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# Operation Manual

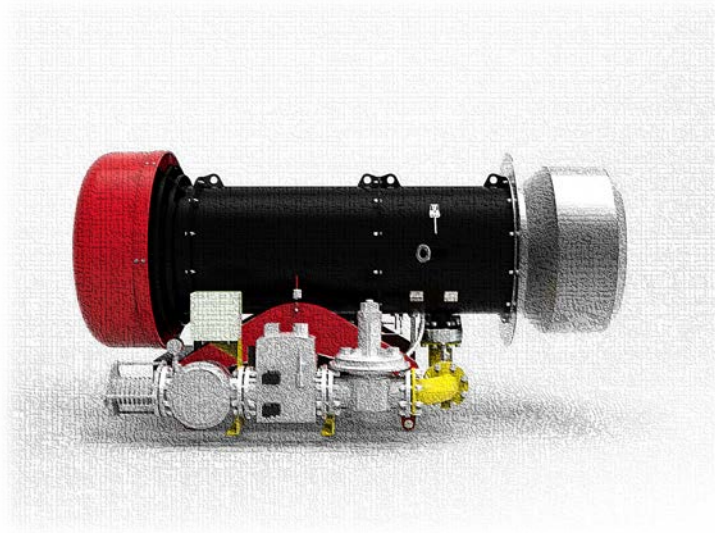
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## LCRYQ Series Burner

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LC2020V3C

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# Important Information

## Purpose

This brochure is the important guidance about the oil burner installation and commissioning. Please do read it carefully before installation and commissioning. If there is any unclear place, please contact our company anytime to avoid any unnecessary equipment faults and danger.

## Critical safety warnings

All participants involved in installation, debugging, commissioning, operation and maintenance should complete related training and carefully read and understand this guidance brochure

All of the other work out of oil burner related operations ONLY can be started AFTER the shutting off of burner, cutting off of the power supply and fuel valve.



**Warning : If violating the regulations, it may cause electric shock or fire disasters and result in serious personal injury or even death.**

## Safety Regulations

### Importance of safety regulations

This chapter includes the required important information about safe operation on burner. For further safe operation guidelines you can find in the following chapters. The operators are duty-bound to comply with all the safety rules.

## Training

All participants involved in installation, dismantling, commissioning, operation and maintenance (including inspection, maintenance and repair) should complete related training and carefully read and understand this guidance brochure

## **Transformation and Retrofit**

Any unauthorized transformation and refit towards the burner is strictly prohibited. If necessary, please do contact the manufacturer. Unauthorized transformation or refit may cause safety problems. Please do not carry it. The manufacturer and seller will be not being liable for any damage caused by any unauthorized transformation and refit towards the burner.

## **Burner Operation and Maintenance**

The burner will start to combust high efficiently once after installation and commissioning and no need of additional manual operation. All of the other work out of burner related operations ONLY can be started AFTER the shut off of oil burner, cut off the power supply and fuel valve. There will be possible dangers of electric shock or fire disasters caused by the violation of the regulations which can result in serious personal injury or even death.

## **Fuel Selection and Operation**

This product can only be used from one of the two fuels: oil or gas, and they cannot be burned at the same time; If fuel oil operation is selected, the corresponding oil valves should be opened and close the gas vales to ensure the safety of use; if gas operation is selected, the oil valves should be closed and the gas valves should be opened at the same time. If each gas operation is completed and it will be not used without short-term, it is still necessary to close the main gas valve to ensure safety. It is recommended to use the fuel that meets the national standard for both oil and gas.

## **Troubleshooting Process**


If any breakdown, the operator should analyze the issues and resolve those according to the troubleshooting procedure. Then give feedback to the manufacturer or seller timely

## **Stop-working Process**

Cut off the master switch

Please do turn off the oil valve and gas valve if the equipment will not be used for a long time.

## Indications and Warning Symbols

	<p>This is the symbol of “paying attention to safety”. When you look at the symbols in this brochure or on the equipment, please pay attention to the possible danger which can result in personal injury and make sure to comply with all the attentions points and safe operation methods.</p> <p>There are always other similar symbols used on the equipment to express the extent of damage including “Danger”, “Warning” and “Caution” as below</p>
<b>Danger</b>	“Danger” symbol indicates immediate direct danger which can result in serious injury or even death
<b>Warning</b>	“Warning” symbol indicates potential danger which can cause serious injury or even death.
<b>Caution</b>	“Caution” symbol indicates potential danger which can cause minor or moderate injury. In this brochure, this symbol also used to remind the attention to danger indication.
<b>Important</b>	“Important” indicates any danger towards the machine but not to person.
<b>Notes</b>	“Note” indicates the additional remark to some info.

# I、Product Overview

LCRYQ series burner is self-designed full-automatic oil/gas dual fuel burner based on thorough research on the asphalt plant drying drum. It's applicable to all kinds of layout of asphalt plant dryer drums with convenient moving, easier installation and maintenance

- With impact structure and moveable wheel device, the integrated-designed burner is specially designed for the asphalt plant drying drum, which features easy installation and maintenance. The compact arrange of the oil and gas pipes and control wires enable easier connection with the system. The double access doors on the left and right sides enable much easier layout and maintenance.
- By adopting advanced low pressure media atomizing spray gun , the burner features energy conservation, environmental friendly and powerful adaptability to various quality oil.
- It is equipped with special guided nozzle and high efficiency flame stabilizing disc and adopts ring pipeline, which enables higher mixing efficiency, energy saving and environmental protection. With hidden gas ring design, the whole machine looks more harmonious and beautiful.
- Both of the oil pump and the fan adopt variable frequency control technology so as to decrease the complexity of the traditional mechanical ratio modulation system and enhance the system reliability.
- The heavy oil can burn directly no need of traditional switch between light oil and heavy oil to reduce the faulty which may be caused by oil quality problem
- The burner is equipped with thorough safety protection measurements including: high and low pressure protection, gas leakage detection, automatic flame detection, automatic blow down and fault fast cut-off etc.
- Safety, energy saving and environmental protection meet China and international industry standards.
- By adopting multi-type of control methods to control the air-fuel ratio so as to get higher combustion efficiency.
- Regulation ratio: 1:10.
- The start of ignition is running steadily and the temperature control precision is high.

## II、Technical Parameters

Model	LCR1000YQ	LCR1500YQ	LCR2000YQ	LCR3000YQ	LCR4000YQ	LCR5000YQ
Max. Oil consumption ( kg/h )	650	940	1280	1940	2400	3000
Max. Gas consumption ( NM <sup>3</sup> /h )	730	1060	1430	2200	2700	3370
Max. heating out ( MW )	7.2	10.5	14.2	21.7	26.8	33.3
Fan Power ( KW )	7.5	11	15	22	30	37
Oil Pump Power ( KW)	1.5	1.5	2	3	4	4
Gas Train Diameter	DN65	DN80	DN100	DN100	DN125	DN125
Matched asphalt plant model	80tph	120tph	160tph	240tph	320tph	400tph
Regulation ratio	1:10					
Compressed air pressure	≥0.6MPa					
Oil supply pressure	≤0.03MPa					
Gas supply pressure	45-55KPa					
Applicable fuel type	Diesel, Heavy Oil, Residual Oil,Natural Gas					

### III、 Burner Structure Introduction

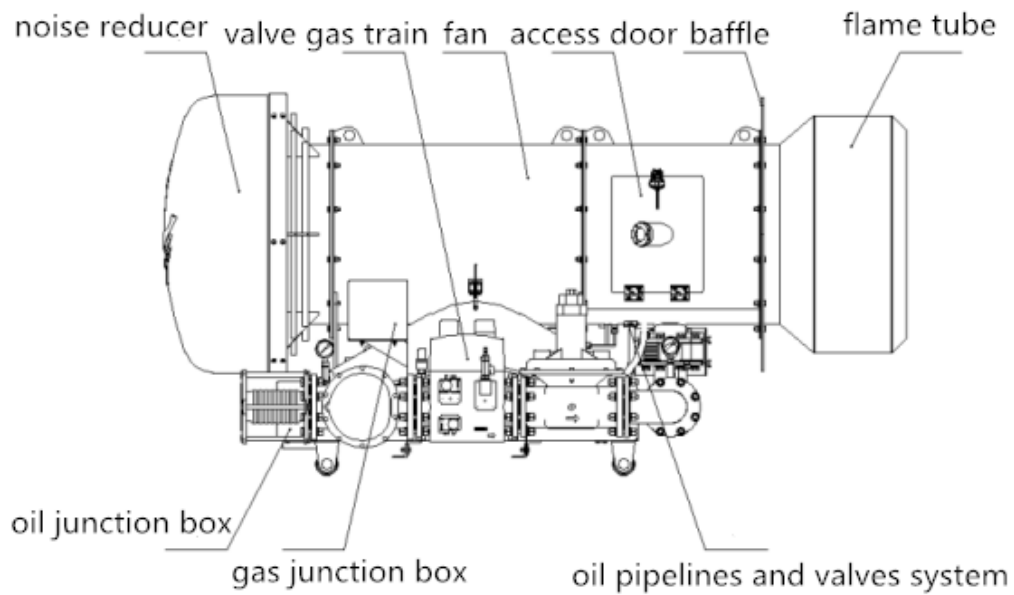


Diagram 1: Burner Main Body outside View

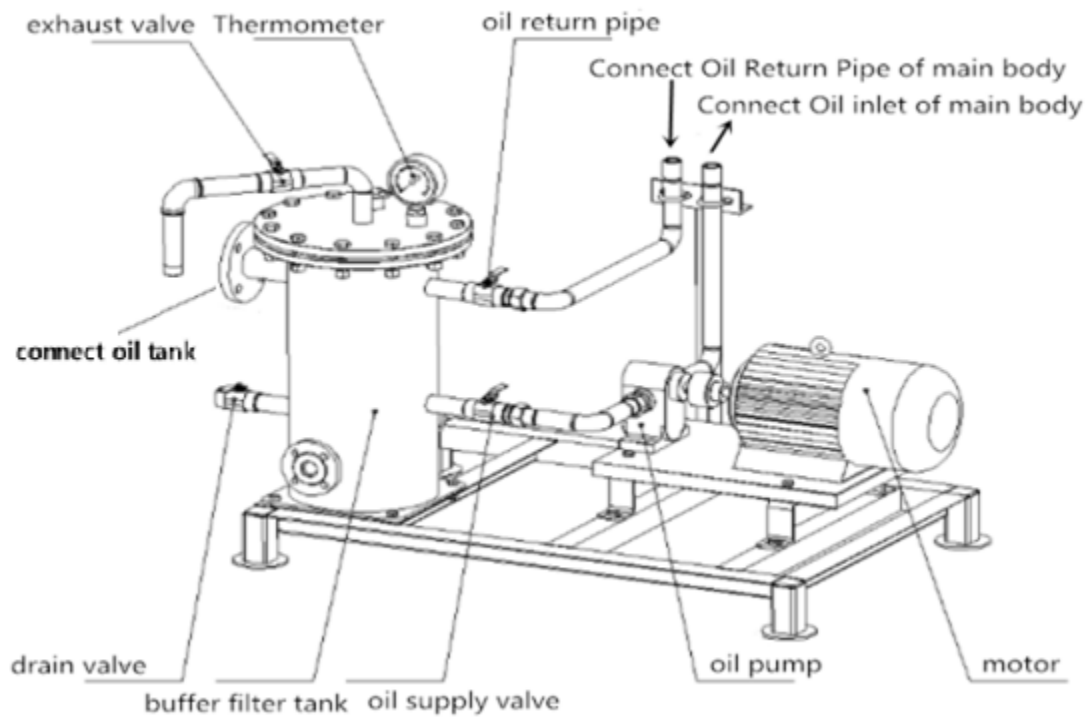


Diagram 2: Oil Pump Unit Composition



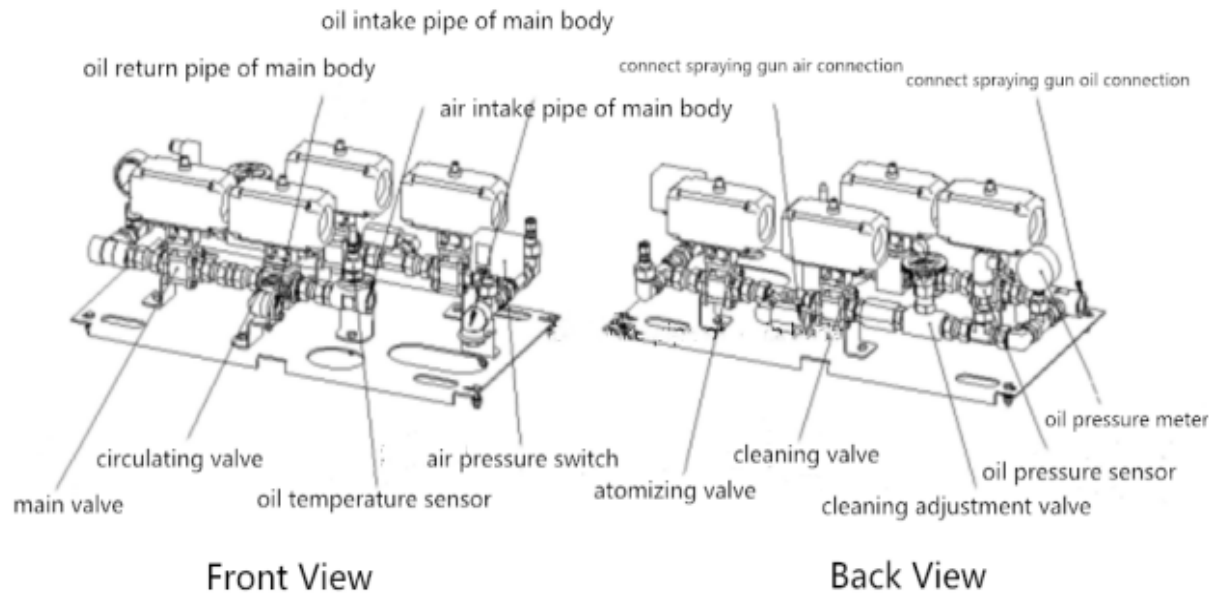


Diagram 3: Composition of Pipelines and Valves System

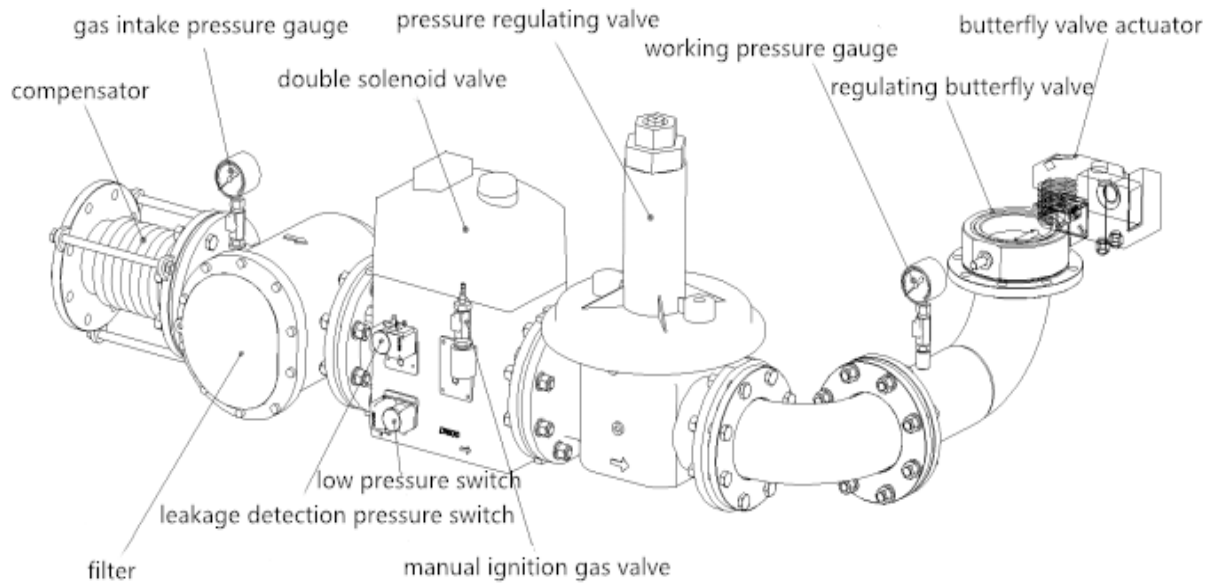


Diagram 4A: DUNGS Gas Valve Train Composition Diagram

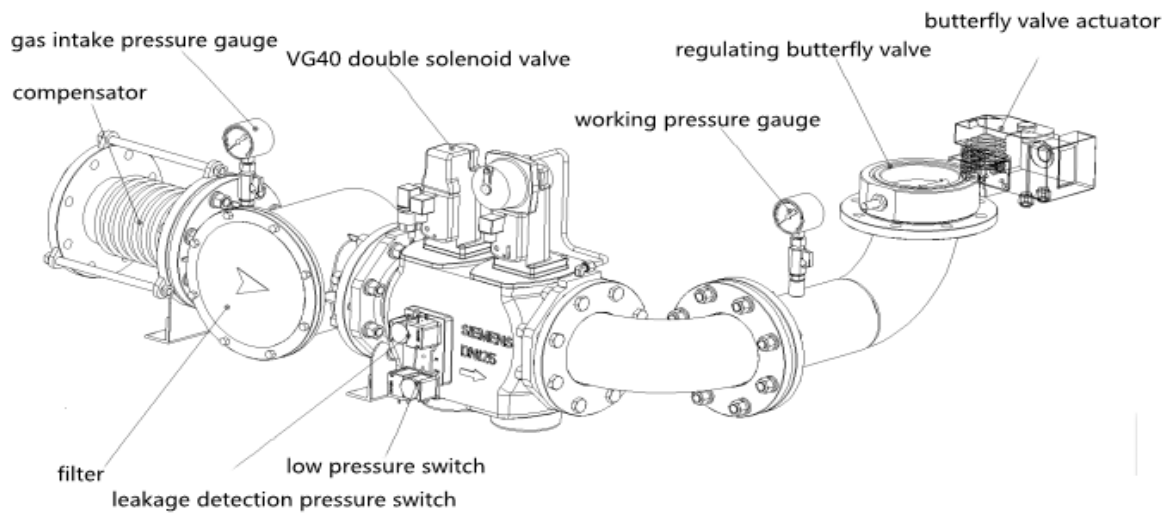


Diagram 4B: SIMENS Combined Gas Valve Modular Composition Diagram

## IV、 Burner Working Flow Introduction

### 1. Oil Combustion Process

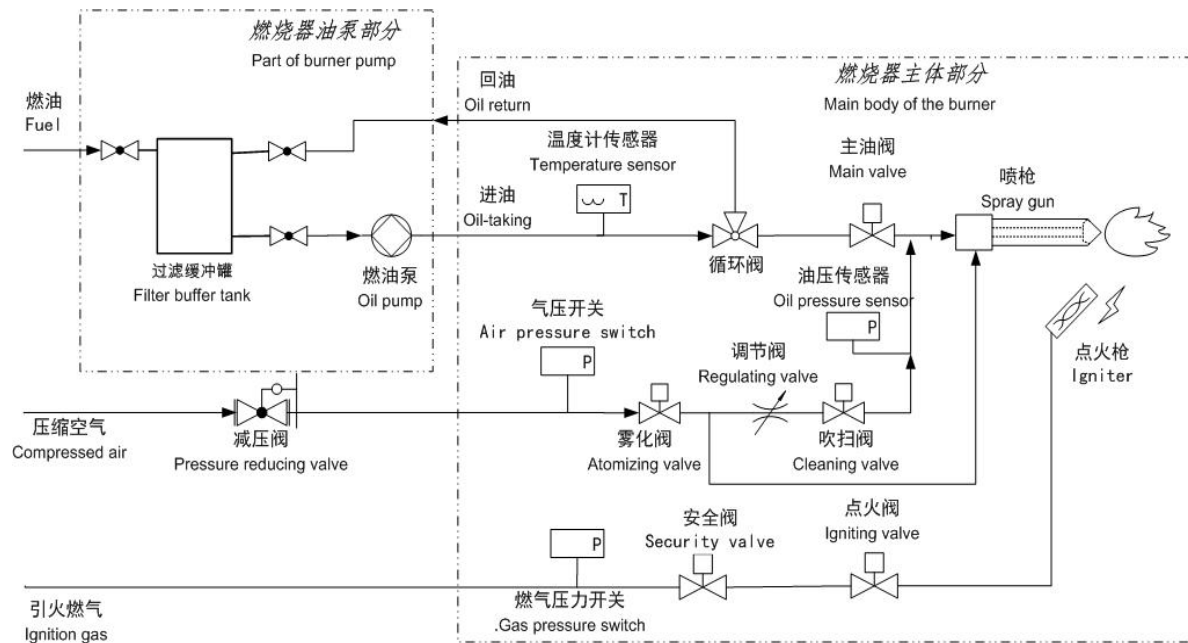


Diagram 5: Oil Pipes System Schematic Diagram

As shown in the burner pipes system, the filter buffer tank and the oil supply pipeline are heated by the heat conducting oil in advance. The burner can be started when the temperature of the oil in the buffer tank meets the operating requirements. The fuel oil pump and the inlet and return pipeline connecting the main body of the burner are also heated by electric trace heating in advance to ensure that the pipeline temperature can make the oil flow. When starting the burner, the oil pump starts and the heated heavy oil in the filter buffer tank passes through the inlet valve →oil pump →oil intake pipe →circulation valve →oil return pipe →oil return valve →filter buffer tank to complete the heavy oil cycle. The oil pump and pipeline are preheated through the oil circulating to let the pressure of the oil pump is gradually going steadily during the circulation.

