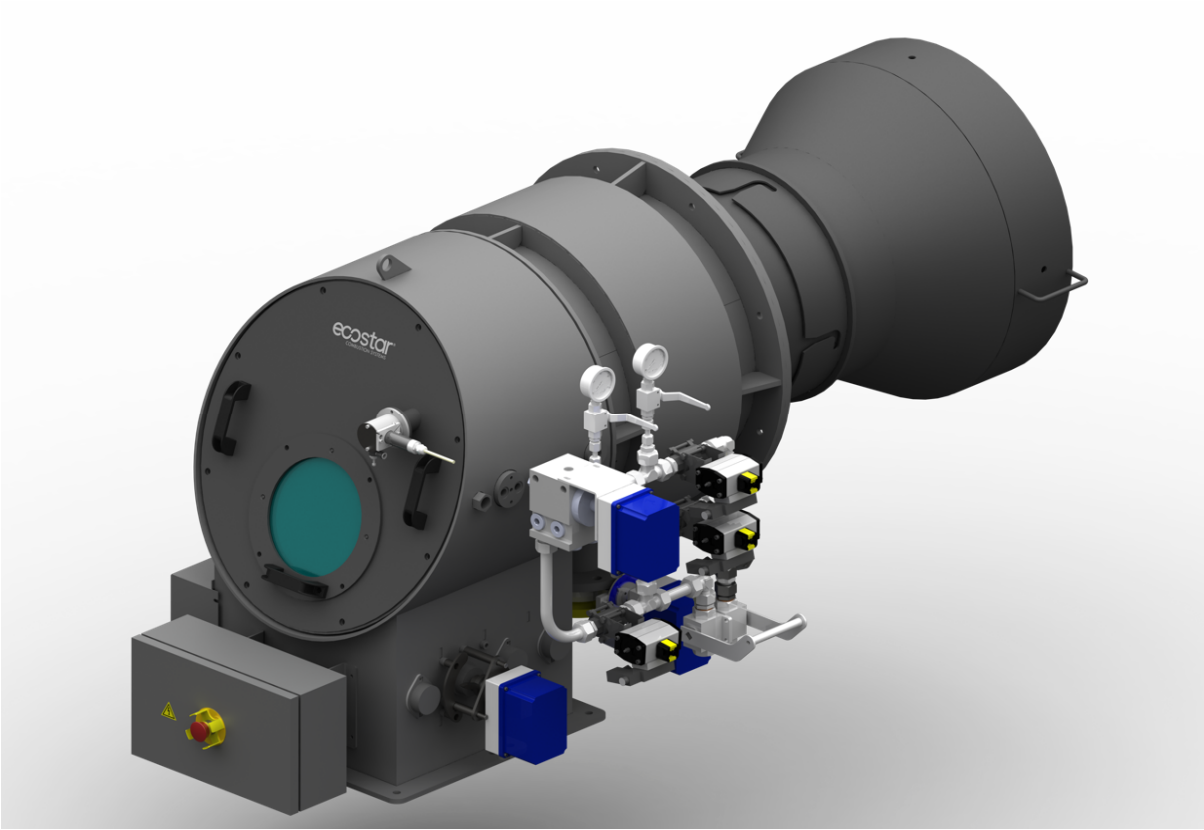


# DUOBLOCK DUAL FUEL (GAS-LIGHT OIL) BURNERS INSTALLATION, OPERATING AND MAINTENANCE MANUAL

MODULATING OPERATION (ELECTRONIC)



ECO 250  
ECO 300  
ECO 350  
ECO 400  
ECO 450  
ECO 500  
ECO 600  
ECO 700  
ECO 800  
ECO 900



**DEAR USER,**

**ECOSTAR ECO 250, ECO 300, ECO 350, ECO 400, ECO 450, ECO 500, ECO 600, ECO 700, ECO 800, ECO 900 Dual Fuel (Gas-Light Oil)** 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.

Ecostar Dual Fuel (Gas-Light Oil) Burners are manufactured in compliance with TS EN 267 and TS EN 676 + A2 standards.






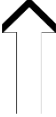

This Operating Manual is an integral part of the burner and must be maintained in a plastic dossier and hung at a clearly visible place in the burner room.

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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.<br>CLEAN GAS LINE.<br>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 analysis 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, air dampers and oil regulators, servomotor and damper connections must be checked to ensure that they are free running in spite of immobility and oil freezing.



**In case of two-piece flame tubes of ECO 450 and upper combined burner models being demounted on the field, after the burner is mounted on the boiler, heat resistant silicone should be applied to the joints.**



## **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 Dual Fuel (Gas-Light Oil) 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 Dual Fuel (Gas-Light Oil) burners are designed and manufactured to work with liquid fuel with max. 2.5- 6 Cst (mm<sup>2</sup>/s) viscosity, natural gas and liquid petroleum gas at gas pressures of min.100 mbar, max.300 mbar and at -%15 to +%10 of nominal voltages, under environmental temperature of max.60°C with rated capacity and burner pressure ranges.

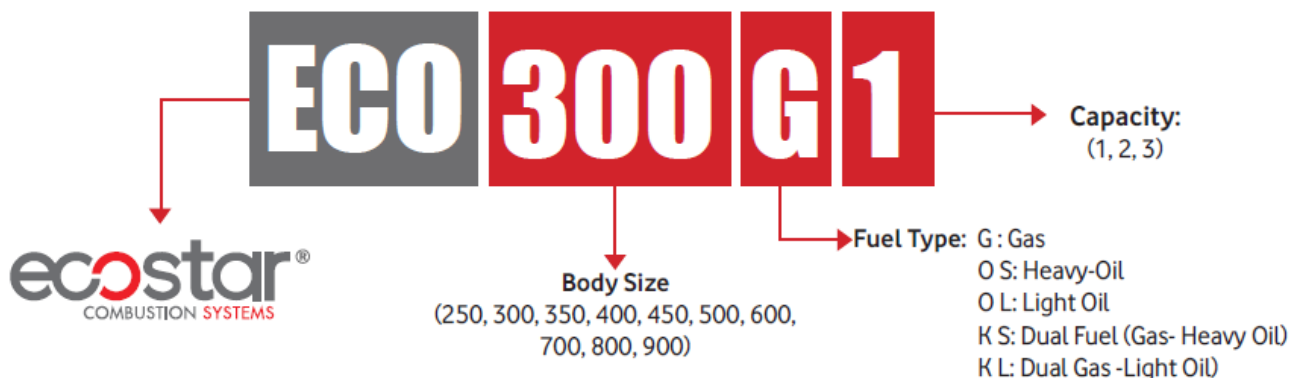
#### 3.1.Purpose of Use and Work Limits of Burners

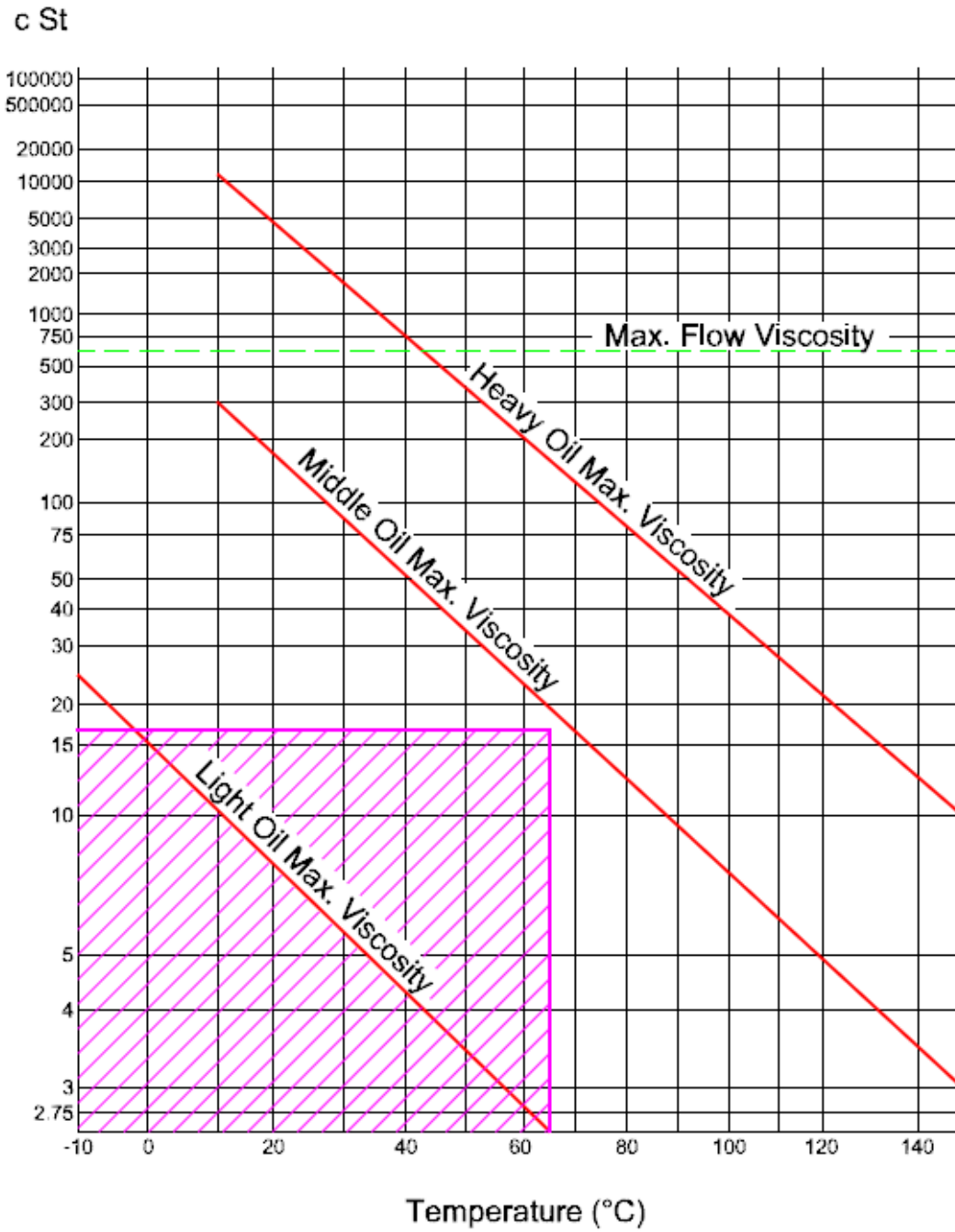
- This product works at any load value equivalent to its max. capacity or covered by its capacity range;
  - In hot water and steam boilers,
  - In direct and indirect hot air generators,
  - Industrial appliances operating at temperature below 600 °C,
  - -15 °C...+60 °C ambient temperature range,
  - 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.



This device must never be operated with open flame!

#### 3.2.Code Key





Temperature change of fuel used in ECOSTAR Dual Fuel (Gas-Light Oil) burners dependent on viscosity



Operating Range

## 4. TECHNICAL DATA

### 4.1.Capacity Table

| BURNER TYPE | CAPACITY |             | NATURAL GAS CONSUMPTION | LIGHT OIL CONSUMPTION |
|-------------|----------|-------------|-------------------------|-----------------------|
|             | Max. MW  | Max. kcal/h | Max. Nm <sup>3</sup> /h | Max. kg/h             |
| ECO-250.1   | 1,9      | 1.600.000   | 193,9                   | 156,9                 |
| ECO-250.2   | 2,6      | 2.250.000   | 272,7                   | 220,6                 |
| ECO-300.1   | 3,4      | 2.900.000   | 351,5                   | 284,3                 |
| ECO-300.2   | 4,2      | 3.600.000   | 436,4                   | 352,9                 |
| ECO-350.1   | 5,0      | 4.300.000   | 521,2                   | 421,6                 |
| ECO-350.2   | 6,2      | 5.300.000   | 642,4                   | 519,6                 |
| ECO-350.3   | 7,3      | 6.300.000   | 763,6                   | 617,6                 |
| ECO-400.1   | 8,1      | 7.000.000   | 848,5                   | 686,3                 |
| ECO-400.2   | 8,8      | 7.600.000   | 921,2                   | 745,1                 |
| ECO-400.3   | 9,7      | 8.300.000   | 1006,1                  | 813,7                 |
| ECO-450.1   | 11,5     | 9.900.000   | 1200,0                  | 970,6                 |
| ECO-450.2   | 12,9     | 11.100.000  | 1345,5                  | 1088,2                |
| ECO-450.3   | 14,5     | 12.450.000  | 1509,1                  | 1220,6                |
| ECO-500.1   | 16,2     | 13.900.000  | 1684,8                  | 1362,7                |
| ECO-500.2   | 17,8     | 15.300.000  | 1854,5                  | 1500,0                |
| ECO-500.3   | 19,4     | 16.650.000  | 2018,2                  | 1632,4                |
| ECO-600.1   | 20,8     | 17.900.000  | 2169,7                  | 1754,9                |
| ECO-600.2   | 23,4     | 20.150.000  | 2442,4                  | 1975,5                |
| ECO-600.3   | 25,0     | 21.500.000  | 2606,1                  | 2107,8                |
| ECO-700.1   | 26,2     | 22.500.000  | 2727,3                  | 2205,9                |
| ECO-700.2   | 27,3     | 23.500.000  | 2848,5                  | 2303,9                |
| ECO-700.3   | 29,1     | 25.000.000  | 3030,3                  | 2451,0                |
| ECO-800.1   | 32,1     | 27.600.000  | 3345,5                  | 2705,9                |
| ECO-800.2   | 33,5     | 28.850.000  | 3497,0                  | 2828,4                |
| ECO-800.3   | 35,2     | 30.250.000  | 3666,7                  | 2965,7                |
| ECO-900.1   | 36,7     | 31.600.000  | 3830,3                  | 3098,0                |
| ECO-900.2   | 39,2     | 33.750.000  | 4090,9                  | 3308,8                |
| ECO-900.3   | 40,8     | 35.050.000  | 4248,5                  | 3436,3                |

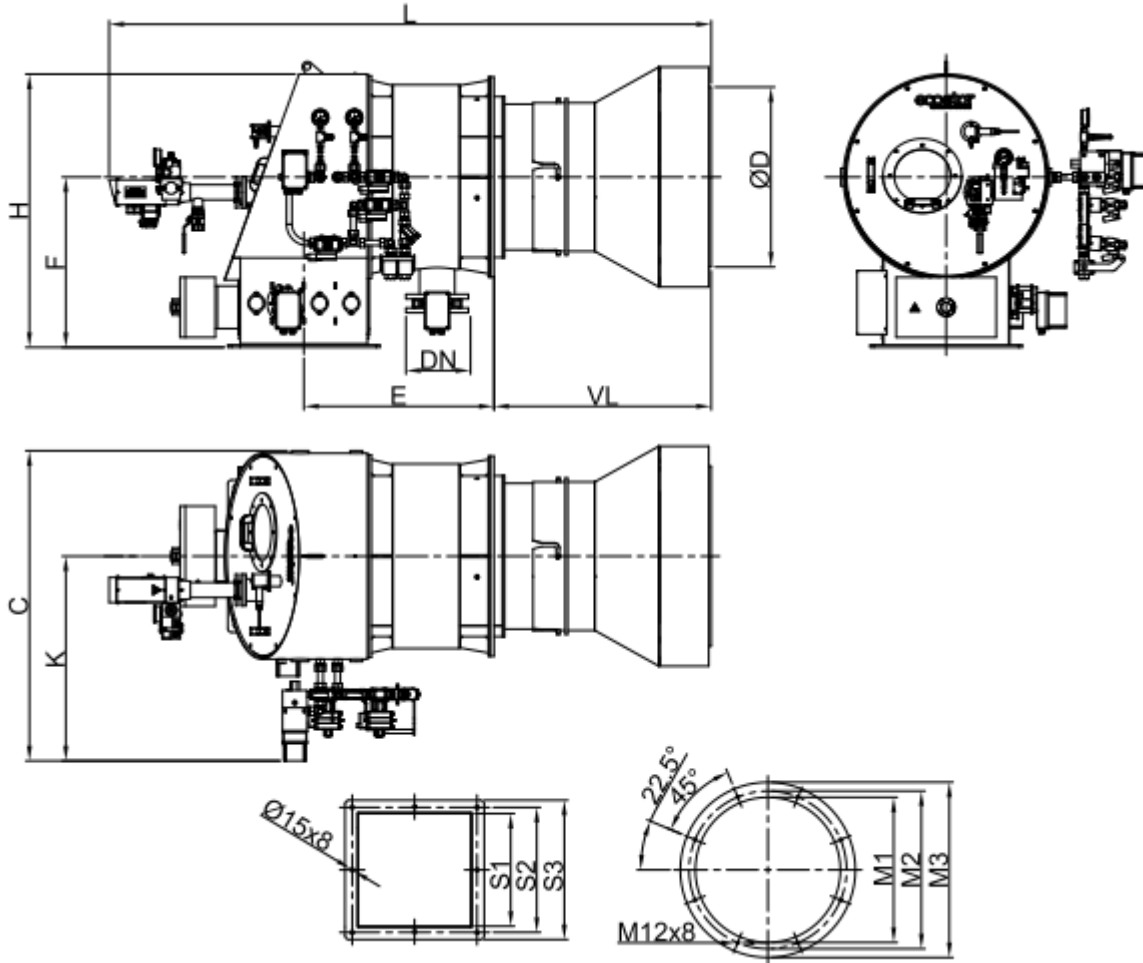
$$H_u \text{ Natural Gas} = 8250 \text{ Kcal/Nm}^3$$

$$H_u \text{ Light Oil (L)} = 10200 \text{ Kcal/kg}$$

**Electronic Modulating Burner-Modulation Ratio:** Natural Gas 10:1, Liquid Fuel 5:1

## 4.2. Burner Dimensions

### ➤ Gas- Light Oil Asphalt Plant

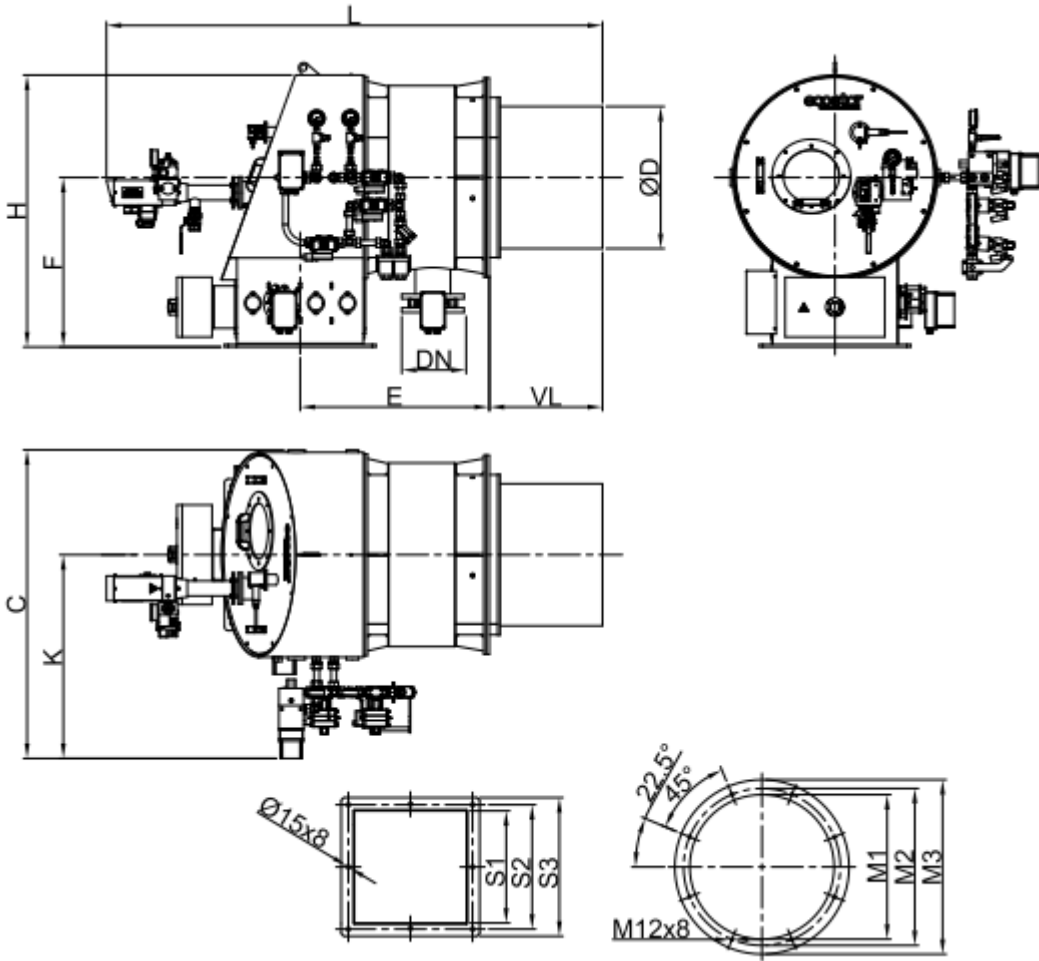


|              | Ø D  | L    | E   | H    | F   | C    | K   | S1  | S2  | S3  | Ø M1 | Ø M2 | Ø M3 | VL  | DN    |
|--------------|------|------|-----|------|-----|------|-----|-----|-----|-----|------|------|------|-----|-------|
| ECO 300 KL 1 | -    | 1850 | 650 | 875  | 500 | 700  | 325 | 300 | 350 | 385 | Ø380 | Ø430 | Ø500 | 570 | DN65  |
| ECO 300 KL 2 | -    | 1850 | 650 | 875  | 500 | 700  | 325 | 300 | 350 | 385 | Ø380 | Ø430 | Ø500 | 570 | DN65  |
| ECO 350 KL 1 | Ø520 | 1900 | 675 | 900  | 550 | 740  | 350 | 350 | 410 | 450 | Ø430 | Ø480 | Ø550 | 670 | DN80  |
| ECO 350 KL 2 | Ø520 | 1900 | 675 | 900  | 550 | 740  | 350 | 350 | 410 | 450 | Ø430 | Ø480 | Ø550 | 670 | DN80  |
| ECO 350 KL 3 | Ø520 | 1900 | 675 | 900  | 550 | 740  | 350 | 350 | 410 | 450 | Ø430 | Ø480 | Ø550 | 670 | DN80  |
| ECO 400 KL 1 | Ø590 | 1900 | 675 | 920  | 600 | 900  | 500 | 400 | 450 | 510 | Ø480 | Ø530 | Ø600 | 670 | DN80  |
| ECO 400 KL 2 | Ø590 | 1900 | 675 | 920  | 600 | 900  | 500 | 400 | 450 | 510 | Ø480 | Ø530 | Ø600 | 670 | DN80  |
| ECO 400 KL 3 | Ø590 | 1900 | 675 | 920  | 600 | 900  | 500 | 400 | 450 | 510 | Ø480 | Ø530 | Ø600 | 670 | DN80  |
| ECO 450 KL 1 | Ø665 | 1950 | 675 | 960  | 640 | 1000 | 500 | 450 | 500 | 556 | Ø580 | Ø630 | Ø700 | 750 | DN100 |
| ECO 450 KL 2 | Ø665 | 1950 | 675 | 960  | 640 | 1000 | 500 | 450 | 500 | 556 | Ø580 | Ø630 | Ø700 | 750 | DN100 |
| ECO 450 KL 3 | Ø665 | 1950 | 675 | 960  | 640 | 1000 | 500 | 450 | 500 | 556 | Ø580 | Ø630 | Ø700 | 750 | DN100 |
| ECO 500 KL1  | Ø740 | 2500 | 760 | 1100 | 690 | 1000 | 500 | 500 | 550 | 608 | Ø660 | Ø710 | Ø800 | 870 | DN125 |
| ECO 500 KL 2 | Ø740 | 2500 | 760 | 1100 | 690 | 1000 | 500 | 500 | 550 | 608 | Ø660 | Ø710 | Ø800 | 870 | DN125 |
| ECO 500 KL 3 | Ø740 | 2500 | 760 | 1100 | 690 | 1000 | 500 | 500 | 550 | 608 | Ø660 | Ø710 | Ø800 | 870 | DN125 |
| ECO 600 KL 1 | Ø890 | 2550 | 810 | 1100 | 690 | 1000 | 500 | 600 | 660 | 708 | Ø740 | Ø792 | Ø860 | 870 | DN125 |
| ECO 600 KL 2 | Ø890 | 2550 | 810 | 1100 | 690 | 1000 | 500 | 600 | 660 | 708 | Ø740 | Ø792 | Ø860 | 870 | DN125 |
| ECO 600 KL 3 | Ø890 | 2550 | 810 | 1100 | 690 | 1000 | 500 | 600 | 660 | 708 | Ø740 | Ø792 | Ø860 | 870 | DN125 |
| ECO 700 KL 1 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 700 KL 2 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 700 KL 3 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 800 KL 1 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 800 KL 2 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 800 KL 3 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 900 KL 1 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 900 KL 2 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 900 KL 3 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |

