

# MONOBLOCK NG SERIES GAS BURNERS INSTALLATION, OPERATING AND MAINTENANCE MANUAL

MODULATING OPERATION



ECO 50 NG  
ECO 55 NG  
ECO 60 NG  
ECO 65 NG  
ECO 70 NG

**DEAR USER,**

**ECOSTAR ECO 50 NG, ECO 55 NG, ECO 60 NG, ECO 65 NG, ECO 70 NG Series Gas** burners are prepared and manufactured according to the latest technical developments and safety rules. It is easy to use for our customers.

We recommend that you read this manual and safety warnings thoroughly before the use of the device in order to ensure safe, cost effective and environmental-friendly use.

If you encounter any issue that is not explained clearly in this manual or you could not understand, please contact with our service department.

We thank you for choosing ECOSTAR brand.











This Operating Manual is an integral part of the burner and must be maintained in a plastic dossier and hung at a clearly visible place in the burner room.

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## 1. WARNINGS

### 1.1. Warning Symbols and Descriptions

Symbols	Symbol Descriptions
	Important information and useful hints.
	Warning of danger to life or property.
	Warning of electrical voltage.
	Product handling information.
P <sub>F</sub>	Impulse connection detecting combustion chamber pressure
P <sub>L</sub>	Impulse connection detecting combustion air pressure
P <sub>BR</sub>	Impulse connection detecting burner gas head
 CLEAN THE GAS BURNER. CLEAN GAS LINE. ЧИСТАЯ ЛИНИЯ ГАЗ.	"Clean the gas line" warning on gas line.
	Electric motor direction of rotation
   	Carry in an upright position. Fragile Item. Protect against water.

## 1.2. General Safety Rules

- All personnel engaged in installation, disassembly, commissioning, operation, control, maintenance and repair should have received the necessary training and fully read and understood this manual.
- No changes that might damage the safety of the burner unit must be made by persons and/or organizations on the burner unit.
- All operation, commissioning and installation works (except for burning adjustment) should be carried out when the burner is not operating and after disconnecting the power supply. Noncompliance with these rules may lead to serious bodily injuries and even death by electrical shocks or uncontrolled flame formation.
- Repairs concerned with safety elements should be carried out only by the manufacturing company.
- The device should never be used by children, mentally handicapped and inexperienced persons.
- Children must not be allowed to play with the device.
- Keep the device away from explosive and flammable materials.
- Device must intake air, ventilation and air discharge holes must not be closed.



### **If you sense gas leakage;**

- Shut down valves of all gas devices.
- Open all doors and windows.
- Do not turn on electric devices or do not turn them off if they are working.
- Do not use burner derived tools such as match and lighter.
- Inform the gas company.



Do not store any inflammable materials in boiler room.



Wear hearing protectors if there is noise in boiler room.



### **In case of fire or other emergency;**

- Switch off the main switch
- Close the main fuel shut-off valve outside the plant.
- Take appropriate actions



The burner installation must be carried out in accordance with the instructions. Vibration can damage the burner and its components.



Keep boiler doors closed while starting burner and during burner operation.



Check combustion values to be correct by using flue gas analyzer at the whole adjustment range between minimum, full load, and ignition load.



Use lifting device or belt for lifting fan motor, if necessary.



During the first commissioning of the burner or in case of any revision carried out in the electrical system or motor cables by any reason, direction of the fan rotation must certainly be checked by the authorized technical service.



For products that have not been commissioned or started more than 6 months, before activating the servomotor;

In gas and air dampers, servomotor and air damper connections must be checked to ensure that they are free running in spite of immobility and oil freezing.



## **BURNER ROOM**

Install the burner in a suitable room/floor with minimum external air openings and sufficient to ensure perfect combustion, in compliance with current regulations.

Never obstruct air openings of the burner room, burner fan intake vents or air ducts in order to prevent:

- a. The build up of toxic / explosive gas mixtures in the burner room,
- b. Combustion with insufficient air, resulting in hazardous, anti-economical and polluting operation.

The burner must be always protected from rain, snow and frost to prevent corrosion and paint deformations.

Keep the burner room clean and free of solid volatile substances, which could be sucked into the fan and clog the internal burner or combustion head air ducts.

## 2. TERMS OF WARRANTY

Main and auxiliary equipment and all components used in Ecostar gas burners are guaranteed for 1 year by TERMO ISI SİST. A.Ş starting from the date of commissioning under the maintenance, adjustment, operating conditions and relevant mechanic, chemical and thermal effects explained herein.



Please note that this warranty is only valid if the device(s) is commissioned and maintained by our authorized services.



Our company reserves the right to make any modifications on the product and all instructions thereof for improvement purposes.

### 2.1. Out of Warranty Conditions

- Any damage arising out of or in relation to customers' non-compliance to their responsibilities with regards to installation, commissioning, operation and maintenance,
- Any damage arising out of or in relation to commissioning, repairs and maintenance carried out by unauthorized services,
- Any damage that may occur during transportation or storage of the product,
- Not preserving the product in its original packaging until the installation stage,
- Incorrect and poor electrical connections, Failures due to incorrect voltage applications, frequent repetition of voltage fluctuations,
- Any damage that may occur as a result of incorrect fuel usage or, foreign substances in the fuel used or using of the product without any fuel,
- Any damage that may occur due to foreign particles entered into the product during installation and operation,
- Failures due to incorrect device selection,
- Any damage to unit due to natural disasters,
- Devices without any warranty certificates,
- Warranty Certificates without the stamp and signature of the authorized dealer or service,
- Devices with any falsification on the warranty certificate or without an original serial number.
- The risks during transportation of device under the responsibility of customer belong to the customer.
- Presence of misuse faults are indicated in the reports issued by authorized service stations or our authorized agent, dealer, representative or our factory in case of unavailability of authorized service stations.
- Customers may apply consumer protection arbitrator committee with regards to this report and request for an expert report.

