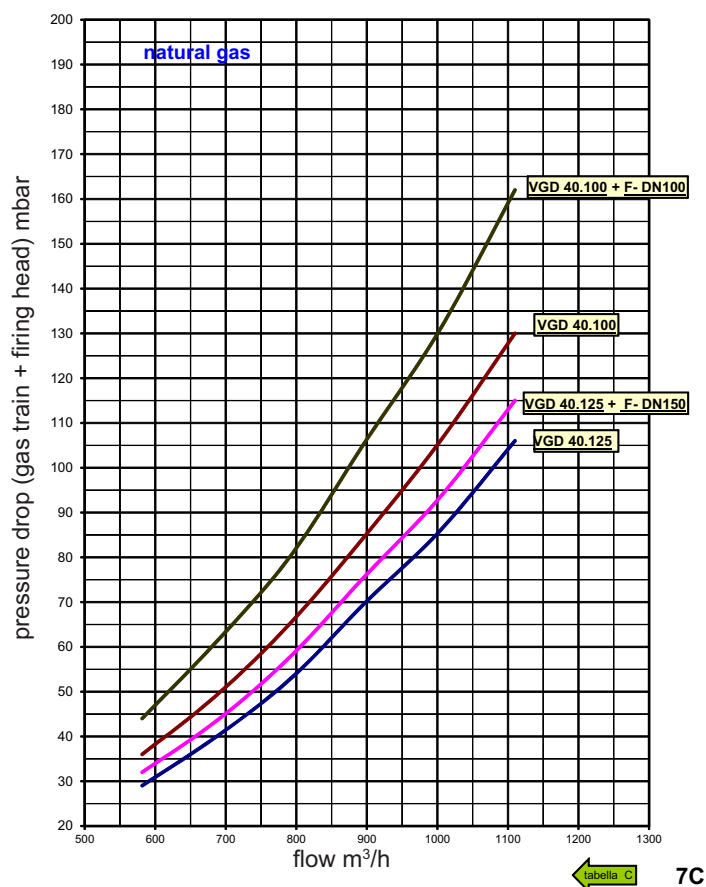


# INSTALLATION

## 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 10000.1 PR<br>MULTICALOR 1000.1<br>MULTIFLAM 1000.1 | VGD 40.125 | no                              | yellow       | 100                           | 700                           | 7C      |
|                                                         |            | FILTER DN 125                   |              | 115                           | 700                           |         |
|                                                         | VGD 40.100 | no                              | yellow       | 130                           | 700                           |         |
|                                                         |            | FILTER DN 100                   |              | 165                           | 700                           |         |
|                                                         | VGD 40.080 | no                              | yellow       | 230                           | 700                           | 7C.2    |
|                                                         |            | FILTER DN 80                    |              | 290                           | 700                           |         |
|                                                         | VGD 40.065 | no                              | yellow       | 440                           | 700                           |         |
|                                                         |            | FILTER DN 65                    |              | 550                           | 700                           |         |

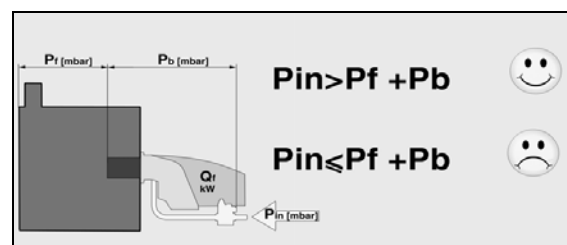


### LEGENDA

Pf: Back pressure of furnace

Pb: Pressure of burner (combustion head + complete gas train)

Pin: Minimum inlet pressure



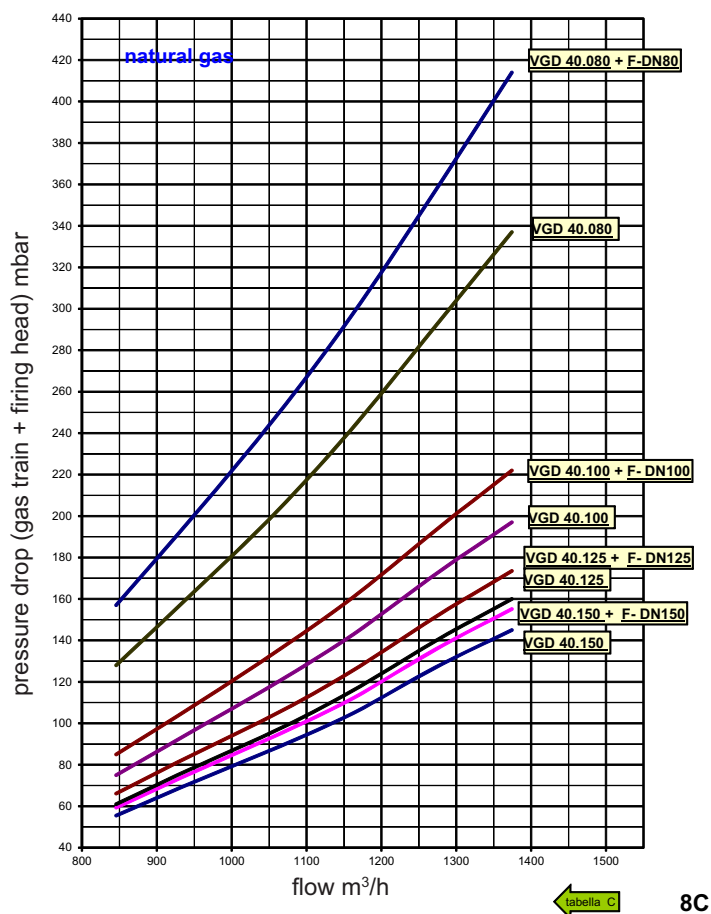
# INSTALLATION

## 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 12000.1 PR<br>MULTICALOR 1200.1<br>MULTIFLAM 1200.1 | VGD 40.150 | no                              | yellow       | 150                           | 700                           | 8C      |
|                                                         |            | FILTER DN 150                   |              | 160                           | 700                           |         |
|                                                         | VGD 40.125 | no                              | yellow       | 160                           | 700                           |         |
|                                                         |            | FILTER DN 125                   |              | 175                           | 700                           |         |
|                                                         | VGD 40.100 | no                              | yellow       | 200                           | 700                           |         |
|                                                         |            | FILTER DN 100                   |              | 230                           | 700                           |         |
|                                                         | VGD 40.080 | no                              | yellow       | 340                           | 700                           |         |
|                                                         |            | FILTER DN 80                    |              | 420                           | 700                           |         |



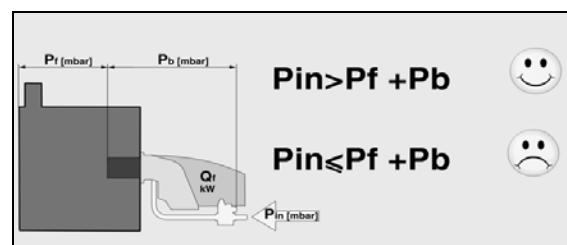
8C

### LEGENDA

Pf: Back pressure of furnace

Pb: Pressure of burner (combustion head + complete gas train)

Pin: Minimum inlet pressure



## Electrical connections



### APPLICABLE STANDARD

**GENERAL WARNINGS:**

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

## ELECTRICAL CONNECTION

1) of the burner

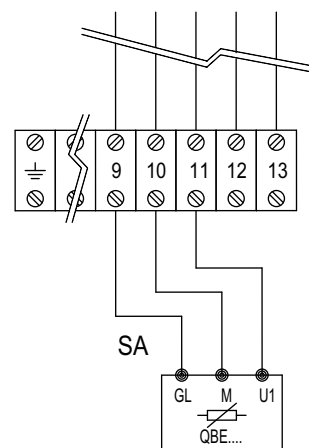
Check and adjust the size of the contactors and thermal relays and the wires section according to the motor and supply voltage specs.

**2) of the gas train**

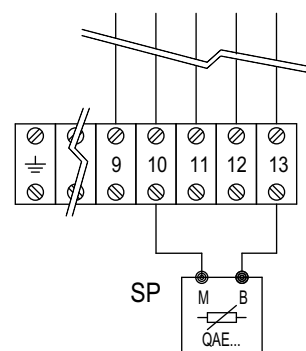
- Connect the plugs pending to the valve:  
either on the cabinet,  
or on the coupling case on the body of the  
burner.