At the same time of oil pump circulating preheating, the burner fan starts, the system carries on the self-inspection of security, after each inspection passes, the burner enters the ignition state. First, the oil pump and the fan run at the initial speed of ignition and the atomizing valve opens and the compressed air to be injected by the spray gun, so that the spray gun has the condition of atomizing oil. Then the high-voltage electrode is electrified to produce an electric spark, the gas ignition valve is opened, and the gas emitted from the ignition head is ignited. When the system confirms the normal combustion of the gas ignition head, the main oil valve and the circulating valve are opened, The oil is atomized with air by the spray gun and sprayed out from the nozzle, the flame of ignition head ignites the oil from the spray gun, Closes the high-voltage electrode and the gas valve after a few seconds, the system confirms that the flame is ignited, the combustion enters the preset load combustion state. The burner will increase or reduce the flame according to the control instruction. This process always carries out flame monitoring. Once the flame is extinguished, the system will

immediately enter shutdown procedure.

When press the “Stop” button , the system enters the shutdown procedure. The main oil valve, circulating valve, atomizing valve and oil pump are closed immediately, the flame in the spray gun is extinguished. After a few seconds, the oil pump turns backwards and opens the circulating valve and main oil valve to pump the oil in the spray gun and the connecting pipe back to the oil tank .The process is very short and then the oil pump stops, The main oil valve and the circulating valve are closed, the same time, the atomizing valve and cleaning valve are opened, Compressed air goes into the oil pipe of spray gun to clean out the remaining oil, The fan continues blowing for a period of time to clean out the remaining oil and gas in the dryer drum.

After the cleaning process, the system enters the reset standby state

## 2. Gas Combustion Process

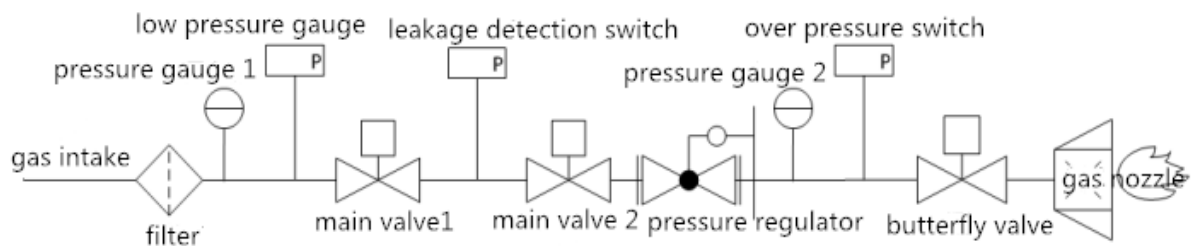


Diagram 6: Gas Pipelines System Schematic Diagram

As shown in the burner pipes system, when the main gas pipe intake valve is opened, the gas passes through the filter before reaching the main valve 1. At this time, the main valve 1 and the main valve 2 remain normally closed. When the burner starts up, the system first carries out the self inspection of gas pressure, gas train leakage detection, butterfly valve actuator, After self-inspection, butterfly valve returns to the initial position to prepare for ignition; while self-inspection, the fan blows down for a period of time to blows away the

possible oil and gas in the drum. In the end of blowing process, the speed of the blowing changes to the initial ignition speed to prepare ignition.

At the beginning of ignition, the main valve 1 opens, and the gas enters the middle position between the main valve 1 and the main valve 2. At this time, the gas ignition valve and the safety valve are opened, and the ignition gas enters the ignition gun. At the same time, the ignition transformer electrifies the high-voltage electrodes in the ignition gun to generate electric sparks to ignite the gas. The system confirms that the ignition gun flame is normal and the main valve 2 will be opened, the gas enters the gas nozzle through the butterfly valve and be ejected to meet the flame of the igniter to be mixed and ignited to set up the main flame.

When the main flame is set up, the ignition transformer, gas safety valve and ignition valve are closed at the same time. At this time, the system checks again whether the main flame is set up normally. If normal, the system enters the loading period and turns the throttle to the preset load for combustion. During this period, the operation of increasing or decreasing flame can be carried out according to the instructions. At the same time, the process of flame inspection and gas pressure inspection will be carried out. Once abnormal is found, the system automatically enters shutdown operation.

When press the STOP button, the system immediately enters the shutdown procedure. At this time, the main valve 1 and main valve2 are first closed, and the flame will extinguish when the gas nozzle is not supplied with follow-up gas. When the flame is extinguished, the fan starts to blow away the residual gas in the dryer drum according to the set blowing frequency and time, and then the system will automatically reset to the initial standby state after the blowing is completed

## V、 Burner Operation Interface Introduction

### 1、 Main Control Interface Introduction

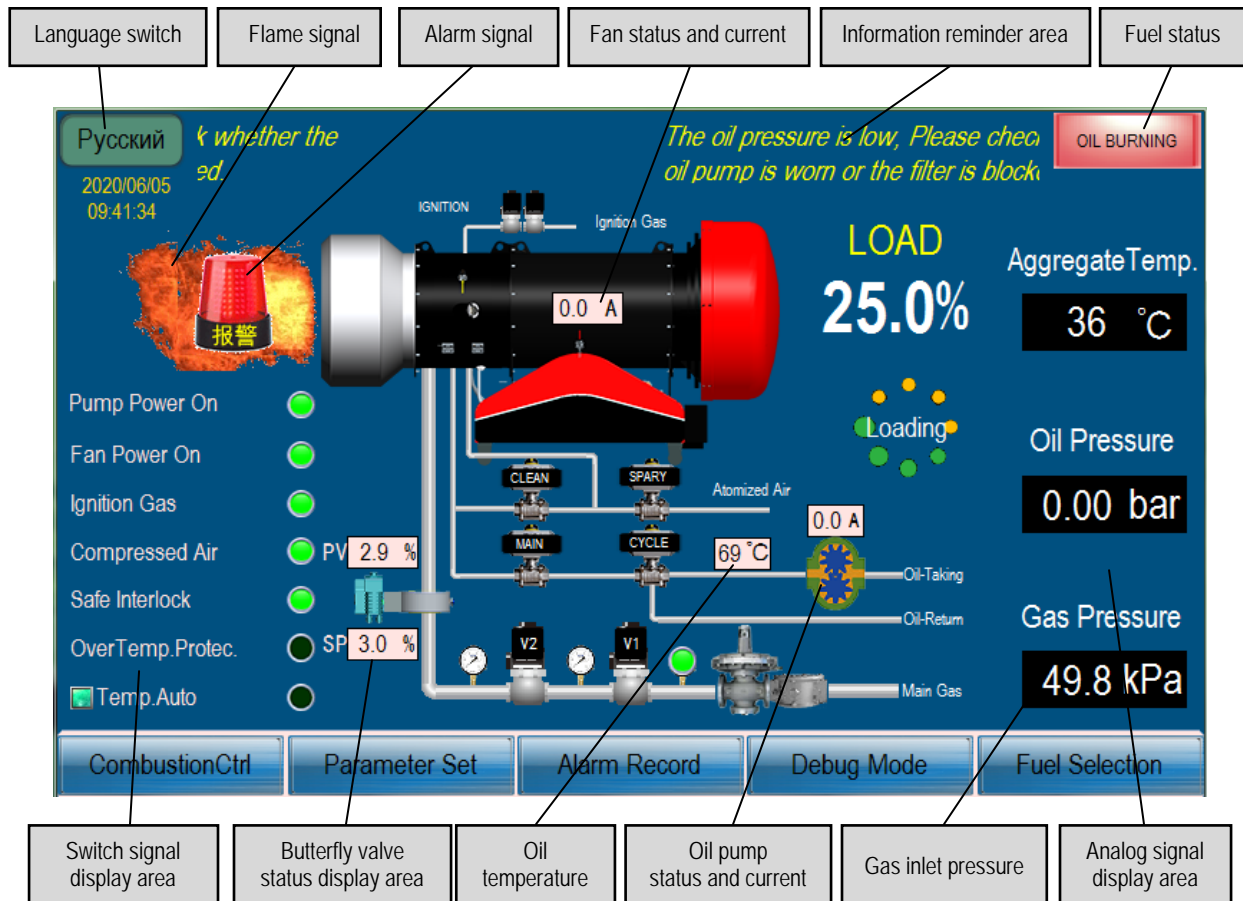


Diagram 7: Main Control Interface

Main interface as diagram7, there are 5 menu buttons on the bottom of the screen: combustion Ctrl, Parameter Set, Alarm Record, Debug Mode, Fuel Selection.

On the left side of the screen is switch signal display area, it will display "over temp protection""pump power on""fan power on""ignition gas""compressed air""safe interlock""Temp. Auto" switching value state.

On the right side of the switch signal display area is the butterfly valve state display area, which can display the power supply state of the butterfly valve, the setting value of the opening of the butterfly valve (SP), and the feedback value of the opening of the butterfly

valve (PV).

On the right side of the screen is the analog signal display area, showing the current values of "aggregate temp", "oil pressure" and "gas nozzle pressure" signals. The "fan current" and "oil pump current" will be displayed in the corresponding pattern.

The middle area of the screen shows the state of the burner main body, which can dynamically reflect the current situation of each component. Among them, "flame signal", "high-volt ignition", "fan starting" and "loading symbol" are not displayed at ordinary time, They are only displayed after triggered. When the action of each valve is triggered, the corresponding pattern will be displayed in Green Square, and the corresponding pipeline will display the flow state and direction dynamically. The pipeline is yellow dynamically indicated as oil and gas, and the pipeline is blue dynamically indicated as compressed air. There are three pressure gauge patterns on the main gas pipeline, which represent the corresponding pressure switches. When the pressure switch detects the pressure signal, the corresponding pressure gauge pattern will turn to be a green indicator lamp.

Information Reminding Area on the top of the screen is not displayed at ordinary time. When the system makes a warning signal, the Yellow Italic script message will be scrolled in this area. The information in this area will not control the burner action, but will remind the operator to pay attention.

When the burner fails and affects the normal operation, the flashing alarm lamp pattern will be displayed in the flame area, and the relevant extinguishing action will be automatically performed. At that time, you can click the "alarm record" to see the cause of the failure and remove the trouble according to the prompt.

There is a Chinese-English switch button on the upper left of the interface. When the

Chinese interface is displayed, click "English" will switch to the English interface; when the English interface is displayed, click "中文" will switch to the Chinese interface.

## 2、 Fuel Selection

On the upper right side of the main interface, it shows the current fuel state which was selected. Before the burner operation, it is necessary to confirm the fuel is "oil" or "gas" in the current burner, and the corresponding fuel pipeline valve is open while the other fuel pipeline valve should be closed. If you need to change fuel, you first need to confirm that the system is shut down and that all components are in reset state.

**Warning:** fuel switch operation cannot be made during burner operation, otherwise serious consequences may occur.

After confirming the fuel type in the pipeline, it is necessary to further confirm whether the control system has chosen the same fuel type, which can be confirmed by the fuel state display at the upper right of the main interface. If it is not correct, you need to change the burning system. Click the "fuel selection" button at the bottom right of the screen, the system will pop up a fuel switching interface and remind you of the safe operation (as shown in the diagram 8). In the fuel switching interface, the button needs to be pressed and held for more than one second to complete the switching action, and the corresponding fuel state will change after the action is completed. (Oil is in red color, gas is in yellow color)





Diagram 8: Fuel Switch Interface

### 3、 Combustion Control Interface Description

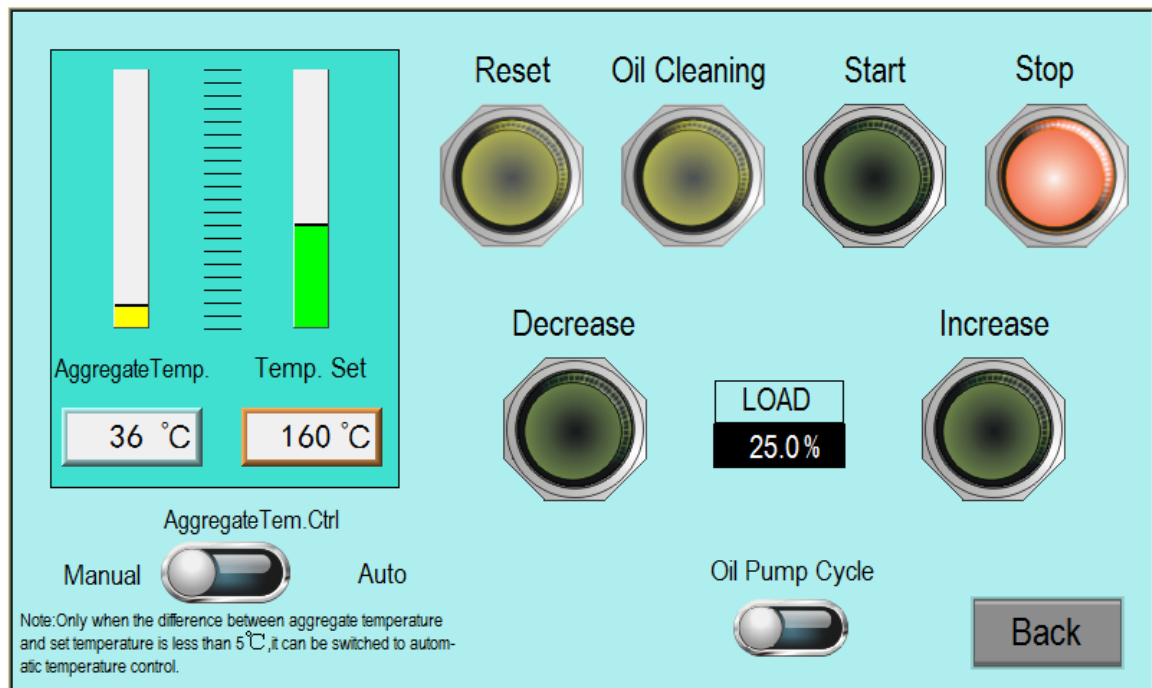


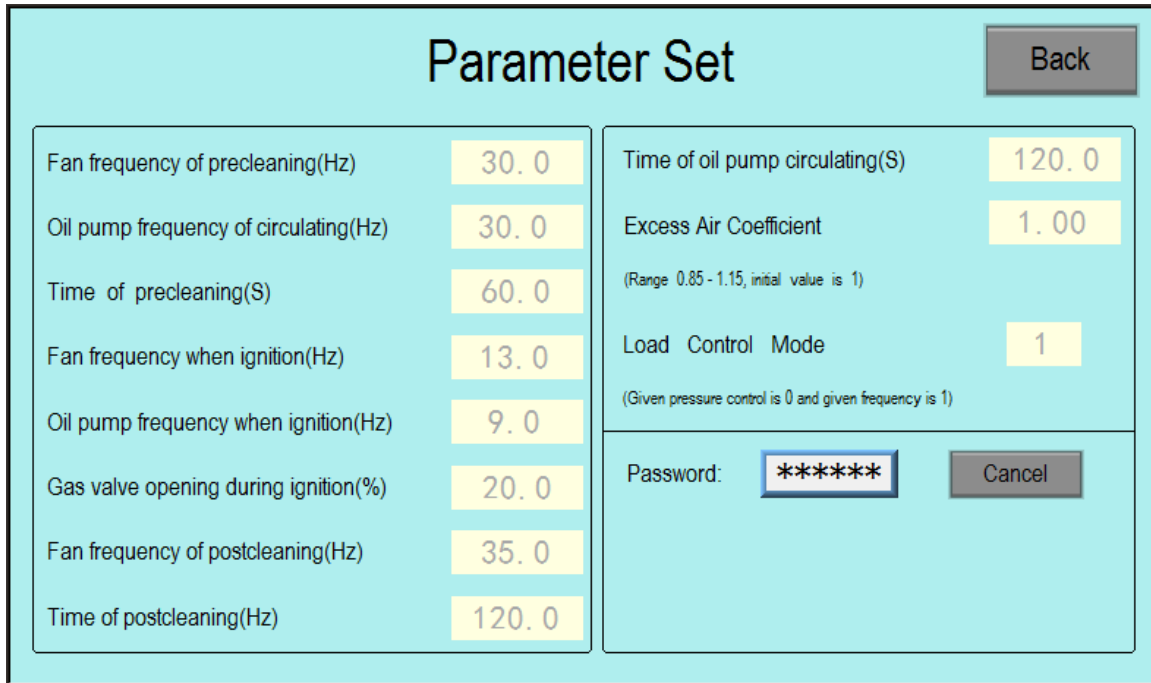
Diagram 9: Combustion Control Interface

In the main interface, click the "combustion ctrl" button in the lower left corner of the interface that pops up the interface shown in diagram 9. In this interface you can complete the burner starting, stopping, increasing, decreasing, reset, oil pipe cleaning, oil pump cycle and other common combustion control action, but also can set aggregate automatic temperature control function, most of the buttons have physical objects. Among them, the function of "oil cleaning" button is to open atomizing valve and cleaning valve separately to clean the pipeline and spray gun; the function of "oil pump cycle" button is to open the oil pump separately before ignition, and fully preheat the oil in the pipeline and filter buffer tank, which can shorten the heating time of the oil and improve the ignition efficiency. When the "oil pump cycle" button is opened, if you do not close it, it will run for 300 seconds and then close itself (the pump circulation time can be adjusted at the parameter set interface, default is 300 seconds, the adjustment range is 20-900).