### 3. BURNER'S GENERAL FEATURES

ECOSTAR gas burners are manufactured such that they operate in gas pressure of min. 20 mbar and max. 300mbar. at 15%...+10% of nominal voltage, between the ambient temperature range of -15°C....+60°C and declared capacity and boiler pressure ranges with Natural Gas and Liquid Petrol Gas.

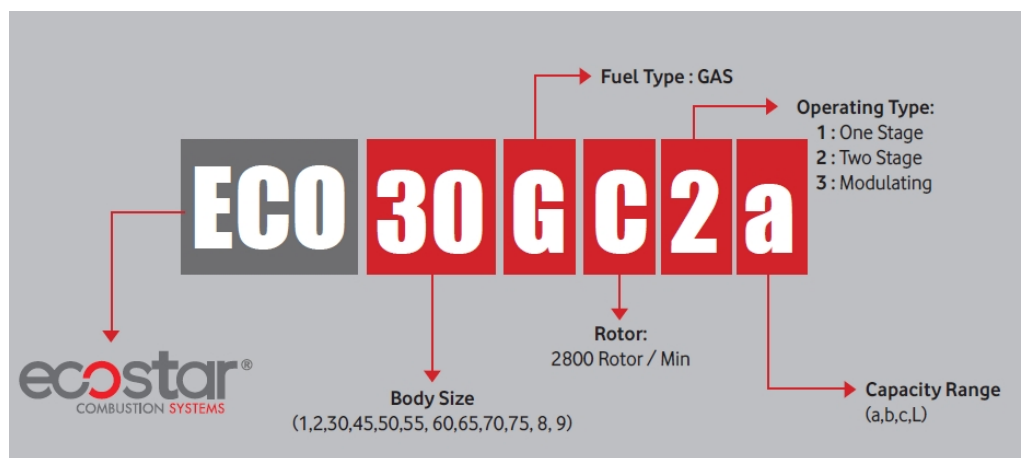
#### 3.1. Purpose of Use and Work Limits of Burners

- This product works at any load value equivalent to its max. capacity or covered by its capacity range;
  - In hot water and steam boilers,
  - In direct and indirect hot air generators,
  - Industrial appliances operating at temperature below 600 °C,
  - -15 °C...+60 °C ambient temperature range,
  - 1N 230 VAC/3N 380VAC /50 Hz feed voltage (-%15...+%10) values,
  - Max. 95% relative humidity,
  - In well-ventilated open and closed spaces compatible with protection class IP 40.
  - Operation with Natural gas and LPG.



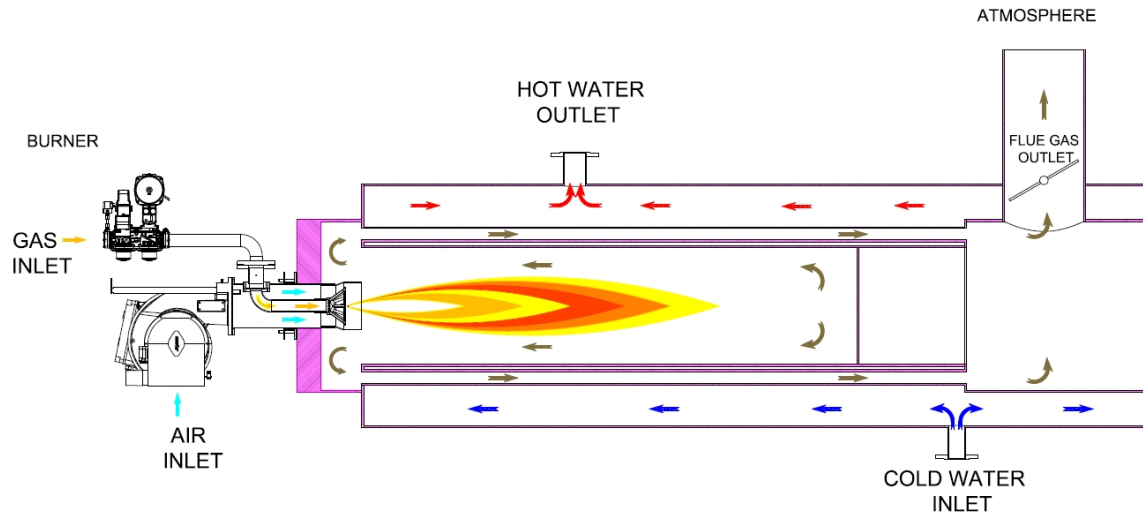
This device must never be operated with open flame!