## PROBES CONNECTION

### ACTIVE PROBE CONNECTION (FOR MODULATING VERSION)

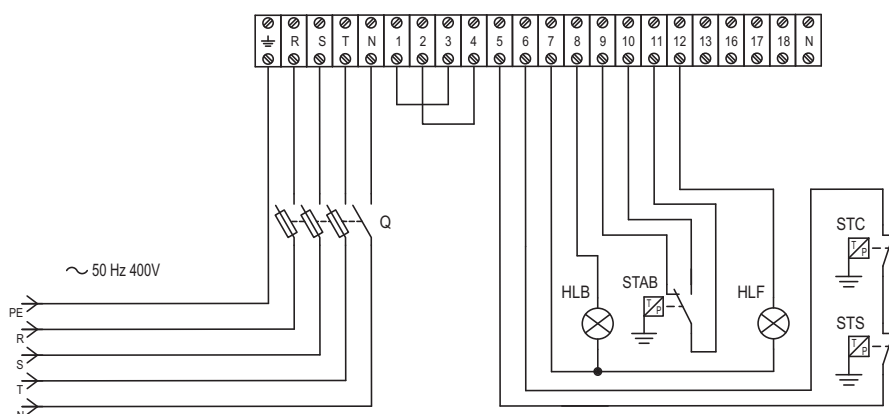


### PASSIVE PROBE CONNECTION (FOR MODULATING VERSION)



## 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



## START-UP: CHECKING PROCEDURE

### CHECKS BEFORE COMMISSIONING:

- That the burner is assembled in accordance with the instructions given here.
- 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 control box 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 gas 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 control box.

The burner will start according to the program flow of the 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 before the gas train 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. Shut-off upon trouble after expiry of safety period (see control box) or shut-off because of gas supply failure.
  7. The burner will either stop as the gas valves open (due to gas pressure decrease) or lock out at the end of the safety time.
- Unlock the 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 CO<sub>2</sub> and O<sub>2</sub> 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 (O<sub>2</sub>) content as low as possible and a carbon dioxide (CO<sub>2</sub>) 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<sub>F</sub>) 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.

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

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:

$$v_{BB} = v_{Bn} \frac{T}{273} = \frac{p_n}{p_{amb} + p_u} = 125 \frac{273+15}{273} \frac{1013,25}{980+100} = 123,9 \text{ m}^3/\text{h}$$

### Example:

|                               |                  |                         |
|-------------------------------|------------------|-------------------------|
| Nom. thermal output           | Q <sub>N</sub>   | 1000 kW                 |
| Boiler efficiency             | η <sub>K</sub>   | 0,88                    |
| Calorific value of gas        | H <sub>u</sub>   | 9,1 kWh/m <sup>3</sup>  |
| Gas pressure                  | p <sub>u</sub>   | 100 mbar                |
| Barometer reading             | p <sub>amb</sub> | 980 mbar                |
| Gas temperature relative      | t <sub>gas</sub> | 15°C                    |
| Gas temperature absolute      | T                | (t <sub>gas</sub> +273) |
| Standard atmospheric pressure | p <sub>n</sub>   | 1013 mbar               |

### Recommended combustion parameters

| Fuel        | Recommended (%) CO <sub>2</sub> | Recommended (%) O <sub>2</sub> |
|-------------|---------------------------------|--------------------------------|
| 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                      |

Ratio between O<sub>2</sub>- and CO<sub>2</sub>- for natural gas H (CO<sub>2</sub>max = 11,7%)

Ratio between O<sub>2</sub>- and CO<sub>2</sub>- for light oil EL (CO<sub>2</sub>max = 15,40%)

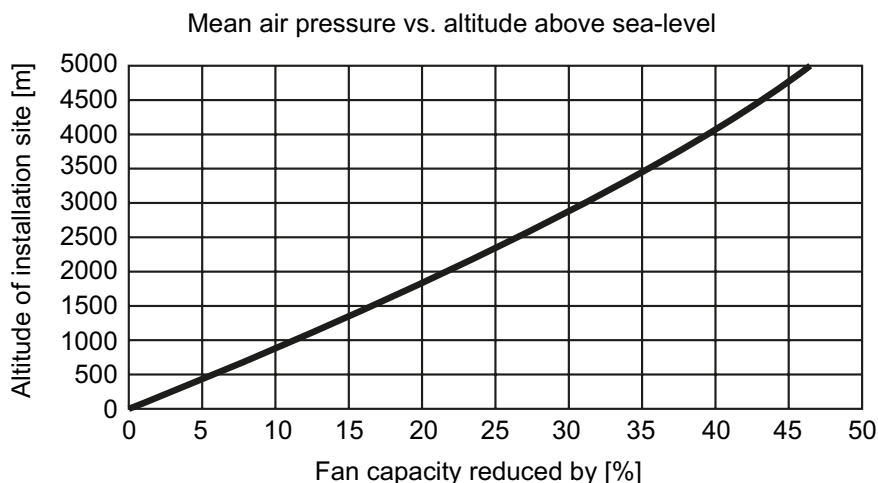
Ratio between O<sub>2</sub>- and CO<sub>2</sub>- for heavy oil S (CO<sub>2</sub>max = 15,60%)

$$O_2 = 21 \frac{CO_{2max} - CO_{2gem}}{CO_{2max}} = \%$$

CO<sub>2</sub> gem = % CO<sub>2</sub> measured on dry flue gases

**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.



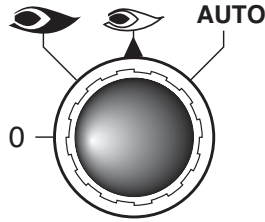
## START-UP

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



0 : operating elements locked in an intermediate position

: operation on maximum capacity

: operation on minimum capacity

AUTO : automatic operation



**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 pilot valves and starts the pilot flame.

After the flame stabilisation the control box opens the main valves and the burner goes in the low flame and the pilot switch off.

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

Gradually go step by step using the selector on position 0 to stop the flame, from the low flame to the high flame in order to have a stable flame.

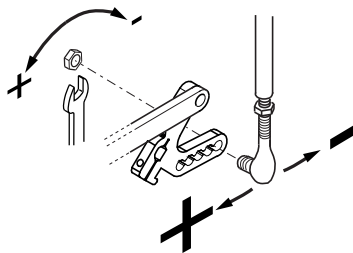
The flame stabilisation can be achieved by adjusting the gas flow on the gas train (REFER TO THE GAS TRAIN MANUAL)

When the servomotor arrive at 90° you have completed first tuning of air and gas flow according to the boiler capacity required.

Check the combustion values throughout servomotor stroke.

### Adjusting the maximum air flow rate

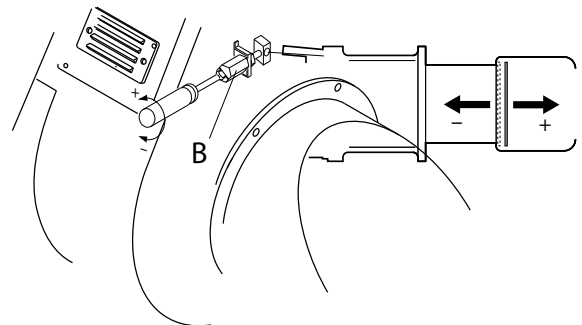
In order to adjust the maximum air flow rate see figure with selector in maximum operation. Loosen the nut holding the air damper transmission rod and correct air flow till you reach the combustion values suggested by reading the value on the combustion analyser. If you do not reach acceptable air flow rate you shall adjust the firing head. Move the head forward to increase air flow backwards to reduce.



### Firing head setting

The firing 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 SQM50 - Air damper motor pre-setting

The cams of the servomotor are set from the factory in order to start the burner and reach the maximum output.

The following setting are the standard one:

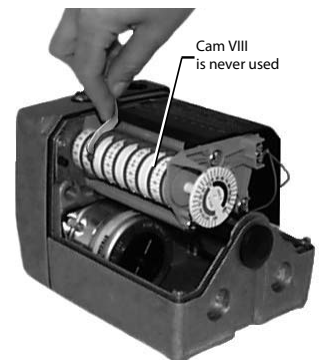
I. High flame position 90°

II. Air flap position in standby 0°

III. Ignition position gas 10°

IV. Low flame position gas 15° (can be modified depending on the minimum output of the boiler)

V. To VIII not used



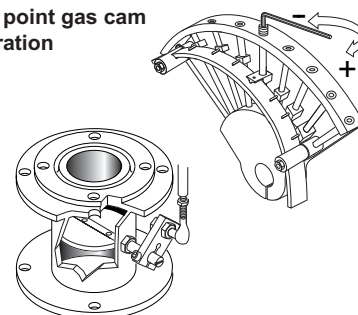
## START-UP

### Adjusting the intermediate burner capacity

In order to adjust intermediate capacity of the burner use the selector on position 0 to stop the stroke and regulate the cam on the different screw position. The adjustment shall be done according to the drawing in order to have the correct combustion value in each points "+/-" switch (different screw positions). Using a suitable Allen wrench, change the position of the cam guide blade; if you screw it down, the flow rate is reduced; if you unscrew it, the flow rate increases.