**Contact The Sales Department**

**Please Contact The Sales Unit For Special VL Sizes**

➤ Gas- Light Oil Steam Boiler



|              | Ø D  | L    | E   | H    | F   | C    | K   | S1  | S2  | S3  | Ø M1 | Ø M2 | Ø M3 | VL  | DN    |
|--------------|------|------|-----|------|-----|------|-----|-----|-----|-----|------|------|------|-----|-------|
| ECO 250 KL 1 | Ø219 | 1600 | 650 | 875  | 500 | 1100 | 725 | 250 | 300 | 340 | Ø330 | Ø380 | Ø450 | 320 | DN50  |
| ECO 250 KL 2 | Ø246 | 1600 | 650 | 875  | 500 | 1100 | 725 | 250 | 300 | 340 | Ø330 | Ø380 | Ø450 | 320 | DN50  |
| ECO 300 KL 1 | Ø259 | 1600 | 650 | 875  | 500 | 1100 | 725 | 300 | 350 | 385 | Ø380 | Ø430 | Ø500 | 320 | DN65  |
| ECO 300 KL 2 | Ø295 | 1600 | 650 | 875  | 500 | 1100 | 725 | 300 | 350 | 385 | Ø380 | Ø430 | Ø500 | 320 | DN65  |
| ECO 350 KL 1 | Ø323 | 1550 | 675 | 900  | 550 | 1140 | 750 | 350 | 410 | 450 | Ø430 | Ø480 | Ø550 | 320 | DN80  |
| ECO 350 KL 2 | Ø350 | 1550 | 675 | 900  | 550 | 1140 | 750 | 350 | 410 | 450 | Ø430 | Ø480 | Ø550 | 320 | DN80  |
| ECO 350 KL 3 | Ø365 | 1550 | 675 | 900  | 550 | 1140 | 750 | 350 | 410 | 450 | Ø430 | Ø480 | Ø550 | 320 | DN80  |
| ECO 400 KL 1 | Ø393 | 1600 | 675 | 920  | 600 | 1300 | 900 | 400 | 450 | 510 | Ø480 | Ø530 | Ø600 | 370 | DN80  |
| ECO 400 KL 2 | Ø401 | 1600 | 675 | 920  | 600 | 1300 | 900 | 400 | 450 | 510 | Ø480 | Ø530 | Ø600 | 370 | DN80  |
| ECO 400 KL 3 | Ø431 | 1600 | 675 | 920  | 600 | 1300 | 900 | 400 | 450 | 510 | Ø480 | Ø530 | Ø600 | 370 | DN80  |
| ECO 450 KL 1 | Ø450 | 1550 | 675 | 960  | 640 | 1400 | 900 | 450 | 500 | 556 | Ø580 | Ø630 | Ø700 | 350 | DN100 |
| ECO 450 KL 2 | Ø485 | 1550 | 675 | 960  | 640 | 1400 | 900 | 450 | 500 | 556 | Ø580 | Ø630 | Ø700 | 350 | DN100 |
| ECO 450 KL 3 | Ø499 | 1550 | 675 | 960  | 640 | 1400 | 900 | 450 | 500 | 556 | Ø580 | Ø630 | Ø700 | 350 | DN100 |
| ECO 500 KL1  | Ø542 | 2105 | 760 | 1100 | 690 | 1450 | 950 | 500 | 550 | 608 | Ø660 | Ø710 | Ø800 | 475 | DN125 |
| ECO 500 KL 2 | Ø556 | 2105 | 760 | 1100 | 690 | 1450 | 950 | 500 | 550 | 608 | Ø660 | Ø710 | Ø800 | 475 | DN125 |
| ECO 500 KL 3 | Ø568 | 2105 | 760 | 1100 | 690 | 1450 | 950 | 500 | 550 | 608 | Ø660 | Ø710 | Ø800 | 475 | DN125 |
| ECO 600 KL 1 | Ø599 | 2155 | 810 | 1100 | 690 | 1450 | 950 | 600 | 660 | 708 | Ø740 | Ø792 | Ø860 | 475 | DN125 |
| ECO 600 KL 2 | Ø619 | 2155 | 810 | 1100 | 690 | 1450 | 950 | 600 | 660 | 708 | Ø740 | Ø792 | Ø860 | 475 | DN125 |
| ECO 600 KL 3 | Ø630 | 2155 | 810 | 1100 | 690 | 1450 | 950 | 600 | 660 | 708 | Ø740 | Ø792 | Ø860 | 475 | DN125 |
| ECO 700 KL 1 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 700 KL 2 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 700 KL 3 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 800 KL 1 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 800 KL 2 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 800 KL 3 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 900 KL 1 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 900 KL 2 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |
| ECO 900 KL 3 |      |      |     |      |     |      |     |     |     |     |      |      |      |     |       |

**Contact The Sales Department**

**Please Contact The Sales Unit For Special VL Sizes**

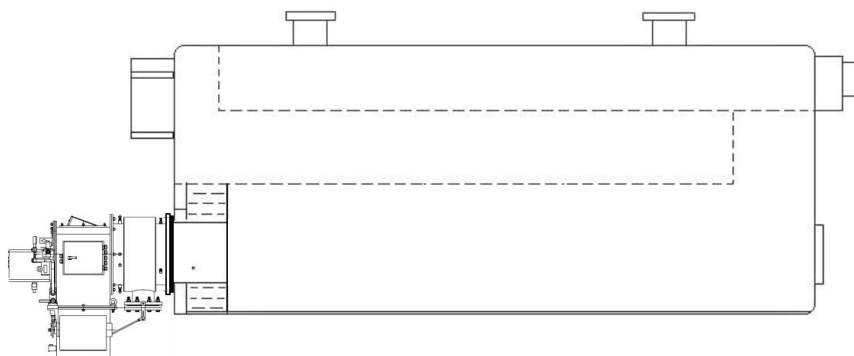


## 5. INSTALLATION

### 5.1. Burner Installation Picture

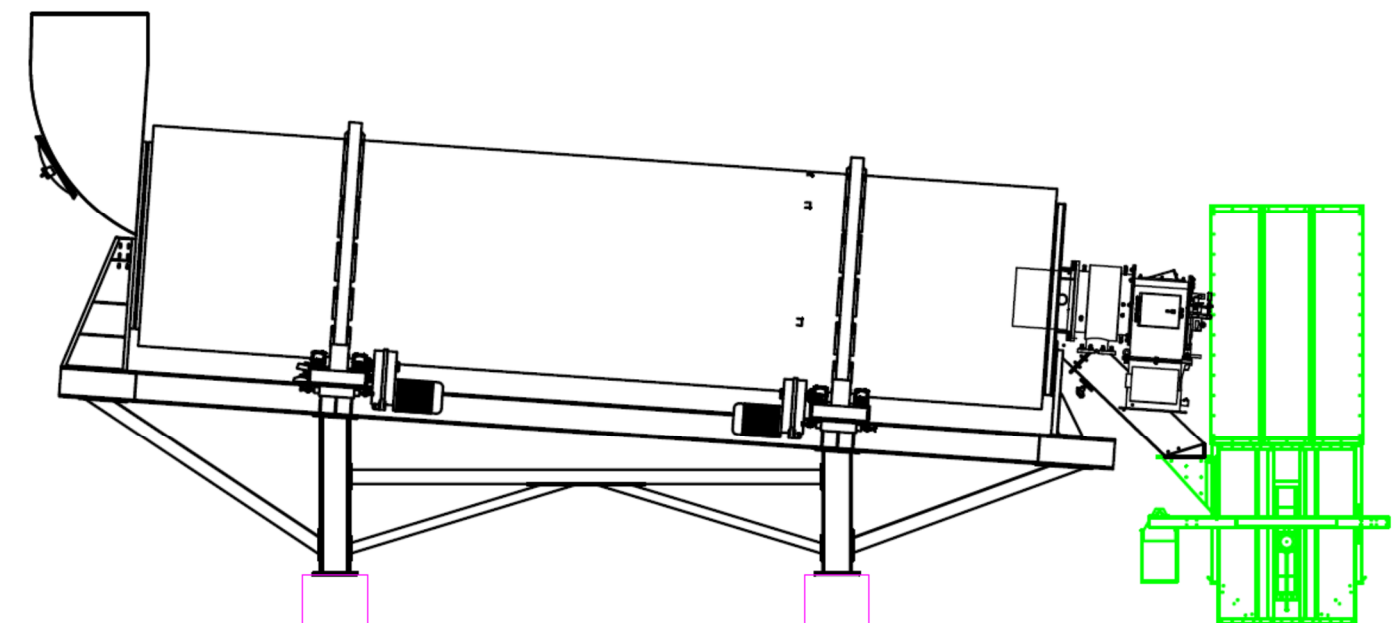
#### Installation on the Boiler

- In the installation of the burner, please only use the installation materials supplied with the burner.
- Make sure that there are no gaps between the flange and boiler cover and ensure a full sealing by a gasket.



Make sure that, when installing burner at tree pass boilers, the end point of flame pipe should be on the same plane with the cover insulation material.

#### Asphalt plant application



## 6. COMMISSIONING

### 6.1. General Controls



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

- Installation of the burner to the boiler is checked.
- Check the fuel line (Are the pipe diameters and the pipe installation correct?)
- Check energy input cables and voltages.
- Check the fuel nozzles according to the boiler capacity.
- Prior to operating the burner, control the boiler water level.
- Make sure water circulation system is turned on, and steam boiler and water feed pumps and boiler inlet - outlets are open.
- Is there electricity current?
- Is there gas?
- Has the boiler explosion lid been controlled?
- Is there sufficient air in boiler room?
- Has the air of the gas line been removed? Has a sealing test been made?

### Commissioning order

#### **Operating with Light-Oil;**

- After performing the above mentioned controls, open the fuel tank valve.
- Open the valve upstream of the fuel filter.
- Check direction of motor rotation.
- Open the pump's vent plug and place the manometer (0-40 bar).
- Turn on the burner switch (turn to position 1).
- When the burner starts up, the motor is activated and turns the pump at the same time.
- It actuates pre-purge and discharges the residual gases remaining in the boiler from the funnel.
- After the pre-purge, fuel is delivered from the nozzle. The fuel meets the flame from the ignition electrodes and the combustion starts.
- After combustion of the burner, the pump pressure is adjusted (modulating; 25 bar).
- The boiler thermostat is adjusted as desired (70-90°C for central heating boilers).
- For the safety of the system, check the boiler thermostats and observe the deactivation of the burner.

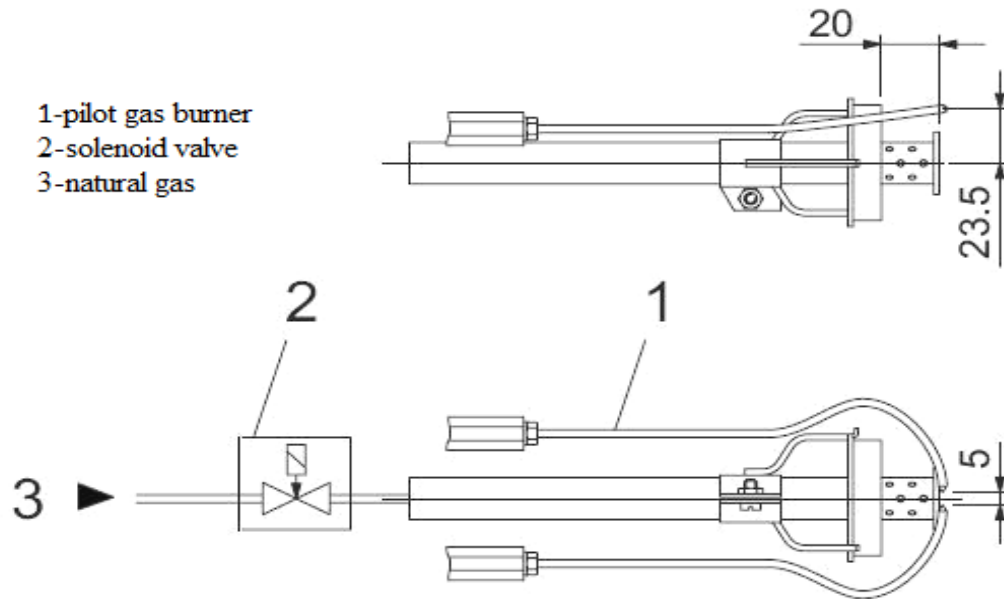
#### **Operating with Gas;**

##### Operation of a modulating burner

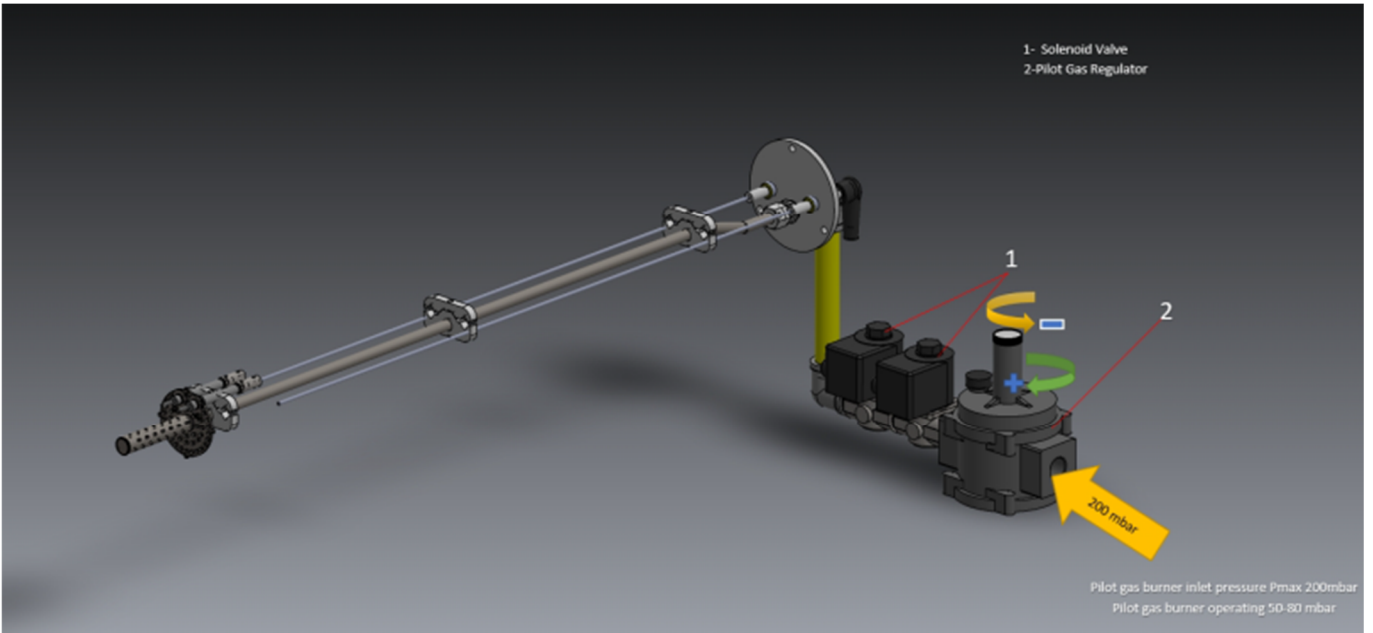
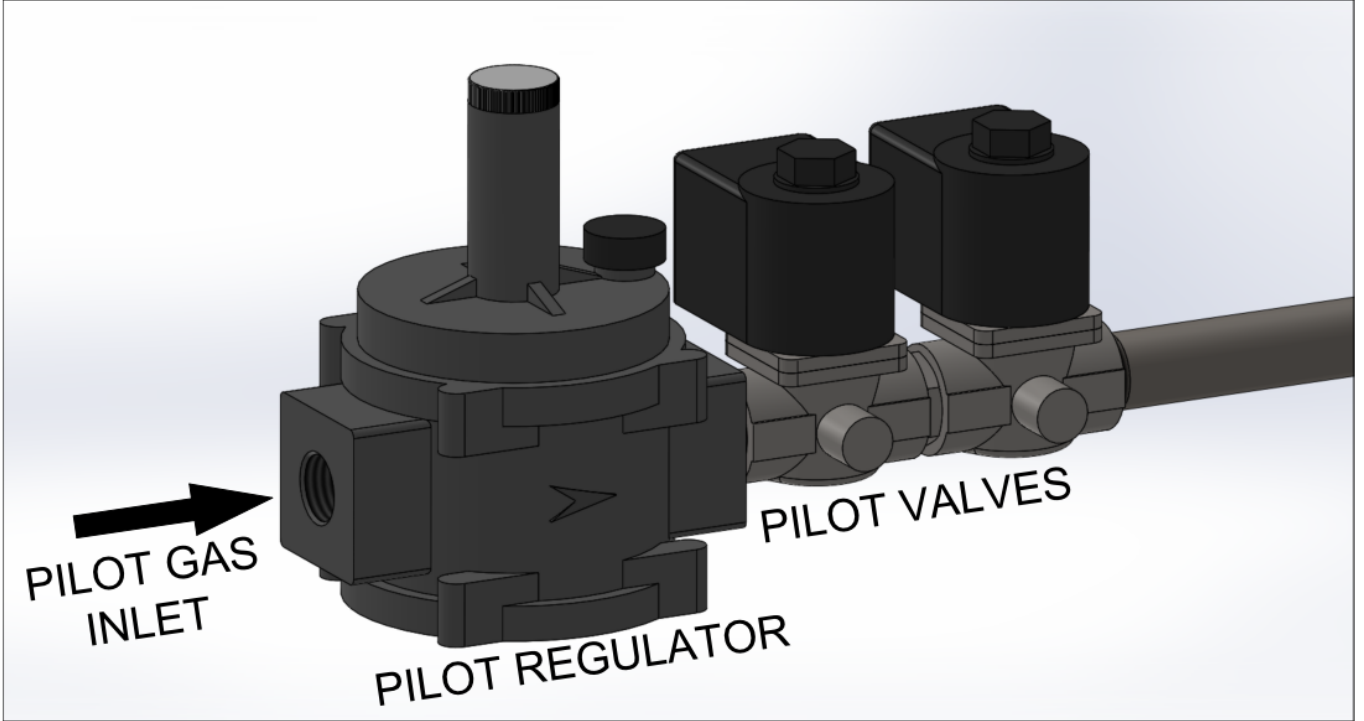
- Open the main gas valve; check max 300 mbar gas pressure from the manometer.
- Open operating switch on the burner panel.
- Turn modulating control switch to automatic.
- Turn the fuel selector switch to "GAS" position.
- Check the temperature and pressure set values from the modulating control unit.
- Burner fan motor will be activated.
- Louvres will open during pre-purge and ignition will take place once louvres are in start position.
- 3 sec. later, the gas valve will be opened and combustion will occur.
- Flame control system will start to flame control.
- In modulating burner, the burner goes into max. capacity according to the signal from the modulating control unit.
- When the boiler water temperature or steam pressure increase, the modulating control unit will cause burner to run with min. capacity.
- 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.

## 6.2. Combustion Adjustment

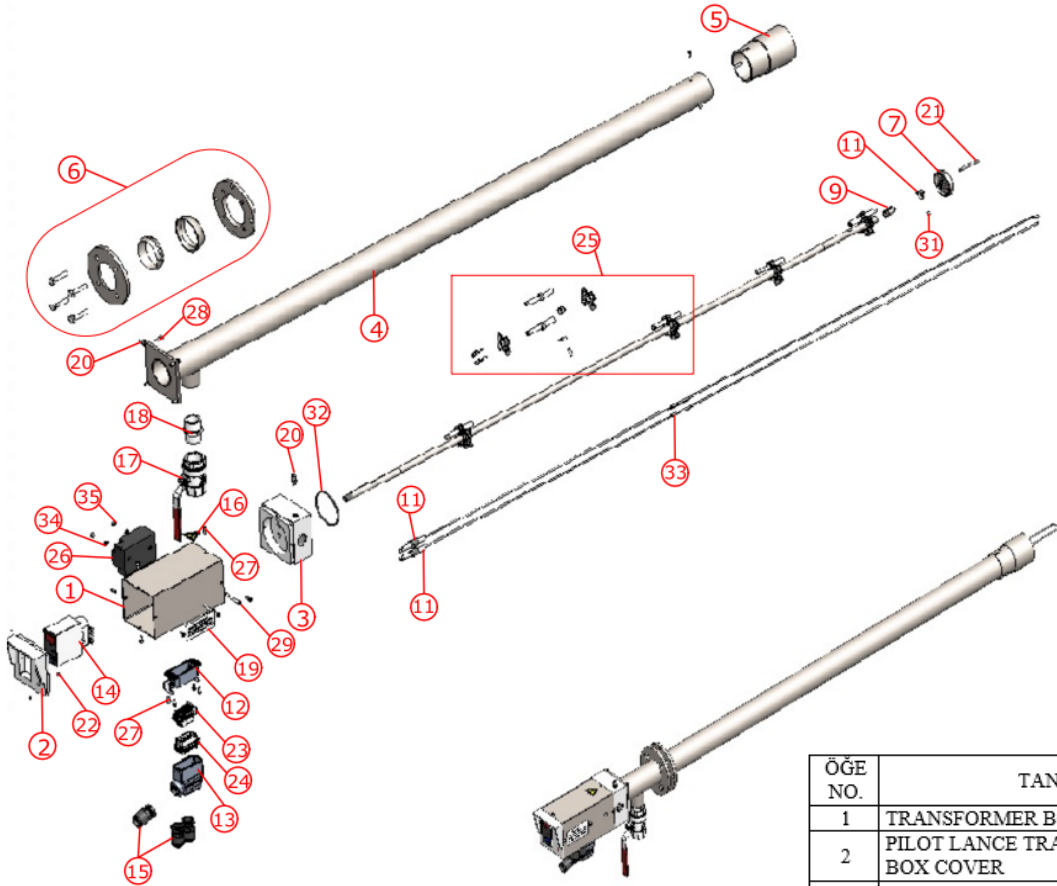
### 6.2.1. Pilot Ignition System



**Pilot gas burner inlet pressure  $P_{max}=150-200$  mbar.  
Operation should be set to  $80-100$ mbar.**



6.2.2.PAL



Gas inlet pressure:35mbar  
Air pressure:17mbar  
Qmax:4,5m³/h  
Flame length:400mm

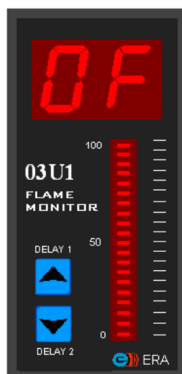
| ÖGE NO. | TANIM                             |
|---------|-----------------------------------|
| 1       | TRANSFORMER BOX                   |
| 2       | PILOT LANCE TRANSFORMER BOX COVER |
| 3       | PILOT LANCE BODY                  |
| 4       | PILOT LANCE OUTER PIPE            |
| 5       | FLAME STABILIZER                  |
| 6       | PILOT LANCE CONNECTING FLANGE     |
| 7       | TURBULATOR                        |
| 8       | GAS PIPE INNER                    |
| 9       | GAS NOZZLE                        |
| 10      | TURBULATOR CENTERING PART         |
| 11      | IGNITION ELECTRODE                |
| 12      | MACHINE TYPE SOCKET               |
| 13      | SOCKET BODY                       |
| 14      | FLAME MONITOR                     |
| 15      | SLEEVE                            |
| 16      | LABEL HIGH VOLTAGE                |
| 17      | NATURAL GAS BALL VALVE            |
| 18      | CASTING NIPPLE                    |
| 19      | LABEL                             |
| 20      | PURGER                            |
| 21      | IGNITION ARC SHAFT                |
| 22      | RED LAMP                          |
| 23      | SOCKET                            |
| 24      | RECEIPT                           |
| 25      | PILOT LANCE CENTERING             |
| 26      | TRANSFORMER                       |
| 27      | BOLT                              |
| 28      | BOLT                              |
| 29      | BOLT                              |
| 30      | SET SCREW                         |
| 31      | SET SCREW                         |
| 32      | O-RING                            |
| 33      | SPLIT PIN                         |
| 34      | WASHER                            |
| 35      | NUT                               |

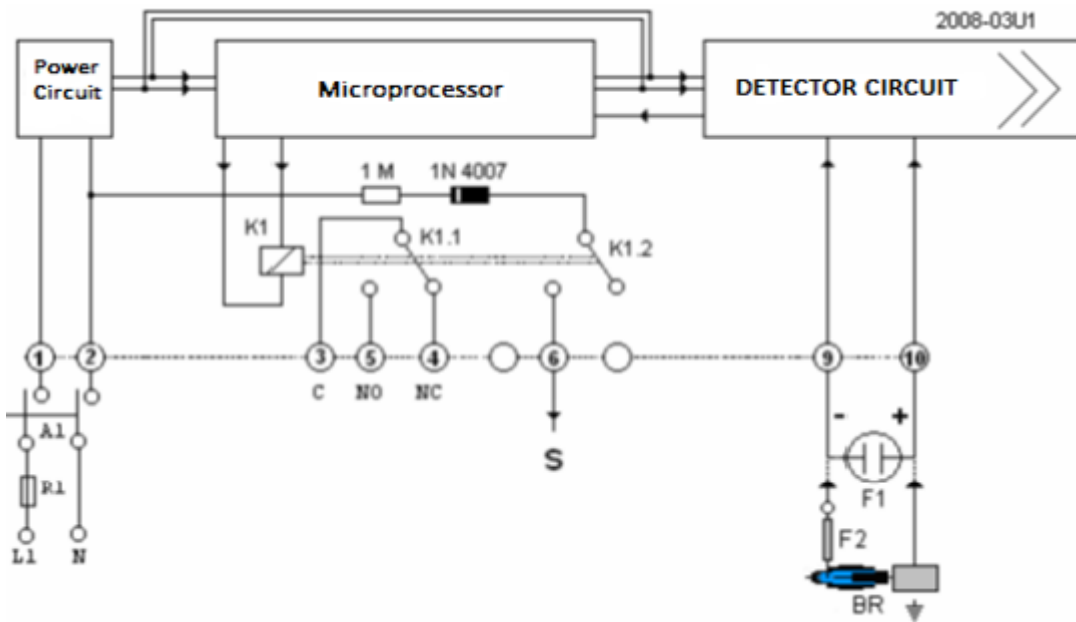
## Flame Monitor



### 03U1 Structure of the flame monitor

- 
- Electronic flame monitoring circuit,
- A relay with bipolar-bidirectional free contact output
- A bargraph or dotmatrix led set, displaying flame existence or level
- Buttons to set the delay time of the flame relay
- A display that displays “ON” when the flame is detected and “OFF” when the flame goes out
- The outer box is made of heat resistant plastic.