#### 3.2. Code Key





#### 4. GAS, FLUE GAS AND HEATING WATER SCHEMA



## 5. TECHNICAL DATA

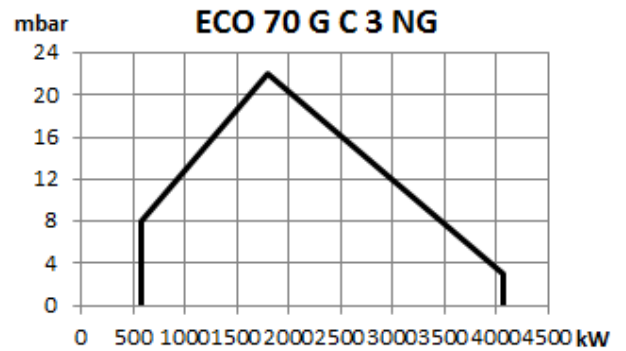
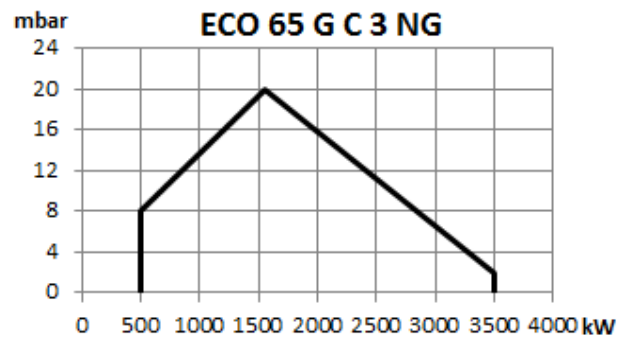
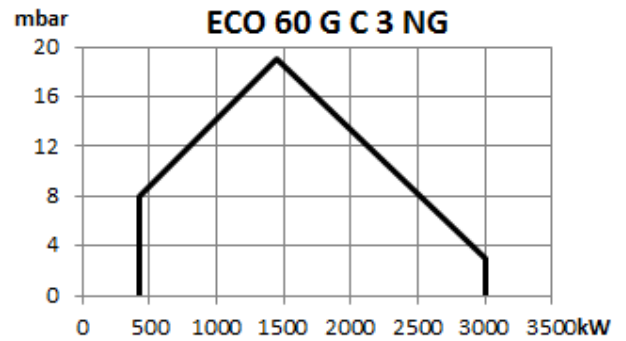
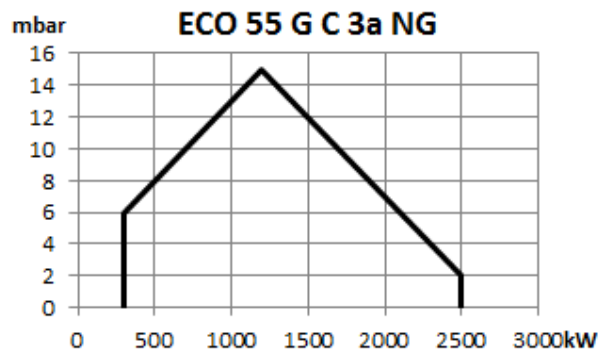
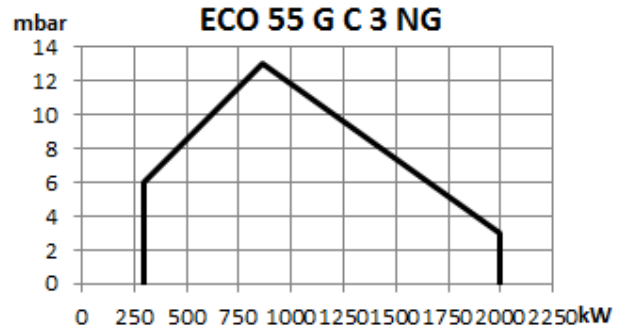
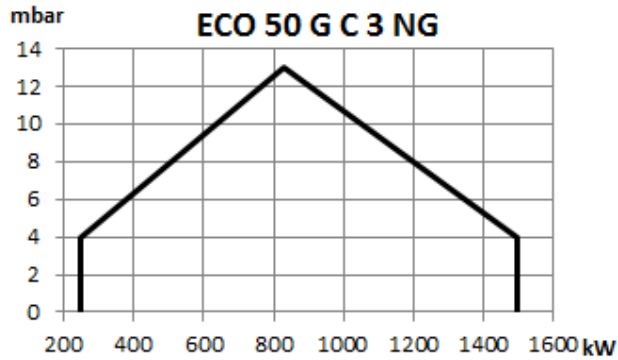
### 5.1. Capacity Table

<b>NEW GENERATION MODULATING GAS BURNERS CAPACITY TABLE</b>										
BURNER TYPE	CAPACITY		CAPACITY		NATURAL GAS CONSUMPTION		LPG CONSUMPTION		FAN MOTOR POWER	MAIN SUPPLY
	Min. kcal/h	Max. kcal/h	Min. kW	Max. kW	Min. Nm <sup>3</sup> /h	Max. Nm <sup>3</sup> /h	Min. Nm <sup>3</sup> /h	Max. Nm <sup>3</sup> /h	kW	VAC
<b>ECO 50 G C 3 NG</b>	215.000	1.290.000	250	1.500	26,1	156,4	9,6	57,3	2,20	3N 380
<b>ECO 55 G C 3 NG</b>	258.000	1.720.000	300	2.000	31,3	208,5	11,5	76,4	3,00	3N 380
<b>ECO 55 G C 3a NG</b>	258.000	2.150.000	300	2.500	31,3	260,6	11,5	95,6	3,00	3N 380
<b>ECO 60 G C 3 NG</b>	369.800	2.580.000	430	3.000	44,8	312,7	16,4	114,7	4	3N 380
<b>ECO 65 G C 3 NG</b>	430.000	3.010.000	500	3.500	52,1	364,8	19,1	133,8	5,5	3N 380
<b>ECO 70 G C 3 NG</b>	498.800	3.500.200	580	4.070	60,5	424,3	22,2	155,6	7,5	3N 380