**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.

Point to point gas cam configuration



### 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.

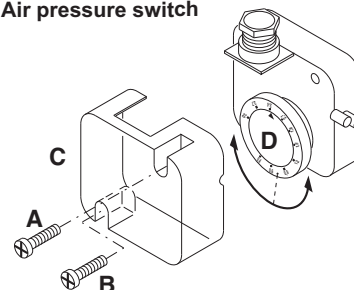
After the air and gas setting you have to calibrate the air switch with the burner working on the low flame by slowly turning the relative knob clockwise until the burner locks out. Read the value and then decrease it by 15%.

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

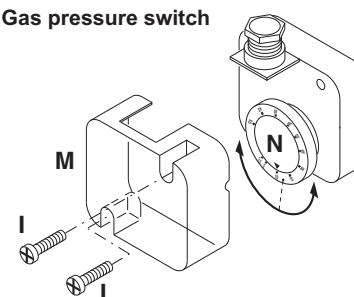
Start the burner and keep in low flame running, while checking that combustion is correct. Through a small cardboard, progressively obstruct the air intake until to obtain a CO<sub>2</sub> increase of 0,5÷0,8% or else, if a pressure gauge is available, connected to pressure port E, until reaching a pressure 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.

Air pressure switch



Gas pressure switch



**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.

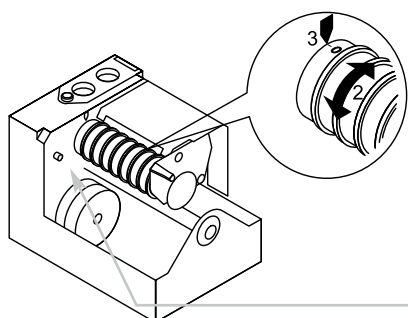
Unscrew off and remove cover M. - Set knob N to a value equal to 60% of gas nominal feed pressure (i.e. for natural gas nom. pressure = 20 mbar, set knob to a value of 12 mbar; for LPG nom. pressure of G30/G31- 30/37 mbar, set knob to a value of 18 mbar).

#### 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.

### Servomotor SQM50 - Final setting



Once the point to point gas cam setting has been completed we need to set the final minimum output of the burner using the servomotor cam IV (low flame gas). Using the suitable key regulate the grades ("+" switch). The low flame position must be higher than the ignition position cam on the servomotor. Turn the burner off and start it again in order to check if the burner start properly otherwise adjust the ignition gas cam number III.

GAS SETTING ENDED: switch the selector to automatic position.



**WARNING:** Do not use the button cam drum release button.

## MAINTENANCE PROGRAM

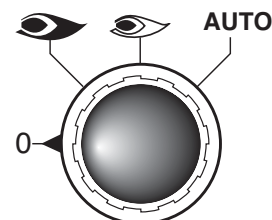
**!** Burner and boiler servicing must only be carried out by authorised and qualified personnel at least once a year. Depending on the type of installation, shorter maintenance intervals may be necessary. The system operator is advised to take out a maintenance contract to guarantee regular servicing.

**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

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 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 housing 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<br>EL | Heavy oil<br>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:  
CO<sub>2</sub> 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:

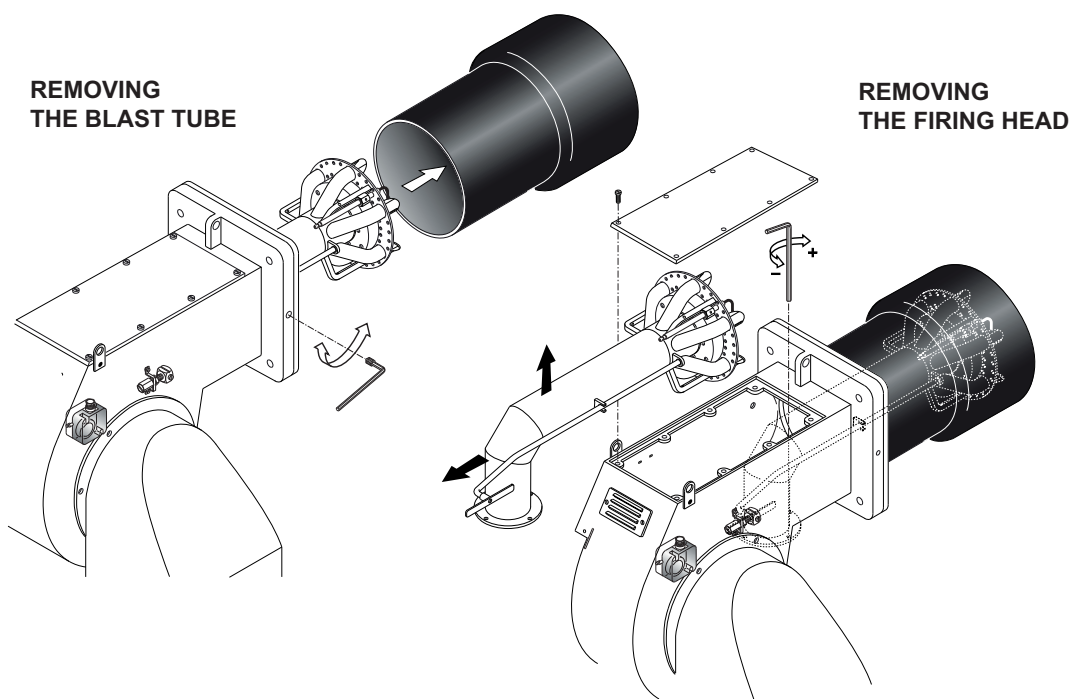
$$q_{Af} = (195-22) \left( \frac{0,37}{10,8} + 0,009 \right) = 7,48\%$$

Data measured in fuel oil mode:  
CO<sub>2</sub> 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:

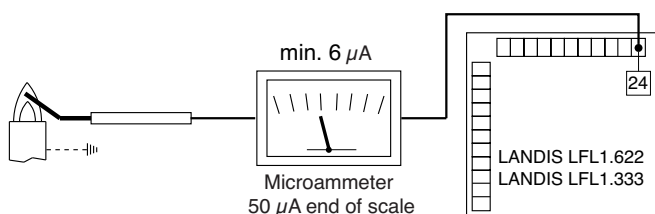
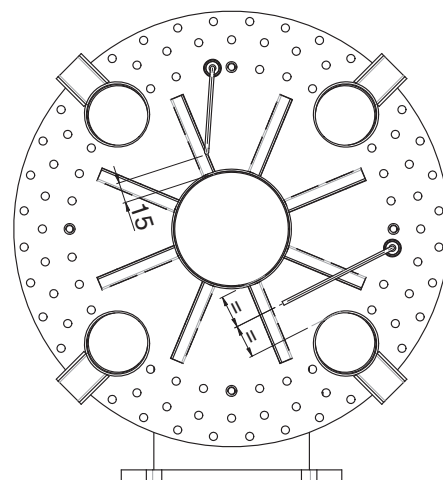
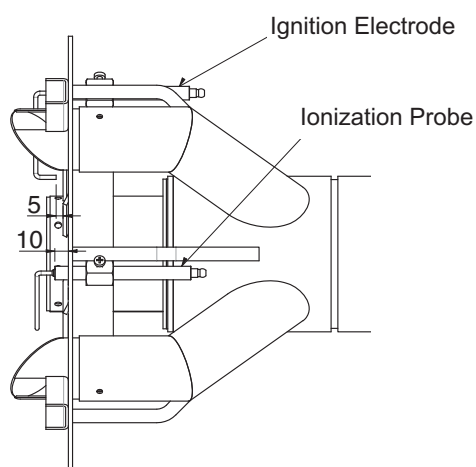
$$q_{Af} = (195-22) \left( \frac{0,49}{12,8} + 0,007 \right) = 7,83\%$$

## MAINTENANCE PROGRAM



### POSITION OF ELECTRODES

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

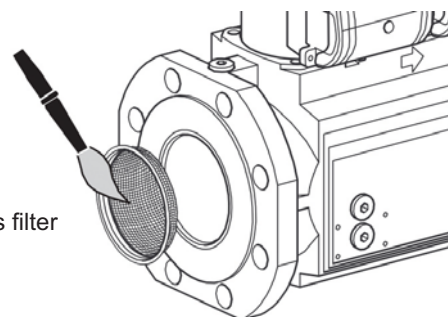


The ionization current is checked by inserting a microammeter with an end scale of  $50 \mu\text{A}$  (d.c.) in series with the ionization probe. A faulty position of the electrode can lead to a reduction in the ionization current and cause a safety shut off of the burner due to a flame detection failure. In this case, check the position of the electrode, its electric connection and the earthing of the burner. The ionization current is normally  $> 20 \mu\text{A}$ .