### 03A1 Structure of the flame monitor

- Electronic flame monitoring circuit,
- A relay with bipolar-bidirectional free contact output
- A operation lamp that is integrated to the electronic circuit which operates according to the flame's existence and strength,
- Buttons to set the delay time of the flame relay
- A display that displays "ON" when the flame is detected and "OFF" when the flame goes out
- The outer box is made of heat resistant plastic.
- 
- 



The controller device must never be opened or modified!

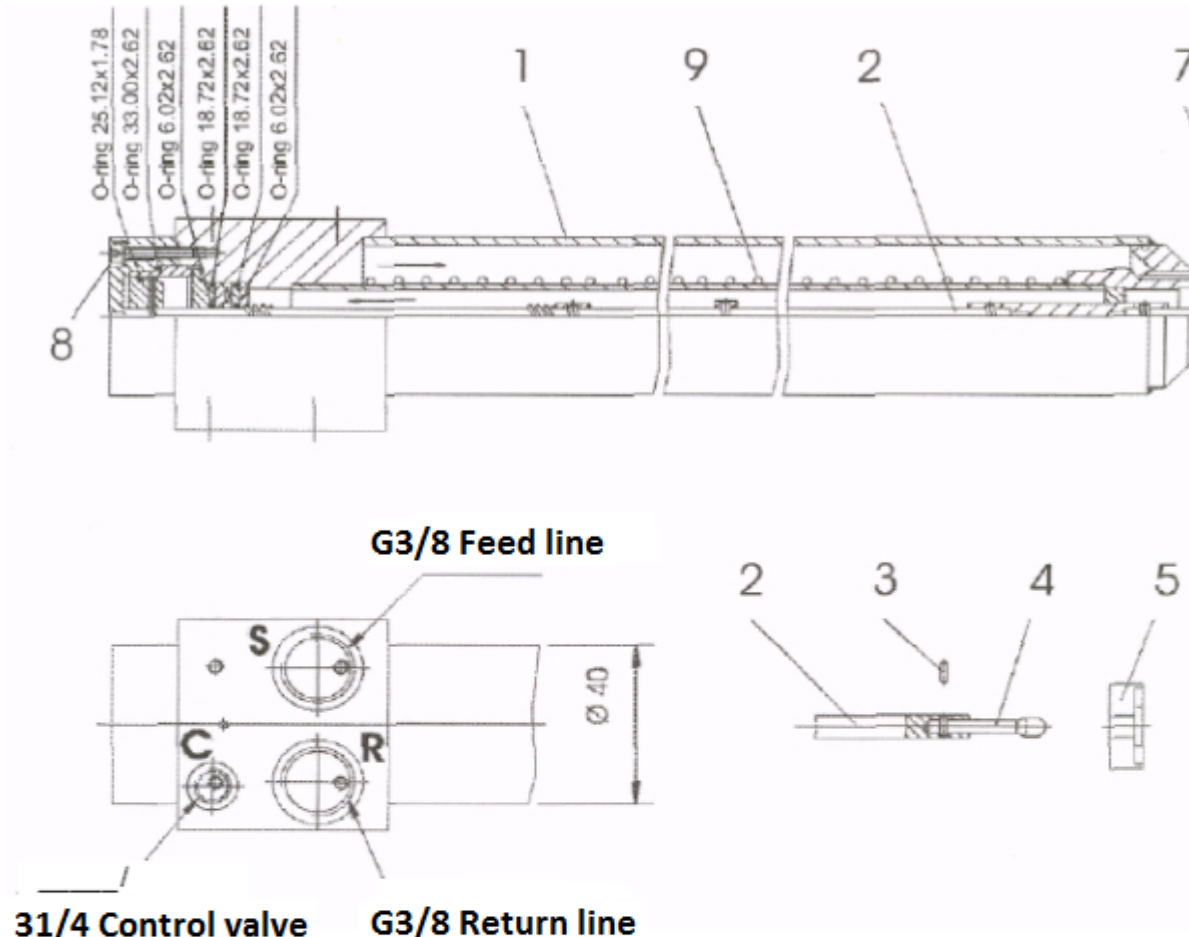
- The flame monitor must be installed and run by authorized staff only.
- The power supply must be turned off prior to removing the device from its socket
- Connection terminals must be checked after installation of cables
- If any problem occurs with the device, our technical staff must be contacted before intervening.



### 6.3. Nozzle

#### ➤ HA-D Nozzle

32-HA-D is a needle closed lance with return line. Shut down needle (4) make press to nozzle plate (6) through a spiral on pushing piston. Shut down needle is opened by pneumatic way.



- |   |                  |   |              |
|---|------------------|---|--------------|
| 1 | 32 HA-D          | 6 | Nozzle plate |
| 2 | Nozzle rod       | 7 | Collar nut   |
| 3 | Pin              | 8 | Screw        |
| 4 | Shut-off needle  | 9 | Resistance   |
| 5 | Turbulence plate |   |              |

#### installation of shut-off needle and plates

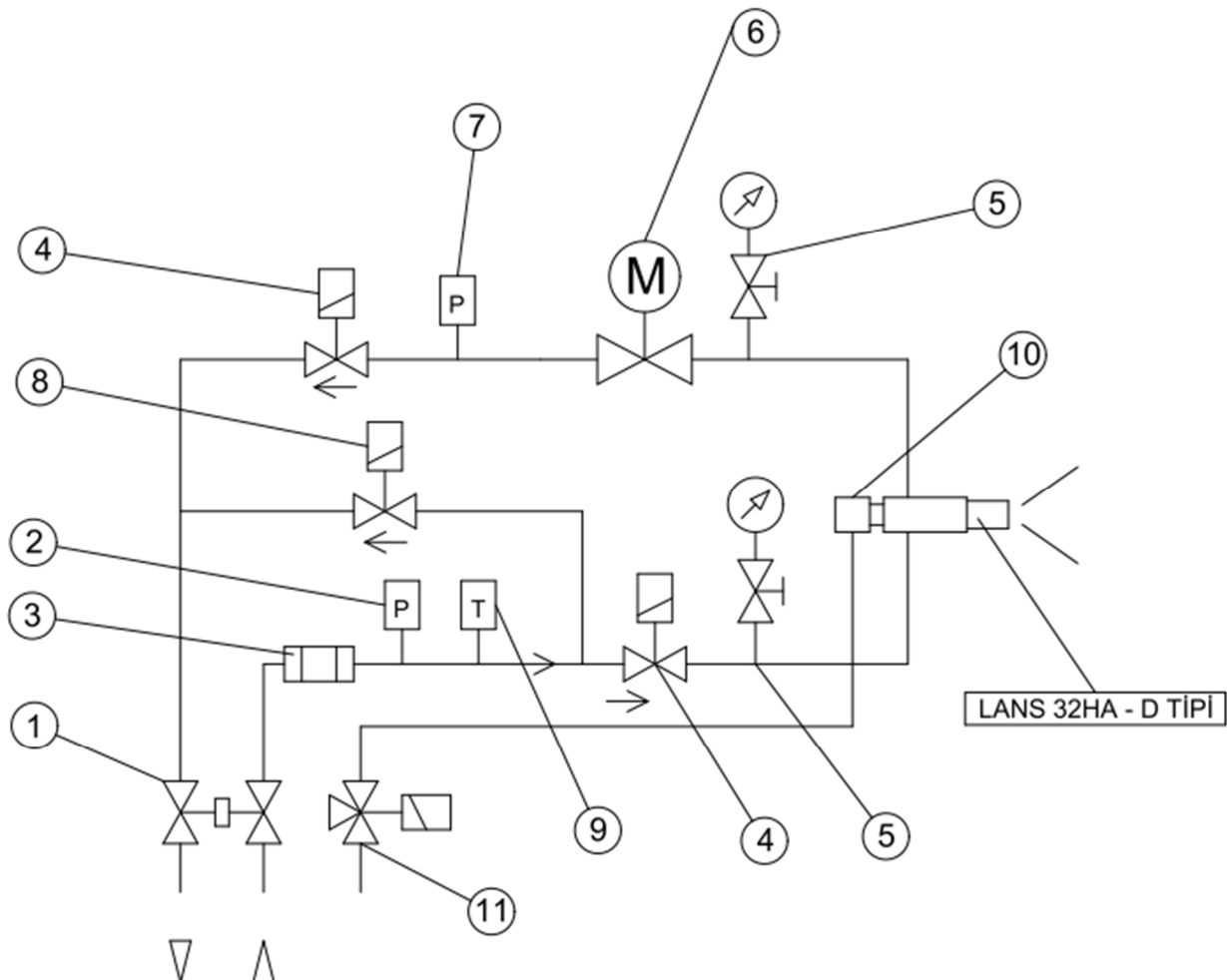
.Loosen the screws(8) and pull out the nozzle rod(2) backwards

.Insert shut-off needle(4) and pin(3)

.After inserting the rod, check if the needle head is inserted in the needle guide and turbulence plate

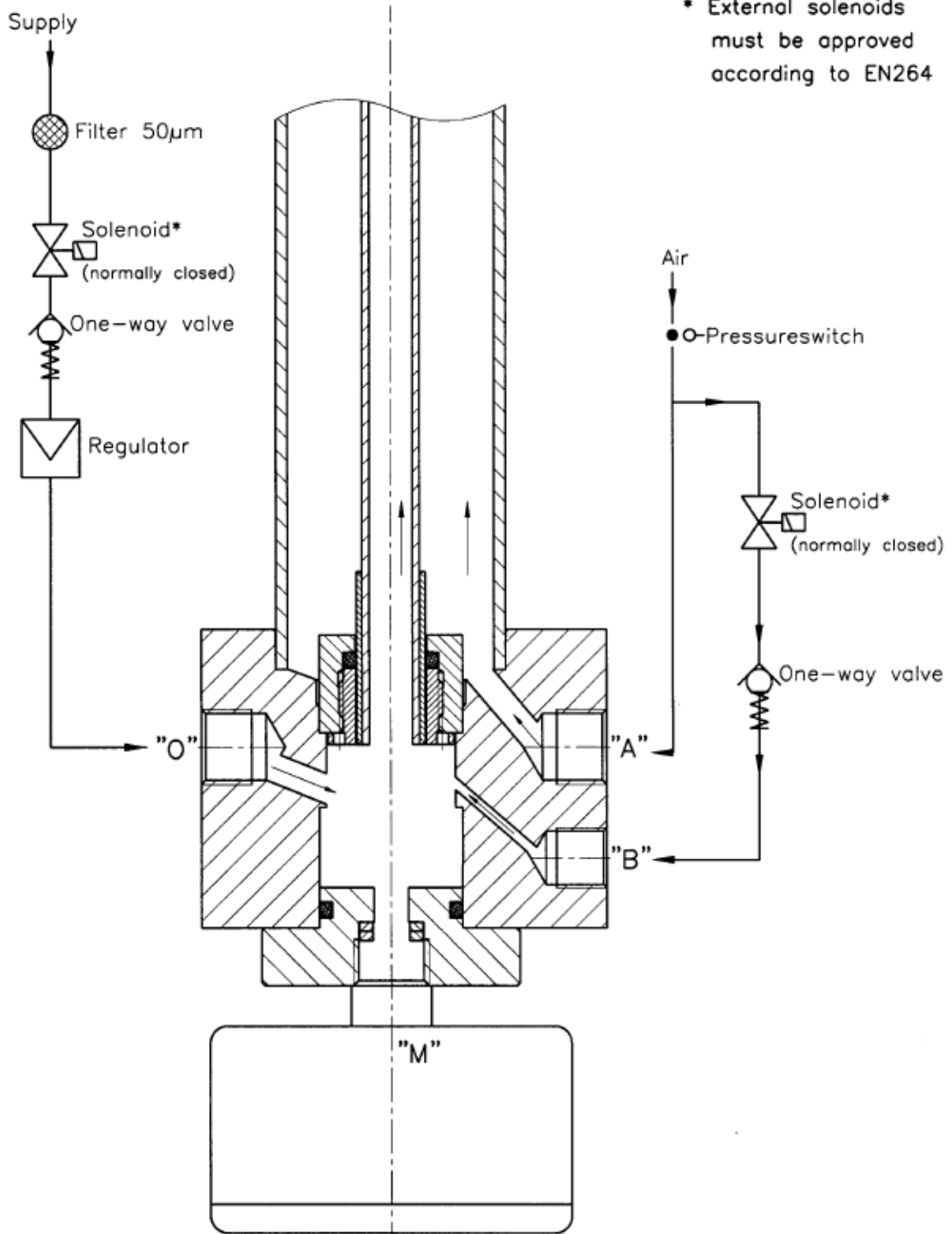


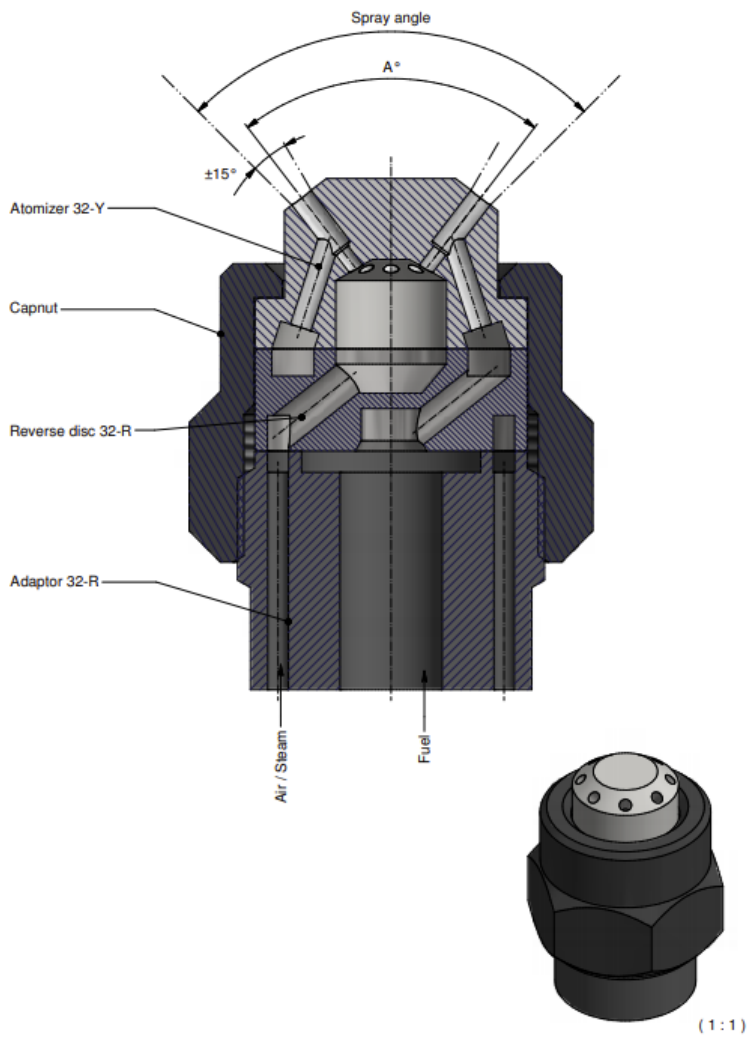
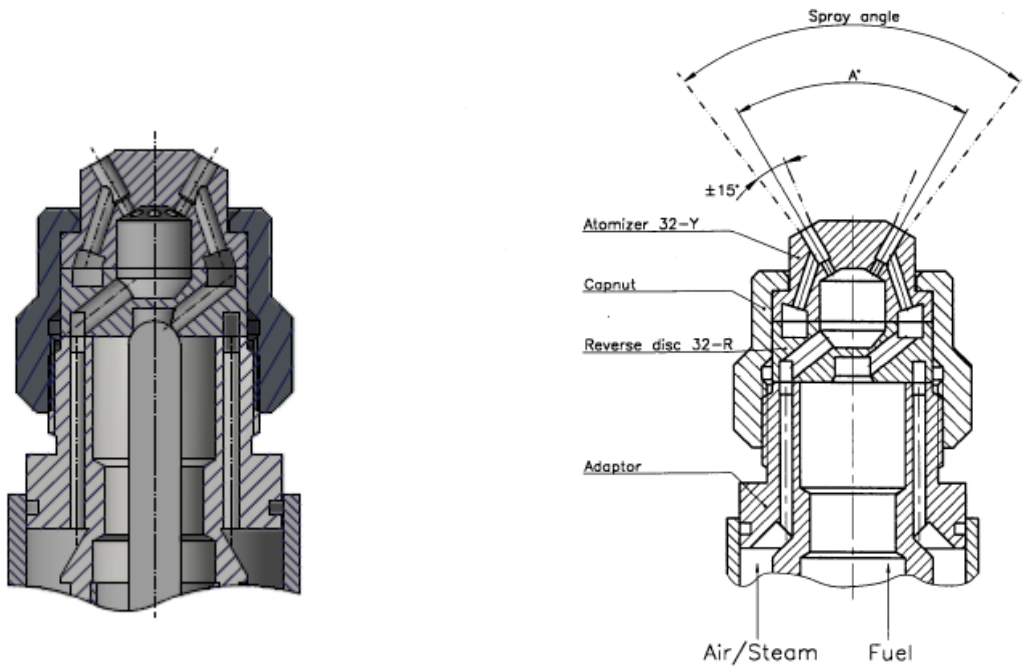
➤ **HA-D Nozzle Hydraulic Diagram**



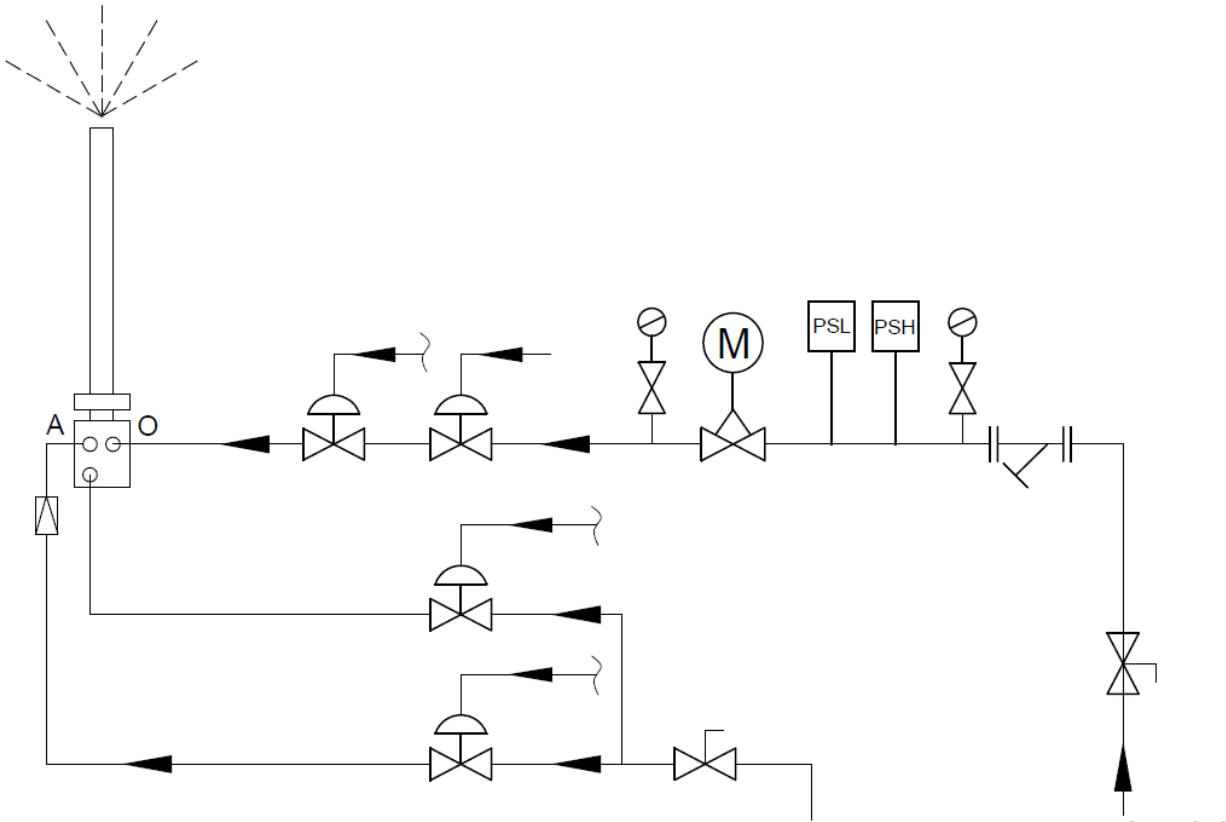
- 1- Double Ball Valve
- 2- Pressure Switch Min. (Optional)
- 3- Filter
- 4- Selenoid Valve
- 5- Manometer and Tap
- 6- 3/4" Oil Adjustment Valve and Servomotor
- 7- Pressure Switch Max. (Optional)
- 8- Selenoid Valve
- 9- Thermostat
- 10- Pneumatic Air Inlet
- 11- 3/2 Way Valve (Compressor Air)