$H_u$  Natural Gas =8250 kcal/Nm<sup>3</sup>

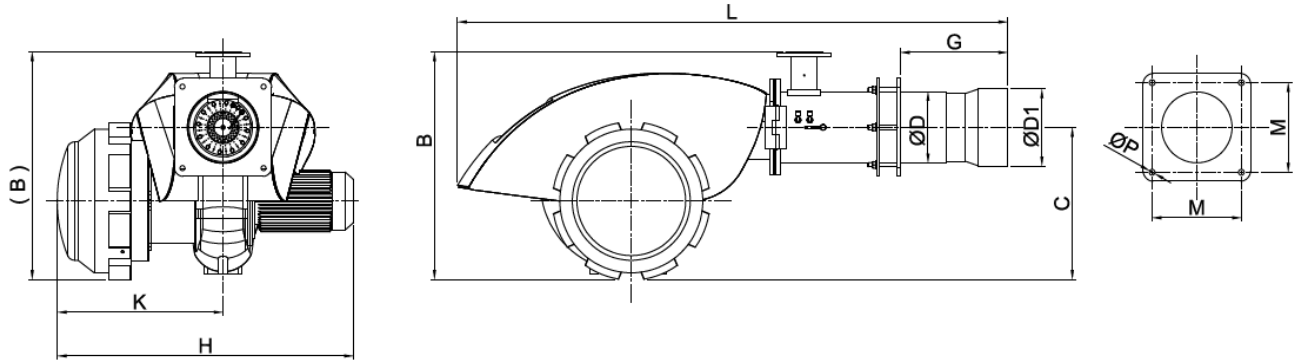
$H_u$  LPG=22500 kcal/Nm<sup>3</sup>

## 5.2. Back Pressure-Capacity Diagrams

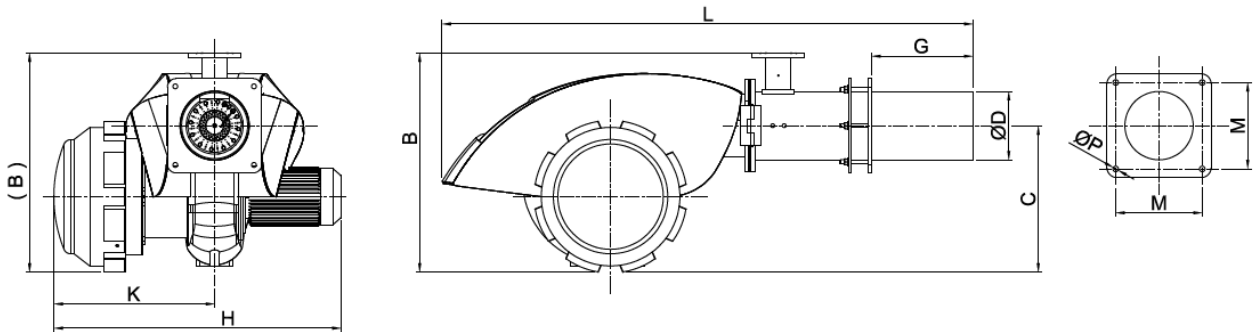


### 5.3. Burner Dimensions

ECO 50 NG ECO 55 NG ECO 65 NG ECO 70 NG



ECO 60 NG

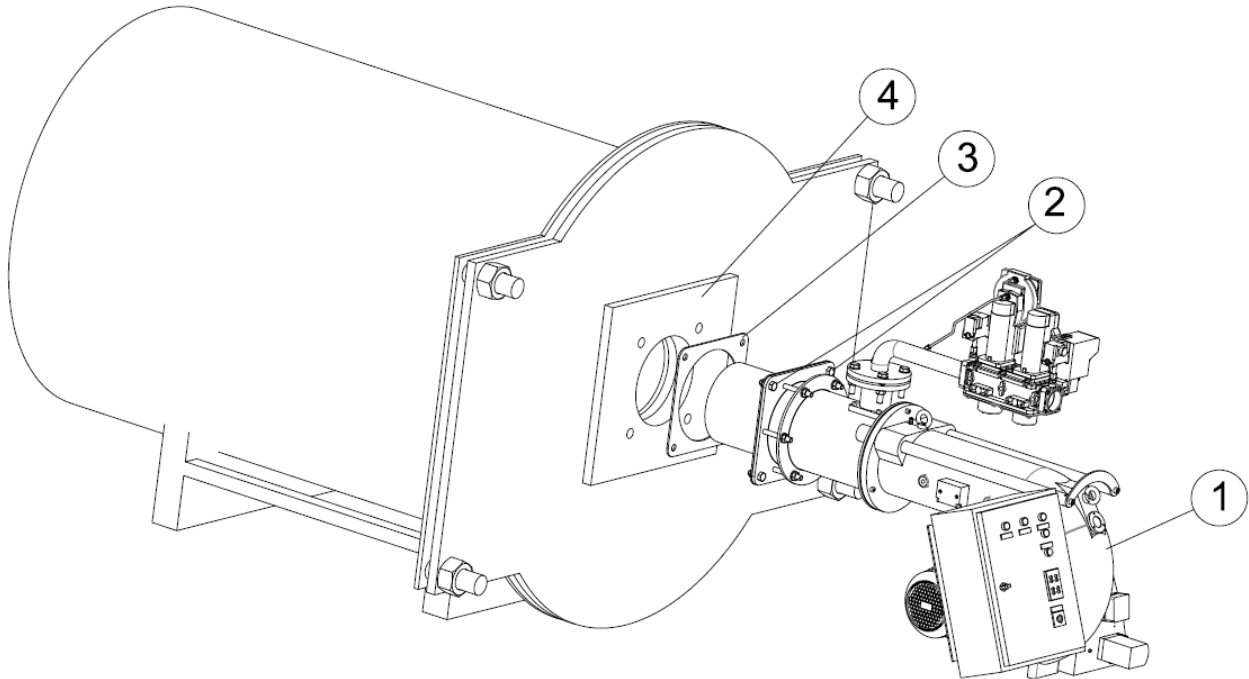


BURNER	L	Gmin	Gmax	H	K	B	C	ØP	M	ØD	ØD1
	mm	mm	mm	mm	mm	mm	mm	Ø	mm	Ø	Ø
ECO 50 G C 3 NG	1560	280	440	890	530	630	430	18	275	218	236
ECO 55 G C 3 NG	1560	280	440	890	530	630	430	18	275	218	236
ECO 55 G C 3 a NG	1560	280	440	890	530	630	430	18	275	218	236
ECO 60 G C 3 NG	1855	200	355	1000	560	770	515	18	275	240	-
ECO 65 G C 3 NG	2005	200	440	1000	560	770	515	18	275	250	280
ECO 70 G C 3 NG	2005	200	440	1000	560	770	515	18	275	250	280



## 7. INSTALLATION

### 7.1. Burner Installation Picture



- 1- Burner
- 2- Boiler Connection Flange
- 3- Gasket
- 4- Boiler Flange



You must definitely ensure sealing between boiler and burner!