### GAS FILTER CLEANING - GAS PILOT FILTER CLEANING



Check and clean the gas filter in the pilot gas valve



## TROUBLESHOOTING INSTRUCTIONS

The list of faults/causes/possible solutions for a set of main failures is a guideline for professional personell authorised to carry out service and maintenance.

Irregular burner operation or malfunction: check that every adjustment parameter is correctly set as per instruction on this manual.

| TROUBLESHOOTING TABLE<br>GAS OPERATION   |                                                              |                                                                                        | Burner doesn't start | Burner starts with continuous pre-purge | Burner starts and then goes into lock-out | Pilot Ignition failure (1st safety time) | Main Ignition failure (2nd safety time) | Burner lock-out after flame appearance / pulsation | Flame control repeats the cycle and does not give consent | Combustion emission not satisfactory | Burner doesn't switch into Hi flame | Burner lock-out during operation | LFL |
|------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------|-----------------------------------------|-------------------------------------------|------------------------------------------|-----------------------------------------|----------------------------------------------------|-----------------------------------------------------------|--------------------------------------|-------------------------------------|----------------------------------|-----|
| STATUS                                   | CAUSES                                                       | REMEDIES                                                                               |                      |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  |     |
| PRE-START<br>(MISSING SIGNALS)           | Defective control box unit                                   | Replace control box unit                                                               | X                    |                                         | X                                         | X                                        | X                                       | X                                                  | X                                                         |                                      | X                                   | X                                | YES |
|                                          | No electrical power supply<br>Wrong electrical connections   | Check switches/contactors<br>Check connections                                         | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Air pressure switch not "closed"                             | Check contacts                                                                         | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Boiler thermostats open                                      | Check contacts                                                                         | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Fan motor overload intervention                              | Replace Fuse                                                                           | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Auxiliaries fuses interrupted                                | Replace Fuse                                                                           | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Servomotor [CLOSE] position switch not reach                 | Check servomotor settings                                                              | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Minimum gas pressure switch not close                        | Open manual ball valve, check pressure switch settings, contacts, replace if necessary | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
| LEAKAGE<br>CHECK                         | Leakage test successful - signals not arrive to control unit | Check contacts                                                                         | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Leakage Test failure (VPS / VDK)                             | Clean valves or replace leakage controller if necessary                                | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Leakage Test failure (LDU kit)                               | Check contacts, clean valves or replace leakage controller if necessary                | X                    |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
| SEQUENCE<br>START                        | Servomotor [OPEN] position switch not reach                  | Check servomotor settings                                                              |                      | X                                       |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Servomotor [MIN] position switch not reach                   | Check servomotor settings                                                              |                      | X                                       |                                           |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Extraneous light                                             | Eliminate light source                                                                 |                      |                                         | X                                         |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
| LACK<br>OF AIR                           | Air pressure switch fail to connect to Terminal 14           | Check contacts                                                                         |                      |                                         | X                                         |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Fan contaminated / dirty                                     | Clean fan                                                                              |                      |                                         | X                                         |                                          |                                         |                                                    |                                                           | X                                    |                                     | X                                | YES |
|                                          | Fan motor rotation direction not correct                     | Check direction and contactor                                                          |                      |                                         | X                                         |                                          |                                         |                                                    |                                                           | X                                    |                                     | X                                | YES |
| IGNITION & FLAME<br>STABILISATION PERIOD | Flame supervision circuit internal test failed               | Replace control unit                                                                   |                      |                                         | X                                         |                                          |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Pilot flame failure - Pilot gas valves not open              | Check valves contacts / replace if necessary                                           |                      |                                         |                                           | X                                        |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Pilot flame establish - weak flame signal                    | Check Ionisation or flame sensor<br>Replace if necessary                               |                      |                                         |                                           | X                                        |                                         |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Ignition transformer faulty                                  | Replace                                                                                |                      |                                         |                                           | X                                        | X                                       |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Ignition cable & electrodes defective                        | Replace                                                                                |                      |                                         |                                           | X                                        | X                                       |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Electrode bad position                                       | Check setting / replace if necessary                                                   |                      |                                         |                                           | X                                        | X                                       |                                                    |                                                           |                                      |                                     |                                  | YES |
|                                          | Main solenoid valve fails to open                            | Check contacts and clean valves<br>Replace valves if necessary                         |                      |                                         |                                           |                                          | X                                       |                                                    |                                                           |                                      |                                     |                                  | YES |
| COMBUSTION                               | Flame sensor signal failure                                  | Clean, re-position or replace if necessary                                             |                      |                                         | X                                         | X                                        | X                                       | X                                                  |                                                           |                                      |                                     | X                                | YES |
|                                          | Head adjustment not correct                                  | Check settings                                                                         |                      |                                         |                                           |                                          |                                         | X                                                  |                                                           | X                                    |                                     | X                                | YES |
|                                          | Gas / Air mixture setting not correct                        | Check settings                                                                         |                      |                                         |                                           |                                          |                                         | X                                                  |                                                           | X                                    |                                     | X                                | YES |
|                                          | Oscillating gas pressure                                     | Install damping throttle (AGA 25) - order separately or reduce supply pressure         |                      |                                         |                                           |                                          |                                         | X                                                  |                                                           | X                                    |                                     | X                                | YES |
|                                          | Capacity reduction due to lower gas supply pressure          | Check gas pressure, clean filter, replace cartridge if necessary                       |                      |                                         |                                           |                                          |                                         |                                                    |                                                           | X                                    |                                     |                                  | YES |
|                                          | Gas pressure regulator not regulating                        | Replace regulating valve                                                               |                      |                                         |                                           |                                          |                                         |                                                    |                                                           | X                                    |                                     |                                  | YES |
|                                          | Load control device does not close                           | Check load control, replace if necessary                                               |                      |                                         |                                           |                                          |                                         |                                                    |                                                           |                                      | X                                   | X                                | YES |

## 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.  
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

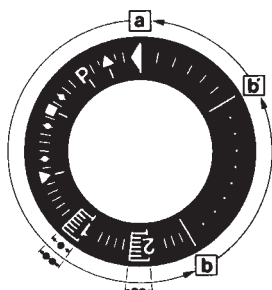
control box by pressing the fault eliminate key and start the burner.

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.

### Control program in the case of trouble and fault indicator LFL 1... / LGK 16...



LFL 1... / LGK 16...

a-b Starting program

**b-b'** In a number of time versions; idle steps of the program unit to self-stop after burner start-up (b' = operating position of program unit)

**b(b')-a** After-flushing program after regular stop. In the starting position "a" the program unit will automatically stop or initiate an immediate restart of the burner, e.g. after a fault has been eliminated

- Duration of the safety period for single-tube burners

- Duration of the safety period for burners with ignition gas valve

**Basically, any type of trouble will result in the immediate stop of the fuel supply.**

At the same time, the program unit and consequently the fault indicator will stop. The type of trouble can be identified by the symbol opposite to the reading mark of the indicator:

◀ **No start**, e.g. because the "CLOSED" signal from the "Air Damper CLOSED" limit switch is missing or a contact is not closed between terminals (12) and (4) or (4) and (5); or the contacts of all control and safety units in the controlled system are not closed (e.g. gas pressure or air pressure switches, temperature or pressure regulators).

▲ **Operating stop** because the "OPEN" signal from the "Air Damper OPEN" limit switch is missing.  
Check and adjust the limit switch concerned.

**P Shut-off on trouble because there is not air pressure** signal at the beginning of the air pressure check.

**Any air pressure failure after this time will also lead to a shut-off on trouble.**

■ **Shut-off on trouble** because of a fault in the flame monitoring circuit.

▼ **Operating stop** because the position signal of the "Partial Load" limit switch (air damper in "Partial Load" position) is not available on terminal (8). Check and adjust the limit switch concerned.