➤ **SK Nozzle**

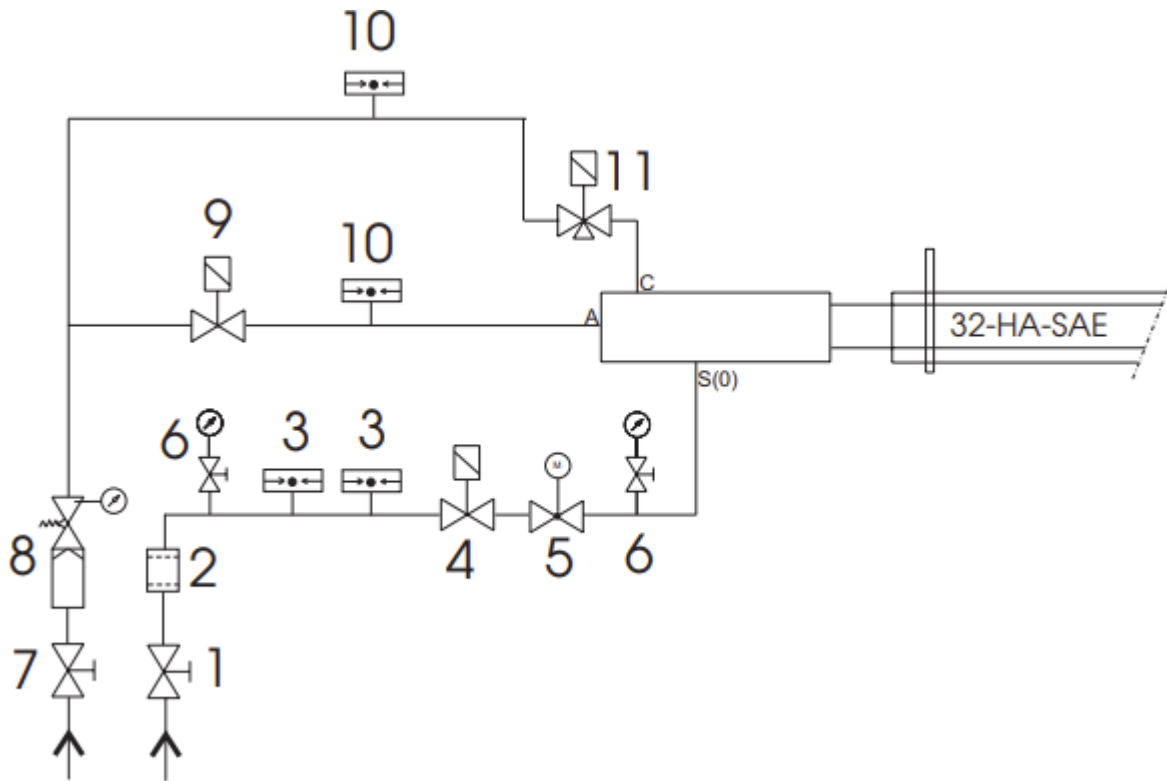




➤ SK Type Nozzle Hydraulic Diagram

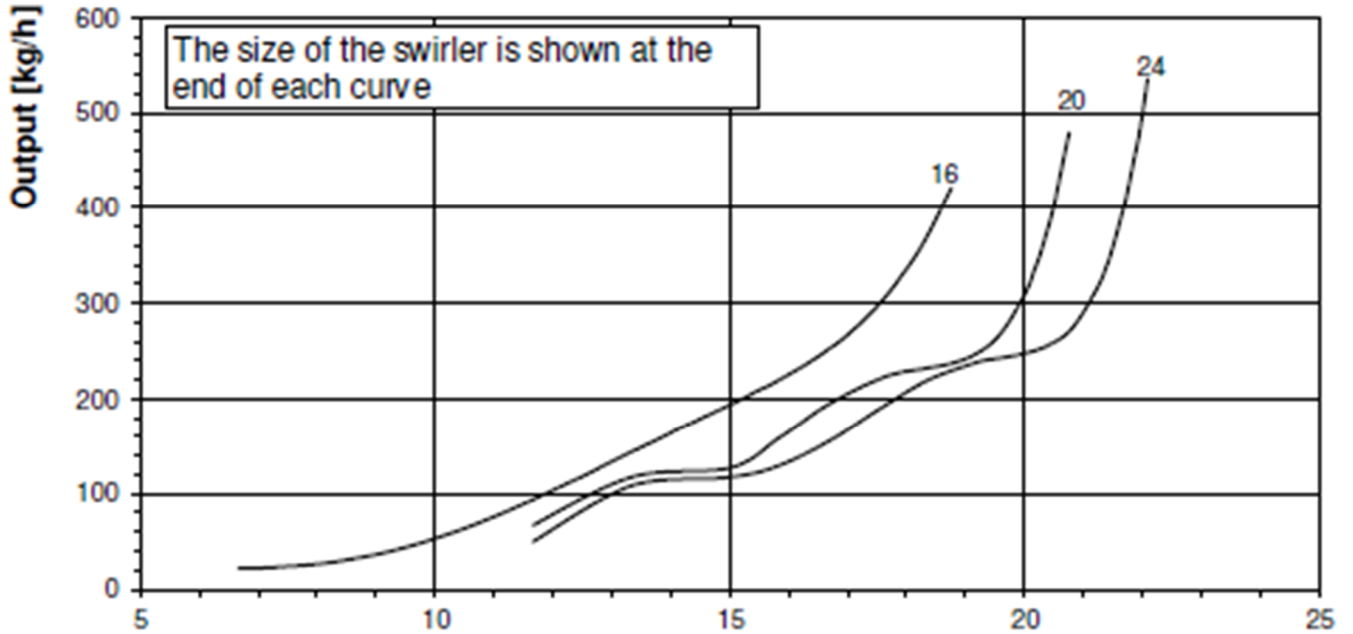


➤ H Type Nozzle Hydraulic Diagram

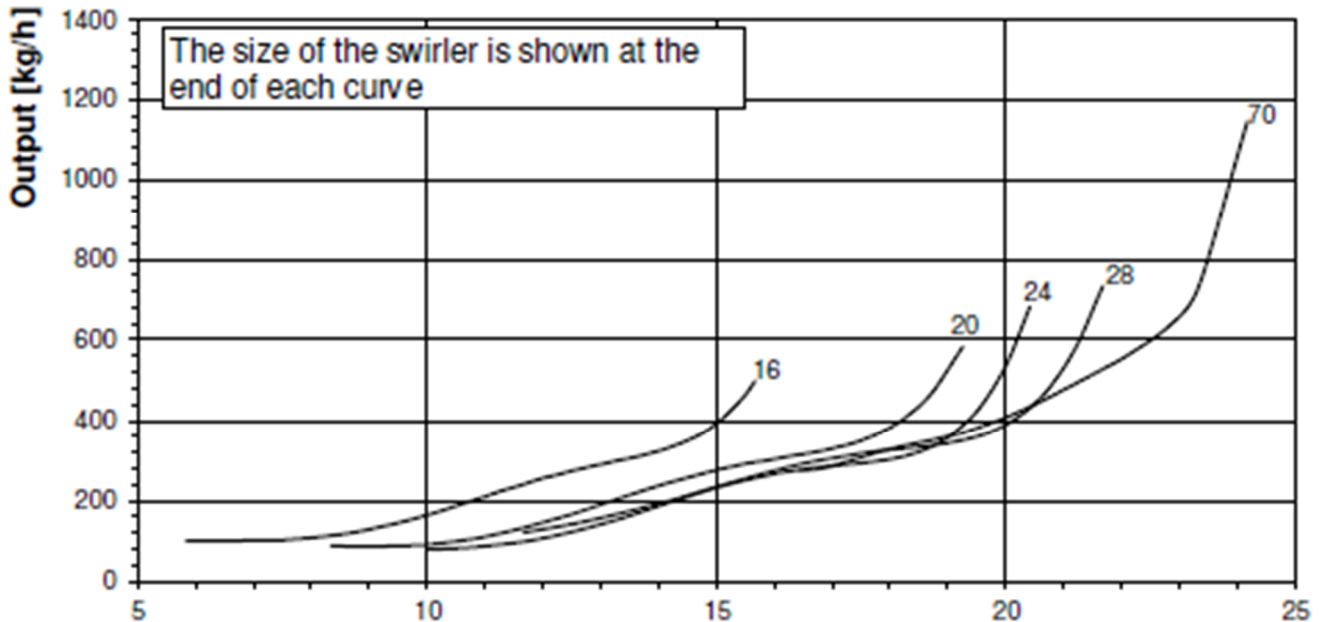


### 6.4. Curves According To Fuel Consumption (Fuel Nozzles)

➤ ECO 250.1 & ECO 350.2

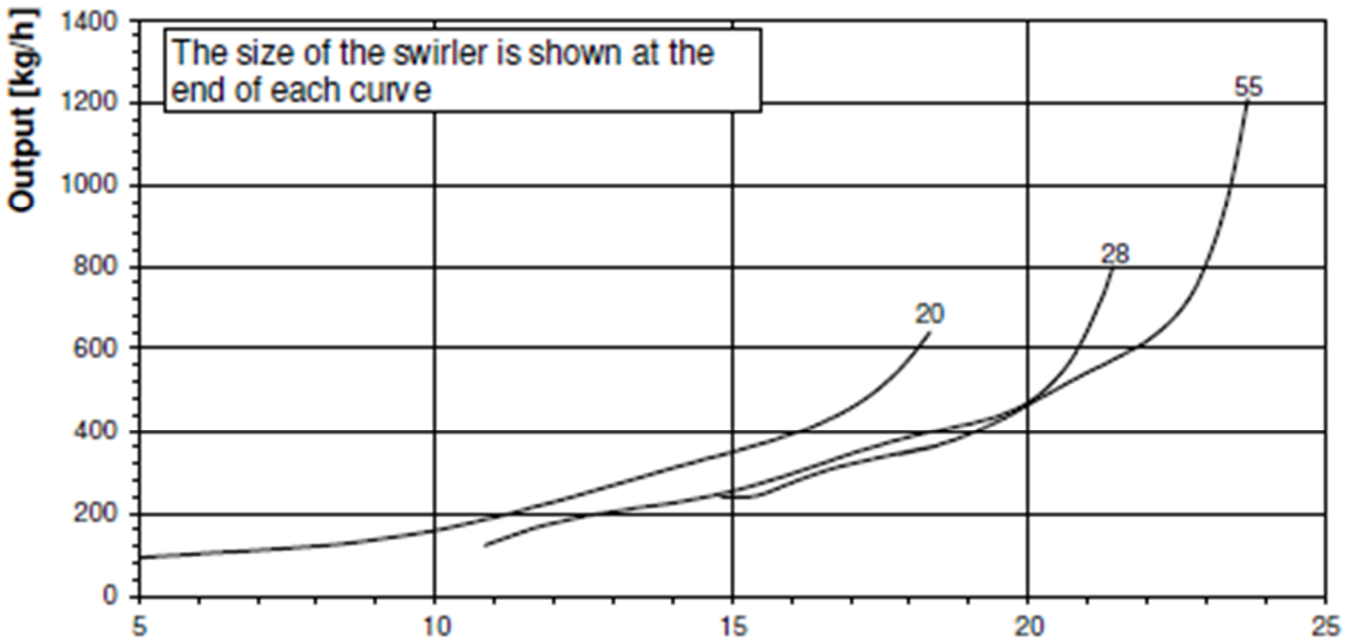


➤ ECO 350.3 & ECO 400.1

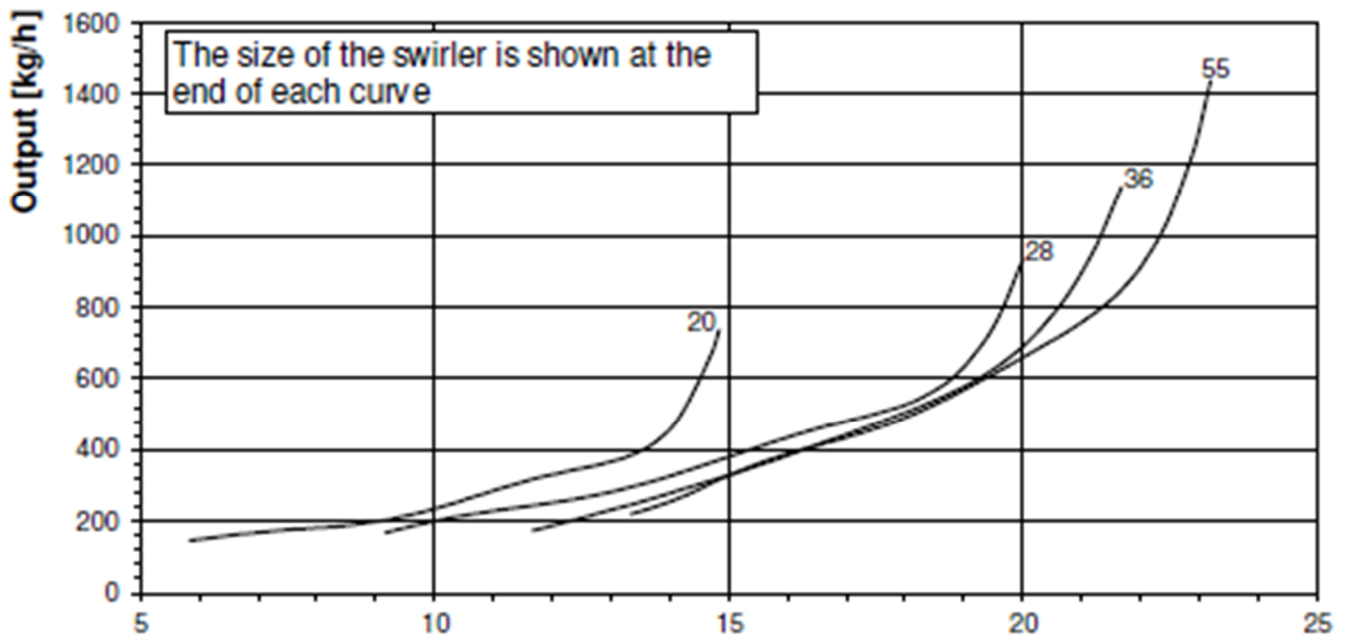


Pump Operating Pressure 25 Bar

➤ ECO 400.2 & ECO 400.3 & ECO 450.1

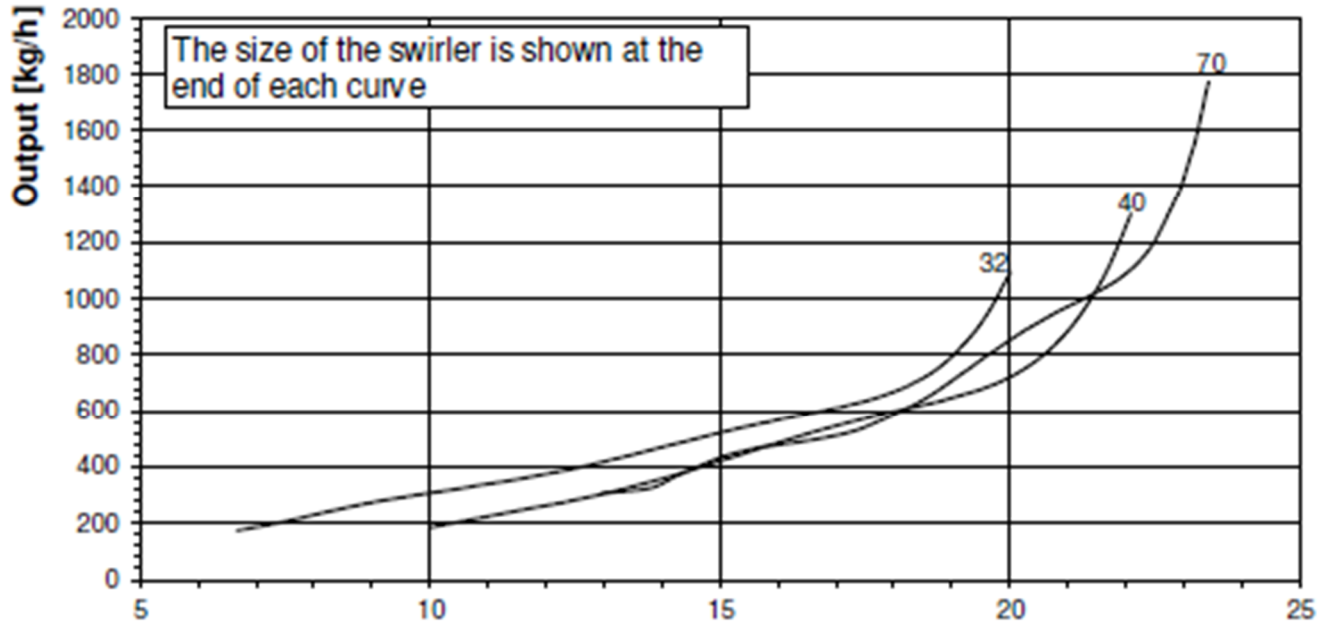


➤ ECO 450.2 & ECO 450.3

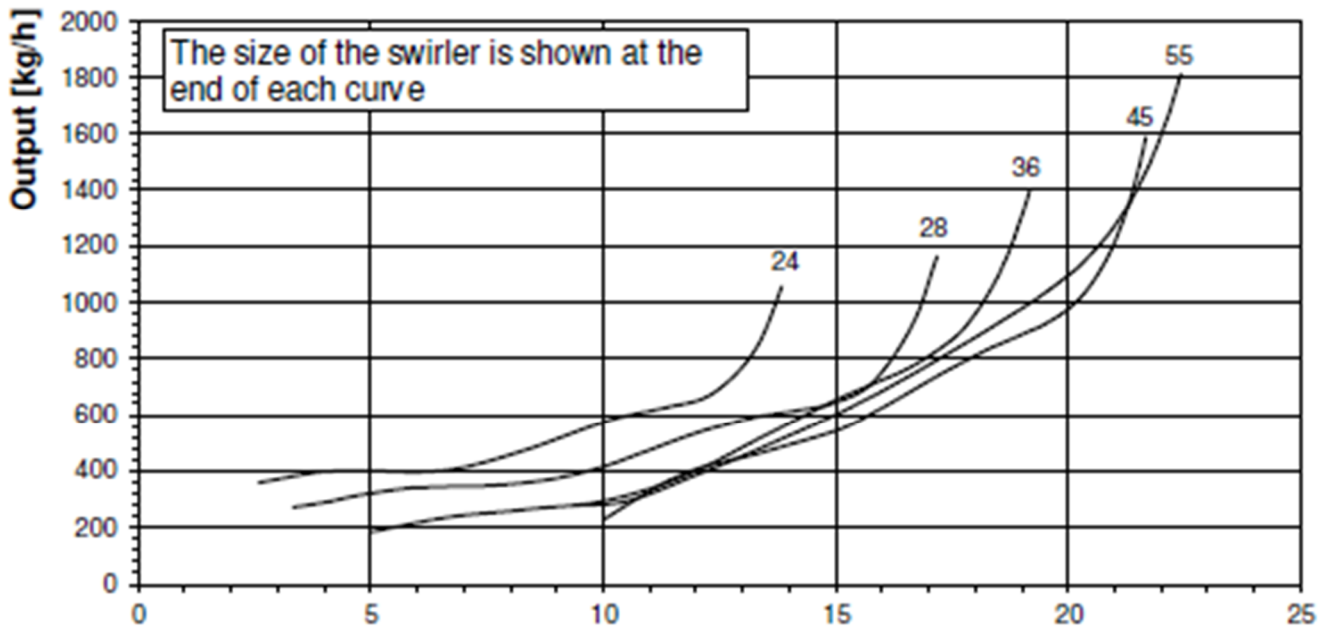


Pump Operating Pressure 25 Bar

➤ ECO 500.1 & ECO 500.2



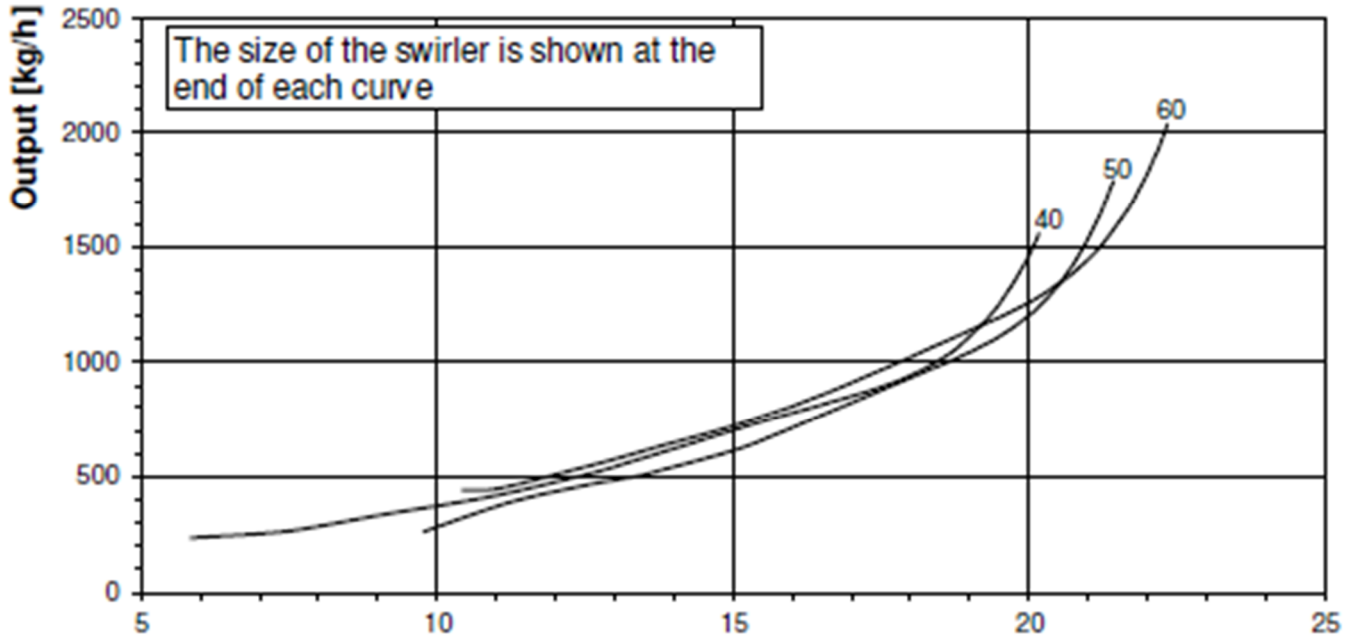
➤ ECO 500.3 & ECO 600.1



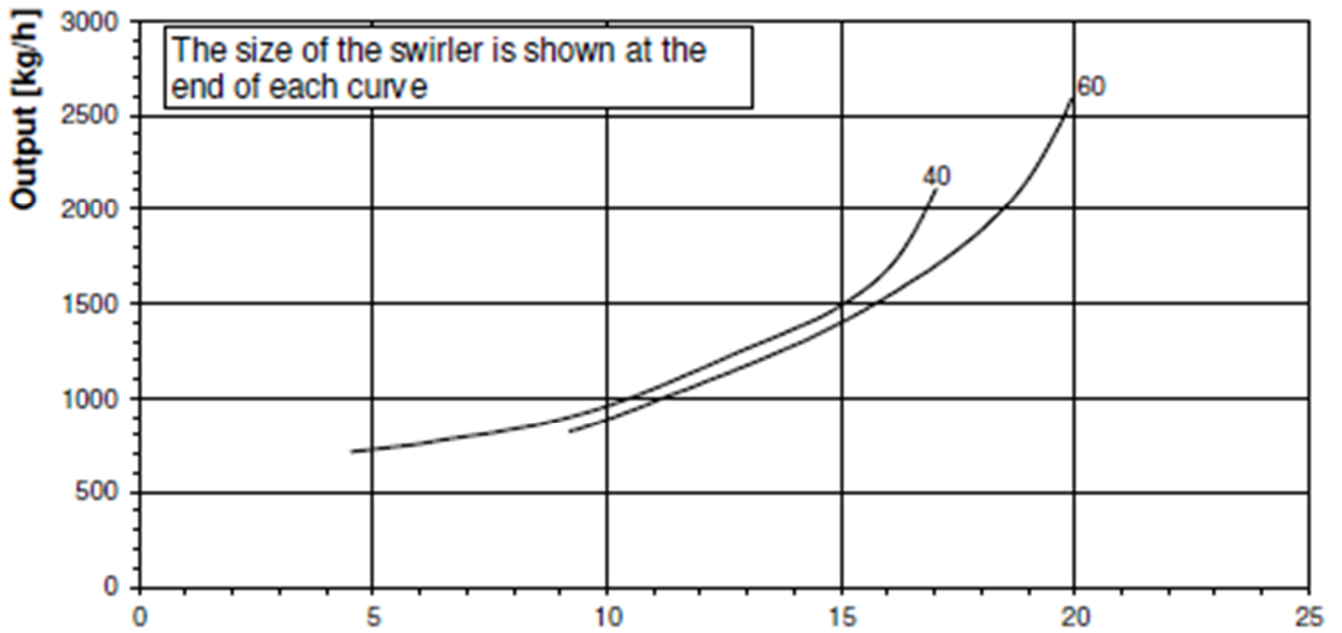
Pump Operating Pressure 25 Bar



➤ ECO 600.2



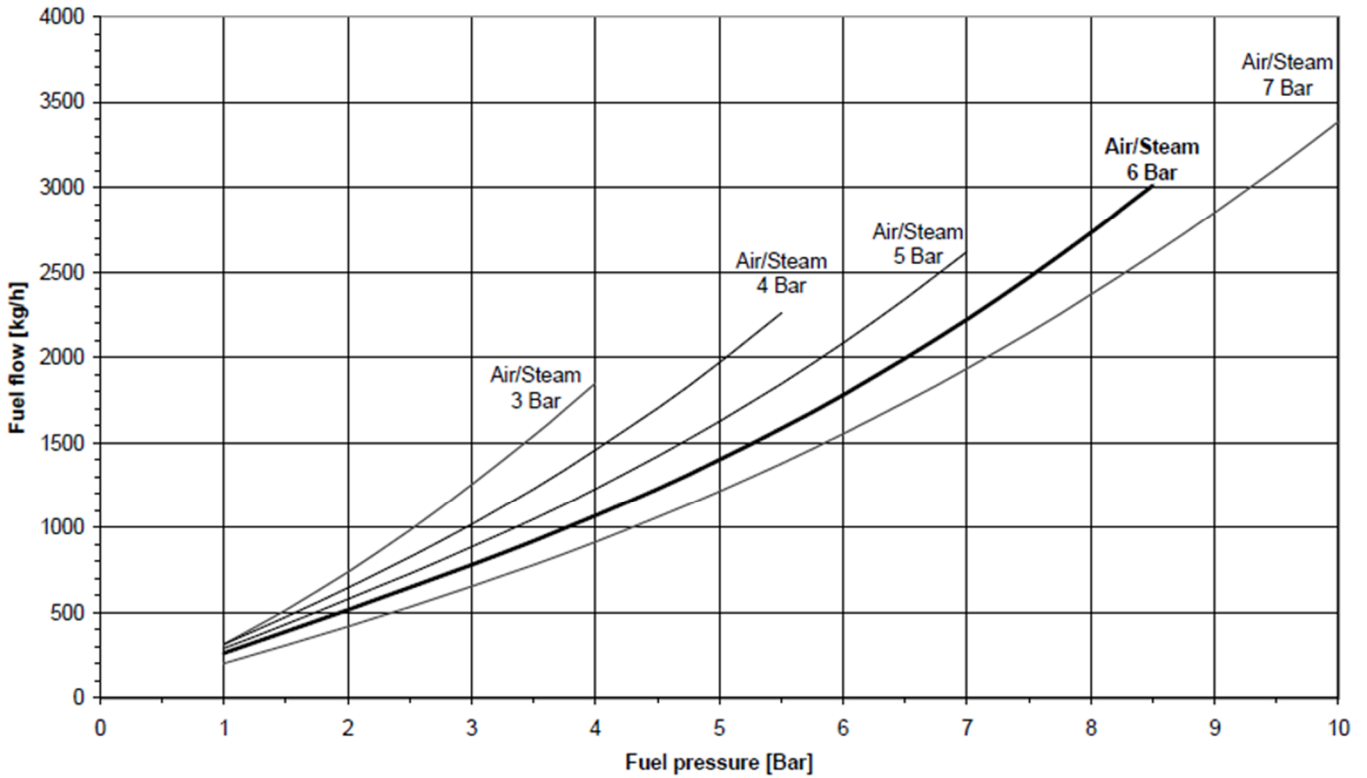
➤ ECO 600.3 & ECO 700.1 & ECO 700.2 & ECO 700.3