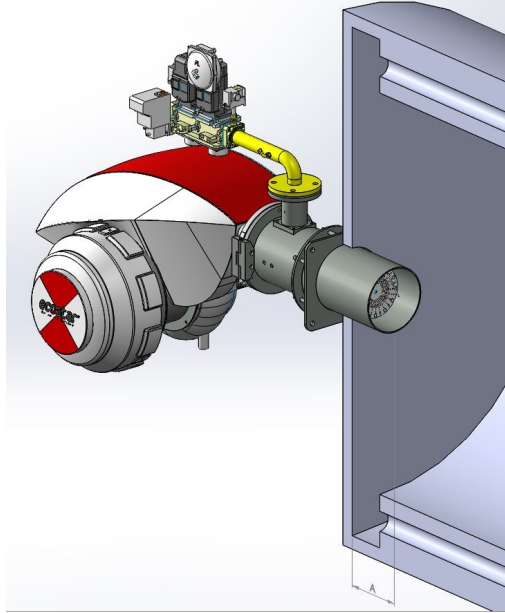
Device must be shipped in original packaging!



Do not lift the device holding from servomotor, gas valve, impulse pipes or pressure switch during installation!



Clean the inside of fuel line thoroughly before installing the burner to the fuel line. Any damage that may occur due to solid objects and metal particles from the fuel line shall not be covered by our company.



While installing the burner in reverse flame front mirror boilers, flame tube tip must be adjusted such that it gets inside by 50 mm-100 mm from flue pipes ( $50\text{mm} \leq A \leq 100\text{mm}$ ). Otherwise flue gas temperature will rise and fuel consumption will increase.

## 8. COMMISSIONING

### 8.1. Before Commissioning



#### Electrical connection

Perform electrical connections according to the diagram provided with the burner. Follow general security rules during installation of electric wiring and making connections. Connect the earthing terminal in electric panel to the earthing installation.

### 8.2. General Controls



Make sure to perform the following controls before commissioning the burner.

- Ø Are the electrical connections correct?
- Ø Is there electricity current?
- Ø Is there gas?
- Ø Has the heating system been filled with water?
- Ø Is the thermostat set at the required temperature?
- Ø Has the boiler explosion lid been controlled?
- Ø Is there sufficient air in boiler room (ventilation section  $\text{cm}^2 = \text{boiler capacity kW} \times 7$ )
- Ø Has the boiler been installed correctly? Has the boiler cover been closed properly?
- Ø Has the air of the gas line been removed? Has a sealing test been made?

## **Operation of a modulating burner**

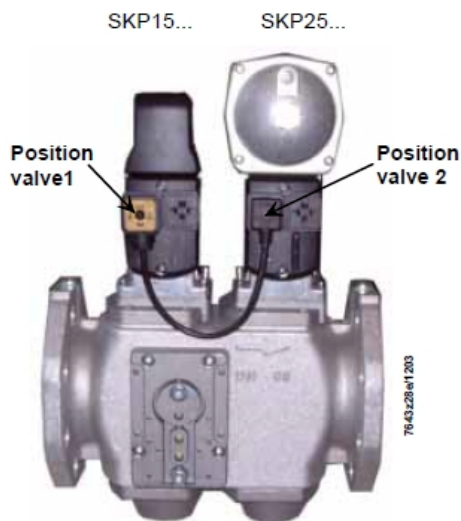
- Ø Open the main gas valve; check max 300 mbar gas pressure from the manometer.
- Ø Open operating switch on the burner panel.
- Ø Switch on the modulating control switch.
- Ø Switch automatic-hand switch to automatic.
- Ø Check the temperature and pressure set values from the modulating control unit.
- Ø Ignition will take place at the end of pre-purge process.
- Ø 3 sec. later, the gas valve will be opened and combustion will occur.
- Ø Flame control system (ionization) will start flame control.
- Ø In modulating burner, the burner goes into max. capacity according to the signal from the modulating control unit.
- Ø When the boiler water temperature or steam pressure increase, the modulating control unit will cause burner to run with min. capacity.
- Ø If the boiler water temperature or steam pressure increases despite the operation of burner with min. capacity, the modulating control unit will stop the burner.

### **8.3. Combustion Adjustment**

#### **8.3.1. Gas Adjustment**

Follow the instructions of the valve manufacturer during installation, dismantling and adjustment of the gas valve