After clicking "Temp.Set" and "Load" numeric box in the interface, the numeric keyboard will pop up to input the settings. In the interface, "aggregate temp ctrl" can adjust the aggregate temperature by PID during the normal operation of the drying drum. Only when the difference between aggregate temperature and set temperature is less than 5°C, it can be switched to automatic temperature control. Otherwise, the system will not switch and display prompt information at the top of the main interface. Once the aggregate temperature control is set to the automatic state, the system will automatically increase and decrease the fire according to the aggregate temperature, and automatically revise the control coefficient to the optimal value. After the stopping of burner, it will automatically reset to manual temperature control.

**Notes** : "oil cleaning" and "oil pump cycle" button touch time needs to be maintained for more than 0.5 seconds before it can be activated.

#### 4、Parameter Set Interface Description



The diagram shows a 'Parameter Set' interface with a light blue background. At the top right is a 'Back' button. The interface is divided into two main sections. The left section contains a list of parameters, each with a label and a value in a yellow box: Fan frequency of precleaning(Hz) 30.0, Oil pump frequency of circulating(Hz) 30.0, Time of precleaning(S) 60.0, Fan frequency when ignition(Hz) 13.0, Oil pump frequency when ignition(Hz) 9.0, Gas valve opening during ignition(%) 20.0, Fan frequency of postcleaning(Hz) 35.0, and Time of postcleaning(Hz) 120.0. The right section contains 'Time of oil pump circulating(S)' 120.0, 'Excess Air Coefficient' 1.00 (with a range note: (Range 0.85 - 1.15, initial value is 1)), and 'Load Control Mode' 1 (with a note: (Given pressure control is 0 and given frequency is 1)). At the bottom right is a 'Password:' field with a masked input '\*\*\*\*\*' and a 'Cancel' button.

Parameter	Value
Fan frequency of precleaning(Hz)	30.0
Oil pump frequency of circulating(Hz)	30.0
Time of precleaning(S)	60.0
Fan frequency when ignition(Hz)	13.0
Oil pump frequency when ignition(Hz)	9.0
Gas valve opening during ignition(%)	20.0
Fan frequency of postcleaning(Hz)	35.0
Time of postcleaning(Hz)	120.0
Time of oil pump circulating(S)	120.0
Excess Air Coefficient	1.00
(Range 0.85 - 1.15, initial value is 1)	
Load Control Mode	1
(Given pressure control is 0 and given frequency is 1)	

Password: \*\*\*\*\* Cancel

Diagram 10: Parameter Set Interface

In the main interface, click the "parameter set" button at the bottom of the button that pops up the interface of diagram 10, in which you can modify the burner control parameters, The initial state of the various parameter bar numbers are displayed in gray color, at this time you cannot modify the parameters, you need to enter the correct password then these fonts will turn into black color so that you can to modify the parameters, Each parameter has a limited range, and only the numbers in the input range are valid. Each time when a password is entered, the system automatically gives 30 seconds to modify the parameters. If it exceeds, the system automatically saves the modified parameters and logs out the password. If it continues to modify, it needs to re-enter the password.

## 5、Alarm Record Interface Description

Alarm Record			
S/N	Date	Time	Fault information, reason and solution
5	20/06/05	09:43:44	Can not detect the flame during burner normal working,some reasons: 1.Flame detecting system fault 2.the smoke positive pressure inside the drum recoils and extinguished the flame 3.Water or air comes in
4	20/06/05	09:43:44	The oil pressure is low, Please check whether the oil pump is worn or the filter is blocked.
3	20/06/05	09:35:46	The oil pressure is low, Please check whether the oil pump is worn or the filter is blocked.
2	20/06/05	09:30:42	Не обнаружено пламя при нормальной работе горелки
1	20/06/05	08:09:14	燃烧器正常工作中检测不到火焰，可能有以下原因：

Diagram 11: Alarm Record interface

Click on the "alarm record" button at the bottom of the main interface, it will pop up the interface of diagram 11. This interface will record all the fault records and prompt information of the burner. The operator can find out the time and reason of the fault by inquiring the interface and guide the operator to make troubleshooting. The record will be saved for 7 days for later inquiry.

## VI、 Burner Adjustment

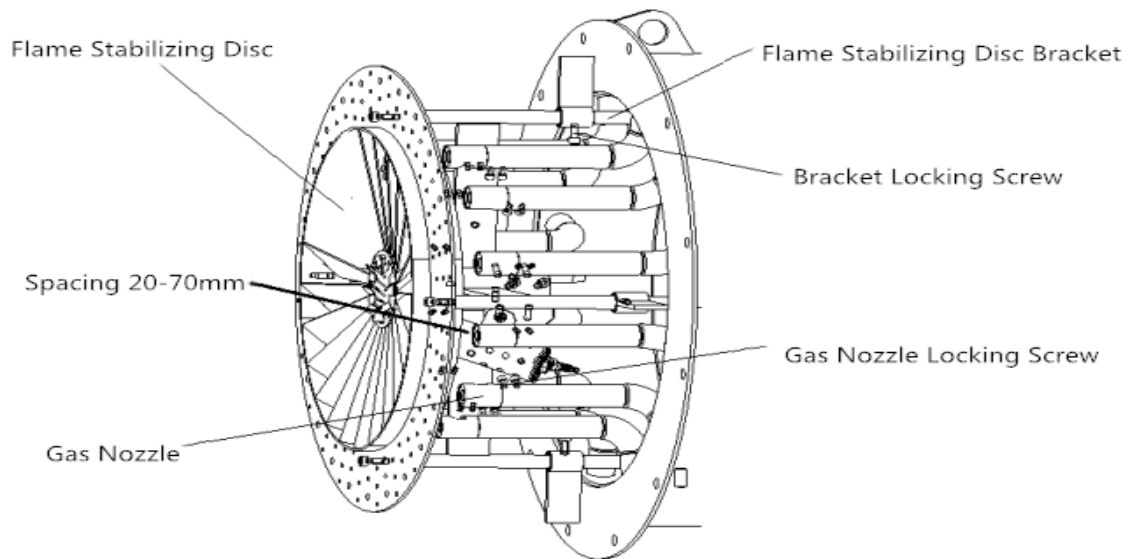


Diagram 12: Flame Stabilizing Disc Adjustment

### 1、 Flame Stabilizing Disc Adjustment

The initial adjustment of the flame stabilizing disc can control the distance between the two brackets as shown in diagram 12 to be about 30-60 mm. After the position is determined, the fixed screw of the flame stabilizing disc can be tightened. When the disc is tightened, it should be tightened along the circumference respectively. The best position is that the flame tube is in the coaxial position along the outer edge of the flame stabilizing disc. Flame stabilizing disc position adjustment can affect flame shape, if it is near fan position, the flame will be short and thick, on the contrary, the flame will become long and thin.

### 2、 Adjustment of the Spray Gun

When the spray gun is installed, the initial adjustment position is the head of the spray gun exceeds the front of the flame stabilizing disc by 10-20 mm. After confirming the position, the spray gun is fixed with the fixing screw and then the corresponding pipeline is connected

after the fixing.

### 3、Adjustment of Photoelectric Tube

The installation position of the photoelectric tube is located near the flame stabilizing disc at the initial stage. After installation, the photoelectric tube's light receiving surface is facing forward and it is best to pass through the hole on flame stabilizing disc, after the adjustment, fasten screws.

### 4、Adjustment of Ignition Gun

There are two types of pilot gas ignition guns (see diagram 13 and diagram 14 respectively), the functions of the two are the same. There are two aspects to adjust the ignition gun. First check and adjust the electrode gap of the spark plug or the porcelain rod high voltage electrode .The minimum distance between the electrodes of the front end of the spark plug is 3-5mm. The spark plug should be of burner-specific type.

After adjusting the gap between the electrodes, the position of the ignition gun should be adjusted. The position of the ignition gun nozzle should be directed towards the nuzzle lower circle gap. After adjusting, the relevant screws should be locked to prevent loosening.

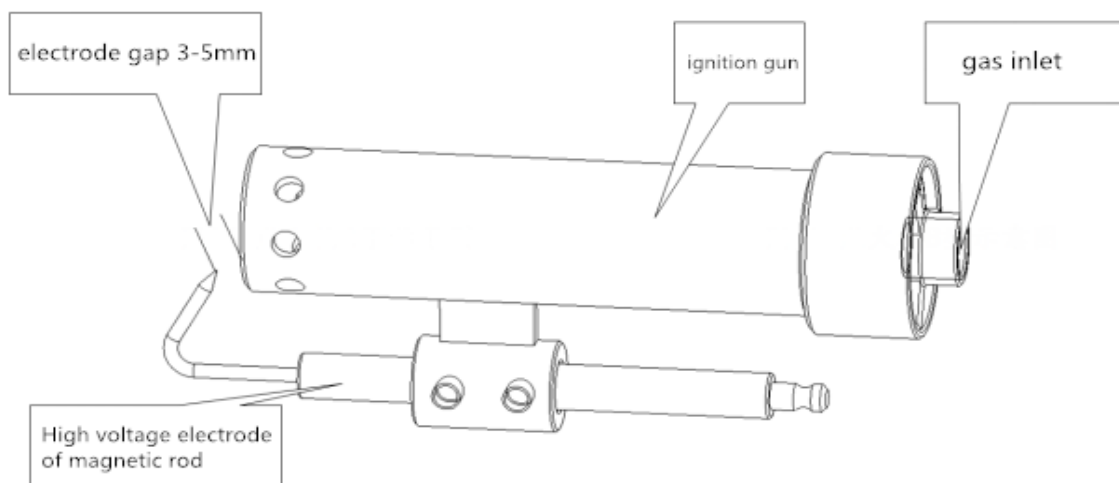


Diagram 13: A Type Ignition Gun Diagram

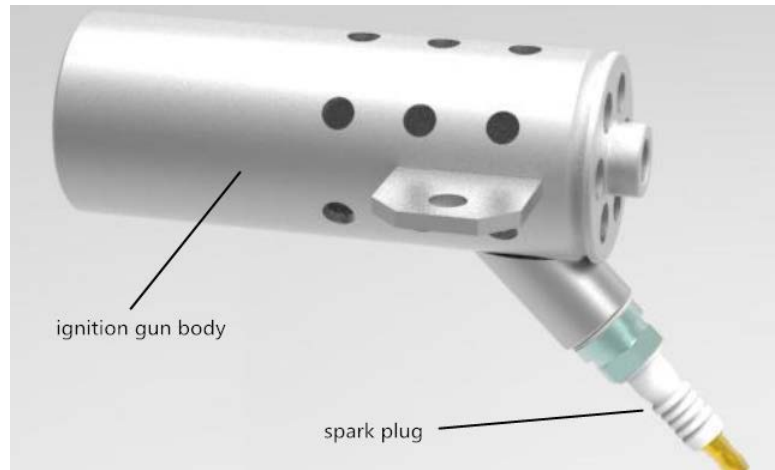


Diagram 14: B Type Ignition Gun Diagram

## 5. Gas Nozzle Adjustment

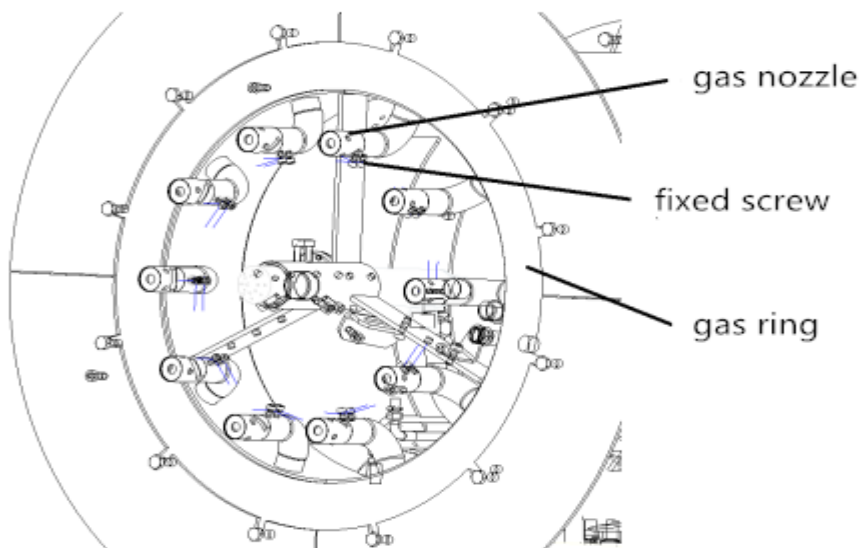


Diagram 15: Gas Nozzles Distribution

The adjustment of the gas nozzle is simple, it is better to remove the flame stabilizing disc, and then adjust the gas nozzle. When adjusting, loose the fixed screw of the gas nozzle rotates the inclined direction of the gas nozzle, make the outlet move towards the center direction and then fix it. When adjusting, pay attention to the direction of each gas nozzle, they should be uniform. After adjusting, install the flame stabilizing disc back to its original

position

## VII、Burner Installation

1、The burner is easy and simple to install. After the platform is in place and the relative position between the burner platform and the drying drum is determined, the burner main body is hoisted onto the platform track. Re-determine the relevant dimensions of the platform track and the drying drum discharge outlet push the burner main body into the discharge outlet opening. Pay attention to push it in place and properly pad or move the platform, It is the best that make the burner flame tube and the guiding tube of discharge outlet coaxial. Finally, lock the burner rail with locking device, see the diagram 16

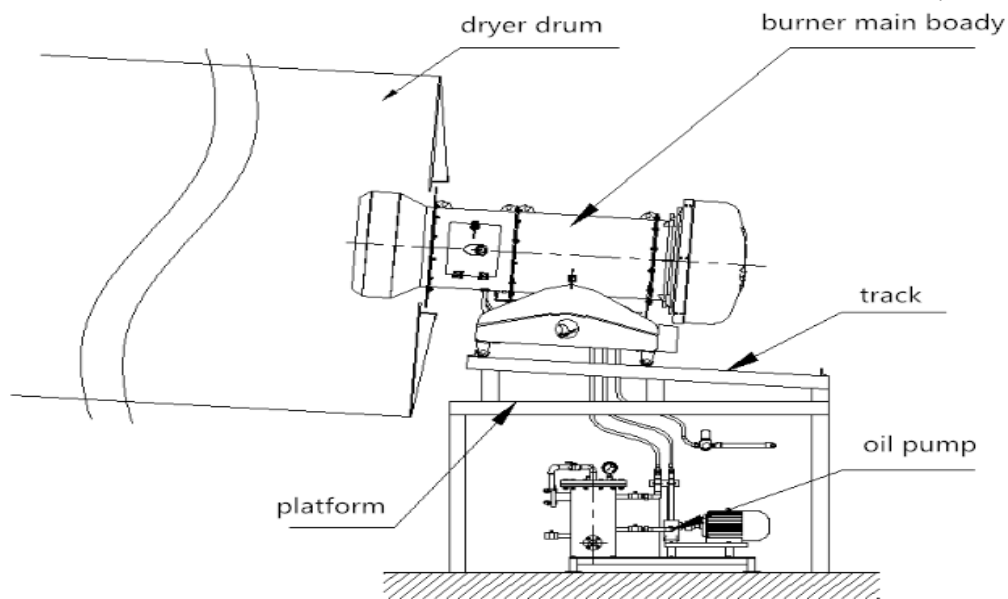


Diagram 16: Burner Installation

2. Place the oil pump under the burner platform and connect the relevant heavy oil, diesel and heat conduction oil pipelines according to the pre-designed pipeline system diagram
3. According to the cable configuration of the oil burner to lay the cable, the length of the



cable depends on the site installation.

4. The fuel supply pressure in the fuel tank to the oil burner should range from 0 to 0.3kg/cm<sup>2</sup>. If the fuel is heavy oil, the user needs to heat the oil temperature to about 80-90 °C (a small part of heavy oil needs to be maintained at 50-60 °C, and the excess temperature is easy to produce bubbles. The heating temperature should be determined according to the actual situation, It is better that the fuel is easy to flow and does not produce bubbles. In principle, the temperature is better to be high not low)

5、 The metal hose is used to connect the main body of the burner with the oil pump assembly unit. If the metal hose is not long enough, a steel pipe should be added on the oil system of the burner. After the connection, please confirm it is leak-free, and then use attached electric tracing hot wire to wrap on the connecting pipe to ensure that there is no heating dead angle. At the same time, use aluminum tape and adhesive tape to tightly track the heating cable and the tubing, and each meter of the tube is not less than 3 meters of electric heating cable. It is suggested to wrap the rubber-plastic foam insulation hose to get better effect.

6、 Compressed air is needed for combustion operation and system control of the burner. The pressure of air supply should be greater than 0.65 MPa and the air supply should meet the burner operating conditions. There is a pressure reducing valve at the end of the burner where the nozzle of the burner enters the burner, which needs to be adjusted to 0.5 MPa in advance.

**Notes:** When adjusting the pressure, the valve should be kept in a continuous air consuming state; otherwise it can cause the inaccuracy of pressure adjustment

7. The connection of the gas burner needs to be connected with the attached

metal hose at the intake of the burner, and then connect the gas pipeline terminal pipeline at the user site. The pipeline terminal must have a valve. When the gas is not used, the gas pipeline terminal valve should be closed.

8. The pilot ignition gas of burner should be natural gas or acetylene, connect the acetylene pipeline to the ignition gas inlet of burner body, seal the interface and prevent leakage. The acetylene and relevant connection pipelines are provided by the user. Pressure of acetylene should be between 0.02 MPa and 0.06 MPa (according to the type of gas and the size of flame, it is set when site debugging, the first debugging proposal pressure is set at 0.05 MPa). Gas is used only at the initial stage of burner start-up. After the ignition and the burner running normally, close the gas main valve, and open again before the next start-up.

9. After all the parts of the burner are in place; all the parts are connected by the cables.

When connecting, the types of cables should be distinguished. In principle, special cables should be used for sensor cable and the cable shield layer should be grounded reliably. The specific installation circuit diagram can be referred in the attached drawings.

## VIII、 Burner Debugging

**Caution:** The debugging of burner needs strong professional knowledge, which can only be done after burner debugging training. Otherwise, it will bring certain risks.

Before commissioning, it is necessary to check whether the burner components are damaged, whether the connecting parts are tightened, whether the pipeline is leaked by air pressure monitoring in advance, whether the connecting cable joints are connected correctly and reliably. Remove the sundries (especially the sundries left in the fan housing) which affects the normal operation of the burner on site and equipment. After the checking, if all is

correct, the system can be powered on, and the power of the control cabinet can be switched on to debug the burner

## 1、 System is Powered on Operation

Turn on the main switch and air compressor

Turn on the power of burner fan

Turn on the power of oil pump

Turn on the power of electric heat tracing wire

Turn on the power of burner control

**Notes:** turn on power and make pre-heating more than 20 minutes ahead of time to ensure that the valve and pipelines are fully heated.