Pump Operating Pressure 25 Bar

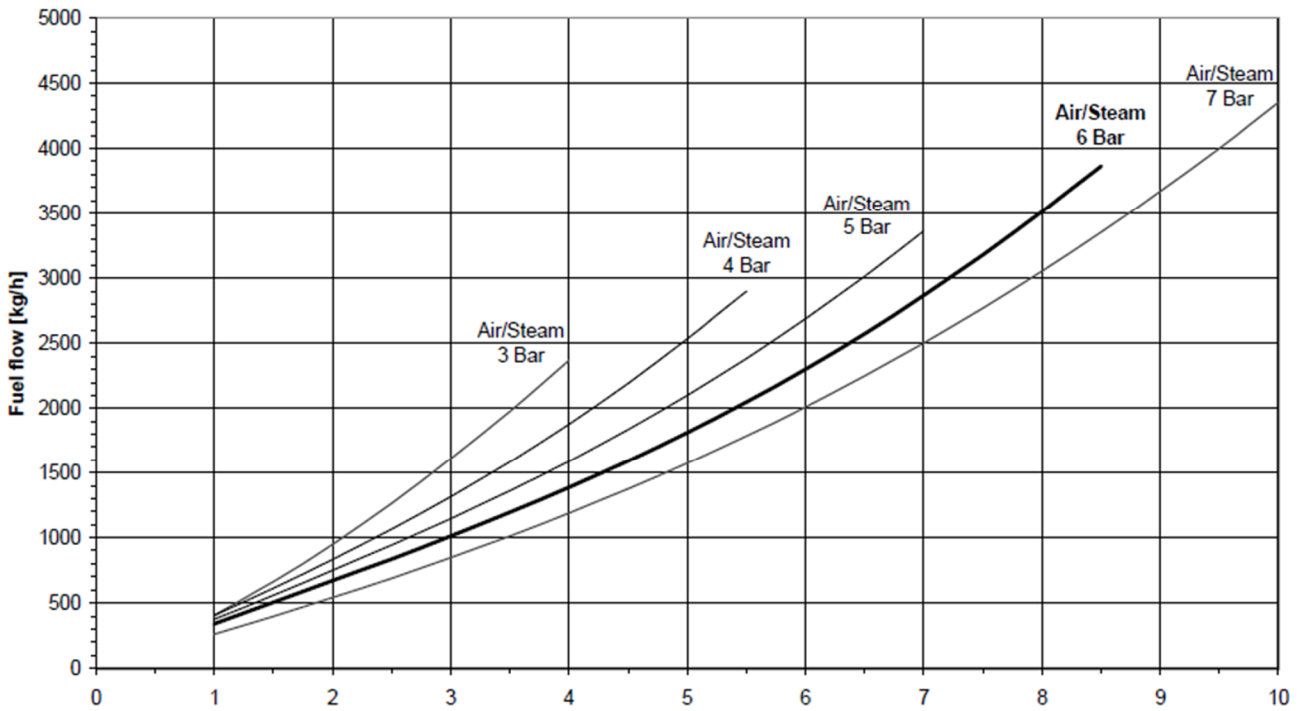
➤ ECO 800.1 & ECO 800.2

**Atomizer 32-Y-A°-14-7 with reverse disc**



➤ ECO 800.3 & ECO 900.1

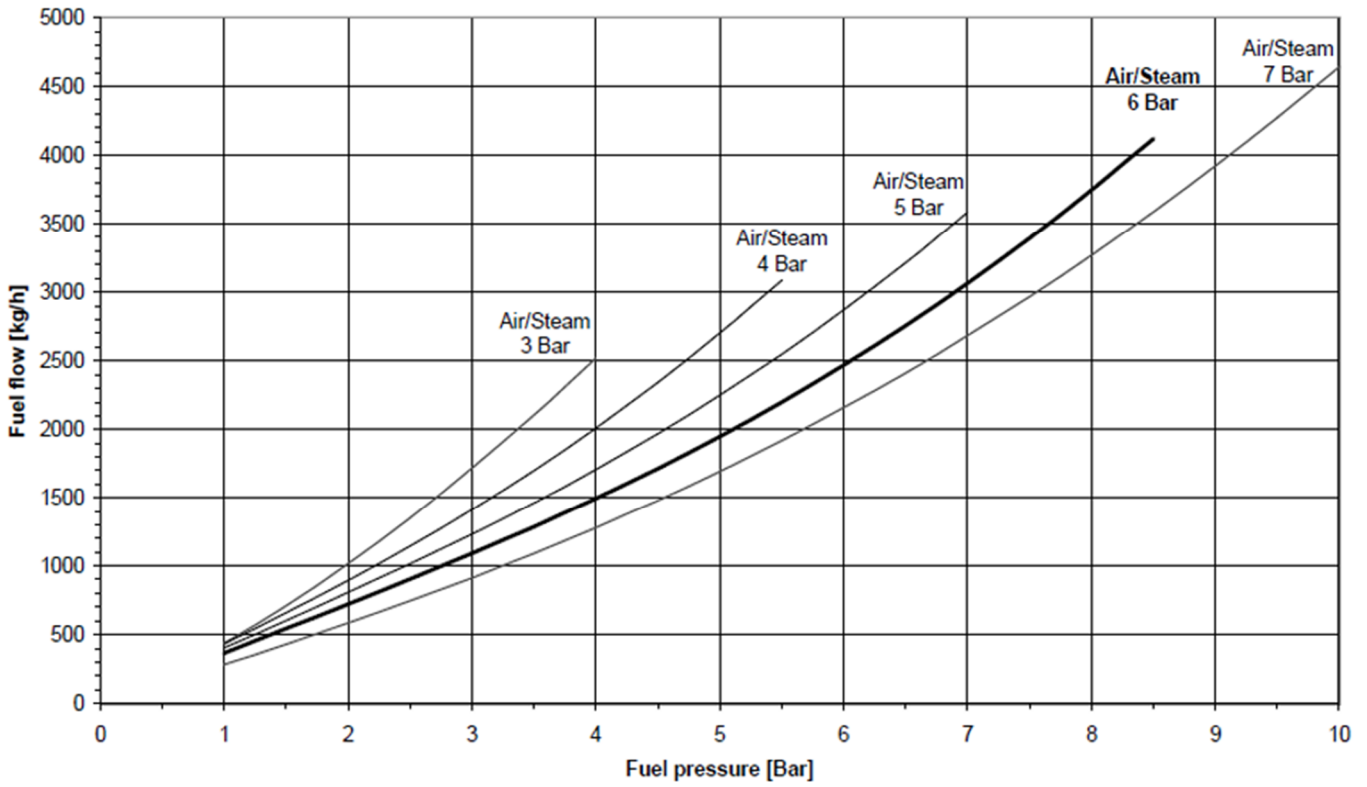
**Atomizer 40-Y-A°-13-10 with reverse disc**



Pump Operating Pressure 25 Bar

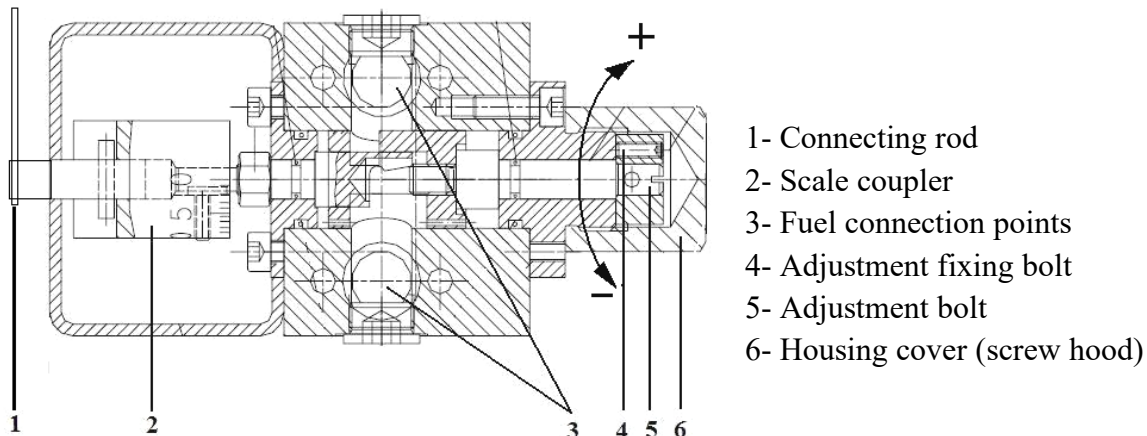
➤ **ECO 900.3**

**Atomizer 40-Y-A°-14-10 with reverse disc**



Pump Operating Pressure 25 Bar

## 6.5. Oil Adjustment Regulator



### Fuel Regulator Adjustment

1-Remove the housing cover number 6

2-Loosen the fixing bolt number 4

3-When you rotate the shaft number 5 (when looked from the shaft end) clockwise, the pressure value you observe from return manometer will increase, and burner consumption will also increase since nozzle pressure increases.

4-When you rotate the shaft number 5 (when looked from the shaft end) anti-clockwise, the pressure value you observe from return manometer will decrease, and burner consumption will also decrease since nozzle pressure decreases.

5-When the adjustment is completed, make sure that the adjustment you have made is permanent by tightening the fixing bolt number 4.

6-Place the housing cover number 6.

### 6.6. Air Pressure Switch Adjustment

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

- Unscrew the screw of the transparent cover and remove the cover.
- Turn the adjustment wheel in the direction to increase the pressure, note the pressure value at which the burner is failed.
- 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.
- It is recommended that this adjustment is carried out when the burner is at minimum load.



## 6.7.Servomotor Adjustment



### ➤ Actuator SQM33



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

## 6.8.Emission Measurement

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

- $\text{CO} < 100 \text{ mg/ kWh}$
- $\%3 \leq \text{O}_2 \leq \%5$
- $\text{NO}_x < 170 \text{ mg/ kWh}$
- Excess air ratio  $1,2 \leq \lambda \leq 1,3$

In emission measurements, the following values are accepted as reference according to TS EN 267 standard.

- $\text{CO} < 110 \text{ mg/ kWh}$
- $\%3 \leq \text{O}_2 \leq \%5$
- $\text{NO}_x < 250 \text{ mg/ kWh}$
- Excess air ratio  $1,2 \leq \lambda \leq 1,3$



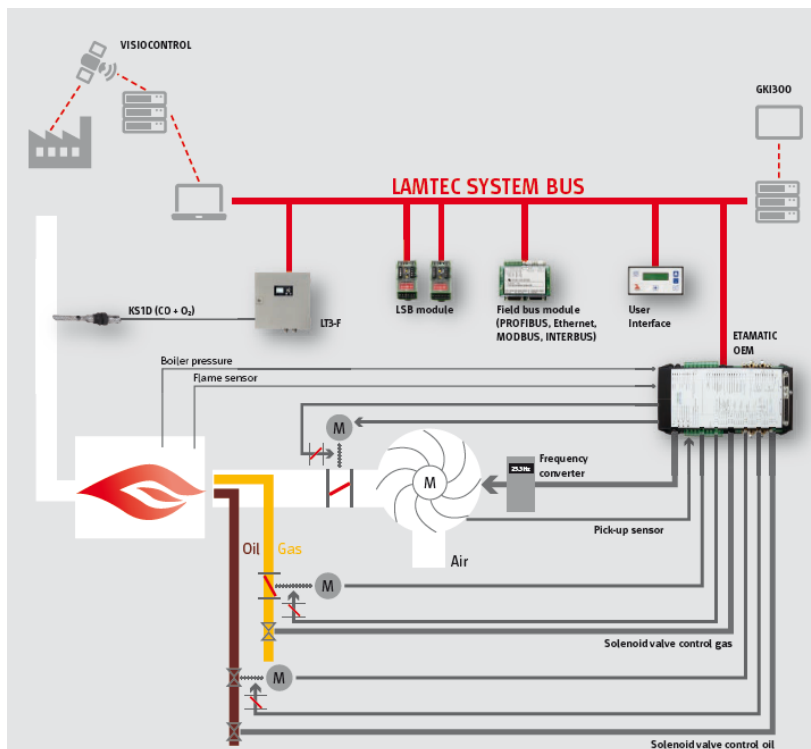
It is important for the boiler to be sealed in order to avoid incorrect measurements during emission measurements.



Boiler temperature must be between 40 C° and 80 C° while making emission measurement in hot water boilers.

## 6.9.Program Relay

### ➤ ETAMATIC OEM



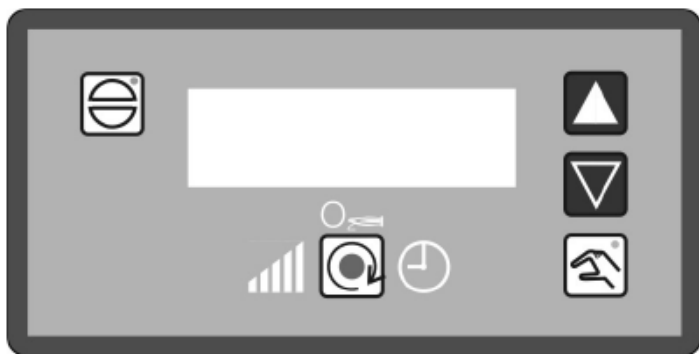


Fig. 4-1 Customer interface

**Description of key functions:**

-  → RESET
-  → Firing-rate/fault history up
-  → Firing-rate/fault history down
-  → MANUAL mode EIN/AUS
-  → Umschaltung der Anzeige
  - Fuel/air ratio control
  - O<sub>2</sub>
  - Flame intensity
  - Operating hours



- ← Display change:
- Fuel/air ratio control
  - O<sub>2</sub>)
  - Flame intensity

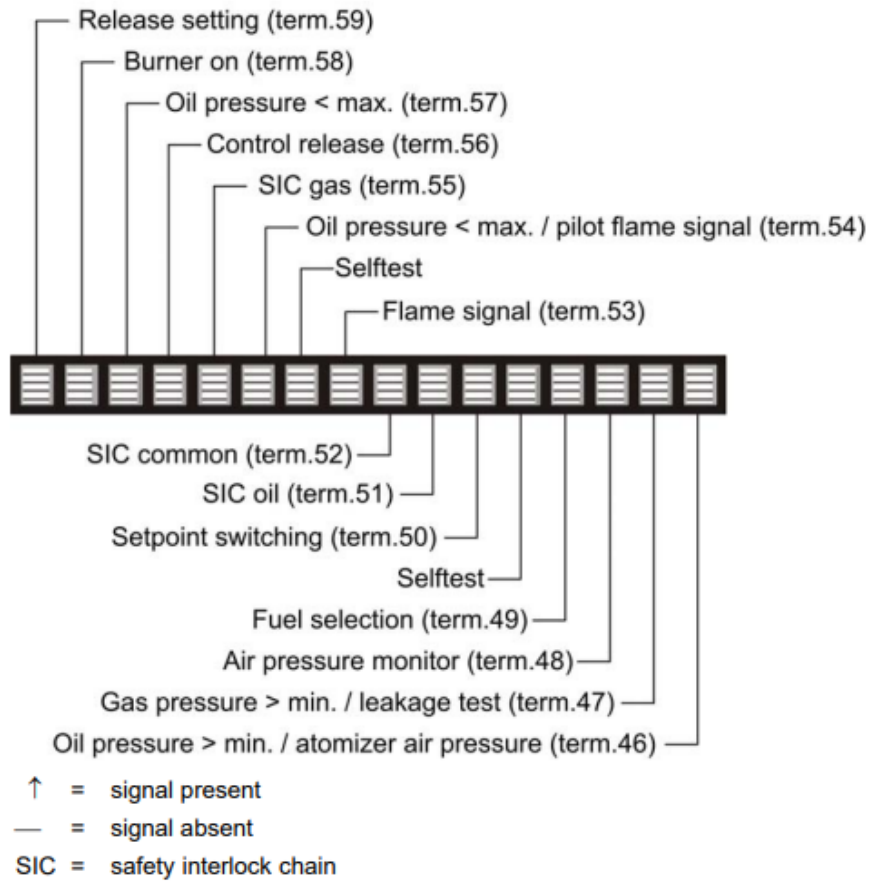


Fig. 5-2 Programming unit

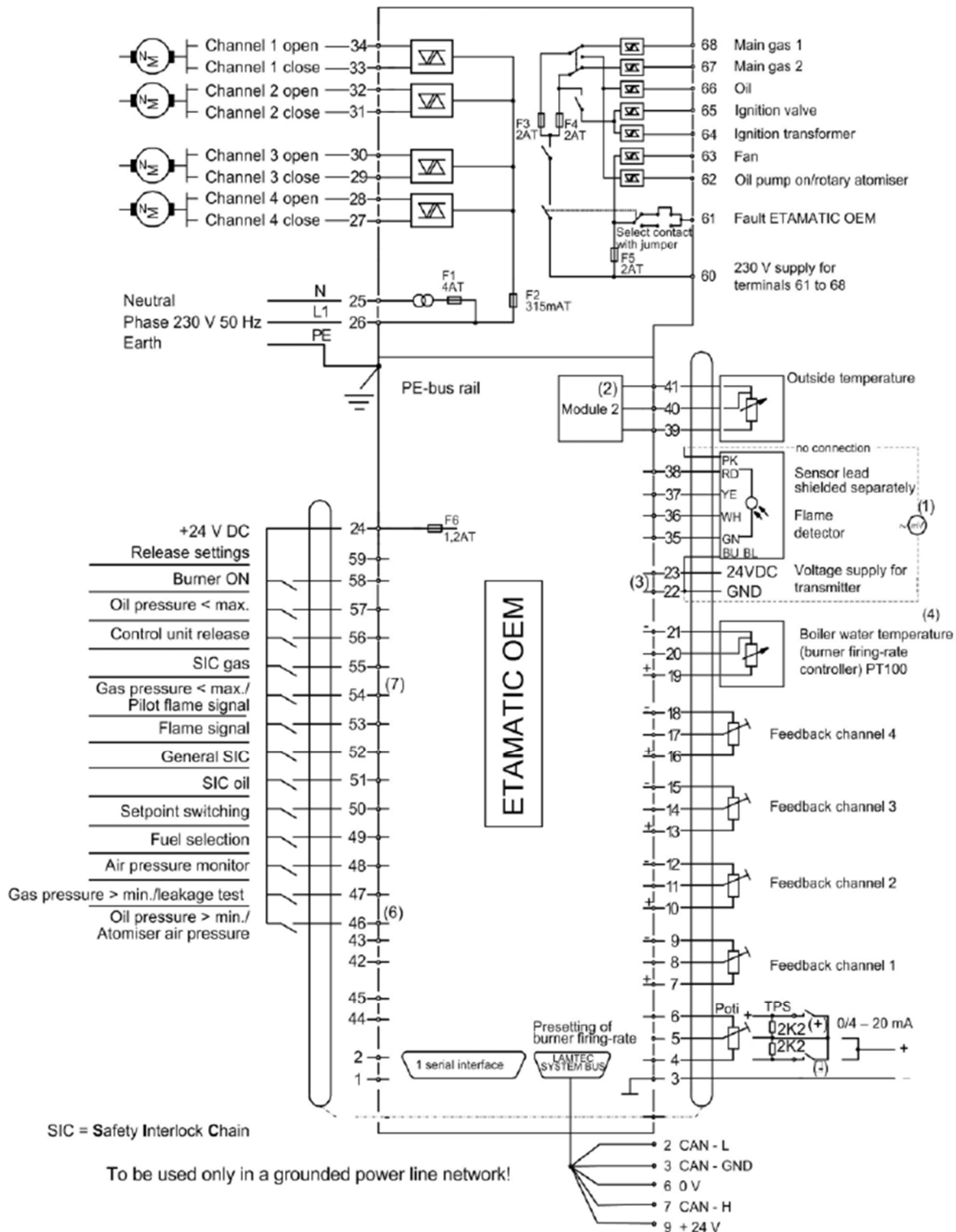


## Etamatic OEM Digital Inputs

### Meaning of the digital inputs ETAMATIC OEM



## ETAMATIC Connection Diagram



## Fault Codes

| Fault Code No. | Restart according to |          | Description   |
|----------------|----------------------|----------|---|
|                | TRD                  | EN676    |   |
| <b>000</b>     | <b>0</b>             | <b>0</b> | <b>No fault code available for this fault</b>   |
| <b>001</b>     | <b>0</b>             | <b>3</b> | <b>Ignition flame does not appear.</b>  |
| H/Ü            |                      |          | Check flame stability.<br>Check wiring.<br>Check ignition transformer and pilot burner.<br>Check flame sensor.<br>Check Parameter 788.  |
| <b>002</b>     | <b>0</b>             | <b>0</b> | <b>parasitic light failure</b>  |
| H/Ü            |                      |          | Check wiring.<br>Check setting flame sensor.<br>Check Parameter 788.  |
| <b>003</b>     | <b>0</b>             | <b>3</b> | <b>Flame fault during ignition</b>  |
| H/Ü            |                      |          | Check flame stability.<br>Check ignition transformer and pilot burner<br>Check flame sensor settings  |
| <b>004</b>     | <b>1</b>             | <b>1</b> | <b>Flame fault during operation</b>   |
| H/Ü            |                      |          | Check flame stability<br>The switch off time for digital input "flame signal is <200ms!<br>For this reason, a flame fault can also have another cause, e.g.:<br>- The fuel solenoid valves close.(EMV, low voltage))<br>- "gas pressure < min" switch off time <1s<br><br>FMS with 660 R 0016 V4.3 with burner stationary<br>Check wiring between FMS and 660R0016 V4.3<br>Change 660 R 0016 V4.3 if wiring is correct. |
| <b>005</b>     | <b>0</b>             | <b>3</b> | <b>Flame signal does not appear during 1st safety time</b>  |
| H/Ü            |                      |          | Check flame stability.<br>Check wiring.<br>Check ignition transformer and pilot burner.<br>Check flame sensor.<br>Check Parameter 774, 775 and 788.   |

| Fault Code No. | Restart according to |          | Description  |
|----------------|----------------------|----------|--|
|                | TRD                  | EN676    |  |
| <b>006</b>     | <b>0</b>             | <b>3</b> | <b>Flame signal goes out during stabilising time</b>   |
| H/U            |                      |          | Check flame stability.<br>Check set pilot burner.<br>Check flame sensor.   |
| <b>007</b>     | <b>0</b>             | <b>3</b> | <b>The flame signal extinguishes during the first safety time</b>  |
| H/U            |                      |          | Check flame stability.<br>Check set pilot burner.<br>Check flame sensor.<br>ETAMATIC: Check Jumper.  |
| <b>008</b>     | <b>0</b>             | <b>0</b> | <b>The flame signal extinguishes during the second safety time</b>   |
| H/U            |                      |          | Check flame stability.<br>Check wiring.<br>Check flame sensor.   |
| <b>009</b>     | <b>0</b>             | <b>0</b> | <b>Flame signal does not appear during safety time</b>   |
| H/U            |                      |          | Check flame stability.<br>Check wiring.<br>Check flame sensor.<br>Check Parameter 774, 775 and 788.  |
| <b>010</b>     | <b>0</b>             | <b>0</b> | <b>Flame signal goes out immediately after ignition</b>  |
| H/U            |                      |          | If the flame extinguishes within three seconds after ignition, fault H010 is shown; after that, fault H004 appears.<br>Check the flame stability.<br>Check the flame sensor setting.<br>Check the sensitivity of the sensor.<br>The deactivation time for the "Flame signal" digital input amounts to <200ms!<br>For this reason, a flame fault can also have another cause, e.g.:<br>- The solenoid fuel valve closes (EMC, low voltage)<br>- "Gas pressure < min" deactivation time <1s. |
| <b>011</b>     | <b>0</b>             | <b>0</b> | <b>Internal fault: 5 sec. outside light monitoring period not kept</b>   |
|                |                      |          | The fault can occur during an internal self-test.<br>Reset the fault. In the process, switch the mains voltage off and on again if necessary.<br>Check all fuses in the device.<br>If the fault persists despite reset → exchange the device or respective card  |
| <b>012</b>     | <b>0</b>             | <b>0</b> | <b>relay module not connected or missing 24V supply for relay</b>  |
|                |                      |          | Check the wiring between FMS and relay module 660R0016 and fuse F2 on the FMS front panel. FMS with relay module type 660 R 0016 V4.3 when the burner is at a standstill: Check the wiring between FMS and 660 R 0016 V4.3.<br>If the wiring has been performed correctly:<br>Exchange relay module type 660 R 0016 V4.3.  |
| <b>013</b>     | <b>1</b>             | <b>3</b> | <b>main flame signals appears during Ignition</b>  |
|                |                      |          | If parameters 774 and 775 are set to value 3 or 4, only the ignition flame may be present during ignition (up to the beginning of the second safety time). If the main flame is detected in this time, fault S013 is displayed. Check the flame sensor setting. The main flame sensor must detect only the main flame and not the ignition flame.  |
| <b>102</b>     | <b>0</b>             | <b>0</b> | <b>Internal fault: Internal communication fifo has overflowed</b>  |
| H              |                      |          | The fault can occur during an internal self-test.<br>Reset the fault. In the process, switch the mains voltage off and on again if necessary. Check all fuses in the device.<br>If the fault persists despite reset → exchange the device or respective card.  |

