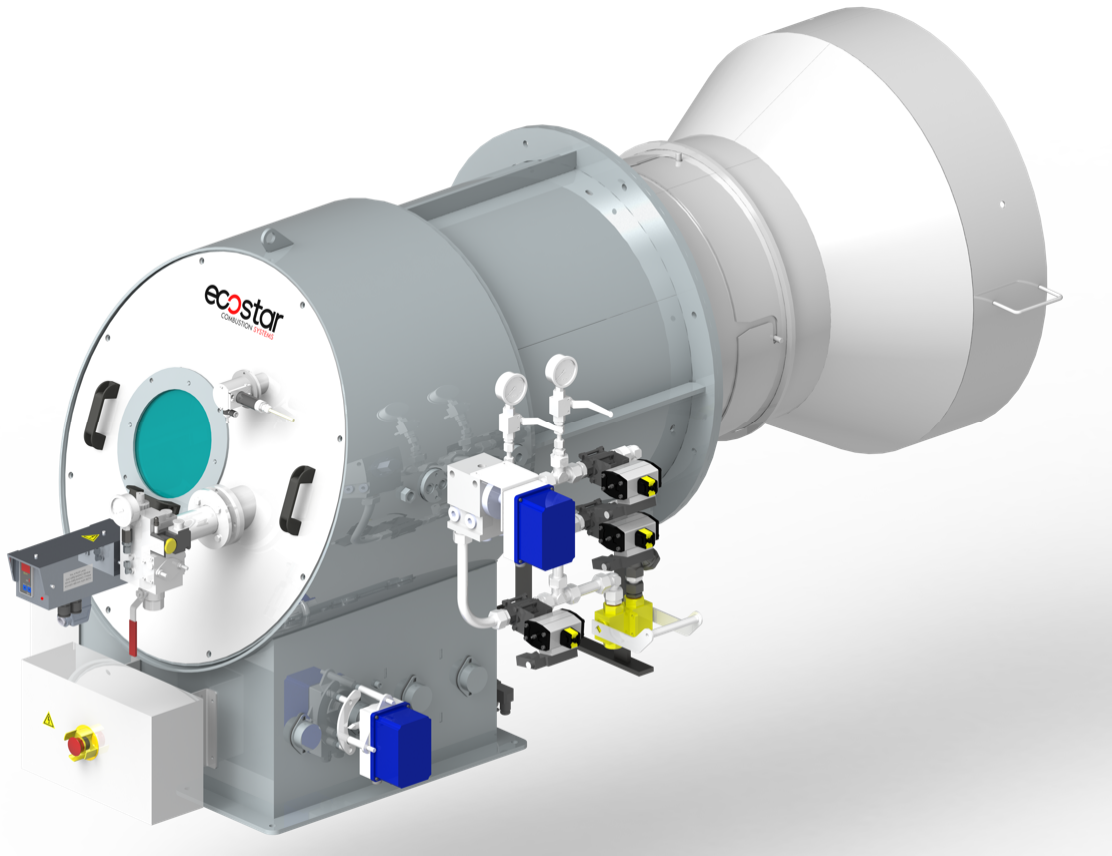


DUOBLOCK HEAVY OIL BURNERS INSTALLATION, OPERATING AND MAINTENANCE MANUAL

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 Heavy 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 Heavy Oil Burners are manufactured in accordance with TS EN 267 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.



TERMO ISI SİSTEMLERİ SAN.VE TİC.A.Ş.

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

Kartal Monumento Plaza

Kartal/İSTANBUL/TÜRKİYE

Tel: +90 216 442 93 00

Fax: +90 216 370 45 03

www.ecostar.com.tr





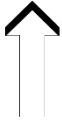

e-mail:servis@ecostar.com.tr

CONTENTS

1. WARNINGS	3
1.1. Warning Symbols and Descriptions	3
1.2. General Safety Rules	4
2. TERMS OF WARRANTY	6
2.1. Out of Warranty Conditions.....	6
3. BURNER'S GENERAL FEATURES	7
3.1. Purpose of Use and Work Limits of Burners.....	7
3.2. Code Key.....	7
4. TECHNICAL DATA	9
4.1. Capacity Table.....	9
4.2. Burner Dimensions	10
5. INSTALLATION.....	12
5.1. Burner Installation Picture	12
6. COMMISSIONING	13
6.1. General Controls.....	13
6.2. Combustion Adjustment	14
6.2.1. Pilot Ignition System	14
6.2.2.PAL.....	16
6.3.Photocell	19
6.4. Nozzle.....	21
6.5. Curves According To Fuel Consumption (Fuel Nozzles)	27
6.6. Oil Adjustment Regulator	33
6.7. Oil Burner Ring Line	34
6.8. Servomotor Adjustment.....	35
6.9. Emission Measurement.....	36
6.10. Program Relay.....	37
7. MAINTENANCE	72
7.1. Weekly Maintenance	72
7.2. Monthly Maintenance.....	72
7.3. Seasonal Maintenance.....	73
8. TROUBLESHOOTING	74
9. PERIODICAL FLUE GAS MEASUREMENT REPORT.....	75
10. AFTER SALES SERVICES.....	76
11. NOTES	77

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.
	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.



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
- Take appropriate actions



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



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



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



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



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



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

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



BURNER ROOM

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

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

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

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

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

2. TERMS OF WARRANTY

Main and auxiliary equipment and all components used in Ecostar heavy 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 Heavy Oil burners are designed to operate with oil at 2.5 – 20 Cst (mm²/s) viscosity, at rated capacity and pressure ranges and -15% to +10% nominal voltage.

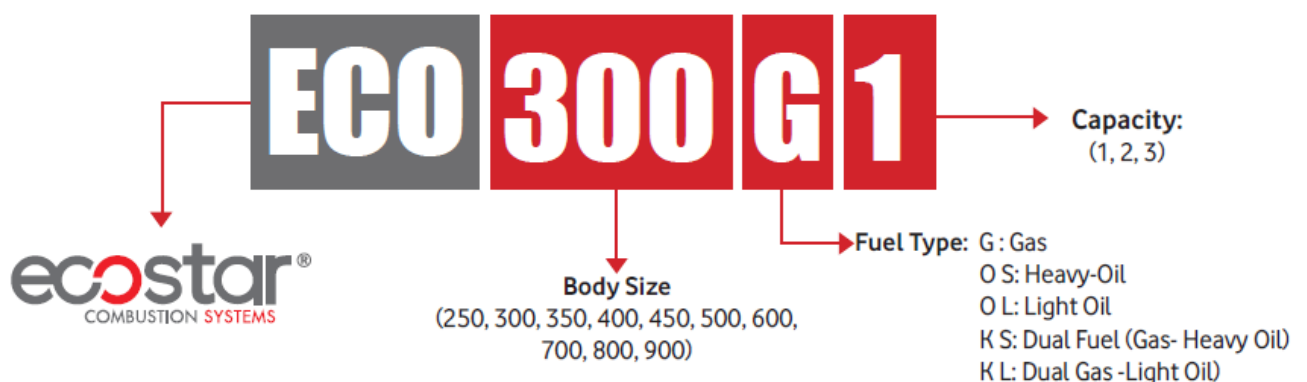
3.1.Purpose of Use and Work Limits of Burners

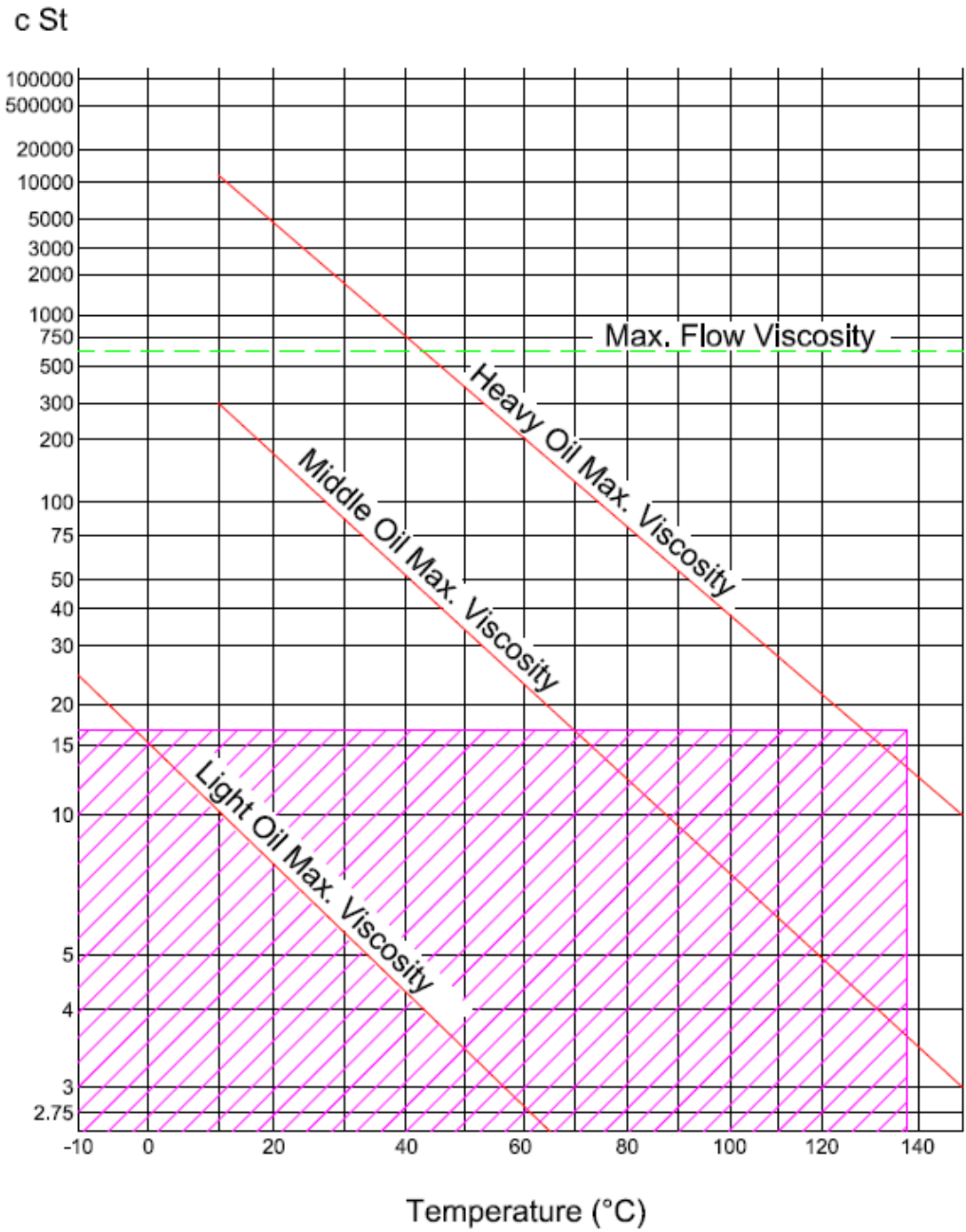
- This product works at any load value equivalent to its max. capacity or covered by its capacity range;
 - In hot water and steam boilers,
 - In direct and indirect hot air generators,
 - Industrial appliances operating at temperature below 600 °C,
 - -15 °C...+60 °C ambient temperature range,
 - 1N 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 Heavy Oil burners dependent on viscosity



Operating Range

4. TECHNICAL DATA

4.1.Capacity Table

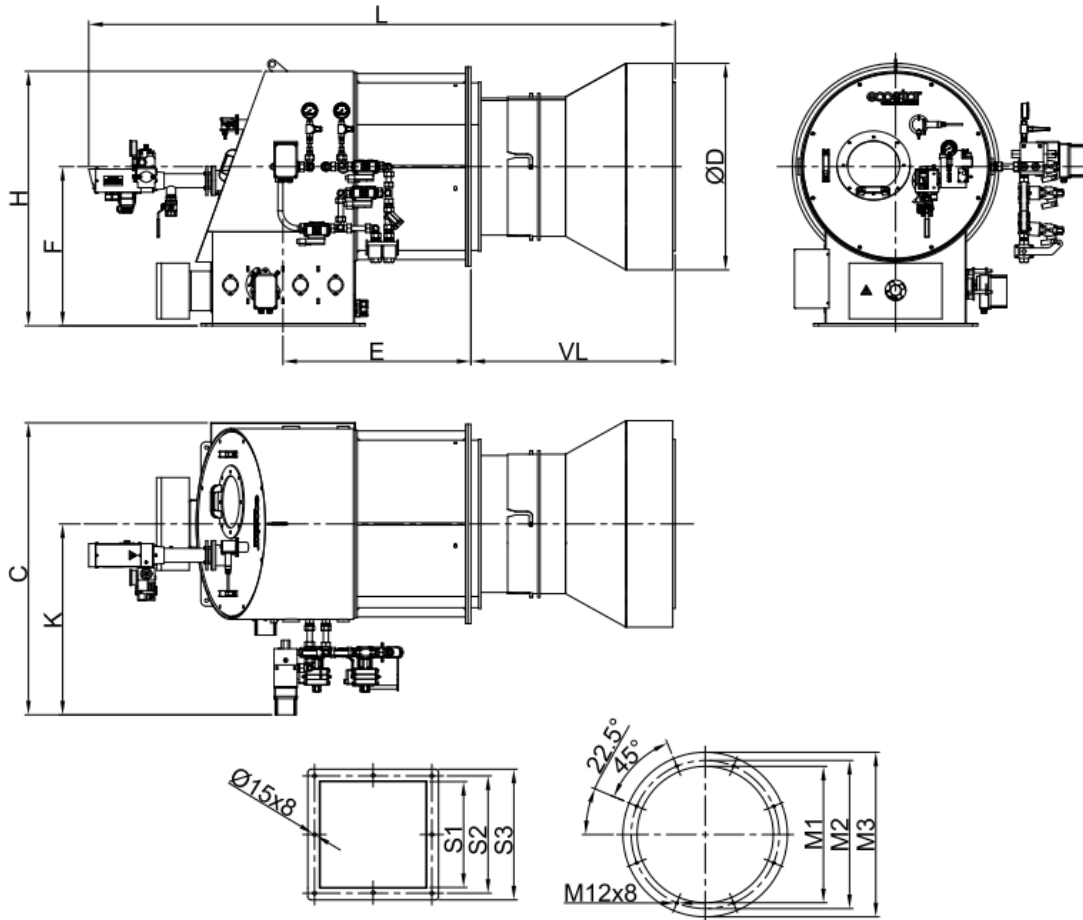
BURNER TYPE	CAPACITY		HEAVY OIL CONSUMPTION
	Max. MW	Max. kcal/h	Max. kg/h
ECO-250.1	1,9	1.600.000	165,8
ECO-250.2	2,6	2.250.000	233,2
ECO-300.1	3,4	2.900.000	300,5
ECO-300.2	4,2	3.600.000	373,1
ECO-350.1	5,0	4.300.000	445,6
ECO-350.2	6,2	5.300.000	549,2
ECO-350.3	7,3	6.300.000	652,8
ECO-400.1	8,1	7.000.000	725,4
ECO-400.2	8,8	7.600.000	787,6
ECO-400.3	9,7	8.300.000	860,1
ECO-450.1	11,5	9.900.000	1025,9
ECO-450.2	12,9	11.100.000	1150,3
ECO-450.3	14,5	12.450.000	1290,2
ECO-500.1	16,2	13.900.000	1440,4
ECO-500.2	17,8	15.300.000	1585,5
ECO-500.3	19,4	16.650.000	1725,4
ECO-600.1	20,8	17.900.000	1854,9
ECO-600.2	23,4	20.150.000	2088,1
ECO-600.3	25,0	21.500.000	2228,0
ECO-700.1	26,2	22.500.000	2331,6
ECO-700.2	27,3	23.500.000	2435,2
ECO-700.3	29,1	25.000.000	2590,7
ECO-800.1	32,1	27.600.000	2860,1
ECO-800.2	33,5	28.850.000	2989,6
ECO-800.3	35,2	30.250.000	3134,7
ECO-900.1	36,7	31.600.000	3274,6
ECO-900.2	39,2	33.750.000	3497,4
ECO-900.3	40,8	35.050.000	3632,1