2、 Turn on the power and after the system completes self inspection, it enters the main interface (see diagram 17)

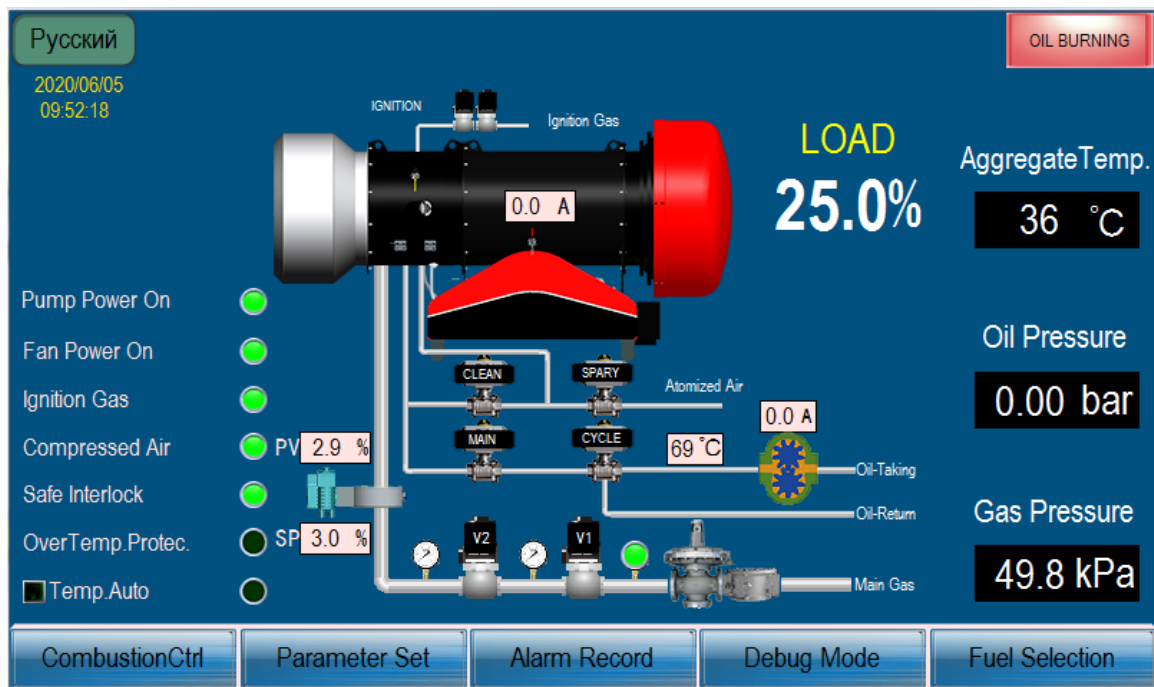


Diagram 17: Burner Main Interface

After entering the burner main interface, check whether the aggregate temperature, oil temperature, oil pressure, oil pump current, fan current analog signal are normal or not, if not normal, please check the circuit and sensor.

**Notes:** sometimes there are occasional "\*" flashes in the signal window, which is a normal phenomenon.

Check the left switch signal lamps, under normal condition, the pump power on, fan power on, ignition gas, compressed air and safe interlock lamps should be on, indicating that it meets the ignition start-up requirements.

During gas debugging, the signals of "pump power on" and "compressed air " are not used as ignition starting conditions. However, the pressure signal lamp at the main gas intake end should be turned on, and the gas butterfly valve should be power on (light on the butterfly valve pattern), otherwise it will affect the debugging of the gas section.

**Notes:** The temp auto-control lamp can only be turned on when it meets the automatic temperature control requirements( aggregate actual temperature and set temperature have the difference within 5°C) .The right lamp is turned on when it is under the automatic temperature control status. The over temp protection lamp can only be turned on when the asphalt plant gives the signal.

### 3、Enter The Manual Debugging Interface

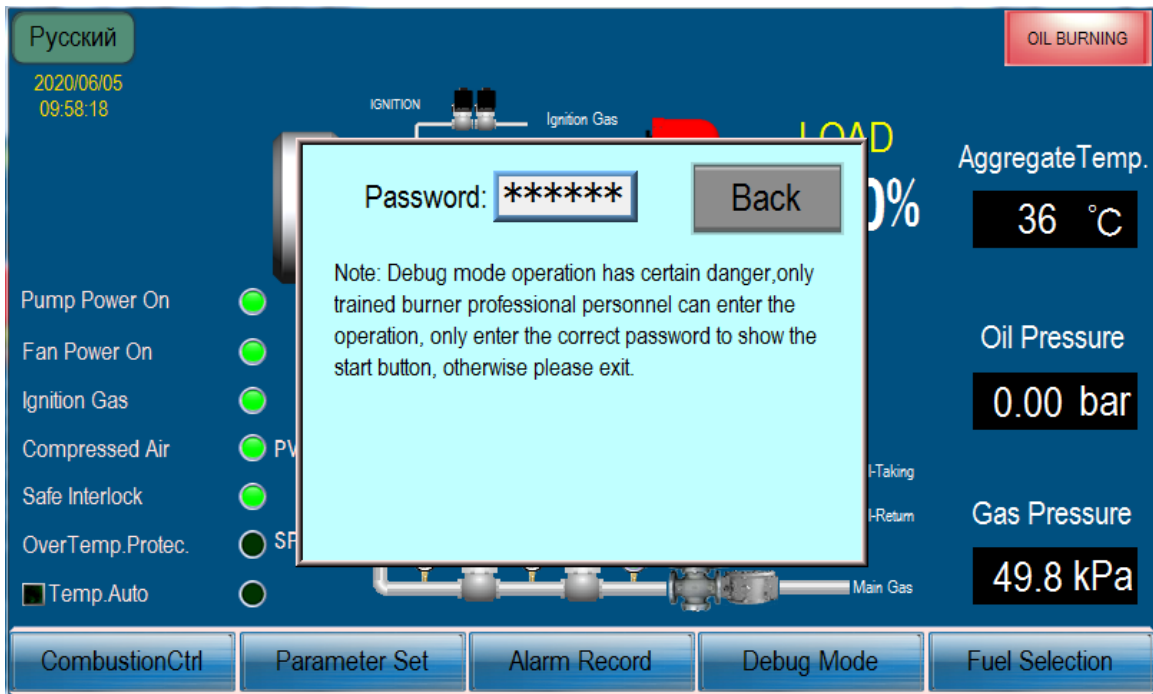


Diagram 18: Enter Debug Mode Security Question and Password Input Dialog Box

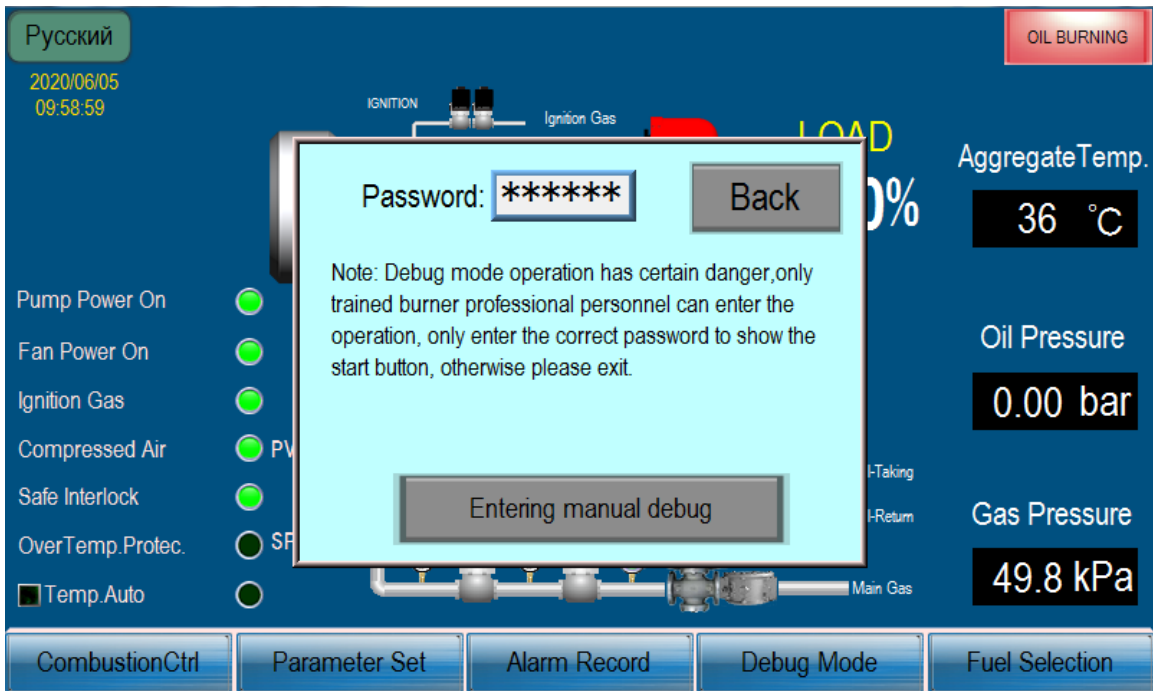


Diagram 19: Indicating Entering Manual Debug Mode Button

To enter the manual debug mode, you first need to enter the debug mode, click the debug mode button in the lower right corner of the main interface, pop up the security question and password input dialog box (diagram 18), click the password box and pops up the password input keyboard, Enter the correct debug password and it will enter the manual debug mode (diagram 19), continue to click the button to enter debug interface (diagram 20)

On the manual debugging interface, the left area is the status indicator, the pressure and the negative pressure display, showing the on-off status of each part, the right area of the interface is the control button, which can manually control the on-off action of each executive device, and the middle upper area is the current display and operating frequency of the fan and the oil pump. Click on the frequency display box to input respective operating frequency, The oil pump motor has clockwise rotation and counter-clockwise rotation debug buttons, In the middle lower area is the position status window of the gas butterfly valve. Clicking on the display box of the given valve position can give the input value of the given valve position. The button in the lower right corner is the button switch to operation mode. After switching, you can make combustion increasing or decreasing adjustment

**Warning:** It is not allowed to change fuel mode during burner running, otherwise serious consequences may occur.

On the right, the control button area is manual switches for each valve. The upper right corner shows either "oil burning" or "gas burning", indicating that the burner is under one mode, the combustion mode switching will be completed by holding the button for more than 0.5 seconds. Under the oil burning mode, "Up.GasValve" and "Down.GasValve" cannot be operated, while in the gas mode, "SPRAY", "MAIL" and "CLEAN" cannot be operated.

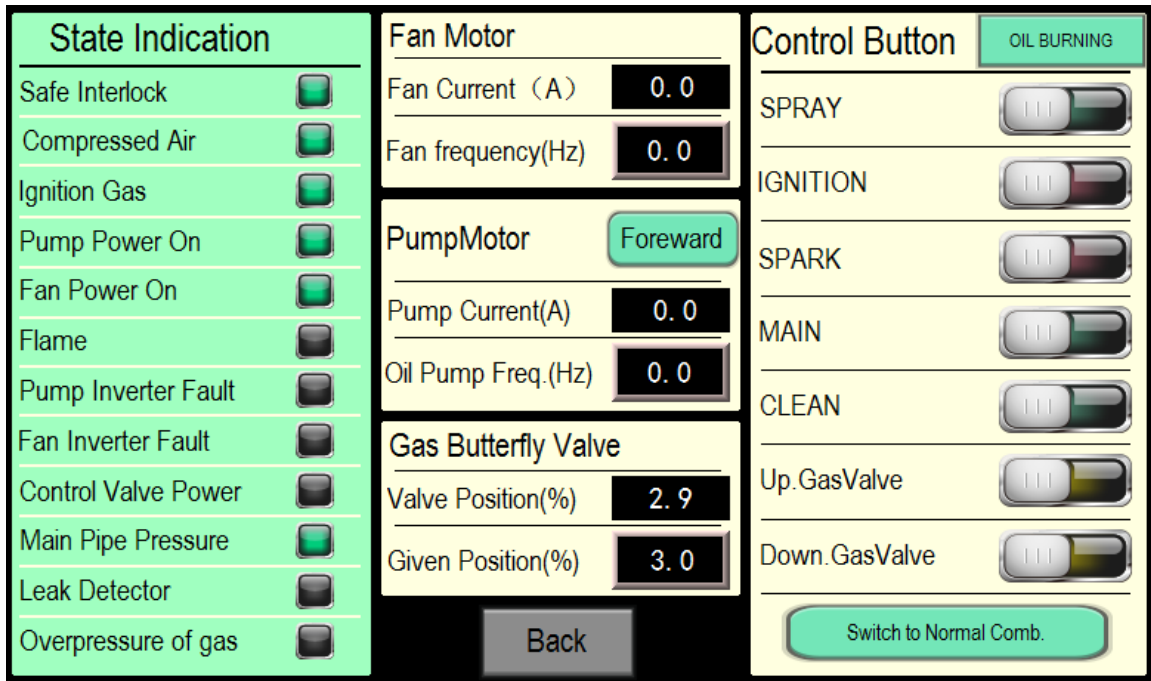


Diagram 20: Manual Debug Interface

**Notes:** clockwise (counter-clockwise)rotation and Switch buttons touching time should be kept over 0.5 seconds so that it can be switched, but the Switch also needs to meet the requirements: manual ignition successful and main flame burning over 20 seconds, then it can be switched.

#### 4. Burner Control Button Manual Debugging

Firstly, switch the fuel to oil burning mode in the main interface, open the valve on the compressed air pipeline to let the compressed air enter the burner, then open the control power on the burner control cabinet to check the opening and closing state of the valves on the pipeline; After turning power on, the valves (MAIN, CLEAN, SPRAY) should be in the initial closing state; If the opening and closing state of the valves do not conform to the above status after turning power on, the pipelines and system should be checked again to keep the

initial state of the valve closed.

Turn on the pilot ignition gas supply valve and adjust the gas supply pressure to 0.02-0.05MPa

Check whether the state indicators are consistent with the physical, for example: when compressed air pressure is normal, compressed air pressure indicator lights; when the flame signal is normal (can use lighter flame to test), the flame signal lights. If not, fix the breakdown in time. Before starting the manual operation, make sure that the five indicating lights are on: safe interlocked, compressed air, ignition gas, pump power and fan power on

Start Entering Manual Debug Mode.

- Click on the SPARK button to see if the ignition relay in the control cabinet works and if the ignition device on the spot has an electric spark
- Check whether pilot ignition gas pressure is normal and whether the valve leaks. Confirm the pilot ignition gas supplying condition and the sealing of the pipeline. .
- Click on the CLEAN button to see if valve action is normal. Click on the SPRAY button to see whether the valve is working normally. Confirm the sealing property of the atomizing medium (compressed air) pipeline to see if there is any leakage. Shut down after examination. Click on the MAIN button and to observe whether the valve action is identical
- 

**Notes:** The time of continuous power-on should not exceed 20 seconds during electric spark debugging. Wait for more than one minute after each power-on before the next power-on debugging. Otherwise, the high voltage ignition coil will be damaged easily.

When debugging gas combustion mode for the first time, the main gas intake valve should be closed, enter the main interface, click on fuel selection to switch to gas burning



mode, and then enter the debug mode window. Check the status of gas-related components. At this time, "Up.GasValve" and "Down.GasValve" should be closed. The "butterfly valve power indicator should be on. At this time, the gas pressure indicator which is located on gas intake end should not be turned on. Click on the switch of "Up.GasValve" and "Down.GasValve" respectively to see if the actual action of the gas valve on site is consistent. Check whether the feedback value of the gas butterfly valve position is not much different from the given value (deviation should be less than 1%), re-enter the given value and observe whether the feedback value of the valve position can be tracked to the given value (deviation is less than 1%). If it is abnormal, please first eliminate the problem, then the next step can be operated.

**Warning:** The above gas components must be checked and debugged properly before the actual gas supplying, otherwise serious consequences may be caused. When debugging gas for the first time, the induced draft fan must be turned on to keep the dryer drum in a well ventilated condition.

Open the main gas intake valve and let the main gas enter the burner. At this time, the gas pressure indicator should be turned on. Use soap water to check whether there is leakage in all parts of gas pipeline and if there is leakage, check and eliminate the problem.

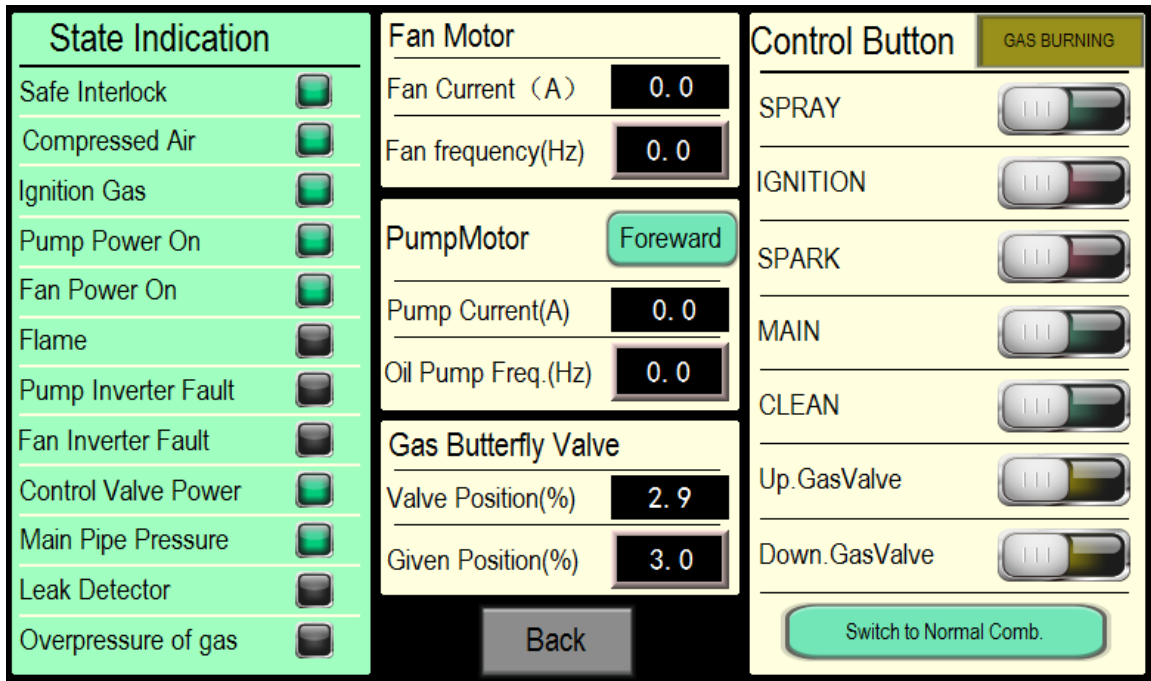


Diagram 21: Manual Debug Interface Under Gas Mode

Open the downstream gas valve for 3 seconds and then close it and wait for 20 seconds. At this time, the indicator light of the gas leakage detection switch should not be turned on. If the leakage detection switch light is turned on, it indicates that the upstream gas valve leaks, it needs to be checked and eliminated. Open the upstream gas valve for 3 seconds and then close. At this time, the gas leakage detection switch indicator light should be on, observe and wait for 20 seconds. If the light goes out during the period, it indicates that there is leakage between the downstream gas valve or the upstream and downstream valve. If the light keeps on, it means that the upstream and downstream valves are well sealed and you can make next step debugging.

**Warning:** The leakage detection and debugging of the above gas valve train must be carried on under the condition of dryer drum well ventilated. Close the gas valve immediately after each opening to prevent excessive leakage of gas and possible danger.

## 5、 Fan and Oil Pump Debugging

Switch to oil combustion mode: Click on the fan frequency and pump frequency display box, first input 10HZ frequency in the pop-up digital keyboard , then observe the operation of the motor, if it has faults, please check wiring, observe whether the real rotation direction and demand rotation is consistent, if it reverses, please change the motor phase sequence and change the speed frequency value settings, then observe whether the frequency converter transmission is corresponding, at the same time observe the change of motor current on the main interface. (Diagram 22)

**Notes:** When do the oil pump debugging, it should be idle running for the first time, but not more than three minutes running. If fuel oil available ensures that the pipes and fuel are fully heated and the sealing condition of the fuel oil circulation must be checked first. When the frequency of the fan and the oil pump is greater than or equal to 2.5Hz, it will start automatically, On the contrary, it automatically stops.