##### **8.3.1.1. VGD 40... Series Gas Valve**





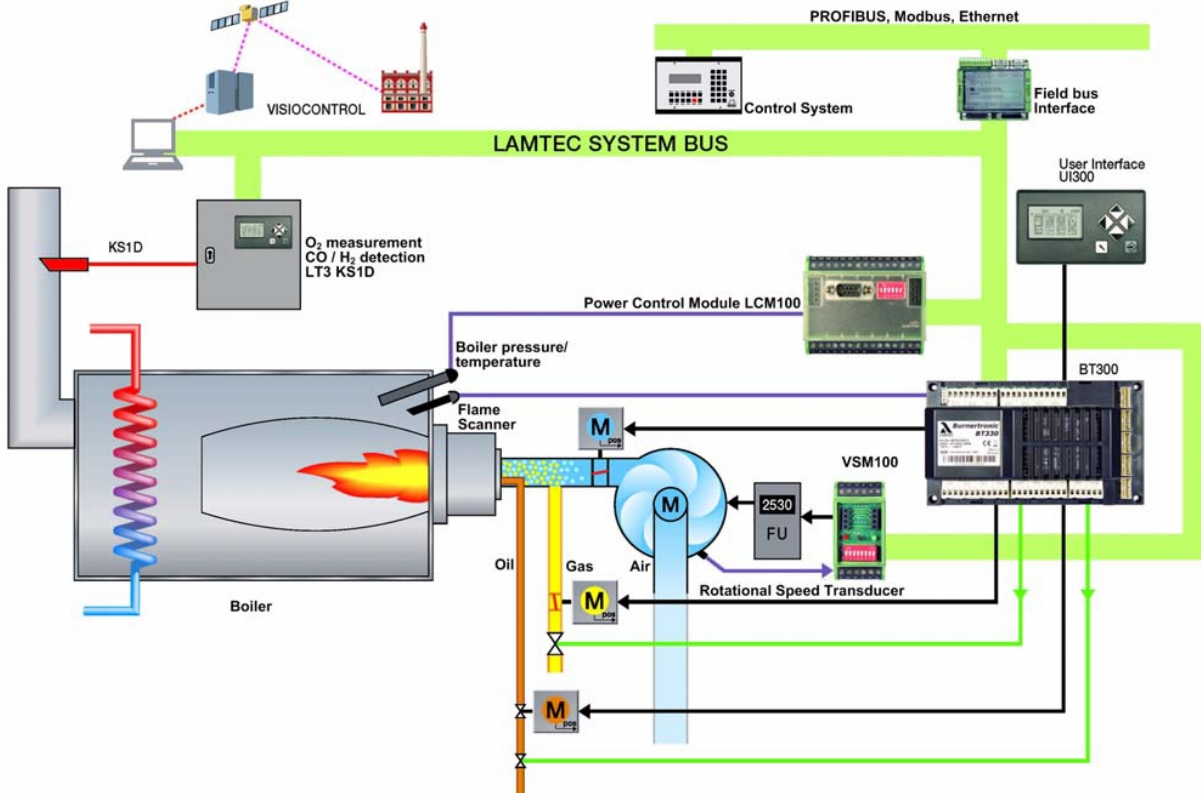
## 8.4. Air pressure switch adjustment

While the burner is working without any problem, the air pressure switch is adjusted to desired minimum pressure as follows.

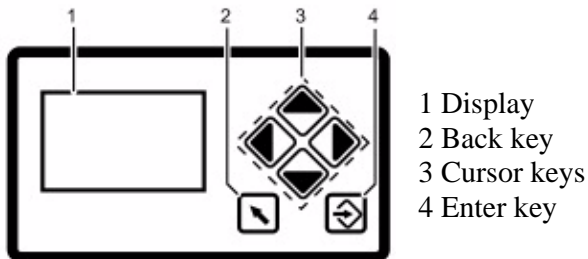
- Ø Unscrew the screw of the transparent cover and remove the cover.
- Ø Turn the adjustment wheel in the direction to increase the pressure, note the pressure value at which the burner is failed.
- Ø Set the pressure switch to a value 1 mbar lower than the pressure value at which the burner failed and close the pressure switch lid.
- Ø It is recommended that this adjustment is carried out when the burner is at minimum load.



## 8.5. BT 300




### 8.5.1. Operating Control and Displays



**Display:** The display shows in pictograms:

- 1 - The menu structure
- 2 - Operating status
- 3 - Parameters
- 4 - Error messages

 **Back key:** Jump to previous window.

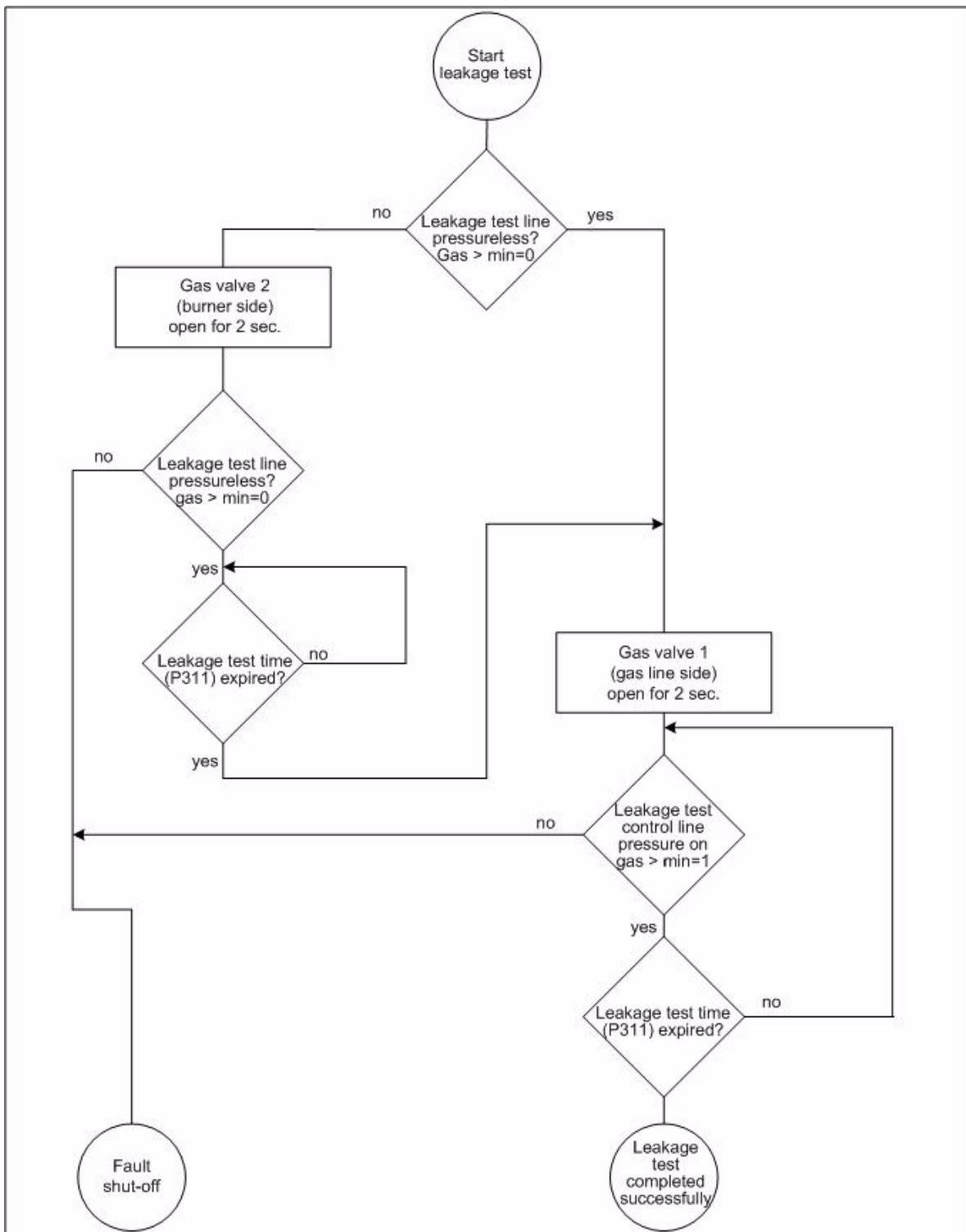


**Cursor keys:** You navigate in the menu using the cursor keys. You use the "left" and "right" keys to move step by step to the selected row. At the end of the selected row, the cursor jumps to the next row down, if possible. If the menu has multiple rows, you can use the "up" and "down" keys to switch rows. To display the parameters, switch between the individual fields.