H_u Heavy Oil (S) = 9650 Kcal/kg

Electronic Modulating Burner-Modulation Ratio: Liquid Fuel 5:1

4.2. Burner Dimensions

➤ Fuel Oil Asphalt Plant

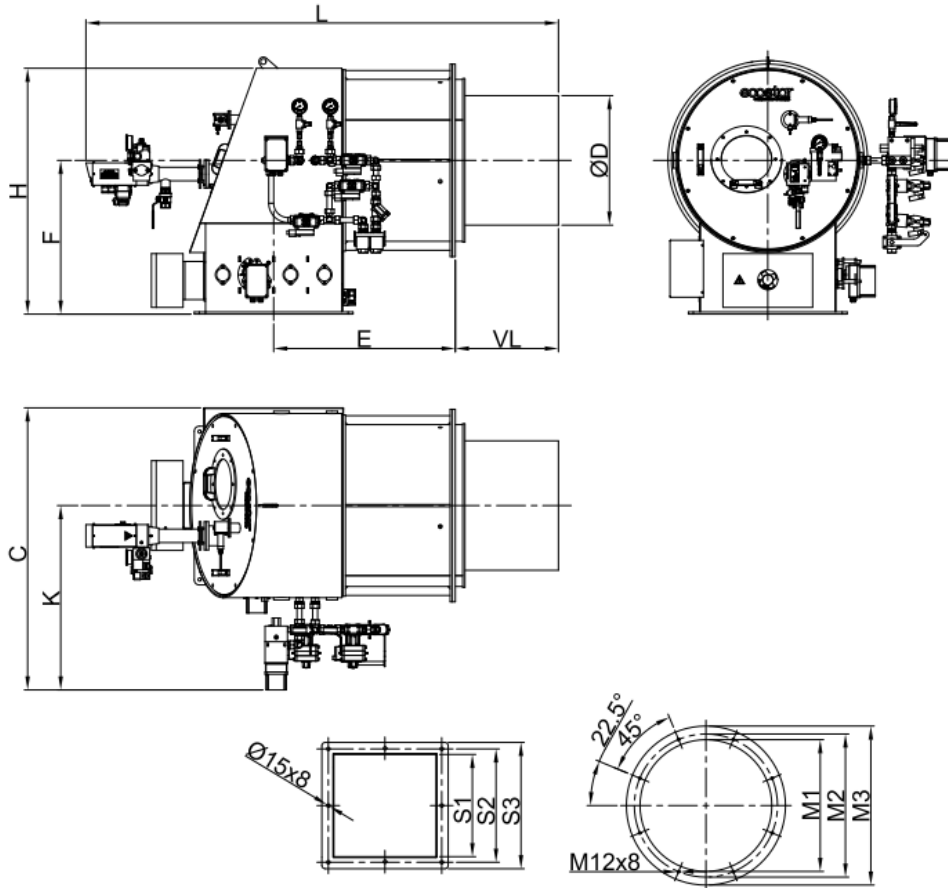


	Ø D	L	E	H	F	C	K	S1	S2	S3	Ø M1	Ø M2	Ø M3	VL
ECO 250 OS 1	-	1850	650	875	500	700	325	250	300	340	Ø380	Ø430	Ø500	570
ECO 250 OS 2	-	1850	650	875	500	700	325	250	300	340	Ø380	Ø430	Ø500	570
ECO 300 OS 1	-	1850	650	875	500	700	325	300	350	385	Ø380	Ø430	Ø500	570
ECO 300 OS 2	-	1850	650	875	500	700	325	300	350	385	Ø380	Ø430	Ø500	570
ECO 350 OS 1	Ø520	1900	675	900	550	740	350	350	410	450	Ø430	Ø480	Ø550	670
ECO 350 OS 2	Ø520	1900	675	900	550	740	350	350	410	450	Ø430	Ø480	Ø550	670
ECO 350 OS 3	Ø520	1900	675	900	550	740	350	350	410	450	Ø430	Ø480	Ø550	670
ECO 400 OS 1	Ø590	1900	675	920	600	900	500	400	450	510	Ø480	Ø530	Ø600	670
ECO 400 OS 2	Ø590	1900	675	920	600	900	500	400	450	510	Ø480	Ø530	Ø600	670
ECO 400 OS 3	Ø590	1900	675	920	600	900	500	400	450	510	Ø480	Ø530	Ø600	670
ECO 450 OS 1	Ø665	1950	675	960	640	1000	500	450	500	556	Ø580	Ø630	Ø700	750
ECO 450 OS 2	Ø665	1950	675	960	640	1000	500	450	500	556	Ø580	Ø630	Ø700	750
ECO 450 OS 3	Ø665	1950	675	960	640	1000	500	450	500	556	Ø580	Ø630	Ø700	750
ECO 500 OS 1	Ø740	2500	760	1100	690	1000	500	500	550	608	Ø660	Ø710	Ø800	870
ECO 500 OS 2	Ø740	2500	760	1100	690	1000	500	500	550	608	Ø660	Ø710	Ø800	870
ECO 500 OS 3	Ø740	2500	760	1100	690	1000	500	500	550	608	Ø660	Ø710	Ø800	870
ECO 600 OS 1	Ø890	2550	810	1100	690	1000	500	600	660	708	Ø740	Ø792	Ø860	870
ECO 600 OS 2	Ø890	2550	810	1100	690	1000	500	600	660	708	Ø740	Ø792	Ø860	870
ECO 600 OS 3	Ø890	2550	810	1100	690	1000	500	600	660	708	Ø740	Ø792	Ø860	870
ECO 700 OS 1														
ECO 700 OS 2														
ECO 700 OS 3														
ECO 800 OS 1														
ECO 800 OS 2														
ECO 800 OS 3														
ECO 900 OS 1														
ECO 900 OS 2														
ECO 900 OS 3														

Contact The Sales Department

Please Contact The Sales Unit For Special VL Sizes.

➤ Fuel Oil Steam Boiler



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

Contact The Sales Department

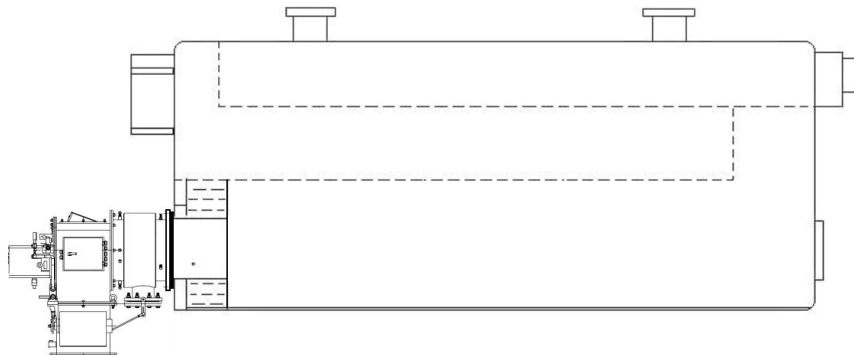
Please Contact The Sales Unit For Special VL Sizes.

5. INSTALLATION

5.1. Burner Installation Picture

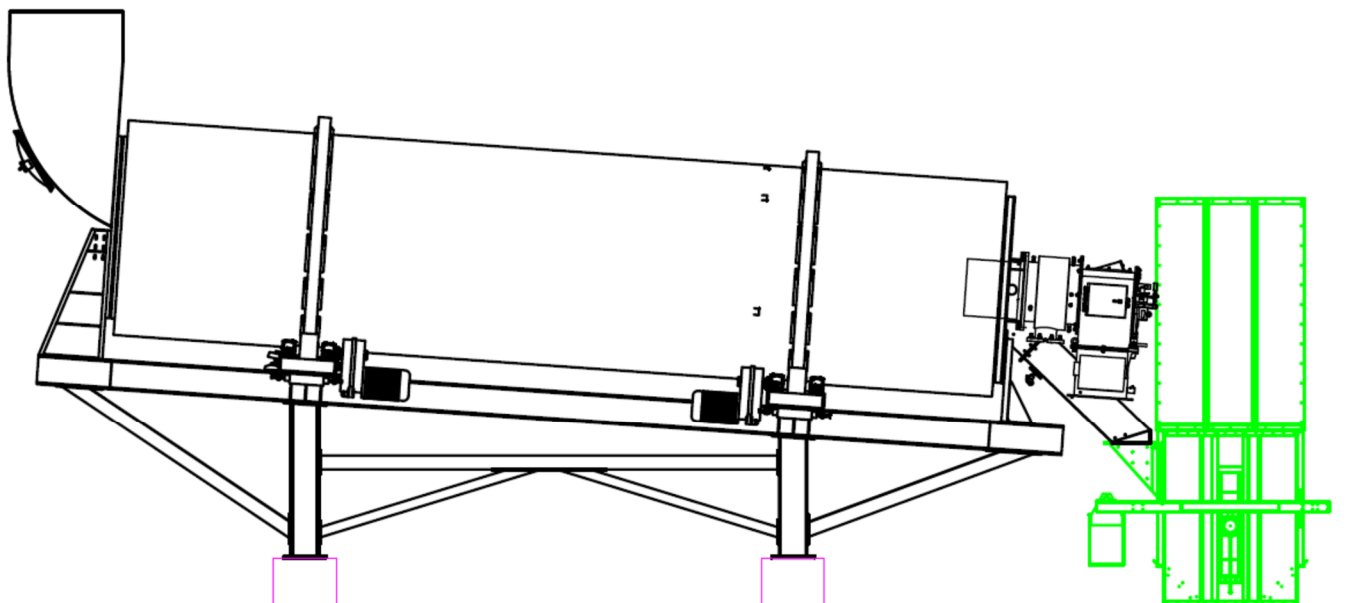
Installation on the Boiler

- 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.

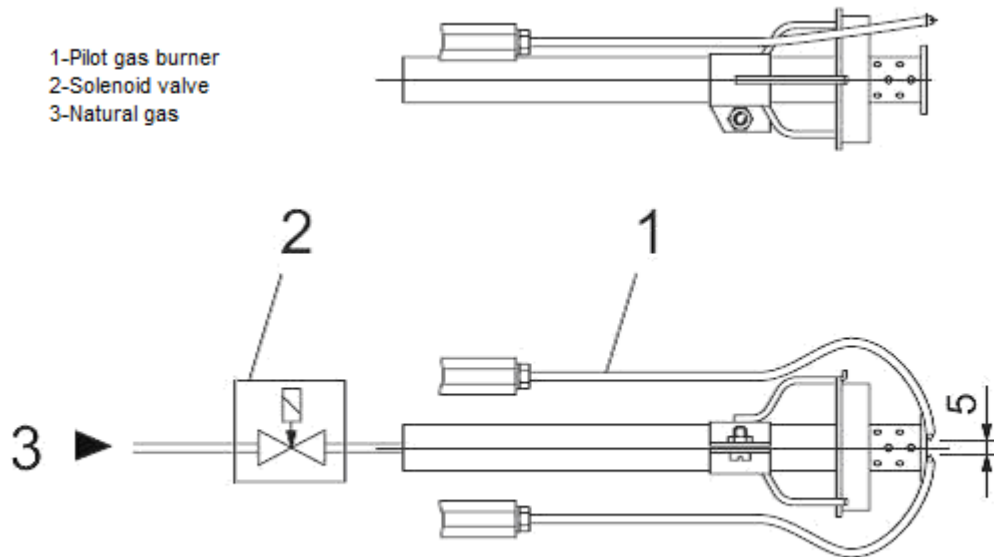
- Installation of the burner to the boiler is checked.
- Check the fuel line (are the pipe diameters and the pipe installation correct?).
- Check energy input cables and voltages.
- Check the fuel nozzles according to the boiler capacity.
- Prior to operating the burner, control the boiler water level.
- 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 sufficient air in boiler room

Commissioning order

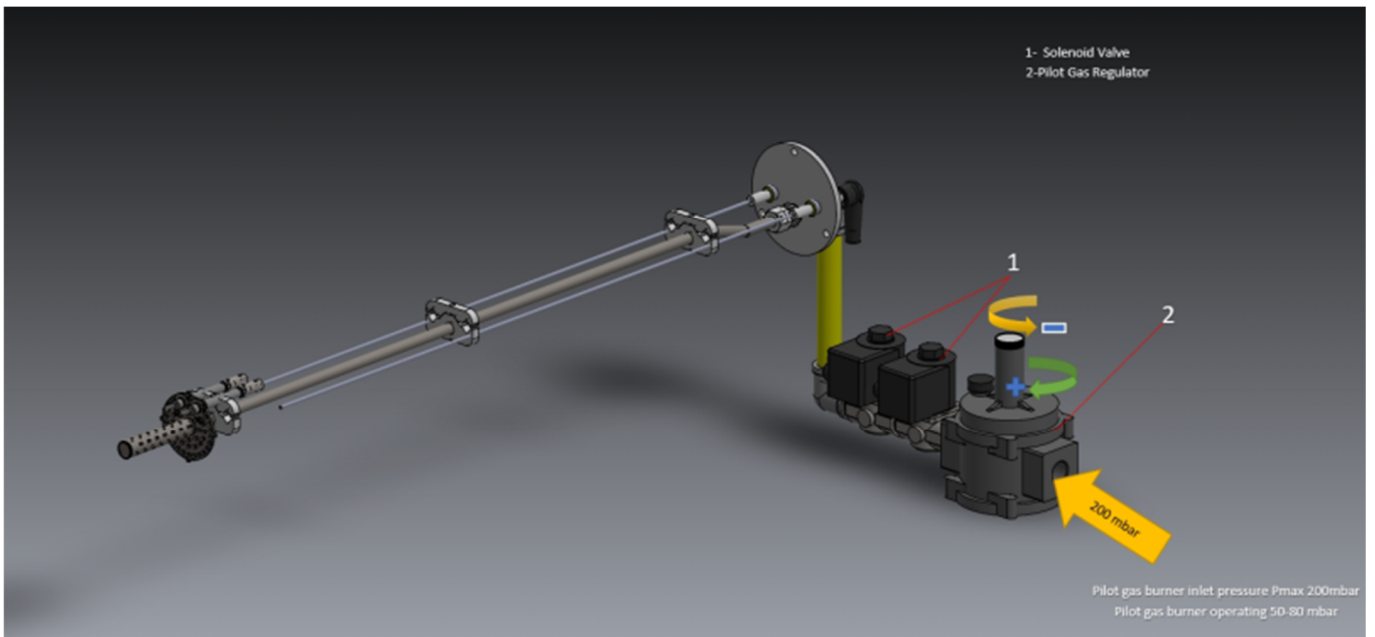
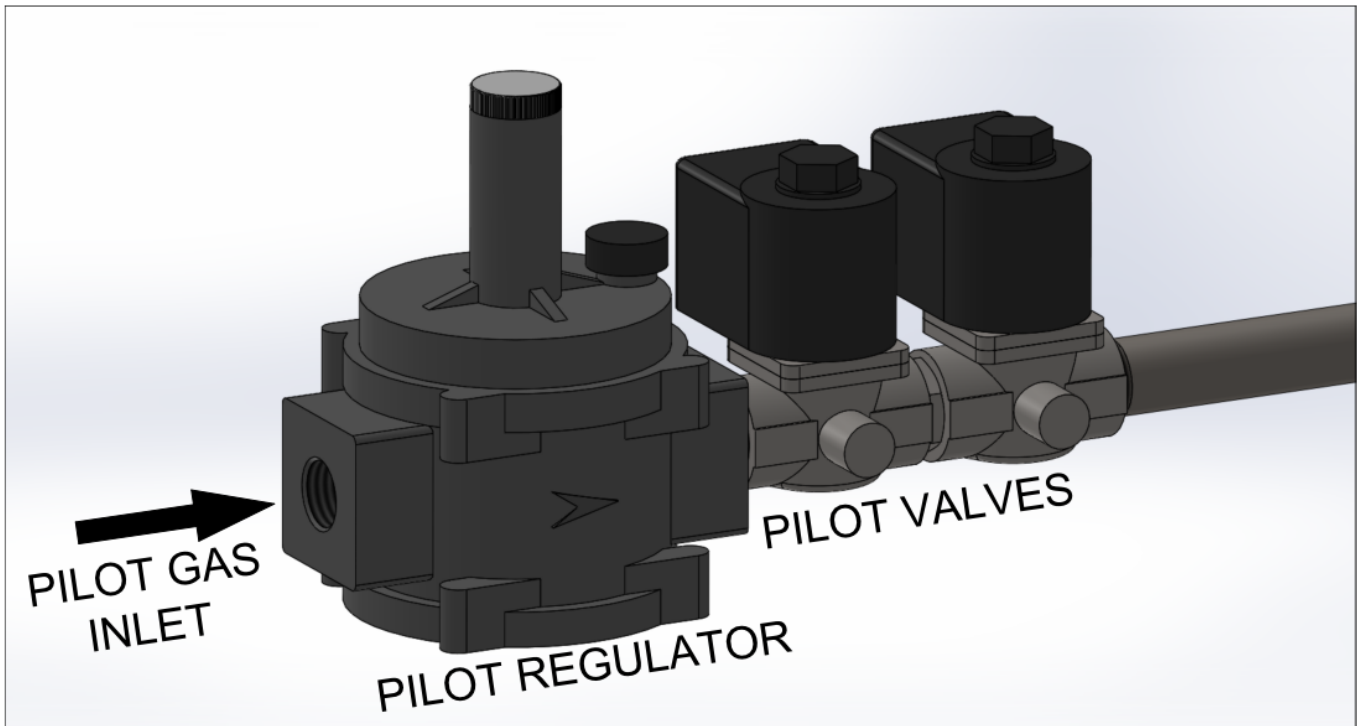
- Open the main gas valves.
- Open operating switch on the burner panel.
- Turn modulating control switch to automatic.
- Check the temperature and pressure set values from the modulating control unit.
- Burner fan motor will be activated.
- Check if the gas pressure from the inlet manometer is 30 bars.
- Air Dampers will open during pre-purge and ignition will take place once dampers are in start position.
- 3 sec. later, the F.O. operating 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

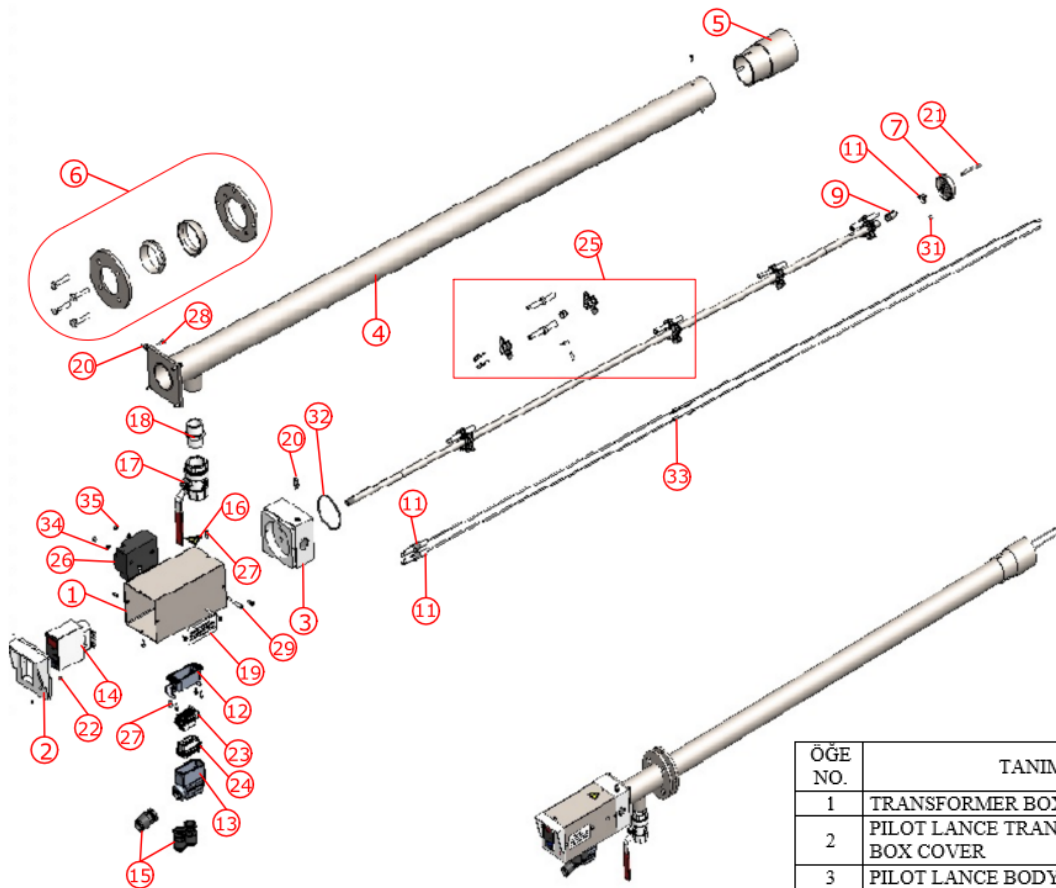
6.2.1. Pilot Ignition System



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



6.2.2.PAL



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

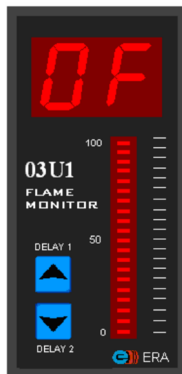
ÖGE NO.	TANIM
1	TRANSFORMER BOX
2	PILOT LANCE TRANSFORMER BOX COVER
3	PILOT LANCE BODY
4	PILOT LANCE OUTER PIPE
5	FLAME STABILIZER
6	PILOT LANCE CONNECTING FLANGE
7	TURBULATOR
8	GAS PIPE INNER
9	GAS NOZZLE
10	TURBULATOR CENTERING PART
11	IGNITION ELECTRODE
12	MACHINE TYPE SOCKET
13	SOCKET BODY
14	FLAME 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