**1 Shut-off on trouble** because a flame signal is not available on the expiry of the (1st) safety time.

**Any failure of the flame signal on the expiry of the safety time will also lead to a shut-off on trouble.**

**2 Shut-off on trouble** because the flame signal has not occurred on the expiry of the (2nd) safety time (flame signal of main flame with burners having an ignition gas valve).

| **Shut-off on trouble** because the flame signal failed during burner operation or a lack of air has occurred.

◀ **Shut-off on trouble** during or after the control program flow due to external light (e.g. by flame not extinguished, leaking fuel valves) or a faulty flame signal (e.g. fault in flame monitoring circuit, or similar); see flame monitor.

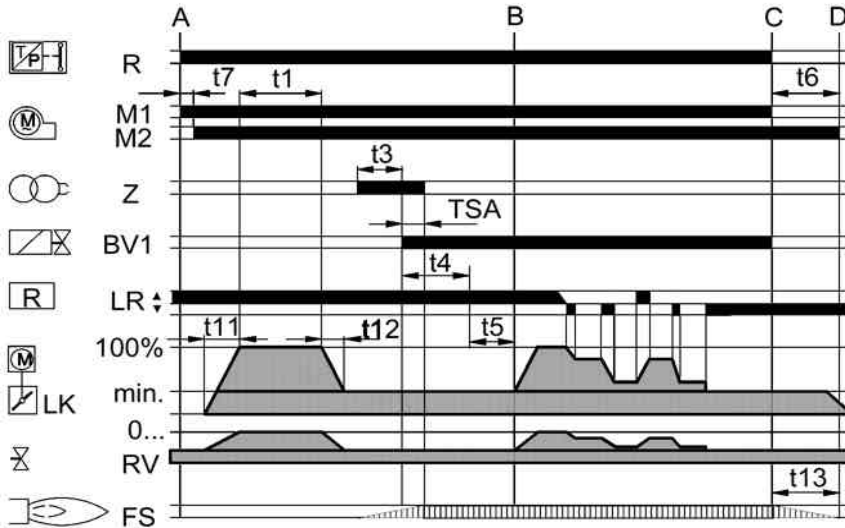
**If the shut-off on trouble occurs at any other time between start and pre-ignition that is not identified by a symbol as above, this will normally be due to an early flame signal which is considered to be a faulty flame signal.**

**The control box may be unlocked** immediately after a shut-off on trouble using the unlock button with integrated fault signal lamp or an external switch. After it has been unlocked (and after a defect with resultant operating stop has been eliminated and after a voltage failure), the program unit will in any case return to its starting position with voltage being only supplied to terminals 7, 9, 10 and 11 as preset by the control program. It is only at this stage that the program of the control box will restart the burner.

## APPENDIX

### Control box - Damper actuators

#### CONTROL BOX LFL 1.../LGK...



R: Temperature or pressure controller  
M: Fan motor  
Z: Ignition transformer  
BV: Fuel valve(s)

LR: Load regulator  
LK: Air damper  
RV: Steadily adjustable fuel valve  
FS: Signal of flame

The LFL 1.../LGK... type controller is designed to control and monitor burners working according to a stepwise or modulating principle. A detailed functional description with technical data and project planning information with respect to the automatic combustion controllers can be found in the annex and in the documents: LFL 1...-7451/LGK...

Functional diagram  
LFL 1.../LGK...

A: Starting type interval  
A-B: Flame development interval  
B: Burner has reached operating position  
B-C: Burner operation (heat generation)  
C-D: Regular shut-off  
t1: Pre-ventilating time  
t2: Safety time  
t3: Pre-ignition time  
t4: Fuel valve enable  
t5: Load regulator enable  
t11: "OPEN" run time of air damper  
t12: "CLOSE" run time of air damper

#### DAMPER ACTUATORS SQM50...

##### Description

The SQM actuator is intended for use with two-stage sliding or modulating oil, gas or dual-fuel burners. The reversible actuator is fitted with a synchronous motor which drives a shaft via a gearbox. The shaft end carries a coupling to drive the fuel and combustion air controlling element.

The SQM actuator has been designed for dual-wire control by controller or switching units with change-over contacts.

Potentiometers can be installed for a range of applications on customer's request.

The limit and auxiliary switches are set by means of manually adjustable latching cam plates. Scales are fitted between the disks to facilitate the selection of the switching points.

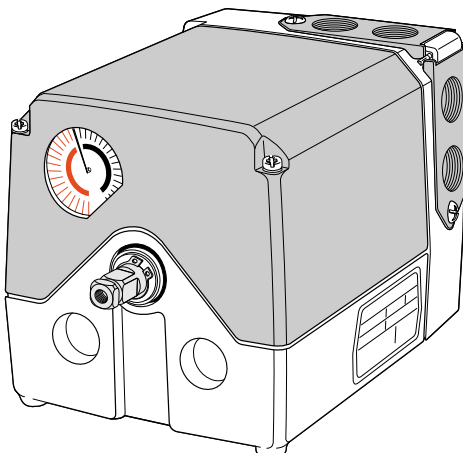
The cam plates are provided with a small pointer for indicating the switching point of a scale between the setting ranges.

An additional scale fitted to the end of the cam roller serves to indicate the position of the actuator.

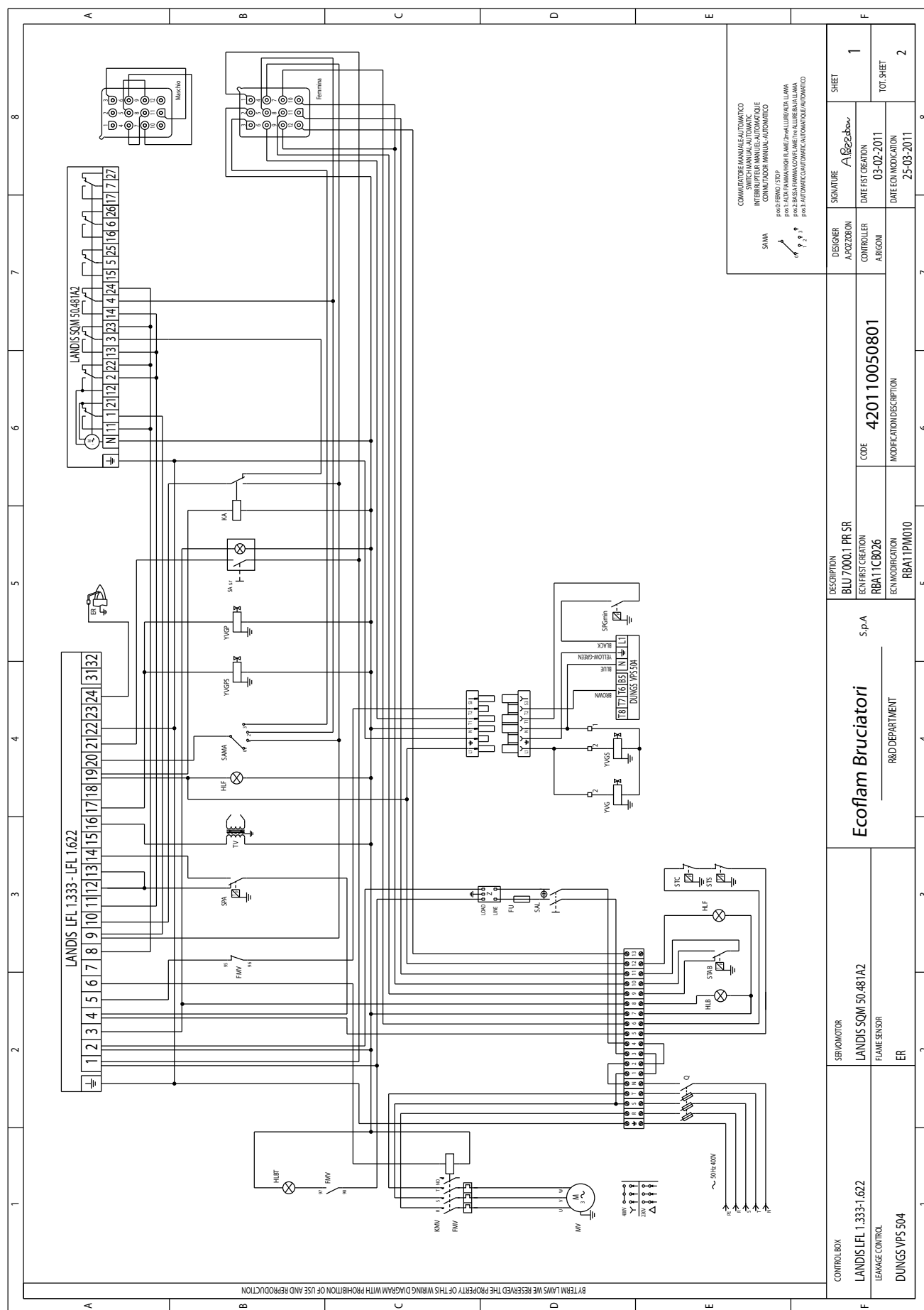
The drive unit may be disconnected from the controlling element by changing over a rocker arm mounted to the gearbox.