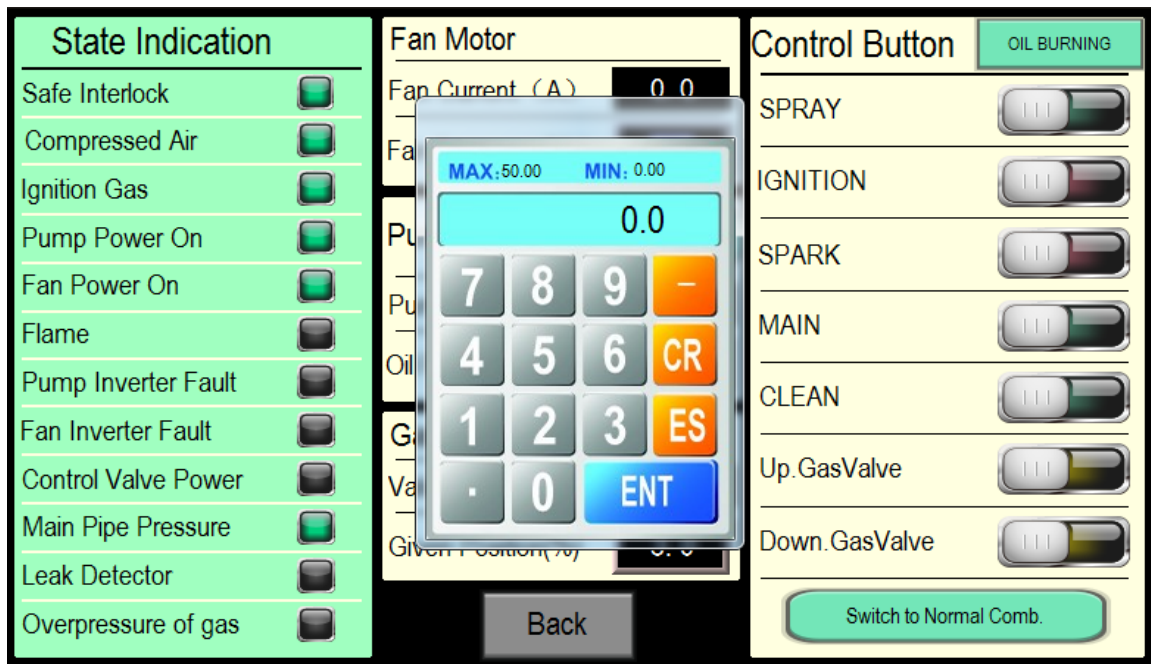


Diagram 22: Debugging of Fan and Oil Pump

## 6、Parameter Set

On the main interface window, click the bottom parameter set button to enter the parameter set interface and enter password to modify the relative parameters(see diagram12)

If you enter the authorized debug password on the parameter set interface, advanced set and air-oil ratio buttons will pop up at the lower part, you can enter the respective interfaces for more advanced parameter modifications (see diagram 23, 24, 25)

**Notes:** When you enter password to start parameters settings, you only have 30 seconds to modify it, when time out, the system will shut down the modification function

**Caution:** advanced system parameters and air-oil ratio are the key core parameters, unauthorized personnel should not change it, the parameters only used for that said machine, please backup it after debugging

Advanced parameters are set in the same way as above. Advanced parameters are more important and need to be set carefully. Otherwise, it may cause system failure

After the parameter settings are completed, close the interface and ignition operation can be carried out.

## Parameter Set

Back

<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Fan frequency of precleaning(Hz)</span> <span>30.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Oil pump frequency of circulating(Hz)</span> <span>30.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Time of precleaning(S)</span> <span>60.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Fan frequency when ignition(Hz)</span> <span>13.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Oil pump frequency when ignition(Hz)</span> <span>9.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Gas valve opening during ignition(%)</span> <span>20.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Fan frequency of postcleaning(Hz)</span> <span>35.0</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Time of postcleaning(Hz)</span> <span>120.0</span> </div> </div>	<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Time of oil pump circulating(S)</span> <span>120.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Excess Air Coefficient</span> <span>1.00</span> </div> <div style="font-size: 0.8em; margin-bottom: 5px;">(Range 0.85 - 1.15, initial value is 1)</div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Load Control Mode</span> <span>1</span> </div> <div style="font-size: 0.8em; margin-bottom: 5px;">(Given pressure control is 0 and given frequency is 1)</div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Password:</span> <div style="border: 1px solid black; padding: 2px 10px;">*****</div> <div style="border: 1px solid black; padding: 2px 10px; background-color: #cccccc;">Cancel</div> </div> <div style="text-align: center; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 5px; background-color: #cccccc; width: 100%;">Advanced Set</div> </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; background-color: #cccccc; width: 100%;">Air-fuel Ratio</div> </div> </div>
--	---

Diagram 23:Parameter Settings Interface 2

## Advanced Set

<div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Oil filling readiness time(S)</span> <span>6.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Oil pump reverse time(S)</span> <span>3.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Burning time together(S)</span> <span>7.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Pressure fluctuation alarm(bar)</span> <span>2.00</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Upper limit of inlet gas(KPa)</span> <span>60.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Lower limit of inlet gas(KPa)</span> <span>30.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Temperature control zone(%)</span> <span>60.0</span> </div> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 5px;"> <span>Temp.Ctrl integration time(S)</span> <span>8.0</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Temp.Ctrl sampling period(S)</span> <span>0.10</span> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <div style="text-align: center; font-size: 0.8em; background-color: #cccccc; padding: 2px;">Pressure anomaly Set(bar)</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; background-color: #cccccc; text-align: center;">Up Limit</th> <th style="width: 50%; background-color: #cccccc; text-align: center;">Down Limit</th> </tr> <tr> <td style="text-align: center;">1.50</td> <td style="text-align: center;">1.50</td> </tr> </table> </div> <div style="border: 1px solid black; padding: 5px;"> <div style="text-align: center; font-size: 0.8em; background-color: #008080; color: white; padding: 2px;">Frequency anomaly Set(Hz)</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; background-color: #008080; color: white; text-align: center;">Up Limit</th> <th style="width: 50%; background-color: #008080; color: white; text-align: center;">Down Limit</th> </tr> <tr> <td style="text-align: center;">5.0</td> <td style="text-align: center;">5.0</td> </tr> </table> </div> <div style="text-align: right; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px 10px; background-color: #cccccc;">Back</div> </div>	Up Limit	Down Limit	1.50	1.50	Up Limit	Down Limit	5.0	5.0
Up Limit	Down Limit								
1.50	1.50								
Up Limit	Down Limit								
5.0	5.0								

Diagram 24:Advanced Parameter Settings Interface

Air-fuel Ratio					
LOAD (%)	OIL			GAS	
	FAN(Hz)	Oil-Freq(Hz)	Oil-Press(bar)	B.V. Open(%)	FAN(Hz)
0.0	3.0	3.0	0.50	5.0	10.0
20.0	10.0	8.8	2.00	22.4	16.7
40.0	19.0	14.8	2.90	35.2	28.9
60.0	26.0	20.9	3.80	48.3	36.4
80.0	35.0	27.4	4.20	58.4	41.2
100.0	45.0	35.5	5.70	75.6	48.1

Note: The air-fuel ratio parameters can be optimized during debugging. Once set, please do not change it at will. If you need to change, please contact the engineer.

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Diagram 25: Air-fuel Ratio Settings Interface

## IX、 Oil Burning Mode Introduction

### 1、 Ignition and Operation under Oil Burning Mode

In the main interface of the burner, first check the fuel oil temperature (generally about 80 °C), adjust induced draft fan to make the drum negative pressure at about 50-100 Pa. (click the button "Increase" and "Decrease" to adjust flame opening value between 25%-30% (default value is 25% ) After confirming that the system is fault-free, click the start button and start the automatic ignition program



Diagram 26: The Indicator lampson the Left side of the Combustion Main Control Interface

**Notes:** Before starting, check that five indicator lamps on the left side should be on ,(see diameter 26), otherwise, the system will not go to the next step.

During the ignition operation, the relevant parts of the burner will act in a set order and display on the main interface, such as: fan operation, oil pump operation, fuel or compressed air flow direction in the pipeline, high-voltage ignition, valve switch and so on. If the system fails, the operator will be alerted and the relevant fault information and solutions will be prompted in the fault Bar. The system alarm is divided into two situations, one is the serious fault which will affect the burner operation, the system will display the alarm signal in the flame area and at the same time ,buzzer sounds in control cabinet,you need to click the alarm record button under the main interface to see the specific problems and solutions, it can be eliminated by pressing the reset button. The second fault is slight and does not cause serious consequences. In this case, the system sends out a reminder sound and rolls the subtitle at the top of the main interface. After the troubleshooting, subtitle will disappear automatically.

After the ignition is successful, the flame image will be displayed on the interface. When the upper space of the oil pump moving diagram appears, it shows that the system is now in normal working state, you can make flame increase and reduce operation. At this time, you can check whether the burner works according to the requirements. The above situation is shown in diagram27-32.

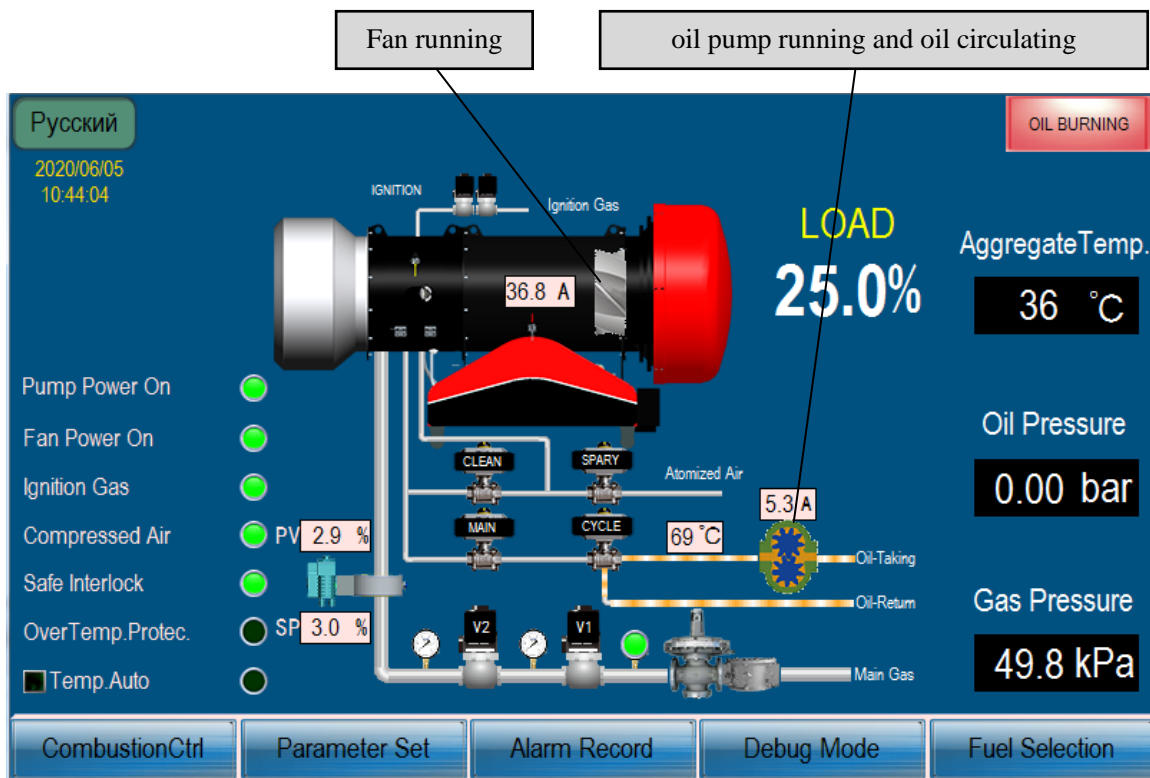


Diagram27:Interface Diagram of Self Inspection at the Beginning of System Start  
up Stage



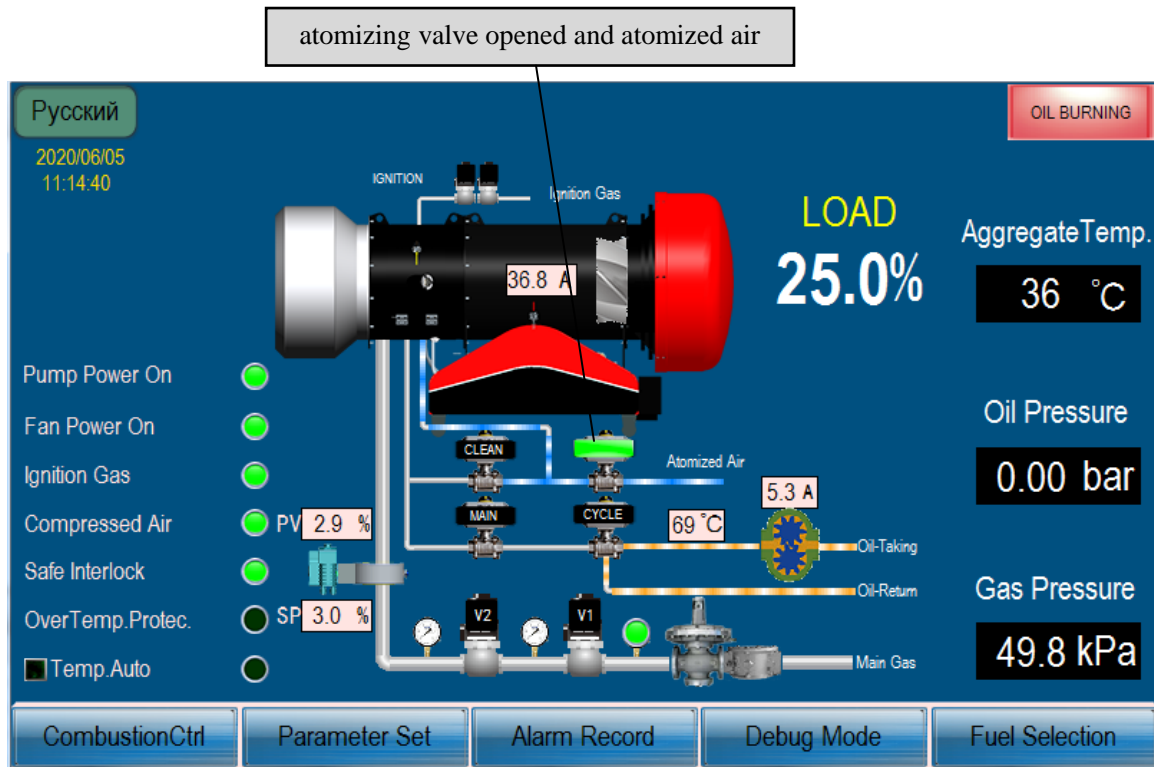


Diagram 28: Atomizing Valve Opening Stage Interface Before Ignition

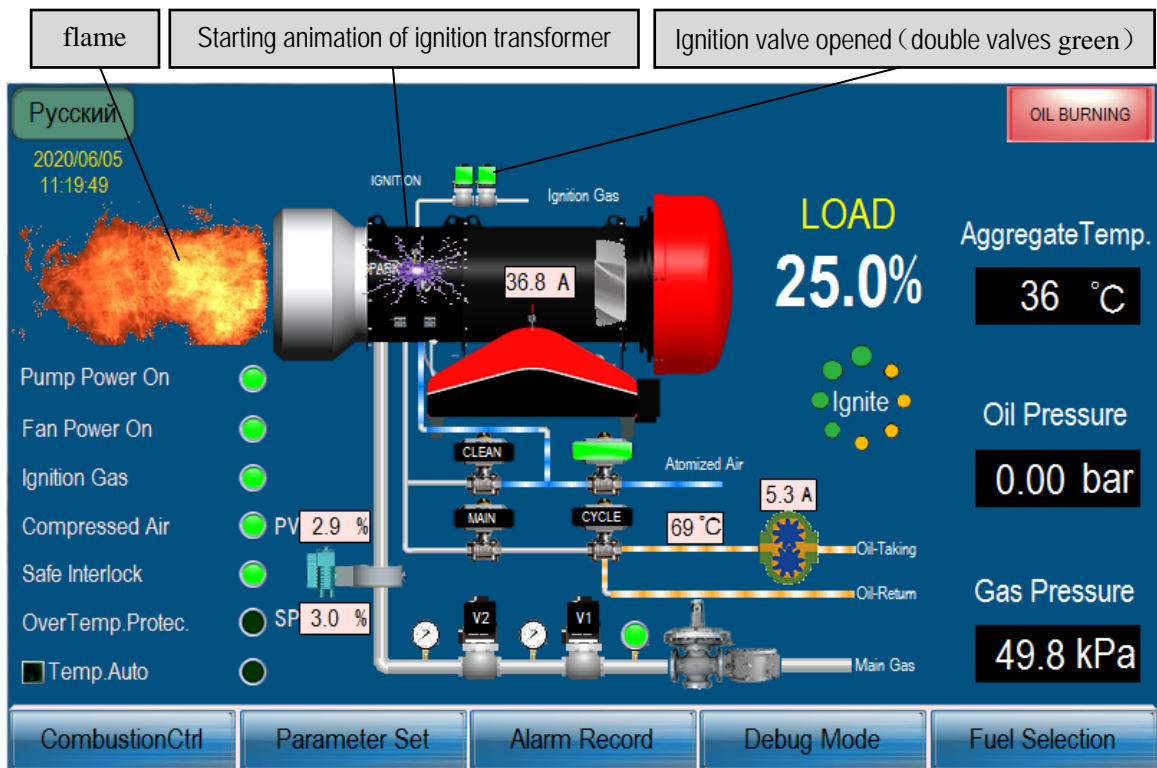
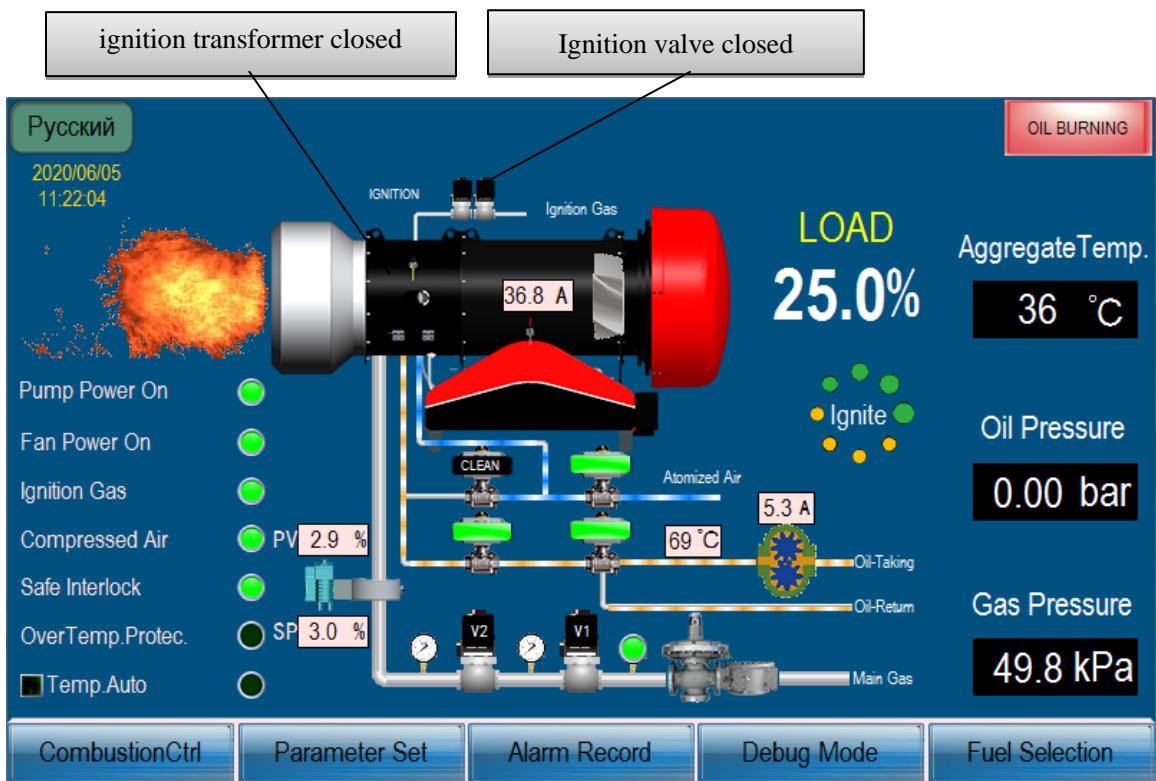
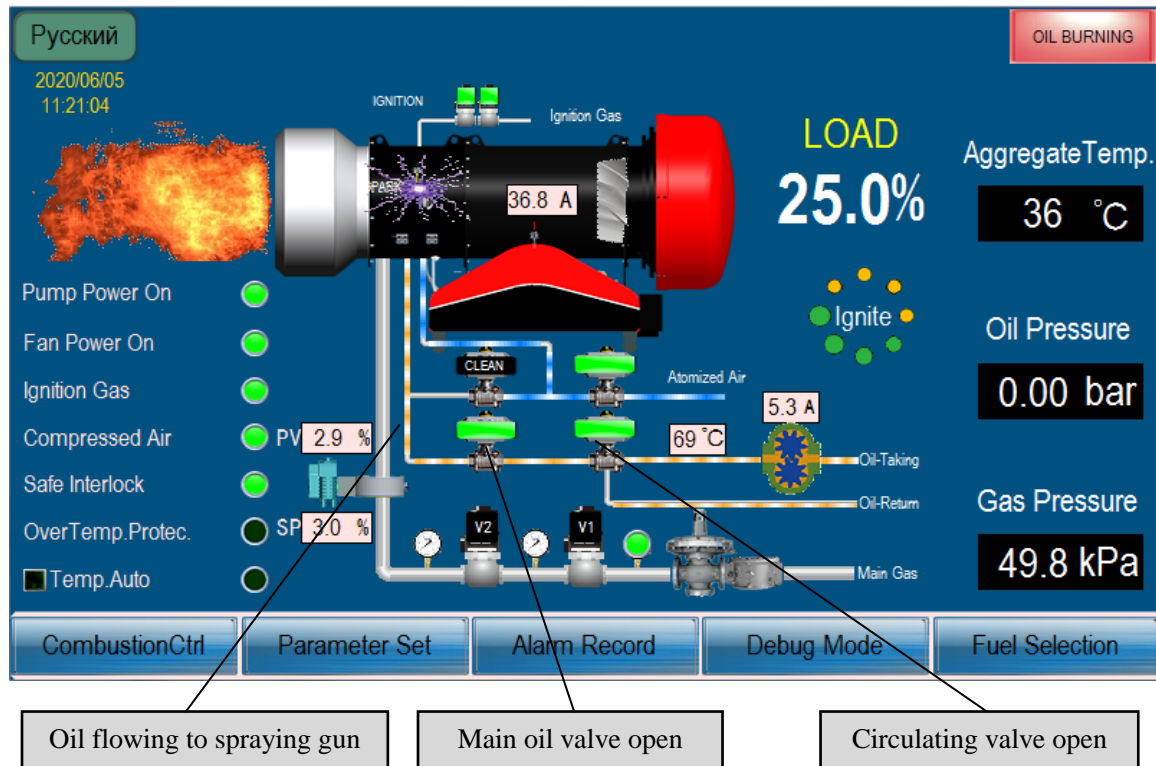