| Fault Code No. | Restart according to |          | Description  |
|----------------|----------------------|----------|--|
|                | TRD                  | EN676    |  |
| <b>103</b>     | <b>0</b>             | <b>0</b> | <b>Internal fault: Error in misc. data</b>   |
| H/U            |                      |          | <p>The fault can occur during an internal self-test. A fault was discovered during the reading of the redundant data in the EEPROM.</p> <p>Reset the fault. In the process, switch the mains voltage off and on again if necessary.</p> <p>Check all fuses in the device.</p> <p>Re-enter the curve.</p> <p>Import the current data record into the device using the remote control software and check this data record.</p> <p>If the fault persists despite reset → the EEPROM is possibly defective:<br/>Exchange the EEPROM.</p> <p>Import the current data record into the device using the remote control software and check this data record.</p> |
| <b>104</b>     | <b>0</b>             | <b>0</b> | <b>Internal Fault: D/A-Converter faulty</b>  |
| H              |                      |          | <p>Fault during an internal self-test.</p> <p>Reset the fault; switch the mains voltage off and on again if necessary.</p> <p>Check all fuses in the device.</p> <p>If the fault message continues to persist → exchange the device or respective card.</p>  |

| Fault Code No. | Restart according to |          | Description  |
|----------------|----------------------|----------|--|
|                | TRD                  | EN676    |  |
| <b>105</b>     | <b>&gt;88</b>        | <b>3</b> | <b>Curve data faulty! Curve set no.:</b>   |
| H/Ü            |                      |          | <p>During an attempt to save the curve to the EEPROM / during the check of the redundant curves, a fault was discovered.<br/>Repeat the programming.<br/>Reset the fault.<br/>If this fault is still present, proceed as follows:</p> <p>If this fault occurs after the number of curves has been expanded:<br/>1. Select the corresponding curve set<br/>2. Delete the memory<br/>3. Program a new point</p> <p>If the data was saved using the remote control software:<br/>Import the curve data of the corresponding curve set into the device.<br/>If this is not possible:<br/>1. Select the corresponding curve set<br/>2. Delete the memory<br/>3. Re-enter the curve</p> <p>Reset the fault.<br/>If the fault persists → the EEPROM might be defective.<br/>Order a new EEPROM from LAMTEC.<br/>When ordering, enter the original purchase order number, sales order number, and commission of the device.<br/>Return the defective EEPROM in any case (for the address, see the overleaf of this publication).<br/>Exchange the EEPROM and import the current data record into the device using the remote control software and check the result.</p> <p>When exchanging this component, a basic setting must exist before you can continue to work with the device.<br/>If you have saved the data of the device using the remote control software, it suffices to reimport this saved data into the new EEPROM.<br/>For more details, see the "Protected data record" description in the remote control software.<br/>If this is not possible, you must order a preprogrammed EEPROM from LAMTEC.</p> <p>When ordering, you must enter the device number and software checksums. Only in this way are mix-ups excluded. For the address, see the overleaf of this publication.</p> |
| <b>106</b>     | <b>0</b>             | <b>0</b> | <b>parameters not equal for parameter no.:</b>   |
| Ü              |                      |          | <p>Fault during an internal self-test. A fault was discovered during the reading of the redundant data in the EEPROM.</p> <p>After a software update:<br/>Import the protected data recording into the device. If that is not possible:<br/>Change the reported parameters once manually.<br/>Reset the fault.</p> <p>Reset the fault; switch the mains voltage off and on again if pertinent.<br/>Re-enter the curve.<br/>If the fault persists → the EEPROM is possibly defective:<br/>Exchange the EEPROM, import the current data record into the device using the remote control software, and check the data record.</p>   |

| Fault Code No. | Restart according to |          | Description  |
|----------------|----------------------|----------|--|
|                | TRD                  | EN676    |  |
| <b>107</b>     | <b>0</b>             | <b>0</b> | <b>Invalid configuration</b>   |
| H/Ü            |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Using the remote control software, compare the current parameter setting and last working data record.</p>   |
| <b>108</b>     | <b>0</b>             | <b>0</b> | <b>Different input signals on main processor and monitoring processor terminal-</b>  |
| H              |                      |          | <p>Fault during an internal self-test.<br/>The digital input signals for the main processor (H) and monitoring processor (Ü) are compared and are not the same.<br/>Reset the fault; switch the mains voltage off and on again if pertinent.<br/>Check all fuses in the device.</p> <p>A bouncing signal can lead to different states being detected between the main and monitoring processors.<br/>In the case of the main and monitoring processors, the detection of the digital input signals takes place at slightly different times. A signal change is present only long enough for the main processor to detect it, but not the monitoring processor.<br/>Check the signal sequence.</p> <p>If fault messages are constantly appearing one after the other → exchange the device or the respective card (processor card).</p>   |
| <b>110</b>     | <b>0</b>             | <b>0</b> | <b>CRC-16 test had found an error</b>  |
| H/Ü            |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.</p> <p>If the display remains dark or shows confusing characters, some or all of the LEDs will light up and faults 111 and 140 will appear.</p> <p>After the exchange of an EPROM or RAM:<br/>- Remove the processor pc board<br/>Check the components for the correct polarity (all notches point in the same direction).<br/>Check whether all components are properly inserted (e.g., whether any prongs are bent), and press them in firmly if necessary.<br/>Check the proper seat of the processor card connection to the backplane.<br/>Check the proper seat of the power supply card connection to the backplane.</p> <p>If fault messages are constantly appearing one after the other → the EPROM programme is possibly defective.<br/>Request a new programme EPROM from LAMTEC with the precise specification of the respective purchase order number, sales order number, and commission of the device. Return the defective EPROM in any case (for the address, see the overleaf of this publication).</p> |



| Fault Code No. | Restart according to |          | Description  |
|----------------|----------------------|----------|--|
|                | TRD                  | EN676    |  |
| <b>111</b>     | <b>0</b>             | <b>0</b> | <b>RAM-Test detected error</b>   |
| H/Ü            |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.<br/>Check the curve points of the main and monitoring processors for irregularities.<br/>→ Remote software: Curve table and/or set value graphic.<br/>If the display remains dark or shows confusing characters, some or all of the LEDs will light up and faults 111 and 140 will appear.</p> <p>After the exchange of an EPROM or RAM:<br/>- Remove the processor pc board<br/>Check the components for the correct polarity (all notches point in the same direction).<br/>Check whether all components are properly inserted (e.g., whether any prongs are bent), and press them in firmly if necessary.<br/>Check the proper seat of the processor card connection to the backplane.<br/>Check the proper seat of the power supply card connection to the backplane.</p> <p>If the fault occurs only sporadically, a software update to at least Version 5.7 may help.</p> <p>If fault messages are constantly appearing one after the other → exchange the device or the respective card.</p> |
| <b>112</b>     | <b>0</b>             | <b>0</b> | <b>ETAMATICselftest exceeds timeout limit</b>  |
|                |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.<br/>If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>  |
| <b>120</b>     | <b>1</b>             | <b>1</b> | <b>Different operating modes for mon. and main processor</b>   |
| H/Ü            |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.</p> <p>In the case of the main and monitoring processors, the detection of the digital input signals takes place at slightly different times. A signal change is present only long enough for the main processor to detect it, but not the monitoring processor.<br/>Check the signal sequence.</p>  |
| <b>121</b>     | <b>0</b>             | <b>0</b> | <b>The correction is outside the permissible range. Channel: 1</b>   |
| Ü              |                      |          | <p>The monitoring processor checks whether the current correction values lie within the set range.<br/>Check the correction range.<br/>If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>  |
| <b>122</b>     | <b>0</b>             | <b>0</b> | <b>Correction is outside permissible range. Channel : 2</b>  |
| Ü              |                      |          | See S121   |
| <b>123</b>     | <b>0</b>             | <b>0</b> | <b>Correction is outside permissible range. Channel : 3</b>  |
| Ü              |                      |          | See S121   |
| <b>124</b>     | <b>0</b>             | <b>0</b> | <b>Correction is outside permissible range. Channel : 4</b>  |
| Ü              |                      |          | See S121   |
| <b>125</b>     | <b>0</b>             | <b>0</b> | <b>Correction is outside permissible range. Channel : 5</b>  |
| Ü              |                      |          | See S121   |



| Fault Code No. | Restart according to |       | Description  |
|----------------|----------------------|-------|--|
|                | TRD                  | EN676 |  |
| 139            | 0                    | 0     | <b>Integr. Flame Detector: selftest fault</b>  |
| H/Ü            |                      |       | <p>Especially in the case of oil flames: Reduce the intensity of the flame sensor.</p> <p>Check the hardware and software configuration:<br/>If the hardware jumper is set to external flame monitoring and parameter 2 is set to integrated flame monitoring, fault 139 appears as soon as the digital input of the external flame monitoring becomes active. If the flame signal is detected via the flame sensor of the integrated flame monitoring in this configuration, the display of the digital input cycles and a flame fault appears.</p>   |
| 140            | 0                    | 0     | <b>The EEPROM is defective.</b>  |
| H/Ü            |                      |       | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.<br/>If the display remains dark or shows confusing characters, some or all of the LEDs will light up and faults 111 and 140 will appear.<br/>The EEPROM of the respective processors contains important operating data, the parameters, and the curves.<br/>During an attempt to save the curve to the EEPROM, a fault was discovered.<br/>Repeat the programming.<br/>After the exchange of an EPROM or RAM:<br/>Remove the processor pc board<br/>Check the components for the correct polarity (all notches point in the same direction).<br/>Check whether all components are properly inserted (e.g., whether any prongs are bent), and press them in firmly if necessary.<br/>Check the proper seat of the processor card connection to the backplane.<br/>Check the proper seat of the power supply card connection to the backplane.<br/>Reset the fault if it is still present; the EEPROM is possibly defective.<br/>Request a new EEPROM from LAMTEC with the precise specification of the respective purchase order number, sales order number, and commission of the device.<br/>Return the defective EEPROM in any case (for the address, see the overleaf of this publication).<br/>Exchange the EEPROM, import the current data record into the device using the remote control software, and check the data record.<br/>When exchanging this component, a basic setting must exist before you can continue to work with the device.<br/>If you have saved the data of the device using the remote control software, it suffices to reimport this saved data into the new EEPROM.<br/>For more details, see the "Protected data record" description in the remote control software.<br/>If this is not possible, you must order a preprogrammed EEPROM from LAMTEC.<br/>When ordering, you must enter the device number and software checksums. Only in this way are mix-ups excluded. For the address, see the overleaf of this publication.</p> |

| Fault Code No. | Restart according to |          | Description  |
|----------------|----------------------|----------|--|
|                | TRD                  | EN676    |  |
| <b>141</b>     | <b>0</b>             | <b>0</b> | <b>Potentiometer faulty, feedback changing too quickly: channel 1</b>  |
| H/Ü            |                      |          | The return values of a three-point-step servo output change faster than specified as maximum in parameters 12-16.<br>Check the wiring; check the potentiometers for short circuit.<br>It is possible that the range limit switch is set higher than the end of the range of the potentiometer. The upper value is exceeded and changes quickly towards zero.<br>Otherwise, exchange the potentiometers.  |
| <b>142</b>     | <b>0</b>             | <b>0</b> | <b>Potentiometer faulty, feedback changing too quickly: channel 2</b>  |
| H/Ü            |                      |          | See S141   |
| <b>143</b>     | <b>0</b>             | <b>0</b> | <b>Potentiometer faulty, feedback changing too quickly: channel 3</b>  |
| H/Ü            |                      |          | See S141   |
| <b>144</b>     | <b>0</b>             | <b>0</b> | <b>Potentiometer faulty, feedback changing too quickly: channel 4</b>  |
| H/Ü            |                      |          | See S141   |
| <b>145</b>     | <b>0</b>             | <b>0</b> | <b>Potentiometer faulty, feedback changing too quickly: channel 5</b>  |
| H/Ü            |                      |          | See S141   |
| <b>151</b>     | <b>&gt;88</b>        | <b>3</b> | <b>Reci damper deactivated, out of time in reaching CLOSED position, channel:1</b>   |
| H/Ü            |                      |          | The actuating device may not reach its set value since it is limited by a limit switch:<br>Check the setting of the set values/limit switches.<br><br>The actuating device may not have reached its set value quickly enough.<br>This is especially possible in the case of actuating devices that are activated separately and that must then travel the full distance (e.g., recirculation or exhaust valve or in case of a floating curve switchover):<br>Increase the adjusting speed on the motor (if possible)<br>or<br>Limit the adjusting range by limit switch (to save runtime)<br><br>The return does not move even though the actuating device is moving:<br>Check the connection of the return to the device (see the connection diagram)<br>To localise the fault, simulate the return at various points of the return circuit (using a potentiometer or a current sensor).<br><br>The motor does not move:<br>Check whether "OPEN" or "CLOSED" signals are present on the motor.<br>Check the voltage supply circuit on the motor.<br>FMS/VMS:<br>Check whether the "OPEN" or "CLOSED" relay is actuated.<br>If yes:<br>Check the fuse of the relay module.<br>If no:<br>Make sure that no fault is present (can be seen on the fault LED).<br>Check the F2 fuse (on the front panel of the power supply unit).<br>Check the connection between FMS/VMS and the relay module. |
| <b>152</b>     | <b>&gt;88</b>        | <b>3</b> | <b>the same as P 151, but channel: 2</b>   |
| H/Ü            |                      |          | See S151   |
| <b>153</b>     | <b>&gt;88</b>        | <b>3</b> | <b>the same as P 151, but channel: 3</b>   |
| H/Ü            |                      |          | See S151   |
| <b>154</b>     | <b>&gt;88</b>        | <b>3</b> | <b>the same as P 151, but channel: 4</b>   |
| H/Ü            |                      |          | See S151   |

| Fault Code No. | Restart according to |       | Description  |
|----------------|----------------------|-------|--|
|                | TRD                  | EN676 |  |
| 155            | >88                  | 3     | <b>the same as P 151, but channel: 5</b>   |
| H/U            |                      |       | See S151   |
| 161            | >88                  | 3     | <b>Monitoring direction of rotation: channel 1</b>   |
| H/U            |                      |       | The channel is not running or does not start on time. During operation, the channel briefly changes direction.<br>Check the servo motor. |
| 162            | >88                  | 3     | <b>Monitoring direction of rotation: channel 2</b>   |
| H/U            |                      |       | The channel is not running or does not start on time. During operation, the channel briefly changes direction.<br>Check the servo motor. |
| 163            | >88                  | 3     | <b>Monitoring direction of rotation: channel 3</b>   |
| H/U            |                      |       | The channel is not running or does not start on time. During operation, the channel briefly changes direction.<br>Check the servo motor. |
| 164            | >88                  | 3     | <b>Monitoring direction of rotation: channel 4</b>   |
| H/U            |                      |       | The channel is not running or does not start on time. During operation, the channel briefly changes direction.<br>Check the servo motor. |
| 165            | >88                  | 3     | <b>Monitoring direction of rotation: channel 5</b>   |
| H/U            |                      |       | The channel is not running or does not start on time. During operation, the channel briefly changes direction.<br>Check the servo motor. |
| 171            | >88                  | 3     | <b>Dead band over range too long: channel 1</b>  |
| H              |                      |       |  |
| 172            | >88                  | 3     | <b>Dead band over range too long: channel 2</b>  |
| H              |                      |       |  |
| 173            | >88                  | 3     | <b>Dead band over range too long: channel 3</b>  |
| H              |                      |       |  |
| 174            | >88                  | 3     | <b>Dead band over range too long: channel 4</b>  |
| H              |                      |       |  |
| 175            | >88                  | 3     | <b>Dead band over range too long: channel 5</b>  |
| H              |                      |       |  |
| 181            | >88                  | 3     | <b>Dead band under range too long: channel 1</b>   |
| H              |                      |       |  |
| 182            | >88                  | 3     | <b>Dead band under range too long: channel 2</b>   |
| H              |                      |       |  |
| 183            | >88                  | 3     | <b>Dead band under range too long: channel 3</b>   |
| H              |                      |       |  |
| 184            | >88                  | 3     | <b>Dead band under range too long: channel 4</b>   |
| H              |                      |       |  |
| 185            | >88                  | 3     | <b>Dead band under range too long: channel 5</b>   |
| H              |                      |       |  |
| 191            | 1                    | 1     | <b>1st monitoring band over range too long: channel 1</b>  |
| H/U            |                      |       |  |

| Fault Code No. | Restart according to |       | Description  |
|----------------|----------------------|-------|--|
|                | TRD                  | EN676 |  |
| 192            | 1                    | 1     | 1st monitoring band over range too long. Channel: 2  |
| H/Ü            |                      |       |  |
| 193            | 1                    | 1     | 1st monitoring band over range too long. Channel: 3  |
| H/Ü            |                      |       |  |
| 194            | 1                    | 1     | 1st monitoring band over range too long. Channel: 4  |
| H/Ü            |                      |       |  |
| 195            | 1                    | 1     | 1st monitoring band over range too long. Channel: 5  |
| H/Ü            |                      |       |  |
| 201            | 1                    | 1     | 1st monitoring band under range too long. Channel: 1 |
| H/Ü            |                      |       |  |
| 202            | 1                    | 1     | 1st monitoring band under range too long. Channel: 2 |
| H/Ü            |                      |       |  |
| 203            | 1                    | 1     | 1st monitoring band under range too long. Channel: 3 |
| H/Ü            |                      |       |  |
| 204            | 1                    | 1     | 1st monitoring band under range too long. Channel: 4 |
| H/Ü            |                      |       |  |
| 205            | 1                    | 1     | 1st monitoring band under range too long. Channel: 5 |
| H/Ü            |                      |       |  |
| 211            | 0                    | 0     | 2nd monitoring band over range too long. Channel: 1  |
| H/Ü            |                      |       |  |
| 212            | 0                    | 0     | 2nd monitoring band over range too long. Channel: 2  |
| H/Ü            |                      |       |  |
| 213            | 0                    | 0     | 2nd monitoring band over range too long. Channel: 3  |
| H/Ü            |                      |       |  |
| 214            | 0                    | 0     | 2nd monitoring band over range too long. Channel: 4  |
| H/Ü            |                      |       |  |
| 215            | 0                    | 0     | 2nd monitoring band over range too long. Channel: 5  |
| H/Ü            |                      |       |  |
| 221            | 0                    | 0     | 2nd monitoring band under range too long. Channel: 1 |
| H/Ü            |                      |       |  |
| 222            | 0                    | 0     | 2nd monitoring band under range too long. Channel: 2 |
| H/Ü            |                      |       |  |
| 223            | 0                    | 0     | 2nd monitoring band under range too long. Channel: 3 |
| H/Ü            |                      |       |  |
| 224            | 0                    | 0     | 2nd monitoring band under range too long. Channel: 4 |
| H/Ü            |                      |       |  |
| 225            | 0                    | 0     | 2nd monitoring band under range too long. Channel: 5 |
| H/Ü            |                      |       |  |
| 231            | >88                  | 3     | Fuel/air ratio control blocked: channel 1            |
| H              |                      |       |  |
| 232            | >88                  | 3     | Fuel/air ratio control blocked: channel 2            |
| H              |                      |       |  |

| Fault Code No. | Restart according to |       | Description  |
|----------------|----------------------|-------|--|
|                | TRD                  | EN676 |  |
| 233            | >88                  | 3     | <b>Fuel/air ratio control blocked: channel 3</b>   |
| H              |                      |       |  |
| 234            | >88                  | 3     | <b>Fuel/air ratio control blocked: channel 4</b>   |
| H              |                      |       |  |
| 235            | >88                  | 3     | <b>Fuel/air ratio control blocked: channel 5</b>   |
| H              |                      |       |  |
| 301            | 1                    | 1     | <b>Broken wire at firing rate input -1</b>   |
| H/Ü            |                      |       | Check the wiring.  |
| 302            | 1                    | 1     | <b>Broken wire at firing rate input-2</b>  |
| H/Ü            |                      |       | Check the wiring.  |
| 320            | 1                    | 1     | <b>Broken wire at correction input</b>   |
| H/Ü            |                      |       | Check the wiring.  |
| 321            | 1                    | 1     | <b>Broken wire at feedback channel 1</b>   |
| H/Ü            |                      |       | Check the wiring; check the potentiometers for short circuit.  |
| 322            | 1                    | 1     | <b>Broken wire at feedback channel 2</b>   |
| H/Ü            |                      |       | Check the wiring; check the potentiometers for short circuit.  |
| 323            | 1                    | 1     | <b>Broken wire at feedback channel 3</b>   |
| H/Ü            |                      |       | Check the wiring; check the potentiometers for short circuit.  |
| 324            | 1                    | 1     | <b>Broken wire at feedback channel 4</b>   |
| H/Ü            |                      |       | Check the wiring; check the potentiometers for short circuit.  |
| 325            | 1                    | 1     | <b>Broken wire at feedback channel 5</b>   |
| H/Ü            |                      |       | Check the wiring; check the potentiometers for short circuit.  |
| 351            | 1                    | 1     | <b>Different status of ignition position relay</b>   |
| H/Ü            |                      |       | Check the signal for curve selection.<br>Bouncing signal?<br>Possible bus problems.  |
| 352            | >88                  | 3     | <b>Invalid curve selection (no signals)</b>  |
| H/Ü            |                      |       | Check the signal for curve selection.<br>Possible bus problems.  |
| 353            | >88                  | 3     | <b>Invalid curve selection (several signals)</b>   |
| H/Ü            |                      |       | Check the signal for curve selection.<br>Possible bus problems.  |
| 360            | 0                    | 0     | <b>Shut down from O<sub>2</sub>controller (1) or CO controller (2) :</b>   |
| H              |                      |       | Initially, the time from parameter P904 "O <sub>2</sub> trim active after ignition in seconds" runs out before the fault is permitted. |
| 361            | 1                    | 1     | <b>Different status of ignition position relay</b>   |
| H/Ü            |                      |       |  |
| 362            | 0                    | 0     | <b>carry out burner servicing</b>  |
| H/Ü            |                      |       | The maintenance counter is reset by changing parameter 713 or 714  |

| Fault Code No. | Restart according to |       | Description  |
|----------------|----------------------|-------|--|
|                | TRD                  | EN676 |  |
| 363            | 1                    | 1     | <b>permissible O<sub>2</sub> value was fallen below</b><br>Initially, the time from parameter P904 "O <sub>2</sub> trim active after ignition in seconds" runs out before the fault is permitted. After that, the monitoring time from P966 starts. Also works without an active O <sub>2</sub> controller (from 5.4): After ignition, the monitoring time from P966 starts immediately.   |
| 370            | 0                    | 0     | <b>Internal communication between the processors faulty</b><br>Different values in the main and monitoring processors. Reimport the curves and/or parameter set. A sporadic occurrence of fault H370 is due to EMC interference immunity of the wiring or environment. If the fault persists, exchange the processor pc board.   |
| 371            | 0                    | 0     | <b>Output for internal firing rate faulty</b><br>Ü   |
| 372            | 0                    | 0     | <b>Deviation of the firing rate value between the main processor and the monitoring processor is too high.</b><br>Ü<br>Fault during an internal self-test. Reset the fault; switch the mains voltage off and on again if necessary. Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card.   |
| 381            | 0                    | 0     | <b>Deviation between main processor and monitoring processor too great: correction channel 1</b><br>Ü<br>Fault during an internal self-test. Reset the fault; switch the mains voltage off and on again if necessary. Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or the respective card.   |
| 382            | 0                    | 0     | <b>Deviation between main processor and monitoring processor too great: correction channel 2</b><br>Ü<br>Fault during an internal self-test. Reset the fault; switch the mains voltage off and on again if necessary. Check all fuses in the device.<br>If fault messages are constantly appearing one after the other →exchange the device or the respective card.  |
| 391            | 0                    | 0     | <b>Curves sentence does not fit to the chosen fuel.</b><br>Ü<br>Fault during an internal self-test. Reset the fault; switch the mains voltage off and on again if pertinent. Check all fuses in the device.<br>At the curve set selection by BUS, terminal 75 is missing for plausibility check, or rather terminal 75 can be seen at oil curve.<br>If fault messages are constantly appearing one after the other → exchange the device or the respective card. |
| 392            | 0                    | 0     | <b>Remote not responding (time-out)</b><br>H   |
| 393            | 0                    | 0     | <b>Remote shut down triggered.</b><br>H  |
| 394            | 0                    | 0     | <b>BURNER-ON/OFF Remote signal missing.</b>  |
| 400            | 0                    | 0     | <b>Different point number at programming</b><br>Ü<br>Re-enter the curve.   |
| 451            | 1                    | 1     | <b>Ignition position was left in ignition mode. Channel: 1</b><br>H/Ü<br>In case of a constant output:<br>Possible EMC influences due to ignition transformer; check the frequency converter settings  |