This will allow any desired position of the controller plate to be selected by hand. Drive and output will be coupled in the vertical position of the rocker arm.

The fuel-air curve should be set over the full range of the cam plate so that operating safety will be retained also when the limit switch is overrun.



## Electrical diagrams

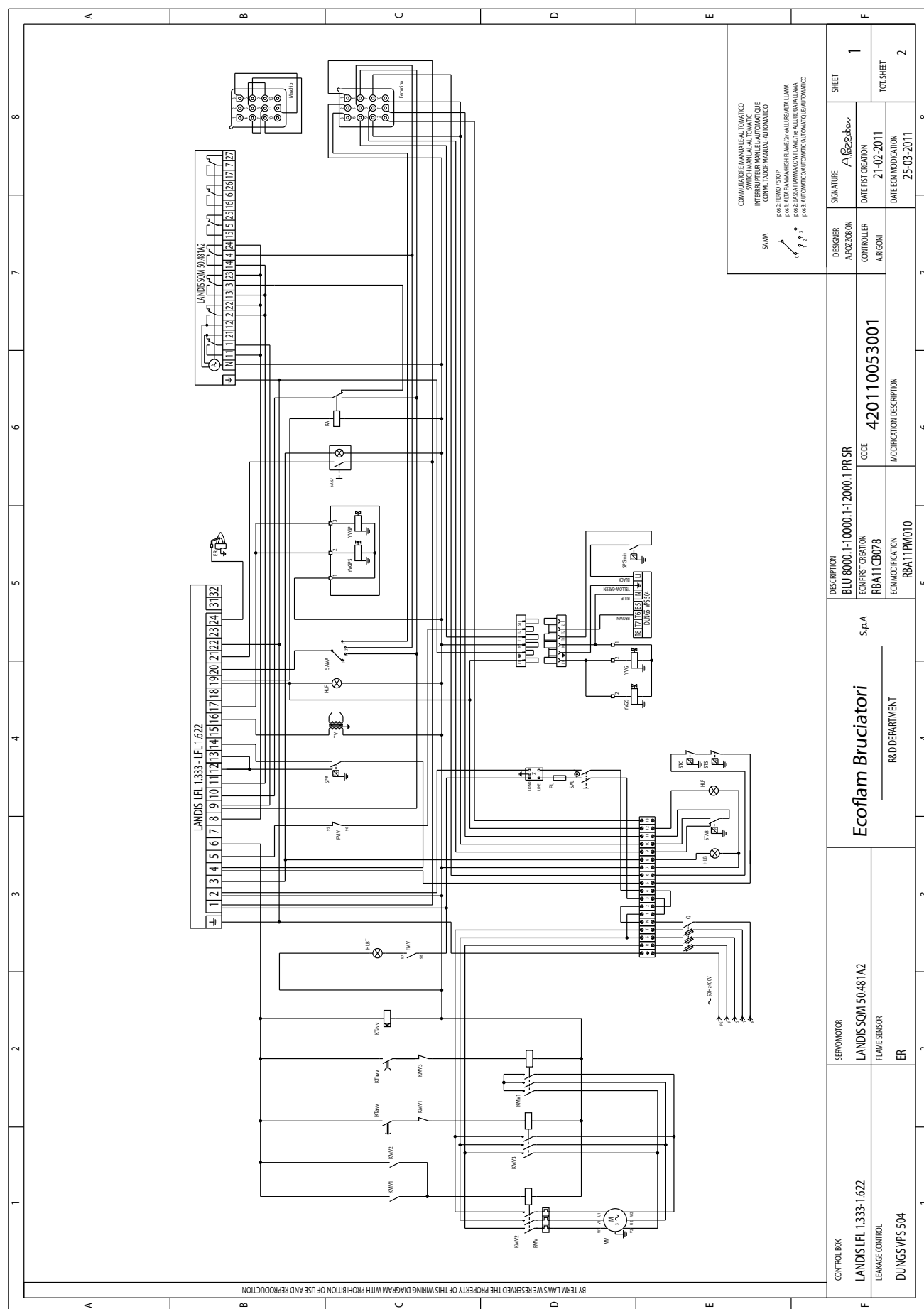


## Electrical diagrams



# APPENDIX

## Electrical diagrams



# APPENDIX

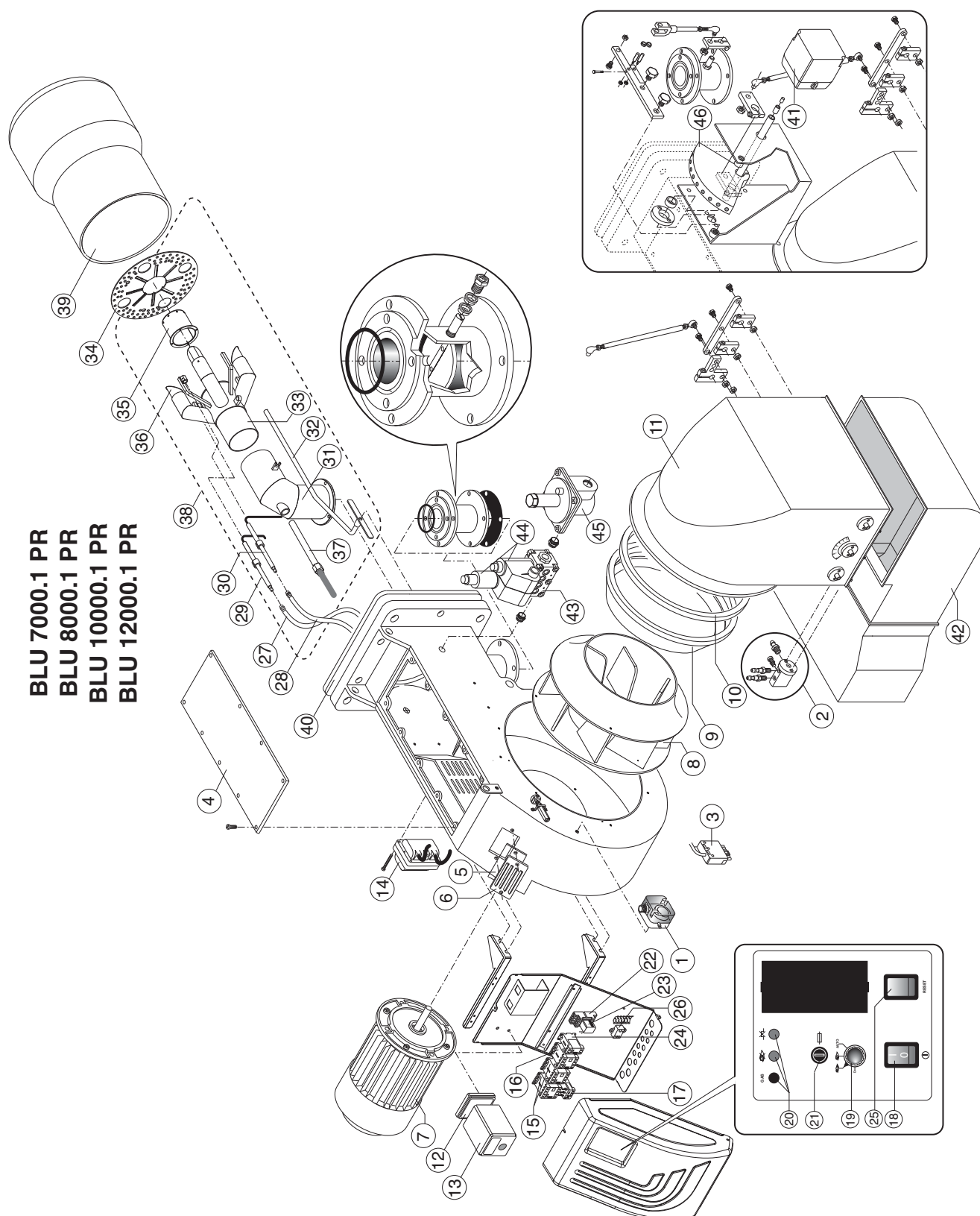
## Electrical diagrams

| 1    | 2                                                                                                                                          | 3      | 4                                                                                                                                                                | 5 | 6 | 7 | 8 |
|------|--------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|
| Q    | INTERRUTTORE GENERALE CON FUSIBILE<br>MAIN SWITCH WITH FUSE<br>INTERRUPTEUR GENERAL AVEC FUSIBLE<br>CONMUTADOR GENERAL CON FUSIBLE         | SAMA   | COMMUTATORE MANUALE AUTOMATICO<br>SWITCH (MANUAL-AUTOMATIC)<br>INTERRUPTEUR MANUEL-AUTOMATIQUE<br>CONMUTADOR MANUAL-AUTOMATICO                                   |   |   |   |   |
| Z    | FILTRO ANTIDISTURBO<br>ANTI-JAMMING FILTER<br>FILTRE ANTIPARASITES<br>FILTRO DE PROTECCION ANTIDISTURBO                                    | STAB   | TERMOSTATO DI ALTA/BASSA FIAMMA<br>HIGH-LOW FLAME THERMOSTAT<br>THERMOSTAT GRANDE-PETITE ALLURE<br>THERMOSTATO DE ALTA-BAJA LLAMA                                |   |   |   |   |
| FU   | FUSIBILE<br>FUSE<br>FUSIBLE                                                                                                                | YVG    | ELETTROVALVOLA GAS DI PRIMA FIAMMA<br>FIRST STAGE GAS SOLENOID VALVE<br>ELECTROVALVE GAZ PETITE ALLURE<br>ELECTROVALVULA GAS DE PRIMERA FLAMA                    |   |   |   |   |
| MV   | MOTORE VENTILATORE<br>MOTOR FAN<br>MOTEUR VENTILATEUR<br>MOTOR VENTILADOR                                                                  | YVGS   | ELETTROVALVOLA GAS DI SICUREZZA<br>EXTRA SAFETY GAS SOLENOID VALVE<br>ELECTROVALVE GAZ DE SECURITE<br>ELECTROVALVULA GAS DE SEGURIDAD                            |   |   |   |   |
| TV   | TRASFORMATORE<br>IGNITION TRANSFORMER<br>TRANSFORMATEUR D'ALLUMAGE<br>TRANSFORMADOR                                                        | SPGmin | PRESSOSTATO GAS DI MINIMA<br>GAS PRESSURE SWITCH MIN<br>PRESSOSTAT GAZ PRESSION MIN<br>PRESOSTATO GAS DE MINIMA POT.                                             |   |   |   |   |
| ER   | ELETTRODO DI RIVELAZIONE<br>IONISATION PROBE<br>ELECTRODE D'IONISATION<br>ELECTRODO DE INYECCION                                           | HLF    | LAMPADA DI FUNZIONAMENTO<br>WORKING LAMP<br>LAMPE DE FONCTIONNEMENT<br>ESPIA DE FUNCIONAMIENTO                                                                   |   |   |   |   |
| FMV  | RELE TERMICO MOTORE VENTILATORE<br>MOTOR THERMAL RELAY (FAN MOTOR)<br>RELAIS THERMIQUE MOTEUR VENTILATEUR<br>RELE TERMICO MOTOR VENTILADOR | KA     | RELE<br>RELAY<br>RELAYS<br>RELE                                                                                                                                  |   |   |   |   |
| HLB  | LAMPADA DI BLOCCO<br>LOCK-OUT LAMP<br>LAMPE DE SECURITE<br>ESPIA DE BLOQUEO                                                                | YVGP   | ELETTROVALVOLA GAS PILOTA<br>PILOT FLAME SOLENOID GAS VALVE<br>ELECTROVALVE GAZ PILOTE<br>ELECTROVALVULA GAS PILOTO                                              |   |   |   |   |