Diagram 29: Ignition Stage Interface



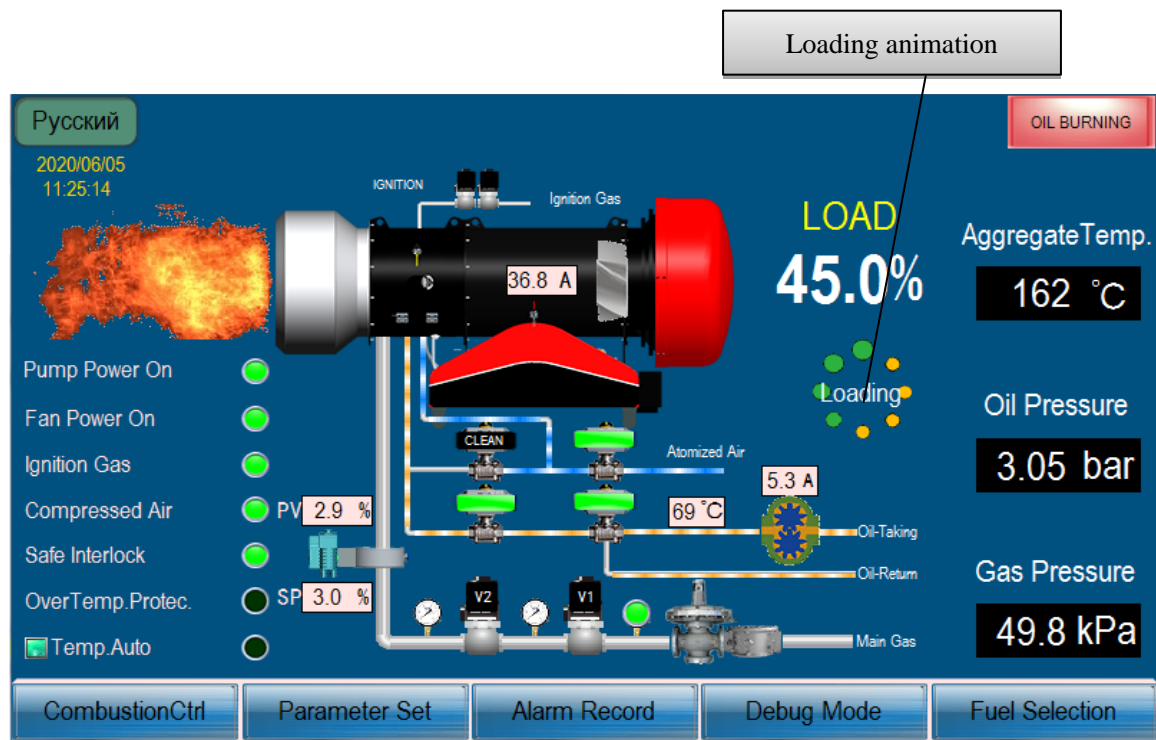


Diagram 32: The System Enters the Normal Burning Loading State

## 2、 Burner Shutdown Operation Under Oil Burning Mode

After the ignition is successful, click the “STOP” button and the system enters the automatic shutdown procedure. The system will control each part of the system to make the relevant shutdown operations according to the set shutdown procedure: first, the oil pump stops running, the main oil valve and circulating valve close, the fan opens after flame extinguishing; the then the oil pump reverses, the main oil valve and circulating valve will open and send the oil in the pipeline to the filter tank; and then the oil pump stops. the main oil valve and circulating valve close, the cleaning valve open to blow down residual fuel in pipes and spray guns.; finally the atomizing valve and cleaning valve closed, the fan continues to work for a certain period of time. The fan is always in the state of cleaning under the condition of shutdown process. After the finishing of cleaning, the system automatically resets to the pre-ignition state and the shutdown operation is completed. The above situation is shown in diagram 33-36.

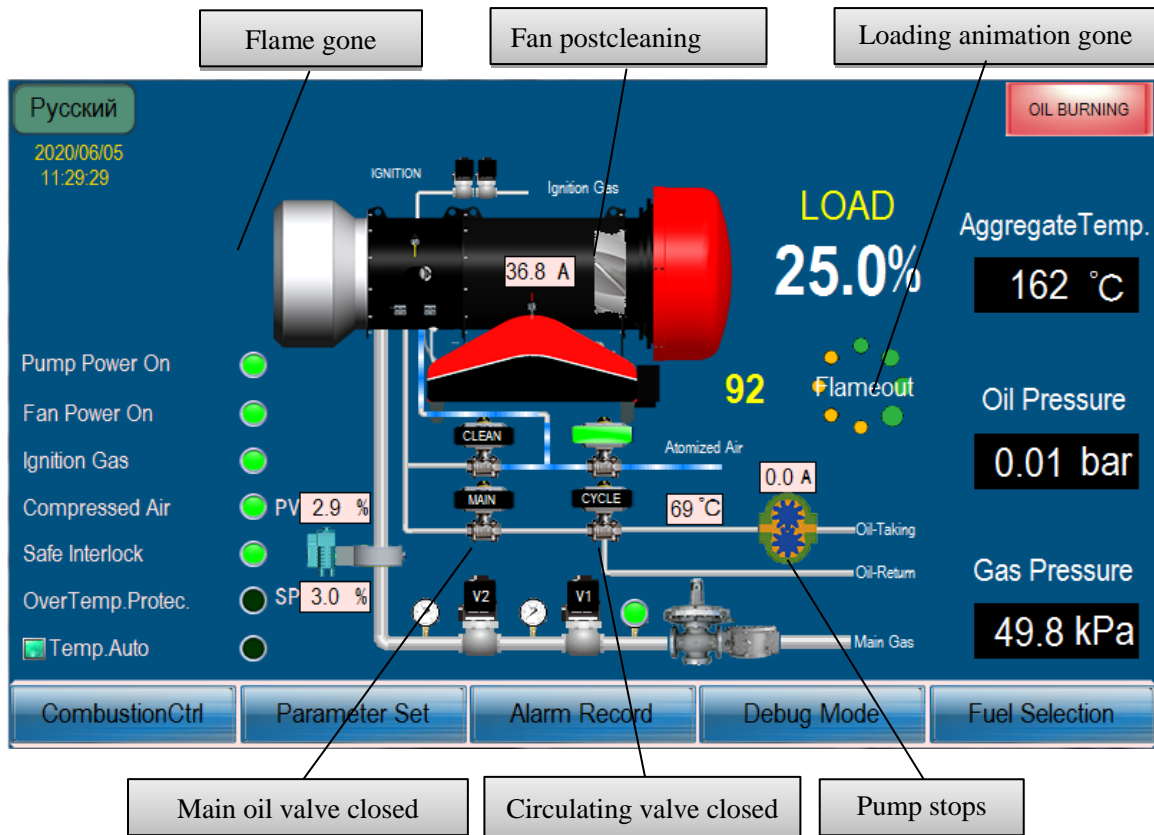


Diagram 33: The System Enters Shutdown State 1

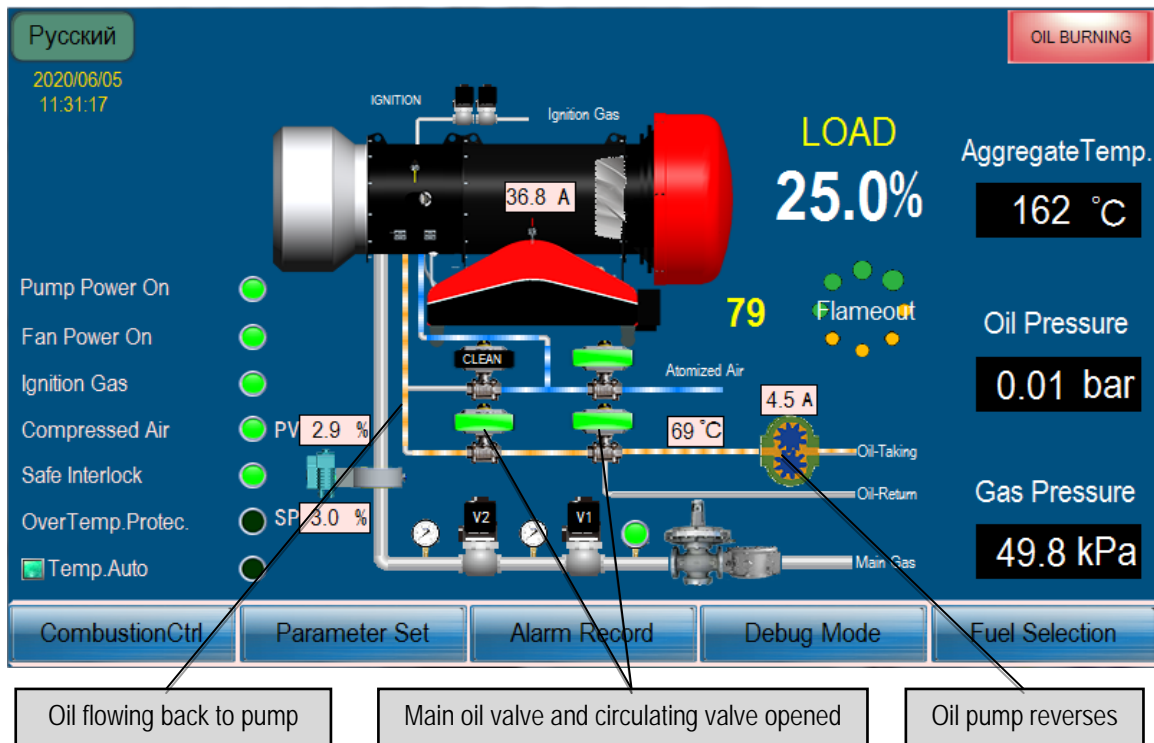


Diagram 34: The System Enters Shutdown State 2

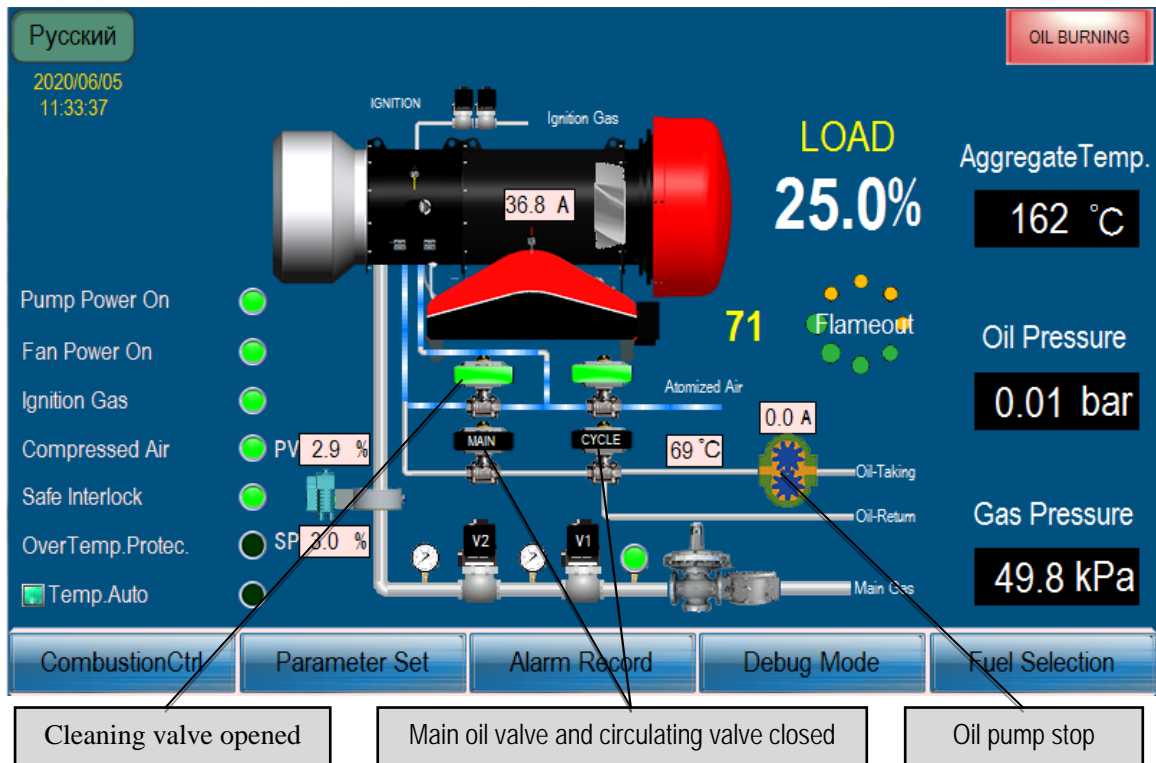


Diagram 35: The System EntersShutdownState3

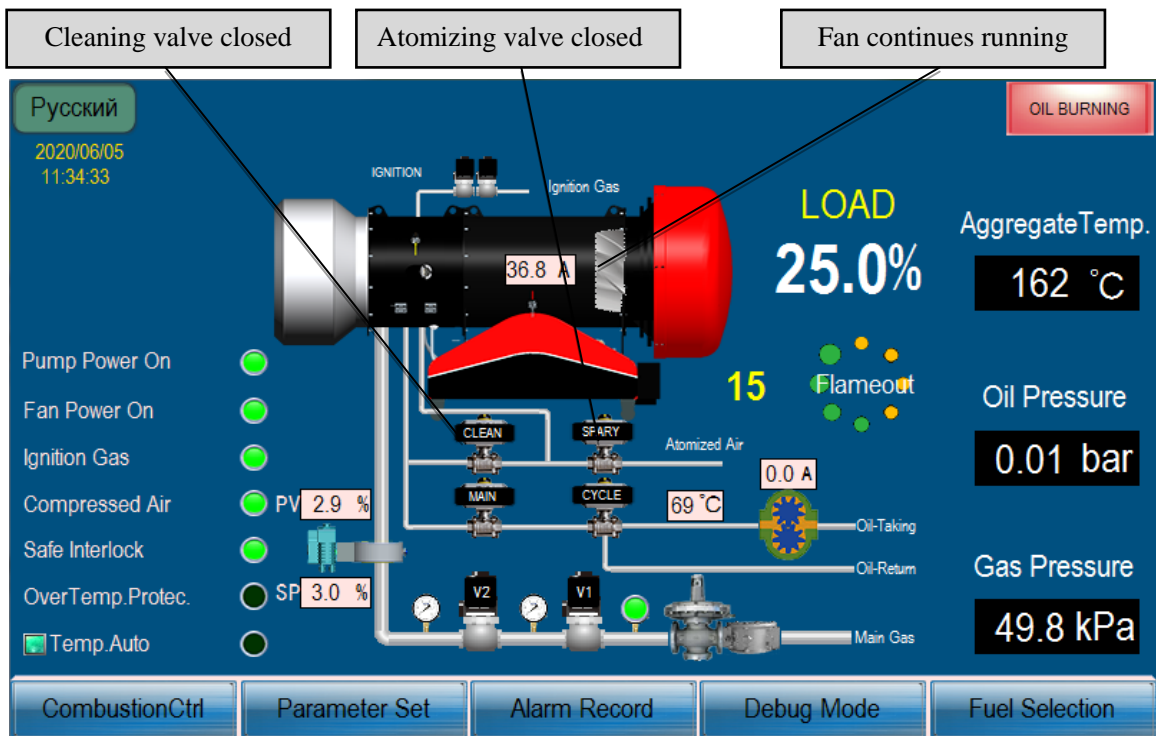


Diagram 36: The System EntersShutdownState4

## X、 Burner Working Under Gas Burning Mode

In the main interface of the burner, check and select fuel as gas combustion mode, adjust the induced draft fan to make the dryer drum negative pressure around 50-100 Pa. Click on the increasing and decreasing buttons to adjust the flame opening to 25% - 30% (default is 25%). After confirming that the system is fault-free, click the start button and start the automatic ignition program. When ignition is successful, it will go to normal loading stage so that you can make increasing and decreasing operation. If press “STOP” button, the system will shut down automatically according to set procedure