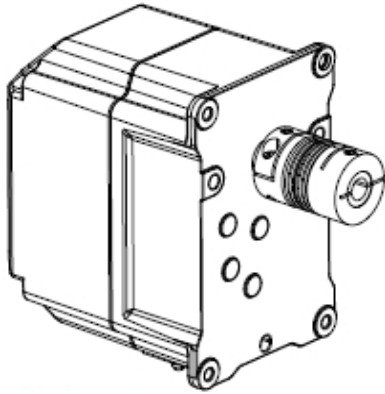


**Enter key:** Press ENTER to call up the menu on the start screen. You open the selected submenu from a menu window. By pressing the ENTER key, you transfer the setting values from a parameter window.

### 8.6. Leakage Test for Main Gas Valves



## 8.7. Servomotors



Lamtec motor ver. 2

Servomotors drive air dampers, gas butterfly valve and oil regulator. With the help of servomotors electronic air and fuel ratio control is carried out, controlled by burner control.



- Ø Static electricity can damage servomotor.
- Ø Do not open servomotor. Do not interfere with or modify unit or equipment connected to it. It may damage servomotor or change burner settings.
- Ø Completely isolate equipment from the main supply before performing any wiring changes in servomotor connection area.
- Ø Check that wiring is in an orderly state.
- Ø Protect equipment from condensation, water and ice.
- Ø Fall or shock can adversely affect safety functions. Such servomotors may not be put into operation.



Do not open servomotor. Do not interfere with. It may damage servomotor or change burner settings.

## 8.8. Function Controls and Adjustments

The BT300 combines the benefits of an electronic fuel-air ratio control system with up to three motorized actuating devices and an optional module like an analogue output for speed control of the combustion air fan with an electronic burner control unit. The leakage test, flame monitoring system, power control unit and (optional) CO/O<sub>2</sub> controller for control and optimization of an oil or gas-fired forced-draught burner are all integrated. The BT300 is suitable for virtually all combustion plants. Safety interlock chains, monitors (e.g. gas and air pressure) and sensors are wired directly to the BT300. This greatly reduces the cost of additional relays and wiring. The BT300 was designed to be attached to the burner. The short wiring paths also save money. As a result, the BT300 is particularly suitable as standard equipment for monoblock burners. The compact design of the BT300 burner control system also has its advantages during commissioning. Standardizing the wiring and the unified operator interface minimizes sources of errors from the start, while intelligent information in the display makes searching for errors much easier.

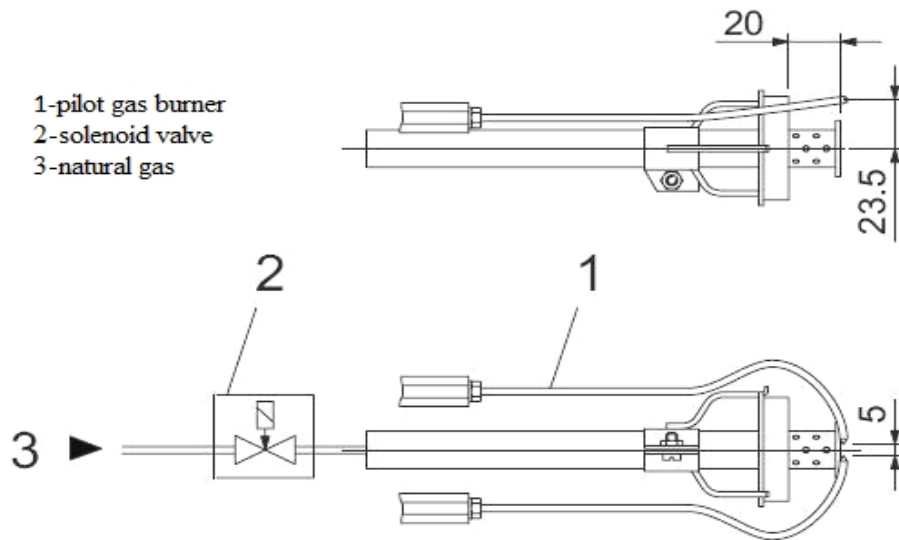


**Magnetic valves must not be energized during pre-purge. Check if valves are in closed position!**

## 8.9. Final Checks

- Ø Switch of all purges after completion of all necessary measurements.
- Ø Start and stop the burner at least 3 times to check the operation of the program.
- Ø Make sure that all safety circuits on the burner and boiler operate properly before leaving the installation site.

### 8.10. Pilot Ignition System



**Pilot gas burner inlet pressure  $P_{max}$ = 200 mbar**

### 8.11. Emission Measurement

In emission measurements, the following values are accepted as reference according to TS EN 676 +A2 standard.