| KM1  | CONTORE DI STELLA<br>STAR CONTACTOR<br>CONTACTEUR DETOILE<br>CONTACTOR DE ESTRELLA                                                         | YVGPS  | ELETTROVALVOLA GAS PILOTA DI SICUREZZA<br>EXTRA SAFETY PILOT SOLENOID GAS VALVE<br>ELECTROVALVE GAZ PILOTE DE SECURITE<br>ELECTROVALVULA GAS PILOTO DE SEGURIDAD |   |   |   |   |
| KM2  | CONTORE MOTORE VENTILATORE<br>REMOTE CONTROL SWITCH (FAN MOTOR)<br>CONTACTEUR MOTEUR VENTILATEUR<br>TELEINTERRUPTOR MOTOR VENTILADOR       | SAst   | PULSANTE DI SBLOCCO APPA RECCHIATURA<br>RESET LOCK OUT BUTTON<br>BOUTON DE DEBLOCAGE DU COFFRE DE SECURITE<br>REARME DE LA CENTRALITA                            |   |   |   |   |
| KM3  | CONTORE DI TRIANGOLO<br>DELTA CONTACTOR<br>CONTACTEUR TRIANGLE<br>CONTACTOR DE TRIANGULO                                                   | KTbnc  | TEMPORIZZATORE<br>TIMER<br>TEMPORISATEUR<br>TEMPORIZADOR                                                                                                         |   |   |   |   |
| SAL  | INTERRUTTORE DI LINEA<br>WORKING SWITCH<br>INTERRUPTEUR DE LIGNE<br>INTERRUPTOR DE LINEA                                                   |        |                                                                                                                                                                  |   |   |   |   |
| SPA  | PRESOSTATO ARIA<br>AIR PRESSURE SWITCH<br>PRESOSTAT AIR<br>PRESOSTATO AIRE                                                                 |        |                                                                                                                                                                  |   |   |   |   |
| STC  | TERMOSTATO CALDRIA<br>BOILER THERMOSTAT<br>THERMOSTAT CHAUDIERE<br>THERMOSTATO CALDERA                                                     |        |                                                                                                                                                                  |   |   |   |   |
| STS  | TERMOSTATO DI SICUREZZA<br>SAFETY THERMOSTAT<br>THERMOSTAT DE SECURITE<br>THERMOSTATO DE SEGURIDAD                                         |        |                                                                                                                                                                  |   |   |   |   |
| HLBT | LAMPADA DI BLOCCO TERMICO<br>THERMAL LOCK-OUT LAMP<br>LAMPE DE THERMAL DE SECURITE<br>ESPIA DE BLOQUEO RELE TERMICO                        |        |                                                                                                                                                                  |   |   |   |   |

|                                                                                                       |   |   |   |   |   |  |  |
|-------------------------------------------------------------------------------------------------------|---|---|---|---|---|--|--|
| BY TEAM LAMS WE RESERVED THE PROPERTY OF THIS WIRING DIAGRAM WITH PROHIBITION OF USE AND REPRODUCTION |   |   |   |   |   |  |  |
| A                                                                                                     | B | C | D | E | F |  |  |
|                                                                                                       |   |   |   |   |   |  |  |