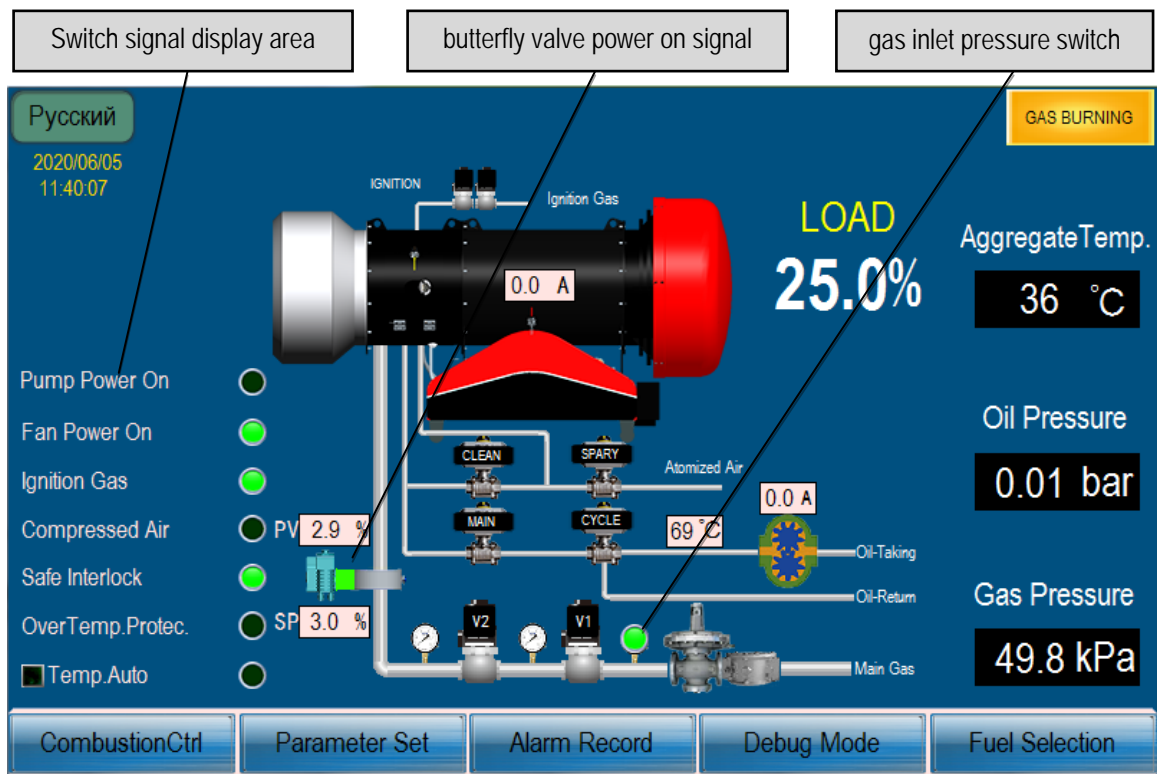


Diagram 37: Main Interface under Gas Burning Mode



**Notes** :Before starting, it is necessary to check that only the three indicator lamps should be power on: fan power on, gas pressure, safe interlock. The butterfly valve power on signal also should be on (diagram. 37), otherwise the system will not go to next step work.

During ignition operation, the relevant parts of the main interface of the burner will perform corresponding actions according to the set order and display information. The gas combustion mode has butterfly valve actuator self-inspection and gas train(namely: manifold valve or valve block )leakage detection procedures but the oil burning mode does not have above two producers, while the other interfaces display and description are the same as oil fuel part. The ignition and combustion process of gas is shown in diagram.38-45.