- Ø  $CO < 100 \text{ mg/ kWh}$
- Ø  $\%3 \leq O_2 \leq \%5$
- Ø  $NO_x < 170 \text{ mg/ kWh}$
- Ø Excess air ratio  $1,2 \leq \lambda \leq 1,3$

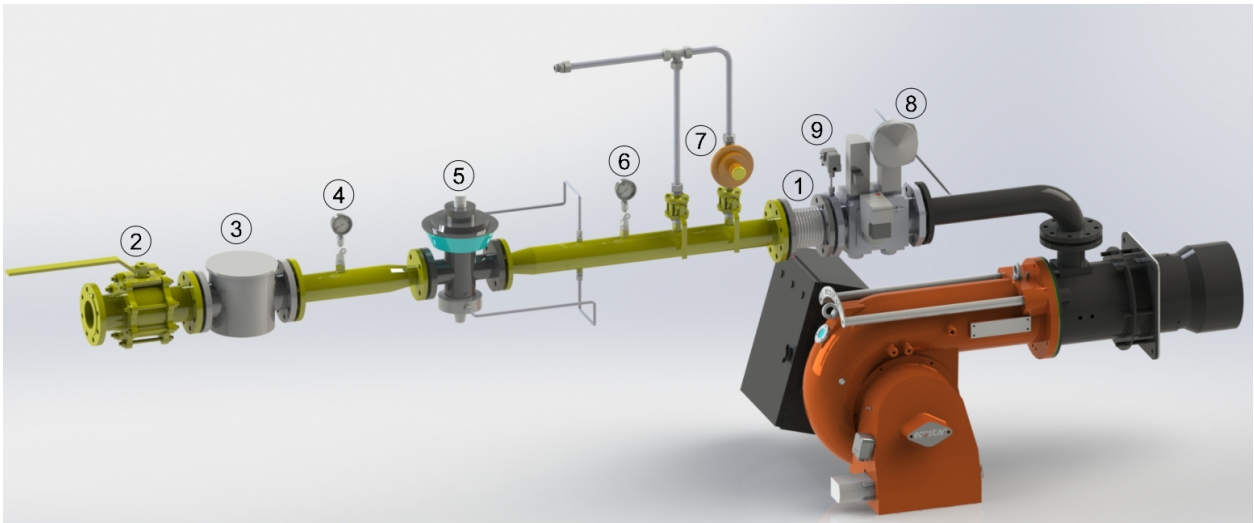


It is important for the boiler to be sealed in order to avoid incorrect measurements during emission measurements.



Boiler water temperature must be between  $40 \text{ C}^\circ$  and  $80 \text{ C}^\circ$  while making emission measurement in hot water boilers.

## 8.12. Gas Pass Equipment Required in Gas Line



<b>Pe &lt; 300 mbar Q&lt;1200kW</b>	<b>Pe &gt; 300 mbar Q&lt;1200kW</b>	<b>Pe &lt; 300 mbar Q&gt;1200kW</b>	<b>Pe &gt; 300 mbar Q&gt;1200kW</b>
1- Compensator	1- Compensator	1- Compensator	1- Compensator
2- Ball valve	2- Ball valve	2- Ball valve	2- Ball valve
3- Gas filter	3- Gas filter	3- Gas filter	3- Gas filter
4- Inlet manometer + valve	4- Inlet manometer + valve	4- Inlet manometer + valve	4- Inlet manometer + valve
8- Multi-block (safety and operation solenoids)	5- Regulator	8- Multi-block (safety and operation solenoids)	5- Regulator
9- Sealing Control Set	6- Outlet manometer + valve	9- Sealing Control Set	6- Outlet manometer + valve
	7- Safety discharge valve		7- Safety discharge valve
	8- Multi-block (safety and operation solenoids)		8- Multi-block (safety and operation solenoids)
	9- Sealing Control Set		9- Sealing Control Set



Threaded and flanged connections may vary depending on the gas pressure and consumption.

## 9. MAINTENANCE

### 9.1. Monthly Maintenance

Monthly maintenance is a comprehensive process where general checks of burner and peripheral components are performed to prevent possible faults. After completion of maintenance and adjustment processes, make sure to perform an emission analysis.

- Ø Clean the filters on the main line and multiblock.
- Ø Check the burner gas tip.
- Ø Perform insulation measurements of ignition and ionization electrodes; replace electrodes should there be leakage to the body.
- Ø Check ignition cables and sockets.
- Ø Check all wiring points. Tighten loose connections.
- Ø Clean the dust and layers accumulated on the fan and air damper.
- Ø Check gas line pressure, it must be the same with the first adjusted pressure, otherwise burner load and emission values will also have changed.
- Ø Check all bolts of the burner. Tighten loose bolts.
- Ø After starting the burner and adjusting air damper, perform flue gas emission measurement and check if there is an ideal combustion.

### 9.2. Seasonal Maintenance

Comprehensive maintenance work when the burner is restarted after long periods of shut-down or interruptions. After completion of maintenance and adjustment processes, make sure to perform a combustion analysis.

- Ø Check insulation resistance of electric motor.
- Ø Replace ignition and ionization electrodes with new ones.
- Ø Clean air fan and clamps.
- Ø Check the operating function.
- Ø Check boiler thermostats.
- Ø Check cleanliness of boiler inside and clean if necessary.



Follow installation directions during maintenance.





## 11. AFTER-SALES SERVICES

Dear Customer,

We believe that providing a good service is as important as providing a good product. Therefore, we continue offering wide range of comprehensive services to our conscious customers.

Our contact details for your requests and complaints

**Esentepe Mah.Milangaz Cad. No:75 K:3**

**Kartal Monumento Plaza**

**KARTAL/İSTANBUL/TÜRKİYE**

**Tel: +90 216 442 93 00**

**Fax: +90 216 370 45 03**

Factory Contact Details

**Türkgücü OSB**

**Bülent Ecevit Bulvarı No:11**

**ÇORLU/TEKİRDAĞ/TÜRKİYE**

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**Web site : [www.ecostar.com.tr](http://www.ecostar.com.tr)**

**E - mail : [servis@ecostar.com.tr](mailto:servis@ecostar.com.tr)**



Please observe the following recommendations.

- Use the product in accordance with the principles of this manual.
- For any service demands regarding the product, please contact our Service Center from the abovementioned phone numbers.
- Upon your purchase, register your warranty certificate during installation.