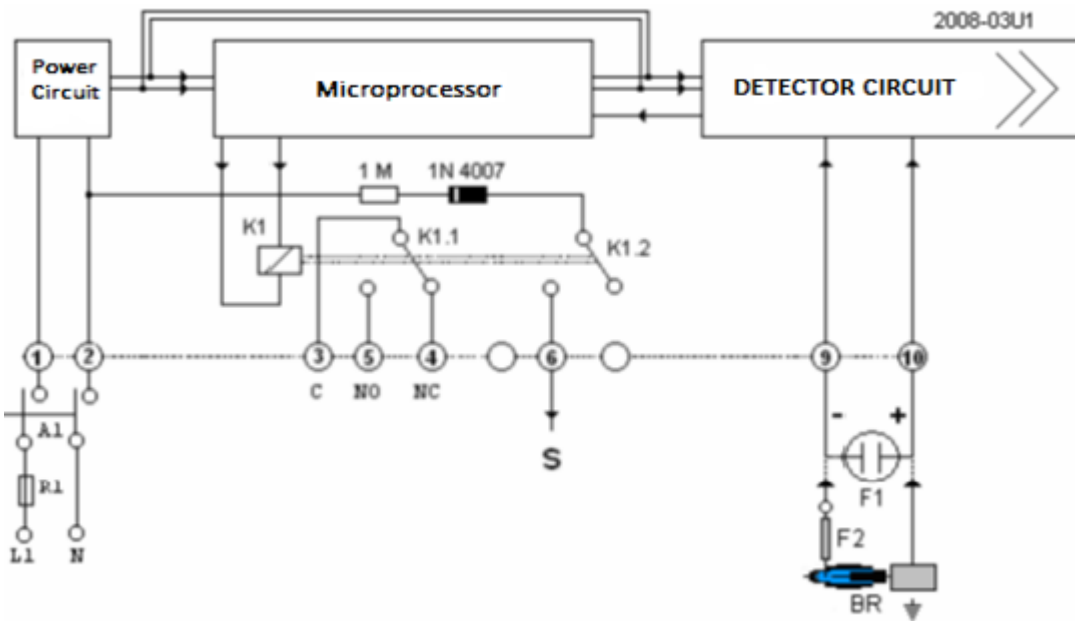
Flame Monitor



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!

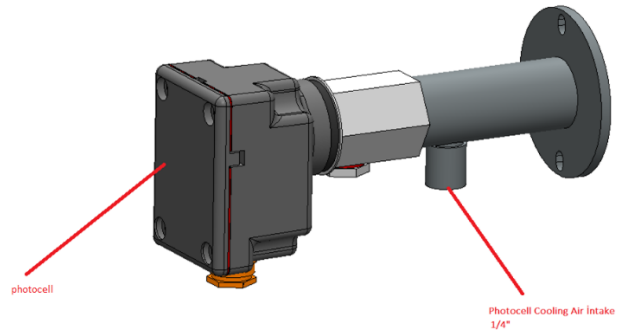
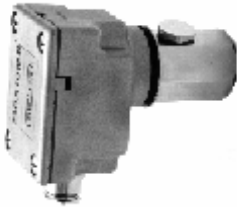
- The flame monitor must be installed and run by authorized staff only.
- The power supply must be turned off prior to removing the device from its socket
- Connection terminals must be checked after installation of cables
- If any problem occurs with the device, our technical staff must be contacted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



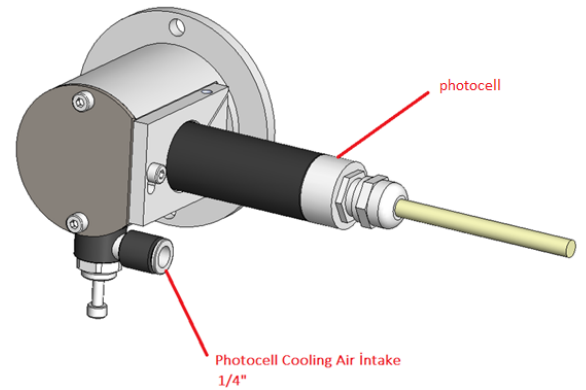
6.3. Photocell

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

➤ QRA10



➤ QRA2



➤ FFS08



➤ **FFS07**



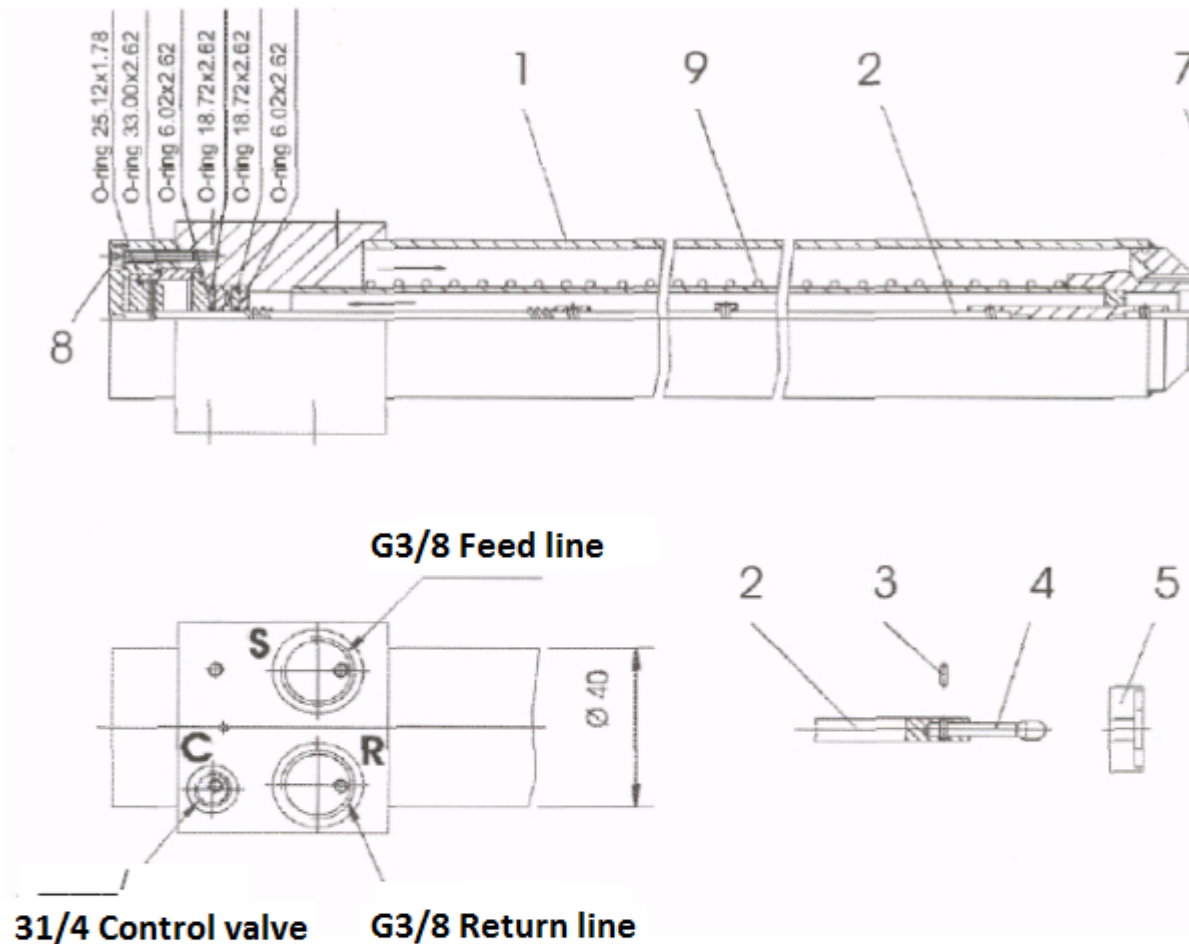
➤ **F200K, F300K**



6.4. 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 | | |

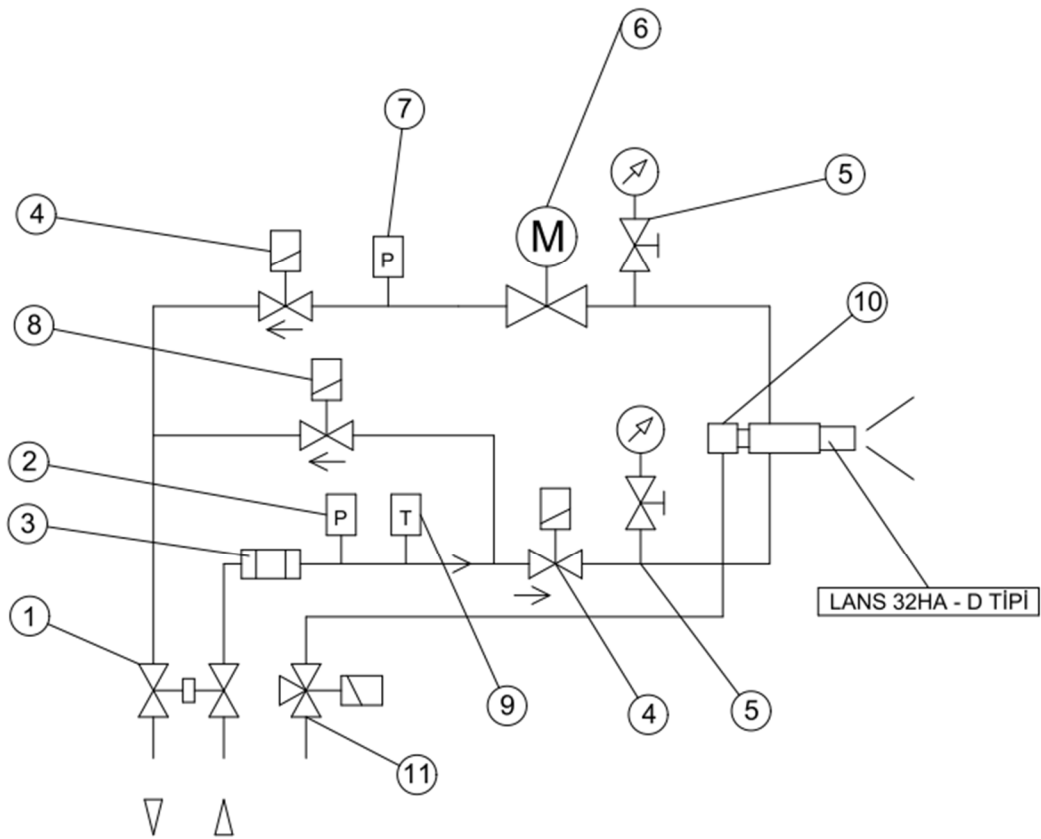
installation of shut-off needle and plates

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

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

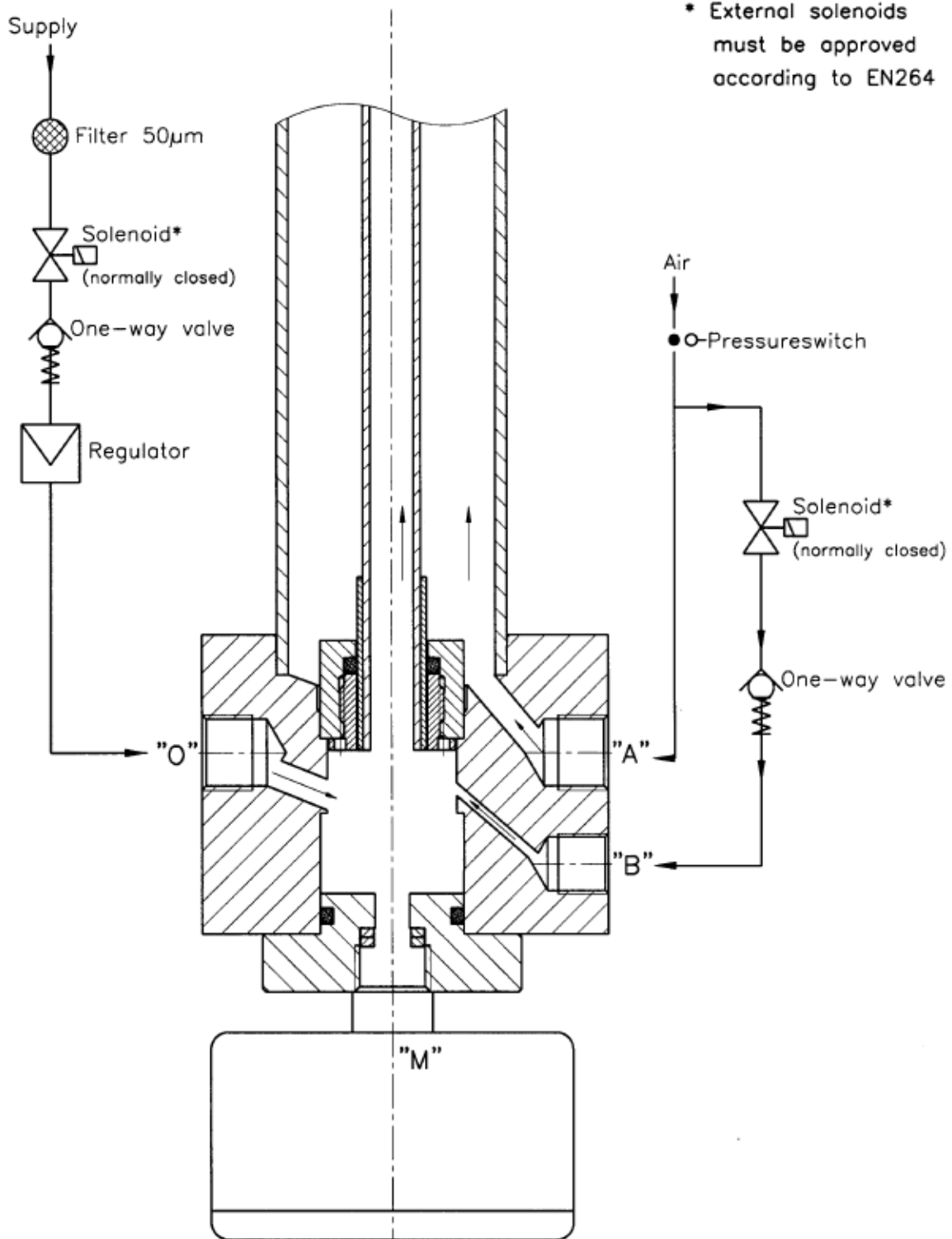
.After inserting the rod, check if the needle head is inserted in the needle guide and turbulence plate

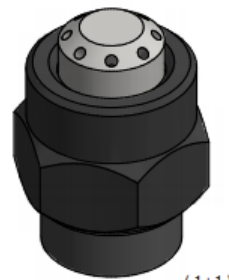
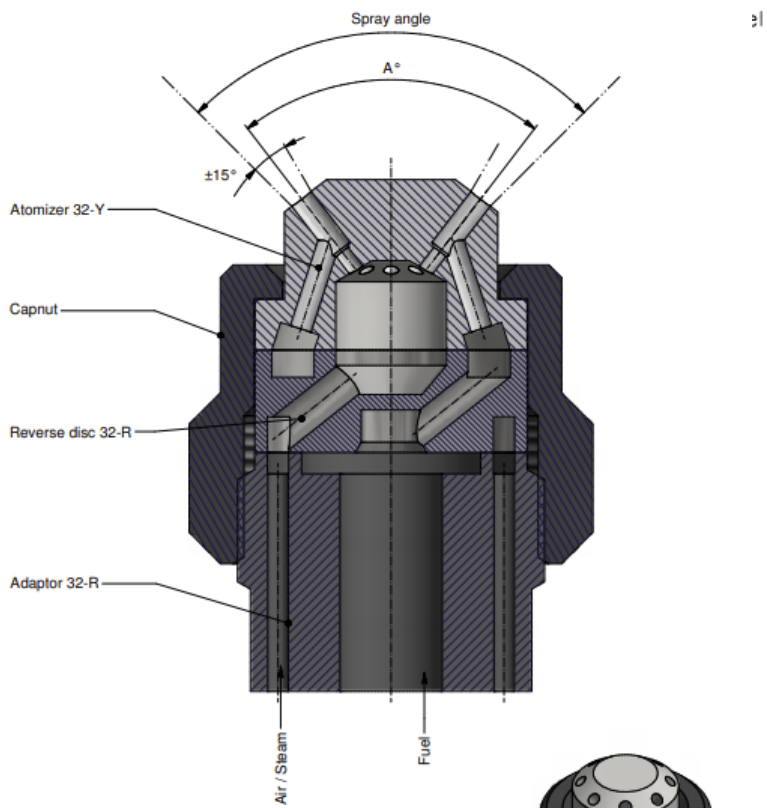
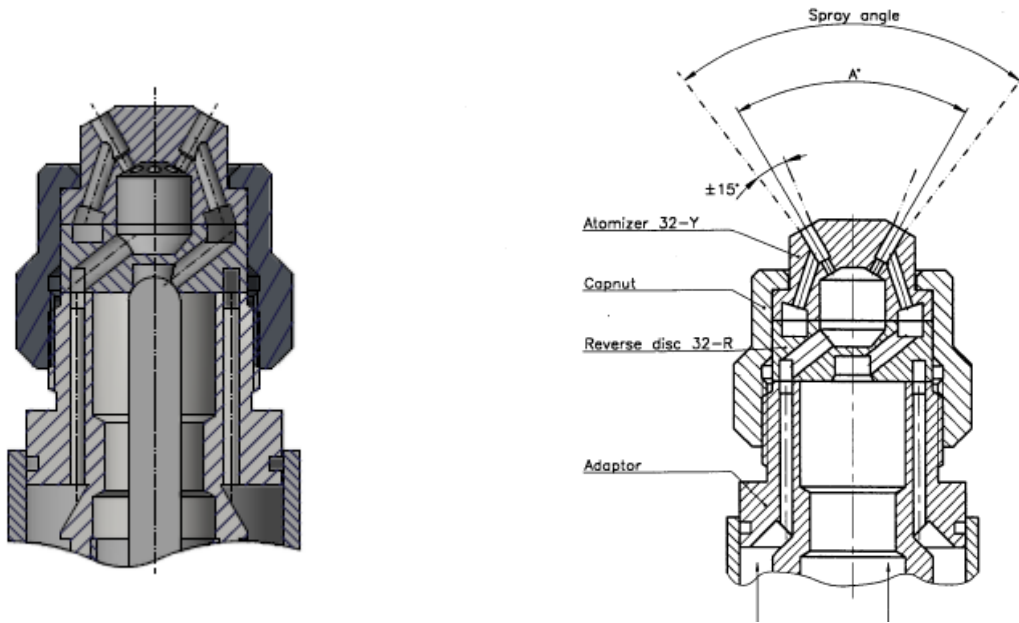
➤ HA-D Nozzle Hydraulic Diagram