| Fault Code No. | Restart according to |          | Description   |
|----------------|----------------------|----------|---|
|                | TRD                  | EN676    |   |
| <b>452</b>     | <b>1</b>             | <b>1</b> | <b>Ignition position was left in ignition mode. Channel: 2</b>  |
| H/U            |                      |          | In case of a constant output:<br>Possible EMC influences due to ignition transformer; check the frequency converter settings  |
| <b>453</b>     | <b>1</b>             | <b>1</b> | <b>Ignition position was left in ignition mode. Channel: 3</b>  |
| H/U            |                      |          | In case of a constant output:<br>Possible EMC influences due to ignition transformer; check the frequency converter settings  |
| <b>454</b>     | <b>1</b>             | <b>1</b> | <b>Ignition position was left in ignition mode. Channel: 4</b>  |
| H/U            |                      |          | In case of a constant output:<br>Possible EMC influences due to ignition transformer; check the frequency converter settings  |
| <b>455</b>     | <b>1</b>             | <b>1</b> | <b>Ignition position was left in ignition mode. Channel: 5</b>  |
| H/U            |                      |          | In case of a constant output:<br>Possible EMC influences due to ignition transformer; check the frequency converter settings  |
| <b>500</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay out terminal 67 not picking up.</b>   |
| H              |                      |          | Fault during an internal self-test.<br>Reset the fault; switch the mains voltage off and on again if necessary.<br>Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card. |
| <b>501</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: The relay output terminal 43 or 68 (ETAMATIC) does not respond.</b>   |
| H              |                      |          | See S500  |
| <b>502</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay out terminal 16 or 65 (ETAMATIC) not picking up.</b>  |
| H              |                      |          | See S500  |
| <b>503</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay out terminal 11 or 66 (ETAMATIC) not picking up.</b>  |
| H              |                      |          | See S500  |
| <b>504</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay out terminal 45 not picking up.</b>   |
| H              |                      |          | See S500  |
| <b>505</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay out terminal 68 or 61 (ETAMATIC) not picking up.</b>  |
| H              |                      |          | See S500  |
| <b>506</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay out terminal 36 (ETAMATIC K202) not picking up.</b>   |
| H              |                      |          | See S500  |
| <b>507</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay out terminal 41 not picking up.</b>   |
| H              |                      |          | See S500  |
| <b>508</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay out terminal 76 not picking up.</b>   |
| H              |                      |          | See S500  |
| <b>509</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: Output K203 not picking up.</b>   |
|                |                      |          | See S500  |
| <b>510</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: Output K201 not picking up.</b>   |
|                |                      |          | See S500  |
| <b>520</b>     | <b>0</b>             | <b>0</b> | <b>Internal comparison: relay output terminal 67 not dropping out.</b>  |
| H              |                      |          | See S500  |



| Fault Code No. | Restart according to |       | Description  |
|----------------|----------------------|-------|--|
|                | TRD                  | EN676 |  |
| 521            | 0                    | 0     | <b>Internal comparison: relay output terminal 43 or 68 (ETAMATIC) not dropping out.</b>  |
| H              |                      |       | See S500   |
| 522            | 0                    | 0     | <b>Internal comparison: relay output terminal 16 or 65 (ETAMATIC) not dropping out.</b>  |
| H              |                      |       | See S500   |
| 523            | 0                    | 0     | <b>Internal comparison: relay output terminal 11 or 66 (ETAMATIC) not dropping out.</b>  |
| H              |                      |       | See S500   |
| 524            | 0                    | 0     | <b>Internal comparison: relay output terminal 45 not dropping out.</b>   |
| H              |                      |       | See S500   |
| 525            | 0                    | 0     | <b>Internal comparison: relay output terminal 68 or 61 (ETAMATIC) not dropping out.</b>  |
| H              |                      |       | See S500   |
| 526            | 0                    | 0     | <b>Internal comparison: relay output terminal 36 not dropping out.</b>   |
| H              |                      |       | See S500   |
| 527            | 0                    | 0     | <b>Internal comparison: relay output terminal 41 not dropping out.</b>   |
| H              |                      |       | See S500   |
| 528            | 0                    | 0     | <b>Internal comparison: relay output terminal 76 not dropping out.</b>   |
| H              |                      |       | See S500   |
| 529            | 0                    | 0     | <b>Internal comparison: Output K203 not dropping out.</b>  |
|                |                      |       | See S500   |
| 530            | 0                    | 0     | <b>Internal comparison: Output K201 not dropping out.</b>  |
|                |                      |       | See S500   |
| 540            | 0                    | 0     | <b>TRIAC selftest : optical couplers are not OFF</b>   |
|                |                      |       | See S500   |
| 541            | 0                    | 0     | <b>TRIAC selftest : all TRIACS are not supplied with voltage!</b>  |
|                |                      |       | Terminal 60 not connected or fuse F5 defective.<br>Check whether terminals 26 and 60 are supply by the same phase.<br>See S500   |
| 542            | 0                    | 0     | <b>TRIAC selftest : main gas 1 is currentless</b>  |
|                |                      |       | See S500   |
| 543            | 0                    | 0     | <b>TRIAC selftest: main gas 2 is currentless</b>   |
|                |                      |       | If a test current is flowing during the TRIAC self test and no test current is at the terminal for Main Gas 2, the software assumes that a fault is present.<br>- The connector of Main Gas 2 is not connected<br>- The solenoid valve is defective<br>- The TRIAC for Main Gas 2 is defective in ETAMATIC.<br>If the device only works for oil operation - disconnect Main Gas 1. |
| 544            | 0                    | 0     | <b>TRIAC selftest : oil pump is currentless</b>  |
|                |                      |       | See S500   |
| 545            | 0                    | 0     | <b>TRIAC selftest : oil valve is currentless</b>   |
|                |                      |       | See S500   |



| Fault Code No. | Restart according to |       | Description   |
|----------------|----------------------|-------|---|
|                | TRD                  | EN676 |   |
| 546            | 0                    | 0     | <b>TRIAC selftest : Ignition transformer is currentless</b><br>See S500   |
| 547            | 0                    | 0     | <b>TRIAC selftest : Ignition valve is currentless</b><br>See S500   |
| 550            | 0                    | 0     | <b>Oil fuel blocked because a required solenoid valve is not connected</b><br>The test current for the TRIAC self-test cannot flow.   |
| 551            | 0                    | 0     | <b>Gas fuel blocked because a required solenoid valve is not connected</b><br>The test current for the TRIAC self-test cannot flow.   |
| 552            | 0                    | 0     | <b>No valve connected? Check fuse F3 and F4</b><br>The oil and gas valves are not connected.  |
| 600            | 0                    | 0     | <b>Programme check time of sequencer expired.</b><br>H/U<br>If no ignition takes place after starting within this time (parameter 777) after 'Burner ON,' a fault is output.<br>If the parameter is set to 0, no fault appears. |
| 601            | 0                    | 0     | <b>Leak check fault: gas pressure still applied.</b><br>H/U   |
| 602            | 0                    | 0     | <b>Leak check fault: gas pressure missing.</b><br>H/U   |
| 603            | 0                    | 0     | <b>Vent gas line manually.</b><br>H/U   |
| 604            | 0                    | 0     | <b>Flame signal not arriving in time.</b><br>H/U  |
| 605            | >88                  | 3     | <b>Oil pressure &lt; min !!!</b><br>H   |
| 606            | 1                    | 1     | <b>Gas &gt; min appears in oil operation.</b><br>H  |
| 607            | 1                    | 1     | <b>Ignition position acknowledgement dropping.</b><br>H   |
| 608            | 0                    | 0     | <b>Boiler safety chain dropping.</b><br>H   |
| 609            | 1                    | 1     | <b>Gas safety chain dropping.</b><br>H  |
| 610            | >88                  | 3     | <b>Oil safety chain dropping.</b><br>H  |
| 611            | >88                  | 3     | <b>Gas pressure too low</b><br>H/U  |
| 613            | 0                    | 0     | <b>Air pressure signal missing.</b><br>H  |
| 614            | 1                    | 1     | <b>F.A. safety interl. chain gets OFF</b>   |
| 615            | 0                    | 0     | <b>Flame is blown away during blow out of oil lance</b>   |
| 616            | 1                    | 1     | <b>Ignition flame goes out in standby operation</b>   |
| 617            | 1                    | 1     | <b>Continuous ignition flame goes out under operation</b>   |

| Fault Code No. | Restart according to |       | Description   |
|----------------|----------------------|-------|---|
|                | TRD                  | EN676 |   |
| 618            | 0                    | 0     | Oil circulation: Temperature does not rise up within 45 sec.  |
| 620            | 0                    | 0     | Oil lance blow out: Delay for opening not kept  |
| 621            | 0                    | 0     | Oil lance blow out: Oil valve actuator not in ignition position                                       |
| 622            | 0                    | 0     | Oil lance blow out: blow out period too long  |
| 623            | 0                    | 0     | Atomizer switch-ON-pre-period not kept  |
| 624            | >88                  | 3     | Oil pressure too low  |
| 625            | >88                  | 3     | Oil pressure too high   |
| 626            | >88                  | 3     | Atomizer air pressure too low   |
| 627            | >88                  | 3     | General safety chain missing  |
| 700            | 0                    | 0     | Pre-ventilating signal present, without signal on terminal 2.<br>H<br>VMS, for ETA V Term. 58         |
| 701            | 0                    | 0     | Flame signal present, without signal on terminal 2.<br>H<br>VMS, for ETA V Term. 58                   |
| 702            | 0                    | 0     | Flame signal appears during pre-ventilating.<br>H<br>VMS, for ETA V Term. 58                          |
| 703            | 0                    | 0     | Flame signal goes out even though signal on terminal 2 still present.<br>H<br>VMS, for ETA V Term. 58 |
| 711            | 0                    | 0     | Illegal operating mode change<br>Ü<br>Check the "Burner ON" signal.<br>Bouncing signal?               |
| 712            | 0                    | 0     |   |
| 713            | 0                    | 0     | Incorrect signal combination in operating mode AU<br>Ü  |
| 714            | 0                    | 0     | Incorrect signal combination in operating mode BE<br>Ü  |
| 715            | 0                    | 0     | Incorrect signal combination in operating mode VO<br>Ü  |
| 716            | 0                    | 0     | Incorrect signal combination in operating mode ZP<br>Ü  |
| 717            | 0                    | 0     | Incorrect signal combination in operating mode ZU   |
| 718            | 0                    | 0     |   |
| 719            | 0                    | 0     | Fuel valves open too long without flame<br>Ü  |
| 720            | 0                    | 0     | Ignition transformer switched on too long<br>Ü  |
| 721            | 0                    | 0     | Ignition valve open too long<br>Ü   |
| 722            | 0                    | 0     | Fuel valves open in maintenance mode<br>Ü   |
| 723            | 0                    | 0     | Ignition process taking too long<br>Ü   |

| Fault Code No. | Restart according to |       | Description  |
|----------------|----------------------|-------|--|
|                | TRD                  | EN676 |  |
| 724            | 0                    | 0     | Gas valves open when burning oil                                       |
| Ü              |                      |       |  |
| 725            | 0                    | 0     | Oil valves open when burning gas                                       |
| Ü              |                      |       |  |
| 726            | 0                    | 0     | Main gas 2 open without main gas 1                                     |
| Ü              |                      |       |  |
| 727            | 0                    | 0     | Main gas 1 illegally open  |
| Ü              |                      |       |  |
| 728            | 0                    | 0     | Main gas valves and ignition valve open too long                       |
| Ü              |                      |       |  |
| 729            | 0                    | 0     | Ignition process taking too long (without pilot burner)                |
| Ü              |                      |       |  |
| 730            | 0                    | 0     | Maintenance mode without pilot burner                                  |
| Ü              |                      |       |  |
| 731            | 0                    | 0     | Ignition valve opened without ignition burner                          |
| Ü              |                      |       |  |
| 732            | 0                    | 0     | Incorrect signal combination during operation                          |
| Ü              |                      |       |  |
| 733            | 0                    | 0     | Incorrect signal combination after operation                           |
| Ü              |                      |       |  |
| 734            | 0                    | 0     | Pre-ventilating time not complied with                                 |
| Ü              |                      |       |  |
| 735            | 0                    | 0     | Fuel safety chain missing  |
| Ü              |                      |       |  |
| 736            | 0                    | 0     | Leak check: both gas valves open                                       |
| Ü              |                      |       |  |
| 737            | 0                    | 0     | Seal tightness check: Main Gas 2 delayed for too long at deactivation. |
| Ü              |                      |       |  |
| 738            | 0                    | 0     | Leak check: main gas 2 missing   |
| Ü              |                      |       |  |
| 739            | 0                    | 0     | Seal tightness check: Main Gas 2 open for too long.                    |
| Ü              |                      |       |  |
| 740            | 0                    | 0     | Seal tightness check: Main Gas 1 leaky.                                |
| Ü              |                      |       |  |
| 741            | 0                    | 0     | Seal tightness check: Main Gas 1 open for too long.                    |
| Ü              |                      |       |  |
| 742            | 0                    | 0     | Seal tightness check: Main Gas 2 leaky.                                |
| Ü              |                      |       |  |
| 743            | 0                    | 0     | Flame monitoring: flame after-burn too long                            |
| Ü              |                      |       | Burning duration (parameter 789) set to be too short.                  |
| 744            | 0                    | 0     | Flame monitoring: flame on again                                       |
| Ü              |                      |       |  |

| Fault Code No. | Restart according to |       | Description   |
|----------------|----------------------|-------|---|
|                | TRD                  | EN676 |   |
| 745            | 0                    | 0     | Programme check time exceeded.  |
| Ü              |                      |       |   |
| 746            | 0                    | 0     | Solenoid valve switch-off faulty  |
| Ü              |                      |       |   |
| 747            | 0                    | 0     | Leak check: ventilating into boiler not allowed   |
| Ü              |                      |       |   |
| 750            | 0                    | 0     | Shut-down on faults via bus.  |
| Ü              |                      |       |   |
| 751            | >88                  | 3     | No data transfer via the bus (time-out).  |
| Ü              |                      |       |   |
| 759            | 0                    | 0     | The "Setting" operating mode exceeded the 24-hour time limit.   |
| 760            | 0                    | 0     | Change of curve selection during setting not allowed  |
| H/Ü            |                      |       |   |
| 761            | 0                    | 0     | Change of curve lasts too long  |
|                |                      |       | The curve set change takes too long/could not be performed.<br>e.g.: The fuel safety chain is missing   |
| 763            | 0                    | 0     | different curve selection between the processors  |
| 764            | 1                    | 1     | CO-Controller, internal fault no. -   |
| 765            | 0                    | 0     | Parameter setting error: The channel for solo-fuel is not to determine.   |
|                |                      |       | Check the parametrisation of the channel configuration.   |
| 766            | 0                    | 0     | The limited firing rate (maximum firing rate without additional-fuel) does not exist in the priority curves   |
|                |                      |       | Check the programming of the priority curves (assignment of the fuel channels and their programming).   |
| 767            | 0                    | 0     | One parameter of the interpolation type for non-fuels is invalid  |
|                |                      |       | Check parameters 390 through 394  |
| 768            | 0                    | 0     | The curve set variable for the assigned air channel (1 = priority, 2 = additional curve) is invalid.  |
|                |                      |       | Compare solo curves and priority curves as they possibly have different firing rate points!   |
| 769            | 0                    | 0     | Ignition while mixed fuel operation or burner-start with solo fuel-A  |
|                |                      |       | Ignition is permitted only in a solo curve set.<br>FMS:<br>Ignition is permitted only with the oil or gas solo curve set, but not with solo fuel A. |
| 770            | 0                    | 0     | Fill-Time for fuel-A too long   |
| 791            | ≠88                  | 3     | Bus master is in a stop.  |
| Ü              |                      |       |   |
| 792            | >88                  | 3     | Bus data length incorrectly configured.   |
| Ü              |                      |       |   |
| 793            | >88                  | 3     | Bus master is decoupled.  |
| Ü              |                      |       |   |
| 800            | 0                    | 0     | Error in parameters, for parameter no.:   |
| H/Ü            |                      |       |   |
| 888            | 0                    | 0     | Fault block activated !   |

| Fault Code No. | Restart according to |       | Description   |
|----------------|----------------------|-------|---|
|                | TRD                  | EN676 |   |
| 889            | 0                    | 0     | <b>Time interval between remote-fault-resets is too short.</b><br>EN 14459 permits a remote unlocking only 4 x within 15 minutes.<br>The fault release is monitored by the remote control software, LAMTEC system bus, and field bus (parameter 19). When exceeded, fault deactivation H889 is generated and additional remote fault releases are ignored.<br>After a waiting period, another remote fault release can be performed.<br>Fault deactivation H889 also takes place if the fault release was sent even though none is present!<br>The release is monitored by terminal, while the programming unit and customer interface are switched of by the standard setting of parameter 19. A release through the front panel is always possible. |
| 900            | 0                    | 0     | <b>Error in self-test sequencer.</b><br>H/Ü<br>Fault during an internal self-test.<br>Reset the fault; switch the mains voltage off and on again if necessary.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card.<br>If the fault appears after a software update, the version of the monitoring processor may be incompatible with the version of the main processor.   |
| 901            | 0                    | 0     | <b>Terminal 10 + 24 Volt switch-off faulty.</b><br>H/Ü<br>Fault during an internal self-test.<br>Reset the fault; switch the mains voltage off and on again if necessary.<br>Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card.   |
| 902            | 0                    | 0     | <b>Error in over-voltage self-test.</b><br>H/Ü<br>Fault during an internal self-test.<br>Reset the fault; switch the mains voltage off and on again if necessary.<br>Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card.   |
| 903            | 0                    | 0     | <b>Error in optical coupler self-test terminal -</b><br>H/Ü<br>Fault during an internal self-test.<br>Reset the fault; switch the mains voltage off and on again if necessary.<br>Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card.<br><br>For ETAMATIC:<br>Are another 24V than those of terminal 24 being used?<br>Check the voltage level.<br>Short circuit on the 24V<br>Disconnect 24: no arrow must be pointing at digital inputs.<br>Connect terminal 24 to only one input<br>Voltage on<br>If the fault still occurs: Deactivation in ETAMATIC defective.  |

| Fault Code No. | Restart according to |          | Description  |
|----------------|----------------------|----------|--|
|                | TRD                  | EN676    |  |
| <b>904</b>     | <b>1</b>             | <b>1</b> | <b>Error in reference of firing rate</b>   |
| Ü              |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.<br/>If fault messages are constantly appearing one after the other → exchange the device or respective card.</p> <p>Using the device enter the Setting mode for about 3 seconds and then return to the Automatic mode to reimport the reference voltage.<br/>The potentiometer possibly has the incorrect polarity, is incorrectly connected (centre pick-up mixed up with the outer one), or is defective.</p> |
| <b>905</b>     | <b>1</b>             | <b>1</b> | <b>Error in reference element of main processor</b>  |
| Ü              |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.<br/>If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>  |
| <b>906</b>     | <b>1</b>             | <b>1</b> | <b>Error in reference element of monitoring processor</b>  |
| H              |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.<br/>If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>  |
| <b>907</b>     | <b>1</b>             | <b>1</b> | <b>Curve set adjustment via LAMTEC SYSTEM BUS, selftest recognizes fault</b>   |
| <b>911</b>     | <b>1</b>             | <b>1</b> | <b>Error in reference, channel: 1</b>  |
| Ü              |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.<br/>If fault messages are constantly appearing one after the other → exchange the device or respective card.</p> <p>Using the device enter the Setting mode for about 3 seconds and then return to the Automatic mode to reimport the reference voltage.<br/>The potentiometer possibly has the incorrect polarity, is incorrectly connected (centre pick-up mixed up with the outer one), or is defective.</p> |
| <b>912</b>     | <b>1</b>             | <b>1</b> | <b>Error in reference, channel: 2</b>  |
| Ü              |                      |          | See S911   |
| <b>913</b>     | <b>1</b>             | <b>1</b> | <b>Error in reference, channel: 3</b>  |
| Ü              |                      |          | See S911   |
| <b>914</b>     | <b>1</b>             | <b>1</b> | <b>Error in reference, channel: 4</b>  |
| Ü              |                      |          | See S911   |
| <b>915</b>     | <b>1</b>             | <b>1</b> | <b>Fault in reference, duct: 5</b>   |
| Ü              |                      |          | See S911   |

| Fault Code No. | Restart according to |          | Description  |
|----------------|----------------------|----------|--|
|                | TRD                  | EN676    |  |
| <b>921</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 11 or 66 (ETAMATIC) faulty.</b>  |
| H/Ü            |                      |          | <p>Fault during an internal self-test.<br/>Reset the fault; switch the mains voltage off and on again if necessary.<br/>Check all fuses in the device.<br/>If fault messages are constantly appearing one after the other → exchange the device or respective card.</p> <p>FMS with 660 R 0016 V4.3 when the burner is at a standstill:<br/>Check the wiring between FMS and 660 R 0016 V4.3.<br/>If the wiring has been performed correctly: exchange 660 R 0016 V4.3.</p> <p>FMS with 660 R 0016 V4.3 at start of burner:<br/>From the start of the burner, relay module type 660 R 0016 V4.3 checks the following outputs:<br/>- Ignition transformer (terminal 86)<br/>- Ignition valves (terminal 85)<br/>- Oil valves (terminal 84)<br/>- Main Gas 1 (terminal 82)<br/>- Main Gas 2 (terminal 83)</p> <p>If faults H921 (in case of starting with gas as the fuel), H923, H924 (in case of starting with O<sub>2</sub> as the fuel) occur by the time ignition is completed, the following faults may be present:<br/>- Lack of or too little firing rates at terminals 82 through 86<br/>- Failure of fuses F1-F4 or F6<br/>- Actual defect in one of the safety-related switching channels<br/>For further troubleshooting, the diagnostic mode can be activated (see DLT6089/ DLT6065).</p> |
| <b>922</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 16 or 65 (ETAMATIC) faulty.</b>  |
| H/Ü            |                      |          | See S921   |
| <b>923</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 43 or 68 (ETAMATIC) faulty.</b>  |
| H/Ü            |                      |          | See S921   |
| <b>924</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 67 faulty</b>  |
| H/Ü            |                      |          | See S921   |
| <b>925</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 45 faulty.</b>   |
| H/Ü            |                      |          | See S921   |
| <b>926</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 68 or 61 (ETAMATIC) faulty.</b>  |
| H/Ü            |                      |          | See S921   |
| <b>927</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 36 (ETAMATIC K202) faulty.</b>   |
| H/Ü            |                      |          | See S921   |
| <b>928</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 41 faulty.</b>   |
| H/Ü            |                      |          | See S921   |
| <b>929</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : output terminal 76 faulty</b>  |
| H/Ü            |                      |          | See S921   |
| <b>930</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : Output K203 defect.</b>  |
| H/Ü            |                      |          | See S921   |
| <b>931</b>     | <b>0</b>             | <b>0</b> | <b>Relay driver self-test : Output K201 defect.</b>  |
| H/Ü            |                      |          | See S921   |



| Fault Code No. | Restart according to |       | Description  |
|----------------|----------------------|-------|--|
|                | TRD                  | EN676 |  |
| 997            | >88                  | 3     | <b>Default language missing or LANGUAGE-FLASH defect</b><br>Fault during an internal self-test.<br>Reset the fault; switch the mains voltage off and on again if necessary.<br>Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card.  |
| 998            | 0                    | 0     | <b>Internal fault: main loop is too slow.</b><br>Fault during an internal self-test.<br>Reset the fault; switch the mains voltage off and on again if necessary.<br>Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card.   |
| H/Ü            |                      |       |  |
| 999            | 0                    | 0     | <b>Internal fault Number -</b>   |
| H              |                      |       | The internal procedure is faulty, and the additional number indicates the position of the fault within the firmware.<br>Internal fault number 2:<br>This fault is triggered by the watchdog processor, when these do not match with the burner sequencer's behaviour of the main processor.<br>Possible cause:<br>The HP activates the maintenance mode without any permission<br>The HP changes into a mixed operation without any permission<br>Internal fault number 3:<br>If the fault occurs once, it may be caused by EMC interference.<br>If the fault occurs often, the processor pc board is defective.<br>Internal fault number 4:<br>The monitoring processor has not detected a signal change at the "Air pressure monitor" input. This can occur if the "Air pressure monitor" input is present at RI RNFR START and is only briefly deactivated. This fault occurs frequently when the fan is started by an external control system.<br>ETAMATIC:<br>Before A4a4002: the "Air pressure monitor" input appears during the TRIAC self-test before the fan output is actuated by ETAMATIC!<br>Internal fault number 7:<br>This fault occurs when the "Burner On" and "Pre-venting" signals occur in the wrong order or too quickly in sequence during the postpurge time in the case of devices without a burner sequencer (VMS / ETAMATIC V).<br>No fault occurs if the device switches to the "Ready" (BE) mode downstream of the "Burner On" input before the "Pre-venting" signal is sent.<br>Internal fault number 22:<br>A fault occurred during the assumption of the curve in the EEPROM.<br>→ Check the curve. Re-enter if required. This fault is possible only in connection with the programming unit!<br>Fault during an internal self-test.<br>Reset the fault; switch the mains voltage off and on again if necessary.<br>Check all fuses in the device.<br>If fault messages are constantly appearing one after the other → exchange the device or respective card. |



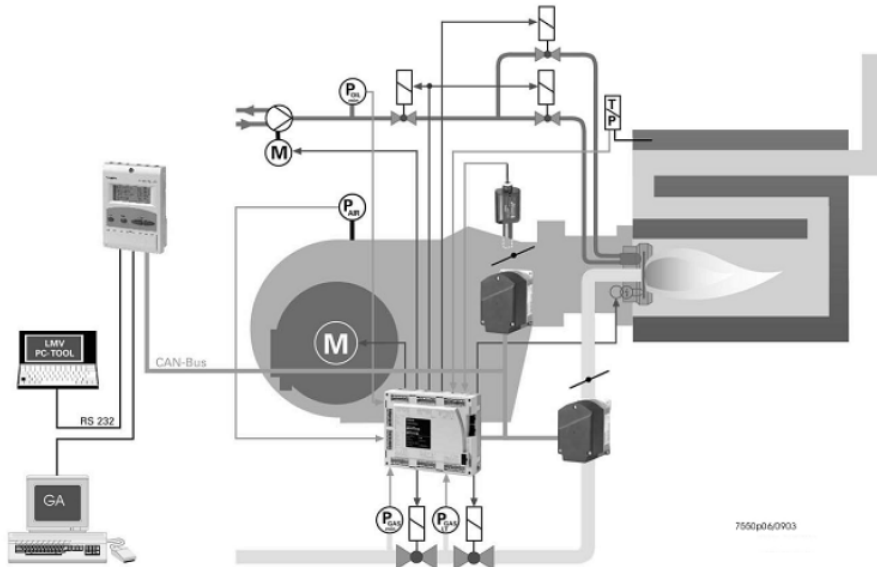
If a fault occurs that is not listed in the fault list, please contact Ecostar after-sales support or your system's commissioning technical personnel.