## APPENDIX

## Spare parts list



## APPENDIX

### Spare parts list

| N° | DESCRIPTION                 |                        | BLU 7000.1 PR<br>code | BLU 8000.1 PR<br>code |
|----|-----------------------------|------------------------|-----------------------|-----------------------|
| 1  | AIR PRESSURE SWITCH         | DUNGS LGW 10 A4        | 65323033              | 65323033              |
| 2  | AIR INTAKE SET              |                        | 65322346              | 65322346              |
| 3  | WIELAND PLUG                | 6 pin                  | 65322072              | 65322072              |
| 4  | COVER                       |                        | 65324059              | 65324059              |
| 5  | GLASS                       |                        | 65320487              | 65320487              |
| 6  | PEED WINDOM FRAME           |                        | 65320488              | 65320488              |
| 7  | MOTOR                       | 15 kW                  | 65325246              | -                     |
|    |                             | 18,5 kW                | -                     | 65325248              |
| 8  | FAN                         | RU-560 M.D.42 15 kW    | 65321805              | -                     |
|    |                             | RU-560 M.D.42 18,5 kW  | -                     | 65324063              |
| 9  | AIR CONVEYOR                |                        | 65320648              | 65320648              |
| 10 | RING                        |                        | 65320646              | 65320646              |
| 11 | AIR INTAKE                  |                        | 65324065              | 65324065              |
| 12 | CONTROL BOX BASE            | LANDIS                 | 65320091              | 65320091              |
| 13 | CONTROL BOX                 | LANDIS LFL1.333        | 65320031              | 65320031              |
| 14 | IGNITION TRANSFORMER        | COFI 820 PM            | 65323227              | 65323227              |
| 15 | REMOTE CONTROL SWITCH       | BF3800A230             | 65323127              | -                     |
|    |                             | AEG LS15K.00           | -                     | 65323136              |
| 16 | REMOTE CONTROL SWITCH       | AEG LS11K.00           | -                     | 65323135              |
| 17 | MOTOR THERMAL RELAY         | RF383200 24-32A        | 65323104              | -                     |
|    |                             | AEG 21-26A             | -                     | 65324066              |
| 18 | MAIN SWITCH                 | cod.401001509          | 65323064              | 65323064              |
| 19 | MANUAL / AUTOMATIC SELECTOR |                        | 65323067              | 65323067              |
| 20 | LAMP                        | Elettrospring EL/N-SC4 | 65322053              | 65322053              |
| 21 | FUSE SUPPORT                | FUSIT FH-B528          | 65322181              | 65322181              |
| 22 | RELAY BASE                  | Finder 5532            | 65323149              | 65323149              |
| 23 | RELAY                       | Finder 5532            | 65323139              | 65323139              |
| 24 | TIMER                       | AEG GMETV              | -                     | 65324073              |
| 25 | RESET BUTTON                | C5559AL                | 65324068              | 65324068              |
| 26 | ANTI JAMMING FILTER         |                        | 65323170              | 65323170              |
| 27 | IGNITION CABLE              | TC                     | 65320948              | 65320948              |
| 28 | IONIZATION CABLE            | TC                     | 65322003              | 65322003              |
| 29 | IGNITION ELECTRODE          |                        | 65320909              | 65320909              |
| 30 | IONIZATION PROBE            |                        | 65320899              | 65320899              |
| 31 | PIPE                        | TC                     | 65321671              | 65321671              |
| 32 | ROD                         | TC                     | 65320247              | 65320247              |
| 33 | FIRING HEAD                 |                        | 65321670              | 65321670              |
| 34 | DISC                        |                        | 65324074              | 65324074              |
| 35 | FRONT PIPE                  |                        | 65321611              | 65321611              |
| 36 | DIFFUSER                    |                        | 65321672              | 65321672              |
| 37 | IGNITION GAS PIPE           |                        | 65321673              | 65321673              |
| 38 | INNER ASSEMBLY              | TC                     | 65325366              | 65325366              |
| 39 | BLAST TUBE                  | TC                     | 65324069              | 65324069              |
| 40 | GASKET                      |                        | 65321136              | 65321136              |
| 41 | AIR DAMPER MOTOR            | SQM50.481A2            | 65322902              | 65322902              |
| 42 | SILENCER                    |                        | 65324071              | 65324071              |
| 43 | GAS VALVE                   | KROMSCH.VCS 125R-LW    | 65324722              | 65324722              |
| 44 | COIL                        | KROMSCH.VCS 125R-LW    | 65324623              | 65324623              |
| 45 | GAS GOVERNOR/FILTER         | 1/2 FG1B 25            | 65325214              | 65325214              |
| 46 | GAS CAM GROUP               |                        | 65322355              | 65322355              |

TC = SHORT HEAD TL = LONG HEAD

## APPENDIX

### Spare parts list

| N° | DESCRIPTION                 |                        | BLU 10000.1 PR<br>code | BLU 12000.1 PR<br>code |
|----|-----------------------------|------------------------|------------------------|------------------------|
| 1  | AIR PRESSURE SWITCH         | DUNGS LGW10 A4         | 65323033               | 65323033               |
| 2  | AIR INTAKE SET              |                        | 65322346               | 65322346               |
| 3  | WIELAND PLUG                | 6 pin                  | 65322072               | 65322072               |
| 4  | COVER                       |                        | 65324059               | 65324059               |
| 5  | GLASS                       |                        | 65320487               | 65320487               |
| 6  | PEED WINDOM FRAME           |                        | 65320488               | 65320488               |
| 7  | MOTOR                       | 22 kW                  | 65324061               | -                      |
|    |                             | 37 kW                  | -                      | 65324062               |
| 8  | FAN                         | RG-630 M.D.48          | 65321803               | -                      |
|    |                             | RG-630 M.D.55          | -                      | 65321804               |
| 9  | AIR CONVEYOR                |                        | 65320647               | 65324064               |
| 10 | RING                        |                        | 65320646               | 65320646               |
| 11 | AIR INTAKE                  |                        | 65324065               | 65324065               |
| 12 | CONTROL BOX BASE            | LANDIS                 | 65320091               | 65320091               |
| 13 | CONTROL BOX                 | LANDIS LFL1.333        | 65320031               | 65320031               |
| 14 | IGNITION TRANSFORMER        | COFI 820 PM            | 65323227               | 65323227               |
| 15 | REMOTE CONTROL SWITCH       | AEG LS15K.00           | 65323136               | -                      |
|    |                             | AEG LS22K.00           | -                      | 65323134               |
| 16 | REMOTE CONTROL SWITCH       | AEG LS11K.00           | 65323135               | -                      |
|    |                             | AEG LS15K.00           | -                      | 65323136               |
| 17 | MOTOR THERMAL RELAY         | AEG B18K-320 25-32A    | 65324428               | -                      |
|    |                             | AEG B55K-055 42-55A    | -                      | 65324067               |
| 18 | MAIN SWITCH                 | cod.4010011509         | 65323064               | 65323064               |
| 19 | MANUAL / AUTOMATIC SELECTOR |                        | 65323067               | 65323067               |
| 20 | LAMP                        | Elettrospring EL/N-SC4 | 65322053               | 65322053               |
| 21 | FUSE SUPPORT                | FUSIT FH-B528          | 65322181               | 65322181               |
| 22 | RELAY BASE                  | Finder 5532            | 65323149               | 65323149               |
| 23 | RELAY                       | Finder 5532            | 65323139               | 65323139               |
| 24 | TIMER                       | AEG GMETV              | 65324073               | 65324073               |
| 25 | PULSANTE RESET              | C5559AL                | 65324068               | 65324068               |
| 26 | ANTI JAMMING FILTER         |                        | 65323170               | 65323170               |
| 27 | IGNITION CABLE              | TC                     | 65320947               | 65320948               |
| 28 | IONIZATION CABLE            | TC                     | 65322003               | 65322003               |
| 29 | IGNITION ELECTRODE          |                        | 65320909               | 65320909               |
| 30 | IONIZATION PROBE            |                        | 65320899               | 65320899               |
| 31 | PIPE                        | TC                     | 65321671               | 65321671               |
| 32 | ROD                         | TC                     | 65320247               | 65320247               |
| 33 | FIRING HEAD                 |                        | 65321670               | 65321670               |
| 34 | DISC                        |                        | 65320744               | 65324074               |
| 35 | TOOTH                       |                        | 65321611               | 65321611               |
| 36 | DIFFUSER                    |                        | 65321672               | 65321672               |
| 37 | IGNITION GAS PIPE           |                        | 65321673               | 65321673               |
| 38 | INNER ASSEMBLY              | TC                     | 65325368               | 65325366               |
| 39 | BLAST TUBE                  | TC                     | 65320460               | 65324070               |
| 40 | GASKET                      |                        | 65321136               | 65321136               |
| 41 | AIR DAMPER MOTOR            | SQM50.481A2            | 65322902               | 65322902               |
| 42 | SILENCER                    |                        | 65324071               | 65324071               |
| 43 | GAS VALVE                   | KROMSCH.VCS 125R-LW    | 65324722               | 65324722               |
| 44 | COIL                        | KROMSCH.VCS 125R-LW    | 65324623               | 65324623               |
| 45 | GAS GOVERNOR/FILTER         | 1/2 FG1B 25            | 65325214               | 65325214               |
| 46 | GAS CAM GROUP               |                        | 65322355               | 65322355               |

TC = SHORT HEAD TL = LONG HEAD

Handwriting practice area with horizontal lines.



**Guangdong Eacocon Energy Equipment Co. Ltd.**

Room 803, Tian'An Energy-saving Technological Zone,  
Development Plaza, No. 555 Panyu Avenue North,  
Panyu District, Guangzhou  
Tel. +86-20-2288 3482  
Fax +86-20-2288 3483  
<http://www.eacocon.com>  
e-mail: [sales@eacocon.com](mailto:sales@eacocon.com)

Manufactured in Italy by:

**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](mailto: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 pregiudicarne 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