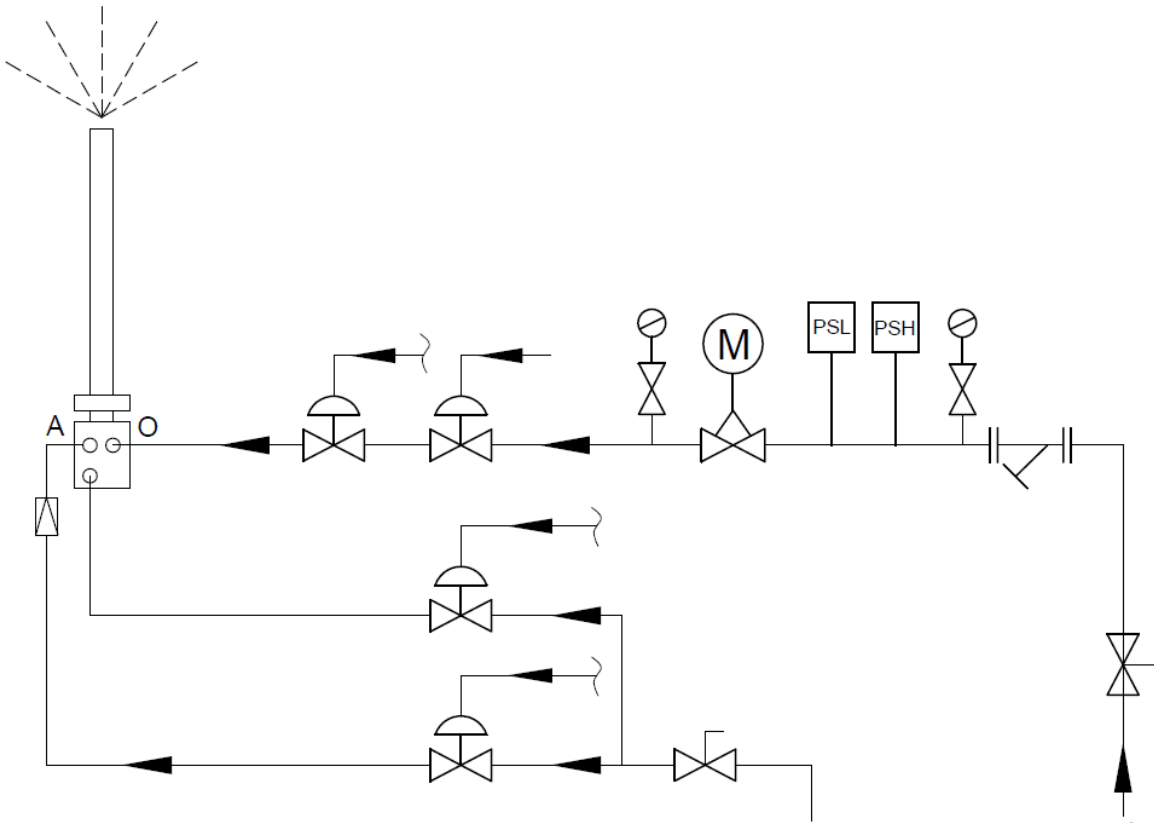
- 1- Double Ball Valve
- 2- Pressure Switch Min. (Optional)
- 3- Filter
- 4- Solenoid Valve
- 5- Manometer and Tap
- 6- 3/4" Oil Adjustment Valve and Servomotor
- 7- Pressure Switch Max. (Optional)
- 8- Solenoid Valve
- 9- Thermostat
- 10- Pneumatic Air Inlet
- 11- 3/2 Way Valve (Compressor Air)