➤ LMV 5...






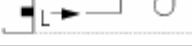

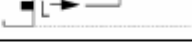



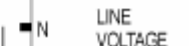



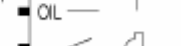
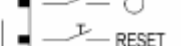






Basic Diagram



AZL52



## Description of connection terminals (AC 230 V)

| Terminal designation | Connection symbol   | Input | Output | Description                                      | Electrical rating   |
|----------------------|---|-------|--------|--|---|
| X3-01                | PIN1<br>   |       | x      | Fan motor contactor                              | AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, $\cos\varphi$ 0.4            |
|                      | PIN2<br>   |       | x      | Alarm  | AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, $\cos\varphi$ 0.4            |
| X3-02                | PIN1<br>   | x     |        | Air pressure switch (LP)                         | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 1.5 mA                  |
|                      | PIN2<br>   |       | x      | Power signal for air pressure switch (LP)        | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 500 mA                  |
| X3-03                | PIN1<br>   | x     |        | End switch burner flange                         | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 5 A                     |
|                      | PIN2<br>   |       | x      | Power signal for end switch burner flange        | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 5 A                     |
| X3-04                | PIN1<br>   | x     |        | Safety loop                                      | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 5 A                     |
|                      | PIN2<br>   |       | x      | Power signal for safety loop                     | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 5 A                     |
|                      | PIN3<br>   |       | x      | Protective earth (PE)                            |   |
|                      | PIN4<br>   |       | x      | Neutral conductor (N)                            |   |
|                      | PIN5<br>  |       | x      | Live conductor (L)                               | AC 230 V +10 % / -15 %, 50...60 Hz, fuse 6.3 AT (DIN EN 60 127 2 / 5) |
| X4-01                |   |       |        | Fuel selection "internal" if pin 1-2 is not used |   |
|                      | PIN1<br> | x     |        | Fuel selection gas                               | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 1.5 mA                  |
|                      | PIN2<br> | x     |        | Fuel selection oil                               | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 1.5 mA                  |
|                      | PIN3<br> | x     |        | Fan contactor contact (FCC) or FGR-PS            | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 1.5 mA                  |
|                      | PIN4<br> | x     |        | Reset / manual lockout                           | AC 230 V +10 % / -15 %, 50...60 Hz, $I_{max}$ 1.5 mA                  |
| X4-02                | PIN1<br> |       | x      | Protective earth (PE)                            |   |
|                      | PIN2<br> |       | x      | Neutral conductor (N)                            |   |
|                      | PIN3<br> |       | x      | Ignition   | AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, $\cos\varphi$ 0.2            |
| X4-03                | PIN1<br> |       | x      | Protective earth (PE)                            |   |
|                      | PIN2<br> |       | x      | Neutral conductor (N)                            |   |
|                      | PIN3<br> |       | x      | Start signal or PS relief (APS test valve)       | AC 230 V +10 % / -15 %, 50...60 Hz, 0.5 A, $\cos\varphi$ 0.4          |

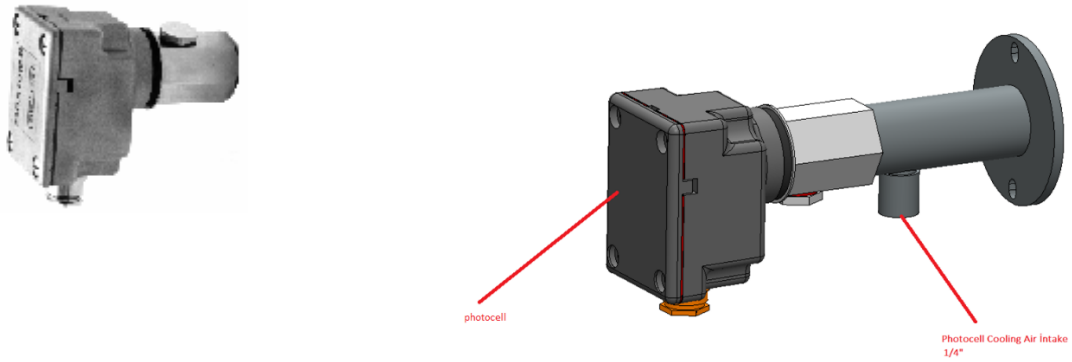
| Terminal designation | Connection symbol | Input | Output | Description  | Electrical rating   |
|----------------------|-------------------|-------|--------|--|---|
| X5-01                |                   |       | x      | Protective earth (PE)                                |   |
|                      |                   | x     |        | Pressure switch min-oil (DWmin-oil)                  | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 1.5 mA |
|                      |                   |       | x      | Power signal for pressure switch-min-oil (DWmin-oil) | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 500 mA |
| X5-02                |                   |       | x      | Protective earth (PE)                                |   |
|                      |                   | x     |        | Pressure switch-max-oil (DWmax-oil)                  | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 1.5 mA |
|                      |                   |       | x      | Power signal for pressure switch-max-oil (DWmax-oil) | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 500 mA |
| X5-03                |                   | x     |        | Controller (ON / OFF)                                | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 1.5 mA |
|                      |                   | x     |        | Controller closes / stage 3                          | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 1.5 mA |
|                      |                   | x     |        | Controller opens / stage 3                           | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 1.5 mA |
|                      |                   |       | x      | Power signal for control of controller               | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 500 mA |
| X6-01                |                   | x     |        | Start release oil                                    | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 1.5 mA |
|                      |                   |       | x      | Power signal start release oil                       | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 500 mA |
|                      |                   | x     |        | Direct heavy oil start                               | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 1.5 mA |
|                      |                   |       | x      | Power signal direct heavy oil start                  | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 500 mA |
| X8-02                |                   |       | x      | Protective earth (PE)                                |   |
|                      |                   |       | x      | Neutral conductor (N)                                |   |
|                      |                   |       | x      | Oil pump / magnetic coupling                         | AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, cosφ 0.4           |
| X8-03                |                   |       | x      | Protective earth (PE)                                |   |
|                      |                   |       | x      | Neutral conductor (N)                                |   |
|                      |                   |       |        | Fuel valve SV (oil)                                  | AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4           |

| Terminal designation | Connection symbol | Input | Output | Description                      | Electrical rating   |
|----------------------|-------------------|-------|--------|----------------------------------|---|
| X7-01                |                   |       | x      | Protective earth (PE)            |   |
|                      |                   |       | x      | Neutral conductor (N)            |   |
|                      |                   |       |        | Fuel valve V2 (oil)              | AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4           |
| X7-02                |                   |       | x      | Protective earth (PE)            |   |
|                      |                   |       | x      | Neutral conductor (N)            |   |
|                      |                   |       |        | Fuel valve V3 (oil)              | AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, cosφ 0.4           |
| X7-03                |                   |       | x      | Protective earth (PE)            |   |
|                      |                   | x     |        | Start release gas CPL (LMV52...) | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 1.5 mA |
|                      |                   |       | x      | Power signal (reserve)           | AC 230 V +10 % / -15 %, 50...60 Hz, I <sub>max</sub> 500 mA |

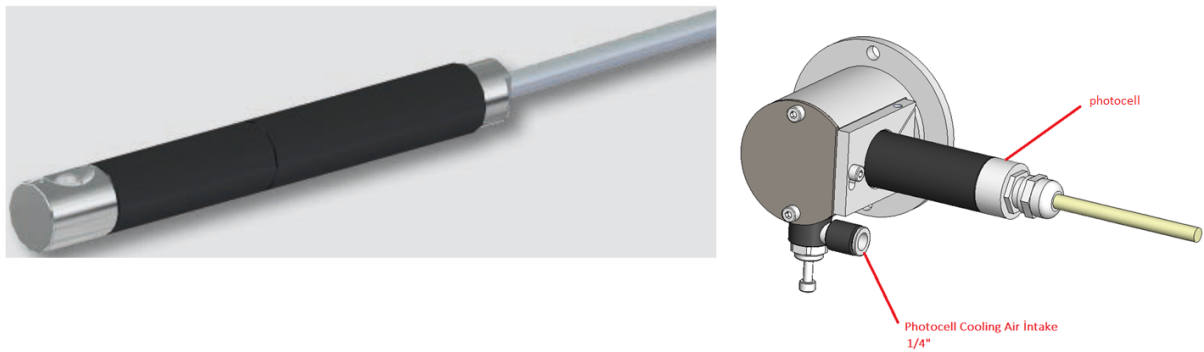
## 6.10. Photocell

Check the photocell weekly. Clean the dust or fume stains on the glass of photocell by a dry cloth.

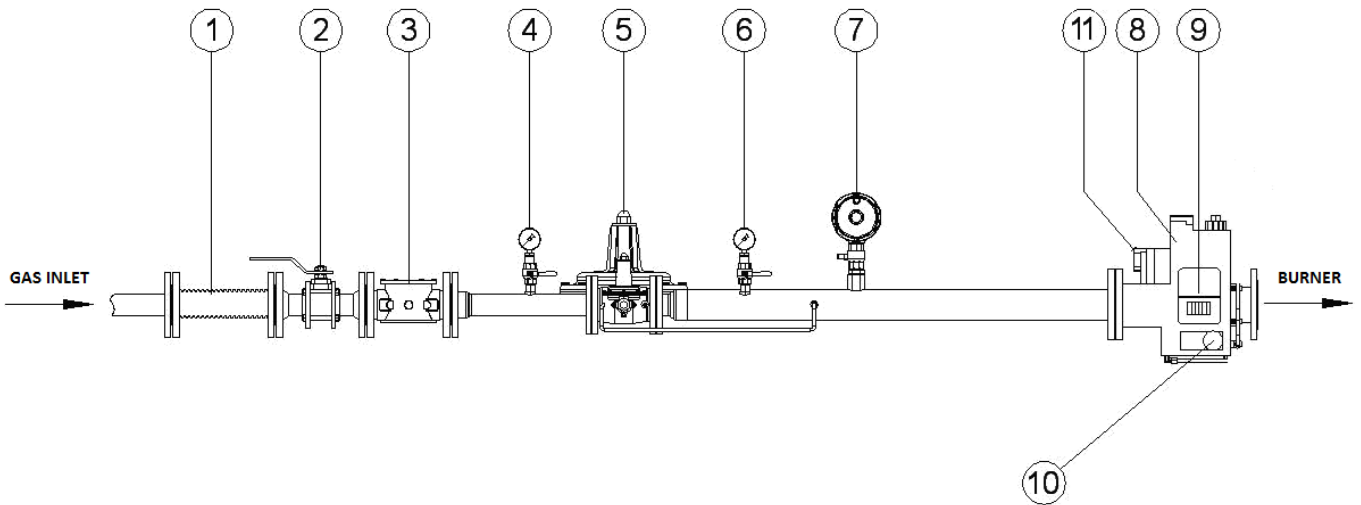
### ➤ QRA10



### ➤ FFS08



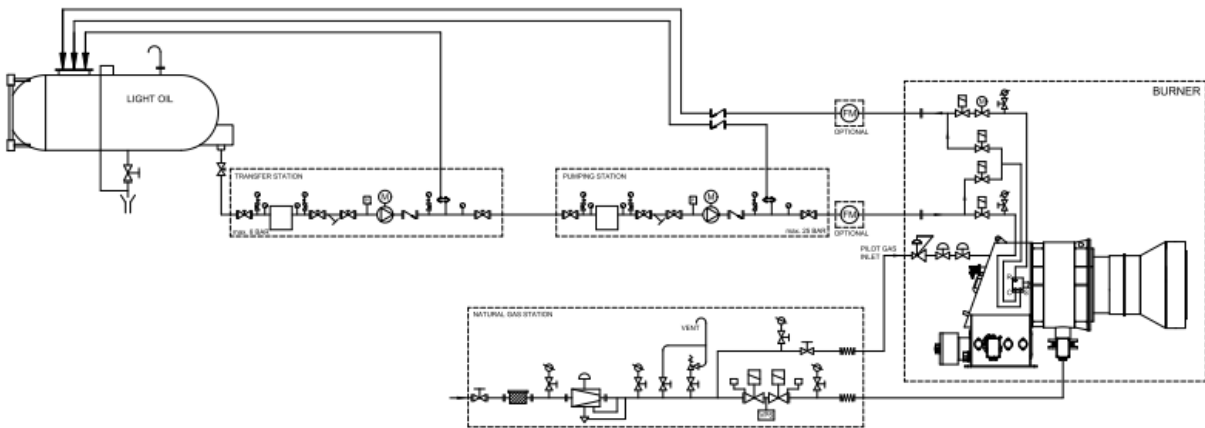
### 6.11. Gas Pass Equipment Required in Gas Line



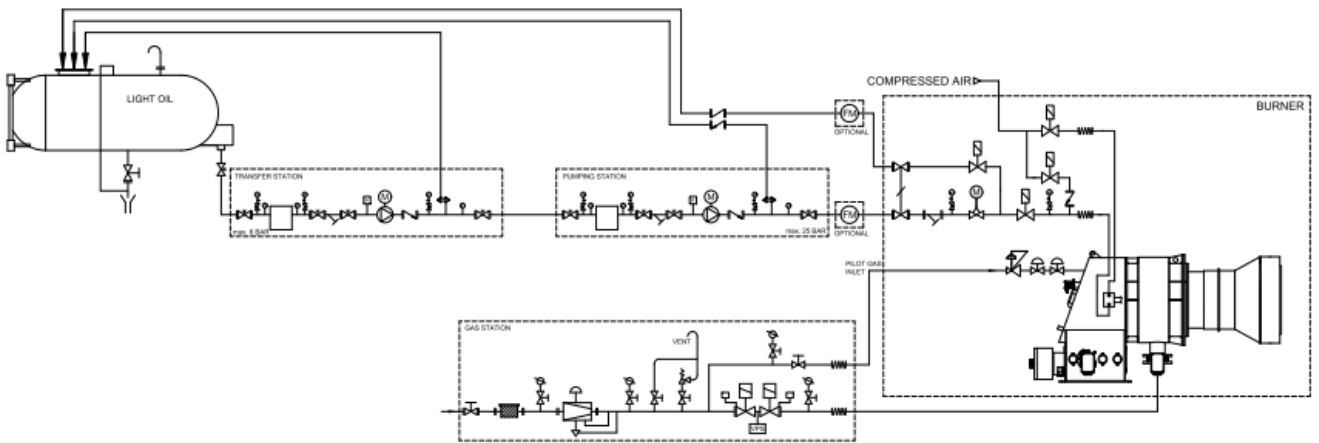
| <b>Pe &lt; 300 mbar<br/>Q&lt;1200kW</b>          | <b>Pe &gt; 300 mbar<br/>Q&lt;1200kW</b>          | <b>Pe &lt; 300 mbar<br/>Q&gt;1200kW</b>           | <b>Pe &gt; 300 mbar<br/>Q&gt;1200kW</b>          |
|--|--|---|--|
| 1- Compensator                                   | 1- Compensator                                   | 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                                     |
| 10- max. gas pressure switch                     | 6- Outlet manometer + valve                      | 9- Sealing Control Set                            | 6- Outlet manometer + valve                      |
| 11- min. gas pressure switch                     | 7- Safety discharge valve                        | 10- max. gas pressure switch                      | 7- Safety discharge valve                        |
|  | 8 – Multi-block (safety and operation solenoids) | 11- min. gas pressure switch                      | 8 – Multi-block (safety and operation solenoids) |
|  | 10- max. gas pressure switch                     |   | 9- Sealing Control Set                           |
|  | 11- min. gas pressure switch                     |   | 10- max. gas pressure switch                     |
|  |  |   | 11- min. gas pressure switch                     |

## 6.12. Gas-Oil Burners Ring Line

LIGHT OIL - GAS P&ID  
MECHANICAL CRACKING ATOMIZATION



LIGHT OIL - GAS P&ID  
AIR CRACKING ATOMIZATION



|  |   |
|--|---|
|  | BALL VALVE  |
|  | MANOMETER<br>PRESSURE GAUGE                       |
|  | THERMOMETER                                       |
|  | FUEL FILTER                                       |
|  | Y TYPE STRAINER                                   |
|  | PRESSURE SWITCH                                   |
|  | PUMP and MOTOR                                    |
|  | CHECK VALVE                                       |
|  | SOLENOID VALVE                                    |
|  | PROPORTIONAL MOTORIZED VALVE                      |
|  | FLOW METER  |
|  | GAS FILTER  |
|  | REGULATOR   |
|  | RELIEF VALVE                                      |
|  | SOLENOID VALVE<br>GAS PRESSURE SWITCH MIN. - MAX. |
|  | FLEX HOSE   |
|  | PILOT GAS REGULATOR                               |
|  | GAS SOLENOID VALVE                                |

## 7. MAINTENANCE

### 7.1. Weekly Maintenance

Weekly maintenance is a routine cleaning and adjustment procedure which is performed to ensure smooth and continuous operation of the system. Burner components must be adjusted after each maintenance work in accordance with the instructions. Otherwise, the burner cannot be operated efficiently.

- Clean all filters in fuel ring system.
- Clean fuel nozzle of the burner.
- Check the burner gas tip.
- If the fin spaces and surface of the diffuser are covered with particles and formed a layer, clean it with a wire brush.
- Clean heads of ignition electrodes. Check by performing manual ignition, adjust the distance between the ignition electrode and diffuser according to the adjustment instructions.

### 7.2. Monthly Maintenance

Monthly maintenance is a more comprehensive maintenance compared to weekly maintenance, 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 a combustion analysis.

- Clean the filters on the fuel line to the burner.
- Clean fuel nozzle of the burner.
- Clean the surface of the diffuser.
- Clean flame pipe.
- Check all wiring points. Tighten loose connections.
- Clean the solenoid valves.
- Clean the photocell.
- Clean the dust and layers accumulated on the fan and air valves.
- Check pump pressure. Check if necessary (Light-Oil: 25bar)
- Check ignition electrodes. Adjust it if necessary. Check ignition cables and sockets.
- Perform cleanliness control of inside panel. Clean if necessary.
- Check all bolts of the burner. Tighten loose bolts.
- After starting the burner and adjusting air damper, perform flue gas analysis and check if there is an ideal combustion.
- Clean the filters on the main line and multiblock.
- Check the burner gas tip.
- Check gas line pressure, it must be the same with the first adjusted pressure, otherwise burner load and emission values will also have changed.
- After starting the burner and adjusting air damper, perform flue gas emission measurement and check if there is an ideal combustion.

### 7.3. 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.

- Check insulation resistance of electric motor.
- Make surface cleaning of ignition electrodes and porcelains. Replace cracked or broken porcelains.
- Clean air fan and clamps.
- Check the operating function.
- Check cleanliness of the nozzle. Replace it if necessary.
- Clean the N.C. solenoid valve. Measure the coil winding resistance.
- Clean the strainer (filter) under the pump cover.
- Clean the photocell.
- Clean fuel filter. Replace it if necessary.
- Check boiler thermostats.
- Check cleanliness of boiler inside and clean if necessary.



## 8. TROUBLESHOOTING

| Problem                                       | Cause  | Explanation-Suggestion  |
|---|--|---|
| Burner cannot be commissioned                 | Light Oil or Gas is cut or does not come               | Light Oil or Gas valve might be closed. Open the valve.   |
|   | Fuse failure   | Check burner power supply. The fuse on the main panel or the fuse on the burner might be tripped.   |
|   | Relay failure  | Reset the thermal relay. Check adjustment of the thermal relay according to the current in motor label. If the failure is not removed, replace the thermal relay.                       |
|   | Boiler thermostat, pressure switch failure             | If there is a problem with the burner thermostats, pressure switches and steam tank this may be due to an unadjusted or faulty water level device; adjust it and if broken, replace it. |
| Flame appears and goes into failure mode.     | Light Oil or Gas pressure error                        | Circuit fuel oil or gas pressure might have dropped.  |
|   | Photocell failure                                      | Photocell may be faulty or contaminated. Remove and clean.  |
|   | Program relay failure                                  | Replace it with a new one.  |
| Burner starts up, but fails after 10 seconds. | Program relay failure                                  | Replace it with a new one.  |
|   | Air pressure switch adjustment                         | Air pressure switch might be adjusted to a high value. There may be dirt in the air pressure switch. Air pressure switch might be broken.   |
|   | Fan motor failure                                      | Check fan motor coils, motor contactor and outlet from program relay.   |
| Burner starts up, but fails after 30 seconds. | Light Oil or Gas valve, light oil or gas pressure drop | Light Oil or Gas valve might be closed. Circuit light oil or gas pressure might have dropped. Check Light Oil or Gas inlet manometer.   |
|   | Ignition electrode failure                             | Ignition electrodes might be misadjusted or ignition cables might have come out of their terminals. Adjust ignition electrodes with a distance of 3-5 mm. between them.                 |
| Boiler cover is overheating.                  | Sealing problem  | Ensure sealing between the boiler cover and burner. If required, use insulating material between the boiler connecting flange and boiler cover.   |

**9. PERIODICAL FLUE GAS MEASUREMENT REPORT**

| <b>Fuel Consumption (kg/h)</b> | <b>Fuel Consumption (m<sup>3</sup>/h)</b> | <b>CO (ppm)</b> | <b>O<sub>2</sub> (%)</b> | <b>CO<sub>2</sub> (ppm)</b> | <b>NO<sub>x</sub> (ppm)</b> | <b>Yield (%)</b> | <b>Flue Temp. (°C)</b> | <b>Date</b> | <b>Signature</b> |
|--------------------------------|---|-----------------|--------------------------|-----------------------------|-----------------------------|------------------|------------------------|-------------|------------------|
|                                |   |                 |                          |                             |                             |                  |                        |             |                  |
|                                |   |                 |                          |                             |                             |                  |                        |             |                  |
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|                                |   |                 |                          |                             |                             |                  |                        |             |                  |

## 10. 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.

For your suggestions, complaints and service requests  
**Esentepe Mah. Milangaz Cad. No:75 K:3**  
**Kartal Monumento Plaza**  
**KARTAL/İSTANBUL/TÜRKİYE**  
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**Fax: +90 216 370 45 03**

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Also you can contact with us:  
**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.