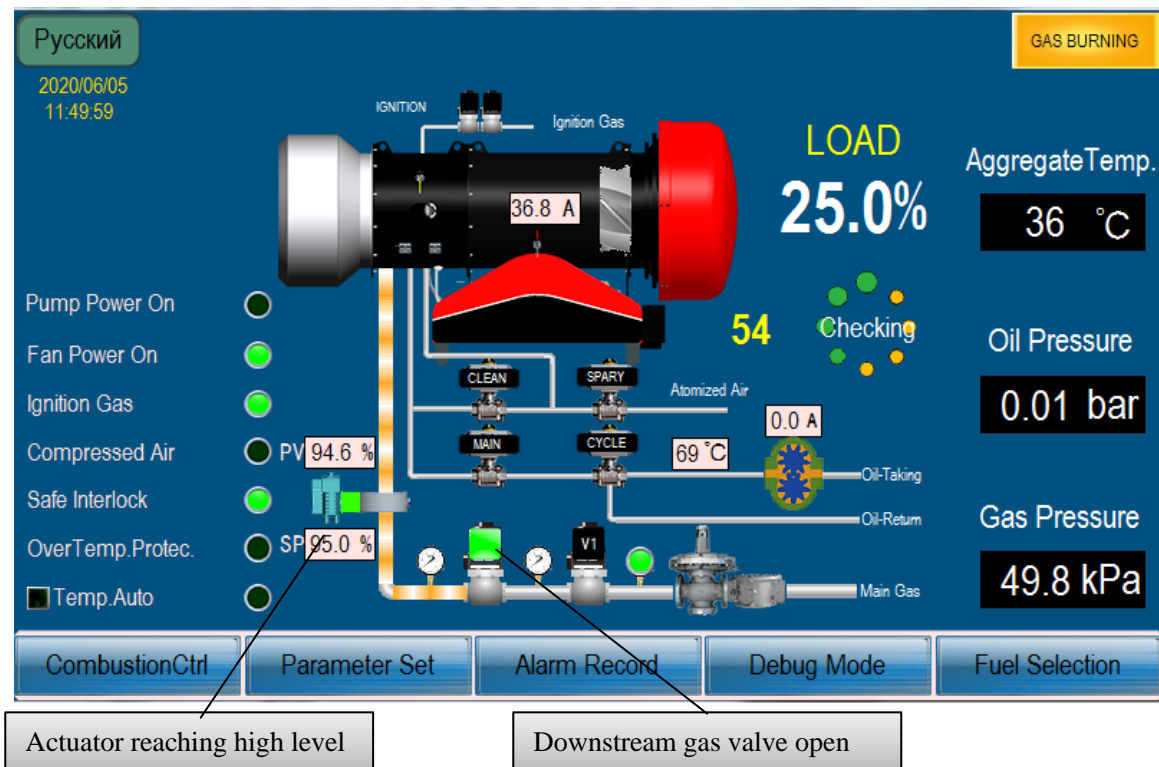


Diagram 38:Self-inspection StageUnderGas Burning Mode Interface 1

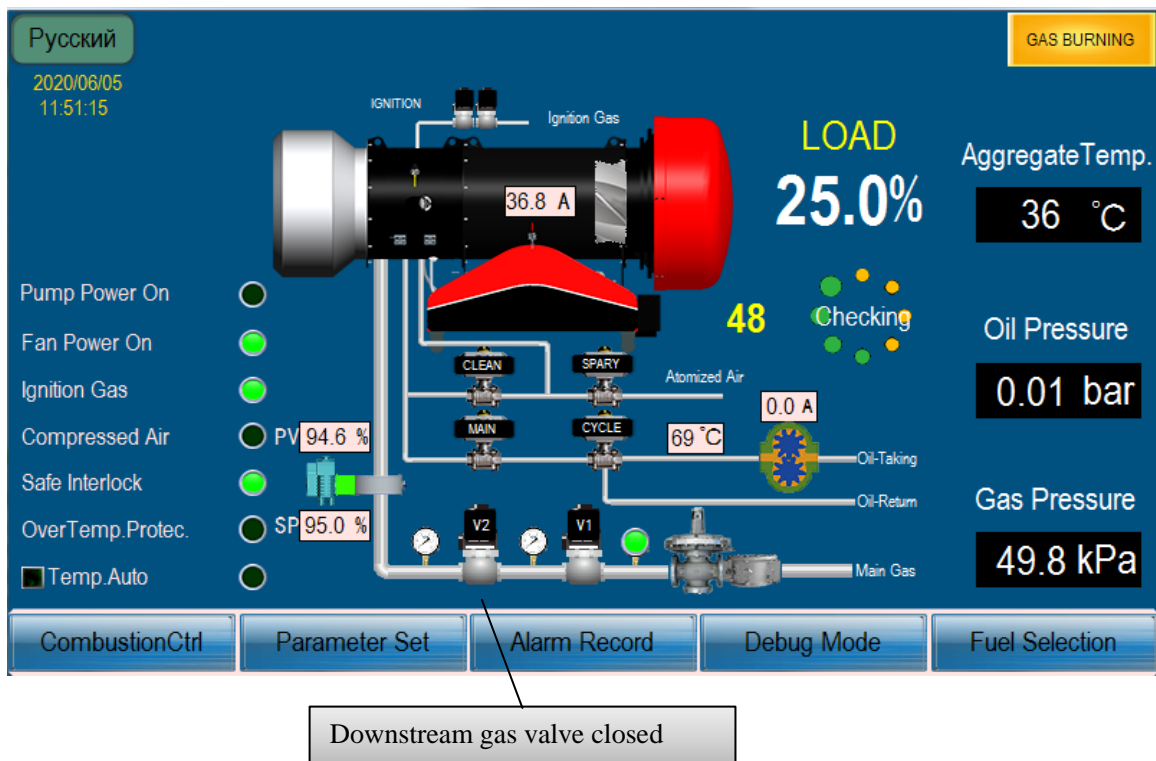


Diagram 39:Self-inspection StageUnderGas Burning Mode Interface 2

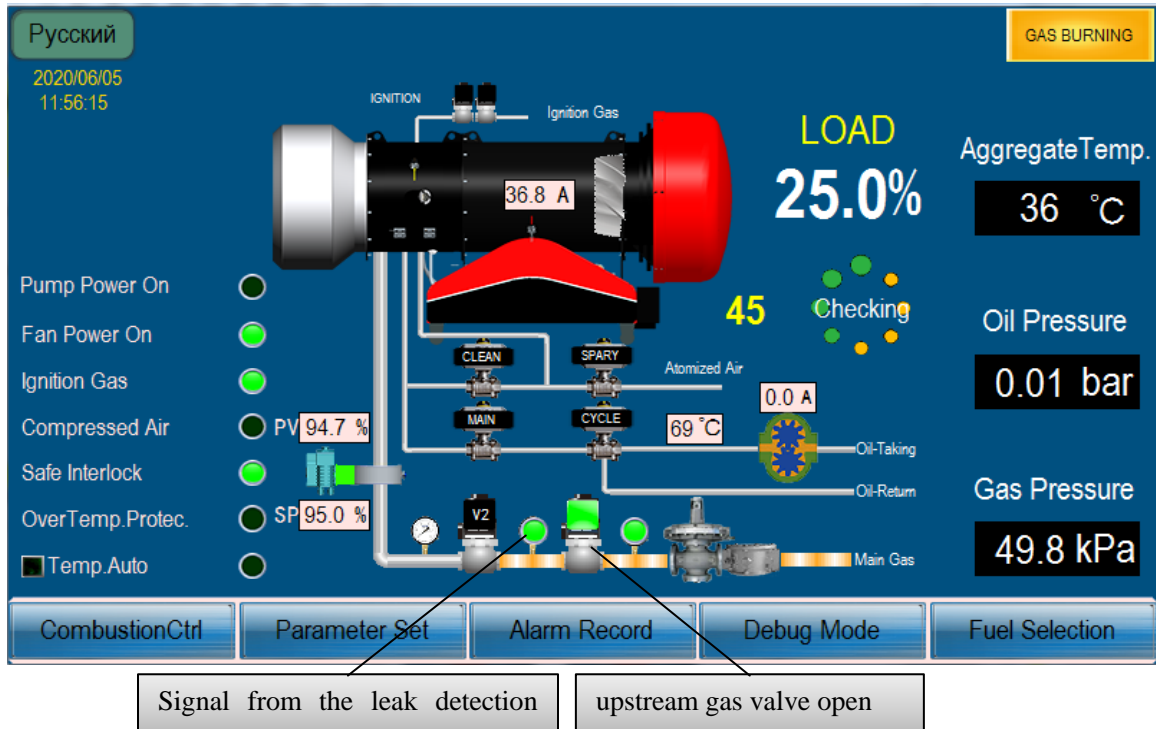


Diagram 40:Self-inspection StageUnderGas Burning Mode Interface 3



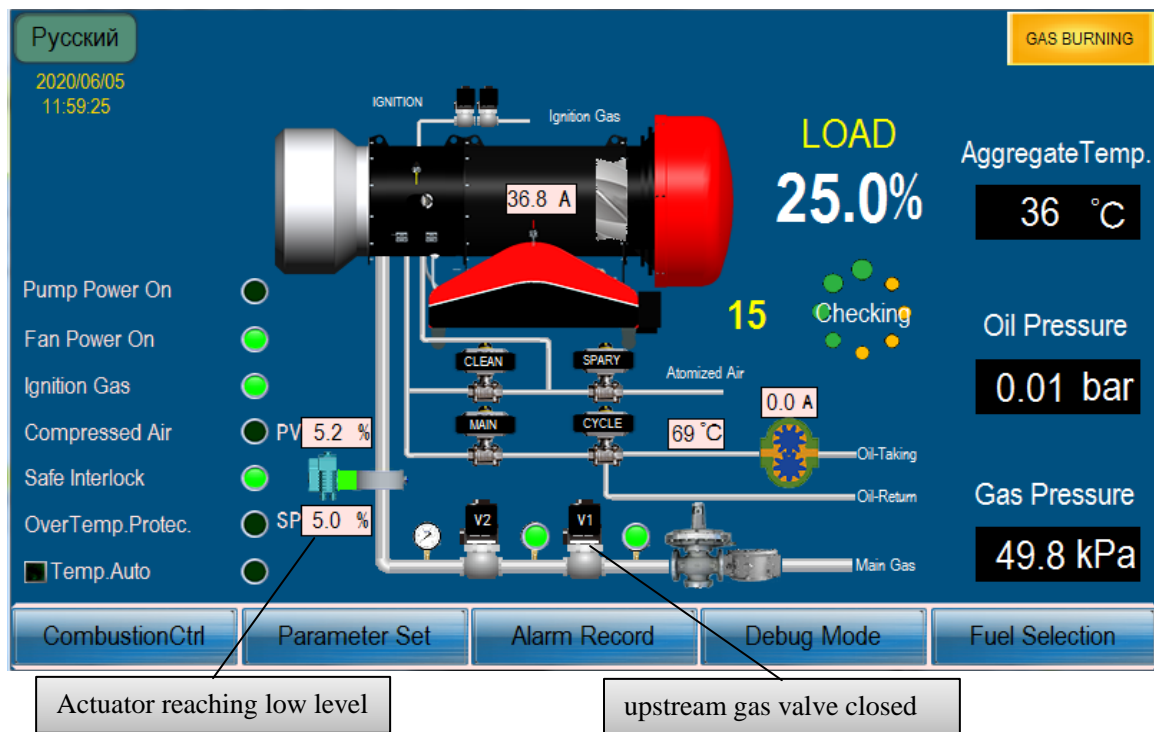


Diagram 41:Self-inspection StageUnderGas Burning Mode Interface 4

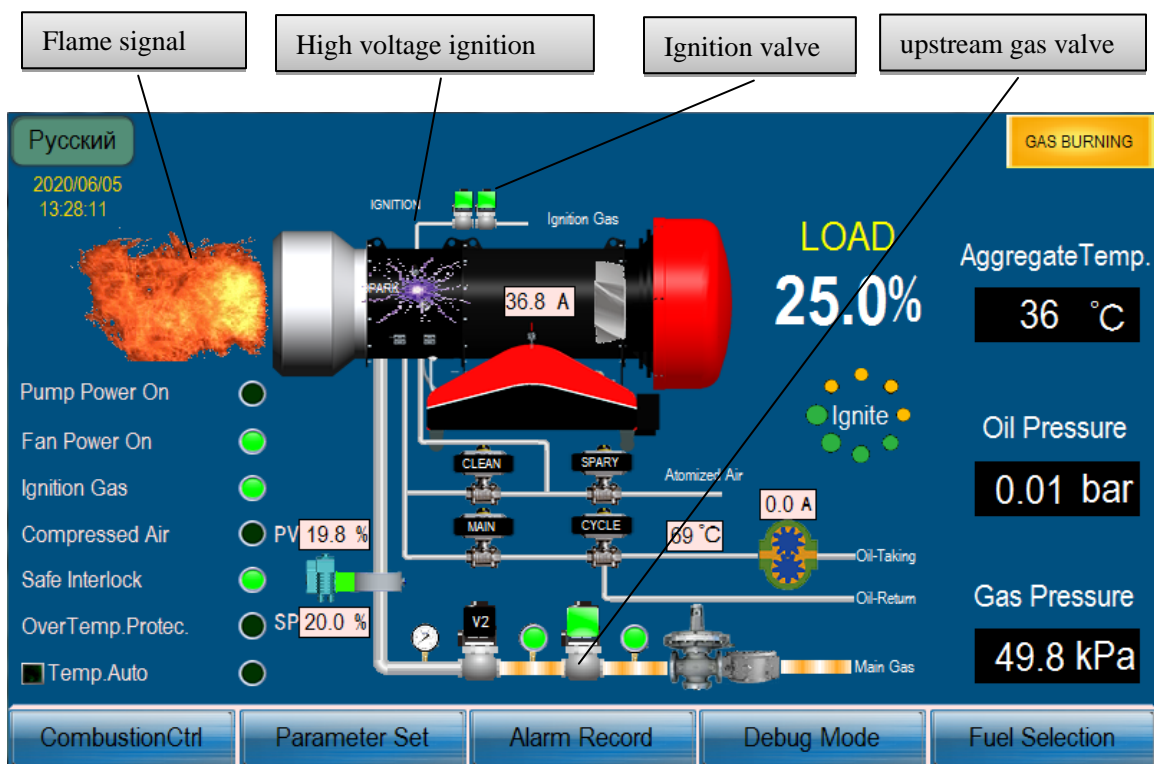


Diagram 42: IgnitionStageunderGas Burning Mode Interface 1

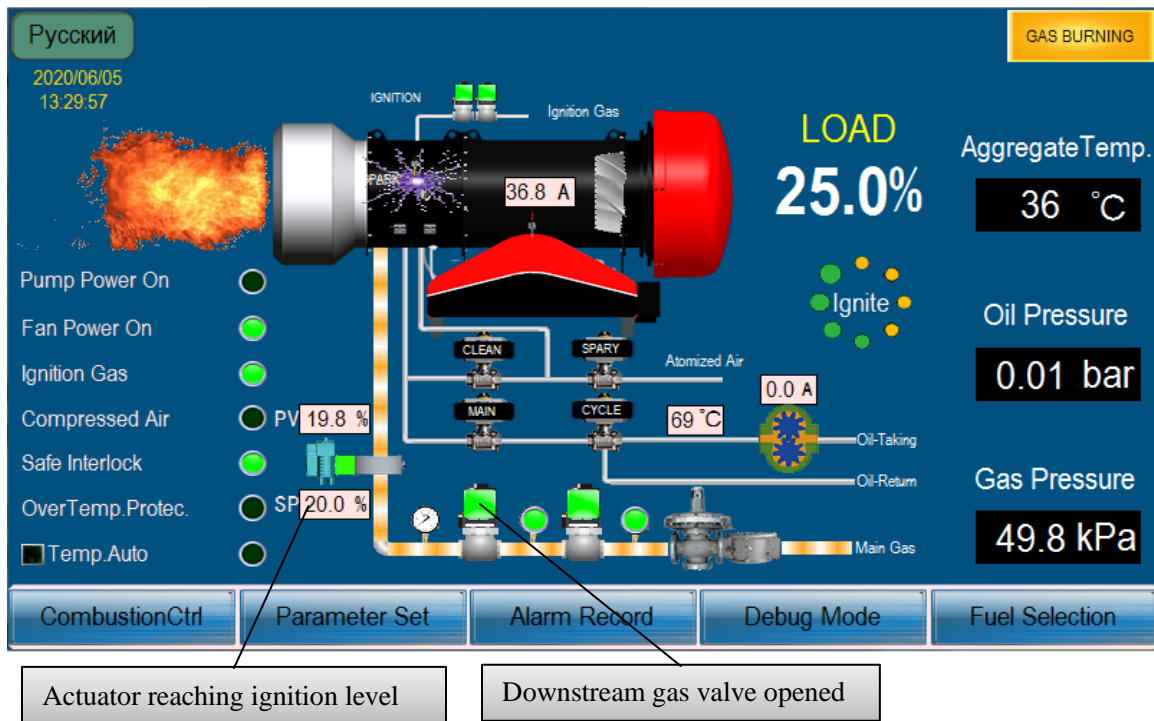


Diagram 43: IgnitionStageunderGas Burning Mode Interface 2

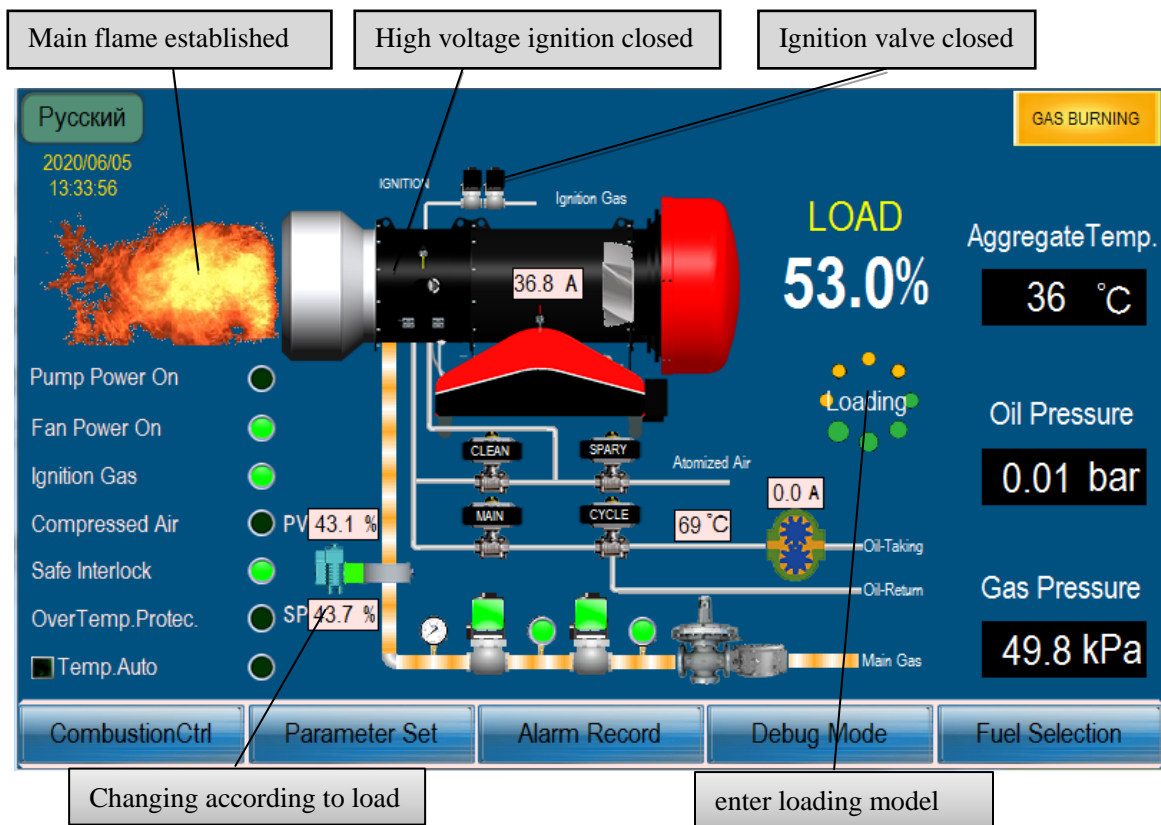


Diagram 44: Loading Stage under Gas Burning Mode Interface

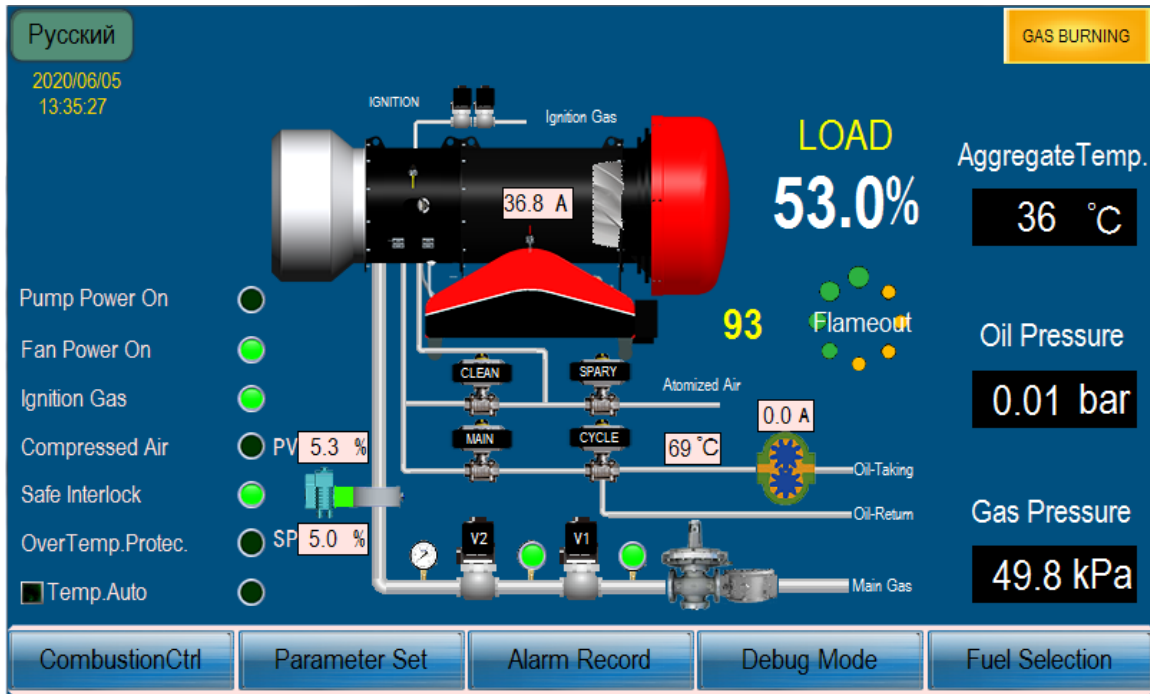


Diagram 45:Shutdown Stage under Gas Burning Mode Interface

## XI、Troubleshooting

### 1. If a fault occurs, please first check the following contents

( 1 ) Check whether the compressed air pressure is normal, whether there is too much condensation water in the air tank, and whether the air inlet valve of the burner pipe has been opened.

( 2 ) Check whether the pilot ignition gas is enough in the gas cylinder, whether the valve has been opened, whether the pipeline is not damaged and whether the ignition gas pressure is normal.

( 3 ) Check whether the oil tank has oil, whether the oil valve is opened, whether the heavy oil temperature is heated enough, whether the heat tracing pipe and valve have been fully heated, whether the heating switch of the spray gun is opened and whether the oil pump can run smoothly and normally.

( 4 ) Check whether the main gas intake valve is opened or not, check whether the main gas pressure meets the requirement, check whether the gas filter is blocked

( 5 ) Check whether all control devices are properly adjusted and whether the burner safe interlock channel is abnormal or not.

( 6 ) Check whether the electrical circuitous normal or not

If it is confirmed that the fault is not caused by external causes, the functions of each part of the burner must be checked.

## 2. Abnormal Problems and Elimination

The Fault Phenomenon	Possible Reasons	Measures
The burner ignition gun has no spark	Wrong position of ignition electrode	The distance between the ignition electrode is 3-5mm
	The ignition electrode has carbon deposition	clean it
	Ignition electrode insulation leakage	Replace or clean and keep dry
	Ignition transformer is damaged	Replace
	The ignition transformer has no power	Check the wiring and control system
Burner ignition gun has electrical spark, but it can't ignite	The gas solenoid valve was not opened	Check the wiring and control system
	gas pressure is low	Adjust the pressure to the specified value or change the gas cylinder
	connecting gas hose is broken	Replace
	The air speed is too large	Reduce the fan opening

( Connect the above-mention )

Fault Phenomenon	Possible Reasons	Measures
The ignition gas is ignited but the oil can not be ignited under oil mode	oil pressure is low	Increase oil pump speed or change oil pump
	The oil temperature is low	Increase oil temperature
	the pressure of compressed air is low	Check the pipeline
	Solenoid valve fault	Repair or replace
	spray gun temperature is low or nozzle blocked	Preheat the spray gun or clean the nozzle
	Ignition flame is too small	Appropriately increase the gas pressure to increase the flame
	too much water in the oil	Change the oil
3 minutes later, the flame goes out after it is ignited	The flame photocell cannot detect the flame.	Check and clean flame photocell or readjust to make the photocell aligns to the flame.
	Flame amplifier fault	Check the flame amplifier and connection lines.
	Flame photocell is damaged.	Replace it
	The buffer filter tank has air or filter screen is blocked	Exhaust or clean the oil filter screen
When normal combustion occurs, the flame is extinguished or flame flicker	oil or air pressure not steady	Clean the oil filter or Replace the oil
	No fuel oil/gas	Replace fuel tanks or refuel
	Flame photocell dirty	Clean it
	Carbon accumulates on the flame stabilizing disc	Clean it
	The fuel contains too many impurities	Replace fuel or remove sundries

( Connect the above-mention )

Fault Phenomenon	Possible Reasons	Measures
Discharge white smoke	excessive air volume	readjust to reduce air volume
	Oil pressure is low	Increase oil pressure & oil pump speed
	too much water in the oil	Replace oil or dehydrate it
Discharge black smoke	The air is too small or the air inlet is blocked	Check and adjust to increase air volume
	nozzle worn	replace it
	oil pressure is too high	Reduce oil pressure and oil pump rotation speed
	compressed air pressure is low	Check the compressed air valve and air compressor
	oil viscosity is high	Increase oil temperature to reduce viscosity
	Incorrect ratio of gas and air	check and properly adjust air volume or butterfly valve opening
	gas pressure before butterfly is out of tolerance	check pressure regulator and adjust pressure
Oil pressure abnormal	filter blocked	close valve, clean filter
	Oil pump worn	replace it
Under gas combustion mode: ignition gun is ignited but main gas is not ignite	main gas pressure is low	check main gas intake pipeline
	Gas valve fault	Repair or replace
	Gas filter blocked	Clean or replace filter element
	Ignition flame small or location is wrong	increase the ignition gun gas pressure appropriately or adjust the position
	Excessive Water Content in Main Gas Pipeline	eliminate

## XII、Maintenance and Overhaul



Warning: During maintenance and overhaul, must cut off the power supply of the burner and all control switches inside the control cabinet, Manually Shut off the compressed air pipeline and valve, oil supply pipeline and valve, gas pipeline and valve.

### 1、Maintenance

( 1 ) Remove the cover plate of the filter on the oil system and remove the filter element.

Clean the impurities on the filter screen to prevent the filter from blocking the oil road. Clean the filter daily when using dirty heavy oil.

( 2 ) Check the working conditions of the packing seal of the oil pump on the fuel line system of the burner. In case of oil leakage, the pressure cover of the packing seal can be adjusted properly. But it is not allowed to press down too tightly, so as to avoid the heat at the packing and the rapid wear of the seal ring

( 3 ) Regularly remove ash accumulation from flame detection tubes of the flame monitoring system.

( 4 ) Regularly check the wear of the probe of the aggregate temperature sensor, rotate the probe of the aggregate temperature sensor according to the wear of the probe, and ensure that the probe of the temperature sensor extends into the aggregate about 20mm.

( 5 ) Check whether there is coking and blockage in the flame disc of the combustion head of the burner. If there is coking, clean out the coke and ash accumulation.

( 6 ) Remove the cover plate of the filter in the gas pipeline, remove the filter element, clean it up and put it back in place.

( 7 ) Check the pollution on electrode of the ignition gun periodically and make sure that after cleaning, the gap between the electrodes is between 3 and 5 mm.

## **2、 Overhaul**

When inspecting the burner, if a small fault is found, the cause should be found out in time and the cause should be eliminated or handled. If the small fault cannot be handled, the burner should be repaired immediately.

( 1 ) Check the wear of the sealing filler at the oil pump seal; if the wear is serious, replace the sealing filler in time.

( 2 ) Check the wear of the probe of the aggregate temperature sensor. If it cannot meet the installation requirements, the aggregate temperature sensor should be replaced.

( 3 ) Check the oil pipeline system. If there are no other abnormal conditions but the pressure of the oil system fails to meet the operating requirements, the pump head may need to be replaced .

( 4 ) Check the nozzle wear of the oil spray gun in the combustion head. If it is seriously worn, it shall be replaced in time.

( 5 ) Please use original parts. When ordering parts, please provide the burner's nameplate number and model number.

( 6 ) When you need maintenance services, please contact the after-sales service engineer of the factory .



## Appendix: Fuel Requirements



Warning: the company strongly recommends the use of fuel oil and gas with the national standards. The use of non-standard fuel may cause the equipment not work stably and well, and may cause abnormal wear of some parts of the equipment. Please pay attention to it

### 1.Oil requirement

The company's fuel burners can use diesel, heavy oil and other fuel oil. In order to ensure that the burner is in continuous good operation, it is recommended to use standard fuel oil. If non-standard fuel oil is used, it is recommended to select and operate according to the following requirements

- (1).The calorific value of the fuel should be  $\geq 9000\text{kcal / kg}$ , and the components in the fuel should be homogenized, without acid or alkaline substances, excessive sediment and moisture
- (2).The viscosity of fuel oil flowing into the burner oil pump should be  $\leq 40\text{mm}^2 / \text{S}$  (or  $5^\circ \text{E}$ ). If the viscosity is too high, the viscosity should be reduced by increasing the fuel temperature;
- (3).The sulfur content in fuel oil should be less than or equal to 3%. Excessive sulfur content will cause serious environmental pollution and accelerate the wear of burner nozzle, oil pump and valve, and also aggravate the corrosion of flue, dust collector and induced draft fan in asphalt mixing plant.
- (4).Fuel flash point (closed)  $\geq 38^\circ \text{C}$ , low flash point will bring fire hazard
- (5).The mechanical impurities in the fuel are less than or equal to 1%. Excessive mechanical impurities will block the filter screen, cause the wear of oil pump and the blockage of fuel injection nozzle, which will affect the normal combustion

(6).The water content in the fuel oil should be as small as possible. If the water content is too much and segregated and gathered at the bottom of the oil tank, the water should be drained completely. Otherwise, if the water enters the oil path, the burner will not be able to ignite, or the flame will flash violently or even flameout

(7).Before using the fuel oil, the fuel oil should be heated to a temperature that meets the viscosity of the burner. In principle, it is better to heat the oil at a slightly higher temperature. A higher oil temperature can reduce the fuel viscosity, which is conducive to improving the combustion efficiency

(8).Please note:The oil pipeline from the oil tank to the oil pump connecting end of the burner shall be equipped with heating sleeve, and the temperature of the pipe section shall be controllable, so long as the fuel oil can flow to the filter end well. In daily use, this section of pipeline is easy to be overheated, which causes a large number of bubbles in the fuel oil in the pipeline, which causes the ignition failure or flameout of the burner. This is also a frequent fault in the initial stage of ignition. (9).There is no need to pressurize the oil at the inlet end of the oil pump of the burner. It is only necessary to ensure that the fuel flows from the oil tank to the connecting end.

(10).The output pipe of the oil tank should be at a certain height from the lowest part of the oil tank, which can precipitate impurities or precipitated water. The oil tank should have bottom drain valves. It is recommended to use two oil tanks to prevent the impurities from being sucked into the burner during oil unloading

(11).When two different fuels are used for mixed combustion, it is necessary to ensure that the two fuels are mutually soluble and cannot produce condensation reaction, otherwise they cannot be mixed. When changing the quality of the oil or changing the supplier, the sample

should be mixed in advance to ensure that the two kinds of oil can be mutually soluble or not react

(12).When the fuel contains acidic or alkaline substances, it will cause abnormal wear and scrap of the oil pump, and then corrode all parts in the fuel pipeline, especially the fuel flushing parts such as spray gun and valve. Please pay attention

**Special reminder: the abnormal wear of burner oil pump and spray gun caused by the use of non-standard fuel is not within the scope of free replacement.**

## **2. Gas Requirements**

In order to ensure the safe and correct use of natural gas, users are expected to make preparations according to the following requirements in advance. If there is any change, please communicate in writing in advance

- (1) The natural gas used shall comply with the national standard GB 17820-2018;
- (2) It is suggested that the calorific value of natural gas should be greater than or equal to 8550kcal / Nm<sup>3</sup>, and the gas supply pressure at the connecting end of burner should be maintained between 45-55kpa, which is recommended to be controlled at about 50kPa
- (3) Coal gas or other refining gases shall not be used
- (4) The diameter of the interface pipeline from the regulator station to the burner end of the user should be as large as possible to ensure that the gas supply flow can meet the requirements of the burner, and then at the end of pipe, the diameter is changed to the connecting size of the burner . (see the table below for details)

(5) Gas valve and filter should be installed at the end of the pipe section before connecting to the burner. It is recommended to install gas safety alarm device. Leakage detection and purging of the pipeline should be carried out before gas supply

(6) The above operation requires the company with local gas installation qualification to install.

(7) When using natural gas, if pipeline natural gas is used as pilot gas, the pilot gas pressure may need to be adjusted to 15-30kpa, otherwise, the pilot flame may not be easily ignited. Please pay attention to it

(8) The specifications and flow requirements of gas inlet end of each type of burner are shown in the table below

Burner Model	Matched asphalt plant	Max heating out ( MW )	Inlet Flange	Max gas consumption (Nm <sup>3</sup> /h)
LCR1000Q/LCR1000YQ	80tph	7.2	DN65PN10	730
LCR1500Q/LCR1500YQ	120tph	10.5	DN80PN10	1060
LCR2000Q/LCR2000YQ	160tph	14.2	DN100PN10	1430
LCR3000Q/LCR3000YQ	240tph	21.7	DN100PN10	2200
LCR4000Q/LCR4000YQ	320tph	26.8	DN125PN10	2700
LCR5000Q/LCR5000YQ	400tph	33.3	DN125PN10	3370

Note: the maximum output power mentioned above is based on natural gas meeting the above requirements.

Before using the burner, please read and be familiar with this manual carefully. If you have any unclear points, please contact the company to avoid the occurrence of faults and dangers. If you use non original accessories, serious dangerous accidents will occur. At the same time, you will give up the right of quality assurance and service.