➤ SK Nozzle

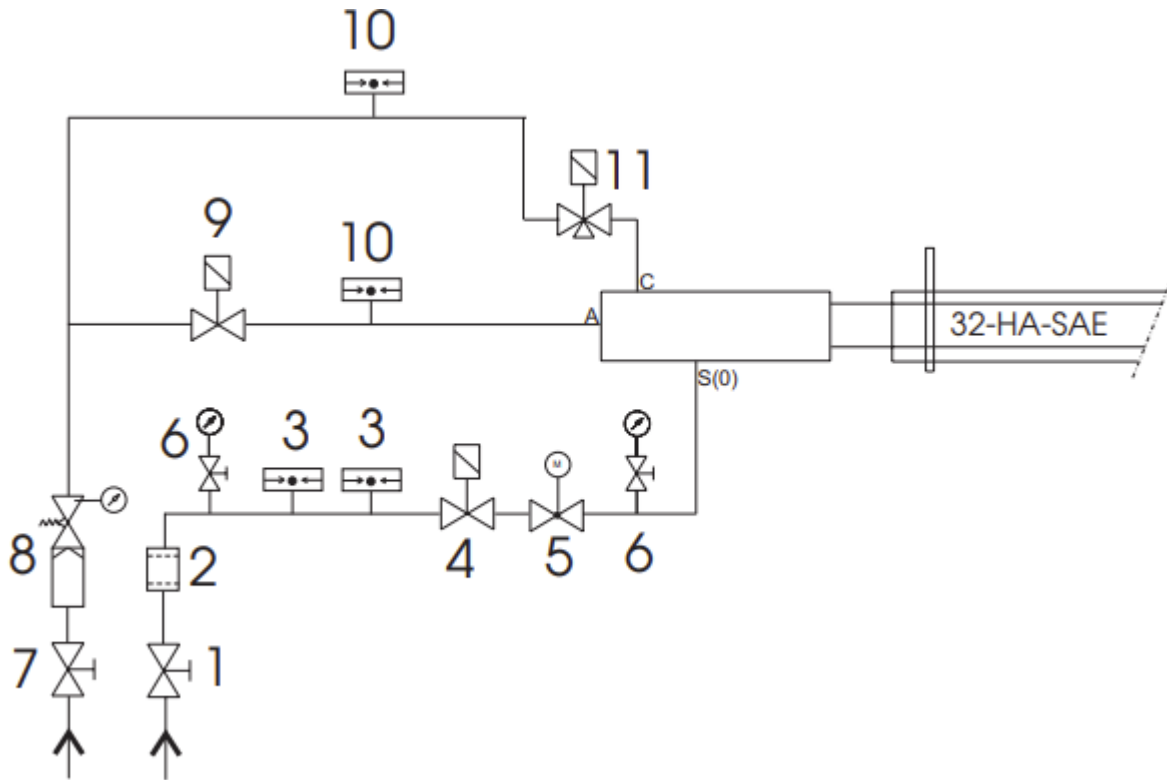




➤ SK Type Nozzle Hydraulic Diagram

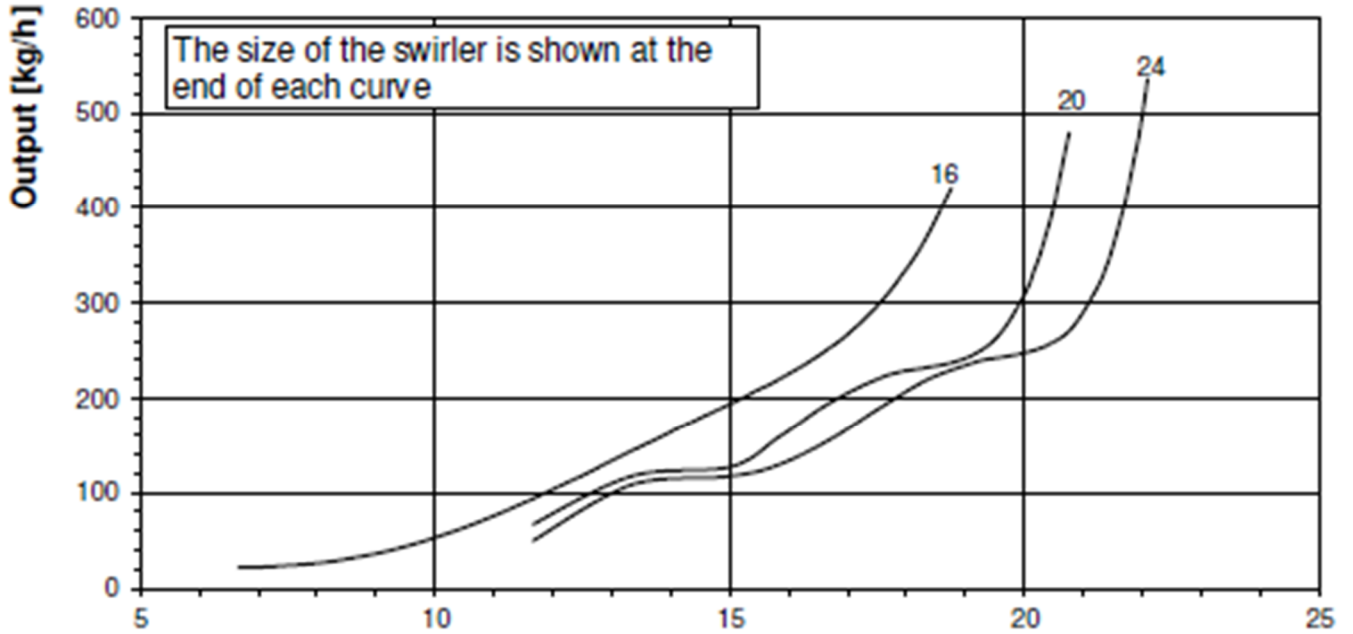


➤ H Type Nozzle Hydraulic Diagram

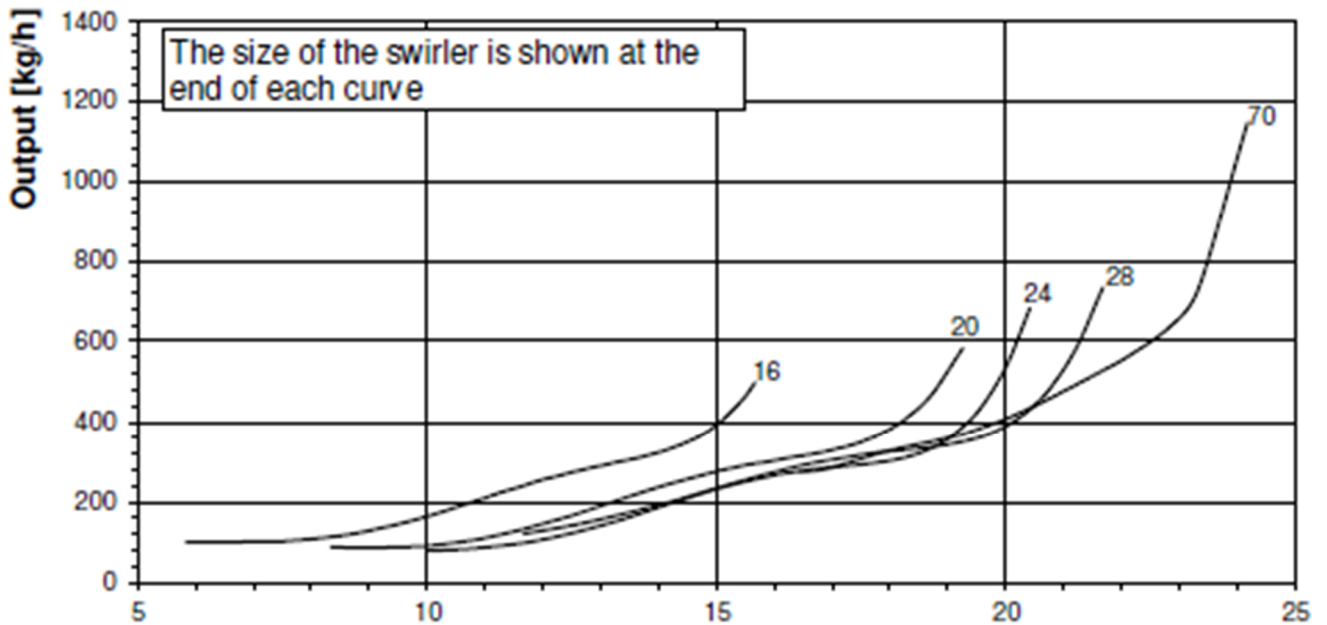


6.5. Curves According To Fuel Consumption (Fuel Nozzles)

➤ ECO 250.1 & ECO 350.2

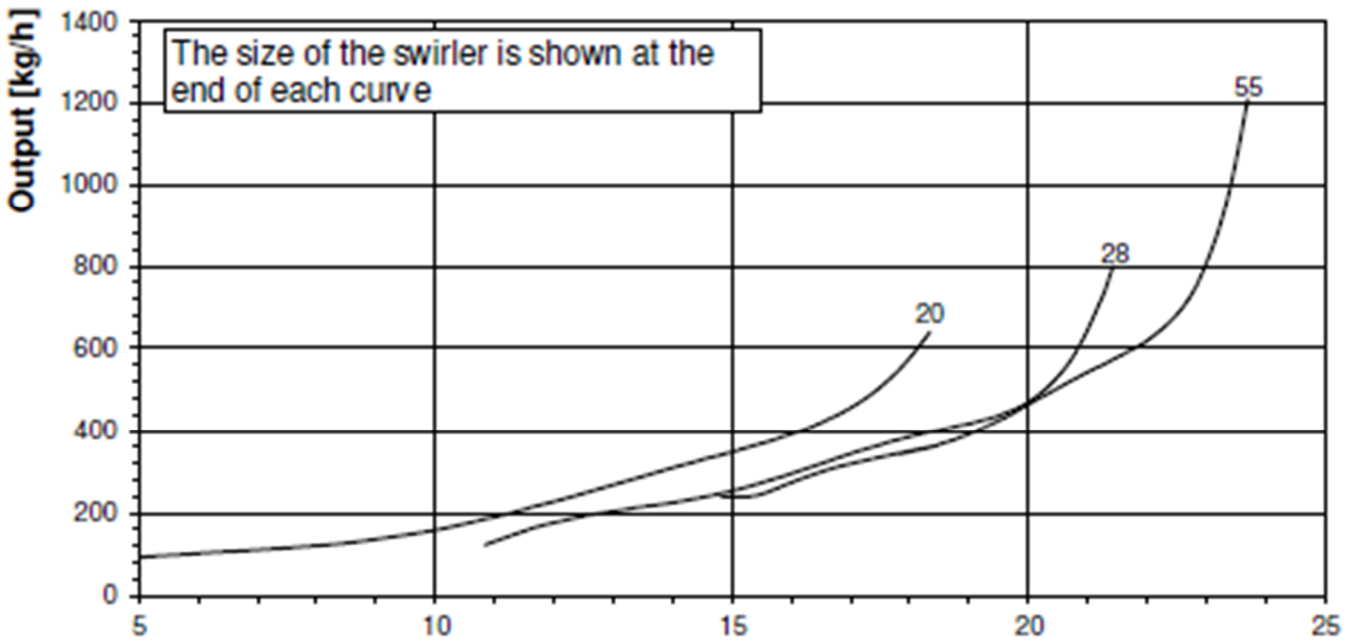


➤ ECO 350.3 & ECO 400.1

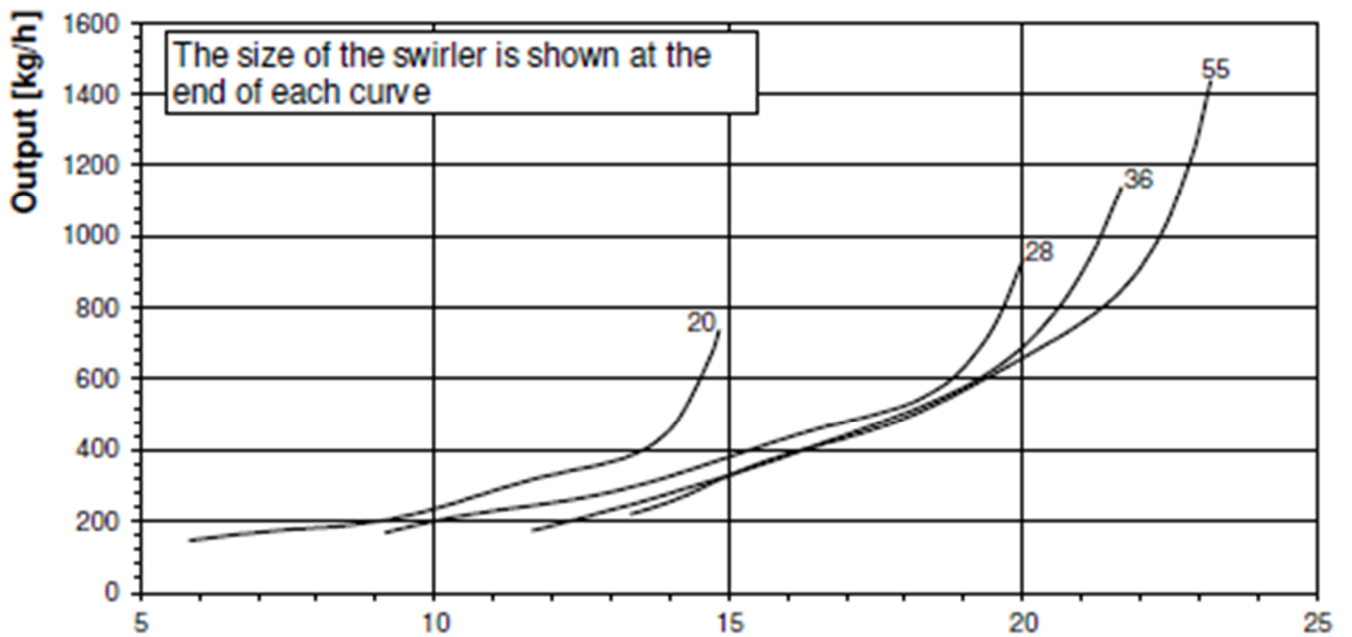


Pump Operating Pressure 25 Bar

➤ ECO 400.2 & ECO 400.3 & ECO 450.1

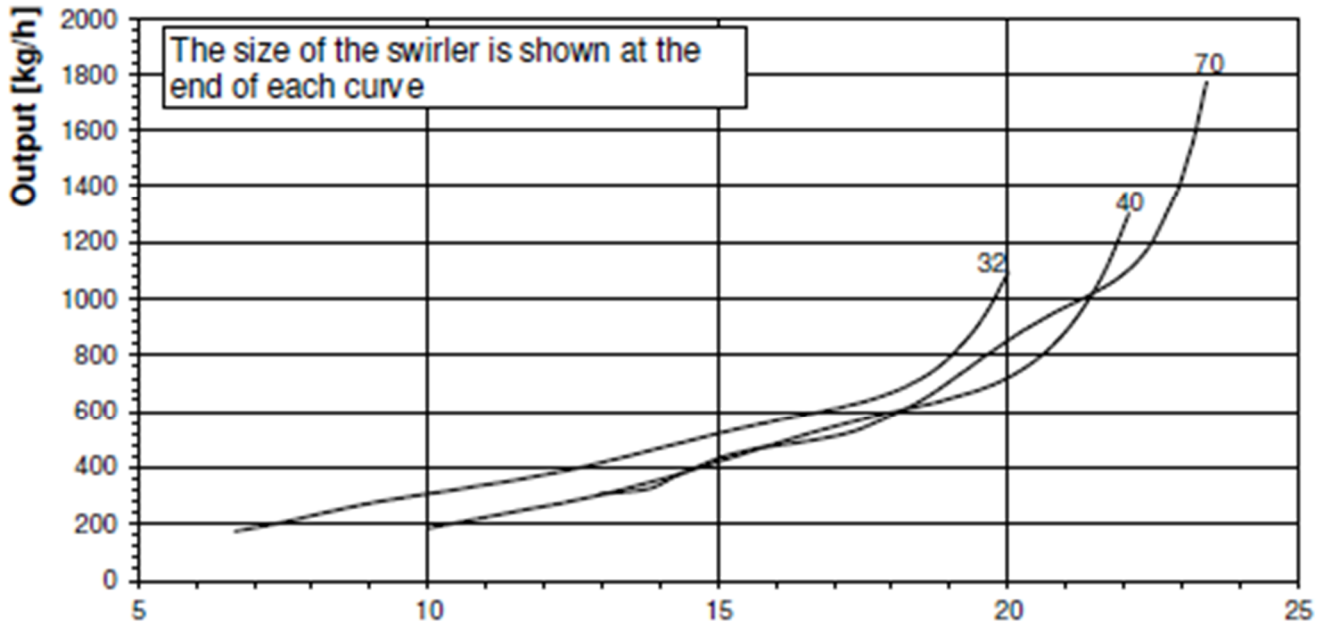


➤ ECO 450.2 & ECO 450.3

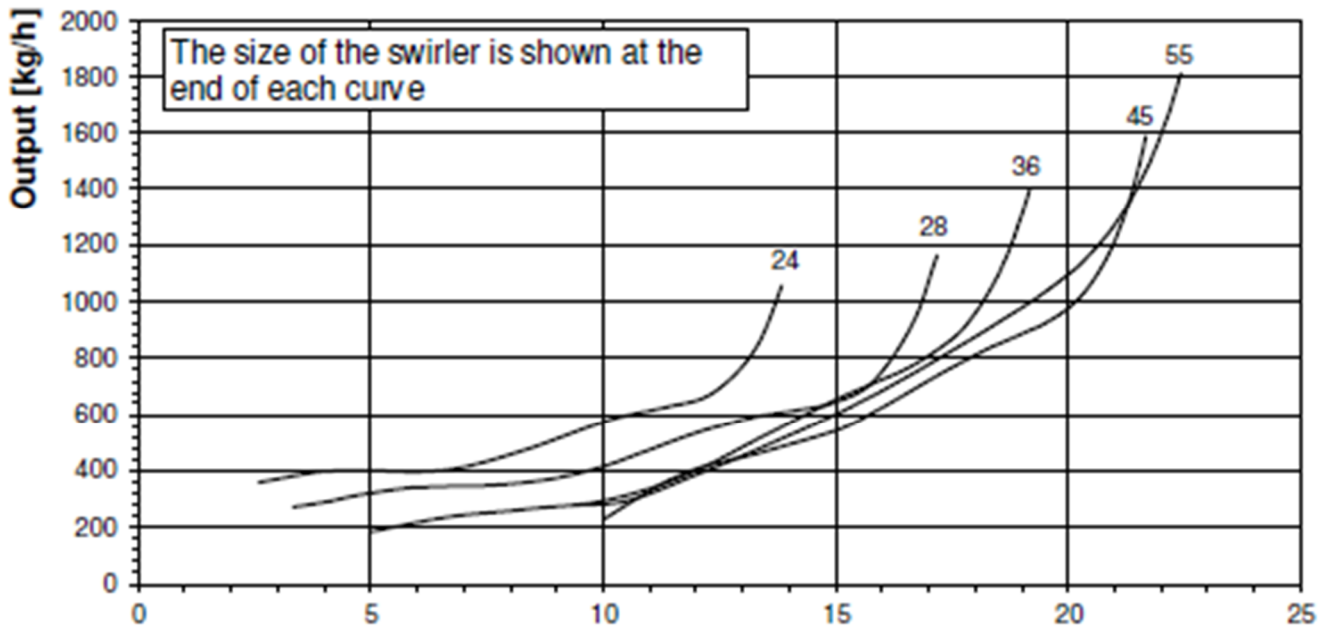


Pump Operating Pressure 25 Bar

➤ ECO 500.1 & ECO 500.2

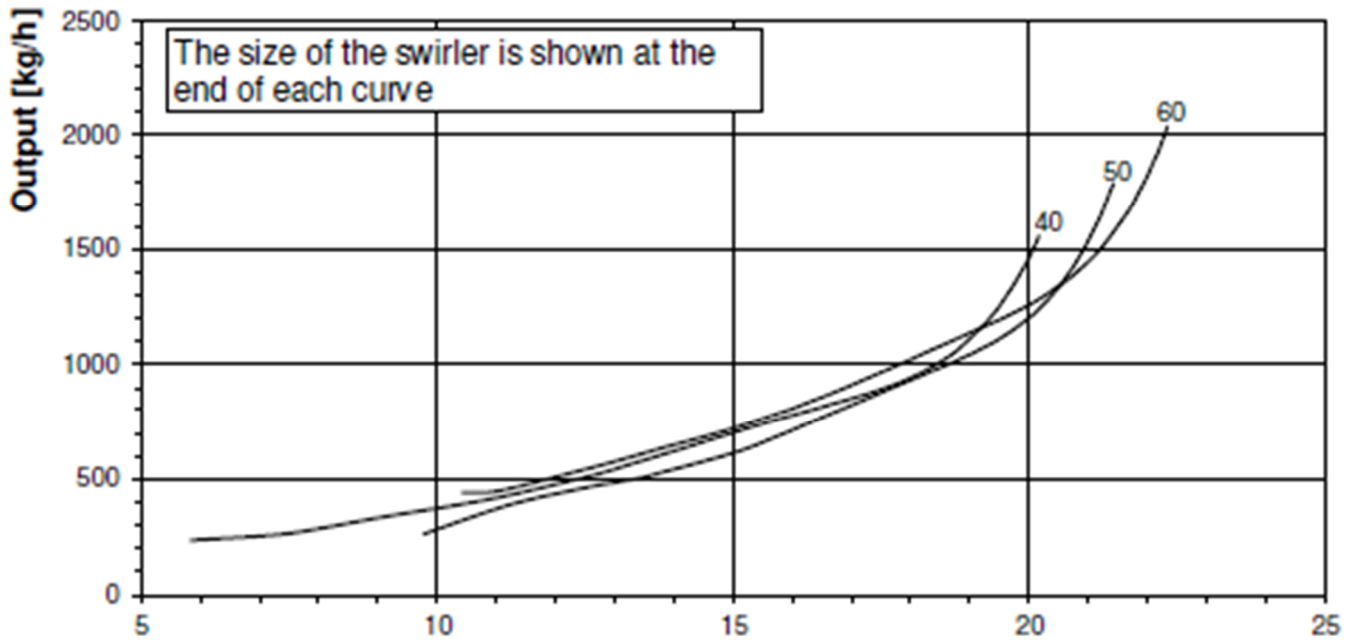


➤ ECO 500.3 & ECO 600.1

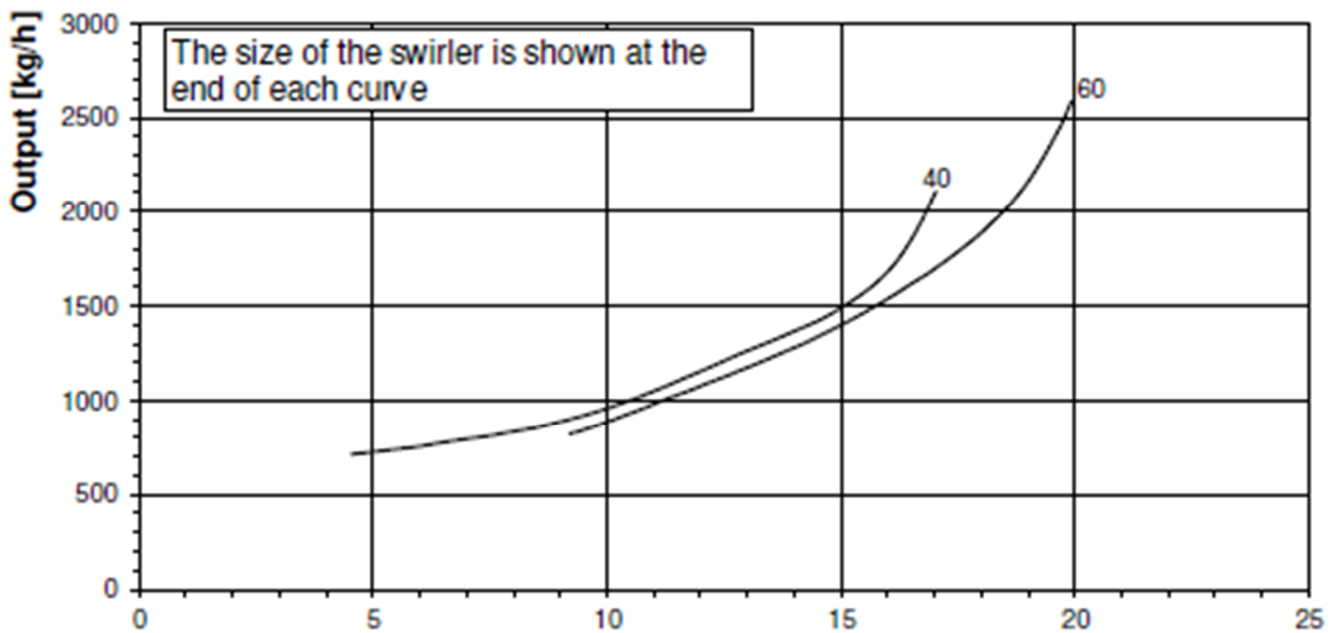


Pump Operating Pressure 25 Bar

➤ ECO 600.2



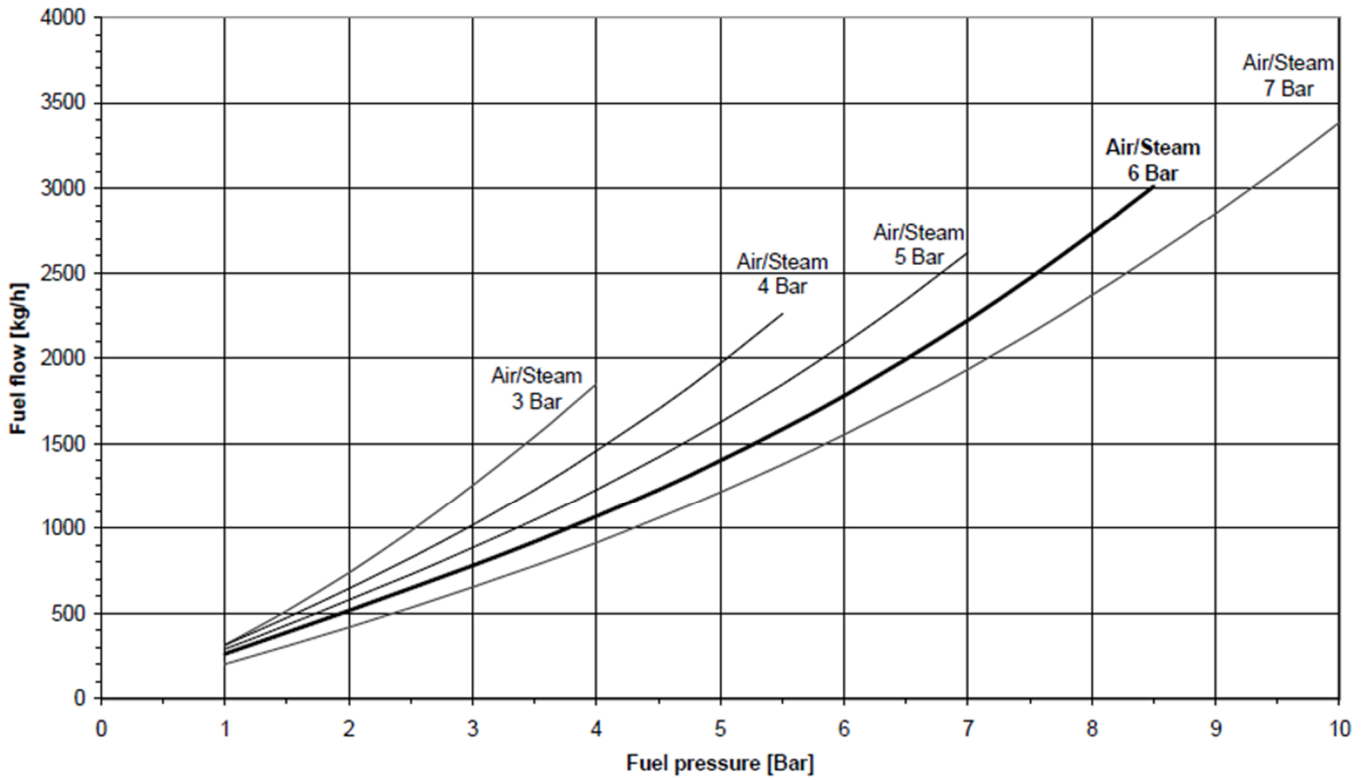
➤ ECO 600.3 & ECO 700.1 & ECO 700.2 & ECO 700.3



Pump Operating Pressure 25 Bar

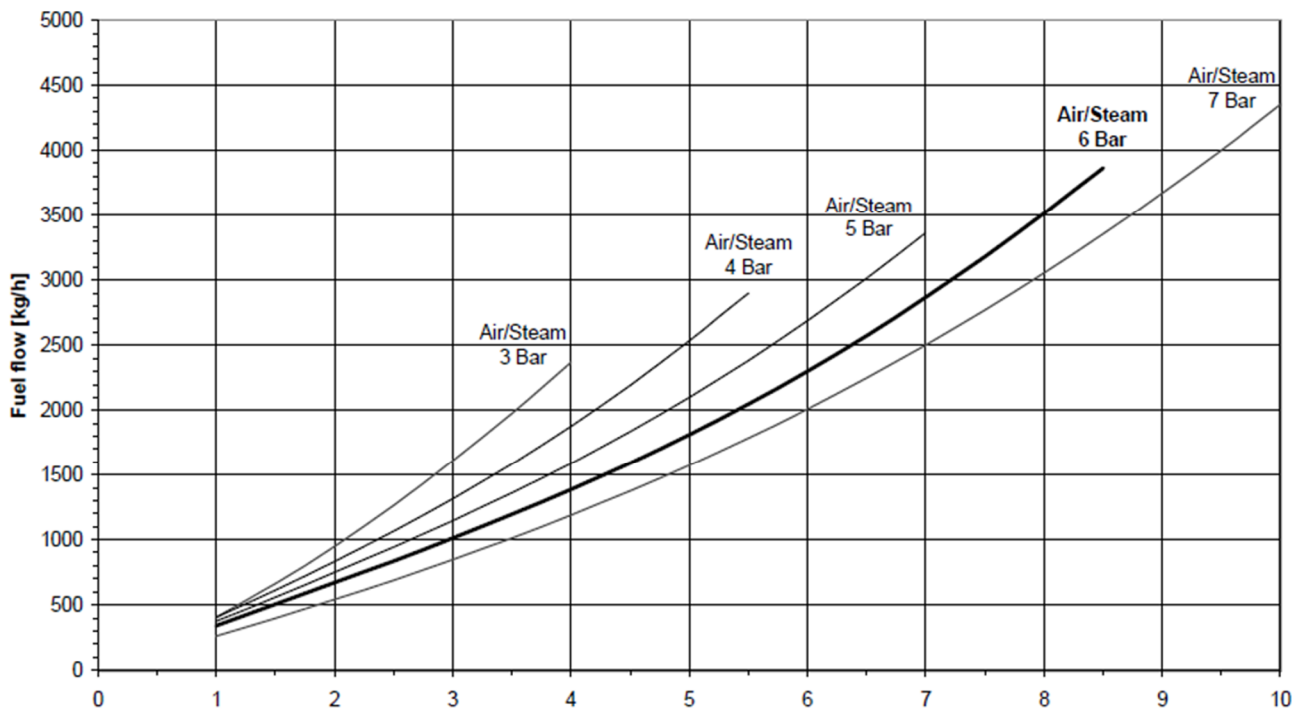
➤ **ECO 800.1 & ECO 800.2**

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



➤ **ECO 800.3 & ECO 900.1**

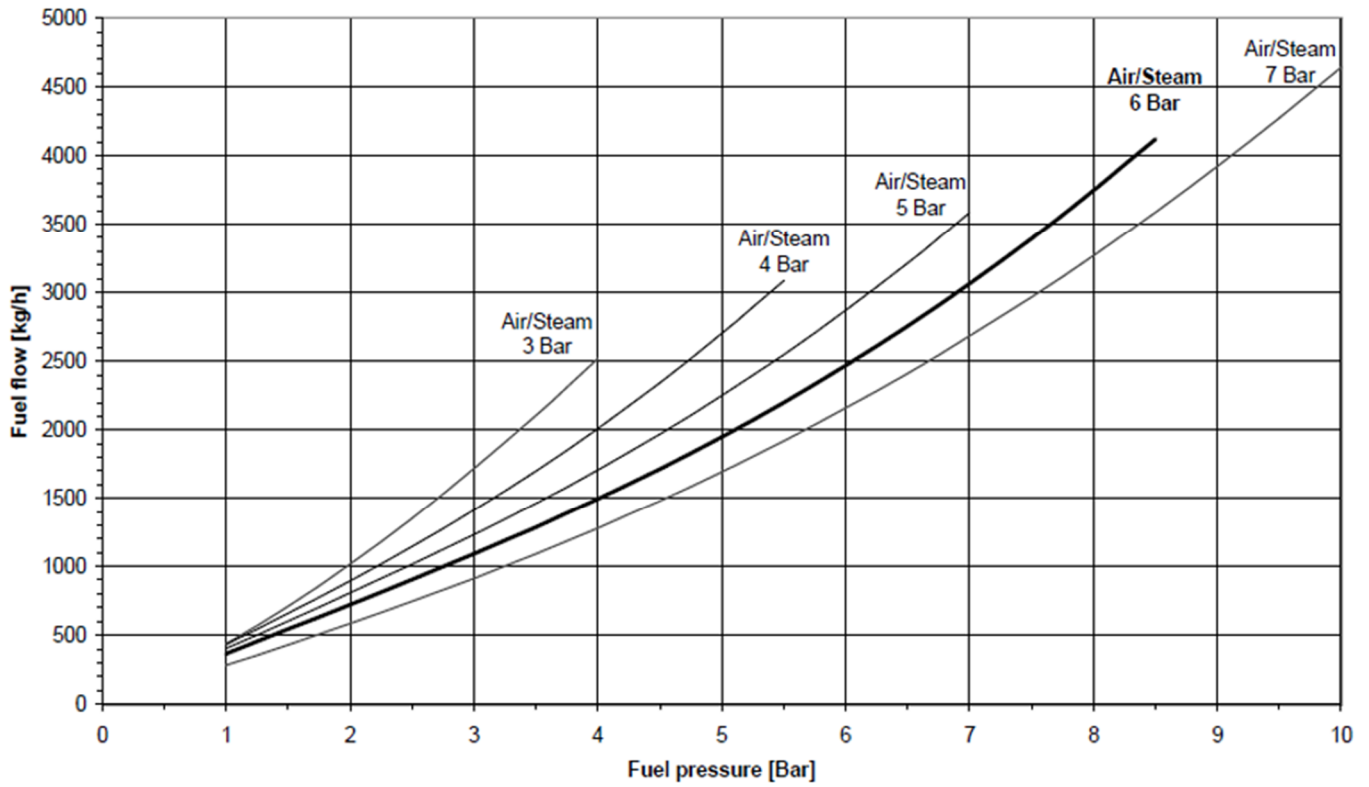
Atomizer 40-Y-A°-13-10 with reverse disc



Pump Operating Pressure 25 Bar

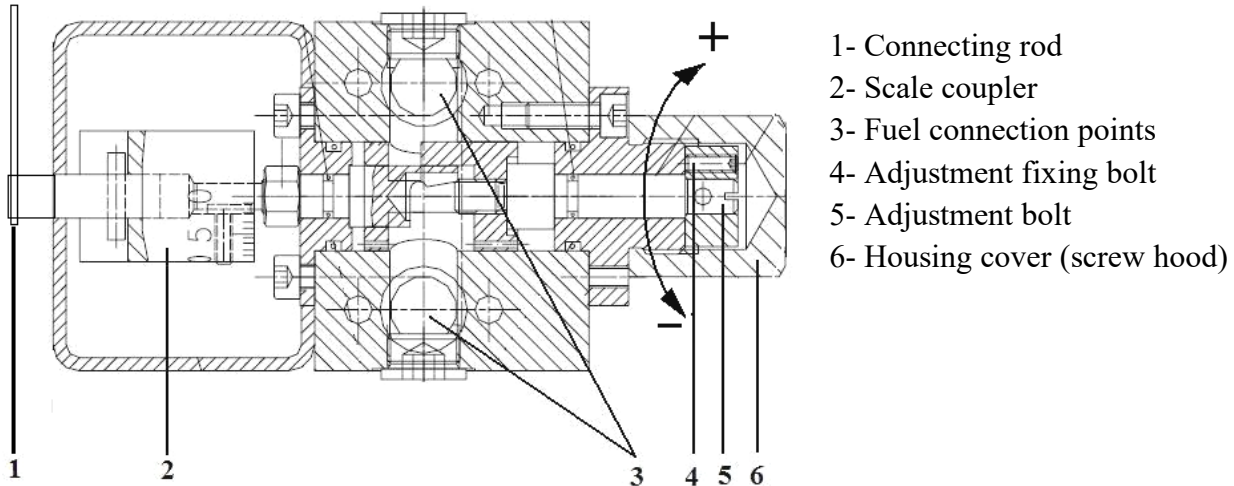
➤ ECO 900.3

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



Pump Operating Pressure 25 Bar

6.6.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.

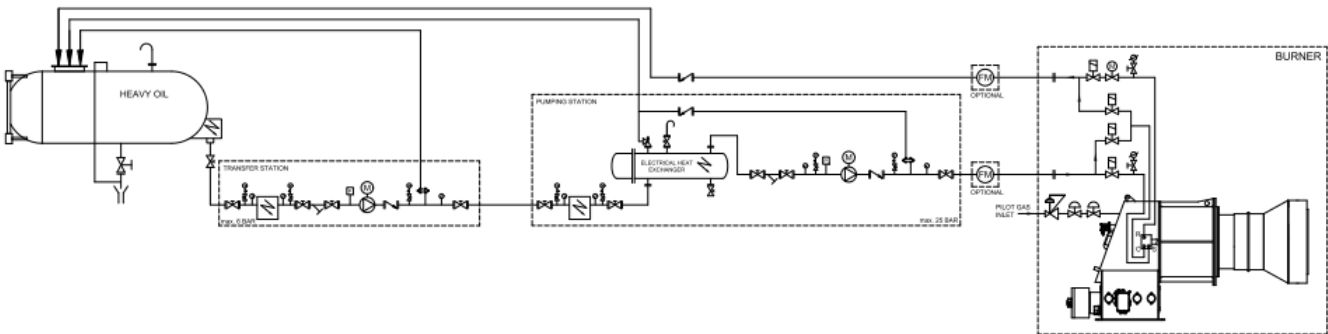
4-When you rotate the shaft number 5 (when looked from the shaft end) anti-clockwise, the pressure value you observe from return manometer will decrease, and burner consumption will also decrease since nozzle pressure decreases.

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

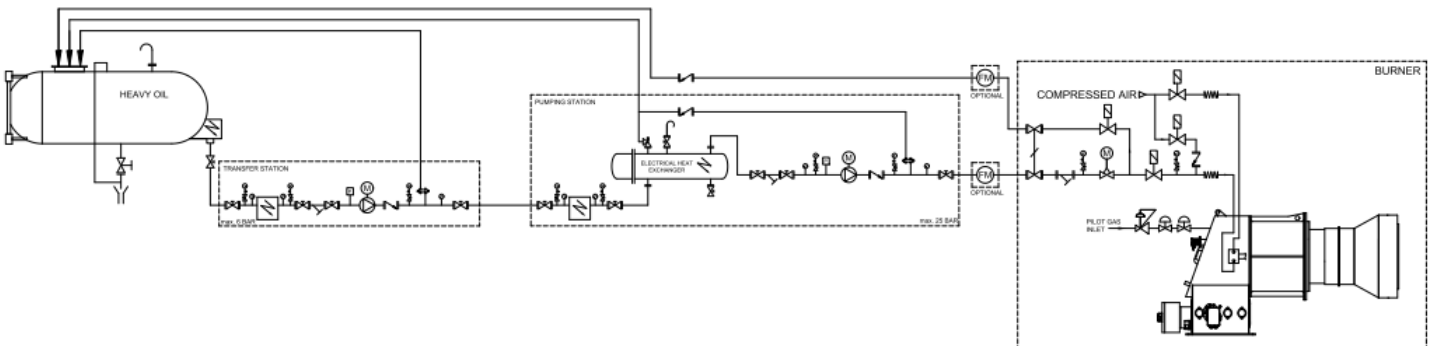
6-Place the housing cover number 6.

6.7.Oil Burner Ring Line

HEAVY OIL P&ID
MECHANICAL CRACKING ATOMIZATION



HEAVY OIL P&ID
AIR CRACKING ATOMIZATION



	BALL VALVE
	MANOMETER PRESSURE GAUGE
	THERMOMETER
	FUEL FILTER
	Y TYPE STRAINER
	PRESSURE SWITCH
	PUMP and MOTOR
	CHECK VALVE
	RELIEF VALVE
	SOLENOID VALVE
	PROPORTIONAL MOTORIZED VALVE
	FLOW METER
	ELECTRICAL HEAT EXCHANGER
	PILOT GAS REGULATOR
	RELIEF VALVE

6.8.Servomotor Adjustment




➤ Actuator SQM33




➤ Actuator SQM45/48



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

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


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

6.9.Emission Measurement

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

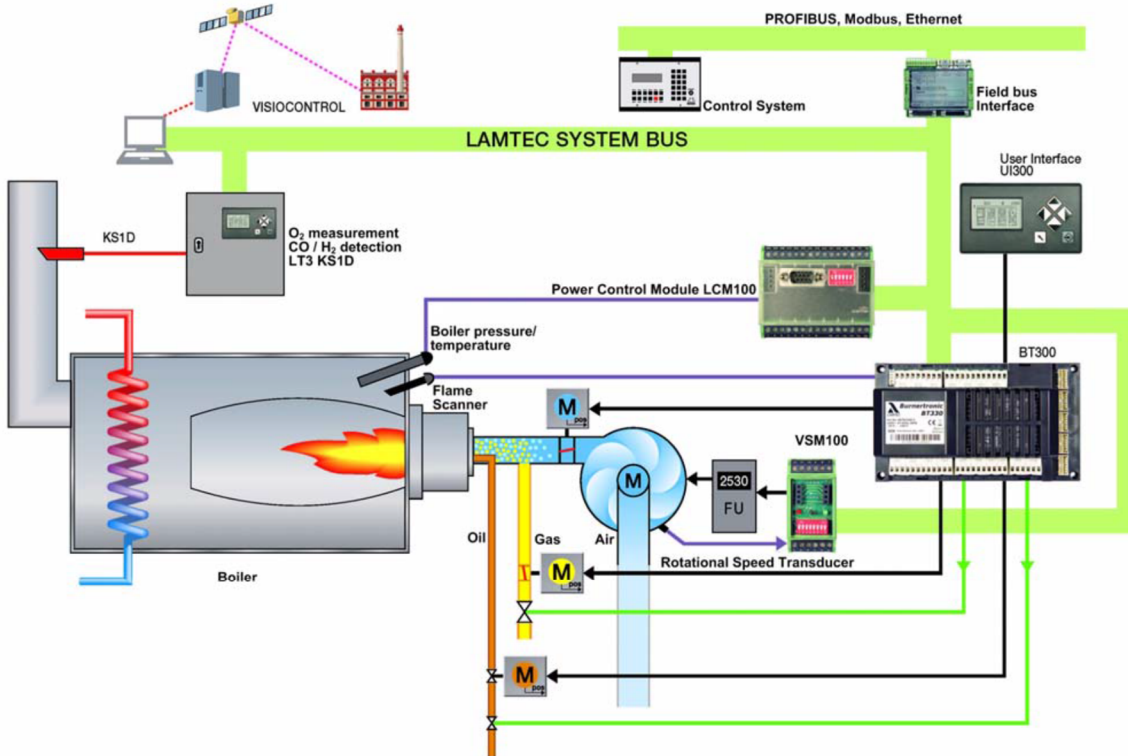
- $CO < 110 \text{ mg/ kWh}$
- $\%3 \leq O_2 \leq \%5$
- $NO_x < 250 \text{ mg/ kWh}$
- Excess air ratio $1,2 \leq \lambda \leq 1,3$

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

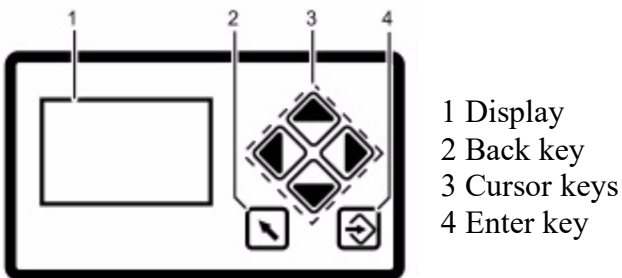
 Boiler temperature must be between 40 C° and 80 C° while making emission measurement in hot water boilers.

6.10. Program Relay

➤ BT 300



Operating Control and Displays



Display: The display shows in pictograms:

- 1- the menu structure
- 2- operating status
- 3- parameters
- 4- error messages



Back key: Jump to previous window.



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



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

Menu Functions

The menu is divided into three paths:



INFO



MANUAL



SETTINGS

INFO



Select the INFO path for information about the following:

- the burner
- errors that have occurred
- the software version
- display of check sums
- the serial number
- actuating drive positions (current damper position for each channel)
- digital inputs/outputs

MANUAL



Select the MANUAL to

- start and stop the burner manually
- adjust the internal burner firing-rate

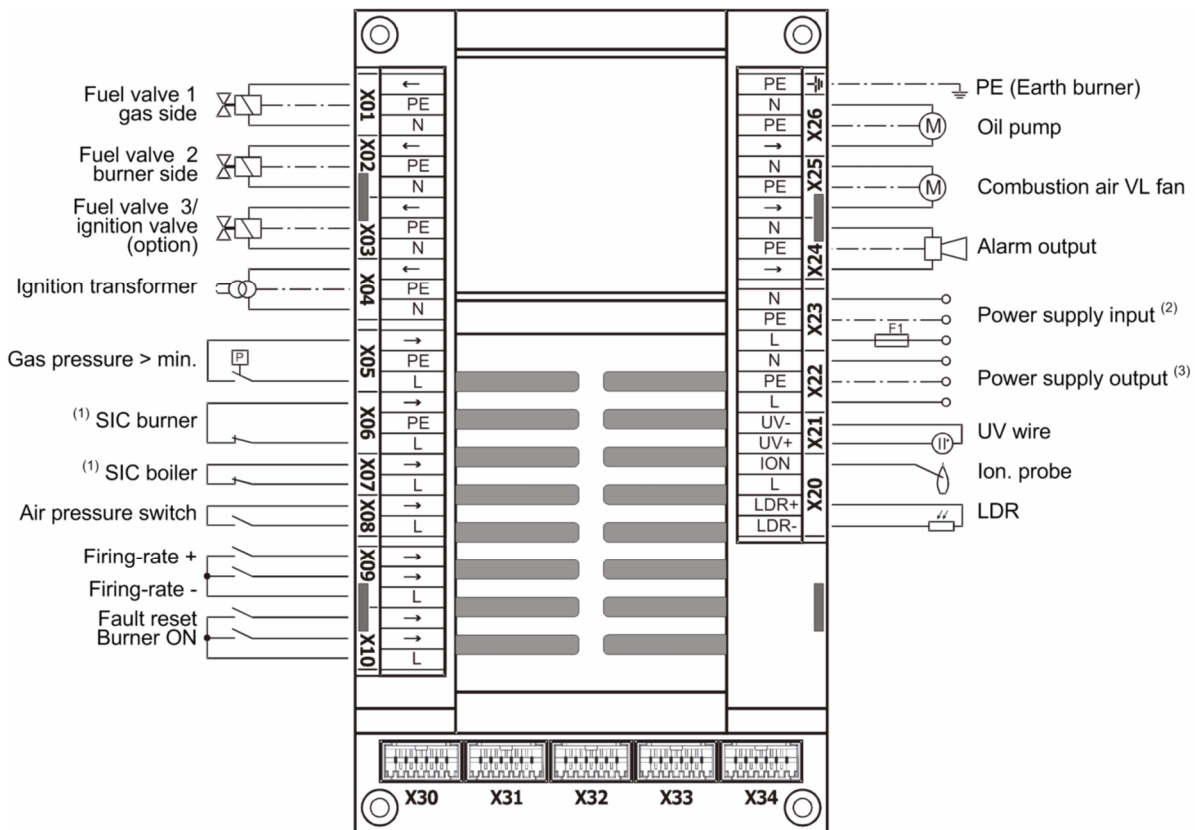
SETTINGS



Select the SETTINGS path for information on, and to make settings for, the following:

- the password
- the burner settings (display and settings)
- the actuator device settings (display)
- the air/fuel control system
- the "delete" curve
- the display settings

BT300 Connecting Diagram



X30 = User Interface UI 300

X31 = LSB Option

X32 = continuous output 1, e.g. air damper

X33 = continuous output 2, e.g. gas damper

X34 = continuous output 3 (optional)

- (1) SIC = safety interlock chain
- (2) 230V AC 47 - 63Hz external fuse protection required (max 10A slow-blow)
- (3) 230V AC for power supply to external devices

Maximum Cable Length:

X01-X10: 10m

X30: 1m

X20-X21: 3m

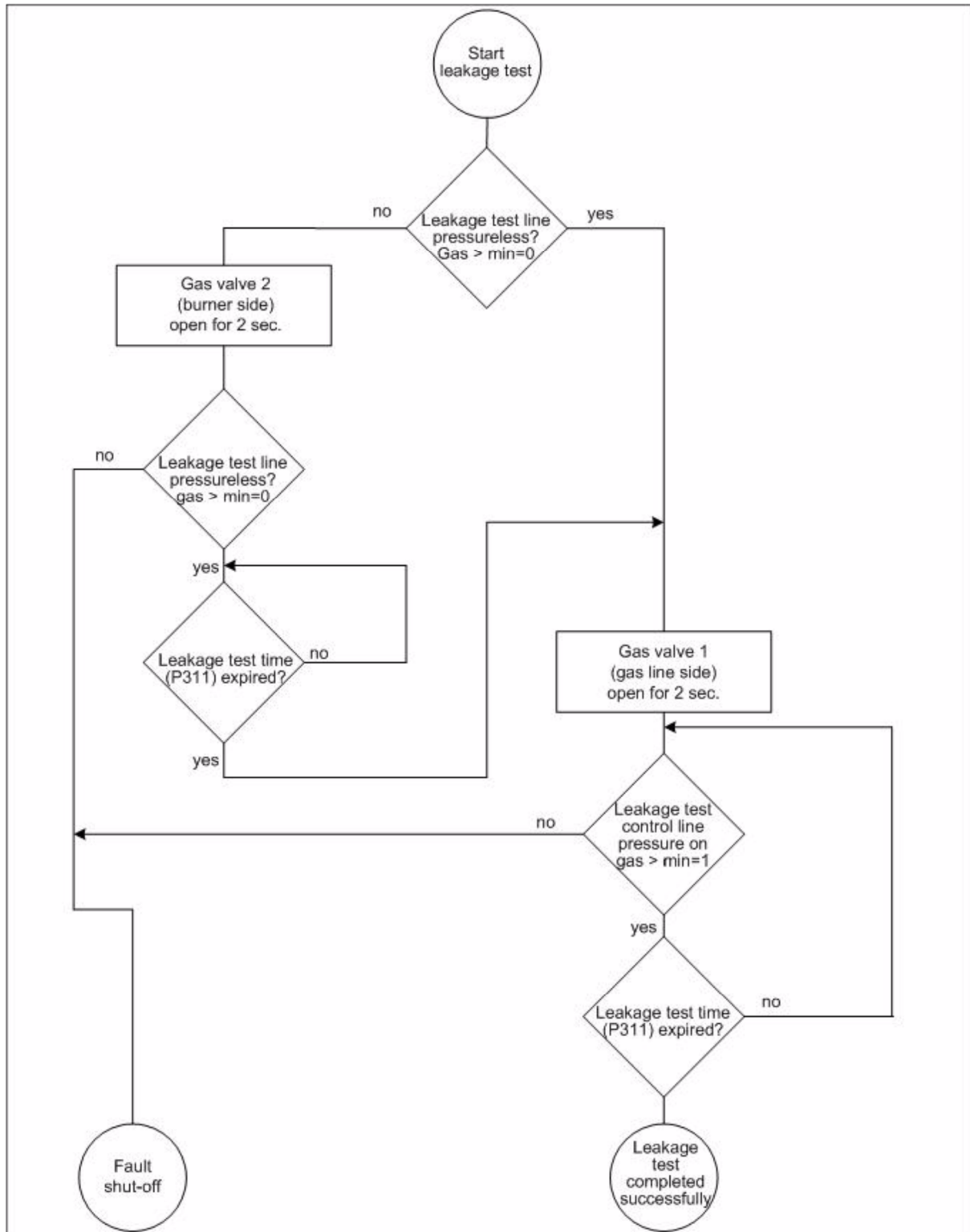
X31: 1m

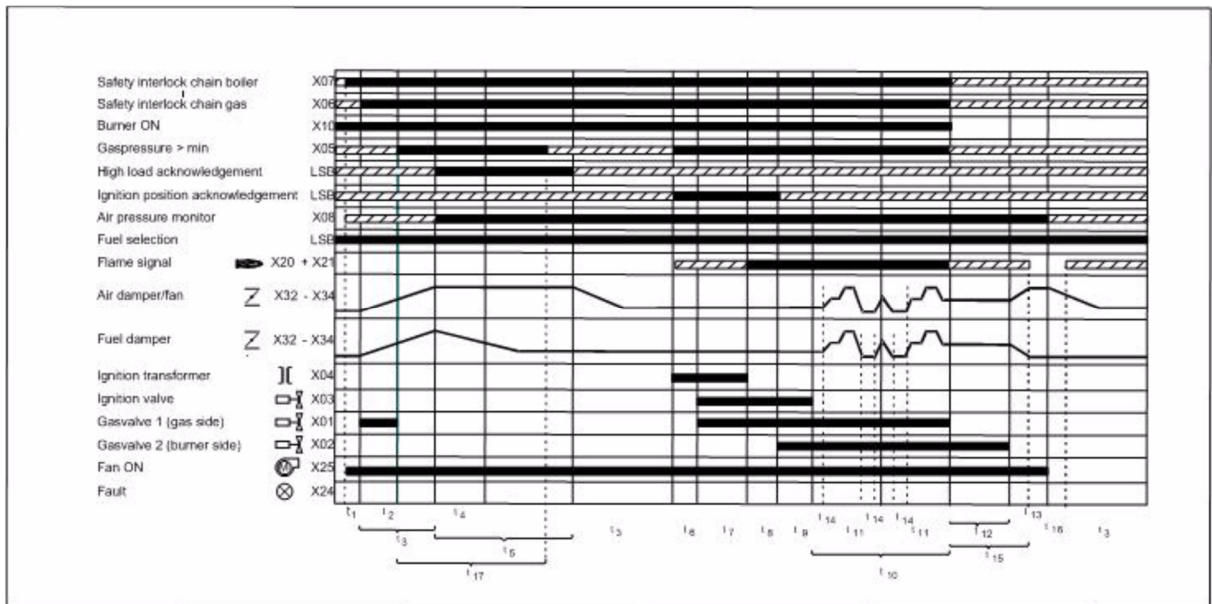
X22-X23: unlimited

X32-X34: 3m

X24-X26: 10m

Leakage Test for Main Gas Valves





Gas with pilot burner and leakage test BT300

➤ ETAMATIC OEM

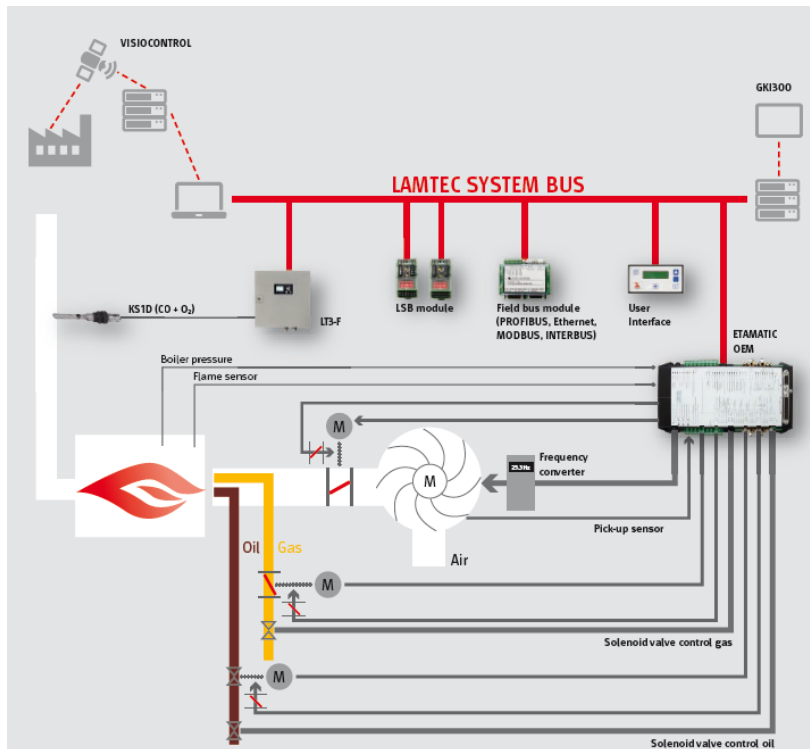
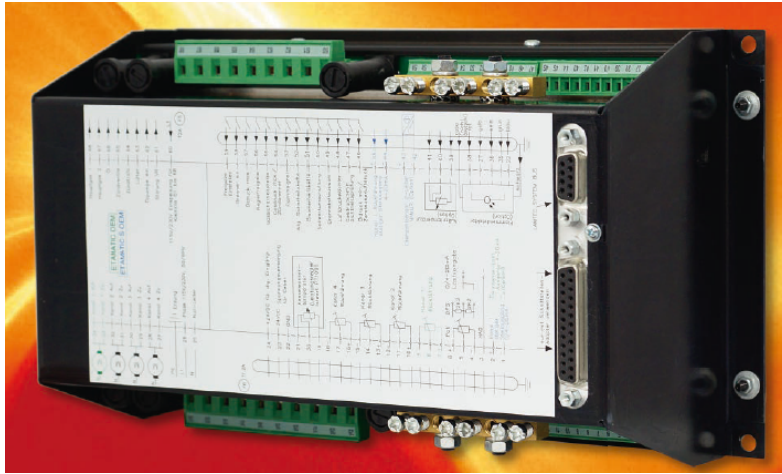




Fig. 4-1 Customer interface

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
 - O₂
 - Flame intensity
 - Operating hours



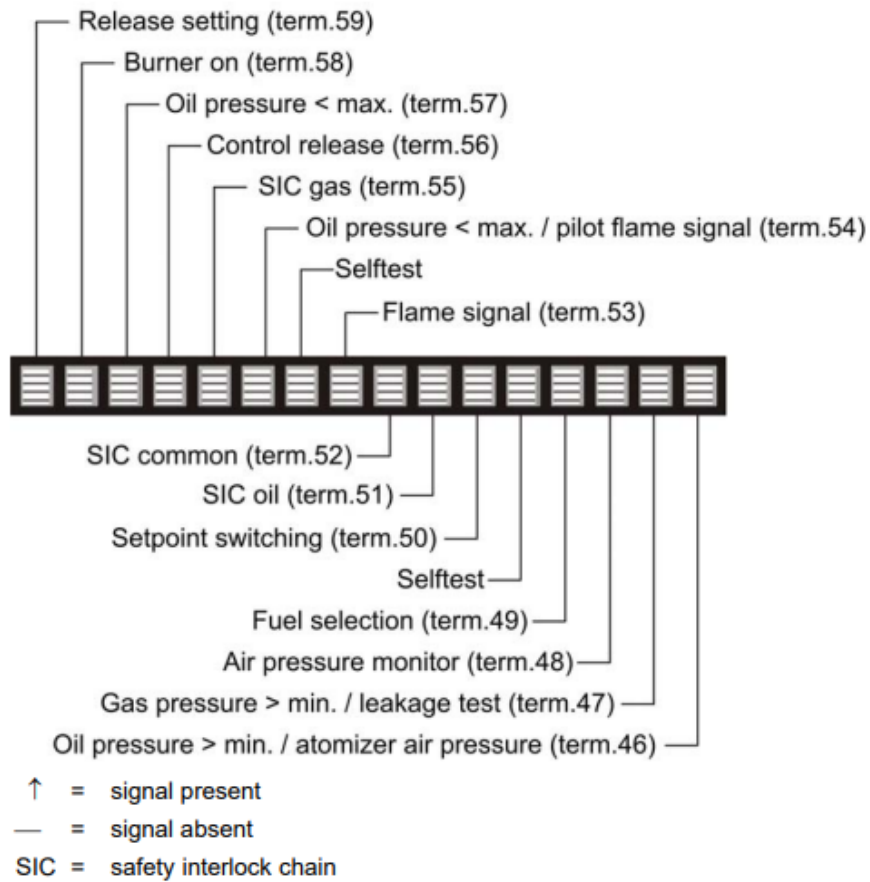
- ← Display change:
- Fuel/air ratio control
 - O₂
 - Flame intensity



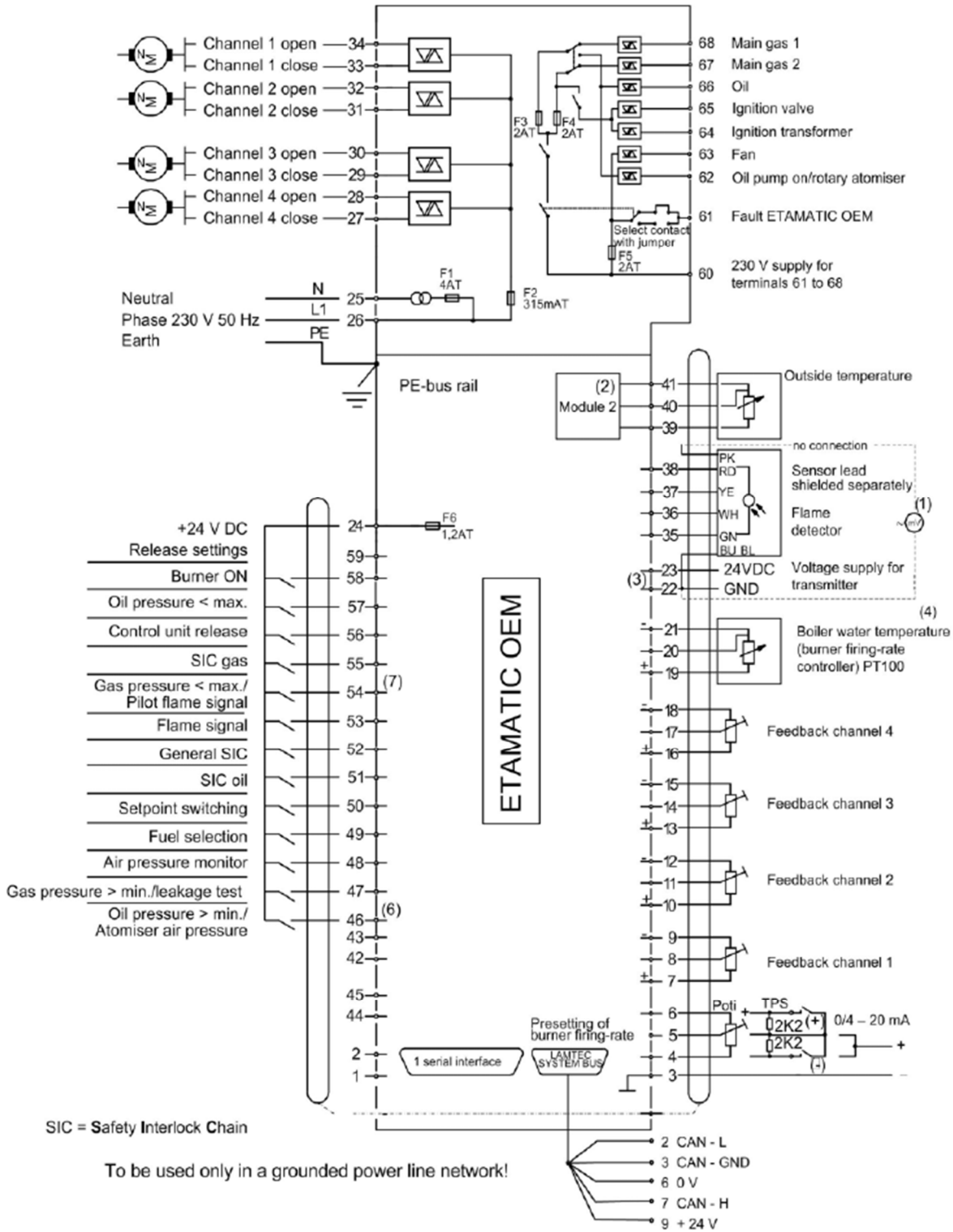
Fig. 5-2 Programming unit

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

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

Fault Code No.	Restart according to		Description
	TRD	EN676	
103	0	0	Internal fault: Error in misc. data
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: Exchange the EEPROM.</p> <p>Import the current data record into the device using the remote control software and check this data record.</p>
104	0	0	Internal Fault: D/A-Converter faulty
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	
105	>88	3	Curve data faulty! Curve set no.:
H/Ü			<p>During an attempt to save the curve to the EEPROM / during the check of the redundant curves, a fault was discovered. Repeat the programming. Reset the fault. If this fault is still present, proceed as follows:</p> <p>If the data occurs after the number of curves has been expanded:</p> <ol style="list-style-type: none"> 1. Select the corresponding curve set 2. Delete the memory 3. Program a new point <p>If the data was saved using the remote control software: Import the curve data of the corresponding curve set into the device. If this is not possible:</p> <ol style="list-style-type: none"> 1. Select the corresponding curve set 2. Delete the memory 3. Re-enter the curve <p>Reset the fault. If the fault persists → the EEPROM might be defective. Order a new EEPROM from LAMTEC. When ordering, enter the original purchase order number, sales order number, and commission of the device. Return the defective EEPROM in any case (for the address, see the overleaf of this publication). 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. 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. For more details, see the "Protected data record" description in the remote control software. 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>
106	0	0	parameters not equal for parameter no.:
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: Import the protected data recording into the device. If that is not possible: Change the reported parameters once manually. Reset the fault.</p> <p>Reset the fault; switch the mains voltage off and on again if pertinent. Re-enter the curve.</p> <p>If the fault persists → the EEPROM is possibly defective: 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	
107	0	0	Invalid configuration
H/Ü			<p>Fault during an internal self-test. Reset the fault; switch the mains voltage off and on again if necessary. Using the remote control software, compare the current parameter setting and last working data record.</p>
108	0	0	Different input signals on main processor and monitoring processor terminal-
H			<p>Fault during an internal self-test. The digital input signals for the main processor (H) and monitoring processor (Ü) are compared and are not the same. Reset the fault; switch the mains voltage off and on again if pertinent. Check all fuses in the device.</p> <p>A bouncing signal can lead to different states being detected between the main and monitoring processors. 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. 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>
110	0	0	CRC-16 test had found an error
H/Ü			<p>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. 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: - Remove the processor pc board Check the components for the correct polarity (all notches point in the same direction). Check whether all components are properly inserted (e.g., whether any prongs are bent), and press them in firmly if necessary. Check the proper seat of the processor card connection to the backplane. 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. 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	
111	0	0	RAM-Test detected error
H/Ü			<p>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. Check the curve points of the main and monitoring processors for irregularities. → Remote software: Curve table and/or set value graphic. 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: - Remove the processor pc board Check the components for the correct polarity (all notches point in the same direction). Check whether all components are properly inserted (e.g., whether any prongs are bent), and press them in firmly if necessary. Check the proper seat of the processor card connection to the backplane. 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>
112	0	0	ETAMATICselftest exceeds timeout limit
			<p>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. If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>
120	1	1	Different operating modes for mon. and main processor
H/Ü			<p>Fault during an internal self-test. 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. Check the signal sequence.</p>
121	0	0	The correction is outside the permissible range. Channel: 1
Ü			<p>The monitoring processor checks whether the current correction values lie within the set range. Check the correction range. If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>
122	0	0	Correction is outside permissible range. Channel : 2
Ü			See S121
123	0	0	Correction is outside permissible range. Channel : 3
Ü			See S121
124	0	0	Correction is outside permissible range. Channel : 4
Ü			See S121
125	0	0	Correction is outside permissible range. Channel : 5
Ü			See S121

Fault Code No.	Restart according to		Description
	TRD	EN676	
139	0	0	Integr. Flame Detector: selftest fault
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: 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	The EEPROM is defective.
H/Ü			<p>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. 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. The EEPROM of the respective processors contains important operating data, the parameters, and the curves. During an attempt to save the curve to the EEPROM, a fault was discovered. Repeat the programming. After the exchange of an EPROM or RAM: Remove the processor pc board Check the components for the correct polarity (all notches point in the same direction). Check whether all components are properly inserted (e.g., whether any prongs are bent), and press them in firmly if necessary. Check the proper seat of the processor card connection to the backplane. Check the proper seat of the power supply card connection to the backplane. Reset the fault if it is still present; the EEPROM is possibly defective. Request a new EEPROM from LAMTEC with the precise specification of the respective purchase order number, sales order number, and commission of the device. Return the defective EEPROM in any case (for the address, see the overleaf of this publication). Exchange the EEPROM, import the current data record into the device using the remote control software, and check the data record. When exchanging this component, a basic setting must exist before you can continue to work with the device. 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. For more details, see the "Protected data record" description in the remote control software. If this is not possible, you must order a preprogrammed EEPROM from LAMTEC. 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	
141	0	0	Potentiometer faulty, feedback changing too quickly: channel 1
H/Ü			The return values of a three-point-step servo output change faster than specified as maximum in parameters 12-16. Check the wiring; check the potentiometers for short circuit. 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. Otherwise, exchange the potentiometers.
142	0	0	Potentiometer faulty, feedback changing too quickly: channel 2
H/Ü			See S141
143	0	0	Potentiometer faulty, feedback changing too quickly: channel 3
H/Ü			See S141
144	0	0	Potentiometer faulty, feedback changing too quickly: channel 4
H/Ü			See S141
145	0	0	Potentiometer faulty, feedback changing too quickly: channel 5
H/Ü			See S141
151	>88	3	Reci damper deactivated, out of time in reaching CLOSED position, channel:1
H/Ü			The actuating device may not reach its set value since it is limited by a limit switch: Check the setting of the set values/limit switches. The actuating device may not have reached its set value quickly enough. 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): Increase the adjusting speed on the motor (if possible) or Limit the adjusting range by limit switch (to save runtime) The return does not move even though the actuating device is moving: Check the connection of the return to the device (see the connection diagram) To localise the fault, simulate the return at various points of the return circuit (using a potentiometer or a current sensor). The motor does not move: Check whether "OPEN" or "CLOSED" signals are present on the motor. Check the voltage supply circuit on the motor. FMS/VMS: Check whether the "OPEN" or "CLOSED" relay is actuated. If yes: Check the fuse of the relay module. If no: Make sure that no fault is present (can be seen on the fault LED). Check the F2 fuse (on the front panel of the power supply unit). Check the connection between FMS/VMS and the relay module.
152	>88	3	the same as P 151, but channel: 2
H/Ü			See S151
153	>88	3	the same as P 151, but channel: 3
H/Ü			See S151
154	>88	3	the same as P 151, but channel: 4
H/Ü			See S151

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

Fault Code No.	Restart according to		Description
	TRD	EN676	
192	1	1	1st monitoring band over range too long. Channel: 2
H/U			
193	1	1	1st monitoring band over range too long. Channel: 3
H/U			
194	1	1	1st monitoring band over range too long. Channel: 4
H/U			
195	1	1	1st monitoring band over range too long. Channel: 5
H/U			
201	1	1	1st monitoring band under range too long. Channel: 1
H/U			
202	1	1	1st monitoring band under range too long. Channel: 2
H/U			
203	1	1	1st monitoring band under range too long. Channel: 3
H/U			
204	1	1	1st monitoring band under range too long. Channel: 4
H/U			
205	1	1	1st monitoring band under range too long. Channel: 5
H/U			
211	0	0	2nd monitoring band over range too long. Channel: 1
H/U			
212	0	0	2nd monitoring band over range too long. Channel: 2
H/U			
213	0	0	2nd monitoring band over range too long. Channel: 3
H/U			
214	0	0	2nd monitoring band over range too long. Channel: 4
H/U			
215	0	0	2nd monitoring band over range too long. Channel: 5
H/U			
221	0	0	2nd monitoring band under range too long. Channel: 1
H/U			
222	0	0	2nd monitoring band under range too long. Channel: 2
H/U			
223	0	0	2nd monitoring band under range too long. Channel: 3
H/U			
224	0	0	2nd monitoring band under range too long. Channel: 4
H/U			
225	0	0	2nd monitoring band under range too long. Channel: 5
H/U			
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	Fuel/air ratio control blocked: channel 3
H			
234	>88	3	Fuel/air ratio control blocked: channel 4
H			
235	>88	3	Fuel/air ratio control blocked: channel 5
H			
301	1	1	Broken wire at firing rate input -1
H/Ü			Check the wiring.
302	1	1	Broken wire at firing rate input-2
H/Ü			Check the wiring.
320	1	1	Broken wire at correction input
H/Ü			Check the wiring.
321	1	1	Broken wire at feedback channel 1
H/Ü			Check the wiring; check the potentiometers for short circuit.
322	1	1	Broken wire at feedback channel 2
H/Ü			Check the wiring; check the potentiometers for short circuit.
323	1	1	Broken wire at feedback channel 3
H/Ü			Check the wiring; check the potentiometers for short circuit.
324	1	1	Broken wire at feedback channel 4
H/Ü			Check the wiring; check the potentiometers for short circuit.
325	1	1	Broken wire at feedback channel 5
H/Ü			Check the wiring; check the potentiometers for short circuit.
351	1	1	Different status of ignition position relay
H/Ü			Check the signal for curve selection. Bouncing signal? Possible bus problems.
352	>88	3	Invalid curve selection (no signals)
H/Ü			Check the signal for curve selection. Possible bus problems.
353	>88	3	Invalid curve selection (several signals)
H/Ü			Check the signal for curve selection. Possible bus problems.
360	0	0	Shut down from O₂controller (1) or CO controller (2) :
H			Initially, the time from parameter P904 "O ₂ trim active after ignition in seconds" runs out before the fault is permitted.
361	1	1	Different status of ignition position relay
H/Ü			
362	0	0	carry out burner servicing
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	permissible O₂ value was fallen below Initially, the time from parameter P904 "O ₂ 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 ₂ controller (from 5.4): After ignition, the monitoring time from P966 starts immediately.
370	0	0	Internal communication between the processors faulty 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	Output for internal firing rate faulty Ü
372	0	0	Deviation of the firing rate value between the main processor and the monitoring processor is too high. Ü 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. If fault messages are constantly appearing one after the other → exchange the device or respective card.
381	0	0	Deviation between main processor and monitoring processor too great: correction channel 1 Ü 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. If fault messages are constantly appearing one after the other → exchange the device or the respective card.
382	0	0	Deviation between main processor and monitoring processor too great: correction channel 2 Ü 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. If fault messages are constantly appearing one after the other →exchange the device or the respective card.
391	0	0	Curves sentence does not fit to the chosen fuel. Ü 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. At the curve set selection by BUS, terminal 75 is missing for plausibility check, or rather terminal 75 can be seen at oil curve. If fault messages are constantly appearing one after the other → exchange the device or the respective card.
392	0	0	Remote not responding (time-out) H
393	0	0	Remote shut down triggered. H
394	0	0	BURNER-ON/OFF Remote signal missing.
400	0	0	Different point number at programming Ü Re-enter the curve.
451	1	1	Ignition position was left in ignition mode. Channel: 1 H/Ü In case of a constant output: Possible EMC influences due to ignition transformer; check the frequency converter settings

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

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

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

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. H VMS, for ETA V Term. 58
701	0	0	Flame signal present, without signal on terminal 2. H VMS, for ETA V Term. 58
702	0	0	Flame signal appears during pre-ventilating. H VMS, for ETA V Term. 58
703	0	0	Flame signal goes out even though signal on terminal 2 still present. H VMS, for ETA V Term. 58
711	0	0	Illegal operating mode change Ü Check the "Burner ON" signal. Bouncing signal?
712	0	0	
713	0	0	Incorrect signal combination in operating mode AU Ü
714	0	0	Incorrect signal combination in operating mode BE Ü
715	0	0	Incorrect signal combination in operating mode VO Ü
716	0	0	Incorrect signal combination in operating mode ZP Ü
717	0	0	Incorrect signal combination in operating mode ZU
718	0	0	
719	0	0	Fuel valves open too long without flame Ü
720	0	0	Ignition transformer switched on too long Ü
721	0	0	Ignition valve open too long Ü
722	0	0	Fuel valves open in maintenance mode Ü
723	0	0	Ignition process taking too long 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. 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. FMS: 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	Time interval between remote-fault-resets is too short.
			<p>EN 14459 permits a remote unlocking only 4 x within 15 minutes. 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. After a waiting period, another remote fault release can be performed. Fault deactivation H889 also takes place if the fault release was sent even though none is present! The release is monitored by terminal, while the programming unit and customer interface are switched off by the standard setting of parameter 19. A release through the front panel is always possible.</p>
900	0	0	Error in self-test sequencer.
H/Ü			<p>Fault during an internal self-test. Reset the fault; switch the mains voltage off and on again if necessary. If fault messages are constantly appearing one after the other → exchange the device or respective card. If the fault appears after a software update, the version of the monitoring processor may be incompatible with the version of the main processor.</p>
901	0	0	Terminal 10 + 24 Volt switch-off faulty.
H/Ü			<p>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. If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>
902	0	0	Error in over-voltage self-test.
H/Ü			<p>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. If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>
903	0	0	Error in optical coupler self-test terminal -
H/Ü			<p>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. If fault messages are constantly appearing one after the other → exchange the device or respective card.</p> <p>For ETAMATIC: Are another 24V than those of terminal 24 being used? Check the voltage level. Short circuit on the 24V Disconnect 24: no arrow must be pointing at digital inputs. Connect terminal 24 to only one input Voltage on If the fault still occurs: Deactivation in ETAMATIC defective.</p>

Fault Code No.	Restart according to		Description
	TRD	EN676	
904	1	1	Error in reference of firing rate
Ü			<p>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. 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. The potentiometer possibly has the incorrect polarity, is incorrectly connected (centre pick-up mixed up with the outer one), or is defective.</p>
905	1	1	Error in reference element of main processor
Ü			<p>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. If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>
906	1	1	Error in reference element of monitoring processor
H			<p>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. If fault messages are constantly appearing one after the other → exchange the device or respective card.</p>
907	1	1	Curve set adjustment via LAMTEC SYSTEM BUS, selftest recognizes fault
911	1	1	Error in reference, channel: 1
Ü			<p>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. 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. The potentiometer possibly has the incorrect polarity, is incorrectly connected (centre pick-up mixed up with the outer one), or is defective.</p>
912	1	1	Error in reference, channel: 2
Ü			See S911
913	1	1	Error in reference, channel: 3
Ü			See S911
914	1	1	Error in reference, channel: 4
Ü			See S911
915	1	1	Fault in reference, duct: 5
Ü			See S911

Fault Code No.	Restart according to		Description
	TRD	EN676	
921	0	0	Relay driver self-test : output terminal 11 or 66 (ETAMATIC) faulty.
H/Ü			<p>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. 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: Check the wiring between FMS and 660 R 0016 V4.3. 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: From the start of the burner, relay module type 660 R 0016 V4.3 checks the following outputs: - Ignition transformer (terminal 86) - Ignition valves (terminal 85) - Oil valves (terminal 84) - Main Gas 1 (terminal 82) - 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 O₂ as the fuel) occur by the time ignition is completed, the following faults may be present: - Lack of or too little firing rates at terminals 82 through 86 - Failure of fuses F1-F4 or F6 - Actual defect in one of the safety-related switching channels For further troubleshooting, the diagnostic mode can be activated (see DLT6089/ DLT6065).</p>
922	0	0	Relay driver self-test : output terminal 16 or 65 (ETAMATIC) faulty.
H/Ü			See S921
923	0	0	Relay driver self-test : output terminal 43 or 68 (ETAMATIC) faulty.
H/Ü			See S921
924	0	0	Relay driver self-test : output terminal 67 faulty
H/Ü			See S921
925	0	0	Relay driver self-test : output terminal 45 faulty.
H/Ü			See S921
926	0	0	Relay driver self-test : output terminal 68 or 61 (ETAMATIC) faulty.
H/Ü			See S921
927	0	0	Relay driver self-test : output terminal 36 (ETAMATIC K202) faulty.
H/Ü			See S921
928	0	0	Relay driver self-test : output terminal 41 faulty.
H/Ü			See S921
929	0	0	Relay driver self-test : output terminal 76 faulty
H/Ü			See S921
930	0	0	Relay driver self-test : Output K203 defect.
H/Ü			See S921
931	0	0	Relay driver self-test : Output K201 defect.
H/Ü			See S921

Fault Code No.	Restart according to		Description
	TRD	EN676	
997	>88	3	Default language missing or LANGUAGE-FLASH defect 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. If fault messages are constantly appearing one after the other → exchange the device or respective card.
998	0	0	Internal fault: main loop is too slow. H/Ü 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. If fault messages are constantly appearing one after the other → exchange the device or respective card.
999	0	0	Internal fault Number - H The internal procedure is faulty, and the additional number indicates the position of the fault within the firmware. Internal fault number 2: This fault is triggered by the watchdog processor, when these do not match with the burner sequencer's behaviour of the main processor. Possible cause: The HP activates the maintenance mode without any permission The HP changes into a mixed operation without any permission Internal fault number 3: If the fault occurs once, it may be caused by EMC interference. If the fault occurs often, the processor pc board is defective. Internal fault number 4: 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. ETAMATIC: Before A4a4002: the "Air pressure monitor" input appears during the TRIAC self-test before the fan output is actuated by ETAMATIC! Internal fault number 7: 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). No fault occurs if the devices switches to the "Ready" (BE) mode downstream of the "Burner On" input before the "Pre-venting" signal is sent. Internal fault number 22: A fault occurred during the assumption of the curve in the EEPROM. → Check the curve. Re-enter if required. This fault is possible only in connection with the programming unit! 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. If fault messages are constantly appearing one after the other → exchange the device or respective card.

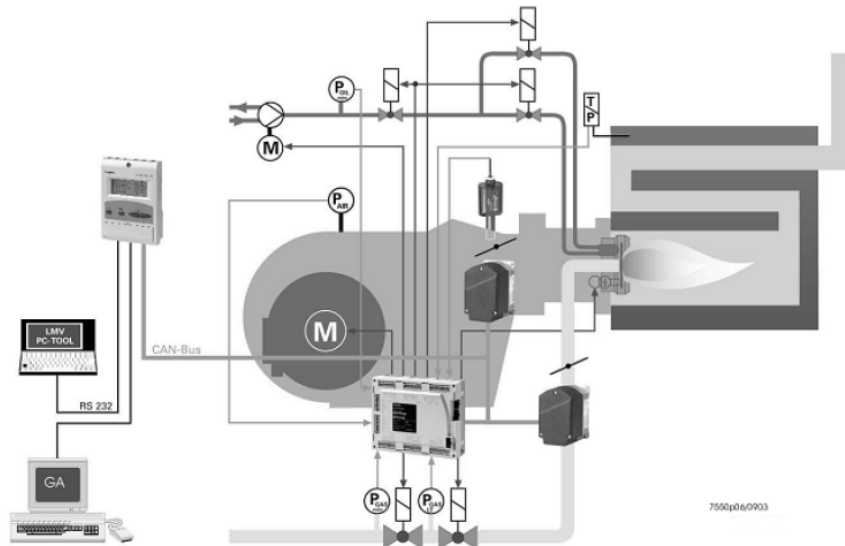


If a fault occurs that is not listed in the fault list, please contact Ecostar after-sales support or your system's commissioning technical personnel.

➤ **LMV 5...**



Basic Diagram



AZL52



Description of connection terminals (AC 230 V)

Terminal designation	Connection symbol		Input	Output	Description	Electrical rating
X3-01	PIN1		x	x	Fan motor contactor	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, $\cos\phi$ 0.4
	PIN2		x		Alarm	AC 230 V +10 % / -15 %, 50...60 Hz, 1 A, $\cos\phi$ 0.4
X3-02	PIN1		x		Air pressure switch (LP)	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 1.5 mA
	PIN2		x		Power signal for air pressure switch (LP)	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 500 mA
X3-03	PIN1		x		End switch burner flange	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 5 A
	PIN2		x		Power signal for end switch burner flange	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 5 A
X3-04	PIN1		x		Safety loop	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 5 A
	PIN2		x		Power signal for safety loop	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 5 A
	PIN3		x		Protective earth (PE)	
	PIN4		x		Neutral conductor (N)	
	PIN5		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		x		Fuel selection gas	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 1.5 mA
	PIN2		x		Fuel selection oil	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 1.5 mA
	PIN3		x		Fan contactor contact (FCC) or FGR-PS	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 1.5 mA
	PIN4	x		Reset / manual lockout	AC 230 V +10 % / -15 %, 50...60 Hz, I_{max} 1.5 mA	
X4-02	PIN1		x		Protective earth (PE)	
	PIN2		x		Neutral conductor (N)	
	PIN3		x		Ignition	AC 230 V +10 % / -15 %, 50...60 Hz, 2 A, $\cos\phi$ 0.2
X4-03	PIN1		x		Protective earth (PE)	
	PIN2		x		Neutral conductor (N)	
	PIN3		x		Start signal or PS relief (APS test valve)	AC 230 V +10 % / -15 %, 50...60 Hz, 0.5 A, $\cos\phi$ 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 _{max} 1.5 mA
			x	Power signal for pressure switch-min-oil (DWmin-oil)	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 500 mA
X5-02			x	Protective earth (PE)	
		x		Pressure switch-max-oil (DWmax-oil)	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 1.5 mA
			x	Power signal for pressure switch-max-oil (DWmax-oil)	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 500 mA
X5-03		x		Controller (ON / OFF)	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 1.5 mA
		x		Controller closes / stage 3	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 1.5 mA
		x		Controller opens / stage 3	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 1.5 mA
			x	Power signal for control of controller	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 500 mA
X6-01		x		Start release oil	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 1.5 mA
			x	Power signal start release oil	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 500 mA
		x		Direct heavy oil start	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 1.5 mA
			x	Power signal direct heavy oil start	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 500 mA
X6-02			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
X6-03			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 _{max} 1.5 mA
			x	Power signal (reserve)	AC 230 V +10 % / -15 %, 50...60 Hz, I _{max} 500 mA

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.
- 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 (Heavy Oil: 25 bar)
- 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 dameper, perform flue gas analysis 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	Fuel is cut or does not come	Fuel 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.	Fuel pressure error	Circuit fuel 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.
	Fan motor failure	Check fan motor coils, motor contactor and outlet from program relay.
Burner starts up, but fails after 30 seconds.	Fuel valve, fuel pressure drop	Fuel valve might be closed. Supply fuel pressure might be low. Check fuel 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

Fuel Consumption (kg/h)	CO (ppm)	O₂ (%)	CO₂ (ppm)	NO_x (ppm)	Yield (%)	Flue Temp. (°C)	Date	Signature

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

Tel: 444 8 326

Fax: +90 216 370 45 03

Factory Contact Details

Türkgücü OSB

Bülent Ecevit Bulvarı No:11

ÇORLU/TEKİRDAĞ/TÜRKİYE

Tel: +90 282 685 44 80-81

Fax: +90 282 685 42 09

Also you can contact with us:

Web site : www.ecostar.com.tr

E - mail : 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.

